Economic and agricultural transformation through large-scale farming : impacts of large-scale farming on local economic development, household food security and the environment in Ethiopia

Bekele, M.S.

Economic and Agricultural Transformation through Large-scale Farming

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Impacts of large-scale farming on local economic development, household food security and the environment in Ethiopia

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Abbreviations

ADLI:	Agricultural Development-Led Industrialization
AGRA:	Alliance for a Green Revolution in Africa
AILAA:	Agricultural Investment and Land Administration Agency
AISD:	Agricultural Investment Support Directorate
AMC:	Agricultural Marketing Corporation
ANRS:	Amhara National Regional State
ASC:	African Studies Centre
ATA:	Agricultural Transformation Agency
ATT:	Average Treatment Effect on the Treated
BD:	Soil Bulk Density
BGRS:	Benshanguel Gumuz Regional State
CAADP:	Comprehensive Africa Agriculture Development Programme
AU:	The African Union
CADU:	Chilalo Agricultural Development Unit
CFSVA:	Comprehensive Food Security and Vulnerability Analysis
CSA:	Central Statistical Authority
CSI:	Coping Strategy Index
CSR:	Corporate Social Responsibility
DFID:	United Kingdom Department for International Development
DiD:	Difference-in-Difference
EEA:	Ethiopian Economic Association
EEPCo:	Ethiopian Electric Power Corporation
EHNRI:	Ethiopian Health and Nutrition Research Institute
EIA:	Environmental Impact Assessment
EPA:	Environmental Protection Authority
EPRDF:	Ethiopian People's Revolutionary Democratic Front
ETB:	Ethiopian Birr
FAD:	Food Production Decline
FAO:	Food and Agricultural Organization of the United Nations
FBS:	Food Balance Sheet
FDI:	Foreign Direct Investment
FDRE:	Federal Democratic Republic of Ethiopia

FEI: Food Energy Intake

FEWSN: Famine Early Warning System Network

FGD: Focus Group Discussion

FPIC: Free, Prior and Informed Consent

FSS: Food Security Strategy

GDP: Gross Domestic Product

GFSI: Global Food Security Index

GHG: Green House Gas

GHI: Global Hunger Index

GTP: Growth and Transformation Plan

HABP: Household Asset Building Programme

HCES: Household Consumption and Expenditure Survey

HDDS: Household Dietary Diversity Score

HFIAS: Household Food Insecurity Access Scale

HoAREC: Horn of Africa Regional Environment Centre

HoARECN: Horn of Africa Regional Environmental Centre & Network

HRW: Human Rights Watch

IDS: Institute of Development Studies

IFAD: International Fund for Agricultural Development

IFPRI: International Food Policy Research Institution

IIED: International Institute for Environment and Development

IPCC: Intergovernmental Panel on Climate Change

Kcal: Kilo Calorie

LANDac: The IS Academy on Land Governance for Equitable and Sustainable Development

LSLA: Large Scale Land Acquisition

MDG: Millennium Development Goals

MoA: Ministry of Agriculture

MoARD: Ministry of Agriculture and Rural Development

MoFED: Ministry of Finance and Economic Development

NEPAD: The New Partnership for Africa's Development

NMSA: National Meteorological Service Agency

NPV: Net Present Value

NTFP: Non-Timber Forest Products

OAU:	Organization for the African Union
OI:	Oakland Institute
ONRS:	Oromia National Regional State
PADEP:	Peasant Agricultural Development Extension Programme
PADTES:	Participatory Demonstration and Training Extension System
PASDEP:	Plan for Accelerated and Sustained Development to End Poverty
PLC:	Private Limited Company
PRAI:	Principles for Responsible Agricultural Investment
PRSP:	Poverty Reduction Strategy Programmes
PSM:	Propensity Score Matching
PSNP:	Productive Safety Net Programme
S&P:	Shampoorji and Pallonji
SEM:	Standard Error of Mean
SIDA:	Swedish International Development Agency
SLA:	Sustainable Livelihood Approach
SNNP:	Southern Nations, Nationalities and People's Region
SOC:	Soil Organic Carbon
SSA:	Sub-Saharan Africa
TGE:	Transitional Government of Ethiopia
TLU:	Tropical Livestock Unit
TNRS:	Tigray National Regional State
TPLF:	Tigray people’s Liberation Front
WADU:	Wolaita Agricultural Development Unit

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Dedicated to

Naomi Maru Shete. I miss you always!

CHAPTER 1: INTRODUCTION

1.1 Positioning Large-scale Farming in the Current Debate

Large-scale farming, also known as 'land grabbing'[1] by those who view the practice negatively, or as large-scale land acquisition by those who maintain a neutral position, is not a new phenomenon (Jones & Khanna 2006; Wilkins 2008). Soaring grain prices in 2007–2008 (GRAIN 2008; Von Braun & Meinzen-Dick 2009; Deininger *et al*. 2011; Rahmato 2011), coupled with fears among governments of some food-importing countries about not being able to access sufficient quantities of food for their citizens, fuelled the quest for large-scale arable land acquisition (Matondi *et al*. 2011). In addition, the goal of increasing the use of biofuels (Olanya 2012), the growth of carbon markets in response to climate change (Vidal 2008; Brittaine & Lutaladio 2010; Benjaminsen & Bryceson 2012; Corson & MacDonald 2012), and the convergence of food–energy–climate crises (Borras & Franco 2012; McCarthy *et al*. 2012) have spurred renewed interest in acquiring large swathes of land in the developing South. On the other hand, Zoomers (2010, p. 433–440) argued that the driving processes for the global 'land grab' are complex and extended the drivers of global land acquisition into seven different processes. She added four further factors: the development of 'Special Economic Zones (SEZ)' for international investments; land acquisition for construction of large-scale resorts for 'tourist complexes'; land acquisition for 'residential migration' by retired people from developed countries; and land acquisition in their country of origin by immigrants living in developed countries.

The volume of Foreign Direct Investment (FDI) flowing to the agricultural sector has increased substantially since 2007, following the tripartite crises of food, finance and energy (Cotula & Vermeulen 2011; Borras & Franco 2012; Makki 2012). Investors and, in some cases, governments of countries exposed to global market volatility explored land-based investment opportunities in countries comparatively rich in natural resources (Von Braun & Meinzen-Dick 2009; De Schutter 2011). This has manifested primarily in a rapidly rising rate of

[1] Land grabbing is a term used to refer to commercial land transactions and speculations by (trans)national investors for the production of, mainly, food and biofuel and for the extraction of other land-based resources by disposing of local and indigenous people (Borras & Franco 2012). While the term 'land grabbing' is largely perceived as something illegal, case studies from different countries show that host governments play active roles in the land transactions, and hence they can be unfair but not illegal (Kaag & Zoomers 2014).

transboundary investments for plantation monoculture, notably in the developing South. Due to the abundance of cheap and agro-ecologically suitable land, Sub-Saharan Africa (SSA) in particular has been considered the primary target of these new land-based investments (Deininger *et al*. 2011; Anseeuw *et al*. 2012). Ethiopia is one of the top five countries in SSA (Schoneveld 2011) to welcome investment in large-scale farming in a bid to modernize its agricultural sector. Although farmlands were handed over to private investment in Ethiopia prior to the 2007–2008 increased global demand for farmland, promotion of the availability of farmlands for foreign capital began in 2007 (Rahmato 2011). In 2008, the government actively promoted and facilitated transfers of farmland to investors by establishing the Agricultural Investment Support Directorate (AISD)[2] (FDRE 2010). This is manifested in the rapid rise in agricultural FDI flows into the country, which have increased from a mere US$ 135 million in 2000 to in excess of US$ 3 billion by 2008 (Weissleder 2009).

1.2 The Research Problem

Diverse views are voiced by different organizations, researchers and activists about the current wave of global large-scale land acquisition. The World Bank (2010), for instance, has argued that large-scale investment in agriculture will result in a win-win solution for both investing and hosting countries, provided that inward investment is well managed. The argument is based on the assumption that large tracts of idle land are available globally that can be used for agricultural investment and offer potential for recipient countries. Borras *et al.* (2013, p. 169) called this view a 'regulate to facilitate land deals' position and it is also held by mainstream economists. De Schutter (2011, p. 250) argues that although inward investment may be well managed, it has 'high opportunity cost and less poverty-reducing impact' compared with situations in which the land is put to an alternative use by the local farming community.

The Washington-based International Food Policy Research Institution (IFPRI) has argued that large-scale land deals are inevitable and mechanisms should be sought to maximize

[2] The Agricultural Investment Support Directorate (AISD) was re-structured in late 2013 and now goes under the name of the Agricultural Investment and Land Administration Agency (AILAA). The Agency is directly accountable to the Minister of Agriculture. Under its previous structure, the AISD reported to the Deputy Minister of Agriculture and operated with fewer than 35 staff. The Agency is expected to have about 165 staff in its new form. In all discussions hereafter, the term AILAA is used throughout the text, and not AISD.

opportunities while mitigating negative impacts (Von Braun & Meinzen-Dick 2009). Supporters of the win-win position have developed Codes of Conduct (Von Braun & Meinzen-Dick 2009), Voluntary Guidelines based on a human-rights approach (FAO 2012a), Principles for Responsible Agricultural Investment (PRAI) (World Bank 2010, xxvii) and Principles for Responsible Investment in Agriculture and Food System (Committee on World Food Security 2014) to ensure investments in large-scale farming achieve win-win benefits. De Schutter (2010) has argued that the World Bank's PRAI are simply instruments to 'destroy the peasantry responsibly' and has suggested promoting smallholder-focused agriculture that has pro-poor and poverty-reducing effects. He is supported by activist groups that warn that the development model of large-scale plantation agriculture displaces local people from their land, degrades the environment and undermines local food security (Via Campesina 2008; Mersha 2009; McLure 2009; Rice 2009; Fitzgerald 2010; Grojnowski 2010; Mihretie 2010), and thus advised to 'stop and rollback land grabbing' (Borras *et al.* 2013, p. 169).

Studies in other countries and in Ethiopia have indicated the risks of large-scale commercial farming on the local population and the environment, asserting that the benefits of investment do not compensate losses. Studies by Dauvergne & Neville (2010), German *et al.* (2010), Rahmato (2011) and Shete (2011) indicate the possible negative impact of land-use change driven by large-scale farming on the environment but do not quantify actual effects. Similarly, Matondi *et al.* (2011) reported the potentially negative impact of land transfers for biofuel feedstock production in Africa on food security due to soaring food prices. Similarly, Von Braun and Meinzen-Dick (2009) have explained the potential risks of growing land acquisitions by wealthy nations on local food security due to the unequal negotiating powers between poor and wealthy nations when making land deals. The same report also mentions the potential contribution that investments in large-scale farming could have on the economic development of poor countries. The 2009 IIED, FAO and IFAD report entitled 'Land Grab or Development Opportunity' indicated the risks to local-level food security of losing key land resources (Cotula *et al.* 2009).

An argument that is often put forward in favour of additional investment in agriculture is the employment it creates. However, the contribution of large-scale farming through employment generation in Ethiopia is minimal due to the seasonal nature of the jobs and low wage rates. But incomes from employment in plantation agriculture serve as a valuable means of extra income generation for immigrant farmers with small landholdings back home and also for the landless in certain areas (Oakland Institute 2011; FAO 2012b). Plantation agriculture has created 0.005 jobs/ha in Ethiopia (Deininger *et al.* 2011), 0.014 jobs/ha in Brazil (FAO 2012c), 0.351 jobs/ha in the Democratic Republic of Congo (Deininger *et al.* 2011) and 0.006 jobs/ha in Madagascar (Andrianirina-Ratsialonana & Teyssier 2010). Smallholder farming generates comparatively more jobs per ha than large-scale farming (FAO 2012c). The impact of large-scale land acquisition on income generation through employment increases if there is linkage between large-scale and small-scale farms through contract farming, as is the case in Ghana (Vath & Kirk 2011). The FAO (2012b) reports that plantation agriculture in Ghana and Uganda have demonstrated a positive and significant contribution to the number of jobs generated for local people, but that these were not sustainable as companies replaced labour-intensive work with capital-intensive technology over time, and wages remained low.

In Ethiopia, studies by Rahmato (2011), Oakland Institute (2011), Shete (2011), Human Rights Watch (2012) and Lavers (2012a) have all reported that expropriation of land resources to investors poses serious challenges to local-level food security, but do not quantify the size of the impact on local people's incomes and food-security status. In a more specific study conducted at one of my research sites, Bako Tibe District, Fisseha (2011) and Rahmato (2011) discuss the institutional framework established and the processes involved in leasing out farmlands to investors in Ethiopia. Both scholars documented in various regional states the land identified for large-scale agricultural investment. More specifically, they collected the views of different stakeholders about Karuturi's farm in Bako Tibe District by employing a qualitative research approach. Both findings mention that the government followed an open-door policy of leasing out farmland to investors and they note that there was no community consultation before the land was transferred to Karuturi in Bako. As a corollary to this, conflicts between the investor and the local people were frequently witnessed in the district. Their findings further reveal that local people depended on the Bako Plain for grazing their cattle; however, in 2008,

this area was transferred to Karuturi, without compensation for the locals. The loss of grazing land was undermined the livelihoods of the local people in Bako.

Although these studies have attempted to show the outcomes of large-scale land acquisition, the depth of understanding of the subject remains limited. This is partly because the studies have merely argued that the impacts are likely to be in a particular direction, based on reasoning, and have focused on explaining the potential impact and assessing the implications of large-scale land acquisition instead of quantifying its actual effects on food security and the income levels of local people. Further, Oya (2013a & 2013b) noted that the 'land-grab' literature is growing very fast, but has limitations in terms of using standard impact assessment methodologies. He concluded that methodological rigour should not be considered as 'a luxury' for a subject which is politically important. This dissertation will make some important methodological contributions by filling up the gaps identified by this researcher.

Studying impact is a very important subject for policymaking. But, attribution of impact to an intervention is a difficult, though not impossible exercise. First, the literature on the evaluation of investment in large-scale farming is presented in three different narratives: win-win, win-loss and loss-loss. The narratives try to compare the returns from investment for two broad categories of actors – the investor and the recipient of investment. Since impact could be different for different groups of people in the recipient countries, I argue that these narratives oversimplify the reality. In this dissertation, I try to examine the impact of large-scale land acquisition at different levels among the recipients of the investment and deepen the burgeoning debate from a mere win-win narrative to more complicated, but closer to reality narratives. These are: win-win-win, win-loss-win, win-loss-loss and loss-loss-loss narratives.

In this study, the recipients of investment are disaggregated into two categories – the local people (and/or the district/region) providing land, and the national/federal government that acts as a *referee* in the land-acquisition process. Thus, I examined impact at a local level and at a national/federal level to see if there are winners and losers among these two groups of actors, who are recipients of the investment, in addition to a third actor, i.e. the investor. Second, studies that attempted to show the impacts of land acquisition for large-scale farming focused

on explaining potential impacts and drawing implications, rather than quantifying actual effects on the local population and the environment. Cotula *et al.* (2009) have also noted the lack of full understanding to date of the scale of the issue and the ways that large-scale farming exacerbates the food insecurity of local people. This dissertation, therefore, aims to fill this lacuna and addresses three key research questions:

1) What are the contributions of large-scale farming to local economic development and to national/federal government in Ethiopia?
2) What are the impacts of large-scale farming on household's food security and income levels?
3) What are the effects of land-use changes induced by large-scale farming on selected environmental parameters?

I have formulated three propositions in a bid to answer the key research questions of this study. The propositions are derived from the literature.

1) ***Proposition I:*** Impact of large-scale farming is determined by the location of the farm. The expectation here is that households in regions with relatively densely populated settlement and who have customary land-tenure rights to communal grazing lands will likely experience the negative effects of large-scale land transfers. Challenges faced by investors will also likely to be different in lowland and highland regions that determine their success/failure. This proposition was built on a number of other studies that contended in a more general terms that local conditions determine impact of large-scale farms. For example, the World Bank (2010) reported that impacts of large-scale farms varies depending on the level of public investment in infrastructure and technology, and population density of the country. In a more general manner, Li (2014) and Smalley (2014) has also argued that local condition will determine the outcomes from large-scale farming.
2) ***Proposition II:*** Impact of large-scale farming is determined by the type of agricultural commodities produced. Production of food crops, biofuel feedstock and crops for industrial input are expected to have different impacts on local population, local economy and the local environment. This proposition was developed based on the exploratory research finding of Shete (2010) who pinpointed that the type of crop that companies produce may have implications to the livelihood of the local population. The

World Bank (2010) has also reported that employment generation is by and large dependent on the type of crop that investor produce. Similarly, Schoneveld (2011) argued that, compared to food crop investment projects, biofuel investment projects threaten local population food security, which again pinpoints the need to further analyse the impact of the type of crop produced on impact at local level.

3) ***Proposition III:*** Performance of large-scale farming is determined by the origin and farming experiences of the investor. Foreign investors are generally hypothesized to have the needed capital, knowledge and technology compared to domestic investors. It follows that impacts of large-scale farming on local economy, a household's food security and local environment are expected to be different for foreign and domestic investors. Li (2014) also argued that the profile of the investor determines the outcome of large-scale farming.

As any research should be limited in scope, this dissertation has focused on answering the three major propositions outlined above. First, impact study can be done at various levels. This study did not go into the analyses of impacts of large-scale farming on intra-household levels, but rather analysed the impacts of the intervention at household level considering members of the household as one unit. Second, there are different business models that large-scale farming companies can adopt: (1) large-scale farms adopting highly mechanized plantation monoculture systems in which smallholder farmers are incorporated into the large-scale farm as providers of human and natural capital; (2) a contract farming and out-growers model that incorporates smallholder farmers along the value chain of production to consumption; and (3) in the ideal and extreme case, smallholder farmers as shareholders in the large-scale farm investment. The different business models, at least theoretically, have different impacts on local economic development in general and on the local population in particular.

The data for this dissertation has come from case studies that adopted mechanized large-scale plantations, and the impact of large-scale farming discussed throughout this dissertation should be understood as taking this context into account. One may argue here that the impacts of this type of business model can be established in advance and that they are unlikely to create much employment, generate little wage incomes, and thus may not improve the food security status of local population compared with a contract farming business model, which enhances the

productivity of smallholder farmers and generates more wages. While including some cases that adopt a contract farming business model would add value to this study, and their exclusion may be considered as one of the limitations, the selection of case studies that adopted mechanized large-scale plantations was done on the following grounds: (1) the government of Ethiopia advocated this type of business model under the narratives of creating employment and improving local food security, and thus there is an urgency to test this narrative empirically and influence government policy; (2) the impacts of large-scale farms that adopt mechanization depends largely on the level of mechanization of the different aspects of the production processes, and impacts cannot be pre-established; and (3) during the start of this study, there were few cases of large-scale farms that adopted contract farming business model in Ethiopia (e.g. state-owned sugar plantations and private-owned biofuel development in Oromia regional state) whose impacts were studied by some PhD students (cf. Schoneveld 2013 and Wendimu *et al.* 2015) and other scholars (e.g. Dyer undated).

Third, the argument on the efficiency of scale of farming remains unsettled. Some argue that smallholder farmers are efficient (Berry & Cline 1979; Ellis 1993; Sobhan 1993; Van Zyl *et al.* 1995; Barrett 1996; Deininger 1999; Kimhi 2003; Lipton 2005; Eastwood *et al.* 2010), support a Chayanovian model of development through re-distribution of land and suggest a profound policy support to family-operated small farms (Lipton 1977; Berry 1972; Bardhan 1973; Griffin, 1974; Rosset 1999; Griffin *et al.* 2002; Birner & Resnick 2010). Others argue that smallholder farmers are not as efficient as large-scale commercial farms and support the promotion of large-scale farming (Zaibet & Dunn 1998; Kevane 1996; Collier 2008 & 2009). While it is clear that this study is about impact of large-scale farming on local economic development, the approach I have followed in the dissertation does not compare smallholder farming to large-scale farming. Rather, in this study, I compare the impacts of land-use types on local economic development in two time periods, i.e. the land-use type before the intervention of large-scale farming (this could be crop land, grazing land, bush/forest land, etc.) and the current land use by the large-scale farm. Therefore, the findings of this study should be considered against this background information regarding the level of analyses, the business model and the land-use types.

1.3 Context and Case Study Overview

Three regional states in Ethiopia, namely, Oromia, Benshanguel Gumuz and Gambella Regional States, were selected for two important reasons: (1) as discussed in the preceding section, massive agricultural investment projects flowed to these regions and studying impacts of intervention in these regions will potentially help improve agricultural policies; and (2) the regions chosen have different population density, level of infrastructure development, market integration, local livelihood patterns, natural resource base, skilled and unskilled labour availability, etc. Investment in large-scale farming under such different regional settings will not only have differential impacts on local economic development, but also differing degrees of success or failure. Oromia Regional State provides information on the impacts of large-scale agricultural investment in the highlands[3] of Ethiopia. Its dense settlements are smallholder dominated and it enjoys a relatively better infrastructure and market integration, better availability of skilled and unskilled labour, and a statutory dominated land tenure system. While Oromia can be considered as a densely populated and smallholder dominated region, it is by no means representative of other highland regions of the country, and the aim here is to have an overview of the differential impacts of large-scale farming when investment is made in the highlands and lowlands. The other two regions represent the lowland parts of the country where a customary land tenure system dominates with sparsely populated agro-pastoralist communities who practise small-scale crop production through shifting cultivation using hand and hoe. Availability of labour, infrastructure development and level of market integration is very low in these regions, which will give us the opportunity to compare impacts with the investment in the highlands. The selection of these three regions (Figure 1.1) helps to address the issue of differential impacts discussed under *proposition I*, above.

The case studies (large-scale farms) in these regions were selected explicitly guided by the three propositions discussed earlier. The case studies and the households living around the vicinity of the large-scale farms were used as a unit of analysis. The types of case studies that I have included in my study are those investment projects that produce food crops (e.g. maize),

[3] Highlands are those parts of Ethiopia that have altitudes ranging between 1500 to 2500 m above sea level. This covers 43% of 1.13 million km^2 of the country. With less than 50% of the total size of the country, the highlands are homes for 85% and 80% of the country's human and livestock population respectively, and constitute 95% of total cultivated land in the country (World Bank 2004).

industrial crops (e.g. cotton) and biofuel/energy crops (e.g. pongomia). These case studies are expected to reveal different impacts due to the differences in crop commodities produced, and hence provide a representative picture of the outcomes of large-scale farming in the Ethiopian context. In addition, the case studies selected include both foreign and domestic investment projects in order to test the proposition postulated earlier. Detailed descriptions of the case studies are presented below.

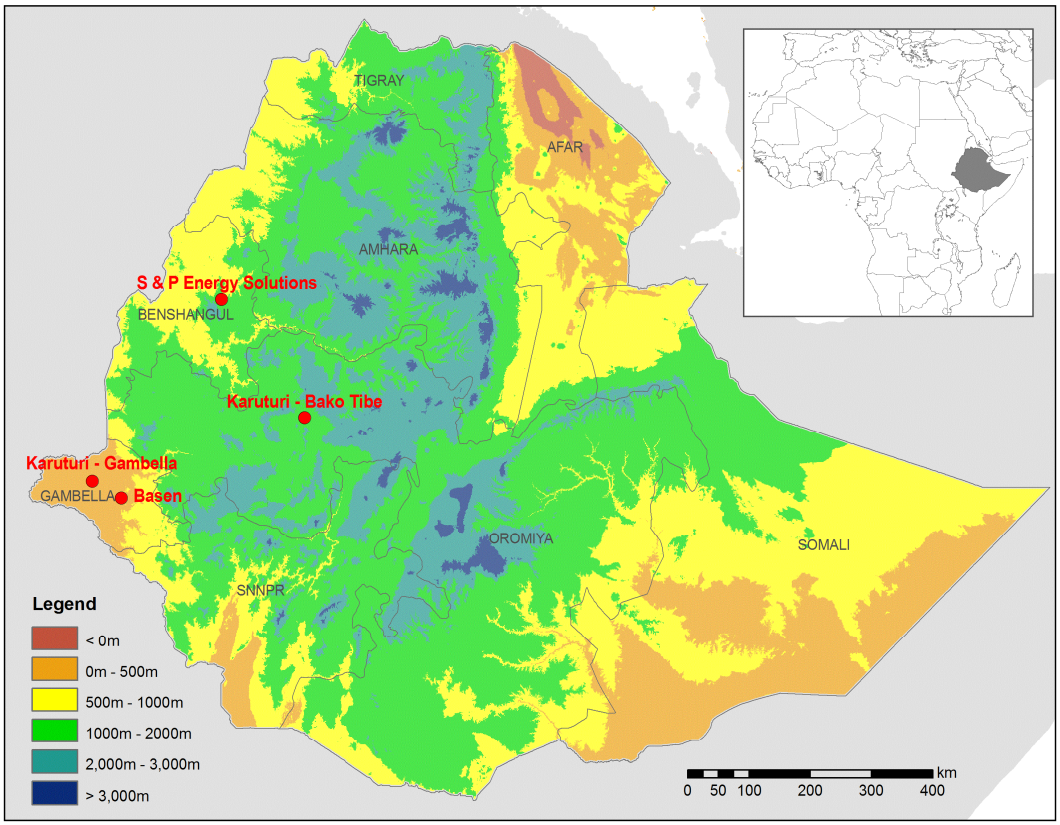


Figure 1.1: Map of study regions and case studies

Case one: Oromia Regional State (Karuturi Agro Products PLC in Bako Tibe District)

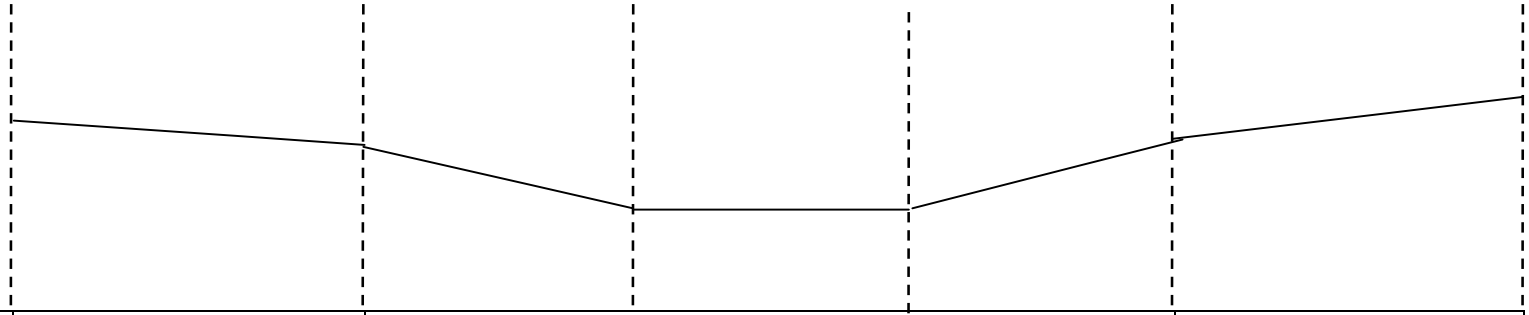
Oromia Regional State is the most populated region that accounts for about 32% (23.7 million) of Ethiopia's population with an area of 363,375 km^2 (CSA 2007). Karuturi Agro Products PLC is the large-scale farm selected in Oromia Regional State. This farm was selected as a case study among others operating in the region for the reasons that the company has been operating

in the District for about five years when this study was proposed, and the investor has already developed a sizeable proportion of the land transferred to it by that time, which makes it feasible for an impact study. The farm is located in Bako Tibe District. The district is found in the West Shoa zone of Oromia Regional State, which is located some 270 km west of Addis Ababa. Our survey showed that there are, on average, seven persons per household in the district and the population density of the district is estimated at 151 persons per km^2 (ONRS 2013), which is higher than the regional average.

In 1984, the Bako Plain, with an altitude of 1650 m and recorded as 'vacant', was identified by the Ethiopian Electric Power Corporation (EEPCo) as a reservoir for a hydroelectric dam. In 2008, Karuturi Global received an offer from Oromia Regional State to acquire the Bako Plain for cultivation of crops. Karuturi Global, an Indian company, is a major cut rose producer and exporter. It entered into the Ethiopian flower production and exporting business in early 2000 with a 50 ha flower farm owned by the Ethiopian Meadows PLC Company.[4] The regional government played a key role in facilitating the land transfer to the Indian company. The district and zonal level administration had limited roles, but executed the decision made at the regional level. The 11,700 ha land[5] deal agreement that provided leasehold rights to Karuturi for the Bako Plain (see Figure 1.2) was signed at the regional level with a lease rate of ETB 135 (US$ 7.04)[6] per ha for 45 years (see Table 1.1 for detail description). There is no land rent fee for the first six years as an incentive for the investor, and the agreement allows cultivation of different crops.[7]

[4] Recent information about Karuturi shows that the company is bankrupt and its flower farms in Ethiopia have been sold to a company in Dubai. Its Dutch affiliated company (Karuturi BV), which is responsible for receiving and trading flowers from Ethiopia and Kenya, was declared bankrupt by a court in Haarlem (GRAIN 2014).
[5] The soil type is predominantly black soil (Vertisol) with a water-logging problem. Thus, it is only suitable for some crops and grazing of livestock.
[6] 1 US$ was exchanged for ETB 19.179 on 14 February 2014.
[7] The contractual agreement is for the cultivation of oil palm and other food crops. The company is cultivating maize although the soil type (Vertisol) is less suitable for maize production.

Figure 1.2: Sketch of the farm landscape in Karuturi and the surrounding smallholder farms



Current ownership	**Smallholder farmers**	**Karuturi's concession**			**Smallholder farmers**
Farm size	About 1 ha per household	11,700 ha			About 1 ha per household
Previous ownership	Farmers with title deeds	Customary ownership by smallholder farmers			Farmers with title deeds
Soil type	Nitosols/Luvisols	Vertic Cambisols	Vertisols	Vertic Cambisols	Nitosols/Luvisols
Natural vegetation	Broad-leafed tropical trees such as fig trees	Grass with scattered fig and acacia trees	Grass with scattered fig and acacia trees	Grass with scattered fig and acacia trees	Broad-leafed tropical trees such as fig trees
Previous land use	Farmland for cereal crops mixed with avocado tree	*Teff* and Niger seed plots	Grazing land	*Teff* and Niger seed plots	Farmland for cereal crops mixed with some avocado trees
Current land use	Same as previous land use	Partly Karuturi's maize farm and partly same as previous	Partly Karuturi's maize farm and partly same as previous	Partly Karuturi's maize farm and partly same as previous	Same as previous

Source: Shete & Rutten (2015a)

The land transferred to Karuturi was used by five *kebeles*[8] – Baca Ode Walde, Oda Gibe, Tirkafeta Gibe, Oda Korma, and Amarti Gibe – and was inhabited by 931, 531, 592, 411 and 852 households, respectively (District Office of Agriculture and Rural Development, unpublished data). The local people owned a total of 22,000 head of cattle that depended on the grazing land on the flood plain. The decision to transfer this land to the Karuturi Company followed the 1984 EEPCo survey, which failed to look into the current scenarios of land use by the local people. The soil types of the land under Karuturi's leasehold in Bako are primarily a combination of Vertic Cambisol and Vertisol (black soils). Vertic Cambisols are found in the relatively better drained part of the Bako Plain and it was generally used by the local people for production of *teff* (*Eragrostis tef*) and Niger seed (*Guizotia abyssinica*). The flood plains, which are mostly made up of Vertisols, suffer from water logging and it was used by the local people for grazing animals (Table 1.3). The local people had customary land-ownership rights for both the valley bottom and the better drained hilly sides (see Figure 1.2). Proclamation No. 130/2007 of Oromia Regional Government does not recognize customary land rights and prohibits lands with black soils to be under smallholder ownership (ONRS 2007).

Case two: Gambella Regional State

Gambella Regional State is found in western Ethiopia some 760 km away from the capital city, Addis Ababa (Figure 1.1). It shares a long border with South Sudan, and has three major rivers – the Akobo, the Baro and the Gilo, which empties into the Sobat River of the Sudan. It also features the Alewero River with a dam constructed with Russian assistance during the Ethiopian first republic. This has now been given to Saudi Star for large-scale irrigated rice production. The region is estimated to have fewer than half a million inhabitants with a mean population density of 10 persons/km^2 (HoARECN 2015). Three indigenous ethnic minorities: the Anuak (100,000), the Nuer (113,000) and the Majanger (60,000) inhabit the region. The Anuak depend on cultivation of maize, sorghum, groundnuts and ginger using the hand hoe. They complement their livelihoods with hunting, gathering and fishing. Livestock management is seldom practiced by the Anuak. The Nuer are agro-pastoralists. They practice farming around the Baro and Akobo rivers using the moisture and nutrient rich soils on the bank of the rivers after the flood retreats; they also fish. The Majanger depend heavily on forest resources and

[8] A *kebele* is the lowest administrative unit in Ethiopia.

Non-Timber Forest Products (NTFP) for their livelihood. Ecologically, Gambella is a hot, humid, tropical zone with a maximum monthly temperature of 35–40^{o}C (Awas *et al.* 2001). It is known for its unique ecosystem with pristine forests to the east and the Duma wetlands to the west. Annual precipitation amounts to 1290 mm (Woube 1999). The region is home to the endangered shoebill stork (*Balaeniceps rex*), the Nile lechwe (*Kobu megaceros*) and the white-eared kob (*Kobus kob leucotis*). Gambella National Park is habitat for the world's second largest mammal migration, with hundreds of thousands of white-eared kob antelope crossing the South Sudanese border through the Boma-Jonglei landscape and returning to Gambella when the weather is right (HoARECN 2013). Two large-scale farms, Karuturi Agro Products PLC and Basen Agricultural and Industrial Development PLC, were selected as case studies in Gambella (see Figure 1.1). The farms were again selected as case studies from other large-scale farms for reasons that the companies have been operational for several years, and the investors have developed a relatively sizeable proportion of land during the start of this study. This makes them feasible to study their impacts on local population, local environment and local economic development. The farms are found in Itang, Makuey and Abobo districts, which are inhabited by Anuak, Nuer and highland settlers, respectively.

1. Karuturi Agro Products PLC (Gambella site)

In 2008, the owner of Karuturi Agro Products PLC, Sai Ramakrishna Karuturi received an invitation from Gambella Regional State, similar to that offered previously by Oromia Regional State in relation to Bako Tibe District, to discuss with the regional government the possibility of acquiring a large parcel of land for agricultural investment. A team from Karuturi, composed of an expert from the public relations department, his father Karuturi Surya Rao and the lawyers of the company, travelled to Gambella in April 2008. The regional government offered the Indians a total of 300,000 ha of land at a rate of ETB 20 (US$ 1.04) per ha, per annum. When Sai Karuturi heard about the attractive land deal, he instructed the team to sign the agreement before the government changed its mind (Dubey 2008). The 50-year leasehold, which provides access to 300,000 ha of land for the cultivation of palm oil, cereals and pulses, was first signed with Itang and Jikawo districts in 2008. In 2010, it was re-signed at the federal level, keeping the articles of the 2008 agreement, but reducing the land size to 100,000 ha. At the time of my survey, Karuturi was managing to cultivate about 5,000 ha of land with maize.

The land transferred to Karuturi in Gambella is inhabited by the Nuer in Makuey District (formerly Jikawo District) and the Anuak in Itang District. Karuturi's farm plot in Itang District is located in Ilia village, on the road to Makuey District.

The Nuer are agro-pastoralists who practise extended livestock production and small-scale crop production following the seasonal overflow of the Baro River. Land is a key source of pasture for their large numbers of cattle and a source of agricultural plots for crop production. The Anuak also practise small-scale food production and eke out a living through fishing and gathering of foods from the forest. The Karuturi concession is composed of pastureland, forest and bush land (see Table 1.1 for case description), and it is part of the *Duma* wetland, which is a unique habitat for insects and birds. Free, Prior and Informed Consent of the community was not obtained before the land was transferred to the investor. Equally, the land identification process by a team of experts was carried out hastily with the help of satellite imagery and with no ground-testing.

2. Basen Agricultural and Industrial Development PLC

In 2004, the Ethiopian Basen Company leased 10,000 ha of land in Abobo District from Gambella Regional State at a lease rate of ETB 30 (US$ 1.6) per ha per year. The lease rate was amended to be ETB 111 (US$ 5.8) per ha per year from 2012 onwards. In eight years, Basen has managed to develop close to 3,569 ha of land, with cotton being the major crop under cultivation. The land transferred to the company was partly covered by open and closed forests, bushes and shrubs (Table 1.1). It was freely used for cultivation of food crops and livestock grazing by immigrants from highland Ethiopia (Southern and Northern Ethiopia) who settled there in 1984. Those who managed to cultivate more plots, in addition to what they own, used to cultivate freely and produce food. In addition, their relatives from the highlands came to live with them due to easy availability of land for farming. In this regard, the study found that 86% of the villagers settled in the area because of a military junta resettlement scheme established in 1984. The remaining 14% settled later due to land availability. Many relatives of the settlers even started farming in the period of the current government regime.

Table 1.1: Description of case studies (Large-scale farms)

Name of the large-scale farm	Region (District)	Inhabited by[9]	Land size (ha)	Land developed (ha)	Year land acquired	Lease agreement	Land converted		Livelihood of local people
							from	to	
Karuturi Agro Products PLC	Gambella (Itang and Makuey)	Anuak and Nuer	100,000	5235	2008	ETB 20 (US$ 1.04) per ha per year for 50 years	Forest land	Maize and sugar cane	Agro-pastoralism, small-scale cultivation, fishing, hunting and gathering
Karuturi Agro Products PLC	Oromia (Bako Tibe)	Oromo	11,700	3000	2008	ETB 135 (US$ 7.04) per ha per year for 45 years	Grazing land and smallholder *teff* /Niger seed cultivation	Maize	Mixed crop-livestock farming
Basen Agricultural and Industrial Development PLC	Gambella (Abobo)	Highland settlers	10,000	3569	2005	ETB 30 (US$ 1.6) per ha per year. Lease period unknown	Forest, shrub/bush land and crop land	Cotton	Mixed crop-livestock farming
S&P Energy Solution	Benshanguel Gumuz (Dangur and Guba)	Gumuz	50,000	1863	2010	ETB 143.4 (US$ 7.5) per ha per year for 50 years	Forest, bush/shrub land	Pongomia, maize, pigeon pea	Gold mining, crop production through shifting cultivation, hunting and gathering

Note: 1 US$ was exchanged for ETB 19,179 on 14 February 2014

[9] This refers to the ethnic groups who are living around the large-scale farm and does not reflect the inhabitants of the respective district.

Case three: Benshanguel Gumuz Regional State (S&P Energy Solution PLC)

Benshanguel Gumuz Regional State is located in the north-western part of Ethiopia and is one of nine regional states that form Ethiopia's ethnic-based federal system. It is estimated to have a total area of 50,699 km^2 and a population density of 11.5 persons per km^2 (CSA 2007). It shares a common border with Amhara Regional State in the north and northeast, with Oromia Regional State in south and southeast and with Sudan in the west. With altitude ranging between 558 m to 2729 m above sea level, and an average daily temperature of 20–25^{0}C, it is endowed with diverse vegetation cover. However, the majority of its area (ca 75%) falls under the lowland category, with a maximum daily temperature of up to 34^{0}C during the hottest period between February and April. The onset and offset of the rainy period in the region is May and October, respectively, and the mean annual precipitation ranges between 500–1800 mm (Daie 2012).

The region is endowed with a variety of minerals, including gold, copper, zinc, base metal and marble, and traditional gold mining is a major source of income for some ethnic groups of the region. The region has several rivers, making it well-suited for irrigated agriculture and hydro-electric power generation. For example, the Great Renaissance hydroelectric dam being constructed on the Blue Nile River is found in this region. The region is inhabited by just over half a million (670,000) people and it is home to indigenous ethnic groups, such as Berta (26.7%), Gumuz (23.4%), Shinasha (7%), Mao (0.6%), and Komo (0.2%). Close to 50% of the total population in the region is inhabited by immigrants from other regions (Balcha 2007; CSA 2007). The livelihood of the local people includes gold mining, small-scale crop production based on shifting cultivation using hand and hoe, hunting and gathering, and small-scale livestock rearing. Shampoorji and Pallonji (S&P) Energy Solution PLC, one of the cases studied for this research, is among the investment companies that acquired large tracts of land for large-scale farming in Dangur and Guba districts of the regional state. The farm is selected as a case study given that it has been operational for several years and acquired large land size. Population density is sparse with a regional average of 14 people/km^2; more specifically, Guba and Dangur districts are inhabited by 3 persons/km^2 only (CSA 2009).

The S&P Farm is part of the large Indian construction conglomerate, Shampoorji and Pallonji, which has no experience in agriculture. In 2010, the company leased 50,000 ha of land in the Dangur and Guba districts of Benshanguel Gumuz Regional State for the cultivation of

Milletia pinnata (pongamia) as a biofuel feedstock, and production of other food crops. The lease is for a duration of 50 years, at a rate of ETB 143.4 (US$ 7.5) per ha. The company is exempted from lease payment for the first five years. As of late 2014, approximately 1863 ha of land have been developed. Previously, the land was used by local people for crop production through a shifting cultivation system, and for the collection of different Non-Timber Forest Products (NTFP), such as forest honey, forest fruits and roots crops (Table 1.1).

1.4 Research Approach

This dissertation addresses three core impact dimensions of an intervention on local development, sometimes called 'the three Ps': impact on people (People), impact on environment (Planet), and impact on local economy (Profit). Some of these dimensions are best addressed through quantitative analysis, while others are more suited to qualitative analysis. This necessitates the adoption of a mixed research approach. A mixed research approach, which is widely referred to in the literature as the Q-Squared approach, uses both qualitative and quantitative techniques of data collection and analyses. The approach has become popular for poverty and evaluation studies in recent years and has been a major theme for several international conferences since 2002 (Shaffer 2012). The two approaches can be used as a means of triangulation in order to confirm, converge or refute findings (White 2002; Booth 2003). These approaches can be presented simultaneously or sequentially to elaborate and discuss a given research topic (Ravallion 2003), and they can also be used sequentially, one leading the other (Hentschel 2003).

In this dissertation, I have integrated the two research approaches for three complementary purposes:

(1) to gain initial insight, select case studies, and identify locally relevant variables for household and employees surveys. In this dissertation, two separate surveys were conducted throughout my study regions. In the first round, an exploratory survey (qualitative method) was used to gain an in-depth understanding of the local situation, to identify locally relevant variables for the second round explanatory survey, and to select case studies that help to address the research questions explained above. In the second round, a more structured household survey was conducted on representative households and employees in each region. But, the second-round survey is not immune from the use of qualitative tools and hence, open-ended questions were also included during the second

phase of data collection. In this case, the qualitative approach contributed to improving the design of the household and employees surveys, which were more quantitative.

(2) to explain and discuss issues throughout the text. I integrated the qualitative analyses based on the responses of the local people and my own field observations with the quantitative analyses results, either sequentially or simultaneously, to produce narratives and provide sound explanations for the quantitative outputs.

(3) Lastly, when issues were ambiguous, I used both the qualitative and quantitative methods as a means of triangulation. The benefit of using qualitative methods that complement survey data of a quantitative nature in evaluating programme effectiveness is also well documented by the World Bank (Khandker *et al.* 2010).

1.5 Conceptual Framework

This section discusses the conceptual framework the study adopted and elaborates the types of impact relationships among the different variables, the interactions between different actors and the recipients of different impacts with the help of a figure. The uni-directional arrows in the conceptual framework indicate flow of outcomes and present the actors who likely receive the immediate effects, outcomes and impact. But for the sake of simplifying the presentation, arrows are not constructed between each immediate effect and outcome with the actors who likely receive the effects and outcomes. The two directional arrows indicate the two-way interactions between different actors involved in the implementation of large-scale farming project. In this case, hosting communities interact with immigrants who are working in the large-scale farms and the local/regional/national government that legally claim to own all lands in Ethiopia; immigrants interact with investors who provide them with wage labour and with the local/regional government to whom they pay income taxes and from whom they receive different social services; local/regional/national governments interact with investors in the land deal process and throughout the implementation of large-scale farms in different ways; and the investors interact with agro-processing industries that use the produces from large-scale farms as raw materials. The broken arrows indicate either direction of causality or the actor who receives the outcome/impact or the type of interaction between actors, but not under the scope of this study.

At the top of the conceptual framework, the intervention by investors through large-scale farming is conceptualized to bring immediate effect through change in land tenure system.

The change in land tenure system is further conceptualized to bring other immediate effects such as change in access to land and natural resources by the local population, which will result in change in state-society relationship and conflict. These will affect the operations of the investors and the local/regional/ national economic development goals. Hall *et al.* (2015) argued that intervention through large-scale land acquisition/transfer brings a change in land tenure ownership, land property relations and patterns of land-use, and thus this part of the conceptual framework is framed based on the argument of this researcher.

The immediate effects of large-scale farming are further conceptualized to bring different outcomes, which will further result in impacts in various ways. Narratives around large-scale farming by the government of Ethiopia presuppose different benefits that are likely to accrue to hosting communities and to the local/regional and national government. These include contributions in terms of fiscal revenue, increasing food production and supply, technology transfer, generating foreign currency, contribution of investors to infrastructure development, creating employment opportunities and producing raw materials for agro-processing industries (MoARD 2010; MoFED 2010). Based on such narratives, the government of Ethiopia anticipates positive impacts on local food security, incomes and local economic development. With the overall aim of testing the narratives, the study tried to capture and presented the various outcome and impact variables. Other studies (cf. Shete 2010; Rahmato 2011; Schenoveld 2013) also discussed the potential impacts of large-scale farming on local communities food security and the environment at large. Therefore, environmental change is also captured in the conceptual framework as one of the impacts of the intervention (see Figure 1.3).

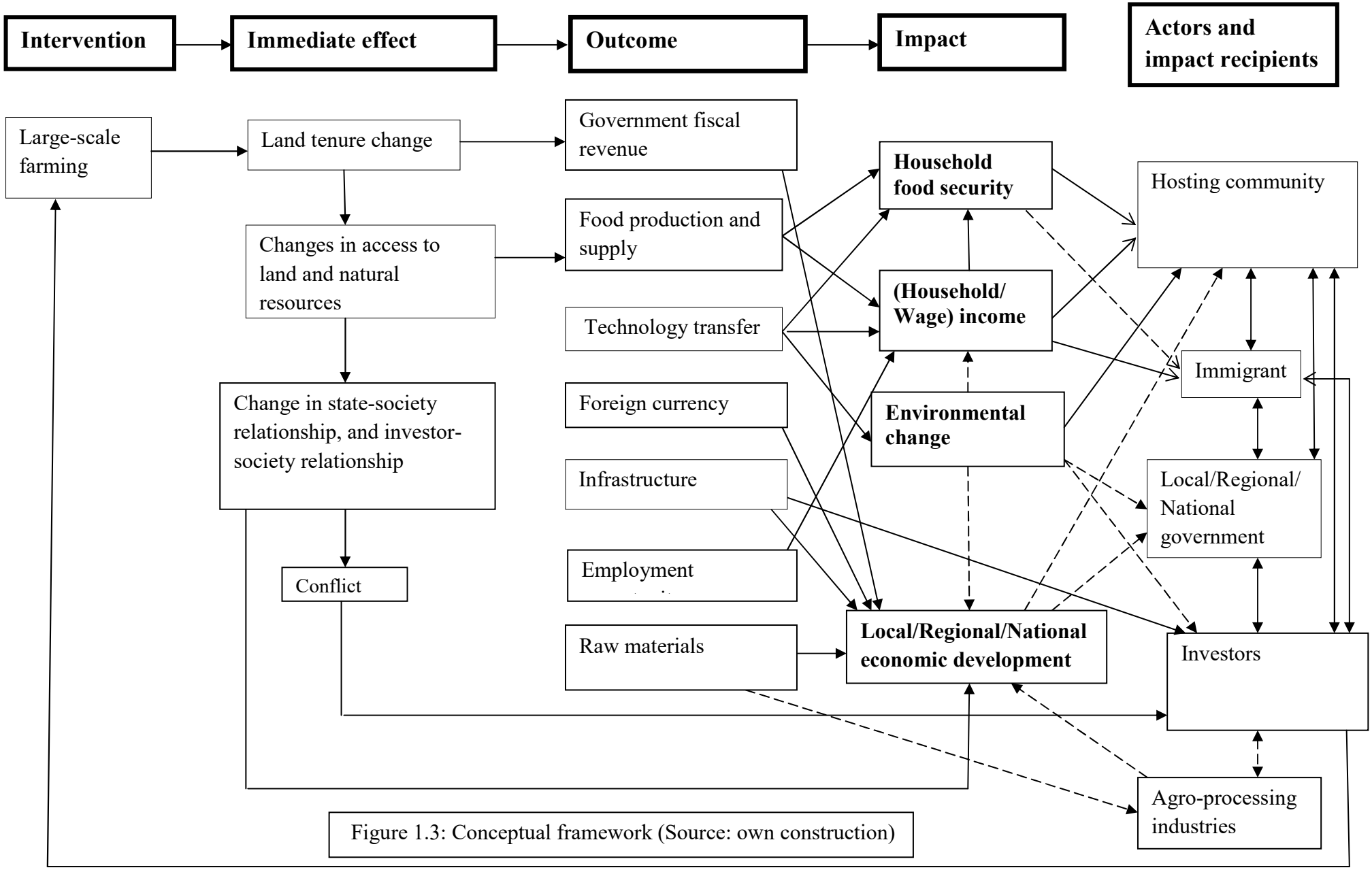


Figure 1.3: Conceptual framework (Source: own construction)

As an approach to the conceptualization of important impact variables (e.g. food security), this dissertation used Sen's entitlement framework, which was published as the theory of *Poverty and Famines* (Sen 1981), but criticized by academicians (cf. Devereux 2001) who described his contribution as more of a framework for analysing famine at a micro-level than a theory to refute the *Food Production Decline (FAD)* theory of Malthus. In his book, Sen (1981, p. 2) raised four entitlements – 'production-based entitlement', 'trade-based entitlement', 'own-labour entitlement', and 'inheritance and transfer entitlement' – that ensure an individual can escape the famine trap. According to his analyses, an individual can access food by: producing it him/herself (which he called the *production-based entitlement*); by buying it from the market using income earned (e.g. wage employment, petty trading, sale of animals, etc.); through different means (which he referred to as *trade-based entitlement*); by receiving food in exchange for labour or a food-for-work scheme (which he called *own-labour entitlement*); and by receiving food aid from the government, aid agencies or social transfer from the community (which he named *inheritance and transfer entitlement*).

These four entitlements ensure the food access dimension of an individual's food security. While the four dimensions of entitlement are important sources of food for families, hunting/gathering of foods from forests is also an important source of food and income for the local population in the lowland regions of Ethiopia. This is missing from Sen's entitlements, unless we argue that it is an aspect of production-based entitlement. This necessitates looking for a broader analytical framework to ensure that nothing is omitted from the analyses. The Sustainable Livelihood Approach (SLA), pioneered by the work of Chambers & Conway (1991) and advocated by the UK Department for International Development (DFID), provides a broader perspective in terms of 'entitlements' (known as natural, human, social, financial and physical capital), which serve as sources of food and income for local people. In this case, for example, hunting and gathering is natural capital of the local people and a livelihood strategy that provides them with food and income. In addition, the eclectic nature of the concept of food security makes it difficult to fully understand without considering the wider livelihood security of local people. This is because demand for food may go down and individuals may confront starvation in order to preserve assets. This is especially true when food insecurity is perceived by an individual as transitory and easily reversible, and when selling assets is not the best coping strategy.

Finally, analysis of the impact of large-scale farming by comparing land-use patterns in two different time periods necessitates an understanding of local people's livelihood strategies. This justifies the use of the SLA. In terms of empirical works, this study has greatly benefited

from the approach by Bardhan (2006, p. 1394), who identified four capacities of the rural poor to analyse the effects of globalization. He considered the rural poor's capacity as: wage workers, consumers of commodities produced by companies, recipients of public services, and users of common property resources. In this study, which follows Bardhan, local people are viewed as: (1) sources of labour for large-scale farms, and hence generate incomes from wages that will influence their food security status; (2) consumers of food commodities produced by the large-scale farms, which will also impact their food security status; (3) providers and users of common-pool resources whose livelihood strategies, based on cultivation, hunting and gathering, could be affected, not only by loss of land, but also by the negative environmental effects of land-use changes; and (4) recipients of services, who may benefit from some infrastructure provided by the large-scale farms or be otherwise affected by the competition for public services between the large-scale farms and immigrant labourers.

1.6 Research Design

Based on the purpose of research, research designs are classified into three major types – exploratory, descriptive and explanatory/causal. Exploratory research design is used when researchers lack adequate information about local contexts and when the research problems are not adequately defined. This design helps to choose data collection instruments, and to identify locally relevant variables that help to establish a (cause-effect) relationship. However, exploratory design does not provide conclusive answers to research questions. Descriptive research design helps to describe status, practice, magnitude, behaviour, attitudes, and characteristics of a phenomenon that exists naturally. It helps to establish a simple relationship between variables and, in some literature, it is also called a correlation study. Explanatory/causal research provides conclusive answers to research questions by establishing a cause-effect relationship among variables.

Choosing a stand-alone research design of any of the three types will not address the research objectives of this study exhaustively. As a result, a combination of the three types of research designs was used in this study. Exploratory research was conducted in all of the three study regions prior to the formal and more structured study. Exploratory studies were carried out in 2010 in Benshanguel Gumuz Regional State, and in Oromia and Gambella regional states in 2012. The purpose of the exploratory study was: to understand fully local contexts, in terms of livelihood strategies used by local people; to collect information about settlement patterns of communities and their interaction with the large-scale farms, to gain a good understanding of the type of sampling strategy to use; to identify locally relevant variables and food security coping strategies used by communities during a period of food insecurity; and to gain better

understanding of the interaction between companies that leased farmlands for large-scale farming and the community members. The descriptive research design was used to describe the magnitude of investment flowing to each region in Ethiopia, and to identify the perceptions and attitudes of different stakeholders (local people, government and employees of large-scale farm) about variables related to expectations and outcomes of large-scale farming. Causal research design was used to establish a cause-effect relationship between large-scale farming and different outcome variables, such as food security, income and environmental parameters –land-use cover change, soil micronutrients, organic carbon and soil bulk density.

Others classify research designs as cross-sectional and longitudinal, based on the time period during which the data are generated. In this study, both cross-sectional and longitudinal designs were used for the household surveys conducted in the three regional states. I had the opportunity to generate longitudinal household data in Oromia and Benshanguel Gumuz regional states, despite the short interval between the first- and the second-round household surveys, especially in the case of Oromia Regional State. In Oromia, the first household survey was conducted in 2012 and the second-round household survey was repeated in 2014. In Benshanguel Gumuz Regional State, the first round of household surveys was conducted in 2010 and this was repeated in 2014. In both regions, the first round of household surveys was conducted some months after the conclusion of the exploratory surveys. For logistical reasons, it was only possible to conduct one household survey (cross-sectional) in Gambella Regional State, in 2013, following the exploratory survey carried out in 2012. The details of the household surveys are presented in the next section.

1.7 Variables and Data Collection Methods

1.7.1 Variables and data sources

Several variables are collected to address the research question of this study. Although enumerating all the variables collected for the study here is of little value, it is worth mentioning some of them for the benefit of framing the data sources and data collection instruments. Information related to the magnitude and distribution of large-scale land acquisition in Ethiopia, environmental impact assessment of large-scale farms, expectations from large-scale farming, revenue generated from large-scale farms, employment record of large-scale farms, land cover change data from Google Maps, etc. are collected from different secondary sources, including various government policy documents, Agricultural Investment and Land Administration Agency, Ethiopian Investment Authority, Regional Investment Bureau, Regional Environmental Protection and Land Administration Bureau, District Offices

of Agriculture, District Revenue Offices, District Administration Office, and Companies engaged in large-scale farming.

Primary data were also collected on a range of variables that are important for answering the research questions of this study. This includes, but is not limited to: data on food consumption from different sources (market, production, food aid, gift, hunting and gathering, etc.); households' food insecurity coping strategies; income from different sources and livelihood strategies/means of communities; household characteristics; perception of environmental strains faced by communities/households due to large-scale farming; expectations and actual experiences of households and government key informants with respect to large-scale farming, and soil data from plots cultivated by large-scale farms and from a comparable control plot, etc. The primary data were generated using different data collection methods, as discussed in the section below.

1.7.2 Sampling and data collection methods

The study used a variety of data collection methods to generate the needed primary data. The rationale for using a combination of data collection methods for similar variables is to triangulate the validity of the information generated from any one of the sources. The data collection methods and the sampling strategy used are discussed below.

Household surveys: data were collected through household surveys in Oromia, Gambella and Benshanguel Gumuz regional states. The household surveys were conducted with the help of enumerators who read, write and speak both Amharic and the local languages. Different sources of income and foods for communities were recorded during the household surveys. Following Sen's entitlement framework and the SLA approach, the variables collected include quantities of food commodities accessed and consumed from various sources, such as own produce, hunting/gathering, borrowing, food aid, food-for-work, purchases from the market, and gifts/transfers from others. Income data about different income sources, such as the sale of different crop commodities, sale of animals and animal products, income from wage employment, petty trading, fishing, sale of firewood and charcoal, income from Non-Timber Forest Products (NTFP) and remittances, were likewise collected from households.

As discussed earlier, in Oromia Regional State (i.e. Bako Tibe District), the land leased by Karuturi Agro Products PLC was previously used by five *kebeles* – Baca Ode Walde, Oda Gibe, Tirkafeta Gibe, Oda Korma, and Amarti Gibe (see Annex 1.1 for the distribution of the

household population). At the time of the first round household survey, which was conducted between March and May 2012, Karuturi was cultivating up to 2,800 ha of land out of the 11,700 ha leasehold concession. As a result, only households in Baca Ode Walde *kebele* had experienced the negative effects from the land being used by the company. For sampling purposes, I stratified the *kebeles* in the district into two groups as 'affected' and 'non-affected'. The 'affected' households are those that lost access to customarily-owned grazing plots and *teff* and Niger seed cultivation plots. The 'non-affected' households are those who still had access to pastures and cultivation plots for *teff* and Niger seed.

A list of households in both strata was obtained from the respective *kebeles* and this was updated with the help of key informants – elders who had lived in the area for many years. A total of 300 households were interviewed in 2012, living in three *kebeles*, namely, Baca Ode Walde, Oda Gibe and Tirkafeta Gibe. From the 'affected' stratum (i.e. Baca Ode Walde *kebele*), 142 households were selected by applying a systematic random sampling technique. From the 'non-affected' stratum (i.e. Oda Gibe and Tirkafeta Gibe *kebeles*), 158 households were selected using a similar procedure, and the sample size from each *kebele* was determined proportionally – 75 households from Oda Gibe and 83 households from Tirkafeta Gibe.

A second-round household survey was conducted in 2014. During this phase, I interviewed all the 158 households in Oda Gibe and Tirkafeta Gibe *kebeles* who were not affected in 2012. By 2014, however, households in Oda Gibe *kebele* had lost access to the de facto customarily-owned cultivation and grazing plots due to the expansion of the company towards Oda Gibe village. This has given me the opportunity to employ two different impact estimation methods – the Difference-in-Difference (DiD) and the Propensity Score Matching (PSM) – that are discussed in detail in the data analysis section. I used the first-round household survey data and systematically compared those households in the 'affected' stratum (i.e. households in Oda Gibe *kebele*) with those households in the 'non-affected' stratum (i.e. Oda Gibe and Tirkafeta Gibe *kebeles*) using the PSM technique. In the second case, I used the data set collected in 2012 and 2014 and did a double difference analysis between households in Oda Gibe and Tirkafeta Gibe *kebeles*. Finally, I compared the impact estimation result that was obtained by using the two different techniques and datasets to see whether the results were consistent and comparable.

Two large-scale farms – Basen and Karuturi – were subject of the study in Gambella Regional State. Household surveys were conducted for both cases in 2013. Basen Agricultural and Industrial Development PLC is located in the Abobo District of Gambella Regional State.

Abobo District is inhabited by the Anuak indigenous people and the highland settlers from the Southern Nations, Nationalities and People's Region and from Amhara Regional State. The settlers immigrated to the area in 1984 via a state sponsored re-settlement scheme aimed at curbing the challenges of food insecurity among the settlers. Basen Farm is located in the area where the settlers are found, and this study used the settlers as a target population. The settlers practise mixed farming in which crop production and livestock rearing is the basis of their livelihood. As in the highlands, the settlers plough their land using draft oxen. The entire household population of the settlers found in each village was categorized into two major strata, i.e. 'affected' – those who are enclaved by Basen Farm and have lost access they once had to extra cultivable land – and 'non-affected' – those who still have similar opportunities to before and who are located at a distance from Basen Farm. A total of 225 households (100 from the affected stratum and 125 households from the non-affected stratum) were selected through systematic random sampling technique. The sample size from each village was determined based on a proportional sampling technique (See Annex 1.2 for distribution of household population).

The second case used as a subject of this study in Gambella was Karuturi Agro Products PLC. The company acquired 100,000 ha of land in the Makuey (at that time, Jikawo District) and Itang districts of Gambella Regional State. It opened two stations in Gambella Regional State, one in Itang and the other in Makuey District. I studied both farms because the livelihood of the local people in the two districts are different, and hence the impact of Karuturi's intervention could be different. Itang District is predominantly inhabited by the Anuak, while Makuey District is inhabited by the Nuer. The Anuak are dependent on the cultivation of crops on small plots of land using hand and hoe. They complement their living with fishing, hunting and gathering. Livestock rearing is not practised by the Anuak. The Nuer, by contrast, are agro-pastoralists; they cultivate crops and keep large numbers of herds. Karuturi's farm in Itang District is located in Ilia village, which is inhabited by 250 households. The local people in Ilia village experienced the direct effect of Karuturi's intervention. As I did for Basen, I identified a village that is comparable to the affected village but has not experienced the intervention of Karuturi. Accordingly, I selected Poolding village[10], which is inhabited by 280 households, to represent the non-affected households. A total of 225 households (100 households from Ilia village and 125 households from Poolding village) were randomly chosen for the household survey.

[10] Including Ilia and Pooldig, there are 21 *kebeles* under Itang District. Poolding was chosen for two reasons: (1) it is found on the same route as Ilia, and (2) it is comparable to the overall setting of Ilia.

On the other hand, Karuturi's farm in Makuey District is located near Bildak village, which is inhabited by 233 households. The households in this village represented the affected stratum. Similarly, I identified a village comparable to Bildak that has not experienced the direct effect of Karuturi. Accordingly, Adura village, which is inhabited by 284 households, was chosen to represent the non-affected households. From Makuey District, a total of 225 households (100 from Bildak village and 125 from Adura village) were selected through a random sampling technique for the household survey. The impacts of both the Basen and Karuturi farms on the income levels and food security status of the households in Gambella Regional State were estimated using the PSM technique. As discussed earlier, I did not have an opportunity to repeat the household survey for the second round, and hence the double difference method of impact estimation was not implemented for Basen and Karuturi investments in Gambella.

In Benshanguel Gumuz Regional State, S&P Energy Solution was selected as case study. The company acquired farmland in Guba and Dangur districts. Two rounds of household surveys were conducted for this case, the first in 2010 and the second in 2014. In 2010, S&P Company had not started any operation, but had opened a station in Kota village, Dangur District. As a result, I was able to obtain baseline information. With the anticipation that Kota village was likely to face the direct effects of S&P's intervention, this village was included to represent the affected households. Badgosh village, which is found some miles away from S&P's camp, was also included in the survey with the anticipation that it represented non-affected households. Kota village is inhabited by 285 households and Badgosh is populated by 250 households. A total of 200 households, 100 households from each village, were randomly selected for the household survey. In 2014, as anticipated, Kota village lost access to forest related resources due to the clearing of land by S&P. However, Badgosh village continued to access forest related resources since the company was not able to develop its entire leasehold concession and did not move beyond Kota village. In the second-round survey, it was possible to revisit the 100 households in Badgosh village, but only 96 of the households in Kota village, resulting in a 4% attrition rate. Key informants in Kota village informed the survey team that four of the households had moved permanently to another village, and I was not able to meet them. Hence, the DiD analysis was computed based on the 96 households who provided information for the two rounds of household surveys.

The data generated from the household surveys were used to identify the convergence/divergence between prior expectations and actual experiences of local people with respect to large-scale farming, as presented in Chapter 3; to examine the impact of large-scale farming on the income levels of local people, which is presented in Chapter 4; to

estimate the impact of large-scale farming on communities' food-security status, detailed in Chapter 5; and to identify the perceptions of local people regarding the environmental impacts of large-scale farming, which is presented in Chapter 6.

Employees survey: to identify the employment benefit of large-scale farming and the variables that determine different levels of wage incomes in different groups of individuals (such as men and women, indigenous and immigrants, youth and adults, etc.), employees working on the large-scale farms – Karuturi Agro-products PLC in Bako, Karuturi Agro-products PLC in Gambella, Basen Agricultural and Industrial Development PLC in Gambella, and S&P Energy Solution in Benshanguel Gumuz regional states – were interviewed using structured and semi-structured questionnaires. A total of 264 employees (100 from Karuturi in Bako, 50 from Karuturi in Gambella, 50 from Basen and 64 from S&P Energy Solution) were interviewed. The survey included only those wageworkers whose incomes are calculated on a daily, piece rate or contractual basis. The samples were drawn randomly from the three categories of wage arrangements (strata) and the sample size from each stratum was determined proportionally. The results of the analysis using the data from employees survey is presented in Chapter 4, particularly in the section that discusses the contributions of large-scale farming to employment generation.

Key informants interview: data were also collected from key informants who are knowledgeable in a certain topic due to their position in the community, company or government offices. A survey with the help of structured and semi-structured questionnaire was conducted using 42 government key informants who are working in the different tiers of the government structure in Oromia, Gambella and Benshanguel Gumuz regional states. The purpose of this is to identify how equally expectations about large-scale farming, presented in various policy documents of the Ethiopian government, were shared among government employees responsible for managing large-scale farming, and in how far they perceived their prior expectations to have been met. The key government informants included experts from AILAA, the Ethiopian Investment Commission, regional and district investment offices, district administration, regional land administration offices, and agriculture and rural development offices. Key informant (qualitative) interviews using open-ended questions were also carried out in all the villages where household surveys were conducted. This included: (1) interviews with directly affected households/individuals about the effects of losing land to companies on their incomes and food security status; and (2) interviews with elderly community members to fine tune the sampling frame we received from the local administration and to collect information on impacts of large-scale farming on community

development activities and on the overall environment. Managers of the large-scale farms in each region, experts in the District Revenue and Justice offices, and Scouts in Gambella National Park were also interviewed.

Focus Group Discussion (FGD): Several FGDs were held to collect information that represent views of community members as a group. Five FGDs, each composed of 5–6 members, were conducted in each village to collect information about: (1) the contributions of large-scale farming companies to community development activities and the negative effects on the communities; (2) the impact of losing land to large-scale farms on household food security, employment and income levels; (3) the changes observed on key environmental parameters after the advent of the large-scale farms; (4) the agency of the local people, conflicts and organized agrarian struggles staged against the large-scale farms; and (5) to assign a weight to the different food security coping strategies,[11] according to the degree of severity perceived by the community. The qualitative interviews and the focus group discussions were done with the assistance of an interpreter who understands and speaks Amharic and the local languages of the community. To ensure reliability of translations and responses, additional questions that were asked in different ways but enquired about same thing were intentionally added. This helped to triangulate consistency of responses, and when discrepancies were encountered probing was done to improve the quality of responses.

Soil survey: The study also aimed at estimating the effects of land-use change induced by large-scale farms on selected soil parameters, such as soil bulk density, soil micronutrients and soil organic matter/carbon. Soil samples were collected, using a ring sampler at a depth of 0–15cm, from large-scale farms (experimental plot) and from lands that are not disturbed by the large-scale farms (control plot), but which are comparable to the original state of the plots prior to development by the large-scale farms. Soil bulk samples were also collected at a depth of 0–30 cm from all the sites where ring samples were taken. The bulk samples were air dried and uniformly mixed to prepare a composite soil sample. Karuturi Agro Products PLC has two farm stations (Ilia and Jikawo sites) in Gambella Regional State and one farm station (Bako site) in Oromia Regional State. Soil samples were collected independently for each site, since there is substantial variation between the sites in terms of slope gradient, vegetation cover and soil types.

[11] Frequency of using different coping strategies, such as decreasing meal frequency and portion, consuming cheap but less preferred foods, borrowing food, consuming seed stock, immature crops, non-timber forest products, sending children to eat with neighbours/relatives and skipping eating for a whole day are some of the coping strategies recorded in the survey and weight for these strategies was developed through focus group discussion.

Although the large-scale farms studied in this research acquired farm sizes in a range of 10,000–111,700 ha, the maximum land size developed by the companies, in any one of the farm stations opened by the companies, is less than 3,600 ha. For example, Karuturi managed to cultivate up to 2,800 ha each at its Bako and Jikawo farm stations. At its Ilia farm station, it developed and cultivated only 2,435 ha. This is despite the fact that the entire concession of the company (both in Gambella and Oromia regional states) is 111,700 ha. Similarly, Basen Farm managed to cultivate only 3,569 ha of land, although it has 10,000 ha leasehold concession. The land developed and cultivated by S&P Company is far less than the other two, and it managed only 1,863 ha out of its 50,000 ha leasehold concession. The soil survey team, led by a soil science specialist, carried out a transect walk (when possible with the help of our field vehicle) in the different directions on the farms developed and cultivated by the large-scale farming companies.

During the transect walks, variability in soil types, slope gradient and vegetation cover were observed and recorded. Then, the team decided on the intervals the samples should be collected. It should be noted here that the soil sampling considered the size of land developed and converted into other forms of land uses, but not the land lease concession of the companies. After examining the variability of the farms using the aforementioned parameters, the survey team agreed that representativeness could be assured if soil samples were taken at 200 ha intervals and until the entire land developed by the companies was covered. In theory, this interval would deliver 9 soil samples for S&P's farm, 12 soil samples for Karuturi's Ilia farm station, 14 soil samples for Karuturi's Jikawo farm station, 14 soil samples for Karuturi's Bako farm station and 18 soil samples for Basen's farm.

In fact, the survey team relaxed the 200 ha interval and managed to collect 18 soil samples from each farm station on the large-scale farms. This means that soil samples were collected at intervals of 104 ha, 135 ha, 156 ha and 156 ha for S&P Company, Karuturi's Ilia farm station, Karuturi's Bako farm station and Karuturi's Jikawo farm station, respectively. A similar transect walk was done along the different directions of the lands adjacent to the cultivated plots of the large-scale farms to identify plots that are undisturbed and similar to the original land-use types of those plots cultivated by the large-scale farms. A total of 18 soil samples were collected from undisturbed (control) plots in a similar manner, which helps to capture variability. This makes the total soil sample taken for each farm station 36 (18 from experimental and 18 from control plots). The soil samples collected from the control plots

were done so using a procedure that ensures comparability with the soil samples collected from the experimental plots.

Spatio-temporal satellite image: During the soil survey, GIS coordinate points were recorded using GPS instrument to pinpoint all the locations where soil samples were collected. In addition, when available, concession maps were acquired from the large-scale farms. By using the GIS coordinate points and the concession maps of the large-scale farms, satellite images were collected from Google Maps for two different time periods. The initial period was before the company started land clearing (i.e. the year in which the company acquired the farmland). The second period was the year we conducted soil and household surveys. This was done for the three (Karuturi, Basen and S&P) large-scale farms. In the case of Karuturi, it was done for its Ilia farm station but not for its Bako and Jikawo sites. This was because the ex-ante land uses of these sites were grazing plots and we found it less important to do this exercise. The data generated from the satellite images were used to examine the land-use changes induced by large-scale farming companies, and this was complemented with sufficient ground truthing. The data from satellite images, from household and soil surveys, key informants interview and FGD were used to identify the impacts of large-scale farms on natural resources. The results are presented in Chapter 5 of this dissertation.

1.8 Data Analyses Methods

This study adopted a mixed research approach and generated both qualitative and quantitative data. Qualitative data were analysed using qualitative tools and quantitative data were analysed using quantitative tools. The following sections discuss the different data analysis tools this study has used throughout the different chapters of the dissertation.

1.8.1 Qualitative data analysis method

The dominant types of qualitative data analysis tools used in this study are proportion/percentages, mode, median, content analysis of policy documents and thematic analysis of responses from key informant interviews and FGD. When found relevant, responses of respondents are presented by quoting them directly, following translation from the local language to English.

1.8.2 Quantitative data analysis method

A wide variety of quantitative data analysis tools are used in the different chapters of this study. This includes descriptive statistics such as mean, Standard Error of Mean (SED), and Standard Deviation (Std. Dev); inferential statistics such as multiple regression (Mincer's

earning function) and t-statistics; the method of project valuation using the Net Present Value (NPV); and impact estimation techniques such as Propensity Score Matching (PSM) and the Difference-in-Difference (DiD) methods. The propensity score matching and the difference-in-difference techniques are used to estimate the impacts of large-scale farming on income levels and food security status of local people. Mencer's earning function is used to estimate the determinants of wage incomes by specifically adapting the model to fit into the local situation of wageworkers and large-scale farming in Ethiopia. The details of the most important analytical tools are discussed in the following paragraphs.

The methods of estimating impacts of intervention

Studying the impact of an intervention is challenging and tricky because it is a problem of missing data. This is because the evaluator cannot observe the outcomes of the intervention on the programme participants had they not been exposed to the programme/the intervention (Khandker *et al.* 2010). Three categories of impact estimation methods are available in the literature. In the first category of impact estimation technique, we find the randomized (experimental) evaluation method in which both the 'treatment' and the 'control' groups are randomly assigned to the intervention/the programme. The method is found to yield reliable impact estimates (Duflo 2006). The second category of impact estimation technique includes estimators such as Difference-in-Difference method, fixed effect models and regression methods. This group of estimators requires pre-intervention measures of outcomes or baseline data (Glazerman *et al.* 2003). The third category of impact estimation techniques includes the retrospective and the quasi-experimental (non-experimental) evaluation methods. The quasi-experimental approach constructs a comparison group through statistical technique. It then matches the 'treatment' and 'comparison' groups using different matching algorisms. The average treatment effect of the programme is computed by deducting the average outcome of those matched individuals in the treatment group from those in the comparison groups (*Ibid.*).

The randomized (experimental) evaluation method is not feasible for evaluating the impact of large-scale land acquisition since agricultural investment projects are taken to a given community/region through a non-random approach. On the other hand, the retrospective evaluation method generates data by putting key research questions in a historical perspective, i.e. it compares the same individual over time. It is often criticized for unreliable estimates of impact due to recall problem and the lack of a mechanism to control other factors that intervene after the introduction of the programme/intervention, but which still affect outcomes (Duflo 2006). As a result, these two techniques were not used in this study and will not be discussed

here. This study used a combination of the DiD and the PSM techniques to estimate the impact of the three large-scale farms on different outcome variables in Oromia, Gambella and Benshanguel Gumuz regional states. Therefore, the following discussion focuses on these two techniques of impact estimation.

Difference-in-Difference evaluation method (DiD): As Khandker *et al.* (2010) have discussed, the randomized and the propensity score matching evaluation methods focus on single-difference estimators that often require only an appropriate cross-sectional survey, whereas the DiD evaluation method requires panel data (at least baseline survey and ex-ante intervention survey) for double-difference estimation. The DiD estimation resolves the problem of missing data by measuring outcomes and co-variates for both participants and non-participants in pre- and post-intervention periods. It essentially compares treatment and comparison groups in terms of outcome changes over time relative to the outcomes observed for a pre-intervention baseline. That is, given a two-period setting where t = 0 before the programme and t = 1 after programme implementation, letting Yt^T and Yt^C be the respective outcomes (e.g. income levels or food security status) for a programme beneficiary (households affected by large-scale farming in our case) and non-treated units (non-affected households in this study) in time t, the DiD method will estimate the average programme impact (i.e. impact on income levels and food security status) as follows:

$$DiD = E(Y_1^T - Y_0^T \mid T_1=1) - E(Y_1^C - Y_0^C \mid T_1 = 0) \qquad (1)$$

In the above equation, $T_1= 1$ denotes households affected by large-scale farming at t = 1, and $T_1= 0$ denotes non-affected households.

The DiD method of programme evaluation assumes that selection bias exists due to unobservable characteristics and this is time invariant. In this approach, the treatment effect (i.e. impact of large-scale farming on income levels and food security status of households) is determined by taking the difference in outcomes across treatment (households affected by large-scale farming) and control units (non-affected households) before (baseline) and after the intervention of the large-scale farming companies. DiD methods can be used in both experimental and non-experimental settings. The major steps in DiD evaluation methods are described in Baker (2000) as follows:

1) conduct baseline survey before the intervention covering both programme participants (affected households) and nonparticipants (non-affected households).

2) conduct a follow up survey after programme intervention, ideally having same sample observation (though there is possibility of attrition) with same instrument. This should be done for both groups as in step one.
3) calculate the mean difference between the after and before values of the outcome indicator (in our case income levels and food security status) for each of the treatment (affected households) and comparison (non-affected households) groups.
4) calculate the difference between these two mean differences using the t-statistics. This is the estimate of the impact of the intervention (i.e. large-scale farming).

The quasi-experimental evaluation method: The quasi-experimental (non-experimental) evaluation method, also widely known as the Propensity Score Matching (PSM) method, compares treatment effects across participant and matched non-participant units, based on a range of observable characteristics that are assumed to determine participation in the programme and affect the programme's outcome. The PSM method assumes that selection bias is based only on observable characteristics and does not account for unobservable factors affecting programme participation and outcome. The method builds the counterfactual group through a statistical model based on the probability of participating in a programme given observable co-variates; participants are then matched to non-participants on the basis of their propensity scores. The propensity score is defined as the conditional probability of receiving a treatment given pre-treatment characteristics: $p(X) \equiv Pr(D = 1|X) = E(D|X)$ (1), where $D = \{0, 1\}$ is the indicator of exposure to treatment and X is the multidimensional vector of pre-treatment characteristics. Given a population of units denoted by i, if the propensity score p(Xi) is known, then the Average Treatment effect on the Treated (ATT) can be estimated as follows (Rosenbaum & Rubin 1983):

$$T \equiv E\{Y_{1i} - Y_{0i}|D_i = 1\} \quad (2)$$
$$= E[E\{Y_{1i} - Y_{0i}|D_i = 1, p(X_i)\}] \quad (3)$$
$$= E[E\{Y_{1i}|D_i = 1, p(X_i)\} - E\{Y_{0i}|D_i = 0, p(X_i)\}|D_i = 1] \quad (4)$$

Y_{1i} and Y_{0i} are the potential outcomes in the two counterfactual situations of treatment and no treatment, respectively. The average treatment effect of the programme (impact), as presented above mathematically, is calculated as the mean difference in outcomes across these two groups (in this study, identified as affected and non-affected households). The validity of the PSM impact estimate depends on the fact that there are no unobservable factors that affect participation and there is a sizeable common support region in propensity scores across the affected and non-affected households. It also requires an adequate number of samples in the

non-affected stratum to match with households in the affected stratum. In addition, two conditions should be satisfied: 1) balancing of pre-treatment variables given the propensity score; and 2) unconfoundedness given the propensity score.

Different mathematical algorisms[12] are developed to match programme participants to non-participants based on their propensity scores. These include Nearest-Neighbour (NN) matching, Caliper and Radius matching, Stratification matching, and Kernel matching and Local linear matching.

In practice, the PSM method is useful as the second best alternative when randomization is not possible for various reasons and when baseline surveys are absent. Some studies compared the reliability of impact estimates from experimental and quasi-experimental methods and came up with consistent results (cf. Cook *et al.* 2006). In this study, we compared the impact estimates using two different methods (PSM and DiD) in Oromia Regional State, and we found consistent results. The PSM method is solely implemented in this study to estimate the impact of large-scale farming on the income and food security status of households in Gambella Regional State, where we did not have the opportunity to generate panel data. For the other two regions (Oromia and Benshanguel Gumuz regional states), we had the possibility to generate panel data, and hence the DiD method is used.

Mincer-type earning function: A Mincer-type earning function is adopted in the analysis of the determinants of wage rate in plantation monoculture in Ethiopia. The Mincer earning regression is widely used in the conceptualization and operationalization of factors earnings. It stipulates the statistical relationship between market wage rates, years of schooling and experience (Mincer 1958). Mathematically, the original Mincer function is presented as follows:

$$lnY_i(t) = a_0 + a_1 S_i + a_2 t_i + a_3 t_i^2 + \epsilon$$

Where the left hand side ($lnY_i(t)$) is observed earning, a_0 is the initial earning capacity of the employee without schooling and experience, a_1 is the rate of return to education, a_2 (coefficient for experience) and a_3 (coefficient for experience squared) are the rate of return to on-the-job training. One universal characteristics of the Mincer's earning function is the concavity of earnings function in which the coefficient for experience squared is expected to

[12] For details of the different matching algorisms see Heinrich *et al.* (2010) and Annex 1.3.

be negative. This is to mean that for individuals who are continuously attached to the labour market, their earnings rise at a decreasing rate throughout their life cycle.

Mincer suggested a log-linear functional form, which was criticized by other researchers. For example, Thurow employed a log-log model assuming that earnings are produced by a Cobb Douglas production function (see Thurow 1969). Heckman and Polachek (1974) used Box-Cox and Box-Tidwell models to test the appropriate functional form. Their findings suggested that the Mincer's log-linear specification fitted their data best. In 1974, Mincer relaxed the constraint that log earnings increase linearly with schooling and the constraint that log earnings experience profiles are parallel across schooling classes by adding an interaction term between experience and schooling (see Mincer 1974).

The Mincer earnings function implies that the more human capital investments an individual makes, the higher his or her earnings. Polachek (2007) argued that this happens in a competitive labour markets that reward employees based on their years of schooling, quality of their education and when the market rewards productivity of labourers. This is problematic particularly in wage employment in Ethiopia where labour markets are not competitive, and enough jobs may not be available for wageworkers with several years of schooling. Therefore, interpretation of the results should be done cautiously.

Although Mincer's earning function postulate the functional relationship between earnings and investment in schooling and on-the-job training (work experience), human capital theory explains that other demographic and socioeconomic variables are also important in explaining wage differences among different groups of workers in the labour market (Polachek 2007). As a result, labour economists estimate Mincer-type earning functions by including variables such as gender, race, and ethnic background, geographic location, occupational type, health status, marital status, age (to capture child labour abuse), union membership, etc. to estimate discrimination against a specific group of population that has relevant policy implications (cf. Gronau 1988; Mellor & Paulin 1995; Cline 2001; Hirsch 2006).

Based on the information generated during the exploratory survey, I extended Mincer's postulation by including other variables that are important determinants of wage incomes in plantation agriculture. This includes, but is not limited to: origin of wageworker, location of the large-scale farm, crop type cultivated by the large-scale farm, and type of wage work performed. The data generated from employees' survey were then subjected to Mincer-type log-linear regression to identify the determinants of different wages among wageworkers. The

analysis is carried out with the aim of identifying which group of the population has benefited from wage employment in plantation agriculture, which has the potential to pinpoint the winners from wage employment. The result is presented in Chapter 4.

1.9 Introducing the Chapters of the Dissertation

This dissertation has seven different chapters with Chapter 1 already discussed in the preceding sections. In Chapter 2, I discuss theoretical and policy issues related to agriculture and large-scale farming. Most importantly, this chapter elaborates the link between agriculture, national food security and its roles in agricultural and economic transformation. It then presents the dominant empirical arguments about agricultural development through large-scale farming. In the sequel section, I preview the political economy of Ethiopia from past to present in order to provide sound historical background about the approaches of large-scale farming in Ethiopia.

Chapter 3 of this dissertation discusses the contributions of large-scale farming to local economic development, based on meso-level (district/regional) and macro-level (national) analysis. The chapter examines: (1) the contributions of large-scale farming to employment generation, technology transfer to smallholder farmers, infrastructure building, and fiscal revenue generation; and (2) the divergence/convergence between early expectations and actual experiences from large-scale farming in Ethiopia held by different stakeholders. It draws more broadly on the implications of the divergence/convergence to agricultural development through large-scale farming. The chapter adopts a cost-benefit analysis approach between two different land-uses (current land-use and the land-use in the previous setting before it was transferred to the companies) to identify the trade-off and pay-offs in investment. It also compares the perceptions of key government stakeholders working at different levels of the government structure and the local community regarding expectations and praxis of benefits from large-scale farming. This chapter is written by elaborating the contributions made to the following publications:

Shete, M., and M. Rutten. 2014. Biofuel Feedstock Production in Ethiopia: Status, Challenges and Contributions. In: Akinyoade, A., W. Klaver, S. Soeters & D. Foeken (eds), *'Inside Africa's Agricultural, Food and Nutrition Dynamics. Digging Deeper'.* Leiden: Brill. p. 135–156.

George, S. and **M. Shete**. 2014. Modernizing the Periphery: Citizenship and Ethiopia's New Agricultural Investment Policies. In: Kaag, M. & E.B, Zoomers (eds), *'Land Grabbing: Beyond the Hype*', London: Zed Books. p. 17–35.

Shete, M., and M. Rutten. Stakeholders' Perspectives on Large-Scale Agricultural Investment in Ethiopia: An Analysis of the Disconnects between Expectation and Reality. Submitted to *Development Policy Review*.

Chapter 4 of the dissertation discusses the micro-level impacts of large-scale farming in Ethiopia on employment generation and income levels of the local people based on data collected from employees survey, company records and household surveys. It adopts the quantitative approach of the Mencer regression function in order to estimate what determines different levels of wage incomes among different groups of wageworkers. It also uses the Difference-in-Difference (DiD), and the Propensity Score Matching (PSM) techniques to estimate the impacts of large-scale farming on the income levels of households who are directly affected by investments. The chapter is written by expanding and adding more data to the following publication:

Shete, M. and M. Rutten. 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.

Chapter 5 of this dissertation presents empirical evidence from household surveys and qualitative interviews of local people on the impacts of large-scale farming on household food security. It provides quantitative estimates of the impacts attributed to large-scale farming using the Difference-in-Difference (DiD), and the Propensity Score Matching (PSM) techniques of evaluating policy interventions. The chapter is based on an extended discussion of two contributions presented below and empirical data from other regions, which were not included in the publications.

Shete, M. and M. Rutten. 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. and M. Rutten. 2015. Large-scale land acquisitions in Ethiopia: Implications for agricultural transformation and livelihood security. In: Hall, R., I. Scoones and D. Tskikata (eds), *'Africa's Land Rush: Implications for Rural Livelihoods and Agrarian Change'*, UK: James Currey. p. 62–85.

Chapter 6 examines vegetation cover change induced by large-scale farming and its effects on selected environmental variables. It addresses the research question, what key environmental components have changed (improved/increased or declined/worsened) due to the intervention, based on the perceptions of local people in their capacity as users of common-pool resources. It integrates the qualitative responses of local people, field observation, land-cover change analysis based on spatio-temporal satellite image, and quantitative analysis of soil data generated from two different land-uses. The chapter is written based on an extended discussion of the following contributions:

Shete, M., M. Rutten, G. Schoneveld and Z. Eylachew. 2015. Land-use changes by large-scale plantations and its effects on soil organic carbon, micronutrients and bulk density: Empirical evidence from Ethiopia. *Agriculture and Human Values,32(4):1−16.* DOI 10.1007/s10460-015-9664-1.

Shete, M. *Forthcoming*. Large-scale farming and patterns of land-use change in Ethiopia: A critical assessment of long term environmental sustainability. A book chapter submitted upon invitation from the Harvard Law School, Institute of Global Law and Policy to the volume: *Land Grabs in Africa: Economic Imperialism*.

Chapter 7 aims at comparing impacts of large-scale farming based on origin of the investor, geographical location of the investment, and type of crop commodity produced. It also aims at synthesizing the key factors that determine the performance of large-scale farms, and draws policy implications and makes recommendations regarding the agricultural development of the country and the global land-acquisition debate.

CHAPTER 2: AGRICULTURE AND ECONOMIC DEVELOPMENT IN AFRICA

2.1 Introduction

Many African nations, with the exception of Ethiopia and Liberia, had a colonial history and their development policies were much influenced by colonial powers. Soon after their independence in the late 1950s and early 1960s, with the exception of few countries such as Mali, Ghana and Guinea, which espoused socialism, many African leaders adopted mixed economic policies and emphasized industrialization, diversification of their economies, expanding educational opportunities and nation building (Eicher & Baker 1992). Their approach to development was generally urban-biased and they gave little attention to the agricultural sector, despite its importance in propelling economic growth and reducing poverty.

African leaders considered agriculture not only to be 'backward' and 'outdated', but also as a sector from which to extract surpluses, through taxation, in order to finance the industrial sector and urban development, and as a source of surplus labour (Eicher & Baker 1992, p. 22; Hoeffler 2011, p. 7). The leaders were generally pessimist about the agricultural sector's ability to bring much-needed economic growth. Industrialization, on the other hand, was perceived as delivering a high rate of economic growth and as being a short-cut to structural and economic transformation (cf. Bates 1981; World Bank 2000; Hoeffler 2011). Historically, producers of agricultural commodities in general and agricultural export commodities in particular were discriminated against by African governments' biased policy that supported producers of non-agricultural commodities (Bates & Block 2009). Hence, for several decades, the agricultural sector faced the challenges of policy distortions and received little government support, which Collier & Gunning (1999) refer to as *sins of commission* and *sins of omission*, respectively.

The *sins of commission* in African agriculture are reflected in the different trade policies. For example, exchange rates were overvalued, export was banned or heavy export duty was levied to discourage export, and marketing boards were set up to provide politically influential urban dwellers with cheap food commodities (Bates 1981; Cabral & Scoones 2006). On the other hand, African governments committed the *sin of omission* in African agriculture by allocating a small proportion of the annual budget to the agricultural sector, and thus investment in rural infrastructure was minimal. Spearheaded by the World Bank and the International Monetary Fund, African governments adopted structural adjustment policies in the 1980s. The punitive measures of structural adjustment policies significantly reduced the capacity of African

nations to invest in the much-needed infrastructure and further fuelled the pervasive nature of the *sin of omission*. For example, public spending as share of agricultural GDP between 1980 and 2000 was very low and evidence showed that it barely exceeded 4% of the agricultural GDP, until the mid-2000s, when it increased slightly to 6.4% (World Bank 2007; Fan *et al*. 2009). An improvement in public spending in agriculture is recorded after the African heads of states acknowledged the poverty-reducing and broad-based economic development roles of agriculture in Africa, which culminated in the adoption of the Comprehensive Africa Agriculture Development Programme (CAADP) in Maputo (African Union 2003). This has significantly affected growth in the agricultural sector.

There is general consensus that agriculture received little policy support in the past, but that land-locked countries exhibited the least bias compared to those in coastal areas (Bate & Block 2009). Agricultural policies and approaches to rural development adopted in Africa were influenced by the global political system (Ndulu *et al.* 2007), and thus different policies were experimented with over the years, but often relegated to the scrap heap before maturing to the point of scaling-up. Therefore, African agriculture was mostly an experimental station of inappropriate western economic models. This emanated from the lack of thorough understanding of the sector's contribution to overall economic transformation as well as its role in poverty reduction and food insecurity relating to the African population.

2.2 The Role of Agricultural Development in Economic Transformation

According to Oya (2010), neo-liberals and neo-populists are pessimistic about the performance of agriculture and its potential role in economic transformation. Neo-liberals associate poor agricultural performance in the 1960s and 1970s in Africa with policy distortions and heavy-handed government interventions in the sector, while neo-populists associate the agrarian crisis to state-designed modernist interventions as well as to subsequent market liberalizations, which discriminated against smallholder food producers. Gradually, however, pessimism is fading and a Green Revolution is anticipated in Africa. The potential role of agriculture in economic growth and poverty reduction is acknowledged, and thus several African nations have designed agricultural-centered development strategies.

A 2008 World Bank report stressed that agriculture is the major source of growth in Sub-Saharan Africa (SSA), accounting for up to 32% of the GDP. Regardless of whether a country is still agricultural-based, is transforming or has become an urbanized economy,[13] the poverty

[13] Agriculture-based countries are those in SSA in which 32% of the growth in GDP comes from the agricultural sector, compared to those transforming (e.g. China and India) and urbanized (e.g. Europe and Central Asia)

reducing effect of growth in the agricultural sector is at least twice the poverty-reducing effect of the non-agricultural sector (World Bank 2007). Agriculture in SSA serves not only as a sector with multiplier effects in other sectors of the economy, but growth in this sector has also proved to have a far-reaching poverty reducing effect compared to countries in transforming and urbanized economies (World Bank 2007; Hoeffler 2011).

Researchers also argue that higher agricultural output: stimulates growth in the non-agricultural sector, and thus spurs overall economic growth in Africa (Juma 2011); generates employment with a far-reaching poverty reduction effect (Bezemer & Heady 2008; Diao *et al.* 2008); and diffuses patterns of urbanization from mega-cities to rural towns, thus having a positive effect in terms of narrowing down rural-urban income disparities (Tacoli & Satterthwaite 2003). Agriculture-led growth is argued to have greater impact on poverty reduction than non-agriculture-led growth (De Janvry & Saddoulet 1996; Bourguignon & Morrisson 1998; Salami *et al.* 2010). Its poverty reducing effect is significantly higher when interventions are targeted at middle-farmers, who can adopt agricultural productivity enhancing technologies and produce marketable surplus, and when interventions are targeted at areas that have high production potential (Mellor & Dorosh 2010).

Most importantly, it is argued that the economic transformation roles of growth in the agricultural sector are achieved when strong linkages are established between surplus agricultural producing areas and the (rural) non-farm sector. This occurs when investment in infrastructure, such as roads, telecommunications and rural electrification, takes place (Haggblade *et al*. 2007; Juma 2011). Alliance for a Green Revolution in Africa (AGRA),[14] in its background note on Africa's economic transformation, noted the presence of untapped agricultural potentials in Africa that can be harnessed to bring a faster economic growth to the continent (AGRA 2015). Despite the potential of the agricultural sector as a driver of economic growth, poverty reduction and improving food security, the performance of the sector in several African countries is still disappointing (Hoeffler 2011; Moyo *et al.* 2015). It is a sector that has showed decline in productivity, unlike experiences from East Asian countries. So far, the Green Revolution has not happened on the continent. The sector still faces severe taxation and restrictive government policies, and private investment is crowded out (Cheru 2008).

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economies in which the contribution of agriculture to their GDP accounts for up to 7% and less than 5%, respectively (World Bank 2008).

[14] AGRA is a partnership between the Rockefeller Foundation and the Bill & Melinda Gates Foundation, working on the development and distribution of improved seeds, improving soil management and enhancing market access.

In 2003, the African Union member states vowed to increase investment in agriculture by allocating 10% of the national budget to the sector by 2008, and by registering at least 6% growth in agriculture per annum. The 2003 Maputo declaration on agriculture and food security is endorsed under the framework of CAADP and contributes to the Millennium Development Goal of halving poverty by 2015 in member states (African Union 2003). Here, it is relevant to unpack the commitment of African governments to providing the needed policy and resource support to the agricultural sector. For example, only 10% and 22% of member state countries in 2003 and 2006, respectively, complied with the Maputo declaration of committing at least 10% of their national budget to agriculture (NEPAD 2009).[15] Similarly, the Food and Agriculture Organization of the United Nations revealed that public spending on agriculture in Africa declined from 4.5% of the total expenditure in 2001 to 2.5% in 2012 (FAO 2015 in Moyo *et al.* 2015).

After the Maputo declaration, agricultural GDP has reportedly grown, on average, by 4%, which is below the target (Moyo *et al.* 2015). While this is an improvement compared to the 1990s, the performance of the agricultural sector is not impressive, even for those countries that spend huge public resources on agriculture. For example, a study by the World Bank (2008) showed that despite a decade of significant public spending on Ethiopia's agricultural sector, productivity is very low and the sector is characterized by low-input and is largely subsistent. In this regard, Geda & Birhanu (2011) argued that spending in the agricultural sector in Ethiopia is made without proper planning and this had resulted in limited welfare and growth impact of public spending in the agricultural sector of the country.

Ethiopia adopted an unbalanced growth model soon after the incumbent government assumed power in 1991. Agriculture was chosen as a leading sector, and the government prepared the Agricultural Development-Led Industrialization (ADLI) as a strategy for implementing the model. Increasing production and productivity of smallholder farming was at the centre of the ADLI, and large-scale farming is anticipated to play a vital and complimentary role in the economic and agricultural transformation of the poverty-stricken nation (cf. MoFED 2003). The next sections provide a historical overview using the model of large-scale farming in Africa as a tool of transformation, and subsequently present a conceptual model to analyse the impacts of large-scale farming on local economic development, household food security and the environment in Ethiopia.

[15] Ethiopia is one of the few countries that has successively allocated at least 10% of the national budget to agriculture since 2003 and achieved more than 6% growth per annum (Geda & Birhanu 2011).

2.3 Economic and Agricultural Transformation through Large-scale Farming

2.3.1. The political economy argument of farm size

In the political economy of agrarian transformation, the literature is dominated by the debate between those scholars who support the neo-classical neo-populism perspective, which profoundly recommends redistributive land reform, from large-scale farm enterprises and property that use hired labour to small-scale family-operated farms (cf. Lipton 1977; Berry & Cline 1979; Griffin *et al.* 2002) – and those who criticize it (cf. Byres 2003; Dyer 2003; Sender & Johnston 2003; Bernstein 2004). Griffin *et al.* (2002) present a number of success stories regarding redistributive land reform in East Asian countries (Taiwan, Japan, South Korea, China and Vietnam) that transferred large-scale landed property to small-scale farmers to support the notion of an inverse relationship between productivity and farm size.

Bernstein (2004) criticized the presentation of Griffin *et al.* (2002) success stories, arguing that the cases do not involve large-scale production with hired labour (but used 'coerced labour') and that they provide little evidence of redistribution of large-scale agricultural enterprises to small-scale farmers; rather, they were limited to discussing the role of local-level struggles for land, as in the case of *Movimento Rural Sem Terra* in Brazil, in today's agrarian question. Further, due to aggregation of data, the analysis failed to take account of differences in crop and livestock production, socio-demographic and agro-ecological differences that are important in determining the inverse relationship postulate. Byres (2003) and Dyer (2003) also challenged the redistributive land reform recommendation of GKI as a strategy for poverty reduction by referring to its defective approach, which is based purely based on the neoclassical approach of perfect competition that fails to consider the historical processes involved in capital transformation. The inverse relationship between productivity and farm size concluded by Griffin *et al.* (2002) is thus, as Byres argues, not true at all times and in all places due to the development of capitalism in agriculture and the emergence of class structure and differentiated peasantry. Sender and Johnston (2003) argue that there is little empirical evidence to support the inverse relationship argument between productivity and farm size in (South) Africa and redistributive land reform is unlikely to benefit the poor.

Bernstein (2004, p. 197) provided an interesting argument after going through the different critiques of the Griffin *et al.* (2002) postulate. He argued that:

> farm size is better understood as an effect of social relations and their dynamics than as the source or cause of productive virtue and vice, as in neo-classical populism on the one hand, technicist conceptions of

> economies of scale on the other hand. Understanding the determinants of farm sizes and their distribution, and of the relations between farm(er)s of different sizes and between farmers and agrarian labour, requires the investigation of historical specificities, utilizing the analytical means provided by more general theoretical models.

It can thus be concluded that it is oversimplification to consider the model of large-scale farming as a 'vice' and that of small-scale farming as a 'virtue' in reducing the plethora of poverty in Africa or in deciding on the allocation of productive factors based on a simple economies of scale argument without understanding specific and significant historical and social relations of production. In the following section, I provide the historical perspectives and some specific experiences of the model of large-scale farming in Africa to shed light on how the decision on the allocation of land resources is framed in the African context.

2.3.2. History and experience of large-scale farming in Africa

Historically, large-scale farming in Africa dates back to the colonial period with the cultivation of export crops by Europeans. After independence in the 1960s, agricultural policies in Africa supported large-scale farming on the ground of bringing rapid economic development by harnessing the benefit of economies of scale (Eicher & Baker 1992).

The debate between large-scale and small-scale farming in Africa was framed around the terminologies of transformation and improvement approaches. The transformation strategy of agricultural development includes different variants of large-scale farming such as plantation agriculture, state farms and land settlement schemes in empty area and the promotion of processing plants. The improvement strategy, on the other hand, is a term used for the strategy of improving the farming practices of smallholder farmers (Eicher & Baker 1982, 1992). Historically, some success stories of large-scale farming, such as the Gezira scheme in the Sudan, Firestone rubber estate in Liberia, Unilever estate in Democratic Republic of Congo (the then Belgian Congo) etc., were presented to justify the 'transformation approach' as the best agricultural development strategy to bring agricultural transformation to the newly independent African states (Eicher & Baker 1982, p. 49).

The transformation approach was challenged by some African scholars who argued that the western advisors exaggerated the contributions of large-scale farming by ignoring failed cases of plantation monoculture schemes such as the East Africa groundnut scheme of the British in Tanzania (the then Tanganyika) and the Mokwa settlement scheme in Nigeria (Baldwin 1957). Eicher and Baker (1982) also argued that fifty years of experience in large-scale

farming in Africa demonstrated the failure of the model. They presented failed examples of large-scale farming schemes from Liberia (e.g., the Uniroyals large scale food production which terminated in 1960s), Ghana (e.g. a maize farm and grain storage complex) and Cameroon (e.g. a 4,000 hectare government-run mechanized wheat farm which faced difficulty in 1979). Detailed evaluation of the transformative model in southern, western, eastern and mid-western Nigeria showed that large-scale plantation schemes all failed to transform Nigeria's economy (cf. Roider 1971; Wells 1974; Andreou 1981). In Ethiopia, state-run large-scale farms that existed during the Derg regime experienced serious inefficiencies and failed to transform the country's economy (cf. Dejene 1987; Bruce 1998; Tirfe 1999).

Yet, there is substantial support among African politicians and donors to the model of large-scale farming as an economic transformative tool. In the recent burgeoning policy debate, however, the argument is not about choosing one model over the other, but exploiting the complementary benefits of smallholder and large-scale farming. Collier and Dercon (2009) argued that by encouraging the vertical integration of smallholder farmers with large-scale commercial enterprises, it is possible to exploit scale economies provided by the later. A second justification in terms of the complementary roles of foreign direct investment in agriculture is provided by Liu (2014).

As discussed earlier in this chapter, the lack of investment in agriculture due to *the sin of omission* was one of the reasons for the stagnation and decline of agricultural productivity in the past three decades. In this regard, public investment in agriculture by governments is a necessary condition in terms of channeling private investment towards agriculture. A higher agricultural output, however, is by no means sufficient to bring the needed economic transformation given that African governments have huge financial gaps (Liu 2014). Evidence showed that the share of official development assistant going to agriculture declined in the past few decades (Hallam 2011), and thus, the investment gap in agriculture is not expected to come from international donors either. Liu (2014) argued that the public investment gap in agriculture can be filled if governments in developing countries harness the complementary roles of foreign direct investment in agriculture and investments made by farmers.

Further, it is argued that the transformative approach has potential positive spillover effects in terms of employment generation with decent incomes, access to capital and markets, increased food availability and transfer of knowledge and technology (Liu 2014; Moyo *et al.*

2015). In this regard, large-scale commercial enterprises that adopt the model of out-grower schemes are generally argued to bring a win-win benefit (Moyo *et al.* 2015).

A detail investigation of large-scale farming and its roles to rural wage employment is presented by scholars from the School of Oriental and African Studies. In this regard, Cramer *et al.* (2008) studied rural labour markets in Mozambique and discovered the positive role of large-scale plantations in generating employment with relatively higher median wages compared to local farmers, who often use wage labour without considering minimum wage rate regulation, despite the fact that job tenure is also insecure in the case of large-scale farms. Another study by Cramer *et al.* (2014) investigated the impact of fair-trade certification on the wage levels of small-scale (coffee) and large-scale farms (flowers) in Ethiopia, and found that wageworkers employed by fair-trade certified companies received less wages than non-certified companies in both small and large-scale farms. In this case, however, the definition of large-scale farming is based on the number of workers absorbed by the farms. Oya and Sender (2009) argued, based on their study in Mozambique, that paternalistic control of married women prohibited their participation in wage employment opportunities available in large-scale plantations compared to those who are divorced, separated and widowed, and thus the transformative approach is found to benefit women-headed households much more than male-headed ones.

The transformation approach had been adopted in Ethiopia as a tool of economic and agricultural transformation since the imperial period, albeit in different ways. Emperor Haile Selassie promoted private-owned large-scale commercial farms while the military junta adopted state-owned large-scale commercial farming as a strategy for agricultural modernization. The incumbent government, on the other hand, adopted both variants of state-run (e.g. sugar estates) as well as private-owned large-scale commercial farming models as a transformation tool. Despite the fact that the agricultural development-led industrialization strategy is largely anchored on enhancing the productivity of smallholder farmers, it had indeed acknowledged the complementary roles of large-scale commercial farming in the country. This signifies that the policy narratives in Ethiopia are in line with the arguments of Collier & Dercon (2009), Liu (2014) and Moyo *et al.* (2015) and the findings of Cramer *et al.* (2008) may support the argument of the Ethiopian government about the economic benefit of promoting large-scale farming in the country. The remaining task is thus to evaluate the impacts of large-scale farming in Ethiopia through a well-grounded research, which is the overall aim of this dissertation.

2.4 Contextualizing Large-scale Farming in the Historical Political Economy of Ethiopia

2.4.1 Introduction

While the general aim of this dissertation is to identify the impacts of large-scale farming on local economic development in Ethiopia, providing a historical overview of state formation and the political economy of the country is vital since it determines frontiers of large-scale farming in the country. Therefore, understanding this historical context is useful for the discussions forthcoming.

2.4.2 State Formation and Ethiopia's Political Economy during pre-Haile Selassie Period (1855–1930)

History reveals that Ethiopia underwent various processes of state formation that resulted in the country having constituted different spaces in the past and present. The traditional state of Ethiopia, known as the Abyssinian Empire, had existed for more than 3000 years. The Abyssinian Empire came under severe pressure at the beginning of the sixteenth century due to a series of expansions by the Oromo, the Ottoman Turks and the Somalis, and thus, the empire was very much weakened. Ras Kasa waged a series of wars to restore the then traditional Ethiopian state in 1853 and he became Emperor Tewdros II in 1855 (Keller 2005). The ideology of modern state formation in Ethiopia started in the mid-1800s, which coincided with the scramble for Africa by the Europeans. Emperor Tewdros II (1855–1868) formed a pioneer kingdom, instrumental for Ethiopian modern state formation, which had a policy of modernization and centralization of power (Teshale 1995). As part of his modernization efforts, he instituted, among other things, new administrative units that abolished the power of local princes and kings, and assigned administrators from his military or members of the royal family. The administrators were responsible for collecting taxes. Following the advice and training of the Turks and Europeans, notably the British, he also established a modern military. These reforms were instrumental for the centralization of power and maintenance of law and order in the country (Keller 2005).

His successive heirs, Yohannes IV (1872–1889) and Menelik II (1889–1913), maintained his policy of modernization of the state and centralization of power to different degrees. Emperor Yohannes was less successful in the centralization of power but made a successful stride in foreign diplomacy. He signed the first peace treaty with Egypt and a trade agreement with Britain (Keller 2005). Emperor Menelik assumed the throne in 1889 after the death of Emperor Yohannes in his battle with the Sudanese Mahdist. As part of the modernization effort, the Menelik regime, with the help of French, British and Italian companies (Norberg 1977), established the first telegraph line linking the provinces of the Ethiopian Empire

(Norberg 1977; Markakis 2011), the Addis Ababa–Djibouti railway, the first financial institution, i.e. the Bank of Abyssinia, the first government owned (Menelik II) school, the first state printing press, the Russian-owned Red Cross hospital and a government owned Menelik hospital. Menelik was also instrumental in creating the socio-spatial patterns of Ethiopia by pushing the frontiers of the state to the south, west and east, through either diplomacy or conquest (Bahru 2002).

The territories of Somali Ogaden and the Baro Salient of today's Somali and Gambella regional states were incorporated into the state during the reign of Emperor Menelik. Like his predecessor, Menelik was also active in foreign diplomacy and signed different treaties, e.g. with Italy, France, Britain and Mahdists, that acknowledged his power and sovereignty in Ethiopia. Keller (2005, p. 87), recognized the relentless efforts of these kingdoms in contributing to the consolidation of the geographical boundary of today's Ethiopia and the creation of modern state bureaucracy along the 'Westphalian model of state organization', which warranted international legal recognition of national state boundaries. The process of state formation through coercive subjugation of the territory, and forming a multi-ethnic unitary state prevailed throughout the four kingdoms. What was largely ignored during these periods, however, was the lack of effective mechanisms, other than cultural and institutional impositions, to integrate the subjects in the periphery into the state, which lashed the development of any strong sense of nationalism. As a result of widespread inequality between the centre and the periphery, national identity was challenged by the ideology of ethnic nationalism in the early nineteenth century, and this was passed to the next heir in 1930 together with the unfinished modernization project of Menelik.

2.4.3 Ethiopia's Political Economy during the last Empire (1930–1974)

The inherited notion of modernization[16] was intact during the rule of Emperor Haile Selassie (1930–1974). While modernization[17] had been advocated since Emperor Tewdros, modern economy building effectively started in the mid-twentieth century with the ideology of development capitalism. The imperial regime of this period sourced expatriate advice and established institutions responsible for crafting centrally-administered development plans. Between 1945 and 1957, with the technical help of the FAO, Yugoslavia and the United

[16]The modernization theory represents the perspectives of non-Marxist writers of the 1950s and 1960s and includes: evolutionism, diffusionism, structural functionalism, systems theory and interactionism (Harrison 2005). Rostow (1960) suggested that all societies should pass through five stages of economic growth: from being a traditional society to the drive to maturity, which represents 'modern' society.

[17] Readers should, however, note that the discussion of modernization efforts of past kingdoms is neither the intent of this dissertation, nor exhaustive by any means. It was rather presented to provide how modernization was understood during those times, and to map the historical evolution of commercial farming in the country.

States, development plans were prepared, but were shelved due to a country-wide shortage of skilled human power to successfully implement the plans. In 1954, the government established the National Economic Council responsible for economic policy making, and it developed two successive five-year development plans (Ofcansky & Berry 1991).

The first five-year development plan (1957–1962) emphasized the development of infrastructure and communication facilities with the aim of extracting resources in the hinterlands, training skilled and semi-skilled labour that can work in import-substituting processing industries, and accelerating agricultural development through the promotion of large-scale farming (Ofcansky & Berry 1991). Following the plan, the country promoted investment in modern education, construction of transport and communication infrastructure (e.g. radio broadcasting, all-weather roads, air transport linking major towns), and development of large-scale mechanized farms and export-oriented plantations. The investment improved urbanization and economic development outside the Abyssinian homeland of the northern highlands, but resulted in declining agricultural productivity and impoverishment of smallholder farmers in the north (Markakis 2011).

In 1963, the imperial regime established the Ministry of Agriculture that was entrusted with the responsibility of providing agricultural extension services to farmers (Abate 2007). The year was the beginning of the second five-year development plan (1963–1967), which focused on transforming the country's economy, based on subsistence agriculture, into one of a vibrant agro-industrial system. It focused on the introduction of modern processing systems, diversification of products and expansion of the economy's production capacity. A modern taxation system was introduced in 1966 with a proposal to register all land, but opposed by the majority of the landed nobility who were members of the parliament (Ofcansky & Berry 1991). A bill on agricultural product tax was also passed in 1967 but discontinued in 1969 after fierce resistance from land owners. Government policies were designed to attract private-owned manufacturing firms and large-scale farms (Vaughan & Gebremichael 2011; Berhanu & Poulton 2014) and an investment code was also enacted. Export commodities such as coffee and *khat* were promoted, and the southern highlands were identified as the frontier of coffee production (Markakis 2011). In the east, the Awash valley was identified as the frontier of large-scale commercial farming. At that time, 200,000 ha of cultivable land with irrigation potential was identified. The presence of road and railway infrastructure passing to port Assab also justified the choice of this frontier (Markakis 2011, p. 138).

The imperial state established the Awash Valley Authority in 1962 entrusted with the responsibility of allocating land resources to investors as deemed appropriate. The Authority had leased 31,000 ha of land to investors by 1971. In 1975, there were twenty private-owned commercial farms and thirteen joint venture[18] farms cultivating a total of 60,000 ha in the Awash valley (*Ibid*. 2011). Although the government claimed that the land could be made available for commercial agriculture with little economic and political trade-off, the conversion of land use affected the traditional migration patterns of pastoralists for pasture and water (Ofcansky & Berry 1991). The commercial farms in this region cultivated high value crops like sugarcane, cotton and sesame (Zewde 2008; Rahmato 2009; Vaughan & Gebremichael 2011). The British company Mitchell Cotts produced cotton (Tendaho cotton plantation) while the Dutch Handels Vereniging Amsterdam (HVA) engaged in sugarcane (Wonji sugar plantation). These two companies were among the most important foreign owned large-scale farms in Ethiopia during this time.

In those days, the production of cotton in the Awash valley accounted for 87% of the total land allocated for large-scale farming, which shows the similarity of the imperial regime with the present Ethiopian government in the selection of cotton as a strategic crop commodity. In the southern highlands, the coffee production potential of the area attracted the state to modernize production and processing of the coffee berry, which was one of the export commodities of the regime. In the northwest, the Humera area was targeted for large-scale oil seed cultivation.

The historical development of capitalist agriculture in Ethiopia illustrates that today's large-scale land transfer for large-scale farming to foreign and domestic capital is not a new phenomenon, but a continuation of past modernization efforts. Another important point here is that all the manufacturing firms and commercial farms were placed outside the 'Abyssinian homeland', with a clear intention of the imperial state to use investment as a tool of economic integration between the centre and the periphery (Markakis 2011). Besides the lack of land in the central highlands making it unsuitable for large-scale farming in Ethiopia, I also argue that the geographical domination of today's large-scale farms in the lowland periphery (discussed below), is partly a mechanism of incorporating the periphery to the core of the republic. During our fieldwork we observed that the Nuer indigenous ethnic group in Gambella interacts more often with South Sudan (for example, in marketing of goods and services and sometimes making a living by finding a job in South Sudan) and the Nuer identify themselves more to South Sudan than to Ethiopia, which shows the lack of effective integration of the

[18] Foreign firms jointly with the imperial state.

periphery into the centre even today. They are also in constant conflict with the Anuak indigenous ethnic group of the region.

The third five-year plan (1968–1973), developed by the Ministry of Planning, aimed at accelerating the country's economic growth by improving the performance of the manufacturing and the agro-industrial sectors. Unlike previous five-year development plans that promoted the development of large-scale farms, the third five-year iteration recognized smallholder farmers (Aredo 1990). With the help of Swedish International Development Agency (SIDA), the Chilalo Agricultural Development Unit (CADU) and the Wolaita Agricultural Development Unit (WADU) were initiated with the aim of implementing integrated rural development activities (Ketsela 2006; Abate 2007). CADU and WADU facilitated, among other things, the provision of improved seeds, fertilizers, credit services to the farmers and promoted the development of road, irrigation and soil conservation structures. In 1972, the Ministry of Agriculture designed the Minimum Package Programmes (MPP) that provided extension advice and credit schemes for wealthy smallholder farmers (Gebremedhin *et al*. 2006; Davis *et al.* 2010). A similar agricultural extension programme, the Comprehensive Package Programme, was also designed for organized groups of farmers (Davis *et al.* 2010), but proved to be less successful due to its huge resource requirements.

Evaluation of the performances of the three successive development plans showed that all failed to reach the planned targets. Some authors (Berhanu & Poulton 2014) claim that structural issues related to land tenure insecurity were one of the critical problems of the imperial era that hampered success. There was a growing opposition to the Haile Selassie regime between 1960 and 1974 that shifted the focus of the regime towards addressing this resistance, rather than implementing the second and third five-year plans. Lack of administrative and technical staff was also among the challenges exhibited throughout the three successive five-year plans that resulted in poor performances. A trade balance deficit was the rule more than the exception, and economic growth hardly surpassed 3.2% in the first five-year plan (Ofcansky & Berry 1991).

Land, the state and politics are intimately interlinked and central to the political economy of the country throughout its history. During this period, the land tenure system was very complex and one can find several versions within a certain region (Bruce 1998). For instance, Ofcansky & Berry (1991) noted about 111 different land tenure systems in the former Welo province. For ease of understanding, the major types of land tenure systems that existed in the northern highlands and the southern highlands are described here. The dominant land tenure

system in northern provinces, such as Gojam, Begemedir, Simen (Gondar), Tigray, highlands of Eritrea, Welo, and northern Shewa, was a communal land ownership system called *rist*. Under this system the land belongs to a lineage group, and descendants have usufruct rights to a plot of family land. Land under this system is inherited from family members, but it can neither be alienated, nor sold outside of the family. Land is not a commodity to be mortgaged or bequeathed since the land belongs to a kinship group. Under this system, the majority of the peasants own *rist* lands but some members (estimated at 2%) who were not part of the family served as tenants on *rist* lands. Absentee landlordism was rare in the northern highlands (Ofcansky & Berry 1991).

In the southern highlands, the *gult* system existed. Under the *gult* system land ownership rights are acquired from the monarch as compensation from the government for serving the monarch or provinces. *Gult* owners collected tribute and received labour services as payment in kind from peasants. The number of tenants under this system was huge, estimated between 65–80%, and payments by tenants to landlords were estimated at 50% of their produce (Ofcansky & Berry 1991). In the southern highlands, two-thirds of the land was owned by the Ethiopian Orthodox Church and landlords. Other forms of land ownership include *maderia* – land granted to government officials as salary, *mengist* – land owned by the state, and *samon* – land granted by the state to the Orthodox Church. The Ethiopian Orthodox Church and the government were estimated to own about 20% and 12% of the country's agricultural land, respectively (*Ibid*. 1991). The state collects tributes from all but the land owned by the Ethiopian Orthodox Church (Markakis 2011). Peasants in the *gult* system had no usufruct rights to land. The period was dominated by unequal land ownership and absentee landlordism was common (Abbink 2011). The peasantry was supposed to pay taxes and land rents to absentee landlords even during periods of famine. They were often evicted from their land when they failed to pay tributes to their landlords (Van Santen 2011).

The government did not give any policy support to smallholder agriculture both in the northern and southern highlands. From 1963–1973, the agricultural sector received only 4% of the state's budget. Particularly in the south, tenure insecurity was a disincentive for farmers to boost their production. This resulted in stagnation of agricultural productivity and a dire fall in per capita food production (Ofcansky & Berry 1991; Bruce 1998; Markakis 2011). Due to the policy bias against the peasantry, the country was not able to cope with the drought that resulted in a shocking famine in 1972, which continued until 1975 (Markakis 2011; Van Santen 2011). The famine reportedly led to the deaths of more than 200,000 people in Tigray and Wollo provinces of Ethiopia (Degefu 1987; Ofcansky & Berry 1991; Devereux 2000).

The land tenure system in the lowland periphery was dominated by communal ownership of pastoralists and governed through customary rules. This remained undisturbed by the rulers from the northern highlands due to the unfriendly environmental conditions of the lowland regions, until technology allowed for the control of malaria risks and increased access to irrigation facilities for large-scale commercial farming in the 1960s, especially in the Awash valley. As had previously been the case, the socio-spatial relations continued to be centralized at the core of the polity during Haile Selassie's period. The expansion of farmlands in the south and east were, therefore, part of the process to integrate the periphery to the state (Markakis 2011; Makki 2012), and it aimed at modernizing the agricultural sector by transforming 'traditional' agrarian society into 'modern' society of the Western style. However, the majority of the lowland areas, dominated by (agro-) pastoralism and shifting cultivation, were not incorporated into the imperial state bureaucracy, and their contribution to the national economy at that time was viewed insignificant due to the absence of effective market linkages for pastoralists' livestock production (Markakis 2011). Thus, they did not receive any meaningful development interventions until recently when tapping land-based resources in those areas, through agri-business development, mining and oil exploration, was considered vital for national economic development (*Ibid*. 2011).

The leaders who reigned the four kingdoms were from the Abyssinian highlands (Keeley & Scoones 2000) and the process of integrating the lowlands to the highlands continued throughout the Ethiopian history. The defining behaviour of the centre-periphery relationship is the centralization of power at the centre and the marginalization of the periphery in political power. Yet, local resources are appropriated to the state by the centre (Markakis 2011). The geographical mapping of the different lowland and highland areas in Ethiopia evolved in the history of modern state formation in the country, which is markedly different from today's geographical delineation based on ethno-lingual federation. The modernization philosophy of the past kingdoms was more biased towards urbanization, state bureaucracy formation, infrastructure building, and neglected the rural hinterlands and smallholder agricultural development.

2.4.4 Ethiopia's Political Economy during the First Republic (1974–1991)

Following the agrarian crisis that existed during the imperial era, a series of uprisings by the so called students' movement led to the overthrow of the emperor by the military junta, the

Derg,[19] in 1974. Soon after gaining power, the Derg adopted Marxism-Leninism as its leading political ideology. A radical land reform that brought all lands, including church lands, under state custody was promulgated on 5 March 1975 (Ministry of Land Reform 1975). The reform banned hiring of farm labour and permanent dislocation (migration) of peasants from their villages (Ofcansky & Berry 1991); it abolished tenancy (Amare 1995), prohibited transfer of land through sale, lease or mortgage and liberated tenants from all forms of obligations and exploitations by landed classes (Bruce 1998; Berhanu & Poulton 2014). It automatically granted tenants usufruct land rights to the parcels they used to farm and for which they paid rent.

A year after the reform, an egalitarian land re-distribution based on family size of households was carried out by a committee of elected elders (Bruce 1998). Land allocation through re-distribution was reported to take into account not only size, but also the productivity of the land. This was, nevertheless, marred with irregularities due to the imprecise measurements of land size and its quality (Amare 1995). Peasants were given usufruct land rights to a maximum of 10 ha of land and a right to transfer it to their immediate heirs (Rahmato 1993; Bruce 1998; Yeraswork 2000). Continuous land re-distribution was permitted for parcels owned by families who are deceased or who had migrated, and this was a source of tenure insecurity in the period (Abate 1995; Bruce 1998). Land rental markets were restricted to those elderly who are unable to cultivate their parcels due to old age or physical illness (Amare 1995).

The land-to-the-tiller reform generally resulted in changes in land-property relationship between the state and the peasantry, and between tenants and landlords. Although the abolition of landlordism and the radical redistribution of land among the peasantry were successful, it was overshadowed by the government's policy of collectivization of smallholder farms into state-controlled producer cooperatives (Rahmato 1984; Bruce 1998). It is also argued that the salient features of the imperial regime such as tenure insecurity, resource extraction, declining agricultural productivity, environmental degradation and impoverishment of peasants continued during the Derg regime due to its architecture of socialist agrarian transformation (Degefa 2001).

[19] Derg is an Amharic term that stands for 'council' or 'committee'. The Derg stands for the coordinating committee of the armed force, police and territorial army. Major Mengistu Haile Mariam was the chairman of the committee, which later became a government after the demise of Emperor Haile Selassie government (Ofcansky & Berry 1991).

The Derg, guided by the socialist ideology of 'redistribution with growth',[20] also nationalized all banks and insurance companies. Private-owned capitalist farms that existed during the imperial period were confiscated, but retail trade and the import-export sector were allowed to stay under private ownership. A total of 75,000 ha of land developed by private owners for large-scale farming was converted to state ownership (Ofcansky & Berry 1991). During this period, capitalist farming stagnated but state farming and producers' cooperatives were promoted. In essence, other than changing title deeds of previously existing privately-owned large-scale farms, the Derg was not against the role of large-scale farms.

Thus, large-scale farming was one of the agricultural development strategies of the Derg. Although state-owned large-scale farms were opened on existing state land, households with a historic claim over 176, 708 ha land were displaced to give way for state farms, resulting in an encroachment by peasants of state-owned large-scale farms (Bruce 1998, p.170). In 1988, the size of large-scale state-owned farms increased to 216,000 ha accounting for 3.3% of the total cultivated area of that period. In its ten-year plan, the Derg planned to increase the size of large-scale farms to 468,000 ha, accounting for 6.4% of the total cultivated land of the country by 1994. However, the Derg regime was removed by the Tigray People's Liberation Front (TPLF) in 1991 before it could implement its plans. It was hoped that the large-scale farms would increase domestic food supply, provide raw materials for domestic industries, and generate the much-needed foreign currency through production of agricultural export commodities (Ofcansky & Berry 1991). The policy expectations of large-scale farming during the Derg regime are not different from the expectations of the current government, which are discussed in the next chapter.

In terms of the level of support provided to smallholder farmers, the Derg period witnessed no major changes other than the radical land reform measures. The implementation of the Minimum Package Programmes (MPP) initiated during the Emperor Haile Selassie period continued to be the agricultural extension approach of the Derg regime for a short period. Thereafter, it was changed to the Peasant Agricultural Development Extension Programme (PADEP) (Berhanu & Poulton 2014). Farmers were obliged to organize themselves into peasant associations, one for every 800 ha of land. The peasant associations were the lowest administrative units instituted by the Derg as instruments to implement development strategies and to promote the socialist ideology of the government (Ofcansky & Berry 1991).

[20] Redistribution with growth strategy is witnessed in the distribution of income to members of the cooperatives based on their labour contributions. In addition, the urban dwellers were privileged to buy cheap food commodities from *kebeles* that were purchased by the Agricultural Marketing Corporation from the farmers at prices lower than going market prices.

Input and output markets were highly centralized with heavy state involvement. Distribution of farm inputs was channelled through the peasant associations, and marketing of agricultural outputs were highly regulated by the state's interventions that disincentivized producers. The Derg established the state-led Agricultural Marketing Corporation (AMC) that obliged peasants to sell a certain quota of their produce at prices lower than market prices. The aim was to supply urban dwellers with food commodities at cheap prices, as these citizens are perceived politically as the most influential by the military regime and could challenge its rule (Vaughan & Gebremichael 2011).

As discussed earlier, the Derg favoured big (state-owned) farms, rather than small farms due to its widely held belief that smallholder farmers are less efficient than big farms (Ofcansky & Berry 1991). This was also reflected in its strategy of organizing smallholder farmers into producers' cooperatives, which, it was argued, helped to pool small parcels and allowed to use technologies that are scale-sensitive. However, this was seen by Abbink (2011) as a setback for farmers in realizing their production potentials as individual producers.

The collectivization of farms and the obligation of farmers to sell their agricultural products to the AMC reduced the incentives for smallholder farmers to boost their production. This resulted in the perpetuation of the agrarian crisis, and the impoverishment of the rural mass throughout the country. It has been argued that this was the result of state policy contradictions that undermined the roles of smallholder producers and instead saw state-owned large-scale farms and producer cooperatives as a panacea to the agrarian crisis of the pre-1974 era (Clapham 1988). In support of this, Ofcansky & Berry (1991) noted that state-owned large-scale farms contributed only 6% of the total agricultural output in 1987, but received 43% of the government's agricultural investment between 1982 and 1990, and 76% of chemical fertilizers imported, 95% of improved seeds, and 81% of agricultural credit supplied in 1983. This indicates that very meagre resources were allocated to smallholder farmers who supplied more than 90% of the agricultural output. Shortly before its demise, the Derg changed its state-dominated economic policy to a mixed economic policy in March 1990, and invited private actors to invest in various sectors of the economy, although this was a reform too late to revitalize the moribund economy.

2.4.5 The Political Economy of Contemporary Ethiopia (1991–present)

The agrarian crisis, widespread famine and poverty that existed during the Derg regime, resulted, as it had during the time of its predecessor, in the demise of the regime (Keeley & Scoones 2000) in 1991. In 1995, a new Constitution was promulgated that established a

federal government based on ethno-lingual arrangements: the Federal Democratic Republic of Ethiopia (FDRE) (FDRE 1995). Spearheaded by the Tigray People's Liberation Front (TPLF), a coalition of four ethnic-based resistance groups formed the Ethiopian People's Revolutionary Democratic Front (EPRDF) that has ruled the country to date (Berhanu & Poulton 2014).

The major economic policy shift of the EPRDF government from the Derg regime was the adoption of a series of economic reform measures with the philosophy of 'free-market policy'[21] that acknowledged the roles of the private sector as an ally to promote economic development. The market liberalization reforms, inter alia, removed the embargo by the former regime to establish private capitalist agriculture. In terms of land ownership, the incumbent government maintained the land policy of the Derg regime and peasants continued to have usufruct land rights (Transitional Government of Ethiopia [TGE] 1991; FDRE 1995; FDRE 1997; Bruce 1998; Degefa 2001; Jemma 2001; Belay & Manig 2004). Legally, all land in Ethiopia belongs to the state. Customary tenure is important in terms of de facto land use, but has no legal basis.

The incumbent Ethiopian government argues that privatization of land concentrates land in the hands of the rich through distress land sale and fosters eviction of the poor farmers (Crewett & Korf 2008). The Ethiopian Economic Association (EEA), on the other hand, argued that ownership of land by the state undermines efficiency and blocks the development of a land market (EEA/EEPRI 2002). In a similar argument, Rahmato (2011, p. 6) argued that peasants and pastoralists in Ethiopia are in a situation of 'land dependency' as opposed to 'land sovereignty'; in practice, this is a source of insecurity as they can be expropriated from their land at any time with the justification of land for greater 'public purposes'. Degefa (2001) also argued that state-ownership of land proclaimed by EPRDF was a source of land tenure insecurity among peasants, affected their decision to make long-term investments in tree planting and soil conservation, crippled the emergence of legalized land markets such as sharecropping, land sale and lease, and thus resulted in overexploitation of resources.

Ethiopia's 1995 Constitution provided regional states in Ethiopia considerable autonomy to develop their own land administration policy under the general law stipulated at federal level. Four regions in Ethiopia –Amhara (ANRS 2006), Southern Nations, Nationalities and Peoples (SNNP 2007), Oromia (ONRS 2007) and Tigray (TNRS 2006) – developed their

[21] Critics argue that the government was not committed to adopting real free-market policy but used it to gain acceptance and foreign aid from Western governments.

own land administration legislation and gave land certificates to smallholder farmers. It is important to differentiate the core and periphery regions, and the lowland and highland divide where different land use patterns exist. In the core/highland regions, smallholder farming dominates and landholders received certificates for their farmlands, but not for grazing lands. In the periphery/lowland regions, pastoralists and agro-pastoralists dominate and land is used under customary ownership systems without land certificates being issued. This is a risk if these lands are sought after by outsiders as Article 40(8) of the Constitution entitles landholders to a compensation payment commensurate to the value of land when it is expropriated for public purpose (FDRE 1995). However, in both the core and the periphery, land users without land certificates are not entitled to compensation in cases where land is expropriated for investment.

The government of Ethiopia committed itself to supporting smallholder agriculture in the early and mid-1990s based on its strongly held premise of peasant farming as a mechanism of achieving food self-sufficiency and propelling overall economic growth, providing raw materials for industry and generating export revenue. The PADEP initiated during the previous government regime continued to be the agricultural extension approach of the EPRDF until the mid-1990s before the Participatory Demonstration and Training Extension System (PADETES) was adopted based on the successful pilot extension programme introduced and supported by the Sasakawa Global 2000 in 1993 (Berhanu & Poulton 2014).

In the mid-1990s, the government announced the Agricultural Development-Led Industrialization (ADLI) strategy in which agricultural extension, based on a PADETS approach, was the major component in the strategy to support smallholder farmers. At the initial stage, food crops such as maize and wheat were the focus of PADETS in selected geographical locations, but later, in the early 2000s, this was expanded to include high value export crops and other geographical regions (Rahmato 2008). The ADLI served as a framework to develop the country's successive Poverty Reduction Strategy Programmes (PRSP), and smallholder farmers were considered as key players in propelling economic growth for the poverty-stricken nation (MoFED 2003). On the other hand, pastoralism was viewed as backward and unsustainable, which is clearly reflected in the government's Rural Development Policy and Strategy, which advocated for the sedentarization of pastoralists over the long term. The strategy emphasized the need to institute irrigated farming and seek other non-pastoral livelihood options through voluntary settlement (MoFED 2002).

Although the importance of attracting foreign capital for lowland areas with irrigation potential was underlined by the ADLI well before the emergence of renewed global interest in farmlands (MoFED 2003, p. 52), the Ethiopian government put large-scale farming high on the agenda for change in 2007–2008 (Rahmato 2013). The second PRSP document, 'Plan for Accelerated and Sustained Development to End Poverty' (PASDEP), emphasized the commercialization of smallholder agriculture and private sector development with a need to attract foreign investment (MoFED 2006). Similarly, the 2010 iteration of the five-year Growth and Transformation Plan (GTP) also underlined the promotion of large-scale farming as a strategic fundamental (MoFED 2010). This summons an intentional shift in the political economy of agriculture from purely smallholder-oriented agriculture to a dual strategy of creating complementarities between smallholder farming and large-scale capitalist farming. The level of support provided to smallholder agriculture has dwindled during the second PRSP. For instance, investment in agricultural R&D in Ethiopia declined from 2003 onwards after a sharp increase during the inception period of ADLI and after its peak in 2002. Ethiopia's spending on agricultural R&D as a percentage of agricultural GDP declined from 0.65% in 2002 to 0.27% in 2008, which is comparatively lower than the intensity of spending on agricultural R&D in Kenya, which was 1.43% in 2008 (Flaherty *et al*. 2010, p. 2). Compared to the AU's recommendation for each member state to commit at least 1% of their agricultural GDP by 2006 on agricultural R&D (African Union 2003), Ethiopia's support to smallholder agriculture is below the target. In 2011, only eight African countries – Mauritania, Uganda, Kenya, Burundi, South Africa, Namibia, Mauritius and Botswana – allocated more than 1% of their agricultural GDP to agricultural R&D (ONE 2013). The focus of agricultural R&D in Ethiopia was, therefore, on adaptive research and dissemination of best practices to smallholder farmers that require relatively limited financial and human capital.

Around the mid-2000s, the government established several agricultural, technical and vocational education and training colleges. Here, large numbers of extension agents[22] were trained who were supposed to work in tandem with farmers trained in newly established farmer training centres. Berhanu & Poulton (2014) alleged that EPRDF's extension system was also an effective mechanism for controlling the peasantry down to the household level, due to the fact that the extension agents were recruited based on their political loyalties. In other words, these authors contend that the extension system has a second, hidden objective:

[22] A report showed that 62,764 extension agents were trained in 2008 and 45,812 of them were employed to work at grassroots level with farmers, which decreased the extension agents to farmers ration significantly (cf. Davis *et al.* 2010).

to control the peasants, rather than simply providing the needed agricultural knowledge support to them.

In 2010, the government of Ethiopia founded the Agricultural Transformation Agency (ATA), modelled on the experiences of Southeast Asia, to support government, private and non-governmental partner institutions in achieving the agricultural transformation stipulated in the GTP. At the initial stage, ATA adopted a value-chain approach of selected food crops such as *teff*, maize, wheat and pulses, and included a future plan to embrace oil crops, rice and livestock production.[23] ATA's intervention was limited to certain food commodities and geographical areas, and here it is reasonable to argue that the bias against the periphery has continued until this period. This shows that small-scale farming in the highlands is still key in the development strategy of the government, while a systemic neglect to provide support to the livelihood strategies of the lowland residents continues. In these parts of the country, promotion of large-scale farming seems the only strategy put in place by the government, which will be discussed below.

2.4.5.1. Narratives around land and large-scale land acquisition in contemporary Ethiopia

A 2009 report by the Ministry of Agriculture stated that Ethiopia was endowed with over 74 million ha of land suitable for annual and perennial crop production, while only 18 million ha were under cultivation. Allocating these 'available lands'[24] to commercial actors would, according to the government, maximize land use efficiency (MoARD 2009). The government justifies the transfer of large-scale farmlands to investors by claiming the presence of vast tracts of 'unused' land that is suitable for large-scale capitalist farming in the country.

One year earlier, in 2008, the Ethiopian government established the Federal Land Bank under the Agricultural Investment and Land Administration Agency (the former AISD) of the Ministry of Agriculture (the former Ministry of Agriculture and Rural Development). The government identified close to 3.6 million ha of land (Rahmato 2011, p. 11), mostly with the help of satellite images, as 'unused' and waiting to be developed in the regional states of Gambella, Benshanguel Gumuz, SNNP, Afar, Oromia and Amhara. With the exception of Oromia and Afar regional states, the regions 'voluntarily' transferred the land identified by

[23] For further details, see: http://www.ata.gov.et/about/.

[24] Rahmato (2011) reported the wide discrepancy of government reports in terms of identifying 'available land' for agricultural investment ranging from 54 million ha by the Ministry of Agriculture to 24 million ha by the Ministry of Mines and Energy. On the other hand, the World Bank (2011) reported that the available land in Ethiopia, which is suitable for farming but non-cropped, non-protected and non-forested with a population density of less than 25 persons/km^2, is 4.726 million ha.

the AILAA to the Federal Land Bank. The lands identified as 'unused' through satellite images were seldom verified with the help of ground-testing, making the notion of 'available but unused' land problematic.

Deconstruction of the 'unused' land narrative in other countries indicates that lands occupied by pastoralists that are assumed to be insufficiently productive are not necessarily 'empty' (Galaty 2012; Lavers 2012a); lands that are assumed to be marginal still have cultural and ecological significance or are part of the pastoralists' seasonal herding system (Borras & Franco 2012). The 'unused' category also refers to lands that overlap with national park boundaries (Nalepa 2013) or lands that are being used by the local people for side-line economic activities such as the collection of honey, wood or other forest products (Abbink 2011). The lands targeted to large-scale farming are, therefore, grazing, forest and bush lands, mostly in the periphery/lowland regions, as these lands were assumed to be underutilized or vacant in the land identification process of AILAA, or warranted to be available with little economic and political trade-off. Makki (2012) also asserts that the core/highland regions are well integrated to the state and hold strong land rights and that the magnitude of land transferred to large-scale farms is lower in these regions than the periphery/lowland regions with a dominant customary land ownership system, which are less effectively integrated into the state system.

The promotion of large-scale farming is premised on the expectation that large-scale commercial farms facilitate transfer of improved farming technology to smallholder farmers, contribute to local level food security by increasing availability of food from large-scale farms and increase the purchasing power of local people through wage employment. This, in turn, generates additional revenue and much needed foreign currency and contributes to infrastructure construction. However, government policies, strategies and/or regulations related to private investment, and aimed at transforming the agrarian-based economy of the country, show ambiguities and inconsistencies (Stebek 2012). While large-scale farming is expected to play a complimentary role to address local-level food security objectives, no specific provisions are presented that will ensure that this objective is attained.

Investment proclamations and directives in Ethiopia either encourage production of non-food commodities or the export of commodities produced locally, which affects availability of food in the local market. For example: (1) Investment Directive No. 10 of the Ministry of Agriculture and Rural Development (MoARD) stipulates that investment projects that aim at cultivating non-food commodities, such as date tree, rubber tree, cotton and sugar cane,

receive priority in terms of acquiring farmlands (see MoARD 2010a); (2) the land deal contracts for large-scale farming prescribes the use of capital intensive technologies that replace labour,[25] which, again, contradicts the objective of employment creation and household food security; and (3) Article 2 of Regulation No. 146/2008 and Articles 4 and 5 of Regulation No. 84/2003 state that investors exporting at least 50% of their production will be exempted from income tax for five to six years. On the other hand, those investors that export less than 50% of their produce will be exempted only for two to three years (FDRE 2003; FDRE 2008). Similarly, the government expects to generate foreign currency through export-based large-scale farming. Proclamation No. 280/2002, however, gives foreign investors the right to expatriate profits and dividends accruing from investment in any convertible foreign currency at a prevailing rate of exchange (FDRE 2002a); this is another contradiction.

2.4.5.2. Magnitude and geographical distribution of agricultural investment

The economic liberalization reform adopted by EPRDF allowed private agricultural investment to mushroom as early as 1992. During early periods, federal states transferred farmlands to investors without any limit to size. However, the magnitude of land transfer was not significant before the soaring food prices of 2007–2008. With investor's keen to acquire large-scale farmlands, the government hastily identified land across different federal states and gave the mandate to transfer plots greater than 5000 ha to the Ministry of Agriculture (FDRE 2010).

Regional governments were mandated to transfer farmlands less than 5000 ha and continued to hand out land to investors. Nevertheless, there was no clear demarcation of land under the mandate of regional states and land reserved for transfer by the federal AILAA. As a result, some parcels have been transferred twice, to different investors, by the regions and by the AILAA. This practice caused conflicts and resulted in inefficiency in the administration of large-scale farmlands. In early 2012, the federal government embargoed economically emerging regions like Gambella and Benshanguel Gumuz from making land deals, even for parcels less than 5000 ha. This was justified by pointing at a corrupt and poor management of land resources, reflected partly through double-allotment of lands to different investors.

Until July 2013, the amount of land transferred nationwide to investors from the land reserved under the Federal Land Bank was a mere 447,803 ha. This does not necessarily indicate that the balance as recorded in the Land Bank is available, since regional governments were

[25] For example, Article 3.5 of the contract agreement between Karuturi and the Ethiopian government clearly states that all activities shall be operated using mechanization (Oakland Institute 2013).

handing out farmlands either from the Land Bank or elsewhere under their mandates, which apparently shows a lack of clarity in the land administration. The most recent information available at the AILAA shows that the government decided to transfer land to investors in different phases based on demonstrated investors' performance. In the first phase, a maximum of 5000 ha can be given to an investor (Sethi 2013). This is contrary to the practices of early 2008, when parcels up to 100,000 ha were transferred to a single investor.

While it is clear that large areas of land have been acquired by investors, estimates of the magnitude of large-scale land acquisitions and number of land deals are inconsistent – largely due to the poor access to reliable information, the time periods the different estimations covered and land size considered. Scoones *et al.* (2013) discussed the problem of data discrepancies and the difficulties of reconciling the various figures. Similarly, Annelies *et al.* (2015, p.12) commented on the 'big data' hype that resulted in debates around land-grabbing. They advise researchers not to be 'overwhelmed' by the quantification of the size of land transferred for large-scale farming and recommend examining the 'quality and reliability' of data. The estimated number of land deals ranges between 63 (Land Matrix 2016) to 1349 (Oakland Institute 2011), while the total land size transferred ranges between 603,000 ha (Cotula *et al.* 2009) and 1.7 million ha (Schoneveld 2013). This makes comparison among different reports difficult. Also problematic is that some reports do not differentiate between virtual and actual investments, and thus overestimate the land size transferred to investors. This is particularly evident in the estimate of Oakland Institute (2011) and Schoneveld (2013). Keeley *et al.* (2014) make considerable effort to provide better figures, but it has limitations in its time period examination (Table 2.1).

Table 2.1: Estimates of land size transfer in Ethiopia

Source	Period	Land size (>ha)	No. of projects*	Total land size ('000 ha)
Cotula *et al.* (2009)	2004–2009	1000	157	603
Oakland Institute (2011)	?– 2011	?	1,349	3,620
World Bank (2011)	2004–2009	500	406	1,200
Schoneveld (2013)	2008–2012	2000	83	1,696
Land Matrix (2016)	2000–2016	200	63	902
Keeley *et al.* (2014)	2005–2012	1000	131	1,060

Source: Author's compilation

This thesis adopted the conceptualization of large-scale farming provided by the World Bank (>500 ha), which is above the land size considered by the Land Matrix (2016), but less than the land size considered by Cotula *et al.* (2009), Keeley *et al.* (2014) and Schoneveld (2013).

* The estimate made by the Oakland Institute does not include projects in Tigray and Somali regional states.

It covered the period between 1992 and 2013, and triangulated the information from different sources including the Ethiopian Investment Commission, Regional Investment Bureau, AILAA, and the Regional Environmental Protection and Land Administration Bureau, in order to avoid double-reporting and to minimize inclusion of unrealized acquisitions. The estimation showed that close to 2.2 million ha of land have been transferred to large-scale private farming in Ethiopia during these periods, confirming that there is an overestimation of the size of land deals by different reports. If lands allocated for sugar estates being developed by the government are taken into account (estimated at 372,022 ha), the figure increases to 2.5 million ha (cf. Shete & Rutten 2015b for details).

In terms of number of deals, a total of 4,698 private-owned projects were granted with a minimum of 500 ha and a maximum of 100,000 ha lands; these are all at various stages of implementation (Table 2.2). This estimate is equivalent to 44.4% of the total agricultural land (4.73 million ha) identified by the World Bank (2011, p. 165) as suitable for farming but non-cropped, non-protected, non-forested and inhabited with less than 25 persons/km^2. The proportion of land allocated to large-scale farming is significantly low (3.8%) when compared to the total agricultural land (56 million ha) identified by the Ethiopian government as suitable and 'available' for crop production (MoARD 2009, p. 4).

Analysis of the proportion of farmlands to the total land transferred across the different regions shows that Benshanguel Gumuz (28.3%), Oromia (21.6%) and Gambella (18.8%) regional states are the first three regions that leased out huge proportions of farmland to private investors. It is important to note here that SNNP region will be the top of the list in terms of receiving large-scale investment when the state-owned Omo-Kuraz sugar estate (175,000 ha) is added to the calculation. In terms of the proportions of farmlands acquired, foreign investors received 47% of the total land size transferred so far. The average land size acquired by a foreign investor[26] is 3,688 ha compared to 479 ha by a domestic investor (Table 2.2).

[26] Foreign investment projects include projects owned by individuals who are Ethiopian by origin but foreigner by nationality, projects owned by foreigners by origin and by nationality and those projects that are joint-ventures (Ethiopians and foreigners).

Table 2.2: Farmland acquired by private investors in Ethiopia (1992–2013)[27]

Region	Land size (ha)	No. of projects	No. of projects by foreigners	Land acquired by foreigners (ha)	Proportion of FDI out of total (%)	Regional distribution (%)*
Afar	47744	48	8	25150	52.7	2.3
Somalia	22762	16	9	13400	58.9	1.1
Tigray	109318	397	36	57030	52.2	5.2
Amhara	171772	1290	28	34720	20.2	8.1
SNNP	311502	1408	50	207316	66.6	14.7
Benshanguel	600254	306	41	243350	40.5	28.3
Gambella	399491	304	14	225012	56.3	18.8
Oromia	458292	929	85	193432	42.2	21.6
Total	2121135	4698	271	999410	47.1	100

* Calculated as land transferred in each region divided by total land transferred to investors in the country

Data Sources: Data sets of AILAA, Ethiopian Investment Commission, Regional Investment Bureau, Regional Environmental Protection and Land Administration Bureau

Indians followed by Saudi Arabians dominate land acquisition in terms of the size of land acquired in Ethiopia. Indian investors engagement in the agricultural sector in Africa in general and in Ethiopia in particular was strengthened after the first India-Africa forum summit held in 2008, which produced the Delhi Declaration. The Import-Export Bank of India provides access to finance to Indian investors who invest overseas. African governments, including that of Ethiopia, see India as an important development partner to access finance, technological know-how and policy options given their increasingly successful development paths (Cheru *et al.* 2013). Trends of large-scale agricultural investment flows in Ethiopia show that private investment in agriculture was insignificant in the 1990s, but exhibited a sharp increase in the period 2007–2009, during which 69% of all the project licences were issued.

A strong peak in the flow of investment projects was observed in 2008. This trend was most distinct in Gambella and Benshanguel Gumuz regional states where 85.7% and 82.3% of the project licences, respectively, were issued over the period 2007–2009. The global food price hike was argued to be one of the drivers for the renewed interest in farmlands by capital rich countries (Rahmato 2011; World Bank 2011). The data in Ethiopia show a strong association between the FAO Food Price Index and investment intensity for the 1992–2010 period. The year 2010, though, appears to be an anomaly as, despite high food prices, investment intensity was comparatively low (Schoneveld & Shete 2014). This might be due to the fact that hosting governments were pressured by various human right groups, donor agencies and researchers

[27] The figures are rounded to the nearest integer

who criticized the rush in land transfer as ‘land grabbing’ and a threat to local food security. Further, the Ethiopian government has become more cautious towards new investments because of some problems experienced in the early leases. For example, an interview with the Minister of Agriculture, Tefera Deribew, pinpointed the government’s discontent regarding the poor performance of Karuturi Agro Products PLC in Ethiopia. The company went bankrupt after it failed to re-pay its loan taken from the state-owned commercial bank of Ethiopia (*The Reporter* 2014).

CHAPTER 3: LARGE-SCALE FARMING AND LOCAL ECONOMIC DEVELOPMENT IN ETHIOPIA

3.1 Introduction

The push to large-scale farming in Ethiopia is promoted by the incumbent government with the aim of modernizing and transforming the agricultural sector from its current status, which is largely based on the use of traditional farming tools, production for subsistence rather than for the market, risk-prone and dependent on the vagaries of nature. As discussed in Chapter 2, the promotion of large-scale farming in Ethiopia is not new, but a continuation of past government efforts to modernize. In Ethiopia, the national and regional governments are actively involved in the current wave of large-scale land transfers throughout the process from land identification and transfer to monitoring of investor performances. High expectations from large-scale farming in Ethiopia are clearly presented in various government policy documents (cf. MoFED 2006, 2010).

As a result, the renewed interest in agricultural land by private investors, corporations and capital-rich governments is viewed by the EPRDF government as an opportunity to achieve its vision of modernization. In fearing of missing out on the unprecedented flow of foreign capital to the agricultural sector, which had not been considered attractive for several years, the Ethiopian government rushed to welcome interested groups, without putting in place the mechanisms to maximize the benefits and to minimize possible trade-offs in these investments. Selection of best investors, identification of suitable lands for farming, compatibility of intervention to existing settlement and livelihood patterns, instituting the needed human and material capacity that manage land deals and monitor implementation, identification of impact mitigation mechanisms, etc., were neither done well or not at all. Everything was done hastily in a bid not to miss the opportunity to 'match' the government's vision of modernization with investors' interests in large-scale farming. This was what Rahmato (2011) called an 'open-door policy' for investment in large-scale farming.

The contributions of large-scale farming to, *inter alia*, local economic development are a function of a set of land governance variables such as: careful mapping and identification of available land and land-related resources; identification of the best, capable and committed investors; negotiations, effective contracting of deals and enforcement of contracts; and

monitoring of project implementations. The outcomes of investment in large-scale farming in Ethiopia should, therefore, be understood against the following background information:

(1) identification of 'suitable'' and 'unused' land for investment was done quickly with the help of satellite images with minimal involvement of other stakeholders (e.g. local people) and with little effort to take into account land-use patterns of agro-pastoralists based on temporal mobility and livelihoods based on forests and shifting cultivation;

(2) an open-door approach of welcoming everyone who showed interest in large-scale farming with little diligence in terms of screening the best investors. A case in point, is that Karuturi was handed 300,000 ha of land in Gambella during the first land deal without making sure that the investor had the capacity to develop the land in a few years. Later, the area was reduced to 100,000 ha following criticism from various groups;

(3) weak capacity of the government in terms of carrying out effective negotiations that will bring the best outcomes or help to achieve the huge rural development targets anticipated. For example, the government anticipated contributions from large-scale farms in the form of social and physical infrastructure construction while contract agreements do not include such provisions; and

(4) the government's weak land governance capacity and poor enforcement of contracts. There is a weak linkage and poor co-ordination among various government bodies that are responsible for the governance of large-scale plantations and sometimes with conflicting roles of government structures at different levels (federal to district).

3.2 The Research Gap

There is a growing body of literature on large-scale farming in Ethiopia. None of these works, however: 1) evaluated the economic returns of large-scale farming to the local/regional economy by comparing it to previous land use; and 2) discussed the expectations and actual experiences to date of the government – the key actor in the land transfer process in the case of Ethiopia – and the households who are directly affected by large-scale farms. For example, studies conducted by Abbink (2011), Lavers (2012a, 2012b), Rahmato (2011) and Shete (2011) discuss early outcomes from large-scale farming in Ethiopia without evaluating

whether earlier expectations of different stakeholders from large-scale farms converge with actual experiences. This chapter attempts to fill these gaps by analysing qualitative and quantitative data collected from: government and company records; households that have been directly affected by large-scale farming; key government informants who have direct roles in large-scale land transfers; and company wageworkers who are working on the farms. Finally, the chapter evaluates the extent to which expected outcomes have been achieved, and contributes to policy debates on large-scale land acquisition and to the governance of large-scale farming in Ethiopia and beyond.

3.3 Methods

Qualitative and quantitative research approaches were adopted to address the objectives of the research. Secondary data were collected from large-scale farms, local government revenue office and district administrations. Variables collected from large-scale farms include, land size developed, costs and benefits, employee data, contributions to local development in various forms, etc. Primary data were collected from key government informants, households and employees via interviews and the use of structured and semi-structured questionnaires. These were complemented with field observations and focus-group discussions. A list of households that had been using the land resources was drawn up[28] and this was used as sampling frame for the household survey.

In a bid to address the three objectives identified above, different data collection and analyses methods were used. First, to identify the economic returns of large-scale farming, data on the various dimensions of economic benefits such as revenue generation (e.g. income tax, profit tax, and land rent), contributions to raw material for local industry and value of food crops produced, employment creation, contributions to physical infrastructure (e.g. road, schools, and clinics), etc., were collected from large-scale farms and government offices. Costs and benefits of large-scale farms were collected from the companies. Information generated from companies was further triangulated for its correctness and reliability with data collected from government offices that keep records in relation to large-scale farms. For example, both companies and government offices keep records of the number of jobs generated, employees' income tax, payment for land lease, profit tax, etc. In such cases, triangulation was carried out to check the correctness of the information provided by both parties. The benefit of large-

[28] A list of households was obtained from the lowest administrative unit (*kebele*), which was updated with the help of elders who have been living in the area for many years and who know individuals missing from the list.

scale farming to the local economy was estimated by adopting a minimum and maximum scenario. The minimum scenario was established by assuming that the companies maintain current productivity, cultivate only the size of land they have developed so far,[29] continue to be operated by the current number of employees and do not change current levels of technology for the whole leasehold period. The maximum scenario, on the other hand, was established based on the companies' planning documents, which stipulate anticipated costs to be incurred and the benefits expected to accrue to the company when the companies develop their entire leasehold concession. Similarly, the average number of family members employed and the average value of crop, livestock and livestock products generated by smallholder farmers from the land transferred to the companies were calculated from the household survey. The average value per household was calculated first. This was then re-scaled to fit all of the households that have lost access to the land handed over to the companies. This was projected over the entire leasehold period, and the average annual benefit generated by smallholder farmers was compared to the benefit generated by the companies after it was discounted to the present value.

Both financial cost-benefit and economic cost-benefit analysis were done in this study. While past and current costs and benefits were taken as they are, future costs and benefits for the years to come were discounted at 10% interest rate using the present value method of project valuation. The discounted mean annual net financial benefit for the large-scale farms was calculated by deducting the total costs from the total benefits for the whole leasehold period; this was then divided by the number of leasehold years. Similarly, the discounted net annual economic cost-benefit analysis method[30] was used between two land-use types (the land-use type before the land transfer and the current land use) to identify the economic contributions of the large-scale farms to the local economy. In the calculation of economic cost-benefit analysis, direct and indirect contributions of the company to local development – such as land rents for the entire leasehold period, income taxes from (projected) land development, value of crop/raw materials, value of physical infrastructure (in this case it was subjected to

[29] The companies have so far only developed and cultivated a small proportion of the land they leased despite their commitment to developing the entire concession in three years. Thus, given their capacity, the minimum scenario assumes that companies will hardly manage to develop additional plots.

[30] It should be noted here that the analysis is done based on financial and economic cost benefit analysis and did not include social and environmental costs. Detailed analysis of the environmental impact of the interventions is presented in Chapter 6.

depreciation) – were included and their values were discounted at a 10% interest rate to bring future benefits to current prices. I relaxed the estimation at the local level by adding values to companies' contributions to the national economy and discussed what these contributions mean overall for Ethiopia's situation. All these economic benefits were summed up and averaged for a single year to estimate the economic returns of land use by the large-scale farms. This was then compared to the economic benefits of handing the land over to local people for use to see if there is overall gain or loss.

Data on the costs and benefits of previous land-use by local people were also collected using household surveys. Data collected from the non-affected households were used to estimate the average value of crops and livestock generated from each hectare of land as a proxy indicator to calculate the total value of crops produced, livestock and livestock products produced and other non-timber forest products harvested per annum by smallholder farmers from the land transferred to the large-scale farms. Since the purpose is to estimate the benefit generated on the land that was transferred to large-scale farms, the estimation considered both marketed and consumed products such as crops, livestock and livestock products and non-timber forest products for a period of one year and valued at local prices. Since there are variations among households, average costs and benefits were estimated, which were finally multiplied by the total number of households who depended on the land transferred to the companies.

Second, having determined the economic benefits of large-scale farming versus the situation before, I established in how far the initial expectations within government circles have been achieved. To identify perceived prior expectations and actual benefits, data were collected through a survey of 42 key government informants. The key government informants included experts from AILAA, the Ethiopian investment commission, regional and district investment offices, district administrations, regional land administration offices, and agriculture and rural development offices. Similarly, data on perceived expectations and actual benefits from large-scale farming were collected from local people in the three regional states living around the large-scale farms. The surveys comprised of households that are directly affected by large-scale farms in the three regional states (details are presented in Chapter 1).

Respondents (both key government informants and households) were asked to rank their expectations on a six-point scale (0= 'nothing expected', 1= 'very low expectations', 2= 'low expectations', 3= 'average/medium expectations', 4= 'high expectations' and 5= 'very high

expectations'). They were subsequently requested to rate the extent to which their expectations were met (0= 'nothing changed', 1= 'a very small part of expectations achieved', 2= 'a small part of the expectations achieved', 3= 'expectations achieved on average', 4= 'most of the expectations realized', and 5= 'expectations completely realized'). Although it is generally acknowledged that identifying ex-ante expectations after communities have experienced a project might be a source of bias, efforts were made to minimize this during the survey period by probing respondents and asking them to justify the reasons for their earlier expectations. To understand the determinants of the disconnects, if any, between ex-ante expectations and ex-post reality, respondents were requested to qualify their responses.[31]

3.4 Results and Discussion

3.4.1 Overall returns of large-scale farming to economic development

Different social and economic benefits are anticipated from investment in large-scale farming by investment recipient countries. Anticipating possible flow of benefits that are untapped in previous forms of land uses, the Ethiopian government provided lucrative packages of incentives to attract investors to invest in large-scale farming. This includes granting land at attractive lease rates,[32] tax holidays for the first five years, duty free imports of machinery and equipment, loans from Ethiopian banks and expropriation of profit in any currency note. Data from AILAA and companies' records showed that Ethiopian banks provided ETB 1.3 billion for 11 large-scale farms, which is equivalent to ETB 6,020 (US$ 314) for each hectare of land acquired by the investors, far higher than the rent payable (Table 3.1).

[31] Technical notes: Data were analysed using median, mean, mode, percentage and a paired t-test technique to identify the disconnects between earlier expectations and the praxis of large-scale farming. In the paired t-test analysis, an equal distance between the six-point scale was assumed. The median/mode value was used in the analysis to assess the consistency of the results with mean values, in case the assumption of equal distance between the responses fail. To improve the validity of the results, the paired t-test analysis was complemented with the qualitative responses of the key informants and triangulated with the mode scores of the responses.

[32] The lease rates applied when granting land lease contracts lack consistency. While there is a directive issued at federal level in determining lease rates based on the distance of the farm from the nearest port, the land lease contracts do not reflect this in most of the cases (see Annex 3.1 for details).

Table 3.1: Loans provided to large-scale farms by commercial banks in Ethiopia (2008–2013)

Company	Land Size (ha)	Origin of Company Founder	Loan Size (in millions)	
			In ETB	In US$
Karuturi Agro. Products PLC	111,700	Indian	127.27[33]	6.64
Basen Agric. & Industrial PLC	10,000	Ethiopian	122.00	6.36
Lucci Farm PLC	4,003	Ethiopian	106.49	5.55
CLC (Spentex)	25,000	Indian	124.39	6.49
White field	10,000	Indian	90.15	4.70
Verdanta Harvest	3,012	Indian	89.49	4.67
BHO	27,000	Indian	45.48	2.37
Tracon Trading	5,000	Ethiopian	46.47	2.42
Ruchi	25,000	Indian	410.07	21.38
Green Valley Agro PLC	5,000	Indian	99.90	5.21
Agro Peace Bio Ethiopia PLC	2,000	Israel	109.24	5.69
Total	227,715		1,370.97	71.48

Data source: AILAA and company data, 2013

Although complete data were not possible to generate for each of the case studies in this dissertation, the duty free imports of Karuturi Agro Products PLC for its Gambella and Bako sites and those of the S&P Company showed that the companies imported machinery with substantial forgone benefit to the government from import taxes (see Annex 3.2 and 3.3 for details). It was alleged, however, that Karuturi Agro-products PLC had routed the farm machinery it had imported using the duty-free privileges away from their farms and into a rental business (Davison 2013). This implies that the Ethiopian government is subsidizing large-scale investment by providing cheap land, duty-free imports and credit windows. A key question here is, if smallholder farmers were to receive similar support, would it be possible to transform and commercialize the agricultural sector as envisaged by the government?

In the following paragraphs, I discuss the overall returns on investments in large-scale farming by comparing two different land uses. The comparison calculated considering various (current and future) benefit streams that (will) accrue to the district/regional economy and to the national/macro economy. In addition, the year the company will break even is estimated. The analysis of returns on investment at micro (household) level is also subsequently presented – while the impact of large-scale farming on household income levels is discussed in this chapter, its impacts on household food security is presented in Chapter 4. The

[33] According to a report by a human rights activist, the amount of money borrowed by Karuturi from Ethiopian banks is ETB 170 million (see G/Mariam 2015).

following discussion is based on data generated from three large-scale farms – Karuturi at its Bako site, Basen and S&P farms – using the discounted net present value of economic cost-benefit analysis to show the returns on investment in large-scale farming at a local (district/regional) level. Since Karuturi's Gambella farm station has been reported bankrupt, it has been dropped from the NPV analysis in this dissertation.

Case 1: Karuturi Agro Products PLC in Oromia Regional State

The net present value analysis of Karuturi's investment in Oromia Regional State for the minimum and maximum scenario showed that the local economy experienced a decline of 38%–74% in overall economic benefit due to the current land use (i.e. maize production by Karuturi) when compared to the previous land use by the local population (i.e. grazing land and cultivation of *teff* and niger seed). On average, the local population had generated an estimated value of ETB 18,758,870.76 per annum by using the land for the production of *teff* and niger seed and by rearing livestock. The estimated value of different streams of benefits had declined to ETB 4,875,618 and 11,603,029 in the minimum and maximum scenario, respectively, after the land was taken over by Karuturi and put under maize production. Despite the overall loss in economic benefit from the current land use by Karuturi, the regional state had earned some short-term income that it had not received from the local population. This includes income from land rent fees, employment income tax, profit tax, etc. (Table 3.2). The local people in Bako Tibe District pay land rent tax at a rate of ETB 134 per ha for the lands they have statutory rights to, but never paid land rent for the valley bottom that they had been using for livestock grazing and production of *teff* and niger seeds. In this regard, Karuturi is expected to pay ETB 411,816 (at current price) per annum for each leasehold year. Similarly, except for the livestock sales taxes – such as ETB 5 per cattle and ETB 3 per sheep/goat – smallholder farmers seldom pay profit taxes. By putting the land under large-scale farming, the regional state anticipated collecting corporate profit tax, which is a new source of revenue for the regional state to finance other development plans.

Table 3.2: Mean annual discounted economic benefit to local and national economy, the case of Karuturi's investment in Oromia Regional State, Ethiopia

	Mean annual NPV (ETB)*		
	Karuturi's land use		
Benefit streams	Minimum Scenario	Maximum Scenario	Farmers' land use[34]
Revenue from land rent fee	411,816	411,816	0
Revenue from profit tax	148,145	1,813,750	0
Revenue from employees' income tax	30,959	67,052	0
Value of direct employment	2,126,985	3,197,862	4,776,480
Value of crop sold at local market**	2,133,791	6,079,673	11,290,136
Value of maize sold at national market	4,978,846	14,185,903	0
Value of livestock production	0	0	2,685,106
Contributions to community development	23,922	32,876	NA
Total contribution to the district/regional economy	4,875,618	11,603,029	18,751,722
Total contribution to national economy	9,854,464	25,788,932	18,751,722
Contribution to the district/regional economy	0.26 times the value generated by farmers (**Loss**)	0.62 times the value generated by farmers (**Loss**)	
Contribution to the national economy	0.52 times the value generated by farmers (**Loss**)	1.37 times the value generated by farmers (**Gain**)	

Note: *Rounded to the nearest integer; **Crop refers to value of maize for Karuturi and it refers to *teff* and niger seed for farmers.

Source: Own computation from survey data, 2012 and 2014

Based on the NPV estimation, Karuturi's investment in Bako will break even in 2015 for the minimum scenario and in 2017 for the maximum scenario, after operating with a net loss for 4–7 years. The company is estimated to make an annual profit of ETB 387,204 to 2,845,896, with an average return on its investment of 2.9% to 11.5% for the minimum and maximum scenario, respectively. It will thus contribute, on average, a corporate income tax of ETB 148,145 to 1,813,750 per annum to the district/regional accounts for the minimum and maximum scenario, respectively. Peasant farming is mostly operated by family labour, and if there is any hired wage labour, wages are not reported officially to the government for any income tax purposes. In addition, putting the land under large-scale investment brings immediate cash income in the form of employment income tax to the district/regional state.

[34] This was calculated by multiplying the average value of different benefit streams generated from each hectare of land per household with the total number of households that depended on the total land transferred to the company.

This is not, however, to deny the fact that in Bako Tibe District landlessness is very high and the youth had been engaged in family-operated farming by cultivating the valley bottom; this is now under the leasehold concession of Karuturi. Under the previous land-use regime, the area generated significant employment for the local people; more than the current land use by Karuturi, despite wage labour by smallholder farmers often being informal in nature and not providing cash income to the district in the form of employment tax. According to the estimation based on the field survey, the land generated a value of ETB 4,776,480 as direct employment for the entire household population when it was used by the local population. This employment benefit reduced to ETB 2,126,985 and ETB 3,197,862 for the minimum and maximum scenario, respectively, after the land was taken on by Karuturi. This was due to the use of capital-intensive technology.

During the field survey, the manager of Karuturi Farm explained that Addis Ababa is the main market destination and the company supplied 70% of its total production to it. In this regard, the price dampening effect of the company on local farmers who are net sellers is not significant. By taking into account the supply of food grain to the national market, the economic contribution of Karuturi is re-calculated for the minimum and maximum scenario. In this case, the current land use by Karuturi under the maximum scenario generated 1.37 times the value of production by local farmers, which is equivalent to an annual gain of 37% over the previous land use. Under both the minimum and maximum scenario, the district economy, however, generated only 0.26–0.62 times the total value generated by farmers, which is equivalent to a loss of 38–74% (Table 3.2). The recipients of the large-scale investment – regional government (meso-level) and federal government (macro-level) – are therefore experiencing different outcomes from investment in large-scale farming, in the maximum scenario, which can be described as a loss-win situation.

Deepening the argument further, four tiers of actors with different outcomes from the investment can be presented. These are the local population (micro level), the district/regional government (meso level), the federal government (macro level) and the investor with a generally loss-loss-win-win scenario. Further analysis of the impact of the intervention on household income levels and food security (micro level) are discussed in subsequent chapters. The local population and the district/ regional economy were better off when the land was under use by the local people. This raises the question, ‘development for whom?’, a

politically-sensitive and ethically-laden concept. Ethiopia has been experimenting with a federal state arrangement based on ethno-lingual arrangements for over two decades. The justification was a narrowing of the regional economic disparity by allowing regional states to determine their own development. Ethnic regions are constitutionally permitted to use their local/regional resources for the benefit of their own population. The case in Bako, however, demonstrates that local resources are being expropriated from local people to the benefit of the national/macro economy. Dispossession of local resources for the accumulation of private capital and for the benefit of macro-economic development has been taking place in Bako in the same way as Makki (2012) argues that it is happening elsewhere.

Case 2: Basen Agricultural and Industrial Development PLC in Gambella Regional State

Following a similar procedure of the discounted net present value analysis, the overall returns from Basen's investment to local (district/region) and national economy were estimated for maximum and minimum scenario. The maximum scenario is calculated based on the plans of the company to cultivate its entire concession and therefore an assumption that it will generate the planned number of jobs and value of employment, produce value of cotton and cotton seed and generate fiscal revenue in terms of tax for the district economy as predicted. On the other hand, the minimum scenario was estimated based on the assumption that the company will continue to operate under current capacity and will generate employment, fiscal revenue and value of cotton for the remaining leasehold period. The current capacity was calculated based on the actual performance of the company collected from its records during the survey period. This was then projected for the remaining leasehold period. The estimated future benefits generated from the company under the minimum and maximum scenario were discounted to produce current values and the average annual benefits were calculated. The average annual benefits generated by smallholder farmers was compared to the benefits generated by the company after it was discounted to the present value.

Based on the NPV estimation, Basen's investment in Abobo district in Gambella regional state break even in 2011 after operating with a net loss for seven years. From the year 2011 onwards, the company has been earning a gross annual profit of ETB 21,117,404 under the minimum scenario, and ETB 35,417,899 under the maximum scenario. It will thus contribute, on average, corporate income tax of ETB 11,521,905 and ETB 18,231,961 per annum to the district/regional account under the minimum and the maximum scenario, respectively.

Annually, the farm is estimated to generate a substantial gain of 42.3% and 30.1% of its invested capital under the minimum and the maximum scenario, respectively.

Table 3.3: Mean annual discounted economic benefit to local and national economy, the case of Basen Farm in Gambella Regional State

Benefit streams	**Mean annual NPV (ETB)***		
	Basen's land use		Farmers' land use
	Minimum Scenario	Maximum Scenario	
Revenue from land rent fee	337,968	337,968	0
Revenue from profit tax	11,521,905	18,231,961	0
Revenue from employee income tax	563,844	639,021	0
Value of total employment*	8,457,661	9,585,310	4,557,000
Value of maize sold at local market	0	0	10,253,250
Value of livestock	0	0	23,188,295
Value of cotton sold at national market	20,656,127	31,967,331	0
Value of cotton seed sold at national market	12,423,717	19,639,243	0
Contributions to community development	0	0	0
Total contribution to the district/regional economy	13,100,329	28,794,260	37,998,545
Total contribution to national economy	53,961,222	80,400,834	37,998,545
Contribution to the district/regional economy	0.34 times the value generated by farmers (**Loss**)	0.76 times the value generated by farmers (**Loss**)	
Contribution to the national economy	1.42 times the value generated by farmers (**Gain**)	2.1 times the value generated by farmers (**Gain**)	

Note: Based on the estimation of this study (see Table 4.1), only 8% of total jobs are occupied by local people. Thus, the value of employment for local population under the minimum and the maximum scenario is ETB 676,612 and ETB 766,825, respectively.

Source: Own calculation based on survey data, 2013

The result showed a similar outcome to the case of Karuturi's investment in Bako Tibe District, albeit with different magnitude. After the land was transferred to Basen for cotton farming, the local/district economy generated only 0.34–0.76 times the value of production by farmers, which is equivalent to a 24–66% decline in overall economic returns. More specifically, the loss had come from the replacement of food crops and livestock production valued at ETB 10,253,250 and ETB 23,188,295 respectively, with cotton production that has contribution to the macro economy rather than to the local economy. Despite the decline in overall returns from large-scale farming, the District Revenue Office had received cash

income that seldom flowed to its treasury when the land had been used by the immigrant settlers. This is being considered as sources of finance for local development. For instance, the local population had been using the land through customary land tenure regime and produced food grains for local consumption, and never paid land rent fee. Basen Farm, on the other hand, acquired the land on long-term leasehold basis and will pay, on average, ETB 337,968.3 per annum when the land lease is discounted at current price. Similarly, employees and corporate income taxes are the other sources of cash income to the district revenue office that had not been captured as benefits in the previous land uses (Table 3.3).

Basen's investment in cotton farming had generated greater employment opportunities than when the land was used by the local population for maize production. Nevertheless, the benefit of employment accrued mostly to labourers from the South. Therefore, it is possible to argue that other than the employment income tax payable to the District's Revenue Office, the value of employment generated contributes little to the local economy.

Cotton production receives policy support from the federal government since the country is unable to supply the needed raw material for the textile and garment factories. There are about 136 textile and garment factories operating in the country, with 10 more expected to join the sector soon. The demand for lint cotton is estimated to range between 90,000 and 100,000 tons per year (Fortune 2015). The domestic supply is not more than 50% of the demand and financing cotton imports has impacted the country's foreign currency. In this regard, land allocation for cotton production, as in the case of Basen Farm, is of national priority. When the value of cotton and cotton seed are considered in the NPV calculation, the overall economic contribution of Basen's investment to the national economy becomes positive, and the company generated 1.42–2.1 times the value of production when the land was under farmers' use. In terms of proportion, the overall gain to the national economy is estimated to be 42% under the minimum scenario, which can go up to 112% under the maximum scenario (Table 3.3). Similar to the argument I presented in the case of Karuturi's investment in Bako, four-tiers of actors *vis-a-vis* the local people (micro-level), the district/regional economy (meso-level), the national economy (macro-level) and the investor can be presented to discuss who has gained and who has lost from the investment. While, the federal government and the investor generally gained from the investment, the local people and the district/regional economy lost from the land-use change. This takes us back to the big question of development for whom? Local resources are expropriated to the benefit of the national economy, in a

similar fashion to what happened during past government regimes in Ethiopia in which the centre and the periphery were linked for resource exploitation.

Case 3: Benshanguel Gumuz Regional State: S&P Energy Solutions PLC

A similar minimum-maximum scenario approach with discounted NPV analysis was followed to estimate the overall contribution of S&P Farm in Benshanguel Gumuz Regional State. The minimum scenario analysis for S&P Farm showed that the local economy generated 0.49 times the value produced by farmers, which is equivalent to a 51% loss in the overall economy. Under the maximum scenario, both the local and the national economy respectively generated a return of 2.2 and 20.3 times the value that was generated by the local population. Despite an overall economic loss to the local economy under the minimum scenario, the district/regional economy generated cash income that did not accrue to its treasury when the land was under local people's use, which is largely viewed by the government as source of development finance. In this regard, the District receives a total income of ETB 2,277,161 per annum from land rent fee, corporate income tax and employment income tax. Income accrued by the district/regional economy is estimated to increase to ETB 12,938,302 under the maximum scenario (Table 3.4).

As part of its community development contribution, the company launched a school feeding scheme with a total outlay of ETB 160,000 per year. The scheme increased primary school enrolment. Children follow their mothers to collect foods from the forest and primary school attendance had previously been low. The school feeding programme, as reported by the Kota School Director, improved school attendance. The company installed a gasifier that converts biomass to electricity. It has also constructed an earth dam to harvest water. Domestic investors are privileged to get access to electric power and water from the earth dam on the farm. The road that passes through S&P's farm also provides service to the local people who pass through the farm. These could be some of the CSR contributions that were not available during the previous land use.

When the NPV calculation takes into account the contributions made by the large-scale farm to the national agricultural GDP, the mean annual gain from putting the land to investment was found to increase by 3.42 times the value generated by farmers for the minimum scenario and 20.3 times the value generated by farmers for the maximum scenario. The large-scale farm is expected to break even in 2014 after five years of operating at a loss. The company is

estimated to make an average of ETB 181,871 annual profit under the minimum scenario and ETB 25,505,993 annual profit under the maximum scenario with a return to average invested capital of 0.01 % and 0.63%, respectively. With this estimation both the national economy and the investor gained from the land transfer while the local population generally lost from the new investment.

Table 3.4: Mean annual discounted economic benefit to local and national economy, the case of S&P Farm in Benshanguel Gumuz Regional State

Benefit streams	**Mean annual NPV (ETB)**		
	S&P's land use		
	Minimum Scenario	Maximum Scenario	Farmers' land use
Revenue from land rent fee	1,402,316	1,402,316	0.0
Revenue from profit tax	112,088	7,846,608	0.0
Revenue from employee income tax	762,757	1,412,217	0.0
Value of direct employment*	1,089,653	2,017,453	500,760
Value of crop sold at local market	0	0	2,372,037
Value of crop sold at national market	14,160,355	87,467,916	0.0
Value of livestock production	0	0	1,581,358
Value of non-timber forest products	0	0	379,526
Contributions to community development	47,293	47,293	0.0
Total contribution to the district/regional economy	2,392,009	10,833,516	4,833,681
Total contribution to national economy	16,552,364	98,301,432	4,833,681
Contribution to the district/regional economy	0.49 (Loss)	2.24 (Gain)	
Contribution to the national economy	3.42 (Gain)	20.3 (Gain)	

* Based on the estimation of this study (see Table 4.1), only 6.2% of total jobs are occupied by local people. Thus, the value of employment for local population under the minimum and the maximum scenario are ETB 67,555 and ETB 125,082, respectively

Source: Own calculation based on survey data, 2014

In summary, as the three case studies demonstrate, the returns to investment in large-scale farming are not the same for different levels of actors. The results from the case studies confirmed that the local/regional economies were not better off when the previous land use by the local population was replaced by large-scale investment other than in terms of generating cash income to the District that, in the past, had not been provided by the local people. The macro-economy and the investors consistently gained from the investments in all the three cases. In terms of the magnitude of effect, the district/regional economy in the highland regions (e.g. Oromia Regional State) had lost substantial amounts of net returns to investment compared to the cases in the lowland areas of Gambella and Benshanguel Gumuz regional

states. This demonstrates the high opportunity cost of putting land under large-scale investment in the highland parts of the country, which are often densely populated and where land is scarce. In the subsequent sections, the prior expectations and actual experiences of large-scale farming as perceived by government key informants and the local people are discussed.

3.4.2 Expectations and actual experiences of government key informants from large-scale farming in Ethiopia

As discussed earlier, the incumbent government has pushed a policy of large-scale farming in Ethiopia. Expectations about the potential contributions of large-scale farming are clearly set out in government policy documents, and have been discussed earlier in Chapter 2. The following discussion aimed at deepening our understanding by analysing the perceived expectations and actual experiences of government key informants. Such analysis is important because outcomes from large-scale farming are determined by, *inter alia*, a shared vision/expectation among government officers who are responsible for the governance of large-scale farming. Lack of shared vision is an impediment to success. Smooth implementation of policy documents is affected by, among other things, the shared-level of expectations held by government stakeholders who are engaged in the implementation process of large-scale farming. The key questions central to this analysis are:

(1) are expectations about large-scale farming shared equally among government officers working at district, regional and federal levels. In other words, are government stakeholders engaged in the governance of large-scale farming 'on the same page' and equally committed to achieving the expected benefits of large-scale farming?
(2) To date, have these expectations been met, from the perspective of these government officers?
(3) If there are divergences in the expectations and actual experiences of the government stakeholders, could this result in a change in the approach to future land deals?

As discussed in the methodology section, 42 government key informants completed a structured questionnaire that asked them to reflect on their perceived ex-ante expectations and ex-post experiences of large-scale farming. The informants were selected from Oromia, Gambella and Benshanguel Gumuz Regional States and from federal government offices that are responsible for or engaged in the governance of large-scale farming. In particular, the

questionnaire asked key informants to rate their perceived expectations and actual experiences in reference to the case studies used for this research.

The results indicated that government key informants had huge expectations about large-scale farming. Mirroring the presentations in the government strategy documents, the key informants believed that large-scale farming will serve as a centre of modern technology generation and transfer and, consequently, smallholder farmers in the vicinity of such projects will be able to learn about best practices and acquire farm inputs that increase farm productivity. Eventually, this is expected to facilitate the transformation process of the traditional agricultural sector into a modern and sustainable sector, and an increase in food availability and the supply of raw materials to local industries that replace imports and generate the much-needed foreign currency through value-added exports is also anticipated. The majority of the informants (95%) had huge expectations (mean score=4.5) about the role of large-scale farming in modernizing the agricultural sector, which indirectly reflected their dissatisfaction with smallholder farming and the agro-pastoralist system of production (Table 3.5). The high degree of expectations of government key informants about the role of large-scale farming in technology transfer to smallholder farmers emanates from the fact that agriculture in Ethiopia is predominantly subsistent and the use of improved farm inputs is very limited (cf. Endale 2011). The World Bank (2011) also indicates that, currently, only slightly more than 20% of the potential yield is realized by the Ethiopian agricultural system.

Technology transfer is expected in Oromia Regional State, where smallholder mixed crop-livestock farming is widely practised adjacent to the large-scale farm at Bako. A key informant from Bako, interviewed on 20 March 2012, explained that Karuturi's investment in the area is planned for sugarcane and oil palm plantations, but that the total land leased by the company is not enough to establish a sugarcane or palm oil processing plant. The key informant explained that he expected the company to adopt an inclusive business model, such as out grower or contract farming schemes, that provides an opportunity for smallholder farmers in the vicinity to engage in the production of sugarcane and oil palm. While the government had the expectation that Karuturi will engage in sugar cane or palm oil cultivation in Bako, the investor had, in fact, shifted to maize growing and shifted the palm oil nursery site from Bako to Gambella. Moreover, the government's expectations are cannot easily be attained due to differences in the types of crops produced by the smallholder farmers, which are largely cereals.

In less developed regions such as Gambella and Benshanguel Gumuz Regional States, (agro-) pastoralism[35] and shifting cultivation, respectively, are extensively practised and there is limited chance of integrating the local people into large-scale farming, at least in the short term. In 2010, Gambella and Benshanguel Gumuz Regional States embarked on resettling the population in selected villages where the local people were provided with farm plots. One of the aims of the collectivization scheme is to transform (agro-) pastoralists into sedentary farmers. Government key informants interviewed on 25 March 2013 in Nynyang (Gambella) and on 11 April 2014 in Manbuk (Benshanguel Gumuz) similarly explained that the resettlement scheme enables peasants to practise farming similar to those in the highland areas of the country, which eventually increases the opportunity of integrating them in the value chain of agricultural production by large-scale farms. This is again anticipated through the adoption of inclusive business models by large-scale farms. I argue here that the possibility of inclusion of peasants and agro-pastoralists is very small given the fact that the large-scale farms are not fully developing their huge leasehold concessions. For example, Karuturi and S&P managed to develop only 5% and 3.7% of their leasehold concessions, respectively, in four years; therefore it does not sound logical for these companies to implement contract farming or out growers' schemes while their leasehold concessions are not yet fully developed. This echoes the evidence presented by Robinson *et al.* (2012) and the FAO (2013), which states that only 1% and 1.7% of the land acquired for large-scale farming globally and in Ethiopia, respectively, are actually cultivated.

While adoption of an inclusive business model by large-scale farms so as to integrate smallholder farmers into the global food chain is attractive in theory, it is not clear how this can be achieved in the Ethiopian context. First, crop commodities produced by large-scale farms are mostly new to the area and different from the food cultures and livelihood settings of the local population. This demonstrates the illusive expectations of key government informants regarding including smallholder farmers or agro-pastoralists in the large-scale farms. Second, companies have already acquired large swathes of land from the government, mostly beyond their capacity to farm their entire concessions, and they do not need contracting smallholder farmers. Third, inclusiveness through using local labour is envisaged as a mechanism of income generation and skill transfer to farmers in the vicinity, which will

[35] Agro-pastoralism consists of production of livestock, such as cattle, sheep and goats, through extensive management system and mobility. This is complemented with small-scale cultivation of crops such as maize and sorghum. Livelihoods based on extensive livestock production system are put at risk due to large-scale farms.

eventually contribute to poverty reduction and modernization of the agricultural sector. Again, this is an elusive expectation since the evidence from fieldwork activities (discussed in detail later in this chapter) confirms that wageworkers coming from outside the regions are benefitting more than the local people, due to a mismatch between the livelihood systems of the local population and the crops cultivated by the large-scale farms.

Table 3.5: Perceived expectations and actual experiences of key government informants' from large-scale farming in Ethiopia (n=42)

Outcome variables	Perceived expectation		Perceived actual experience		Mean difference	St. Error (t-value)
	Mean	Mode (%)	Mean	Mode (%)		
Technology transfer	4.48	4 (95.2)	2.47	2 (92.8)	2.01	0.13 (16.36***)
Generates employment	4.13	4 (92.8)	3.30	3 (88.1)	0.83	0.16 (5.04***)
Source of revenue	4.10	4 (92.8)	2.93	3 (71.4)	1.17	0.12 (9.50***)
Infrastructure development	4.10	4 (90.5)	2.00	2 (61.9)	2.10	0.12 (17.18***)
Generates foreign currency	4.02	4 (88.1)	1.43	1 (95.2)	2.60	0.16 (16.21***)
Provides raw material	3.13	3 (52.3)	1.86	2 (88.1)	1.27	0.20 (6.17***)
Increases food supply	2.96	3 (47.6)	1.79	2 (78.6)	1.17	0.15 (7.87***)

*** Significant at p<0.01

Source: Own survey data, 2012

Other outcomes are also expected from large-scale farming. Given the fact that labour is abundant in the country, companies are expected to create jobs for the rural masses. In lowland areas like Benshanguel Gumuz and Gambella Regional States, where large-scale farming is expanding, labour is scarce and large-scale farms are expected to generate jobs for migrant workers from densely populated highland regions. This was a particular point mentioned by key informants at the federal level who were the subject of this study. In the cases considered (e.g. Basen in Gambella, S&P in Benshanguel Gumuz and Karuturi in Gambella), migrant labour from Southern Nations, Nationalities and People's, Amhara and Oromia Regional States dominated wage employment. In addition, the majority of key government informants (88–93%) had high expectations from large-scale farming insofar as it creates employment with decent wages, generates revenue and much-needed foreign currency, and contributes to the expansion of infrastructure (Table 3.5).

Reflecting on their actual experiences to date, the key informants explained that there are huge gaps between their earlier expectations about the contributions of large-scale farming and the outcomes. They are generally dissatisfied with the projects' contributions, which represents a statistically significant difference across all outcome variables (Table 3.5). The

majority of the key informants explained that only a very small part of their prior expectations had been realized so far. The divergence between earlier expectations and actual experiences are not the same across the different outcome variables. The key government informants considered employment generation to have been at least partially realized. They believed that some landless youth have started to earn incomes by working for Karuturi in Bako, despite low wages (ETB 12 per day). Similarly, they argued that wage employment is created at some level by large-scale farms in Gambella and Benshanguel Gumuz Regional States for migrant labour coming from the highland regions. Nevertheless, key government informants are not satisfied with either the number of jobs generated or the salaries offered to employees compared to their earlier expectations. For instance, after more than three years, Karuturi in Oromia generated jobs for 43 permanent and 200–300 casual labourers in 2012. In the same vein, S&P employed up to 700 casual labourers during pick seasons, which goes down to 200 during slack seasons.

Similarly, actual experiences of expected outcomes such as foreign currency and revenue generation, technology transfer and infrastructure development showed that only a small part of the key government informants' expectations were realized. With regards to technology transfers, government bemoaned the lack of direct smallholder engagement in the production process of the large-scale farms in all the cases. In Oromia, Karuturi typically achieves maize yields (1.5–2 tons per ha) that are less than half of those of smallholder farmers (4–6 tons per ha). Before the land was leased to Karuturi, the local people cultivated *teff* on the black soils and produced about 1.5 ton of *teff* per ha. In terms of its market value, a kilogram of *teff* sells for ETB 16, while a kilogram of maize is valued at ETB 3.50. If the value of the maize produced by Karuturi is compared with the value of *teff* that was previously produced by the smallholder farmers on the same parcel that is now under maize cultivation by Karuturi, the smallholder farmers used to generate a more valuable crop than the large-scale farm does from the same land. This example is a warning that large-scale farms might not possess the best knowledge of technology and crop choice, as initially anticipated. In Gambella (where cotton is produced by Basen) and Benshanguel Gumuz (where pongomia is produced by S&P) Regional States, companies are cultivating crops that are not produced by the local people and, consequently, technology transfer is not achieved.

Some have argued that the Agricultural Development-Led Industrialization (ADLI) strategy of the Ethiopian government has failed to achieve its objective of improving the productivity

of smallholder farmers (Dercon & Hill 2009 in Lavers 2012b; Rahmato 2003) and that the promotion of large-scale farming by the Ethiopian government in recent years is a result of its dissatisfaction with the ADLI strategy (Lavers 2012a). I disagree with the view of this researcher that the government's strategy clearly shows that the promotion of large-scale farming in Ethiopia is because of its vital and complementary roles and not to replace smallholder farming with large-scale farming. The ADLI strategy is still maintained and smallholder farmers are acknowledged for their contributions and are being supported. My argument is in line with Keeley *et al.* (2014). The conference on Land Policy Initiative of the African Union held in Addis Ababa from 11 to 14 November 2014 also strengthened the vital roles of smallholder farmers in African Agricultural development (UN-ECA 2014). But, this is not to deny the fact that large-scale farming was promoted on the lands that were being used efficiently by smallholder farmers, as in the case of Bako Tibe District, but which failed to deliver the expected outcome. A key informant interviewed on 20 March 2012 in Bako Tibe District also questioned whether the company had the capacity to affect the transfer of technological know-how to smallholder farmers in its vicinity.

Key government key informants are also dissatisfied with the level of contributions of the large-scale farms to community development endeavours. As previously mentioned, S&P Energy Solution in Benshanguel Gumuz Regional State launched a school feeding programme for the local Gumuz population in Kota village, with an outlay of ETB 160,000 per year, with the aim of increasing primary school enrolment and attendance in the area. Although this primary school participation has improved, the contribution is considered to be less than initially expected. It was revealed that the company had previously promised to upgrade the primary school to a high school during community discussions. The company has also constructed a three-room labour ward for the local people in Kota village, but again the local people and the local administration are not satisfied because the company did not live up to its promise to furnish it with facilities to make the ward fully functional. Karuturi in Bako constructed feeder roads, boreholes and an electricity grid largely for its own use rather than as a form of Corporate Social Responsibility (CSR). Despite various requests by the local people to get access to these facilities, the local people were refused access to electricity supplies and to the boreholes the company dug on its estate. In a similar vein, S&P constructed feeder road that passes through Kota village to its estate. While both S&P in Benshanguel and Karuturi in Oromia believed that this is CSR in action, key government informants and the local people did not view it as a contribution to community development.

During my fieldwork, I observed that local people in both regions had used the feeder roads for input-output marketing. In Gambella, both Karuturi and Basen farms had not contributed any meaningful CSR to the local population. One should note here that the divergence between expectations and actual experiences about the company's contributions to community development was due to the huge and unrealistic expectations held by key government informants before the inception of the companies.

Due to sluggish land development and incorrect reporting about the large-scale farms, benefits in the form of fiscal revenue generation and foreign-exchange earnings seldom materialize. Examination of the payroll of Karuturi in Bako Tibe District revenue office indicated that the contributions in the form of employees' income tax are insignificant, irregular and marred by false income statements and employment data records. For example, an Ethiopian working as a Human Resource Manager for the company was reported to earn ETB 8,000 per month, while his Indian supervisors were reported to receive ETB 1,500–5,000 per month, much less than their subordinate. Similarly, at the time of the survey, I observed about 13 Indian expatriates working for the company, but the payroll reported to the district's revenue office showed that only three Indians are employed by the company. Similar examination of data from Dangur District revenue office in May 2014 showed that the S&P paid income taxes from 2011–2013 but not for 2014. Land rent taxes are paid to the regional government while income taxes are paid to the district revenue office. An interview with an expert working at the district revenue office indicated that his office collects income taxes based on what is reported by the company, and there is no mechanism to triangulate whether the report is genuine. The report by S&P to the revenue office showed similar inconsistencies to that of Karuturi. The record of the company showed that there were 21 Indian expatriates before they were laid off in 2013, and in 2014 there were two Indians working for the company. None of the incomes of these expatriates were reported to the district's revenue office for income tax purposes. Such discrepancies suggest tax evasion practices. Expressing his dismay, the head of the district's revenue office in Bako Tibe District alleged that Karuturi is 'cheating' the local government and his office plans to sue the company in the court.

I further analysed the views of key government informants by disaggregating the respondents in three categories. I found out that there are marked variations among government key informants at federal, regional and district levels in their ex-ante expectations. While those at federal (mean score=4.25 and median value=4) and regional (mean score=4.13 and median

value=4) levels had 'high' expectations of large-scale farming, those at the district level (mean score=3.1 and median value=3) had relatively lower expectations (Table 3.6).

Table 3.6: Disaggregated analysis of key government informants' perceived expectation and actual experiences from large-scale farming in Ethiopia (n=42)

Outcome variables	**Federal level key informants (n=12)**		**Regional level key informants (n=16)**		**District level key informants (n=14)**	
	Expected	Realized	Expected	Realized	Expected	Realized
Technology transfer	4.5	2.5	4.44	2.83	4.5	2.07
Generates employment	4.5	3.67	4.12	3.3	3.78	2.93
Generates revenue	4.25	3.0	4.43	3.0	3.64	2.79
Infrastructure development	4.25	2.0	4.56	2.0	3.5	2.0
Generates foreign currency	4.58	1.5	4.43	1.5	3.07	1.29
Protects natural resources	4.17	1.83	4.0	1.75	3.21	1.79
Provides raw material	3.92	2.0	3.68	1.87	1.78	1.7
Increases food supply	3.83	1.92	3.35	1.81	1.7	1.64
Overall Mean	***4.25***	***2.3***	***4.13***	***2.25***	***3.1***	***2.02***

Source: Own survey data, 2012

Key government informants at federal and regional levels had a much clearer vision of the strategic objectives of promoting large-scale farming compared to those at district level, who had little or no roles in the land-lease negotiation process. A key government informant from the Agricultural Investment and Land Administration Agency (AILAA) who was interviewed on 15 March 2012 for this study expressed his opinion that 'the Growth and Transformation Plan envisaged agricultural transformation, and this could be achieved if large-scale farms are promoted, developed well and integrated into smallholder farming.' The decision to transfer farmlands to the projects under review in this study came either from the regional government (e.g. Karuturi in Bako and Gambella) or from the federal government through the AILAA (e.g. S&P Energy Solution).

In terms of actual experiences from large-scale farming, a general consensus among key government informants was observed at federal (mean score=2.3 and median value=2), regional (mean score=2.25 and median value=2) and district (mean score=2.02 and median value=2) levels that large-scale farms are not contributing in the way previously anticipated(Table 3.6).

Although expected benefits cannot be fully realized when the projects are not fully developed, the sluggish pace of land development has raised concerns about the capacity of investors to

fully develop the land acquired. The key question here is would the government change its policy of promoting large-scale farming given the significant divergences between expectations and actual experiences? Dissatisfied with the performance of the large-scale farms, the government has questioned its open-door approach to investors interested in acquiring land, which was prevailed in the mid-2000s. The AILAA has now decided not to transfer land in excess of 5000 ha to an investor in a single deal, and future decisions to provide additional land will be decided based on the performance of the investor on the land acquired in the first phase. This was also confirmed in an interview with the Ethiopian's Minister of Agriculture (Sethi, 2013).

The change in approach is contrary to the practices of early 2008, when parcels of up to 100,000 ha were transferred to a single investor. Nonetheless, the government's position regarding the contributions of large-scale farming is intact and land transfer for large-scale farming is set to continue in the future. The AILAA monitoring report mentioned the high cost of land clearing and development and poor infrastructure as critical challenges for successful large-scale farm development in Ethiopia (Ministry of Agriculture 2011a, 2011b, 2012, 2013). The government has reportedly adopted a strategy of developing land and leasing out farmlands to investors to allow them to start production immediately after land contracting (Keeley *et al.* 2014). This approach is similar to the government's approach of establishing industry district zones for companies interested in engaging in the manufacturing sector. The history of state farm development in Ethiopia has shown that there have been huge inefficiencies in spending public resources on land development. The same problem might reoccur if the EPRDF government commits itself to spending meagre levels of public finance on land development for large-scale farming.

3.4.3 Expectations and actual experiences of local people from large-scale farming in Ethiopia

3.4.3.1 Introduction

In this section, the perceived expectations and actual experiences of the local people who are direct stakeholders affected either positively or negatively by the large-scale farms will be discussed. Free, Prior and Informed Consent (FPIC) of the local people about the transfer of land to investors for large-scale farming is not practised in Ethiopia. As discussed in the introductory chapter, this was largely because of the widely-held belief in government circles

that unused land is available and can be allocated for large-scale farming without significant economic trade-offs.

In each of the study regions, the key informants explained that the local administration facilitated a kick-off meeting to introduce the investors to the local people. Among the key issues commonly discussed during these community gatherings were the type of engagement the investors would make in the villages and the potential contributions of the investment to the local economy. Promises by company representatives that substantial benefits would accrue were the rule in most cases, and this raised expectations (cf. Focus on Land in Africa 2013). Against this background information, I further deepened my inquiry by asking local people the following key questions: (1) What were your expectations and actual experiences of large-scale farming? (2) Are you satisfied with the outcomes of large-scale farming to date? (3) If there is a divergence between the expectations and actual experiences of large-scale farming, are there any emerging agrarian struggles in response? The following section discusses the perceptions of local people in terms of their earlier expectations before investors started developing the land, their actual experiences after the investor started farming, and their responses to any possible divergences between earlier expectations and actual experiences.

3.4.3.2 Perceived expectations of the local people from large-scale farming

The majority of the local people (60–95%) who had lived around the four large-scale farms had very high expectations regarding the contribution of the companies in terms of employment. In particular, the local youth had expected to become supervisors of daily labourers and work as tractor operators after receiving the needed skill training by the companies. The majority (69–90%) had very high expectations of receiving decent and stable wages from such engagements (Table 3.7).

In an information meeting held four years ago between the community members and the managers of Karuturi Agro Products PLC in Bako, the local people were promised employment opportunities at the farm at a daily wage rate of ETB 25–30. There were similar expectations among the local people in Gambella and Benshanguel Gumuz Regional States following promises by company representatives to engage local people in various types of employment that would provide them with decent wages.

Other promises by company representatives were also mentioned by the local people in each region. Among these were promises to get access to infrastructures such as roads, clean water, electricity, school facilities, etc. Companies' participation in community development activities was one of the greatest expectations held by the majority (67–98%) of the local people in the cases examined. Contribution of large-scale farms to technology transfer, with the exception in Oromia, was one of the outcome variables about which the majority (61–91%) of the local people in Gambella and Benshanguel Gumuz Regional States had no meaningful expectations. In Oromia, close to 83% of the local people had very high expectations that Karuturi Farm could serve them as a place to access improved farm inputs and farming skills. The engagement of the local people in mixed farming activities in Bako Tibe District of Oromia Regional State boosted their anticipation that some technical knowledge and farm inputs could spill over from the large-scale farm to the smallholder farmers. On the contrary, in Gambella and Benshanguel Gumuz Regional States, the engagement of the local people in livelihood activities other than crop farming (agro-pastoralism, shifting cultivation and hunting and gathering) and the type of agricultural commodity planned for cultivation by the large-scale farms (cotton by Basen Farm and pongomia by S&P Farm) resulted in the local people not having any meaningful expectations in the form of technology spillover.

Table 3.7: Perceived expectations and experiences of land users from large-scale farms in Ethiopia

Outcomes	Karuturi-Oromia (n=142)		Karuturi-Gambella (n=200)		Basen-Gambella (n=100)		S&P-Benshanguel Gumuz (n=96)	
	Expected	Experienced	Expected	Experienced	Expected	Experienced	Expected	Experienced
Technology transfer								
Mean	4.06	0.24	0.39	0.16	0.09	0.08	0.71	0.69
Mode (%)	4 (83.1%)	0 (86.69%)	0 (61.5%)	0 (87.5%)	0 (91%)	0 (92%)	1 (90.6%)	0 (85.4%)
Mean difference	3.8		0.03		0.1		0.02	
t-value (St. Error)	36.7 (0.1)*		0.76 (0.04); NS		0.26 (0.04); NS		0.58 (0.04); NS	
Employment generation								
Mean	4.1	1.37	4.02	0.7	3.98	0.37	4.17	2.01
Mode (%)	4 (83.8%)	2 (51.4%)	4 (59.5%)	1 (65%)	4 (65%)	0 (63%)	4 (90.6%)	2 (80.2%)
Mean difference	2.74		3.36		3.6		2.16	
t-value (St. Error)	30.9 (0.09)*		51.4 (0.06)*		41.3 (0.09)*		26.68 (0.08)*	
Decent income from employment								
Mean	4.1	0.99	4.1	0.3	3.92	0.41	4.13	1.88
Mode (%)	4 (83.8%)	0 (62%)	4 (68.5%)	0 (68.5%)	4 (70%)	0 (59%)	4 (80.2%)	2 (85.4%)
Mean difference	3.1		3.8		3.5		2.25	
t-value (St. Error)	22.5 (0.14)*		71.7 (0.05)*		44.7 (0.08)*		31.9 (0.07)*	
Community development								
Mean	4.49	0.49	4.34	0.26	3.95	0.34	4.11	1.36
Mode (%)	4 (97.1%)	0 (53.5%)	4 (66.5%)	0 (73.5%)	4 (69%)	0 (66%)	4 (97.9%)	1 (90.6%)
Mean difference	4.0		4.07		3.6		2.75	
t-value (St. Error)	52.6(0.08)*		102.3 (0.04)*		44.97 (0.08)*		45.96 (0.06)*	
Increase food availability								
Mean	3.89	0.27	3.9	0.7	0.06	0.05	0.24	0.23
Mode (%)	4 (79.6%)	0 (86.6%)	4 (75.5%)	1 (67%)	0 (94%)	0 (95%)	1 (68.7%)	0 (82.3%)
Mean difference	3.6		3.25		0.01		0.01	
t-value (St. Error)	36.8(0.09)*		67 (0.05)*		0.3 (0.03); NS		0.59 (0.02); NS	
Vegetation clearing								
Mean	4	4.07	4	4.1	4.01	3.9	4.14	4.1
Mode (%)	4 (78.8%)	4 (91.5%)	4 (69.5%)	4 (88%)	4 (69%)	4 (86%)	4 (95.8%)	4 (97.9%)
Mean difference	0.06		0.01		0.11		0.04	
t-value (St. Error)	1.04 (0.06); NS		0.23 (0.04); NS		1.6 (0.07); NS		0.54 (0.06); NS	

Source: Survey data; *P<0.01

On the other hand, the majority (69–94%) of the local people in Abobo (Gambella) and Dangur (Benshanguel Gumuz) districts had very low expectations that the large-scale farms would increase the domestic availability of food supplies due to the cultivation of non-food crops by companies. On the other hand, in Oromia and Gambella Regional States, where Karuturi had a plan to cultivate a food crop (e.g. maize) traditionally consumed by the local indigenous people, the majority (75–87%) had very high expectations that food grain, as promised during pre-engagement meetings, would be available at reasonable prices. Across the four case studies in the three regional states, the majority of the local people (69–96%) commonly anticipated a negative impact of large-scale farms on the environment through the destruction of forests and vegetation.

3.4.3.3 Experiences of the local people from large-scale farming

The disturbing, but not surprising, result was the perceived divergence between earlier expectations and the outcomes actually experienced by the local people from large-scale farming. As presented in Table 3.7, significant divergence ($p<0.001$) is observed between mean perceived expectations and experiences on most outcome variables across the four case studies. Exceptions are observed with regard to technology spillover and increased food supply to the local people from large-scale farms. For these outcome variables, the local people had very low expectations *a priori* and their actual experiences to date are consistent with the expectations they had set. Similarly, local people had anticipated clearing of vegetation by companies and their experiences to date were consistent with their earlier expectations. The mean difference between expectation and actual experience for this variable is not statistically significant, meaning that large-scale farms did contribute as expected, according to the locals, in terms of the destruction of forest and vegetation. Detailed discussion about the impacts of large-scale farming on local environment based on data generated from satellite images and soil data is presented in Chapter 5. Here, it suffices to note the consistent results of the perceived experiences of the local people about the negative environmental impacts of large-scale farming with the quantitative results presented in Chapter 5.

Community members indicated that they had very high expectations of the large-scale farm projects which, it was argued, would result in significant contribution to employment generation and investment in community development. However, employment is highly insecure and seasonal,[36] and wage rates are comparatively low,[37] which limits the contributions made to local livelihoods. In lowland areas, such as in Gambella, the engagement of local people in employment is very limited due to their lack of experience in previous farming activities. In these areas, migrants benefitted from wage employment more than the local people in the highlands. Wages paid are very low and contrary to the expectations of decent incomes that would contribute significantly to household's well-being. For instance, the wage rate paid to daily labourers by Karuturi in Oromia was ETB 7 per day during the first three years of operation. In late 2011, it was increased to ETB 12, which is still significantly lower than the initial promise of ETB 25–30 daily wage rates. The company appears to have had substantial leverage when it came to determining wage rates in Bako due to huge landlessness in the district, which is estimated at 7%. This was partly the result of displacement of farmland and grazing land for project development. In Gambella, the same company paid wages as low as ETB 10 per day for school boys who were engaged in weeding Karuturi's maize plantation and for women who watered the oil palm nursery site at Ilia village. With most labourers being poor and government inspectors noticeably absent, casual labourers have limited bargaining capacity to raise their wage rates.

The local indigenous people in the three regional states had expectations that they would be engaged in technical and supervision tasks. In reality, they predominantly participated in non-technical employment. Many of them were engaged as security guards and plantation workers, despite having the potential to perform more skilled duties. In Gambella and Benshanguel Gumuz Regional States, the engagement of indigenous people in wage employment is very limited, far from their initial expectations, due to the lack of farming experience. In those regions, migrants from highland areas benefitted from the wage employment generated. This is discussed in detail in the next section. Some of the jobs (e.g. tractor operation) that can be performed if skills

[36] Casual workers numbering 200-300 work for two to three months a year. There are 13 security guards working on the farm; 7 supervisors; 9 tractor drivers/helpers and 5 case operators.
[37] For example, the company pays ETB 800–1,200 per month for tractor operators while the going rate in Bako Tibe District ranges between ETB 2,000–3,000 a month. Jakaranda, a domestic investor, pays ETB 20 per day for the services of a daily labourer, while Karuturi pays only ETB 12 a day.

training is provided to local people were taken up by Indian expatriates. Data from the Bako Tibe District revenue office showed that, in 2010–2011, 30–44 Indian expatriates were engaged in Karuturi's on-farm activity in Oromia region. In 2012, it was noted that 13 Indian expatriates were working as tractor operators and field supervisors. Similarly, in Benshanguel Gumuz Regional State there were 21 Indian expatriates engaged in farm employment, which was cut to two in 2013 when the company reduced its farm operations.

Apart from the limited engagement of local people in the much anticipated employment, as mentioned by the wageworkers and key informants, jobs are mostly menial and seasonal in nature, proper hiring and firing procedures are absent, and formal binding contracts between the employees and the companies are completely absent in all cases. With the absence of formal contracts, wage payments are often late and sometimes refused, and wageworkers are fired for unfounded reasons, as happened in Oromia, when Karuturi fired 14 employees in 2012. Furthermore, labour conditions are reported to be demanding and there are also reports of mistreatment by supervisors. Most notably, a number of women were reported to have been abused by Indian supervisors. Two women who were interviewed on 26 March 2012 in Bako reported that they were fired without receiving their wages due to their rejection of sexual advances by an Indian supervisor. They also reported that another woman who used to serve as a housemaid was raped and subsequently fired by an Indian supervisor. Subsequently, she became pregnant and end up being dependent on her family. It was alleged that the Indian who abused her travelled back to India before the woman received any justice. Nevertheless, there were no reports of such abuses from the case studies in Gambella and Benshanguel Gumuz Regional States. In general, the local people have generally lost out from the land transfer with little employment benefits and wage employment far from initial expectations.

Studies on the contributions of large-scale farming in respect of employment generation and poverty reduction are mixed. Lipton (1977) and De Schutter (2011) acknowledged that supporting the productivity of smallholder family-operated farming generates more employment and contributes to poverty reduction more than large-scale mechanized farming does. On the other hand, Cramer *et al.* (2008) in Mozambique and Maertens & Swinnen (2009) in Senegal indicated the positive welfare effects of plantation agriculture for the poor who have limited

access to land. Cramer *et al.* (2008) further pointed out that job insecurity among rural wageworkers in Mozambique is common and the welfare improving impact of rural employment is significant when the number of days that the poor are engaged in employment increases. In Ethiopia, at least in the four cases considered, plantation agriculture did not live up to the expectations of local people when it comes to generating much-needed employment with decent incomes and there is no job security; thus, its welfare impact is insignificant.

Likewise, other expectations have been huge but seldom realized. Very high expectations about community development activities of different types were held by the local people in the three regional states. For example, besides the 9-km feeder road that Karuturi constructed for its own benefit in Bako Tibe District, other promises, such as giving local people access to drinking water from the company's boreholes and their electricity supply, were not realized in Oromia Regional State.[38] Similarly, S&P in Benshanguel Gumuz Regional State promised to upgrade the primary school in Kota village to a high school, to construct and furnish a delivery ward and to supply village electricity. But, besides launching a school feeding scheme to raise school enrolment, and constructing an unfurnished labour ward, the company did not fulfill the other promises. In Gambella Regional State, contrary to the huge community expectations about local development by large-scale farms, no meaningful contribution was made by Basen or Karuturi farms. The mean difference between expectations and actual experiences about the benefits of large-scale farms to communal activities was significant and a major source of dissatisfaction among local people.

The local people had also received guarantees from company representatives that access to key livelihood resources (e.g. water points) would not be blocked by the companies. For example, in Oromia Regional State, communities used to get drinking water for their livestock from the nearby Aboko River, adjacent to their grazing land, and they were assured that they would have continued access to the watering points.[39] However, the company reneged on these promises and completely blocked access, which meant that peasants had to travel an additional three hours to

[38] The company had dug some 20 boreholes for irrigation purposes. Some were even dug on farmers' plots without their consent but peasants are refused access to water from these boreholes.
[39] The company also uses the Aboko River for dry-season irrigation, with a generator that has a discharge capacity of 142 liters/second for six hours a day. This has decreased the availability of water from the river, which is naturally shallow.

the Gibe River to find water for their cattle.[40] The experience in Bako shows that when land is transferred, it is not only farmland that is lost but also related resources like water, which is fundamental for peasants' livelihoods. Alienation of water resources as a result of Large-scale Land Acquisition (LSLA) from the community is described as 'water grabbing' by Bues & Theesfeld (2012, p. 278) for central Ethiopia and as the 'water factor' by Woodhouse (2012, p. 787) for Sub-Saharan Africa.

As mentioned earlier, the land concessions of Karuturi in Bako were formerly used by the local people for grazing and cultivation of *teff* and Niger seed. Although community members were promised that they would receive maize stock from the company for animal feed, this has never materialized. With the loss of huge tracts of land used for grazing animals and production of food crops, the impact on peasants' livelihood is clearly discernible. Even though the entire concession of Karuturi has not yet been cultivated, the local people are increasingly constrained in their ability to access grazing land and to cultivate additional plots for important subsistence crops, such as *teff* and Niger seed. This has led to a reduction in agricultural output.

In Benshanguel Gumuz Regional State, most of the population depend on rain-fed agriculture based on a shifting-cultivation system. They produce crops such as sorghum, sesame, maize and pumpkin, and complement their livelihoods by gathering wild foods, hunting, charcoal-making, domestic honey production, traditional gold mining, and handicrafts (INBAR 2010). Land acquired by S&P Energy Solution was previously used for crop production through a shifting cultivation system, and was a source of forest-based livelihoods. With the loss of key livelihood resources, fallow periods are shortened and access to a forest-based income and food sources significantly decreased due to the land clearing by the company. In Gambella Regional State, the land clearing by Karuturi at Ilia village damaged access to the nearby forest, which was the source of different non-timber forest products of the indigenous Anuak people. This was also contrary to the earlier promises that the leasehold of Karuturi would not overlap with the area needed to sustain the forest-based livelihood of the Anuak people.

[40] This negatively impacted on the farming practices of households as farmers only plough for a few hours now because they have to take their oxen to search for drinking water faraway.

The local people in the three regional states also complained about the loss of indigenous tree species that used to provide food, incomes, and shade during community gatherings and cultural festivities. The communities' firmly-held earlier fears that clearing of vegetation cover by large-scale farms will undermine livelihood options, destroy cultural identity and exacerbate worsening of micro-climate of surrounding environment became a reality within just a few years of the start of land development in all four cases. A Monitoring and Evaluation report by the Ministry of Agriculture on agricultural investment projects for Benshanguel Gumuz Regional State indicated that investors that acquired land for large-scale farming, including S&P, had failed to generate sufficient employment, showed little regard for natural resources management, demonstrated sluggish implementation performances and rarely paid land rents to the districts (MoA 2011a). Potential environmental damage should be mitigated before a project commences, but, often, an Environmental Impact Assessment (EIA) is prepared as a rhetorical device to justify projects without adequate enforcing mechanisms. In many of the projects, as I have confirmed by looking at the EIA documents submitted to the AILAA, it is prepared after they have started operation. This practice is discussed in detail in Chapter 6.

3.4.3.4 Emerging agrarian struggles against large-scale farming

The last question I tried to answer here is what are the responses of the local people when their hopes are dashed and outcomes are contrary to earlier expectations? Dissatisfied with the outcomes of large-scale farming, the local people who are living around the large-scale farms showed various forms of resistance in a bid to 'roll back' the land transferred to the investors. These include abduction of expatriates working for the farms, looting of the property of the companies, setting farms on fire and formal requests about their rights to government officials.

Although organized agrarian struggles are less common, sporadic conflicts between the local people and investors are common. For example, a group of community members in Bako Tibe District had a violent altercation with Indian tractor operators in 2011, which led to the hospitalization of two Indians. The case was taken to the district court but later thrown out due to lack of evidence. The company managers of Karuturi in Oromia frequently report the looting of their properties and grain harvests by community members. The District Justice Office also confirmed that there had been theft and abduction cases filed by the company against local

people, with security guards working at the farm cited as witnesses. A chief officer working for the District Justice Office interviewed on 21 March 2012 confirmed that there were frequent conflicts between community members and the company, largely due to a failure to fulfil promises. A key informant interviewed on 20 March 2012 in Bako Tibe District explained that the District Administration had received a copy of a letter from Karuturi on 30 March 2010, which was directly addressed to the late Prime Minister Melese Zenawi, complaining about the difficult and life-threatening experiences that Indian employees had encountered at different times from the local people.

Two unsuccessful organized efforts by the local people in Bako Tibe District against Karuturi Farm were carried out: (1) Members of 11 mutual aid groups in the community contributed ETB 200 (US$ 10.43) each and sent a five-member delegation to Abadula Gemeda, former President of Oromia Regional State, to relay their dissatisfaction with the project. The representatives were denied an audience with the President. The four FGDs composed of five elderly farmers each, conducted at Goromitti and Oda Gibe villages on 3 April 2012, Chittu village on 4 April 2012 and Worabile village on 6 April 2012, unanimously explained that the local people elected representatives to request their land rights. To the dismay of the local people, their formal requests to the District Administration were ignored by the government. In addition, as explained by the FGDs, individuals who resisted the land transfer to the company have been detained and released with warnings of serious imprisonment if they repeat similar actions in the future. They were labelled as ‘community agitators’ and ‘anti-development activists’ by the government. (2) More than 400 farmers in the district signed a petition and submitted it to the District Administration asking for compensation for the lost land, but never received any response. Despite the various forms of organized and unorganized struggles by local people, Karuturi in Bako Tibe District continued to receive support and protection from the government and anyone who is against such investment is labelled as ‘anti-development’ and faces a stern reaction from the local authorities. This was largely the reason for the sporadic conflicts between local people and the company, rather than continuing to adopt an organized form of agrarian struggle to claim land rights.

The District government argues that the farmers in Bako Tibe District who claim to have lost their land to Karuturi have no statutory land rights and cannot claim compensation payments. But this claim is not correct, since there are a number of farmers with statutory land rights who have lost their farmlands without compensation. A woman who was interviewed on 7 April 2012 at Goromitti village said that Karuturi has constructed an airplane runway on part of her plot of land for which she has a land ownership certificate, but she never received any compensation. Similarly, the company has dug boreholes on land held by farmers with land certificates; these farmers, too, did not receive any compensation as per the provisions stipulated in the Constitution.

Likewise, the local community in Gambella Regional State did not welcome the Karuturi Company as they believed that its arrival signalled a threat of dispossession from their ancestral lands and livelihood sources. The company was in conflict with villagers in Palbol *kebele* due to the construction of diversion canals to take water from the Baro River. Due to the diversion, the community members lost their farmlands. Similarly, community members in Lar village elected a four-member representative committee and presented their dissatisfaction with Karuturi to the district authorities, but did not get any response. In 2012, the members contributed money and sent their representatives to the regional government to present their concern to the Head of the State. Again, they did not get any response to their complaints. In a related account at Godera district of Gambella Regional State, an Indian company called Verdanta Harvest Plc, which leased 5000 ha of land to be used as a tea plantation, faced stiff resistance from local people. Dissatisfied with the transfer of land covered with indigenous forest to the Indian company, the local people set farm buildings on fire on 26 October 2013, resulting in a complete destruction of the investment (*The Reporter* 2013). In a similar account, six Pakistani nationals who were working for Saudi Star Agricultural Development Project in Abobo District of Gambella Regional State and a local police officer were killed on 28 April 2012 (Solidarity Movement for a New Ethiopia [SMNE] 2012). Saudi Star is owned by an Ethiopian-born Saudi multi-billionaire, Sheik Mohammed Alamoudi, who is producing rice on 10,000 ha of land leased from the government.

However, there were mixed responses from local people with regards to Basen Farm in Abobo District of Gambella Regional State. While the local indigenous Anuak ethnic group living around the farm made clear their discontent and repulsion for the company, the highland immigrants who arrived in the area from 1984 onwards, welcomed the farm. The Anuak ethnic group claimed that their ancestral land is being taken away in the name of development with very little benefit accruing to them. By contrast, the settlers viewed the arrival of Basen as an opportunity to balance the long-standing conflict they have had with the indigenous people, in which they have been considered as intruders. Another reason for the settlers to welcome Basen Farm is that their major livelihood is farming. This means that the immigrants are preferred by the investor over the indigenous Anuak, who are considered as less efficient in performing wage employment in farming.

In Benshanguel Gumuz Regional State, the Gumuz ethnic group living around S&P Farm responded to the unmet expectations from the farm in different ways. In an interview held on 28 April 2014, the company manager of S&P Farm explained that there was an unhealthy relationship with the local people. Lootings are common and a building used by company employees was set on fire by unknown agents; the company alleged that it was a deliberate act by local people. All these cases of organized and unorganized agrarian struggles against large-scale farming in Ethiopia show the poor relationship between the companies and the local people as a result of their dissatisfaction with the investments.

The subsequent chapters provide a more detailed analysis of the impacts of large-scale farming on local communities' employment, income, food security status and selected environmental variables in order to show the micro-level impacts of large-scale farming in Ethiopia. This is done by analysing empirical evidence generated from the four large-scale farms located in Oromia, Gambella and Benshanguel Gumuz Regional State.

CHAPTER 4: CONTRIBUTIONS OF LARGE-SCALE FARMING TO EMPLOYMENT AND HOUSEHOLD INCOMES

4.1 Introduction

Rising unemployment has become a global concern. Due to high population growth rates, the challenge of unemployment is alarming in Sub-Saharan Africa in general and in Ethiopia in particular. According to Guarcello and Rosati (2007), lack of broad-based employment opportunities in Ethiopia is one of the critical challenges of the country in terms of achieving the Millennium Development Goals (MDGs). Unemployment rates have worsened since the 2007–2008 economic meltdown that hit many countries in the world. National governments in the developing South took policy measures to attract investments as a panacea to create jobs for the needy.

Some studies (Oakland Institute 2011; FAO 2012b) conducted to examine the employment contributions of large-scale farming contended that incomes from employment in plantation agriculture serve as a valuable source of extra income for migrant farmers with small landholdings back home and also for the landless in certain areas. The World Bank report *Rising Global Interest in Farmland* also stated that large-scale agricultural investment can potentially contribute to poverty reduction through employment creation (Deininger *et al.* 2011). An empirical investigation in Mozambique by Cramer *et al.* (2008) revealed that foreign-owned plantations paid relatively higher median wages compared to those enterprises and plantations owned by Mozambicans and when wageworkers work for local farmers. On the other hand, Li (2011) challenged the view that large-scale farming contributes to employment generation by arguing that large-scale mechanized farms are more labour-repealing than labour-absorbing, and thus the expectations are unrealistic. Wiggins (2009) argued that small farms absorb more labour per hectare compared to large-scale farms, but with lower labour productivity and marginal returns to labour.

In Ethiopia, large-scale farming is promoted partly to generate more jobs for the landless youths and peasants who are under-employed due to an overall dwindling farm size. Nevertheless, as discussed in the previous chapter, the contribution from large-scale farms in the areas studied to

job creation is unsatisfactory to date. The contribution of large-scale farming to employment generation in Ethiopia is minimal, primarily due to the seasonal nature of the job and low wage rates. Regardless of the limited employment generated, which is far from the initial expectations, the promotion of large-scale farming in the country has continued and the government has vowed to generate more employment in future land deals.

In this chapter, I will estimate the average number of jobs generated by large-scale farming for each hectare of land under large-scale investment using data generated from the four case studies. Subsequently, I will identify the key factors that are relevant in determining different wage incomes among different groups of farm labourers using data collected from my survey among 264 employees. In addition, secondary data from large-scale farms will be used. The Mencer regression function is used to identify the key factors.[41] This helps to understand which groups within society (men or women, indigenous or migrant, youths or adults, etc.) are benefitting from large-scale farming, which will have implications for the understanding of income inequality and social differentiation among the different groups.

In addition, the impacts of large-scale farming on the income levels of the local people who are directly affected by large-scale land acquisitions are discussed in this chapter. Annual gross income data were collected through household surveys by capturing the different sources of incomes, such as wage income from crop, livestock and livestock products, income from petty trading and sale of local beverages, transfer payments through remittance and subsidies, and income generated from forests and non-timber forest products. The impacts of large-scale farming on the annual gross income levels of the local people who are directly affected by large-scale land acquisitions was estimated through the Difference-in-Difference method and the propensity score matching techniques.[42]

[41] Details about the sources of data and the Mincer regression function are discussed in Chapter 1.
[42] Details of the source of data and the DiD and PSM techniques are discussed in Chapter 1.

4.2 Results and Discussion

4.2.1 Contributions of large-scale farming to employment generation in Ethiopia

The number of jobs generated from each hectare of land show variation among the cases of this study. This is due to the level of mechanization put in place and the type of crop commodity produced by the companies. In general, the farms generated 0.08–0.28 jobs per ha during slack seasons, and 0.13–0.38 jobs per ha during peak seasons. Cultivation of non-food crops by Basen Farm (e.g. cotton) generated more jobs (0.28–0.38 jobs per ha) than production of food crops by Karuturi (0.09–0.13 jobs per ha in Karuturi-Oromia and 0.15–0.23 jobs per ha in Karuturi-Gambella). This is consistently true both during off- and peak farming seasons. Apart from ploughing and planting, most of the farm activities at Basen Farm are carried out with manual labour. Cotton harvesting is the most labour-demanding and highest paid activity, compared to other activities performed by the wageworkers on Basen Farm. In the case of S&P, once the pongomia tree is planted, there is very little opportunity to generate additional employment for the needy, and thus only a small number of jobs (0.08–0.22 jobs per ha) have been created, despite it being a non-food crop (Table 4.1).

Table 4.1: Employment generation from large-scale farms in Ethiopia

Variables	Large-scale farm			
	Karuturi (Oromia)	Karuturi (Gambella)	Basen (Gambella)	S&P (Benshanguel)
Number of wage jobs per year	200–300	600–1000	234–564	200–700
Going daily wage rate (ETB)	12	35	36	39
Number of permanent jobs	43–50	133	23–69	81
Number of jobs created per ha	0.09–0.13	0.15–0.23	0.28–0.38	0.08–0.22
% of immigrant labour	0%	76%	92%	93.8%
Proportion of women employee	58%	34%	36%	35.9%
Mean age of wageworkers	22.1	26.6	24.4	25.5
Mean education (Years)	6.3	7.8	8.3	9.5
Mean daily wage income (ETB)	13.5	46.2	92.4	57.6
Wageworkers with previous experience	14%	32%	50%	22%

Source: Own computations based on field surveys in 2012, 2013, and 2014

At present, the company has generated a number of jobs by cultivating food crops such as maize, sesame and pigeon pea, in addition to planting the biofuel tree. In the case of Karuturi, there is a

relatively high use of mechanization for the different farming activities such as cultivation, planting, spraying herbicides and harvesting. In Gambella, Karuturi used a combine harvester to do the first harvesting and manual labour for the second harvesting of maize stock, which was missed by the harvester because it was too short. The use of mechanization and the cultivation of food crops (maize) were the reasons for the small number of jobs generated per ha by Karuturi compared to Basen Farm.

A study by Deininger *et al.* (2011) in Ethiopia showed that plantation agriculture[43] generated 0.005 jobs/ha, which is significantly lower than the findings of this study, probably due to the aggregation of data collected from all large-scale farms that cultivated different types of crops (food and non-food) and employed different levels of mechanization. Similar studies in other countries indicated that it has generated 0.014 jobs/ha in Brazil (FAO 2012c), 0.351 jobs/ha in the Democratic Republic of Congo (Deininger *et al.* 2011), and 0.006 jobs/ha in Madagascar (Andrianirina-Ratsialonana & Teyssier 2010). The FAO (2012b) reported that plantation agriculture in Ghana and Uganda demonstrated a positive and significant contribution to the number of jobs generated for local people, but these were not sustainable as companies replaced labour-intensive work with capital-intensive technology over time. In addition, the wages remained low.

Although this study did not compare smallholder farming with large-scale farming, smallholder farming is contended to generate comparatively more jobs per ha than large-scale farming (FAO 2012c). The impact of large-scale land acquisition on income generation through employment increases if there is a linkage between large-scale and small-scale farms through contract farming, as is the case in Ghana (Vath & Kirk 2011).

The remainder of this section will discuss which groups have benefitted from the employment generated so far and the factors that determine levels of income from wage employment in large-scale farming. As expected, there are differences in the average daily wage rates paid by the large-scale farms operating in the different regional states in the country. The location factor is

[43] The definitions of large-scale farming used by the different studies cited here is mixed and sometimes not clear. For instance, Deininger *et al.* (2011) used a scale of 500 ha and above as the definition of large-scale farms. Others, like Cramer *et al.* (2014), defined large-scale farms based on the number of workers. Therefore, care should be taken when considering the citations.

found to be an important determinant in this regard. In Bako Tibe district (Oromia Regional State), where landlessness is very high, labour availability is relatively better. Corollary to this, the average wage rate paid to wageworkers (ETB 13.5) is relatively lower than the average wage rates paid in Gambella (ETB 46.2–92.4) and Benshanguel Gumuz Regional States (ETB 57.6) (Table 4.1). In Bako Tibe district, Karuturi pays a minimum daily wage of ETB 12 for manual jobs and a maximum daily wage of ETB 30 for technical jobs. In Gambella, the same company pays a minimum wage of ETB 35 a day, in addition to free accommodation services. There are some exceptions, however. The wages paid per day to women who provide water and weed in the oil palm nursery at Karuturi's Ilia site in Gambella Regional State was minimal compared to the going wage rate of ETB 35 per day. This was also the case for young boys under the age of 14 years, who earned ETB 10 per day for weeding jobs at Karuturi's Jikawo site in Gambella Regional State, while the going wage rate commonly paid by the company is ETB 35.

In Gambella Regional State (Basen's case), the maximum wage rates can go up to ETB 167 while the going (minimum) wage rate is ETB 36 per day. But, there are substantial variations in the wage rates offered to labourers, depending on the arrangements.[44] It can go as high as ETB 167 per day for cotton picking, which is an arrangement on the basis of volume of work performed. Cotton picking, which is the most laborious duty, is primarily performed by migrant labour from the Wolaita Sodo area of South Ethiopia and by highland settlers who live around the farm. The migrants from Woilata Sodo manage to harvest up to 167 kg of cotton at a rate of ETB 1 per kg, while the settlers collect only 25 kg per day. This brings the average wage paid by Basen Farm to ETB 92.4 per day (Table 4.1). Competition for meagre labour is a common practise in Gambella. In 2011, Basen cultivated 2,100 ha of cotton, but managed to collect only the cotton planted on 1,200 ha due to labour shortages and the crops being damaged by rain. Due to poor levels of road infrastructure and its remote location, cost of labour transport is huge and it costs the company ETB 450 to transport a labourer from Wolaita Sodo to the farm site.[45]

[44] Payment arrangements (such as wage rates and methods) show marked differences in rural labour market (cf. Cramer *et al.* 2008).

[45] Basen farm recruits labourers from Wolita Sodo area by making formal contact with SNNP Labour and Social Affairs Bureau. Unlike the case in which companies recruit labourers themselves from the local community, this type of formal labour arrangement provides transparent agreements in terms of pay scale and other secondary benefits (e.g. transportation and accommodation).

In Benshanguel Gumuz Regional State, S&P pays an average wage rate of ETB 57.6 per day. While the daily going (minimum) wage rate paid by the company is ETB 39, the maximum daily wage rate can go up to ETB 120[46] when wageworkers are offered jobs on the basis of a piece rate arrangement. A common piece rate arrangement is when an activity that takes 4–5 days is given to a labourer at a rate of ETB 600. Other investors in the district also use the piece rate arrangement and, for example, they set a task that takes 4–5 days at up to ETB 1500, which results in competition for meagre labour. During peak season, S&P employed up to 700 casual labourers, which went down to 200 during off-seasons. The maximum monthly salary for a permanent employee at the S&P Farm was recorded at ETB 30,000. There were 22 Indian expatriates working at the company before their number was reduced to only three in 2014.[47] Two of the expatriates work as Operations Managers, and the other one is working as a General Manager. All other employees are Ethiopians working in different capacities as Human Resource Managers and as technical persons.

Variations in wage rates and arrangements are observed in the lowland regions of Gambella and Benshanguel Gumuz. As a result of labour shortages, competition for labour is common. The Great Renaissance Hydroelectric Dam, which is being constructed in Guba District – a district located adjacent to Dangur District – contributed to the stiff competition for labour in Benshanguel Gumuz Regional State. In Gambella Regional State, Saudi Star – which is owned by the multi-billionaire Mohammed Hussein Al Amoudi – also resulted in stiff competition for labour.

As a sequel to an enquiry, I analysed the determinants of wage incomes from large-scale farming in Ethiopia using the Mincer-type earnings function. Theoretically, level of education, work experience, age, sex of employees, etc., determine incomes/wages of an employee and these were included in the analysis. Mincer (1958 and 1974) suggests including a variable that captures the effect of the interaction between schooling and experience, and the effect of returns to schooling at old age by squaring years of work experience. These two variables were included in the first estimation of the Mincer-type earning function (see Annex 4.1), but due to the multi-collinearity

[46] This was estimated from a piece rate arrangement provided by the company, and converted into wage income per day.
[47] S&P Farm reduced its operation in 2014 due to financial constraints and it laid off 19 Indian expatriates who had been working prior to 2014.

problem, the variables were excluded in the final estimation. The result of the final estimation is presented in Table 4.2. While salaries of employees in the skilled labour market are fairly determined based on objective criteria, such as level of academic qualification and work experiences, wage rates are, however, determined by less objective parameters in the unskilled labour market. In addition, the lack of minimum wage rate policy for unskilled labour in Ethiopia contributed to the arbitrary provision of wage rates by large-scale farms. Thus, this necessitated the identification and inclusion of other variables in the estimation of the Mencer-type earning function that would affect levels of wage income in Ethiopia. Variables such as origin of labourer, type of work, type of crop and location were identified as important variables during the exploratory survey conducted in all the three regions prior to the formal employee surveys, and thus, included in the analysis.

Table 4.2: Determinants of wage rates in large-scale farms in Ethiopia

Dependent variable: Ln(Wage per day)		Std.		Collinearity Statistics	
Independent variables	B	Error	t	Tolerance	VIF
Constant	2.461	0.087	28.27***		
Age of the employee (Years)	0.001	0.002	0.27	0.71	1.41
Sex of the employee (0= Female; 1=Male)	0.088	0.036	2.45**	0.86	1.17
Years of farming experience (Years)	0.041	0.006	7.11***	0.70	1.44
Education level (Years)	0.022	0.005	4.59***	0.87	1.15
Origin of employee (0=Immigrant; 1= indigenous)	-0.122	0.062	-1.97**	0.25	3.94
Type of work (0=Manual; 1=Technical)	0.172	0.041	4.24***	0.83	1.21
Location of the farm (0=Highland; 1=Lowland)	1.072	0.064	16.75***	0.25	3.94
Type of crop (0=Food crop; 1=Industry crop)	0.131	0.048	2.73***	0.68	1.47

Source: Survey data, 2012, 2013 and 2014

The performance of the Mincer-type earning function was generally good. The overall model fit was significant (F value=233.7 and $p<0.01$), the variables included in the model explained 87.8% of the variations in wage incomes, and the function is free from multi-collinearity problem.[48] The result of the Mencer-type regression that explained about 88% of the variations in wage incomes among different groups of wageworkers can be accepted as impressive, given that wage rates are

[48] A variance Inflation Factor (VIF) result less than five shows that there is no multi-collinearity problem

determined by less objective criteria and minimum wage rate policy is effectively absent in Ethiopia. Interestingly, most of the variables included in the Mencer-type earning function were statistically significant, and thus determined variations in wage incomes in large-scale farms in Ethiopia. Since the functional form of the regression was a log-linear model, the interpretation of results is based on the percentage value of the coefficients of the independent variables that appeared significant in the estimation (Table 4.2).

During the field survey, I observed that companies use young boys and girls as young as 11 years[49] for watching birds and watering nursery sites, and pay a small daily wage, much below the going wage rate. Boys and girls in Gambella received ETB 10 per day to watch birds and watering palm oil nursery site, which showed a similar trend in Bako in which a boy who watched birds received a wage as low as ETB 7 per day. The going wage rates in the two regions were ETB 35 and 12 respectively. However, the estimation result showed that earnings of wageworkers was not significantly different due to their age differences. This is perhaps because the age of majority of the wageworkers show little variability and only small proportion of young boys and girls participate in the wage employment. In this regards, the average age of our sample was 24 years, indicating that the majority are high school graduates and looking for job opportunities. In Bako, about 7% of the population is estimated to be landless. The youth in this area used to cultivate parcels that they held customarily. But with the advent of Karuturi, as a mechanism to compensate for the land lost, some of them became wage labourers on the farm and others seek opportunities elsewhere. A focus group discussion with five youths working at Karuturi Farm in Bako, which was held in *Goromitti* village on 08 April 2012, revealed that the wage income received from the company is too small to improve their life, but only serve as a mechanism to partially compensate incomes lost due to the land loss.

Wage incomes from plantation employment are biased towards male employees. Statistically, an employee's gender is found to determine the height of wage incomes significantly. The result showed that male workers receive about ETB 8.8% more per day than their female counterparts,

[49] The practice of involving young boys and girls in various activities is common in Ethiopia (Guarcello & Rosati 2007). It is estimated to contribute 4–7% to the family's income (Cockburn 2002), and often done at the expense of their school attendance (Guarcello & Rosati 2007). Poor families welcome children involvement in waged labour since it complements the income of the family. Against this background, authorities in Ethiopia seldom check large-scale farming companies that employ children despite the labour law (Proclamation 377/2003) prohibits employment of children under 14 years old.

since they have access to more paying jobs than females. The companies that are engaged in large-scale farming in the case study areas maintained the commonly held stereotype that women are less fit/efficient as compared to men in performing farm activities. As a result, women are offered jobs such weeding, watering nursery site, maize shelling, and work as housemaids. Thus, they are paid relatively low wages. Men, on the other hand, are offered better paying jobs such as tractor operation, harvesting and threshing using combine harvester and supervising daily labourers. In terms of the proportion of men and women participation in wage employment, more than half of the employees (58%) at Karuturi Farm in Oromia Regional State were women with a decline in participation (34–36%) in Gambella and Benshanguel Gumuz Regional States. In these regions, women are too busy doing different domestic activities and spend less time in wage employment.

The issue of who benefitted from wage employment is a critical question that a country with an ethno-linguistic federal arrangement needs to address. The proportion of the local indigenous people who were engaged in wage employment in the large-scale farms showed significant variations. In Oromia, all the wageworkers were from the local villages contrary to the case in the lowland regions. In Gambella and Benshanguel Gumuz Regional States, migrant labour is common, accounting for up to 94% of the total labour force (Table 4.1). The companies in these regions preferred migrant labour above the indigenous people for their experience in agricultural activities and partly due to the negative preconceptions regarding the work ethic of the local population. The latter case is also supported by Moreda (2015) in his study in Benshanguel Gumuz Regional State. At the Karuturi site in Gambella Regional State, 24% of the wageworkers were from the indigenous population, compared to the other cases (Basen Farm in Gambella and S&P Farm in Benshanguel Gumuz) in which the level of participation of the local people in wage employment was only 6–8%. Cotton picking at Basen Farm in Gambella Regional State is dominantly performed by migrant labour from Wolaita Sodo area. They are perceived by the employers as having the necessary dexterity and speed in picking the cotton fibre with minimum wastage. Due to their traditional livelihood system, the local Anuak are also less interested in cotton picking.

Migrants received better wages than locals and, on average, their wages per day are higher than those of the local people by ETB 12.2%. This takes us back to the question of whose resources are expropriated for investment in large-scale farming and for the benefit of whom? Apart from other political justifications, one of the reasons for the adoption of an ethno-linguistic federal arrangement by the Ethiopian government was to narrow down regional development disparities. Nevertheless, the result from this study show that the indigenous people are not benefitting in the same way as the migrants from wage income. The discussion about the overall returns for investment to the local economy (at district or regional level) from the different large-scale farms, which is presented in Chapter 3, also strengthens the lack of benefit from investment to the local people.

Work experience is seldom considered in the recruitment of wageworkers and in the determination of wage rates. This is because labourers do not have written testimony certifying their previous experiences, and word of mouth is rarely accepted as valid evidence. On the other hand, most of the activities do not require vast experience. As a result, work experience only matters if the remuneration is based on a piece rate system. A well-trained labourer will be able to be more productive and subsequently be rewarded a higher salary. So the interest here is to see how acquired earlier experience in large-scale farming (reflected in speed and volume of work performed) affects the wage income levels of labourers. The variable that captures previous experience of labourers was found to determine the amount of wage incomes significantly at $p<0.01$. This in particular is a reason for wage differentials among those wageworkers when payment is made based on piece rate agreement and on the volume of work performed. On average, those wageworkers who had previous working experience earned 4.1% higher wages per day than those without any experience. For example, at Basen Farm, the field observation revealed that experienced cotton pickers managed to harvest up to 167 kg of cotton per day enabling them to earn ETB 167 per day. Starters would earn not more than ETB 25 while the daily remuneration would be some ETB 36. The wage gap due to skill/experience difference might level off only after beginners acquire the needed skill/experience after some months.

The type of work performed by a wageworker is also a factor that determines wage income differences. Generally, those who perform manual work such as weeding, chemical spraying, harvesting, threshing, housemaid, etc., are paid with the going wage rates of the region. On the

other hand, those wageworkers who are engaged in supervising the labourers and operating machineries of different sorts received wage incomes higher than the going wage rates. On average, labourers that performed administrative and technical roles received a daily wage income that is 17.2% higher than those who performed menial jobs. Education is a factor that affects one's income level by affecting the type of work a wageworker performs. Better educated wageworkers have jobs as supervisors. They received, on average, a daily wage that is 2.2% higher than those with less years of schooling. While the positive contribution of educational attainment to wage incomes is very clear and was also documented by the World Bank in Ghana (Fasih 2008), this does not mean that improved education will automatically lead to higher wages, as there may not be sufficient skilled jobs in the large-scale farms in Ethiopia to fill this promise.

The other interesting finding from the analysis was that wage incomes differ between wageworkers who worked for large-scale farms that produced food crops and industrial crops. Labourers who worked on cotton farms in Gambella received wage incomes significantly higher than those who worked on food-crop producing farms such as Karuturi, both operating in the same regions. On average, a wageworker employed in a non-food crop producing farm received 13.1% higher wage per day than those employed in a food crop producing farm. Owing to the fact that the non-food crop producing farm is operated by a domestic investor (e.g. Basen Farm) and the other two food crop producing farms are operated by foreign investors, one may argue that the wage difference is not a result of the type of crop commodity, but because of a difference in the ownership of the farms. The going daily wage paid by Karuturi (ETB 35) and Basen (ETB 36), both operating in the same regional state but operated by foreign and domestic investors respectively, are comparable. The mean wage incomes paid by these two companies for the different types of activities are, however, significantly different. In this regard, on average, Basen paid ETB 92, while Karuturi paid ETB 46 (Table 4.1). Therefore, it is indicative that the difference in wage incomes is because of the type of crop commodity cultivated but not due to the ownership type. The government's strategy also iterated the significant roles of large-scale farms that produce raw materials for industries in terms of generating employment with a far-reaching income effect. In terms of the multiplying effect of wage employment, not addressed in this study, companies that produce raw materials for industries will have a much more significant impact than those that produce food commodities that are consumed domestically without much

value-addition. Cramer *et al.* (2008) also found similar results in Mozambique in which workers engaged in the production of non-food crops (such as sisal and cotton) received relatively high wage incomes compared to those who engaged in food crops production such as rice, maize, groundnuts and sesame.

As expected, the location of the farm affected wage rates significantly ($p<0.01$). In lowland parts of the country, labour is a serious constraint and competition for wageworkers is stiff. This has raised the wage rates in Gambella and Benshanguel Gumuz Regional States, and wageworkers in these regions received a daily wage which is 107.2% higher than those in Bako Tibe district of Oromia Regional State. This is also related to the harsh weather conditions, high risk of malaria infestation and snake bites, poor social infrastructure development, and high cost of living in those periphery regions. In these regions, unless wages are relatively high, labourers are not interested in taking up these job offers. Unlike the case of the large-scale farm in Oromia, the companies in Gambella and Benshanguel Gumuz Regional States offered free accommodation – sheds for labourers that accommodates 2–4 labourers – and set up basic health facilities to make their offers attractive. The large-scale farm in Bako does not have these facilities for the wageworkers since the labourers can operate from their own home. In addition to the advantage of enjoying relatively cheaper food prices compared to the large-scale farms in Benshanguel Gumuz and Gambella Regional States, its proximity to the nearby Bako town provides wageworkers with access to better social services. In an effort to address the sky-rocketing food commodity prices and costs of transportation, the companies operating in the lowland regions provided cantina services at a reasonable price and transportation services to employees once a week to buy food commodities in the nearby Gublak (in the case of S&P) and Gambella (in the case of Karuturi) towns. In order to attract labourers, the large-scale farms in the lowland regions included secondary labour conditions in their employment, unlike the case of Oromia Regional State where labour availability is not by and large a constraint.

4.2.2 Impact of large-scale farming on income levels of local people

Beyond knowing the determinants of wage incomes, perhaps, the most interesting issue is to examine how employment contributed to incomes of families and how this has impacted the life of the wageworkers (i.e. change in status of food security and well-being). The fact that the majority of the wageworkers are migrants who have other livelihood activities and families living

in their area of origin makes it difficult to examine impacts of employment at full scale. This is only possible if one traces remittance economy and amount of money invested in farming and non-farming activities by the wageworkers in their area of origin. Unfortunately, this was not addressed in this study. What this study examined was the impact of the land transfer on the income levels of households who have lost access to the lands under the leaseholds of the companies, and the impact of the land transfer on the food security status of the local people. While the latter will be discussed in the next chapter, the impact of losing land to large-scale agricultural farms on the income levels of the local people is addressed in the following section.

Annual gross income per household from different sources, such as wage income, petty trading, sales of different crop commodities, livestock and livestock products, remittance, collection and sale of non-timber forest products (e.g. forest fruit, wild honey, firewood, etc.) was systematically recorded and analysed for two different groups of households (affected and non-affected) and for the same households for two different time periods (before and after the intervention) using the technique of propensity score matching and the double-difference (DiD) method of impact study respectively. For Oromia, the impact of large-scale farming on the income levels of affected households was estimated using the Difference-in-Difference (DiD) method and discussed here in comparison with the estimation based on the PSM technique so as to show the robustness of the two estimation techniques. For Gambella, since I did not have the opportunity to collect data for two different time periods, I estimated its impacts on the income levels of households only using the PSM estimation technique and for Benshanguel Gumuz, the estimation based on DiD technique is presented.

Case one: Karuturi Agro Products PLC in Oromia Regional State

In Bako Tibe District, before the land was transferred to Karuturi, the gross mean annual income of households in the affected stratum (ETB 18035) and non-affected stratum (ETB 18207) were comparable and there was no statistically significant difference between them (Mean difference=171.8 and t-value=0.08). After Karuturi's intervention, the mean annual income of households in the affected stratum has declined by 34.6% (ETB 13,400) compared to their incomes before the intervention (ETB 18,035). However, those households in the non-affected stratum showed no significant change in their incomes after Karuturi's intervention (ETB 18,279)

compared to their incomes (ETB 18,207.4) before the intervention, albeit there is some positive increment. After the intervention, the mean income (ETB 13,400) of households in the affected stratum was 35.7% less than the income levels of those households in the non-affected stratum (ETB 18,279) (Table 4.3). But, it is not possible to attribute the difference in income levels between the two groups of households (i.e. 35.7%) entirely to Karuturi's intervention unless we do a DiD estimation to account for changes due to time factors[50] and factors other than Karuturi's intervention.

Table 4.3: Difference-in-difference estimation of the impact of Karuturi Farm on household annual gross income (ETB) in Bako Tibe District, Oromia Regional State

Mean gross income (in ETB)	Affected (n=75)	Non-affected (n=83)	DiD (n=158)
Before intervention in 2012 (a)	18,035.6	18,207.4	-171.8 (t=-0.08)
After intervention In 2014 (b)	13,400	18,278.6	-4,878.5 (t=-2.3)**
Mean income difference (b-a)	**-4,635.5**	**71.3**	**-4,706.8 (Impact)**
Standard Error	369.1	61.08	356.6
t statistics	-12.6***	1.167	-13.2***

Source: Survey data, 2012 and 2014 *** p<0.01; ** p<0.05; * p<0.1

Based on the DiD estimation technique, the loss in income levels of household's that can be fully attributed to the land transferred to the company is, on average, ETB 4,707 per annum, which is a 26% decline in income levels (Table 4.3). The figure is within the range of the estimated result by using the PSM technique. The households in the affected stratum showed, on average, a decline in income levels of ETB 2,949–4,760 per annum compared to those households in the non-affected stratum. There is decline in income levels of up to 24% due to Karuturi's intervention, which is statistically significant at p<0.05. The results of the two estimation techniques are comparable and consistent, and thus suggest the applicability of the PSM technique for this type of research problems under the Ethiopian context (Table 4.4).

[50] One of the weaknesses of the PSM technique is its inability to control for changes that come due to time factor and other unobservable covariates. The purpose of presenting the results of the two estimation techniques for Oromia is, therefore, a showcase to demonstrate the performance of the PSM under the Ethiopian context and can be viewed as a methodological contribution of the study.

Table 4.4: PSM estimation of the impact of Karuturi's intervention on household income and livestock ownership in Bako Tibe District, Oromia Regional State[51]

Outcome variable	Matching algorithms[a]	Matched samples		Impact (ATT)	Standard Error[b]	t statistics
		Affected	Non-affected	Income in ETB (%)		
Income (ETB)	NN	142	66	-4,760 (-24)	2,257.4	-2.2**
	Radius	36	39	-5,578 (-28.2)	5,246.5	-1.1
	Kernel	142	142	-2,949 (-14.9)	1,366.8	-2.2**
	SS	142	142	-3,477 (-17.6)	1,557.2	2.2**
Livestock size (TLU)	NN	142	66	-3.1 (23.8)	1.5	-2.0**
	Radius	36	39	-2.3 (17.3)	3.2	-0.7
	Kernel	142	142	-3.2 (24.6)	0.9	-3.4***
	SS	142	142	-3.6 (27.7)	1.2	-3.1***

[a] Radius matching is done with a calliper of 0.001 [b]Bootstrap standard error is calculated based on 100 replications; ***p<0.01; ** p< 0.05
Source: Survey data, 2012

The land under the leasehold of Karuturi Farm in Bako Tibe District of Oromia Regional State was used by five *kebeles* − Baca Ode Walde, Oda Gibe, Tirkafeta Gibe, Oda Korma, and Amarti Gibe − and was inhabited by 931, 531, 592, 411 and 852 households, respectively (Bako Tibe District Office of Agriculture and Rural Development, unpublished data). The local people owned a total of 22,000 head of cattle that depended on the grazing land on the flood plain (Schoneveld & Shete 2014). The local people in Bako used the valley bottom of the land transferred to Karuturi to graze their animals. Prior to the land transfer in 2008, households in both the affected and non-affected strata owned herds averaging 13 Tropical Livestock Units (TLU)[52]. After the intervention, while those in the non-affected stratum did not show any significant changes in ownership of livestock (Mean TLU=12.6), those households in the affected stratum owned 45% less livestock (Mean TLU=8.9), which is statistically significant at p<0.01 (Table 4.5).

[51] The common support option has been selected and it was [0.139, 0.999]. The balancing property is satisfied and in a block of 7, the mean propensity scores for affected and non-affected households are not different.

[52] Domestic animals owned by households were converted to Tropical Livestock Units (TLU) using the conversion factors suggested by Storck *et al.* (1991).

Table 4.5: DiD estimation of the impact of Karuturi Farm on household's livestock ownership (TLU) in Bako Tibe District, Oromia Regional State

Mean TLU	Affected (n=75)	Non-affected (n=83)	DiD (n=158)
Before intervention in 2012 (a)	12.9	12.8	0.1 (t=0.95)
After intervention in 2014 (b)	8.9	12.6	-3.6 (t=-2.7)**
Mean TLU difference (b-a)	-4.0	0.4	-3.7 (Impact)
Standard error	0.25	0.14	0.28
t statistics	-11.5***	0.2	-13.5***

*** p<0.01; ** p<0.05

Source: Survey data, 2012 and 2014

The decline in livestock ownership is due to a shortage of pasture after the land was leased to Karuturi. The decrease in household livestock ownership cannot, however, be fully attributed to the transfer of land to Karuturi. The DiD estimation result showed that livestock ownership, on average, decreased by 3.7 TLU after the land was transferred to Karuturi (Table 4.5). This is statistically significant at $p<0.01$, and the magnitude of loss in livestock ownership that can be attributed to the land transfer to Karuturi is equivalent to 28.7%. Based on the PSM estimation, households in the affected stratum owned 3–3.6 TLU less (depending on the different matching algorisms) compared to those in the non-affected stratum. This is statistically significant at $p<0.05$ for NN matching and at $p<0.01$ for kernel and SS matching, and it is equivalent to a 24–28% loss that can be attributed due to the land transfer to Karuturi (Table 4.4). The results based on the two estimation techniques are again comparable, indicating the robustness of the findings.

The loss of grazing land also changed the composition of herds owned by the local community. Households in the affected stratum significantly changed their holdings of livestock from large grazers (such as ox and cow) to small ruminants (such as sheep and goats). Grazers require more space and pasture than small ruminants, which can be kept in the homestead and fed on leaves, roughages, crop by-products, barks and bushes (Table 4.6).

Table 4.6: Distribution of livestock holdings and composition between affected and non-affected households

Type of herd	Affected households			Non-affected households		
	Before intervention (SD)	After intervention (SD)	Mean difference (t)	Before intervention (SD)	After intervention (SD)	Mean difference (t)
Oxen	2.78 (2.67)	1.23 (0.99)	-1.56 (-8.43)***	3.83 (4.58)	3.16 (2.17)	-0.67 (-1.72*)
Cows	3.86 (4.62)	1.61 (1.23)	-2.25 (-5.95)***	5.31 (6.82)	4.34 (4.48)	-1.0 (-2.8)***
Steers	1.82 (2.3)	1.01 (1.21)	-0.8 (-4.0)***	3.16 (5.61)	2.71 (3.54)	-0.46 (-1.61)
Heifers	1.9 (2.6)	1.05 (1.15)	-0.83 (-4.0)***	3.51 (4.96)	3.61 (4.57)	0.095 (0.72)
Calves	2.27 (3.43)	0.72 (0.56)	-1.55 (-5.58)***	3.38 (4.62)	3.03 (3.14)	-0.35 (-1.51)
Goats	0.15 (0.89)	2.81 (3.05)	2.65 (11.14)***	0.31 (0.33)	0.04 (0.3)	0.006 (0.38)
Sheep	0.42 (1.42)	1.2 (3.55)	0.78 (3.25)***	0.83 (1.95)	0.56 (1.5)	-0.27 (-2.05)**
Mules	0.04 (0.20)	0.04 (0.20)	0 (0.00)	0.15 (0.36)	0.16 (0.39)	0.01 (0.53)
Donkeys	0.40 (1.01)	0.26 (0.62)	-0.14 (-2.19)**	0.78 (1.21)	0.7 (0.97)	-0.09 (-1.1)
Chickens	2.41 (3.26)	14.7 (7.16)	12.25 (20.74)***	9.2 (11.2)	7.6 (8.33)	-1.35 (-2.1)**
Beehives	3.18 (5.95)	2.7 (7.16)	-0.49 (-0.69)	10.5 (18.3)	8.53 (14.6)	-1.93 (-1.72)*

***Significant at p<0.01 **Significant at p<0.05 *Significant at p<0.1

Source: Survey data

In terms of boosting the wealth status of households, supplying draft oxen-power for crop cultivation and increasing the availability of milk and milk products for family consumption and for marketable surplus, ownership of cows and oxen are vital for the local people in the study area. The change in livestock ownership from large-grazers to small ruminants will have a significant negative effect on incomes and food security (discussed in next chapter) of local people. Livestock plays a vital role in the livelihoods of households in Bako Tibe District and the loss of grazing land means a significant loss of income for households from reduced livestock production. Due to a shortage of pasture, some households sold their cattle while others lost them as a result of feed shortages. Milk and milk products are important sources of income as well as food for households in the Bako area. A decline in the ownership of cows had a significant impact on household income.

In the same vein, before the company started operations in the community, households used to cultivate, on average, about 2 ha of land to produce different food commodities, such as *teff*, maize and Niger seed. In terms of land ownership with statutory rights, local people own a mean land size of 1 ha. The remaining comes from customarily owned plots that were transferred to the company in 2008. The focus-group discussions also revealed that a significant proportion of landless youth used to generate income by cultivating *teff* and Niger seed along the hilly side of the vertic cambisol, which is now part of the company's concession (see Figure 1.2 in Chapter 1). Apart from the loss of grazing land, the loss of cultivation plots (estimated at 1 ha per household) contributed to the decline in income levels for the affected households.

Case two: Gambella Regional State

Matching of affected and non-affected households based on propensity scores is used to estimate the impact of Karuturi (both for the Nuer and the Anuak cases) and Basen farms on household income in Gambella. The propensity scores are estimated with the help of co-variates that are measured before the intervention for the affected and non-affected households. The results of estimations are presented below.

Karuturi Agro Products PLC in Gambella Regional State

The mean household annual gross incomes for the Anuak and for the Nuer were ETB 13,219 and ETB 21,518, respectively. When disaggregated, the mean income for affected households of the Anuak and the Nuer were ETB 12,475 and ETB 21,104, respectively. The results of the four matching algorisms indicated that there is no statistically significant difference between the affected and non-affected households in their annual gross income for the Nuer, despite the value being negative. In the case of the Anuak, however, the impact of Karuturi's intervention on the gross income of households affected by the intervention is negative and statistically significant at either 1%, 5% or 10%. On average, the Anuak households that are affected by Karuturi's intervention have experienced a 8.6–10% decline in their annual gross income provided that there is no selection bias due to unobservable covariates. The income contribution of the company through wage employment was insignificant in terms of offsetting the negative impacts of the intervention on the annual gross income of the Anuak in which land is key resource for their livelihood. The Anuak in Ilia village lost their cultivation plots as well as key forest-based food and income sources due to the destruction of trees by the company (Table 4.7).

Table 4.7: Impact of Karuturi's intervention on gross household income (ETB) in Gambella Regional State[53]

Case	Matching technique[a]	Matched samples		Impact (ATT)	Standard Error[b]	t-value
		Affected	Non-affected	Income in ETB (%)		
Anuak	NN	98	71	-1,333.3 (-9.6)	642.3	-2.08*
	Radius	92	108	-1,237.4 (-8.9)	485.0	-2.55**
	Kernel	98	120	-1,386.5 (-10)	440.7	-3.15***
	SS	97	121	-1,188.4 (-8.6)	391.0	-3.22***
Nuer	NN	100	4252	-2,257.8	2063.8	-1.09
	Radius	80	106	-1,277.7	2173.5	-0.59
	Kernel	100	122	-1,410.2	1491.4	-0.95
	SS	100	122	-1,208.9	1577.3	-0.77

[a] Radius matching is calculated in a calliper of 0.01; [b]Bootstrap standard error is calculated based on 100 replications; ***=p<0.01; **=p<0.05; *=p<0.1
Source: Survey data, 2013

The Nuer in Jikawo, where Karuturi is cultivating maize, received an offer to collect maize from the company's field. Karuturi's farm plot in Jikawo site was flooded for two consecutive years and the company did not harvest any maize grain. The Nuer who live around the farm were allowed to take the maize grain and stock (for livestock feed) for two years. On the other hand, since the company has not cultivated its entire leasehold concession, land is not currently a limiting factor. For these reasons, the welfare loss due to the loss of land is not statistically significant for the Nuer. The basic question here is will the free maize grain and stock offered by the company be sustainable in the future? This is probably impossible and the negative value, which is not significant now, may turn out to be strongly significant in the future when the entire land is put under crop production.

[53] Note: The common support option has been selected and it was [0.0689, 0.848] for the Anuak case and [0.1033, 0.9521] for the Nuer case. The balancing property is satisfied for both cases. The mean propensity scores for affected and non-affected households are not different in a block of 6 for the Anuak case and in a block of 7 for the Nuer case.

Basen Agricultural and Industrial Development PLC in Gambella Regional State

The mean annual income of households living in the vicinity of Basen's farm is ETB 21,023 per annum. The mean income of households in the affected stratum was ETB 15,894, which is 32.3% less than the mean income of the households in the area. Based on the matching test, the immigrant settlers who are enclaved by Basen Farm experienced, on average, a decline in their gross income by 31–34% compared to those in the non-affected category, provided that there is no selection bias due to unobservable co-variates (Table 4.8).

Table 4.8: Impact of Basen's intervention on gross household income (ETB) in Gambella Regional State[54]

Matching technique[a]	Matched samples		Impact (ATT)	Standard Error[b]	t-value
	Affected	Non-affected	Income in ETB (%)		
NN	100	54	-8,056.7	2852.5	-1.82
Radius	67	111	-6,452.8 (-30.7)	1347.1	-4.79***
Kernel	100	125	-6,810.6 (-32.4)	1825.8	-3.73***
SS	91	134	-7,075.2 (-33.7)	1657.8	-3.22***

[a] Radius matching is calculated in a calliper of 0.01; [b]Bootstrap standard error is calculated based on 100 replications; ***=p<0.01; **=p<0.05
Source: Survey data, 2013

As discussed earlier, the company prefers to recruit migrants from Wolaita Sodo area who are more experienced in cotton picking than those settlers who are originally from Wolo and Kembata areas. Participation of settlers in wage employment did not increase their annual gross income significantly. But, given the fact that labour is scarce in the area, the company would have positively and significantly contributed to annual household income levels had there been a mechanism of improving the cotton picking skills of the settlers through training.

Surprisingly, the settlers who experienced hardship due to the transfer of the land to Basen, preferred the company to continue operating in the area contrary to the negative perception of the Anuak, who are indigenous to the area but minimally affected by the company as they live some miles away from Basen Farm. The Anuak believe that the land under the leasehold of Basen and

[54] The common support option has been selected and it was [0.0996, 0.9309]. The balancing property is satisfied and the mean propensity scores for affected and non-affected households are not different in a block of 7.

under cultivation by the settlers since 1984 belongs to their ancestors. As a result, they are in constant conflict with both the settlers and the company. The settlers believe that the presence of Basen's investment in the area will provide them protection against any resistance from the indigenous people since the government backs investors in the area by mobilizing the military and the federal police when conflicts arise. Below, a comparative narrative of the life story of a settler, a migrant labourer from Wolaita Sodo and an Anuak living close to Basen's farm is presented (Box 1, Box 2 and Box 3).

Box 1: Life story of a migrant labourer on Basen Farm, Abobo District, Gambella Regional State

Aleyu Ketema (not his real name), 36 years old, is a migrant labourer picking cotton on Basen's farm. He came from Wolaita Sodo area to Abobo for three consecutive years. He has family back in his area of origin and explained that his plot of land is too small to feed his relatives and to cover other expenses. He earns a good income (estimated at ETB 12–15,000 during a fourth month stay) by working at Basen's cotton farm. With this additional income, he managed to buy a house in his area of origin, feed his family well and send his children to school. He mentioned that he invested in the money he received from the farm in buying farm inputs for agricultural production activities back home and this has increased his farm productivity and given him additional income and food for the family.

Box 2: Life story of immigrant settlers in Abobo District, Gambella Regional State

An elderly farmer, age 65, who started to live in Abobo District since 1984, narrated his life story as follows. Due to shortage of land, drought and land degradation in his area of origin, Wollo, the Derg regime moved several of his ethnic group to this area as a solution for their food insecurity problems. When he moved to this area, malaria infestation was a critical problem and several of them died due to this disease, while others returned back to their birthplace. Arega (not his real name) decided to settle here permanently and eke out a living in spite of malaria and other water-borne diseases. After some years, he established a family and he is now a father of five.

Until recently, farming in Abobo had been done without limited access to land and it was not difficult to feed family members and send children to school. After the land was transferred to Basen, according to Arega, the opportunity to cultivate additional plots was lost. Nowadays, he cultivates the small plots around his homestead. Employment opportunities from Basen Farm are limited and cannot compensate for the lost opportunity. Moreover, Basen's preference is to employ migrant workers from the Wolaita Sodo area, rather than people like Arega. Even worse, according to him, both the District Administration and the local people marginalize the immigrant settlers by describing migration as a form of exploitation launched by the previous junta. He explained that his property was looted and his claim for justice in the District's Justice Office was ignored. The Anuak believe that the wealth generated by the immigrant settlers belongs to them, since they consider themselves as the heirs of the land. Arega explained the conflicts the immigrant settlers have with the Anuak as a source of insecurity and making it difficult to invest in fixed assets.

Box 3: Life story of an Anuak, Abobo District, Gambella Regional State

Chan (not his real name) is 28 years old and was born in Abobo. He has three children and makes a living by cultivating maize, fishing in the Alewero River and hunting and gathering. He is against the large-scale farm investment taking place in his birthplace and the immigrants who were settled in Abobo by the Derg regime in 1984. He has the view that the land put under large-scale farming and used by the immigrants belongs to the Anuak and that the influx of farm investments and 'outsiders' is a threat to the Anuak since land for crop production will be scarce in the future. He explained that he is not interested in working for the large-scale farms. In fact, the investors are not willing to give them jobs, he narrated. Asked whether he experienced hardship due to the land transfer to Basen, Chan mentioned that, so far, land is not a critical problem and his farm plots are far from where Basen is farming.

Case 3: S&P Energy Solution in Benshanguel Gumuz Regional State

Before the land was developed by S&P, the mean annual gross income of households for both Kota and Badgosh village was estimated to be in the range of ETB 16,409–16,555, and there was no statistically significant difference in the average incomes of households between the two villages. The mean annual income estimated in 2014, i.e. after S&P Farm started cultivation, was in the range of ETB 16,383–16,520. However, there is no statistically significant difference between the households in the affected and non-affected villages. Although the impact of the intervention on average gross household gross income showed a negative value (loss), the DiD estimation revealed that the decline in income is not statistically significant (Table 4.9).

Table 4.9: Difference-in-difference estimation of the impact of S&P farm on annual gross household income (ETB) in Dangur District, Benshanguel Gumuz Regional State

Gross income in ETB	Affected (n=96)	Non-affected (n=100)	DiD (n=196)
Before the intervention in 2010 (a)	16408.7	16555.0	146.2 (t-value=0.11)
After the intervention in 2014 (b)	16382.7	16520.3	137.6 (t-value=0.11)
Mean income difference (b-a)	-26.0	-34.7	-8.6 (Impact)
Standard error	135.6	98.5	167.6
t statistics	-0.19	-0.35	-0.05

Source: Own computation from survey data, 2010 and 2014

Dangur District is predominantly inhabited by the Gumuz indigenous population whose major income source is gold mining. They complement their incomes through crop farming based on shifting cultivation, gathering of forest honey and other non-timber forest products. Farming is extensive. They develop new cultivation plots by clearing trees and bushes, and cultivate sorghum/sesame for one or two years using hand-hoe and then leave the old plots to rejuvenate. Land is not a limiting factor for production in the region. Since 2010, the regional government embarked on allocating parcels of up to 10 ha per household that are officially registered. The local people are no longer allowed to clear additional parcels for shifting cultivation.

After the land was allocated to S&P Farm, incomes from forest honey have declined and fallow periods shortened. For instance, a typical Gumuz used to collect up to 90 kg of honey from the

forest; this has declined to 25 kg due to the forest clearing by the S&P Farm. Research outputs on pongomia trees documented that pongomia flowers are a good source of pollen for honey bees. If there was a strategy to assist the Gumuz in honey bee domestication, the lost income from wild honeybees could be compensated for once the pongomia trees start flowering. On the other hand, leasing out land to highlanders from Amhara Regional State is a common practice in the region, and this serves as a source of income for the local people. Despite the fact that the practice is officially banned by the regional government, the Gumuz informally continue the practice and income from land leasing has not substantially decreased. Though the impacts of the S&P Farm on the income levels of affected households is not statistically significant, the value is negative. The outcomes of the intervention are currently inconclusive and the impact could change in the future when the company fully develops the entire 50,000 ha concession.

4.3 Conclusion

In general, the impacts of large-scale farming on the income levels of local communities is worse in the areas where mixed crop-livestock farming is predominantly practised (Karuturi in Bako and Basen in Abobo) and when a forest-based livelihood is an important source of income (e.g. the Anuak case in Gambella). Land scarcity is the common driving force for the direction of impact of the large-scale farms. As noted earlier, Bako Tibe District of Oromia Regional State is densely populated and expropriation of land to make way for large-scale farming has higher opportunity costs than is the case in Gambella and Benshanguel Gumuz Regional State where population density is low. Wage employment is seasonal and generally favours migrant workers.

CHAPTER 5: IMPACTS OF LARGE-SCALE FARMING ON HOUSEHOLD FOOD SECURITY

5.1 Introduction

Food security has become a global concern after the worldwide food crisis of the 1970s, and its conceptualization following the World Food Conference of 1974. In spite of this, the latest estimates of the United Nations Food and Agriculture Organization indicate that about 805 million people in the world are undernourished in 2012–2014, with 26.6% in SSA (FAO 2014). Although the number of people who are food insecure has declined by about 100 million over the last decade, and many countries are forecast to attain the Millennium Development Goal (MDG) of halving hunger by 2015, the magnitude of food insecurity is still huge by any standard. Many countries in SSA have an alarming Global Hunger Index (GHI), which is an aggregate index based on an equal weight of food security indicators such as undernourishment, child weight and child mortality (IFPRI *et al*. 2012). As a result, food security continues to be a concern for politicians, researchers, academics and civil society.

There are about 7.6 million to over 8 million people in Ethiopia who are chronically food insecure on an annual basis (World Food Programme 2012; Rahmato & Pankhurst 2013; World Bank 2013). These people receive resource transfers (cash, food or both) through the Productive Safety Net Programme (PSNP). The PNSP was started in 2005 and identified a total of 319 food insecure districts in a total of 7.6 million people. The number of people who are in need of emergency food aid is even higher if those who are experiencing transitory food insecurity are included in the statistics. The country has been a major food-aid recipient since the catastrophic famine of the 1980s that claimed the life of about 1 million people (Ofcansky & Berry 1991). Since 1996, the amount of emergency relief food aid received by the Ethiopian government per annum has reached 5.2 million metric tonnes (World Bank 2013). The GHI for Ethiopia in 2012 was estimated at 28.7%, which falls under the category of 'alarming' food insecurity, but has declined from an 'extreme alarming' score of 42.2% in 1990, 38.6% in 1996 and 34.5% in 2001 (IFPRI *et al.* 2012). As a country frequently affected by food insecurity challenges, achieving national food security is always on the agenda of Ethiopia's development planners. A national Food Security Strategy (FSS) was first developed in 1996 as part of the broader poverty reduction strategy of the country, which considered agriculture as an engine of growth and poverty reduction. The FSS focused on three basic interventions: increasing domestic availability of food supply, improving access to food for food insecure households, and enhancing the emergency

response capacity of the country. The FSS, according to Woldemichael (2013), was expanded in 2003 – *the New Coalition for Food Security* – to ensure food security for chronically food insecure people. The new package has four components: the Productive Safety Net Programme (PSNP), the Household Asset Building Programme (HABP), the Complementary Community Investment programme (CCI), and the resettlement programme (started in 2003).

The Agricultural Development Led Industrialization (ADLI) strategy of the country is entrusted to increase the domestic availability of food, and this was considered one of the pillars for achieving national food security. ADLI envisaged increasing smallholder productivity in the highlands, and expanding large-scale commercial farming in the lowlands. A World Bank study identified the western lowlands of Ethiopia, bordering the Sudan, as a potential agricultural frontier with millions of hectares of arable land for both rain-fed and irrigated agriculture. The study recommended that the country tap into and develop land and water resources in the lowlands in a bid to accelerate the industrialization process (World Bank 2004). Ethiopia's strategy of using agriculture as an engine of economic growth and transformation, and to reduce the plight of poverty and food insecurity in the country, coincided with the rush for Africa's farmlands in 2007–2008. This has resulted in the transfer of large swathes of farmland to foreign and domestic capital in different parts of the country, including in the highlands, but notably in the lowlands. Increasing domestic availability of food supplies and creation of employment opportunities through the promotion of large-scale agriculture were, and still are, the transmitting mechanisms considered by the Ethiopian government to reduce poverty and food insecurity. This chapter analyses the food security contributions of large-scale farming in Ethiopia by using empirical data collected from households living in the vicinities of the large-scale farms selected as cases studies.

5.2 Concepts of Food Security

The concept of food security has evolved over more than four decades. Several definitions and indicators are used by researchers, and in some cases this has created ambiguities in terms of identifying what is being discussed (Jones *et al*. 2013). Maxwell and Smith (1991), for instance, counted more than 180 definitions used by researchers in the study of food security. The diversity in the conceptualization and operationalization of the concept comes not only due to the complexity and elusive-nature of the concept, but also the difficulty of measuring it. This compelled researchers to resort to adopting easily measurable indicators.

In the beginning, the definition of food security was dominated by supply-side issues (United Nations 1975), and goals were geared towards ensuring stable and adequate supplies of food at national and international levels, without diligent attention to improved access to food at individual and household levels (Maxwell & Smith 1991). Thus, several countries adopted a green revolution strategy for boosting agricultural production and increasing national food supplies. However, failure of the direct translation of increased food availability by the successful green revolution to improve the food security situation of individual households necessitated the consideration of the demand-side of food security.

Amartya Sen's 1981 thesis *Poverty and Famine: An Essay on Entitlement and Deprivation* showed the widespread famine and starvation among individuals in countries that were successful in achieving sufficient food supplies at national levels. Thus, Sen's thesis adequately demonstrated the importance of ensuring access to food when nations deal with issues of food security (Sen 1981). He further argued that the poor may lack adequate access to food due to declining wage rates and high food prices regardless of sufficient food availability. As a result, the concept of food security was re-defined in 1983 to include 'entitlements to food' through secured physical and economic access to available foods by vulnerable groups of people (cf. FAO 1983).

Three years later, in its report *Poverty and Hunger*, the World Bank (1986) came up with the notion of chronic food insecurity, which is caused by structural factors (lack of assets, education, etc.) and transitory food insecurity caused by temporary factors (volatility of commodity prices, war, natural calamities, etc.). Transitory food insecurity is further qualified as cyclical and temporary food insecurity, with the former indicating recurrence. Such distinctions had a significant impact on a country's long-term economic development policy measures regarding the reduction of poverty and short-term strategies for addressing short-term factors of food insecurity. In this respect, Ethiopia is globally known for cyclical food insecurity problems that affect millions of its population due to irregular patterns of rainfall. As this thesis is being written, several parts of Ethiopia are hit by El Nino,[55] which has resulted in failed and poor rainfall conditions in the *belg* and *meher* seasons,[56] respectively, and the number of people

[55] El Niño is a water-warming weather phenomenon in the Pacific Ocean with mixed/diverse effects of both reduced rainfall levels and flooding in East Africa (*The Irish Times* 2015).
[56] Ethiopia has a bimodal rainy season in several parts of the country. The *belg* season (usually between February and April) is short while the *meher* or main rainy season (May to September) is long. In the *belg* rainy season, early

needing emergency food aid had escalated to close to 8.2 million in October 2015 (*The Irish Times* 2015) from 4.5 million in August 2015 (GIEWS 2015; UNOCHA 2015) and is forecast to reach 15 million in 2016 (BBC Africa 2015).

In the 1990s, the concept of food security further evolved to address the concerns of access to healthy and nutritious food to ensure an active and healthy life for individual members of a household. Such re-definition came after concerns over inequitable access to nutritious food stuffs among men and women within a household were raised (Quisumbing & Maluccio 1999), which necessitated looking into the food acquisition behaviour of households (Jones *et al*. 2013). This evolution brought a third important component – utilization of food – into the food security conceptualization, which shifted the focus of food security studies to consider issues of dietary quality (Jonsson 2010). The inclusion of the food utilization dimension in the definition of food security implied that simple physical and economic access to food are necessary but not sufficient to achieve food security (Jones *et al*. 2013). The delegates of the World Food Summit in 1996 thus considered the importance of food utilization in attaining food security within the household and came up with a re-definition of food security to reflect issues of dietary quality and intra-household food access. The first definition was adopted in the 1996 World Food Summit and states "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life" (FAO 1996). FAO provided an alternative definition in 2001. In the second version, social access to sufficient, safe and nutritious food was added in addition to ensuring physical and economic access to food so as to reflect the importance of consumption of food stuffs that are culturally acceptable to society (FAO 2001).

In the 1996 and 2001 conceptualizations of food security, the phrase *at all times* is included to emphasize the importance of *stability of food security* across time. This has further strengthened the 1986 World Bank's notion of chronic and transitory food security. Due to the use of cross-sectional research designs, food security researchers seldom addressed stability of food security despite the fact that individuals and households move in and out of food security situations due to temporary as well as permanent shocks (Carter & Barrett 2006). Though these definitions are comprehensive and cited several times by researchers, indicators used to measure the different

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maturing crops are usually produced and fill up food balance gaps of the population, in addition to supplying green pasture and water for livestock.

dimensions stated in the definitions show variation, again reflecting the practical challenges of food security metrics.

5.3 Indicators and Measurement of Food Security

The literature on food security is massive and diverse. Researchers use food security indicators that measure any one or combinations of the four dimensions (availability, access, utilization and stability) of food security at national, regional, household and/or individual level. The diversity of food security indicators used in the literature brings a "dizzy array of options" to the measurement of food security (Jones *et al*. 2013, p. 484). This section tries to present a summary of the widely used food security metrics at various levels/scales so as to provide a conceptual map of the selection of food security indicators for this study.

Depending on the scale of analysis – national, regional, household or individual – and the dimension of food security – availability, access, utilization or stability – a variety of food security indicators are used to estimate the magnitude of food security. At national/regional level, the availability and access dimensions of food security are commonly addressed by several studies (Jayne & Molla 1995; Asefa & Zegeye 2003; Van der Veen & Tagel 2011). Indicators such as Food Balance Sheet (FBS),[57] Global Food Security Index (GFSI), Famine Early Warning System Network (FEWSN), Comprehensive Food Security and Vulnerability Analysis (CFSVA), etc., are some of the indicators used in this respect. The Global Hunger Index uses an aggregate index of three equally weighted indicators – undernourishment, child mortality and child under weight – as an indicator of food security status (IFPRI *et al*. 2012). While food security metrics that capture the availability dimension of food security provide information about food surplus or deficiency at national level (FAO 2001) allow comparisons among countries based on food supply to their citizens (Jones *et al*. 2013), and enable the setting of targets for agricultural production (FAO 2001), these hide the many facets of food insecurity at household and individual level (FAO 2012d).

At household and individual level, the focus of several studies is on the access and utilization dimensions of food security, and indicators such as Household Consumption and Expenditure Survey (HCES), Coping Strategy Index (CSI), Household Dietary Diversity Score (HDDS), Household Food Insecurity Access Scale (HFIAS), Food Energy Intake (FEI), and

[57] Food balance sheet is calculated using national aggregate data on food supply (domestic food production and total food imports) and food utilization (FAO 2001).

anthropometric measure of weight and height are commonly used (Hoddinott & Yohannes 2002; Maxwell *et al*. 2003; Schmidt & Dorosh 2009; Shete 2010; Gebreyesus *et al*. 2015). The stability dimension of food security is less commonly researched since it requires a cohort of observations for repeated measurement. The food consumption expenditure adjusted for family size, age and sex composition is widely used as an indicator of the *access* dimensions of household food security status. This requires establishing a food basket that represents the food preferences of the poor so as to address the basic concept of 'food preferences' embodied in definition of food security. Dietary diversity is an indicator of food security used to capture the nutritional quality of a household's food basket.

In this study, three different indicators of food security such as the Food Consumption Expenditure, the Coping Strategy Index and the Food Energy Intake are used to measure levels of food security using the conceptualization of food security on the basis of access and utilization dimension. Combining different types of indicators helps to see the robustness of the food security metrics as well as to complement the deficiency of anyone of the indicator. In two of the case studies (Oromia and Benshanguel Gumuz), the same cohort of respondents was studied for two different time periods using these indicators. This helps to rule out food insecurity arising from factors not related to the intervention.

The basket of food items developed for highlands of Ethiopia (see Annex 5.1), which ensures an individual 2,200 Kcal per adult equivalent per day (Dercon & Tadesse 1999, p. 89), was one of the indicators used in this study. The basket of food items was valued at the local market prices for each study area and prices were collected concurrently with the household surveys. This served as a food poverty line for that particular area. Household consumption data from different sources were collected for the week prior to the survey to reduce problems of recall. This was valued using the local market prices in the same way as the basket of food items, and it was later converted into a monthly consumption expenditure after it was adjusted for adult equivalent units (see Annex 5.2).[58] Household consumption expenditure per adult equivalent was then compared to the basket of food items that provides 2,200 Kcal per adult equivalent per day in order to identify a family's food security status. Households with daily consumption expenditure below 2,200 Kcal per adult equivalent per day are food insecure.

[58] Consumption difference between households due to differences in age and sex of family members were normalized using adult equivalent units developed for Ethiopia by Dercon and Krishnan (1998, p. 40).

A second food security indicator used in this study is the Coping Strategy Index (CSI). This method takes into account the coping strategies that households follow when they neither have enough food at their disposal, nor enough money to buy food from the market. It measures the coping behaviour of households adopted as a short-term fall-back mechanism in response to an immediate and temporary decline in access to food. The coping behaviours are reversible compared to adaptation strategies adopted for persistent deprivation to food. For each study area, the coping strategies adopted by food insecure households were identified during the exploratory phase of the research conducted in each region. The frequency of use of the coping strategies was recorded for the past seven days in the follow-up household surveys conducted in each region. With the help of five Focus Group Discussions (FGDs) organized in each study area, household coping strategies were weighted for their severity levels as least severe, moderate severe, severe, and most severe. A weighted average severity score was then calculated for each coping strategy by multiplying the frequency of use of the coping strategy by each food insecure household with the severity score. This gives a score for the Coping Strategy Index.[59]

A third food security indicator used in this study is the Food Energy Intake per adult equivalent per day. The Ethiopian Health and Nutrition Research Institute (EHNRI) and the Food and Agriculture Organization of the United Nations developed food composition tables for different traditional foods consumed in Ethiopia (EHNRI 1997; EHNRI & FAO 1998). Using these food composition tables, the consumption data collected from households were calculated for energy content. Allowance was given for the loss of food during preparation. The daily household energy intake was then rescaled into an adult equivalent unit using adult equivalent conversion factors. Households that fulfil a daily energy intake of 2,200 Kcal and above per adult equivalent are food secure. The basket of food items developed for highlands of Ethiopia with cereal-based farming cannot be a representative food basket for lowland areas of the country, which have a different food culture and preferences. Therefore, this indicator was not used for Gambella and Benshanguel Gumuz Regional States. For these two regions, only the CSI and the daily Food Energy Intake indicators of food security were used, but for Oromia Regional State all the three indicators were applied.

[59] For details of the procedures to calculate the CSI score see Maxwell & Caldwell (2008).

5.4 Results and Discussion

5.4.1 Evidence from Oromia Regional State: the case of Karuturi Farm in Bako

As discussed in the methodology section of Chapter 1, the impact of Karuturi's intervention on household food security status is estimated using two different methodological approaches – the PSM and the double difference technique (DiD) – of estimating impacts of interventions. It is important to remind readers again about the data sources of this study used for the two impact estimation techniques. The data set used for the estimation based on the PSM technique came from 300 households (142 affected and 158 non-affected households) that were surveyed in 2012. On the other hand, the data set used for the estimation based on the DiD technique came from the 158 households who were surveyed in 2012 representing the non-affected households. Hence, the 2012 survey on 158 households served as a baseline survey for the DiD estimation. In 2014, these households were surveyed again for the second time. During this time, 75 out of the 158 households had lost access to land due to Karuturi's intervention and hence they were surveyed representing the affected stratum. On the other hand, 83 out of the 158 households still had access to the land owned through the *de facto* customary property regime, and hence they were surveyed representing the non-affected households. This means that the data set for the two impact estimation techniques has some overlap, which will yield comparable but not necessarily the same estimates. The following section presents the results from the two approaches.

5.4.1.1 Estimation of magnitude and impact of Karuturi's intervention on household food security using the 2012 cross-sectional household survey data

1) Magnitude of food security in Bako Tibe District using cross-sectional data (n=300)

The quantities of food commodities accessed and consumed by each households from different sources were recorded for the week prior to the survey period. This was later converted into consumption expenditure and re-scaled using adult equivalent units to account for differences in the age and sex of household members. This allowed comparison between different households. To identify the difference in food-security status between affected and non-affected households, household consumption expenditure data in both categories was compared to a basket of food items that provides 2,200 Kcal per adult equivalent per day. The estimate indicates that expenditure on food in order to be food secure in the district was ETB 1,925 (US$ 106) per year in 2012, which is a little less than the national estimate of ETB 1,985 (US$ 109) per year. The mean monthly consumption expenditure for households affected by Karuturi was estimated at ETB 256 for the same year, which is 27% lower than the mean monthly consumption expenditure

of non-affected households (ETB 351). Using this indicator, the level of food insecurity in Bako Tibe District was 32% for affected and 12% for non-affected households (Table 5.1).

Table 5.1: Magnitude of food security in Bako Tibe District for affected and non-affected households

Food security indicator	Affected households (n=142)						Non-affected households (n=158)					
	Food insecure		Food secure		Total		Food insecure		Food secure		Total	
	F	*%*	*f*	*%*	*F*	*%*	*f*	*%*	*F*	*%*	*F*	*%*
Consumption expenditure	46	32.4	96	67.6	142	100	19	12	139	88	158	100
Coping strategy index	51	35.9	91	64.1	142	100	21	13.3	137	86.7	158	100
Food energy intake	47	33.1	95	66.9	142	100	21	13.3	137	86.7	158	100

Source: Survey data, 2012; Note: f= Frequency

The Coping Strategy Index was the other food security indicator for Bako. Households that faced food shortages and had no income at their disposal to buy food in the market employed different coping mechanisms. A relatively high coping strategy score shows a high degree of food insecurity. Those who faced severe food insecurity employed more precarious coping mechanisms than those who had less serious food security problems. Households in the affected stratum were found to use more challenging coping mechanisms. These included not eating for a whole day, borrowing food from neighbours (which is considered as a loss of dignity in the community) and consuming seed stock that has been set aside for cultivation in the following season. On the other hand, households in the non-affected stratum adopted less severe coping mechanisms, such as buying and consuming less preferred and cheaper foods and reducing the size and frequency of their meals. By definition, a zero CSI score means that a household is food secure and a CSI score above zero means that some level of food insecurity exists. The results of the survey showed that while households in the non-affected stratum had an average CSI score of 0.17, those in the affected stratum had an average CSI score of 1.7 (see Annex 5.3 and 5.4 for the coping strategies adopted in Bako area).

The households in both affected and non-affected categories that adopted some level of coping mechanisms were identified and the percentage of households that were food insecure was calculated. The results indicated that 36% of the households in the affected stratum had a CSI score above zero, and were thus food insecure, compared to 13% of those in the non-affected stratum (Table 5.1). This result is comparable to what was found using consumption expenditure

per adult equivalent as an indicator of food security and justifies the robustness of the study's findings.

The third food security indictor used in Bako was the Food Energy Intake (FEI) measured in kilocalories. As discussed in the previous section, the food composition table developed by FAO and ENHRI for use in Ethiopia was used in the calculation of the food energy contents of the different food commodities consumed by households in Bako. The mean energy consumed per adult equivalent per day by those households in the affected stratum was 2,232 Kcal, which is 12.5% less than the energy intake (2,510 Kcal) consumed by those in the non-affected stratum. Based on this indicator, 33.1% of the affected households were found to be food insecure, which is a little less than the estimated magnitude of food insecurity based on the CSI indicator but closer to the magnitude of food security estimated based on the Food Consumption Expenditure. On the other hand, the level of food insecurity of the non-affected households (13%) estimated using the FEI as indicator was consistent with the estimated magnitude of food insecurity based on the CSI indicator. All the three food security indicators provided estimates of the magnitude of food insecurity in the area with only marginal differences demonstrating the stability of the results.

By any standard, the magnitude of food insecurity of the households estimated using all the three indicators (32–36%) in the affected stratum is comparatively higher than those in the non-affected stratum (12–13%). Several factors could contribute to the level of food insecurity in the affected and non-affected strata and cannot be entirely attributed to Karuturi's intervention. It is therefore necessary to decompose the food insecurity that occurred due to the intervention by Karuturi. The next section, therefore, discusses the impact of Karuturi's intervention on the food security status of households using the technique of PSM.

2) Impact of Karuturi's intervention on households' food security in Bako Tibe District using cross-sectional data (n=300)

To determine the degree of food insecurity that was attributed to the transfer of land to Karuturi, the Propensity Score Matching (PSM) techniques was estimated. The PSM results presented in Table 5.2 indicate that the affected households, on average, spent food consumption expenditure which was 20–26% lower than the non-affected households. In other words, on average, they spent ETB 69–92 less money on food items compared to the food expenses of the non-affected households. Based on the CSI indicator, the scores of coping strategies adopted by households in

the affected stratum were nine times higher than those of non-affected households. The difference between the scores indicates the severity of the coping mechanisms adopted, which is related to the high degree of food insecurity experienced by the affected households. Similarly, due to the intervention of Karuturi, the affected households consumed food energy that was 12–13% (i.e. a decline of 268.95–294.75 Kcal per adult equivalent per day) lower than the food energy consumed by the non-affected households. The results were significant at either $p<0.01$, $p<0.05$ or $p<0.1$ (Table 5.2)

Table 5.2: Impact of Karuturi's investment on households' food security in Bako Tibe District

Food security indicators	Matching algorithms [a]	Matched samples		Impact (ATT)	Std. error[b]	t-statistics
		Affected	Non-affected	Kcal/ ETB/CSI (%)		
Consumption expenditure (ETB)	NN	142	66	-91.9 (-26.2)	49.1	-1.87*
	Radius	36	39	-77.3	80.1	-0.97
	Kernel	142	142	-69.3 (-19.7)	30.9	-2.24**
	SS	142	142	-70.4 (-20)	33.9	-2.07**
Coping Strategy Index (CSI)	NN	142	66	1.5 (8.8 times)	0.5	2.96***
	Radius	36	39	0.8	1.5	0.52
	Kernel	142	142	1.6 (9.4 times)	0.5	2.99***
	SS	142	142	1.6 (9.4 times)	0.5	3.29***
Food energy intake (Kcal)	NN	142	66	-268.95 (-12.3)	91.3	-2.95**
	Radius	36	39	-276.97 (-12.4)	55.3	-5.0***
	Kernel	142	142	-294.75 (-13.3)	66.37	-4.44***
	SS	142	142	-275.86 (-12.3)	70.95	-3.89***

[a] Radius matching was done with a calliper of 0.001 [b]Bootstrap standard error is calculated based on 100 replications *** $p< 0.01$; ** $p< 0.05$; and * $p< 0.1$

Source: Survey data, 2012

To identify the degree of food insecurity due to the intervention by Karuturi, the food insecurity level of the affected households in the district before and after the intervention for all the three food security indicators was decomposed. To do this, the average loss of monthly consumption expenditure (ETB 69–92) was accounted for in relation to each household's monthly consumption expenditure. The result indicated that about 26–30% of the affected households became food insecure after the intervention due to the transfer of land to the company. On the other hand, the food insecurity level of the affected households before the intervention, which was the result of factors other than the intervention by Karuturi was 3–6%. This confirms that large-scale land acquisition in Bako Tibe District exacerbated communities' food insecurity

levels, assuming that there is no selection bias due to unobservable farm and non-farm co-variates (Table 5.3).

Table 5.3: Decomposition of affected households' food insecurity after accounting for the estimated loss of consumption expenditure, n=142

Matching technique	Frequency / (%) of food-insecure households		Frequency / (%) of total food-insecure households
	Before the intervention	After the intervention	
NN	4 / (2.8)	42 / (29.6)	46 / (32.4)
Kernel	9 / (6.3)	37 / (26.1)	46 / (32.4)
Stratification	8 / (5.6)	38 / (26.8)	46 / (32.4)

Source: Survey data, 2012

The same procedure was followed for the CSI food security indicator in order to decompose the level of affected households' food insecurity before and after the intervention. Based on the CSI score, 36% of the affected households were food insecure. Results of the Propensity Score Matching indicated that the affected households adopted food security coping strategies with scores that go up to 1.6 (Table 5.2). When the mean increase in CSI score due to the loss of the land is subtracted from the individual household's CSI score, the level of food insecurity after the intervention by Karuturi is 30%. This means that only 6% of the households were food insecure in Bako District before Karuturi started farming in the villages. This result is again comparable with the estimation based on the consumption expenditure indicator and confirms the robustness of the findings (Table 5.4).

Table 5.4: Decomposition of affected household's food insecurity after accounting for the estimated increase in CSI score, n=142

Matching technique	Frequency / (%) of food-insecure households		Frequency / (%) of total food-insecure households
	Before the intervention	After the intervention	
NN	8 / (5.6)	43 / (30.2)	51 / (35.9)
Kernel	8 / (5.6)	43/ (30.2)	51/ (35.9)
Stratification	8 / (5.6)	43/ (30.2)	51/ (35.9)

Source: Survey data, 2012

Likewise, a similar procedure was followed to decompose the proportion of affected households who were food insecure before and after the intervention of Karuturi by accounting for the average food energy consumption, which declined due to the loss of land and impacted each household's daily food energy consumption. The estimated result using the PSM technique yielded that, on average, the affected households consumed 269–295 Kcal less food energy per adult equivalent per day (Table 5.2). The estimated declines in food energy consumption were added to each affected household's daily food energy consumption to examine the changes in their status of food security. The result revealed that 27.5–28.2% of the affected households became food insecure after they lost access to farm and grazing lands due to the transfer of land to Karuturi. Prior to the land transfer to Karuturi, only a small proportion of the households (5–6%) were food insecure based on the food energy intake indicator of food security (Table 5.5).

Table 5.5: Decomposition of affected households' food insecurity after accounting for the estimated loss of food energy consumed per adult equivalent per day (Kcal), n=142

Matching technique	Frequency / (%) of food-insecure households		Frequency / (%) of total food-insecure households
	Before the intervention	After the intervention	
NN	8 / (6.3)	39 / (27.5)	47 / (33.1)
Radius	7 / (4.9)	40 / (28.2)	47 / (33.1)
Kernel	7 / (4.9)	40 / (28.2)	47 / (33.1)
Stratification	7 / (4.9)	40 / (28.2)	47 / (33.1)

Source: Survey data, 2012

In sum, the results presented so far were from a data set generated from 300 households in 2012 (142 affected and 158 non-affected) through a cross-section research design in which the affected households were compared to the non-affected ones using the PSM technique. With this approach, the study estimated that 26–30% of the affected households were food insecure based on the indicator of food consumption expenditure, 30% of them were food insecure based on the CSI indicator, and 27–28% of them were food insecure based on the indicator of food energy intake. All three food security indicators provided a comparable estimation results for the magnitude of impact of transferring the farm and grazing land owned through the *de facto* customary property regime on the food security status of local people. Local people used to produce food crops such as *teff* and Niger seed in the relatively well-drained parts of the valley

bottom and graze animals in the water-logged parts of the valley, which are now given over to large-scale farming by Karuturi. The transfer of these lands to Karuturi worsened the food insecurity status of the local population in Bako Tibe District to an alarming rate, from 3–6% of food insecurity before the intervention to 32–36% after the intervention.

5.4.1.2 Estimation of magnitude and impact of Karuturi's intervention on household food security using the 2012 and 2014 household survey data

As mentioned previously, a second impact estimation approach, i.e. the double-difference (DiD) technique, was implemented to estimate the magnitude of impact of Karuturi's intervention on the food security status of the local population in Bako Tibe District. This was done in an effort to see whether the attribution of changes in the food security status of the local population is consistent between the two approaches. The discussions presented below are therefore based on the analysis of a data set generated from 158 households interviewed both in 2012 and in 2014 using the approach of the double-difference technique for impact estimation.

1) Magnitude of household food security status in Bako Tibe District using panel data (n=158)

During the baseline period (i.e. in 2012), the mean monthly consumption expenditures for households in affected (n=75) and non-affected (n=83) strata were about ETB 352 and ETB 351, respectively. In 2014, the mean consumption expenditure for affected households had declined to ETB 248 from the 2012 estimate, which was ETB 352. Proportionally, the affected households experienced a decline in their consumption expenditure in 2014 by about 29.5%. On the other hand, those households in the non-affected group, on average, experienced only a 0.008% decline in their food consumption expenditure (Table 5.6).

Based on the coping strategies adopted, both the affected and non-affected households had similar CSI scores in 2012, which was 0.16–0.17. After the affected households experienced the negative effects of Karuturi's intervention, they adopted coping strategies with relatively high severity scores, and as a result, their CSI score increased by 91.2% (i.e. CSI score=1.81), while the CSI score for the non-affected households had only increased marginally by 5.5% (i.e. CSI score=0.18). Similarly, based on the caloric intake, both the affected and non-affected households had a similar average caloric consumption in 2012, which was 2509 Kcal for the affected and 2512 Kcal for the non-affected ones. In 2014, however, the affected households experienced a decline in caloric consumption by 12.3%, while the caloric consumption of the non-affected households declined marginally by 0.3% (Table 5.6).

Table 5.6: Difference-in-difference estimation of the impact of large-scale farming on household food security in Bako District, Oromia Regional State

Food security indicator	Affected (n=75)	Non-affected (n=83)	DiD
Mean consumption expenditure (ETB) in 2012 (a)	351.5	350.5	1 (t=0.04; NS)
Mean consumption expenditure (ETB) in 2014 (b)	247.9	350.2	-80.7 (t=-3)***
Mean difference (b-a)	**-82.1**	**-0.3**	**-81.7 (Impact)**
SE (t statistics)	11.4 (-7.2)***	2.4 (-0.14)	11.7 (t= -7.3)***
Mean CSI score in 2012 (a)	0.16	0.17	-0.01 (t=-0.1)
Mean CSI score in 2014 (b)	1.81	0.18	1.63 (t=5.14)***
Mean difference (b-a)	**1.65**	**0.01**	**1.64 (Impact)**
SE (t statistics)	0.31 (t=5.4)***	0.06 (t=0.2)	0.3 (t=3.0)***
Mean calorie intake in 2012 (a)	2509.2	2511.6	-2.4 (t=-0.03)
Mean calorie intake in 2014 (b)	2235.2	2504.2	-269.1 (t=-3.7)***
Mean difference (b-a)	**-274**	**-7.3**	**-266.7 (Impact)**
SE (t statistics)	37.3 (t=-7.3)***	32.8 (t=-0.22)	49.5 (t=-5.4)***

Source: Survey data, 2012 and 2014; *** $p<0.001$

The basket of food items that provides 2200 Kcal per adult equivalent per day is valued using the food prices collected in Bako local market in 2014. The amount of food consumption expenditure that enables an adult to be food secure per month in Bako was ETB 175. The food expenditure needed by an adult per month to be food secure in 2014 is 9% higher than the food consumption needed by an adult per month in 2012 (i.e. ETB 160.42). The estimation of the magnitude of food security using the data set for two periods indicates that the household food security status deteriorated between the two periods. Magnitude of food insecurity for affected households in 2012 was about 5%, and for the same group of households, the magnitude of food insecurity has worsened in 2014 and reached 33–36%. For the non-affected households, the magnitude of food insecurity in 2012 was 5–6% and remained relatively unchanged at 6% in 2014 (Table 5.7). The magnitude of food insecurity for the affected households estimated using cross-sectional survey data of 2012 for the three food security indicators ranges between 32–36%, which is closer to the magnitude estimated using panel data (2012 and 2014), which was 33–36% (Tables 5.1 and 5.7).

Table 5.7: Magnitude of food security before (2012) and after Karuturi's intervention (2014) in Bako Tibe District, Oromia Regional State

Food security status based on different indicators	Affected (n=75)		Non-affected (n=83)	
	Before (2012)	After (2014)	Before (2012)	After (2014)
1. Consumption expenditure				
Frequency / (%) food secure	71 / (95)	50 / (67)	79 / (95)	78 / (94)
Frequency / (%) food insecure	4 / (5)	25 / (33)	4 / (5)	5 / (6)
2. Coping strategy index				
Frequency / (%) food secure	70 / (95)	48 / (64)	78 / (94)	78 / (94)
Frequency / (%) food insecure	4 / (5)	27 / (36)	5 / (6)	5 / (6)
3. Food energy intake				
Frequency / (%) food secure	71 / (95)	50 / (67)	78 / (94)	78 / (94)
Frequency / (%) food insecure	4 / (5)	25 / (33)	5 / (6)	5 / (6)

Source: Survey data, 2012 and 2014

2) Impact of Karuturi's intervention on household food security status in Bako Tibe District using panel data (n=158)

This section deals with the impact of Karuturi's intervention on the food security status of households and compares the result with the impact estimated based on the cross-sectional data set presented in section 5.5.1.1.

The double difference impact estimation result presented in Table 5.7 indicates that the transfer of land that was used by the local population in Bako Tibe District through the *de facto* customary property regime had significantly undermined household food security status for all the three food security indicators. Using the double difference approach and the food consumption expenditure indicator, those households who had lost access to farm and grazing lands due to Karuturi's intervention, on average, spent ETB 82 less per month for an adult in 2014 compared to their expenditure in 2012. Using the PSM approach, those households who are affected by Karuturi spent, on average, ETB 69–92 less per month compared to those households who are not affected by Karuturi's intervention. The decline in average consumption expenditure, estimated through the DiD technique for affected households, is within the range of the consumption expenditure values estimated through the PSM method, demonstrating the comparability of the two impact estimation approaches.

Decomposition analysis was carried, accounting for the average loss in consumption expenditure (i.e. ETB 82) to each household's monthly consumption expenditure data, and then compared to the base line that makes an individual food secure. The result revealed that 28% of the households became food insecure after they lost access to lands due to the intervention of Karuturi (Table 5.8). The decomposition result calculated based on the double-difference impact estimation approach is comparable to the decomposition outcome done using the PSM technique presented in Table 5.3.

Table 5.8: Decomposition of the food insecurity level of affected households after accounting for the impact of the intervention

Food security indicators	Frequency (%) food insecure households (n=75)		Frequency (%) total food insecure households
	Others factors	Due to intervention	
1. Consumption expenditure	4 (5.3%)	21 (28.0%)	25 (33.3%)
2. Coping strategy index	5 (6.7%)	22 (29.3%)	27 (36.0%)
3. Food energy intake	4 (5.3%)	21 (28.0%)	25 (33.3%)

Source: Survey data, 2012 and 2014

The same approach was followed for the Coping Strategy Index and the Food Energy Intake indicators of food security to estimate the impact of Karuturi's intervention on household food security status. Accordingly, after the local people lost access to land, on average, the affected households adopted a mean CSI score that has a severity score of 1.64 (Table 5.6). This score is comparable to the value estimated using the PSM approach, which was 1.5–1.6 (Table 5.2). Based on this indicator, the decomposition analysis revealed that 29.3% of the affected households became food insecure after they lost access to land following the transfer of the land to Karuturi (Table 5.8), and the magnitude of impact is comparable to the result estimated using the PSM approach, which is 30% (Table 5.4). Similarly, the average impact of losing land to Karuturi on the daily calories consumed per adult equivalent was 265 Kcal (Table 5.6), which is again close to the range of the impact estimated using the PSM approach (269–296 Kcal) presented in Table 5.2. The decomposition analysis after the double-difference analysis revealed that 28% of the affected households were estimated to be food insecure using the caloric intake food security indicator after they lost access to land due to Karuturi's intervention (Table 5.8).

This magnitude of impact is the same as the magnitude of impact attributed to Karuturi using the PSM approach, which was 28% (Table 5.5).

In sum, the magnitude of food insecurity estimated based on the two-year panel data and using the double-difference approach revealed that food insecurity among affected households worsened between 2012 and 2014, and the magnitude attributed to the loss of access to land due to Karuturi's intervention was 28–29%. Moreover, the PSM and the double-difference approaches of estimating impacts of development intervention consistently estimated the magnitude of impact of losing access to land on household food security status in Bako Tibe District.

Bako Tibe District has a good agricultural production potential and has only suffered a few incidences of food insecurity, unlike other parts of Ethiopia where it is prevalent. The magnitude of food insecurity attributed to Karuturi's intervention can be argued as very high for an area which used to experience a very low incidence of food insecurity (5–6%). A study by Fisseha (2011) also reported that the local people were food self-sufficient prior to 2008. The transfer of farmland to large-scale commercial farming has worsened the local food insecurity situation and resulted in a loss of income for the local community. Karuturi is currently supplying its products to the Addis Ababa market, which has little negative impacts in terms of dampening the local Bako price for smallholder farmers who are net sellers. Nor has it enhanced food security by increasing the availability of food for those who are net buyers.

While the development approach adopted by the Ethiopian government aims to enhance the food security and incomes of local people, this has not been achieved in the case of Bako Tibe District. The quantitative findings of this study agree with the claims made by the former UN Special Rapporteur on the Right to Food, Olivier De Schutter (2011, p. 250), that inward agricultural investment, no matter how well managed, has high opportunity costs and a low poverty-reducing effect for the local people. Findings from around the world also reported that the business model of plantation agriculture[60] undermined, rather than complemented local-level food security (cf. Oxfam 2014), reduced local food production by alienating land and exacerbated the pre-existing poverty of local people (Smalley 2013). The policy expectations of the Ethiopian

[60] "'Plantations grow one main cash crop; require capital investment; are larger than an average-sized holding although some land may be left uncultivated; rely on hired resident or non-resident labor, often including migrant labor; and are centrally managed. Ownership may be foreign or domestic, private or corporate" (Smalley 2013, 3).

(developmental) state that large-scale agricultural investment would play a complementary role in addressing local-level food security objectives have not been realized in the case of Bako. In this part of the region, promoting smallholder farming might be much more important than large-scale farming, given the evidence from this study that households were better off in terms of food-security status and income levels before land was transferred to the company.

5.4.2 Evidence from Gambella Regional State: The case of Basen Farm

The magnitude of food insecurity is relatively higher in Gambella Regional State compared to the situation in Oromia Regional State. On average, those households affected by Basen Farm in Abobo District of Gambella Regional State employed one or more coping strategies that had a mean CSI score of 4.2. Based on this indicator, 58% of the affected households were food insecure. On the other hand, those households that are selected to serve as counterfactuals adopted coping strategies that had a mean CSI score of 2.18. Proportionally, the magnitude of food insecurity among the non-affected households was lower than the affected households, which was estimated at 46.4% (Table 5.9).

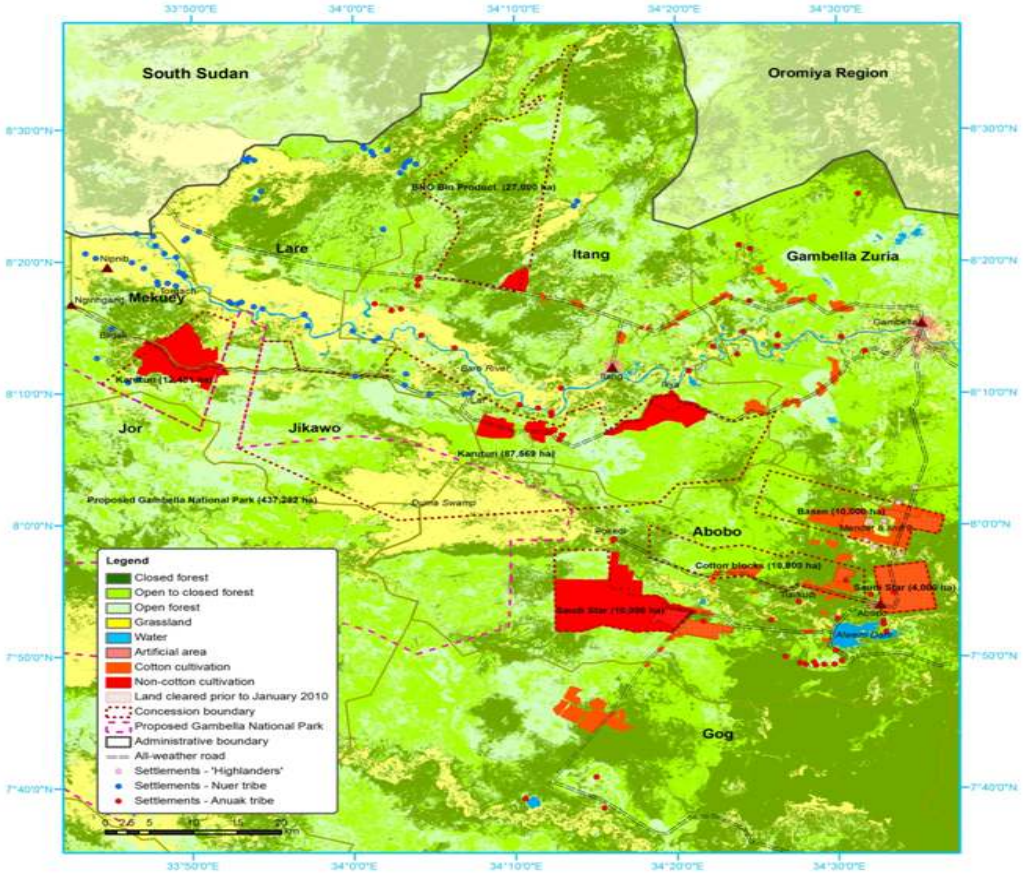
Table 5.9: Food security status of households affected by Basen Farm, Gambella Regional State

Indicator	Affected households (n=100)			Non-affected households (n=125)		
	Food insecure	Food secure	Total	Food insecure	Food secure	Total
Food energy intake (Kcal)	57(57%)	43 (43%)	100(100%)	61(48.8%)	58(46.4%)	125(100%)
Coping strategy index (CSI)	58 (58%)	42 (42%)	100(100%)	58(46.4%)	55(44%)	125(100%)

Source: Survey data, 2013

There are, generally, similarities between those households in the affected and non-affected strata in terms of employing food security coping strategies, albeit the difference is the frequency with which the strategies are employed. Coping strategies adopted include seeking emergency food aid, hunting and consuming bush meat, borrowing food from neighbours and/or relatives, decreasing portions and frequency of meals, consuming seeds put aside for next planting season and skipping meals. The households who are affected by Basen's intervention used precarious coping strategies, such as reducing both the frequency and portion of meals, and borrowing food from neighbours or relatives, which is considered shameful by society. Apart from the magnitude of food insecurity, the types of coping mechanism adopted by food insecure households serve as

a good proxy for the worsening food security situation among those households who lost access to additional cultivation plots due to the appropriation of farmlands by Basen Farm (Annex 5.5 and 5.6). According to an estimate by Schoneveld (2013), 383 immigrant settlers were enclosed by the concession of Basen Farm and they had lost 45% of their farmlands due to their inability to cultivate additional parcels after the inception of Basen's cotton farm (see Figure 5.1). The claim of the author corroborates with the findings of this study in that magnitude of food insecurity among households affected by Basen Farm had generally increased.



Source: Schoneveld (2013, p. 66)
Figure 5.1: Settlement pattern and large-scale farm development in Gambella Regional State

As is the case in Bako, the magnitude of food security in Abobo District was also estimated based on the food energy consumed per adult equivalent per day. Generally speaking, households in both strata failed to satisfy the minimum energy intake per adult equivalent per day required for a healthy life. The mean number of calories consumed per adult equivalent per day by those households affected by Basen Farm was 2,004 Kcal, which was lower than the amount of calorie

consumed by the households in the non-affected stratum (2093 Kcal). The food energy consumed by affected and non-affected households was 9.8% and 5.1% less than the recommended calories (2200 Kcal per adult per day), respectively, indicating that the immigrant settlers in the district are generally food insecure. Based on the FEI indicator of food security, 57% of the households in the affected stratum and 48.8% of the households in the non-affected stratum were food insecure. The estimated food insecurity using the CSI and FEI indicators are generally consistent, showing the robustness of the results (Table 5.9).

To factor in the magnitude of food insecurity to the intervention, the Propensity Score Matching was estimated in this study. Before proceeding to the estimation of the Average Treatment effect on the Treated (ATT), the balancing property for the affected and non-affected households was checked, and this was satisfied in a block of seven. The common support region that ensures the mean Propensity Score for the two groups of households was not different either. The average treatment effects on the treated (ATT) – in this case the average increase in the scores of coping strategies and the average decline in the amount of calories consumed – were estimated through nearest neighbourhood, radius, kernel and stratification matching techniques. The results confirmed that, on average, the coping strategies adopted by the households in the affected stratum were 1.9–2.2 higher than the non-affected stratum. Proportionally, due to the appropriation of farmlands by Basen Farm, the immigrant settlers adopted food security coping strategies that are 46–50% more severe. Similarly, the affected households, on average, consumed 78–93 Kcal per adult equivalent per day less than the amount consumed by their counterfactuals. Proportionally, the average decline in caloric consumption due to the loss of farmlands was 3.9–4.7%. The average increase in the scores of the Coping Strategy Index and the decline in the caloric consumption by those households due to the loss of land to Basen Farm was statistically significant for all the matching techniques (Table 5.10).

Cotton picking in Basen Farm is largely done through wage labour, and thus there is a huge demand for labour in this regard. Participation in wage employment could potentially offset the loss of land and minimize the negative impacts of farmland appropriation on household food security status. Nevertheless, the company imports labour from the Wolaita Sodo area in southern Ethiopia, and the settlers who are enclaved by Basen Farm did not receive any significant benefit from wage employment. In an interview conducted with the Human Resource Manager of Basen Farm on 28 January 2012 it was revealed that the company has reservations about recruiting labourers among the settlers because they not only lack the needed dexterity to pick the cotton

fibre from the pods efficiently, with little wastage, but they also perform slowly compared to those from southern Ethiopia. As a result, the company disfavour them in wage employment. Although farmland investments are promoted by the Ethiopian government, partly under the guise of employment creation for local people that would improve their food security situation, the position of Basen clearly illustrates that this was not the case.

Table 5.10: Impact of Basen Farm on household food security, Gambella Regional State

Food security indicators	Matching technique[a]	Matched samples		Impact (ATT)	Std. error[b]	t-value
		Affected	Non-affected	Kcal/CSI (%)		
Food energy intake (Kcal)	NN	100	54	-92.73	55.90	-1.66*
	Radius	67	111	-89.04	56.51	-1.58*
	Kernel	100	125	-78.54	40.00	-1.96*
	SS	91	134	-82.53	42.26	-1.95*
Coping Strategy Index (CSI)	NN	100	54	1.89	0.66	2.88**
	Radius	67	111	2.24	0.64	3.49***
	Kernel	100	125	1.93	0.59	3.29***
	SS	91	134	2.18	0.53	4.14***

[a] Radius matching was done with a calliper of 0.01 [b]Bootstrap standard error is calculated based on 100 replications; ***p<0.01; **p<0.05; *p<0.1
Source: Survey data, 2013

Further, in a bid to decompose the magnitude of food insecurity caused by Basen Farm and other factors, the average increase in CSI score was accounted for in respect of the food security Coping Strategy Index adopted by each affected household. Similarly, the average decline in Kcal is also accounted for with regard to the food energy consumed per adult equivalent per day by each affected household. For both the CSI and FEI indicators, the decomposition analysis revealed that food insecurity has increased among immigrant settlers by 8–10% due to their inability to access farmlands. Using the FEI indicator, all the matching techniques used in the analysis revealed that 8% of the households in the affected stratum became food insecure due to the loss of land to Basen Farm, while the causes for the food insecurity for the remaining 49% of the households were due to factors other than the loss of land. Similarly, using the CSI indicator, 10% of the households in the affected stratum became food insecure after they lost access to land

due to Basen Farm, while the causes for the food insecurity for the remaining 48% of the households were factors other than Basen's intervention.

Basen's concession enclaves a significant proportion of households who immigrated to and settled in Gambella in 1982 through the national re-settlement scheme implemented by the former military regime as a solution for food insecurity challenges in their area of origin. Originally, the settlers came from the southern and northern highlands of Ethiopia where food insecurity was rampant due to a shortage of cultivable land and frequent droughts. The scheme was reportedly unsuccessful and, as confirmed by this study too, the magnitude of food insecurity among the settlers who are non-affected by Basen Farm is very high, albeit it was meant to minimize the challenges of food insecurity prevalent in the area of origin of the settlers. The food insecurity level of the settlers worsened after they lost access to farmlands. The key informants of this study also explained that they are marginalized by the local administration. For example, when they request better access to farmlands, they are told that the land does not belong to them, but to the native Anuak (Key informant interview with two elderly highlanders conducted at Mender 8 of Abobo District on 28 January 2013). The 1982 settlers who have ethnic backgrounds other than the indigenous people of Gambella Regional State are largely viewed as intruders, not only by the local people, but also by the local administrators. This is much related to the ethnic federalism system that Ethiopia adopted since the downfall of the Derg regime, and the remnants of the settlers from outside Gambella Regional State are, therefore, systematically discriminated in all administrative matters in a form of protest against the political economy adopted by the former regime. The key informants further noted that conflicts over resources are common between the settlers and the Anuak, and on several occasions, the properties of the settlers have been looted with no meaningful administrative and political assistance given to them.

Apart from the loss of cultivable land, as will be discussed in Chapter 6, flooding is exacerbated due to the change in vegetation cover and the farming practices of large-scale farms operating in the vicinity. This has also contributed to the worsening of the welfare condition of the local people.

5.4.3 Evidence from Gambella Regional State: The case of Karuturi Farm

The second large-scale plantation studied in Gambella Regional State is Karuturi Agro Products PLC. In 2013, the company had developed close to 6,500 ha of land out of its 100,000 ha leasehold concession. The company opened farms in two different sites. One of its sites is located

in Ilia village with an estimated developed land size of 2,435 ha. This area is inhabited by the Anuak ethnic group. The second farm site is located in Makuey District (former Jikawo) and the estimated farm size developed so far is 4,000 ha. This area is inhabited by the Nuer ethnic group. Since the livelihood strategies of the Anuak and the Nuer are different, the study hypothesized that Karuturi's intervention will have different impact levels on the food security situation of the two ethnic groups. For this reason, surveys were conducted in both sites, and the findings are presented below.

Gambella Regional State is generally endowed with dense forests, woodlands, wetlands (e.g. the *Duma* wetland), extensive savanna grassland and water bodies (such as Baro, Gillo and Alwero rivers). According to Behailu *et al*. (2011), the Abobo-Gog, Mesengo and Godere areas are estimated to have 540,000 ha of forests, which are classified as national forest priority areas. These areas provide a variety of food sources, such as wild fruits and game meat, for the inhabitants of the region. Paradoxically, food insecurity is estimated to be very high in these parts of Gambella Regional State. Food deficit persists for 3–6 months in the regions, of which March to June are the most severe periods of the year. The results of this study revealed that 45–53% of the non-affected households and 52–63% of the households affected by Karuturi's intervention were food insecure. In terms of the food security situation, the Anuak were initially better off than the Nuer. This is confirmed by the magnitude of food insecurity among the non-affected households of both ethnic groups in which about 54–55% of the Anuak and 47–49% of the Nuer were food secure.

Although it is difficult to compare the mean scores of the food insecurity coping strategies adopted by the two ethnic groups due to differences in the types and severity weights of the strategies (see Annex 5.7–5.10), it is fair to compare them based on the mean calories consumed by the two groups. In this respect, the Anuak, who are not affected by Karuturi's intervention, on average, consumed food commodities that provided 2,143 Kcal per adult equivalent per day, which is lower than the daily caloric intake recommended (2,200 Kcal) for an individual by 2.7%. For the Nuer, this was 2,074 Kcal per adult equivalent per day, which is 6.1% lower than the recommended calorie intake, further revealing that food insecurity among the non-affected Nuer was higher than those among the Anuak (Table 5.11).

Table 5.11: Food security status of households affected by Karuturi Farm, Gambella

Case	Indicator	Affected households (n=100)			Non-affected households (n=125)		
		Food insecure	Food secure	Total	Food insecure	Food secure	Total
Anuak case	Food energy intake (Kcal)	63(63%)	37(37%)	100(100%)	56 (44.8%)	69(55.2%)	125(100%)
	Coping strategy index (CSI)	62(62%)	38(38%)	100(100%)	58 (46.4%)	67(53.6%)	125(100%)
Nuer case	Food energy intake (Kcal)	52(52%)	48(48%)	100(100%)	64 (51.2%)	61(48.8%)	125(100%)
	Coping strategy index (CSI)	53(53%)	47(47%)	100(100%)	66 (52.8%)	59(47.2%)	125(100%)

Source: survey data, 2013

Comparison of the food security situation within each ethnic group shows that the average caloric intake for the Anuak who are affected by Karuturi's intervention was 5.6% (2,030 Kcal/adult equivalent/day) lower than those who were not affected by the intervention (2,143 Kcal/adult equivalent/day). In terms of the average scores of coping strategies, the Anuak who are affected by Karuturi adopted coping strategies that had 48.8% higher mean score values (mean CSI=4.1) than those in the non-affected stratum (mean CSI=2.1). Based on the CSI and FEI indicators, 62–63% of the Anuak who are affected by Karuturi were food insecure. Comparatively, 45–46% of the non-affected Anuak were food insecure, which is 17% lower than the magnitude of food insecurity observed among the affected ones (Table 5.11).

Similarly, the Nuer who are affected by Karuturi's intervention, on average, consumed 2,059 Kcal per adult equivalent/day, which is only 0.73% less than the calories consumed by the non-affected ones (2,074 Kcal/adult equivalent/day). Based on the CSI indicator, the Nuer, who are affected by Karuturi's intervention, adopted coping strategies that had mean values of 2.33, compared to the non-affected ones who had CSI mean values of 2.12. Based on the FEI and CSI indicators, 51–53% of the Nuer who are affected by Karuturi were food insecure, which is 4% higher than the magnitude of food insecurity among the non-affected Nuer (47–49%) (Table 5.11). Comparisons of the average calories consumed and the mean scores of coping strategies adopted by the affected and non-affected households for the Nuer and the Anuak reveal that the differences are huge for the Anuak but not for the Nuer, probably demonstrating the different

magnitude of impact of the intervention between the two ethnic groups. For a more rigorous scientific analysis of the impacts of Karuturi's intervention on the food security situation of the Anuak and the Nuer, the Propensity Score Matching was estimated. The average treatment effects on the treated (ATT/impact) – in this case, the average increase in the scores of coping strategies and the average decline in the amount of calories consumed due to the intervention of Karuturi – were estimated using the nearest neighbourhood, radius, kernel and stratification matching techniques for both the Anuak and the Nuer ethnic groups. The results indicated that Karuturi's intervention had a significant impact on the food security situation of the Anuak, but not on that of the Nuer (Table 5.12).

Table 5.12: Impacts of Karuturi's intervention on the food security status of the Anuak and the Nuer, Gambella Regional State

Case	Food security indicators	Matching method[a]	Matched samples		Impact (ATT)	Std. error[b]	t-value
			Affected	Non-affected	Kcal/CSI		
Anuak Case	Food energy intake (Kcal)	NN	98	71	-94.87	51.84	-1.83*
		Radius	92	108	-105.46	48.76	-2.16**
		Kernel	98	120	-112.13	36.68	-3.06***
		SS	97	121	-115.96	31.47	-3.69***
	Coping Strategy Index (CSI)	NN	98	71	1.83	0.63	2.90**
		Radius	92	108	1.89	0.66	2.88**
		Kernel	98	120	2.03	0.53	3.8***
		SS	97	121	2.04	0.47	4.31***
Nuer case	Food energy intake (Kcal)	NN	100	42	-38.05	71.92	-0.53
		Radius	80	106	-26.35	47.77	-0.55
		Kernel	100	122	-33.80	51.32	-0.66
		SS	92	129	-23.64	43.62	-0.54
	Coping Strategy Index (CSI)	NN	100	42	0.55	0.53	1.05
		Radius	80	106	0.48	0.52	0.93
		Kernel	100	122	0.39	0.38	1.03
		SS	92	129	0.35	0.39	0.89

[a] Radius matching was done with a calliper of 0.01 [b]Bootstrap standard error is calculated based on 100 replications *** p< 0.01; ** p< 0.05; and * p< 0.1

Source: Survey data, 2013

In the following section, I aim to explain this observed varying outcome for the Anuak and the Nuer, respectively.

The Case of the Anuak

The Anuak produce food crops such as maize, sorghum, groundnut, etc. on a small scale using hand-hoe. Although they produce these food crops, they complement their food basket by hunting, gathering and fishing. Karuturi's farm operation at the Ilia site cleared forests that had significant economic and food value for the Anuak. Since they are largely dependent on forest-based livelihood resources, clearing of trees to open up new farms exacerbated the food insecurity situation of the local people. Indigenous trees such as *Vitellaria paradoxa* (also called shea nuts or shea tree), *Anogeissus leiocarpus*, *Combretum adenogonium* and *Grewia tenax* were predominan in the area, but deforested by the company. A focus group discussion held at Ilia village with five elderly women on 15 March 2013 revealed that collection of different fruits, seeds and roots from the forest – most importantly, shea tree (locally called *Wudo* in which both the fruit and the seeds are consumed), date tree (locally called *Wulemo*), *Dioscorea alata* (common name yam), *Cucurbita maxima*[61] (common name pumpkin) and an orange-like fruit locally called *Aulemo* – serve as important food and cash sources for the Anuak. It provides the needed food for the Anuak families and serves as an important consumption smoothening strategy during the months of deficits. The elderly women also mentioned that they used to collect forest honey, ground nuts and ginger in the forest area, which has now been bulldozed and cultivated for maize production. The oil palm nursery site and the plots under maize production by Karuturi at Ilia village are also reportedly used by local people for summer season production of food crops.

The loss of land that was used for production of summer season food crops and the clearing of forests that had important economic and food values worsened the food insecurity situation of the Anuak. The Anuaks, who are affected by Karuturi's farm operation, on average consumed 95–116 Kcal per adult equivalent per day less than those households who are not affected by the company. By the same token, the affected households adopted coping strategies that had a weighted mean values higher than those who were not affected by the company, further showing the increased intensity of food insecurity due to the large-scale plantation. The average loss in

[61] In the literature different scientific names such as *Cucurbita pepo*, *Cucurbita moschata*, and *Cucurbita maxima* are used for pumpkin.

caloric consumption and the increase in the frequency of coping strategies adopted by the affected households were both significant at either $p<0.01$, $p<0.05$ or $p<0.1$ (Table 5.12).

I accounted for the estimated impact of the intervention on the affected household's calorific consumption and Coping Strategy Index and examined their food security status without the intervention. Accordingly, based on the indicator of the Coping Strategy Index, 13% of the households became food insecure after they lost access to land and related natural resources due to the appropriation of the resources by Karuturi. Similarly, based on the Food Energy Intake indicator, 15% of the magnitude of food insecurity of the affected households is attributed to the appropriation of land-based resources to Karuturi. In other words, the magnitude of food insecurity among the Anuak who are affected by Karuturi would have been 48–49% without the large-scale plantation monoculture, showing that food insecurity has worsened to the present level of 62–63%. By national standards, even before the intervention, the magnitude of food insecurity among the Anuak is much higher than the magnitude estimated at national level, which calls for serious development planning.

Different coping mechanisms are used by the Anuak, such as seeking emergency food aid, migrating to neighbouring areas (e.g. towards the area where the Majenger ethnic group resides) to gather foods from the forest, reducing portions and frequency of meals, looking for social transfer from families/neighbours, skipping meals, etc. (Annex 5.7 and 5.8). The government also responded to the worsening food security situation of the Anuak by providing emergency food aid. However, the elderly women who participated in the focus group discussion criticized the amount of wheat grain supplied as food aid for being insufficient and inconsistent, while the damage suffered as a result of the appropriation of their lands was permanent. The frequency of use of coping strategies by those Anuak who are affected by Karuturi is somehow different from those who are not affected by the company, despite the similarity of coping behaviours between the two groups. For example, Anuak families who are affected by Karuturi frequently used coping strategies that have high severity scores, such as reducing the frequency and portion of meals, skipping meals altogether, migrating to nearby places to search for foods from the forest, etc. On the other hand, those Anuak families who continued to have access to land-based resources in the same way as before (i.e. the non-affected households) adopted food insecurity coping strategies that are less severe in their intensity. These include eating with or borrowing food from neighbours/families, reducing the portion size of meals, etc. (Annex 5.8). In the Anuak culture, when a household has no food to feed the family, borrowing food and eating with other

families/neighbours are accepted as normal practices, and thus have low severity scores. These types of coping behaviours are, however, considered as a loss of dignity and shame among households in the highland area, and thus have high severity scores (see the results from Bako and Abobo).

The Nuer case

The Nuer are generally agro-pastoralists and practise both crop production and extended livestock rearing. Owning livestock has both economic and social values among the Nuer ethnic groups. Cattle are sources of food and income for the Nuer families as well as a buffer against potential disasters such as droughts and diseases. On average, they own about 25 herds per household. A typical household owns up to 300 cattle. Savanna grassland and shrubs are the main sources of livestock feed for the Nuer. This makes grazing lands very important for the livelihood as well as social fabric of the Nuer. They also produce crops, dominantly maize, both in the rainy season and in the dry season. In the rainy season, they cultivate plots located away from the Baro River. In the dry season, when the floods of the Baro River recede, they move closer to the bank of the river and cultivate predominantly maize using the residual moisture on plots enriched with soil nutrients by the over-flooding.

This practice is often referred as 'flood recession farming' and common in several parts of Ethiopia such as Baro-Akobo in the southwest and Wabishebelle catchment in the southeast (cf. Mengistu 2005), Omo River valley in the south (cf. Woodroofe 1996), Lake Tana catchment in the northwest (cf. McCarthey *et al*. 2010), and Awash River in the northeast (Nederveen 2012). Food crop production from flood re-treat farming is an important source of food and feed for the Nuer since it bridges the long dry season. Abandoning this practice will pose a serious threat on their food security status. In terms of mobility, therefore, the Nuer temporarily move between dry and rainy season cultivation plots and, compared to the pastoralists elsewhere in Ethiopia (e.g. the pastoralists in the Afar and Somalia regions), they are relatively sedentary.

With the advent of large-scale plantations in the area, land availability for dry and wet season farming as well as for livestock grazing dwindled. The limited access to grazing land had some marginal impact on the milk productivity of cattle, but was found to be not statistically significant. The focus group discussion held in Bildak village on 26 March 2013 with six elderly women who are responsible for milking cows revealed that scarcity of animal feeds due to the conversion of parts of the grazing lands into maize farm by Karuturi has become a common

problem, in contrast to the situation before the transfer of the land to Karuturi. This had resulted in a decline in the productivity of milk and average length of lactation period. According to the elderly women, the average lactation period used to last for six months; this has now declined to five months due to shortage of feeds. In Gambella, extended livestock management is predominantly practised and, based on my own estimate, the average milk productivity is about 1.6 litres/day per lactating cow, which is lower than the national average (1.85 litres/day) estimated in 2011 (CSA 2011). The impact of Karuturi's intervention on household food security status was statistically insignificant for the Nuer ethnic group, who are predominantly agro-pastoralists despite its negative value (Table 5.12).

A couple of reasons can be mentioned for the insignificant impact of Karuturi's intervention. First, since the company has not cultivated its entire leasehold concession, the Nuer had access to savanna grassland in the areas not yet covered by Karuturi. Second, the Jikawo site of Karuturi was flooded for two consecutive years and the Nuer who live around the farm were invited to take the harvest for two years. The welfare loss due to losing land was compensated for by the maize grain collected from Karuturi's farm. The central issue here is would the free maize offered to the local people by Karuturi be sustainable? Before it went into bankruptcy in late 2014 and ceased its operations, Karuturi was planning to shift to the cultivation of upland rice, a crop that would be better suited to overcoming the water surplus. After Karuturi failed to perform to the expectations of the government, the AILAA planned to transfer the land that had been leased to Karuturi to another investor that can fully develop the entire concession. With a similar business model to that of Karuturi, i.e. plantation monoculture in which the local people are not well integrated, the impact of transferring the same land to another investor may bring a significant negative impact to the food security status of the Nuer families when the entire farmland is developed.

Another impact observed after the intervention of Karuturi is the increased intensity of conflicts due to resource scarcity. Within the Nuer ethnic group, there are different clans who compete and struggle for resources. The freedom to roam from one area to another, within the same ethnic group, in search of pasture, is not without problems. For example, in Makuey and Jikawo districts, there are four different clans, the *Ceichaany*, *Cienyajaam*, *Ciewaw*, and *Ciereng*, who compete for resources during times of scarcity. These conflicts existed long before Karuturi acquired farmlands in the area. To address the issue, the former Jikawo District is administratively divided into two districts as Makuey and Jikawo. The *Ceichaany*, who inhabit Makuey, cannot move further from Baro River as they face fierce conflict from *Cienyajaam*. The

Ceichaany in Makuey District cannot move towards the South Sudan border as they will they will be confronted by the Moorlie of South Sudan. The Moorlie live along the Ethio-South Sudan border and they are highly armed with modern guns. They frequently come to Makuey District to raid cattle as a strategy of cattle re-stocking. Conflicts between the different clans of the Nuer and between the Nuer and the Moorlie have exacerbated since Karuturi's arrival, which has created more scarcity of livestock feed.

5.4.4 Evidence from Benshanguel Gumuz Regional State: The case of S&P Farm

Agro-ecologically, Benshanguel Gumuz Regional State (BGRS) is suitable for the production of different types of food (e.g. sorghum, millet and maize) and cash crops (e.g. sesame, groundnut, cotton). It is endowed with various water sources – such as the Blue Nile, Dabus, Beles and Dedessa Rivers – that are suitable for irrigated agriculture and different minerals – such as gold, marble, limestone, copper, cobalt, zinc and lead – that provide a good potential for non-agriculture based development. While agriculture is one of the major livelihood activities of the indigenous population,[62] crop production is done traditionally through slash and burn, hand and hoe culture and through the system of shifting cultivation, with the exception of the *Shinasha* indigenous people who practise oxen-ploughing. Other activities such as gold mining, hunting and gathering, and livestock-rearing also contribute to the livelihood of the local people. Despite the huge potential of the region for agricultural and non-agricultural livelihood activities, it is one of the least developed regional states in Ethiopia, with a high prevalence of poverty and food insecurity (Benshanguel Gumuz Region, 2004). The period from May to September is generally one of food deficits for many of the districts in BGRS.

Given its huge agricultural potential, the Benshanguel Gumuz Regional State has received a significant proportion of large-scale plantation investments in the past few years. S&P is the large-scale agricultural investment selected as the case study for this dissertation. In 2010, the company leased 50,000 ha of land in Dangur and Guba districts of BGRS for the production of pongomia and other food crops. So far, the company has developed only a tiny portion of the land. Two rounds of household surveys were conducted in Dangur District in 2010 (before the company developed the land) and 2014 (after the company developed some portion of its concession) to examine the impacts of the large-scale plantation on the local food security situation in the area. In both rounds of household surveys, the same cohorts of households were

[62] The indigenous people include Berta (26.7%), Gumuz (23.4%), Shinasha (7%), Mao (0.6%) and Komo (0.2%). Significant proportion of Amhara (22.2%), Oromo (12.8%) and other (7.1%) make up the remaining proportion of the population of the region (CSA 2007).

interviewed to analyse the changes over the two periods. Similar to the process for Bako Tibe District, I systematically compared the food security situation of two different groups of households (affected and non-affected households) for two different time periods (2010 and 2014) using the FEI and CSI indicators.

In 2010, the mean calorific intake of the households in the affected village was 2,237 Kcal per adult equivalent per day. In 2014, after the company developed the land, it declined to 2,220 Kcal per adult equivalent per day. The average energy intake for both periods is slightly above the minimum calories (2,200 Kcal per adult equivalent per day) required to satisfy the needs of an adult, showing that, at village level, there was no problem of food insecurity in Dangur District for both periods (Table 5.13). The results confirm that while several districts (e.g. Sherkole, Kurmuk, Sirba Abay, Guba, and Menge) in BGRS are generally classified as food insecure by some studies (Oxfam-GB, 2000; Benshanguel Gumuz Region, 2004), at village level, Dangur District is immune from the problem of food insecurity. Dangur District is also not identified as chronically food insecure and thus not included in the lists of districts for the Productive Safety Net Programme (PSNP) (FAO 2011a).

Table 5.13: Difference-in-Difference estimation of the impact of S&P Farm on household food security in Dangur District, Benshanguel Gumuz Regional State

Outcome variables	Affected (n=96)	Non-affected (n=100)	DiD (n=196)
Mean CSI in 2010 (a)	2.02	1.98	0.03 (t=0.06)
Mean CSI in 2014 (b)	2.27	2.14	0.13 (t=0.83)
Difference (b–a)	**0.26**	**0.16**	**0.1 (Impact)**
SE (t-value)	0.29 (t=0.88)	0.23 (t=0.72)	0.37 (t=0.8)
Mean calories in 2010 (a)	2,237.2	2,237	0.19 (t=0.006)
Mean calories in 2014 (b)	2,220.0	2,235.3	-15.2 (t=-0.52)
Difference (b–a)	**-17.14**	**-1.75**	**-15.4 (Impact)**
SE (t-value)	11.8 (t=-1.5)	14.02 (t=-0.13)	18.3 (t=-0.4)

Source: Survey data, 2014

The double difference estimation results indicated that the impact of the S&P intervention on household food security status is insignificant both for the Food Energy Intake and the CSI

indicators (Table 5.13). However, it is important to note here that there is a general decline in the amount of food energy consumed per adult equivalent per day and a general increase in the scores of coping strategies adopted by the households as a result of the intervention of S&P Farm, despite the changes being insignificant. After the intervention of S&P Farm, those households in the affected village increased their coping strategy scores by 25% and they adopted coping mechanisms – such as skipping meals for a whole day, decreasing meal frequency and meal portions – that have high to moderate severity weights compared to those households in the non-affected village who adopted food security coping mechanisms – such as borrowing money to buy food and borrowing food from neighbours – that have less severe weights (Annex 5.9 and 5.10). As such, land is not a limiting factor for production. The Gumuz living in the vicinity of the S&P Farm are not fully and solely dependent on farming as a source of food and income (see Annex 5.11), contrary to the households in the highland parts of the country who depend predominantly on crop-livestock mixed farming (e.g. Bako Tibe District).

The households in the affected village have about 10 ha of land, which they use in an extensive cultivation system. Commonly, they cultivate sorghum on 0.5–2 ha of land and lease out the remaining parcels that they own. In the situation before the land was transferred to S&P Company, they had unlimited access to land (more than 10 ha), and they could develop and lease out farmlands for highlanders (especially for those who come from Gojjam) at a common lease rate of ETB 1,000–1,500 or for a 100 kg of sesame for each hectare of land leased out. The Gumuz prefer to take the 'in kind' lease arrangement, since one kg of sesame sells at a price higher than ETB 1. This trend has now declined due to the land transfer to S&P, although it has not been completely abandoned since families have access to parcels that are not yet developed by the company.

In addition, the Gumuz depend on collection of honey from the forest for their food and incomes. In 2010, the Gumuz in Dangur District managed to collect 80–90 kg of honey from the forest, which has declined to 10 kg of honey in 2014 for the households in the affected village (a 700–800% decline). Due to the clearing of indigenous trees, the productivity of wild honey bees declined also for the households in the non-affected village. In 2014, the households in the non-affected stratum, on average, managed to collect 24 kg of honey from the forest (a decline by 233–275%). It is generally true that environmental effects are not limited to those who are close to the changes made by the S&P Farm, but also to those households who are far from it and did not lose land directly. For this reason, those households in the non-affected stratum have also

experienced a slight decline in the average calorific intake and have adopted coping strategies with frequency scores higher than their scores in 2010. Both the changes in the mean calorific intake and the CSI are insignificant for the non-affected households too.

At household level, however, 28% of the households in 2010 and 30% of the households in 2014 were food insecure and consumed food commodities that provide less than the required calorie per adult equivalent per day (Table 5.14). In 2014, a general decline in the mean calorific intake (by about 12 Kcal per adult equivalent per day) is observed in those households who experienced the negative effects of losing land due to the intervention of S&P Farm despite being not statistically significant.

Table 5.14: Levels of food security before and after the intervention of S&P Company in Dangur District, Benshanguel Gumuz Regional State

Food security status based on different indicators	Affected (n=96)		Non-affected (n=100)	
	Before (2010)	After (2014)	Before (2010)	After (2014)
1. Food Energy Intake (Kcal)				
Frequency (%) food secure	69 (71.9%)	67 (69.8%)	72 (72%)	71 (71%)
Frequency (%) food insecure	27 (28.1%)	29 (30.2%)	28 (28%)	29 (29%)
2. CSI score				
Frequency (%) food secure	72 (75%)	70 (72.9%)	75 (75%)	74 (74%)
Frequency (%) food insecure	24 (25%)	26 (27%)	25 (25%)	26 (26%)

Source: Survey data, 2014

Using the Coping Strategy Index as an indicator of food security, households in the affected village adopted a weighted mean CSI score of 2.72 and 3.05 before (2010) and after (2014) the intervention of S&P Farm, respectively. Based on this indicator, 25% of the households in 2010 and 27% of the households in 2014 adopted one or more types of coping mechanisms to address the problem of household food insecurity. Coping strategies adopted by food insecure households include borrowing money to buy food, eating with neighbours or borrowing food grains, consuming seed stock reserved for next cropping season, decreasing meal frequency and meal portions and skip eating for the whole day. The strategies have different severity scores. The FGD rating of the various food security coping mechanisms shows that missing meals for a

whole day has a high severity score while reducing meal frequency and limiting meal portions have moderate severity scores. Borrowing money to buy food when families perceive that they can repay back loans and eating with relatives/neighbours who have food or borrowing food from neighbours are coping strategies that have less severe scores. It is interesting to note here that eating with neighbours/families and borrowing food from neighbours are coping strategies that are considered normal in the case of Dangur District, as in the case of Gambella (Annex 5.11 and 5.12). On the other hand, consuming food by collecting wild foods from the forest (i.e. hunting and gathering) is considered as food security coping strategy in some countries (cf. Nangulu 2009 for Kenya; Sneyd 2013 for Cameroon; Unger & Chagomoka 2014 for Ghana). However, in the case of Dangur District, consumption by hunting and gathering is common practice and not considered as a coping strategy. Those who have no food security problems also complement their consumption through these strategies. In Dangur District, households gather different root crops (locally called *echa, cisi, boya*), vegetables (e.g. pumpkin) and collect honey from wild honeybees. Though illegal, they hunt and consume different types of bush meat as sources of animal protein. These are important sources of food and income sources for the communities in the study area.

For both periods, the level of food insecurity measured using the CSI as indicator of food security (25–27%) is a little less than the magnitude measured using the Food Energy Intake (28–30%). This shows that as long as families manage to eat something at their disposal, they do not feel that they are food insecure. In reality, however, their diet may not be nutritious and provide the needed calories.

Though generally worsening, the changes in the level of household food security after the intervention of S&P are insignificant for two plausible reasons. First, the company developed only a small proportion of the 50,000 ha land, despite operating for about five years, and the Gumuz families still have access to the portion of land not yet developed. Second, land scarcity is not such a constraint in the area. Moreover, the regional state, through its regional re-settlement scheme, allocated, depending on the size of the family, up to 10 ha of land per household. This land size is huge compared to the mean land size available in other regions. Third, agriculture is not the only source of livelihood for the Gumuz (Annex 5.13), and the loss of land may not have a huge impact as long as other sources of livelihoods function well.

5.5 Summary

The results presented so far, based on the analysis of data generated from different case studies in the three regional states, show mixed pictures. Intuitively, but also logically, differences in the magnitude of impacts of large-scale agricultural investments on household food security are highly anticipated. The hypotheses presented in Chapter 1 were formulated based on the logical reasoning that impacts of large-scale plantations on household food security status depend on contexts and crop commodities produced by the large-scale farms. The results from the case studies confirmed the hypotheses that the magnitude of impacts of large-scale plantations is different across different contexts. Despite the insignificant impact of interventions on household food security in some cases (e.g. Karuturi in Gambella Regional State for the Nuer case and S&P in BGRS), the direction of impact for all the large-scale plantations was negative. All the large-scale plantations adopted the same type of business model in which the local people around the farms are simple providers of natural resources, mostly land and water and, in some limited cases, they are also sources of wage labour. The negative impact of land transfer on local people's food security status was not compensated for by the employment generated by large-scale farms due to very limited engagement of the local population in wage employment.

CHAPTER 6: IMPACTS OF LARGE-SCALE FARMING ON LOCAL ENVIRONMENT

6.1 Introduction

The world's population is projected to increase from 7 billion today to 9 billion by 2050 (United Nations 2013) and the demand for food is expected to rise by 60% by 2050 from the 2005–2006 production level (FAO 2012e). While converting forests and grazing lands into farmlands to feed the increasing population has been a common practice (Gibbs *et al.* 2010), the rate of land conversion both for food and biofuel feedstock production has been unprecedented since 2007 following massive large-scale land acquisitions driven by the food, fuel and finance crises (Hall 2011). On the other hand, land alienation from local communities for conservation programmes has been widely practised in Africa (Brockington 2004). To deal with the oil price spike, the European Union mandated EU member states to meet at least 10% of their transport energy needs from renewable energy sources by 2020 (European Union 2009). To fulfil 10% of the transport energy from renewable sources, 20–30 million ha of land will be needed (HLPE 2011).

The increased global demand for land to produce biofuel feedstock was estimated to quadruple in the coming 15–20 years (Fairless 2007) and was projected to require 20% of the world's agricultural land by 2050 (White & Dasgupta 2010). This was also a major push factor for the increased demand for land for biofuel feedstock production. Opponents have also stated that biofuels are not necessarily a panacea for the twin crises of energy security and climate change that initially served as the justification for investing in biofuels. The magnitude of GHG emissions per unit of energy from biofuel feedstock production depends on how and where biofuel crops are produced (UNIDO 2010; Pacheco *et al.* 2012) and the conversion technology used (Alder *et al.* 2007; Pacheco *et al.* 2012). For instance, Fargione *et al.* (2008) estimated that expansion of biofuel crops into natural landscapes could release 17-420 times more CO_2 than annual GHG reductions by using liquid biofuels. Gibbs *et al.* (2008) noted that large-scale biofuel feedstock production is carbon-saving when produced on degraded/cultivated plots but is carbon-emitting when replacing tropical forests. Whether land is converted to produce biofuel feedstock, flowers or food crops, is one of the key determinants that affects environmental sustainability.

Recipient countries viewed the rush for farmland by wealthy nations and corporations as an opportunity to speed up their national development, and they provided investors with lucrative incentive packages (discussed in Chapter 1), which attracted investors to acquiring farmlands in the developing South. As a result, globally and also in Ethiopia, huge tracts of land have been leased out to foreign and domestic capital for long-term plantations.[63] Land Matrix (2015) estimated that over 16 m ha of land globally, of which about 55% from Africa, are acquired for agricultural production. In Ethiopia, close to 2.2 million ha of land was transferred to investors between 1992 and 2013, of which the lion's share was transacted in 2008 (Chapter 1). Government statistics revealed that close to 1.5 million ha of land were transacted to investors in Ethiopia for biodiesel feedstock production between 2005 and 2010, but only a few have started implementation (Shete & Rutten 2014).

The transfer of large swathes of land for food and biofuel production has changed pre-existing land uses both globally and in Ethiopia. Borras and Franco (2012, pp. 39–42) presented the dominant global land-use change typologies in four distinct patterns. The authors acknowledged that the typologies are simplified presentations of the complex realities of land-use changes across the globe and can be used as a conceptual map to explain the drivers of land-use change and its effects on the land users. I have adapted their conceptual framework to explain the dominant land-use changes in Ethiopia and added one more typology that shows a change from food and non-food land-uses to crop production for industrial raw materials. A brief description of the dominant land-use change typologies adapted from the authors is presented below (Figure 6.1).

Typology I: under typology I, three different sub-categories are identified. These are: (1) a change from subsistence food production to a more market-oriented domestic food production, (2) a shift to smallholder food production from large-scale food production, and (3) a shift from subsistence food production to food production for export. All these are taking place in Ethiopia. A shift in policy from smallholder-focused agriculture to commercialization of agriculture is observed in Ethiopia since the launch of the second national development plan – the Plan for

[63] This includes land allocated for large-scale food, biofuel feedstock and industrial raw material (e.g. cotton, rubber tree, etc.) production.

Accelerated and Sustained Development to End Poverty (2005/06-2009/10) (see MoFED 2006). As a result, land devoted primarily to subsistence food production by households was allocated for the production of food for domestic markets. The shift from large-scale farming to smallholder subsistence food production, however, is also observed in Ethiopia in which the incumbent government re-distributed large-scale farms that were owned by the previous government regime among those landless youth with the objective of addressing food security at local levels. These two sub-categories are, however, beyond the topic of 'land grabbing', and are not the interest of this chapter.

In the second sub-category, farmlands previously devoted for food production by the local people either through statutory or customary ownership are transferred to large-scale food production for export. This is one of the dominant patterns of land-use change that is feared to bring negative outcomes to local people and is criticized by different rights groups, researchers and donor groups for the likely dispossession of local people from their land-based resources.

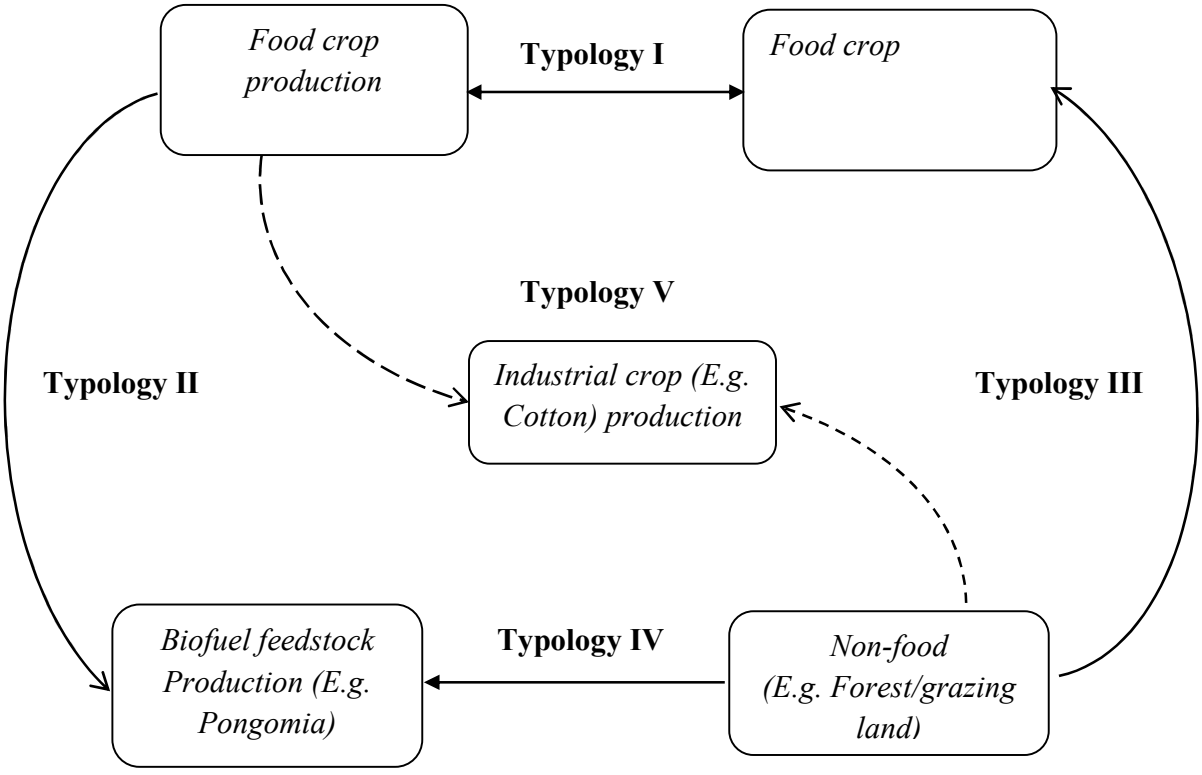


Figure 6.1: Conceptual framework for the dominant global land-use changes

Typology II, which is a shift in land uses from food production to biofuel feedstock production, is one of the typologies that has been the subject of global land grabbing in the recent past. While the land allocation was made with the dominant narrative of unused land that has neutral food security reducing impacts, critiques argued that lands suitable for food production were allocated for biofuels. Between 2003 and 2007, two thirds of the global increase in maize production went to biofuels (World Bank 2009, p.4). The pressure on arable land due to biofuel feedstock production has arguably set back food security for the coming 20 years (FAO 2011b). In Ethiopia, for example, the case of S&P Energy Solution and Karuturi Agro Products PLC falls partly under the pattern of land-use change from local food production to biofuel feedstock production (Table 6.1).

Typology III: depicts the shift from non-food land use to food production. While converting forest and grazing lands into farmlands to feed an increasing population has been a common practice (Gibbs *et al.* 2010), the 2007/2008 global food crisis has increased the rate of land conversion from other forms of land use to food production. In Ethiopia, this has been done under the narrative that the country is endowed with over 74 million ha of land suitable for annual and perennial crop production but only less than 25% of it (18 million ha) is under cultivation. As presented in Table 6.1, the majority of the lands transferred to domestic and foreign capital in Ethiopia falls under this land-use change typology.

Table 6.1: Patterns of dominant land-use changes due to large-scale farming in Ethiopia

Company	Origin of Investor	Region	Size (ha)	Year	**Dominant *ex ante* land use**[+]	Current land use	**Pattern of land-use change**
Karuturi Global	Indian	Oromia	11,700	2008	Grazing land with scattered trees and partly used for *teff* and Niger seed	Maize cultivation	Typology I and III
Arjo-Dedessa Sugar Mills	Ethiopian Government	Oromia	28,000	2007	Shrub land and grassland	Sugar cane	Typology III and V
S&P Energy Solution	Indian	Benshanguel	50,000	2010	Forests, grassland and shrub land and shifting cultivation	Pongomia trees and food crops	Typology I, III and IV
Spentex	Indian	Benshanguel	25,000	2009	Forests, grassland and shrub land	Cotton	Typology V
Tana Beles Sugar Mills	Ethiopian Government	Benshanguel and Amhara	75,000	2010	Forests, bush land and shrub land	Sugar cane	Typology V
Omo Kuraz Sugar Mills	Ethiopian Government	SNNP	175,000	2011	Shrub land and grassland	Sugar cane	Typology V
Lucci	Ethiopian	SNNP	4003	2009	Grazing land and plots for maize and tobacco	Cotton farming	Typology V
Mela	Ethiopian	SNNP	5000	2010	Grassland and bush	Oil crops and cereals	Typology III
Adama	Ethiopian	SNNP	18,516	2010	Grassland	Cotton and cereals	Typology III and V
Whitefield	Indian	SNNP	10,000	2010	Grassland	Cotton	Typology V
Verdanta Harvest	Indian	Gambella	3012	2010	Indigenous forest	Tea plantation	Typology V
Sannati	Indian	Gambella	10,000	2010	Grassland and woodland	Rice and pulses	Typology III
BHO	Indian	Gambella	27,000	2010	Grassland and woodland	Edible oils	Typology III
Ruchi	Indian	Gambella	25,000	2010	Grassland and woodland	Soya beans	Typology III
Karuturi Global	Indian	Gambella	100,000	2010	Forest, Grassland and seasonal cultivation of maize and sorghum	Maize, sugar cane, oil-palm cultivation	Typology I, III and V
Basen Farm	Ethiopian	Gambella	10,000	2008	Scattered trees, bush land and cultivation of sorghum and maize	Cotton	Typology I and V
Saudi Star	Saudi	Gambella	10,000	2010	Grassland and woodland	Rice cultivation	Typology III
Kesem Sugar Plantation	Ethiopian Government	Afar	20,000	2010	Grassland and woodland	Sugar cane	Typology V
Tendaho Sugar Mills	Ethiopian Government	Afar	50,000	2010	Grassland and woodland	Sugar cane	Typology V

Source: Own survey (2011, 2012 and 2013) and Ethiopia Sugar Corporation (2013)

Note: It should be noted here that the cases are presented to capture the dominant forms of land-use changes and it is by no means a complete list. The shaded from the list are the large-scale farms that this study examined in detail.

Typology IV: represents the shift in land-use from non-food production to the production of biofuels. As a double solution to the fossil fuel price and climate change crises in 2007–2008, the use of biofuels was advocated and subsequently resulted in the conversion of lands from other forms of use to the production of biofuels. In Ethiopia, both bio-ethanol and biodiesel production are advocated. The country is estimated to have 23.3 million ha of land suitable for biodiesel (Forum for Environment 2011) and 333,500 ha of land for irrigated and rain-fed sugar cane and associated bio-ethanol production (Ethiopia Investment Agency 2008). Government records show that a total of 1.5 million ha of land was leased to 34 investors for biodiesel feedstock production (Annex 6.1) and 294,000 ha of land is allocated for eleven new sugar plantations (Annex 6.2) planned for three regional states[64] in the country. Data from the Ethiopian Sugar Corporation showed that 330,000 ha of land is already allocated to the state-owned Sugar Corporation and private investors for the production of sugar cane and bio-ethanol (Ethiopian Sugar Corporation 2013). Ethanol production for blending with gasoline is one of the products targeted in these projects. The transfer of land for biodiesel and bio-ethanol production has brought substantial changes in land-use in Ethiopia from non-food and sometimes from temporary food production to biofuel production.

Environmental degradation is generally conceptualized as the deterioration of natural resources such as natural vegetation, soil, water, wildlife, aquatic resource, etc. due to the deleterious effect of human activity (Johnson *et al.* 1997). Intervention through large-scale farming is one area of human interference that affects the natural environment. Researchers reported the impact of land-use change due to large-scale farming on different environmental parameters in different countries. For example, land conversion for food and flower production was reported to accelerate deforestation and loss of biodiversity (Foley *et al*. 2005; Pimentel *et al*. 2006), increased encroachment of national parks by local people who have been displaced by large-scale farms (Deininger *et al*. 2011), and contributed to water scarcity (Rutten & Mwangi 2008; Woodhouse 2012). Land-use change is also reported as a major contributor to climate change and is estimated to account for 13–17% of global anthropogenic Green House Gas (GHG) emissions (FAO 2008). Corollary to this, the fifth assessment of the Intergovernmental Panel on Climate

[64] In Southern Nations, Nationalities and Peoples Regional State, a total of seven new sugarcane production farms are being established on 175,000 ha of land; in Amhara Regional State, three new sugarcane production farms will be established on 75,000 ha of land; and in Tigray Regional State, one new sugar factory is being established on 44,000 ha of land (Ethiopian Sugar Corporation 2013).

Change (IPCC) report emphasized that humans are responsible for global climate change (IPCC 2013). A report by the National Meteorological Service Agency (NMSA) in Ethiopia also indicated that land-use change is a major source of GHG emission, and agricultural activities accounted for 80% of the total CO_2 equivalent emissions (NMSA 2001).

Although there is a growing body of literature about the environmental effects of large-scale land acquisition (cf. Shete 2010; Agrarian Justice 2013; Balehegn 2015), the subject is less researched compared to scholarly works that study the impact of large-scale land acquisitions on the human dimensions (Lazarus 2014). More importantly, the term environment embraces several components and requires more in-depth analyses of specific environmental parameters. Some researchers exerted scholarly efforts to analyse the impact of large-scale land acquisitions on specific environmental parameters. For example, Rodrigues *et al.* (2009) linked deforestation in Amazonia with regional level changes in climate-related variables and Gobena (2010) noted that large-scale land acquisition has worsened the magnitude of deforestation in Ethiopia; Rulli *et al.* (2013) estimated the volume of irrigation water appropriated globally due to 'land grabbing'; Lazarus (2014) documented the effects of global 'land-grabbing' on rivers' sediment flux; and Rabalais *et al.* (2010) analysed the effects on coastal water bodies of run-off from farmlands rich in nitrogen and phosphorus petrochemical fertilizer.

To date, research about the effects of land-use changes due to large-scale farming on vegetation cover change, soil related environmental parameters such as soil carbon stock, soil bulk density (porosity) and soil micronutrients in Ethiopia has been minimal. And yet, the effects on the soils are important and should be taken into the equation when valuing land-use changes due to large-scale farming. As a result, among the different elements that constitute the natural environment, this study examined the effect on large-scale farming on vegetation cover change and on soil quality.

Globally, the organic soil pool is estimated at 2,500 billion tons, of which soil organic carbon constitutes more than three times the atmospheric carbon pool (Lal 2004a). CO_2 emissions due to land-use change are estimated to have averaged 5.9 billion tons annually in the 1990s (IPCC 2007). Soils with a high level of organic matter increase biodiversity (Pimentel *et al.* 2006) and

serve as a carbon sink. Piccolo (2012) argued that cultivation accelerates the release of organic compounds into the atmosphere by exposing top soils to surface drying and oxidation that makes farms sources of carbon to the atmosphere rather than carbon sinks. When properly managed, agricultural soils could serve as a carbon sink and play a vital role in reducing GHG emissions (Lal 2004b; Janzen 2004).

Cultivation also changes the soil's aggregation/porosity, which determines the circulation of air and water in the soil. Water-holding capacity of soils vary considerably across undisturbed natural environments and cultivated lands. This has a direct effect on groundwater availability and surface run-off (Gomiero *et al.* 2011). Undisturbed soils retain moisture better than cultivated soils.

Furthermore, Lazarus (2014) noted, without in-depth analysis, that the recent 'land grab' introduced industrial farming practices that could result in soil depletion around the globe. While soil macronutrients such as nitrogen (N), phosphorus (P) and potassium (K) are very important in crop production and could be affected by intensive large-scale farming, this study did not examine them because adding inorganic fertilizers (N, P, and K) is commonly practised by large-scale farms and we considered it less important.

Researchers who conducted soil analysis for micro-nutrients in Ethiopia found that zinc (Zn) and copper (Cu) are deficient in several locations in Ethiopia (Desta 1983; Asgelil *et al.* 2007 as cited in, Abera & Kebede 2013) and iron (Fe) and manganese (Mn) are deficient in Verisols of Central highlands of Ethiopia (Abera & Kebede 2013). Mn soil plays an important role in photosynthesis and chlorophyll production, both of which have a strong association in crop yields (Mousavi *et al.* 2011). Similarly, Fe soil serves as a catalyst in chlorophyll formation and it is an essential element in the formation of plant protein, plant respiration and photosynthesis. Plants need zinc for protein synthesis and plant metabolism (Uchida 2000). This calls for an in-depth study on the impacts of the recent large-scale land acquisition on land-use changes and soil related environmental parameters, notably the effects on micro-nutrients in Ethiopia.

This chapter, therefore, aims to address the following objectives: (1) to examine the changes in vegetation cover induced by large-scale land acquisition using spatio-temporal remote sensing imagery; and (2) to estimate the effects of land-use changes induced by large-scale land acquisition on soil organic carbon, soil micro-nutrients and soil bulk density. The results are based on data generated from spatio-temporal satellite images, soil data, perceptions of households affected by large-scale farms, key informants' interviews and focus group discussions. Details of the data collection and data analyses methods are already presented in Chapter 1.

6.2 Results

6.2.1 Vegetation cover change induced by large-scale farms in Ethiopia

Inevitably, cultivation brings change in vegetation cover. The land allocation to large-scale farming in Ethiopia predominantly targeted grazing lands, shrub/fallow lands and open to closed forests that are assumed by the government to have less socio-economic impacts. In some limited cases, farmlands cultivated by local people, often through customary ownership, and lands that were under state farms are transferred to large-scale farming companies. Our spatio-temporal satellite image analysis revealed that the large-scale farms studied as the subject of this research cleared closed forests and open-to-closed forests for farmlands. Out of the total land developed by Karuturi Agro Products PLC at its Ilia farm station of Gambella Regional State (2,435 ha), 18.6% and 80.2% of the lands were previously covered by closed and open-to-closed forests, respectively (Table 6.2 and Figures 6.2a and 6.2b).

Table 6.2: Vegetation cover change induced by large-scale farms in Gambella and Benshanguel Gumuz Regional States

From: **Previous land use (ha)**	**To: Current land uses (ha)**		
	Karuturi's maize plantation Ilia site Gambella	Basen's cotton plantation Gambella	S&P's pongomia and annual crop plantation Benshanguel Gumuz
Cropland	29.6	107.1	145.0
Open to closed forest	1952.5	1607.5	1026.5
Closed forest	452.8	849.6	630.2
Shrub/fallow	0.0	632.4	61.6
Existing plantation	0.0	372.8	0.0
Total	**2434.9**	**3569.4**	**1863.3**

Source: Analysis based on spatio-temporal satellite image

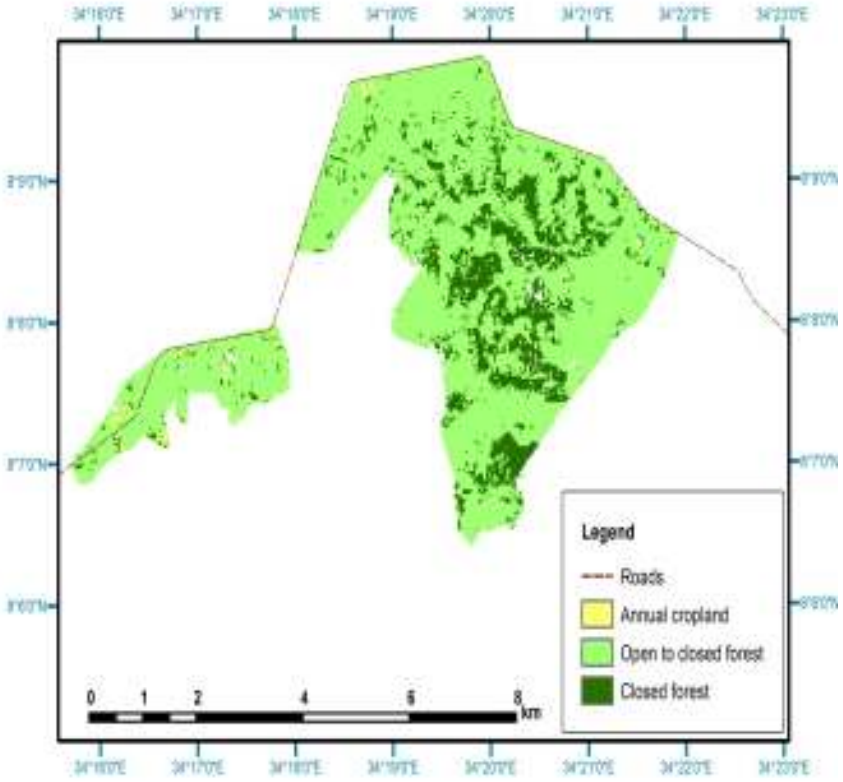


Figure 6.2a: Land use by Karuturi (Ilia site, Gambella) in 2008

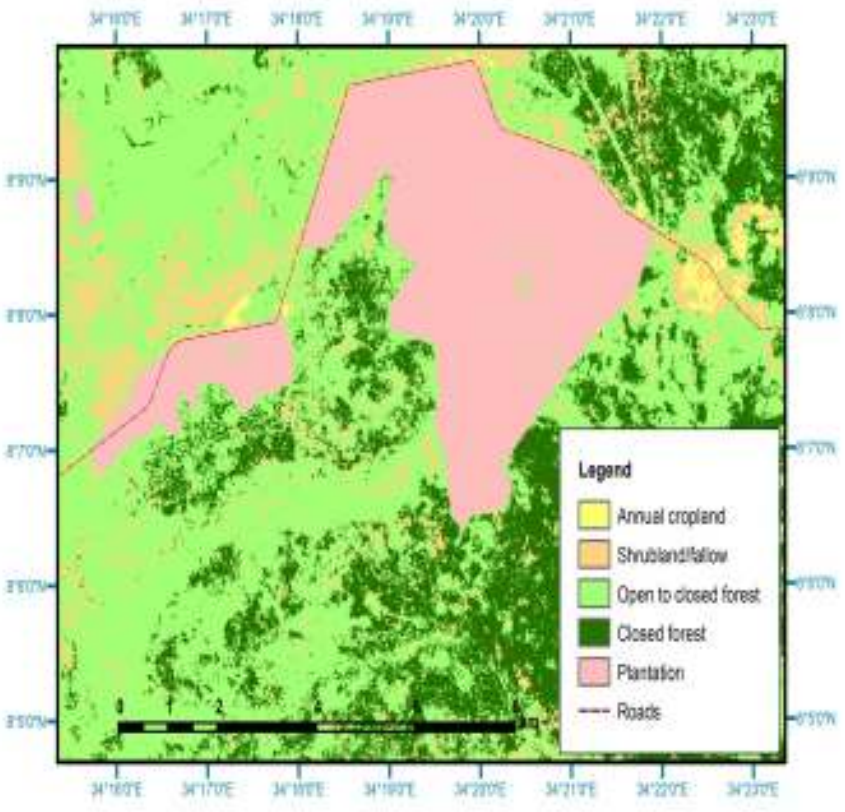


Figure 6.2b: Land use by Karuturi in 2015

A site visit to Karuturi's farm in Ilia village in 2012 and 2013 also confirmed that Karuturi bulldozed indigenous trees that have important ecological roles and socioeconomic values. In the same vein, although we have not analysed satellite images, we observed that Karuturi converted 2,800 ha of grassland in Jikawo and close to 3,000 ha of grazing land in Bako Tibe into maize farms.

In Benshanguel Gumuz Regional State, the S&P Energy Solution acquired 50,000 ha of land for the plantation of different food crops and pongomia trees. The spatio-temporal satellite data analysis indicated that the company developed 1,863 ha of land out of its total leasehold concessions. The magnitude of open-to-closed forests and closed forests cleared by S&P was substantial and accounted for 55.1% and 33.8% of the total land covered by maize and pongomia in 2014, respectively (Table 5.1 and Figures 6.3a & 6.3b). Pongomia belongs to the *Leguminaceae* family. It is an ever-green and oil rich tree adapted to a wide ranges of temperature conditions (1–38^{0}C) and tolerant to alkaline and saline soils (Meher *et al.* 2004). The seeds are estimated to contain 30–40% of oil. The oils have low density property and are suitable for biodiesel production. The S&P farm cultivated pongomia and pigeon pea intercropping on parts of its leasehold concessions and maize mono crop in some of its plots. In the forthcoming discussion, the impacts of the land-use change from natural forest to an economically beneficial tree and maize mono crop will be presented.

Similarly, out of the total land developed and planted with cotton by Basen Farm (3,569 ha), 23.8% and 45% of the lands were converted from closed and open-to-closed forests respectively. The company also cleared bushes and cultivated cotton, which accounts 17.7% of the total cultivated land of the company. Part of the land covered with cotton by Basen was previously owned by Abobo state farm and this accounted for 10.4% of the total land developed by Basen in 2014. This was also confirmed in our ground truthing field visit to Basen's farm in 2012 and 2013 (Table 6.1 and Figures 6.4a & 6.4b).

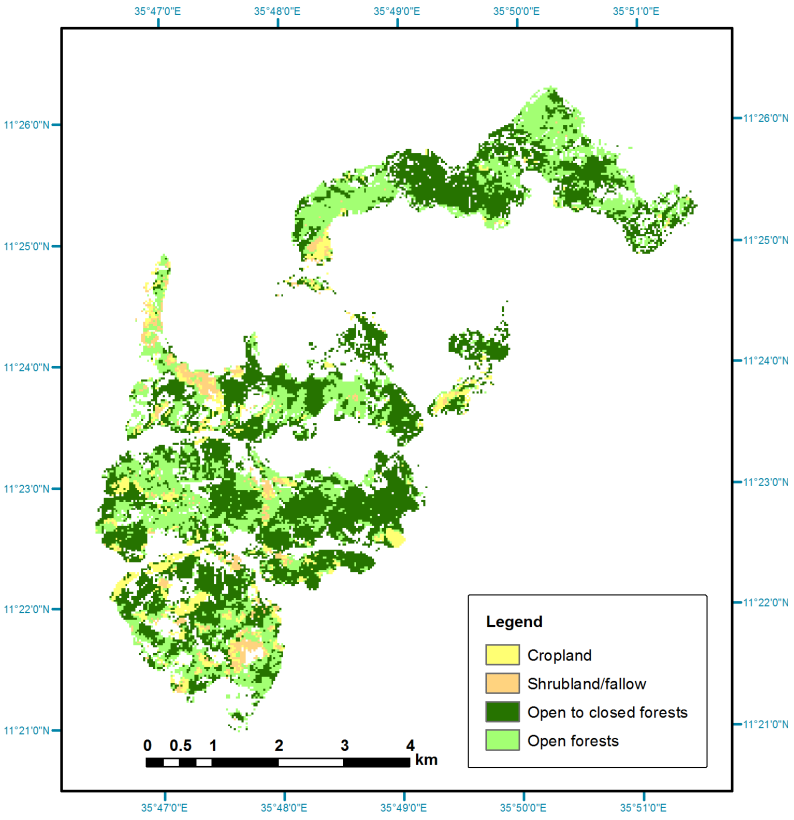


Figure 6.3a: Land use map of S & P farm in 2009

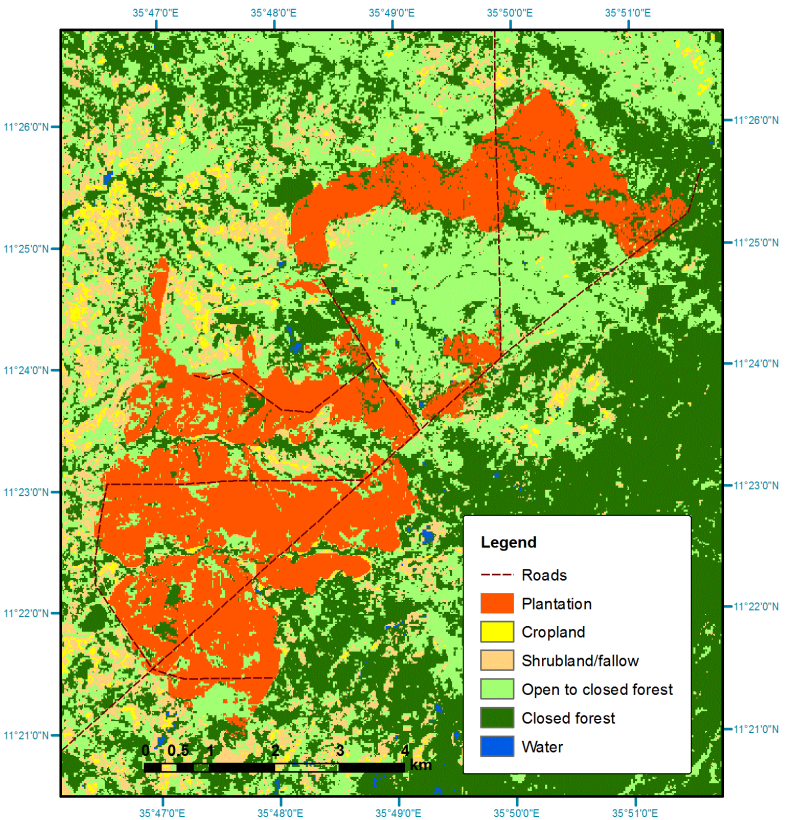


Figure 6.3b: Land use map of S & P farm in 2015

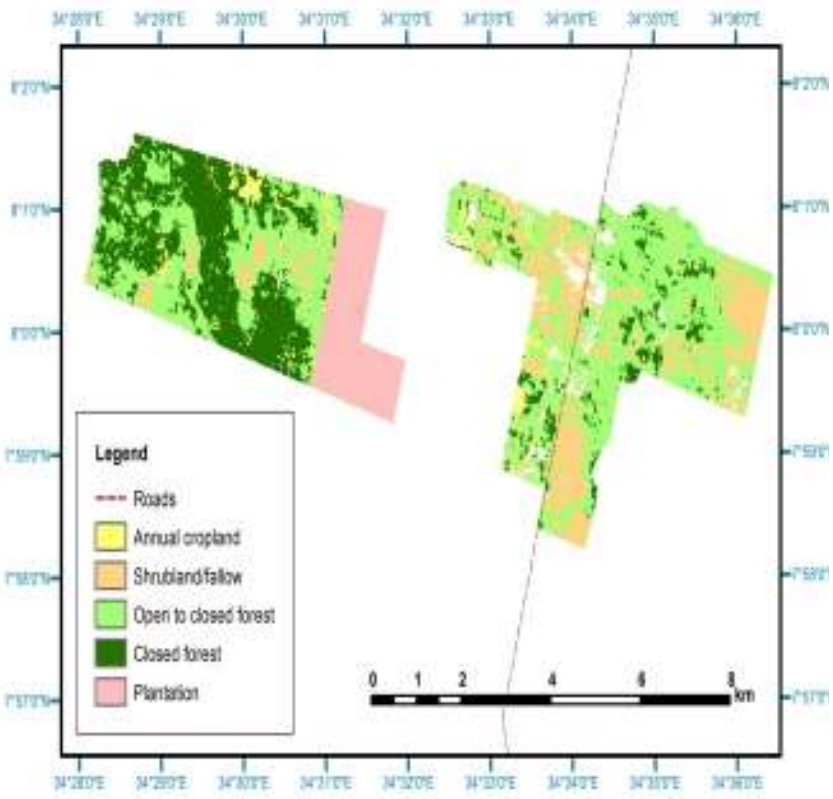


Figure 6.4a: Land use of Basen Farm in 2003

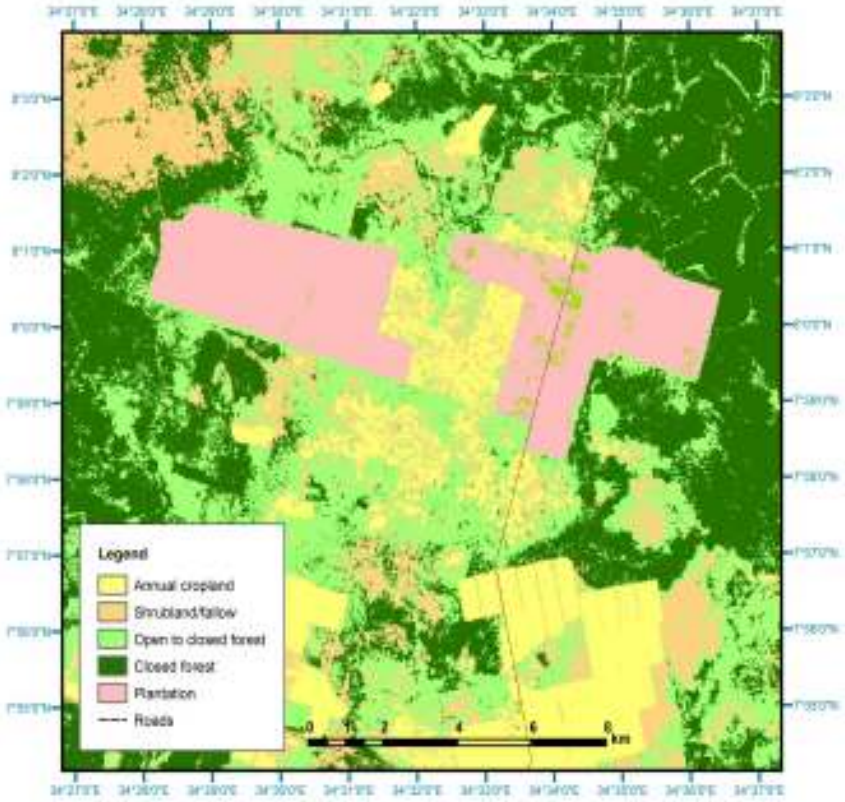


Figure 6.4b: Land use of Basen Farm in 2015

6.2.1 Impact of large-scale farming on soil carbon stock

As discussed in the aforementioned section, the large-scale farms examined as case studies for this research brought dominant changes in vegetation cover. Changes in vegetation cover induced by these farms, *inter alia*, have a direct effect on the soil's organic matter. The analysis of soil carbon levels on the large-scale farms operating in Oromia, Benshanguel Gumuz and Gambella Regional States confirmed the hypothesis that the farms sequestrated less organic carbon compared to the control. In Oromia, the soil carbon-stock at Karuturi Farm declined by 17.7% compared to the control. An exceptional result was observed in Benshanguel Gumuz Regional State at S&P Farm where pongomia was intercropped with pigeon pea. The plot covered with these crops – both crop types fix atmospheric nitrogen into the soil – improved the soil's organic carbon by 19%, implying that the type of land-use determines the effect on soil organic carbon. This is perhaps due to the nitrogen fixing characteristics of pongomia and pigeon pea. On the other hand, the plot of S&P Farm planted with maize was found to reduce soil's organic carbon by 6% compared to the control plot, which is covered by scattered trees (Table 6.3). The maize and sugar cane fields of Karuturi Farm in Gambella sequestrated 61% and 40% less organic carbon than the natural controls, respectively. Basen Farm in Gambella sequestrated 16% less organic carbon compared to the forest control. The changes in soil carbon-stock due to the land-use changes caused by the farms in Oromia, Benshanguel Gumuz and Gambella regional states are all statistically significant either at $p<0.05$ or $P<0.01$ (Table 6.4).

6.2.2 Impact of large-scale farms on soil compaction

The large-scale farms in Gambella, Benshanguel Gumuz and Oromia Regional States resulted in changes in soil-bulk density (BD). In Oromia, the change in land-use from grazing land to maize farm and the use of heavy machinery on Vertisols has increased the soil's BD by 9.5% (significant at $p<0.01$). The intercropping of pigeon pea with pongomia by the S&P Farm significantly improved the soil's bulk density in Benshanguel Gumuz Regional State. This is associated to the fact that the roots of pigeon pea and pongomia penetrate different zones of the soil and both improve the soil organic carbon by fixing atmospheric nitrogen through their root nodules. In its maize mono cropping, however, S&P Farm worsened the soil's bulk density by 7% (Table 6.3).

In Gambella, the conversion of grazing land to maize and sugarcane plantations increased the soil-bulk density by 28.5% and 46.7%, respectively. The increase in soil compaction is significant at $P<0.01$. This is due to a loss of organic carbon (OC) and an increase in soil compaction as a result of using heavy farm machinery for cultivation. The company burnt the sugarcane fields in 2013 when the soil samples for this study were being taken. This reduced the soil's OC and increased its BD. Although we observed that agro-pastoralists also burn grazing lands to encourage re-growth of fresh grass, this does not change the soil's BD. This might be because the loss of OC through burning is compensated for by animal dung. At Basen Farm the soil's BD has increased by 16% when compared to the uncleared forest, which was significant at $P<0.01$ (Table 6.4).

Table 6.3: Effects of land use change on soil bulk density and organic carbon in Oromia and Benshanguel Gumuz Regional States

Parameters	Land use of Karuturi Farm in Oromia region		Land use of S&P Farm in Benshanguel Gumuz region		
	Karuturi's maize farm	Grazing land (Control)	Pongomia intercropped with pigeon pea	Maize farm	Scattered tree (Control)
Bulk Density in gm/m3					
Mean ± SEM	1.39 ± 0.015	1.27 ± 0.007	1.37 ± 0.003	1.49 ± 0.02	1.39 ± 0.01
Std. Dev.	0.064	0.028	0.01	0.05	0.03
t statistics (Std. Error)	0.12 (9.45%)***		4.9 (0.01)	5.99 (0.02)	
Mean difference (%)	7.2 (0.02)		-0.03 (-1.4 %)***	0.1 (7.2%)***	
Organic Carbon in %					
Mean ± SEM	2.05 ± 0.022	2.49 ± 0.028	2.22 ± 0.03	1.74 ± 0.02	1.86 ± 0.03
Std. Dev.	0.09	0.12	0.06	0.05	0.12
t statistics (Std. Error)	-0.44 (-17.7%)***		9.0 (0.04)	2.8 (0.04)	
Mean difference (%)	12.2 (0.04)		0.36 (19.4%)***	-0.12 (6.4%)**	

Source: Survey data (2013 & 2014); ***Significant at p<0.01; **Significant at p<0.05

Table 6.4: Effects of land use change on soil bulk density and organic carbon in Gambella Regional State

Parameters	Land use of Basen in Abobo		Land use of Karuturi at Ilia site		Land use of Karuturi at Jikawo site		
	Basen's cotton farm	Forest/bush (Control)	Karuturi's maize farm	Forest/bush (Control)	Karuturi's maize farm	Karuturi's sugar cane farm	Grazing land (Control)
Bulk Density in gm/m3							
Mean ± SEM	2.01 ± 0.03	1.73 ± 0.03	2.09±0.05	1.90±0.01	1.76 ± 0.01	2.01 ±0.02	1.37 ± 0.01
Std. Dev.	0.11	0.13	0.22	0.04	0.038	0.07	0.024
Mean difference (%)	0.28 (16.2%)***		0.19 (10%)***		0.39 (28.5%)***	0.64 (46.7%) ***	
t statistics (Std. Error)	7.10 (0.04)		3.73(0.52)		32.26 (0.01)	35.38 (0.02)	
Organic Carbon in %							
Overall Mean ± SEM	2.35 ± 0.01	2.79 ± 0.01	0.82±0.01	1.04±0.01	1.49 ± 0.01	2.29 ± 0.01	3.82 ±0.01
Std. Dev.	0.05	0.04	0.01	0.03	0.017	0.033	0.028
Mean difference (%)	-0.44 (-16.1%)***		0.22 (-21.2%)***		-2.3 (-61%)***	-1.5 (-40.1%)***	
t statistics (Std. Error)	29.11 (0.02)		28.71(0.01)		225.13 (0.01)	119.68 (0.01)	

Source: Survey data (2013); ***Significant at p<0.01

6.2.3 Impact of large-scale farms on soil micro-nutrients

Soil nutrient uptake by plants, unless checked and treated through the application of deficient soil nutrients, will lead to soil nutrient imbalance. Land conversion from natural vegetation to crop production, as witnessed in the large-scale farms in Oromia, Benshanguel Gumuz and Gambella Regional States, is anticipated to result in exploitation of soil micro-nutrients. Sims and Johnson (1991) and Kparmwang *et al.* (2000) indicated that the critical levels of available Fe and Mn required for plant growth are 2.5–4.5 mg/kg and 1.0 mg/kg, respectively. Similarly, McKenzie (2001) argued that soils that have greater than 1.0 mg/kg of Cu, 1.0 mg/kg of Zn, 4.5 mg/kg of Fe and 1.0 mg/kg of Mn are classified as adequate for this micro-nutrient.

The land-use change from grazing land to maize farming by Karuturi Agro Products PLC in Bako Tibe District (Oromia) resulted in the reduction of the soil's Fe, Cu, Zn and Mn levels by 38%, 36%, 66% and 63%, respectively. The declines in these nutrients are statistically significant at $P<0.01$. In absolute figures, we discovered that the area was generally deficient in Zn (0.76 mg/kg) and Cu (0.44 mg/kg) compared to the minimum level (1 mg/kg for both Zn and Cu) needed for a healthy plant growth. The stock of Zn and Cu were further declined to 0.26 mg/kg and 0.28 mg/kg, respectively, due to the land-use change induced by Karuturi Farm. Although the declines of Fe and Mn due to the land use change were significant, the stock of these micro-nutrients in the soil are well above the minimum amount required for plant growth, and hence they are not yield limiting factors at the moment (Table 6.5). Tilahun (2007) also found a decline of soil micro-nutrients due to land-use change from grazing and forest land to cultivation in Ethiopia.

The analysis revealed that Bako Tibe has an adequate stock of soil Fe and Mn, although the land-use change brought a statistically significant reduction of these micro-nutrients. The company cultivated maize year after year. Although this study did not examine the effects of mono cropping on the soil's biodiversity, cultivation of same crop without crop rotation for four consecutive years by Karuturi resulted in the mining of important soil micro-nutrients.

Table 6.5: Effects of land-use change on soil micronutrients in Oromia and Benshanguel Gumuz Regional States

Soil micronutrients (mg/kg)	***Land use of Karuturi Farm in Oromia***		***Land use of S&P Farm in Benshanguel Gumuz***		
	Karuturi's maize farm	Grazing land (Control)	Pongomia intercropped with pigeon pea	Maize plot	Scattered tree (Control)
Iron (Fe)					
Mean ± SEM	10.42 ± 0.09	16.7 4± 0.08	8.67 ± 0.19	8.83 ± 0.05	8.89 ± 0.03
Std. Dev.	0.40	0.33	0.56	0.15	0.11
t statistics (Std. Error)	5.2 (0.12)		1.66 (0.13)	1.14(0.05)	
Mean difference (%)	-6.32 (-37.75%)***		-0.22 (-2.5%); NS	-0.06 (-0.6); NS	
Copper (Cu)					
Mean ± SEM	0.28 ± 0.002	0.44 ± 0.008	1.53 ± 0.01	1.55 ± 0.01	1.58 ± 0.01
Std. Dev.	0.009	0.035	0.03	0.04	0.05
t statistics (Std. Error)	19.1 (0.01)		3.2 (0.02)	2.24 (0.02)	
Mean difference (%)	-0.16 (-36.36%)***		-0.06 (-3.2%)***	-0.04 (-1.9%)**	
Zinc (Zn)					
Mean ± SEM	0.26±0.002	0.76±0.008	0.44 ± 0.01	0.45 ± 0.01	0.47 ± 0.01
Std. Dev.	0.008	0.034	0.01	0.01	0.03
t statistics (Std. Error)	6.5 (0.01)		2.86 (0.01)	1.95 (0.01)	
Mean difference (%)	-0.05 (-65.8%)***		-0.025 (-6.3%)**	-0.021 (-4.25%)*	
Manganese (Mn)					
Mean ± SEM	4.41±0.003	11.94±0.046	32.45 ± 0.16	32.56 ± 0.13	32.58 ± 0.12
Std. Dev.	0.01	0.19	0.50	0.39	0.52
t statistics (Std. Error)	16.1 (0.05)		0.46 (0.2)	0.03 (0.18)	
Mean difference (%)	-7.53 (-63.06%)***		-0.09 (-0.4%); NS	-0.006(-0.01%); NS	

Source: Survey data (2012 & 2014); NS= Not Significant; *** Significant at p<0.01; ** Significant at p<0.05; * Significant at p<0.1

In Benshanguel Gumuz Regional State, S&P cleared the natural vegetation and cultivated some of the plots with maize mono crop and some with pongomia-pigeon pea intercropping. Cultivation resulted in a significant decline of Cu by 2–3% and Zn by 4–6%. However, there was no significant reduction in the soil's Fe and Mn. The area under cultivation by S&P's farm was generally deficient in Zn (0.47 mg/kg) compared to the critical minimum needed for plant growth (1.0 mg/kg) even before the land-use change induced by S&P. The land-use change by the S&P Farm further reduced the soil's Zn to 0.44–0.45 mg/kg (Table 6.4). The soils of S&P Farm have a slightly acidic reaction (pH 6.1–6.9) with high contents of Ca ions (20.3–24 cmol(+) kg). Acidic soils are reported to have high Mn and Fe since these micro-nutrients are less available with an increase in soil acidity (Lindsay 1979). This explains the insignificant decline of the soil's Fe and Mn in Benshanguel Gumuz region compared to the control plot.

In Gambella, Basen Farm mined 34% and 74% of Cu and Fe, respectively, and these results are significant at $P<0.01$. The analysis also showed that Zn and Mn declined on the farm, but they are not statistically significant. Nevertheless, the four micro-nutrients are available in adequate amounts, which are above the critical levels needed for plant growth and they are not growth limiting factors for the farm. Karuturi's Ilia maize farm in Gambella mined 36% of Fe, 12% of Cu, 30% of Zn and 4% of Mn and the reductions were statistically significant at $p<0.01$. Similarly, Karuturi's maize and sugar cane plantations at Jikawo farm station reduced all the four soil micronutrients significantly ($p<0.01$). Compared to the control, the maize plantation at Jikawo reduced the soil's Fe, Cu, Zn and Mn by 57%, 80%, 74% and 41.5%, respectively. The sugar cane plantation at Jikawo station has also mined the soil's Fe by 75%, Cu by 76%, Zn by 71% and Mn by 5%. At Ilia farm station, all micro-nutrients but Cu are found in sufficient amounts. Before the intervention of Karuturi, the availability of Cu was, on average, 0.5 mg/kg, which is below the critical level (1.0 mg/kg) needed for plant growth. This further declined by 12% after the land-use change induced by Karuturi Agro Products PLC. In the other two stations (Jikawo/Karuturi and Abobo/Basen), all the four micro-nutrients are found in sufficient amounts and they are not plant growth limiting factors (Table 6.6).

Table 6.6: Effects of land-use change on soil micro-nutrients in Gambella Regional State, the case of Basen and Karuturi farms

Micronutrients (mg/kg)	*Land use of Basen in Abobo*		*Land use of Karuturi at Ilia site*		*Land use of Karuturi at Jikawo site*		
	Basen cotton farm	Forest/bush (Control)	Karuturi's maize farm	Forest/bush (Control)	Karuturi's maize farm	Karuturi sugar cane farm	Grazing land (Control)
Iron (Fe)							
Mean ± SEM	8.42 ± 0.26	32.09 ± 0.11	4.22 ± 0.02	6.60 ± 0.01	8.51 ± 0.01	9.64 ± 0.06	19.7 ± 0.06
Std. Dev.	1.1	0.46	0.09	0.04	0.02	0.16	0.25
Mean difference (%)	-23.7 (-73.8%)***		-2.37(-36.1%)***		-11.2(-56.8%)***	-10.1 (-51.2%)***	
t statistics (Std. error)	8.4 (0.28)		9.69 (0.02)		13.27 (0.08)	10.89 (0.09)	
Copper (Cu)							
Mean ± SEM	19.06 ± 0.37	29.03 ± 0.08	0.44 ± 0.01	0.50 ± 0.01	12.51± 0.01	14.82 ± 0.05	62.8 ± 0.03
Std. Dev.	1.6	0.34	0.01	0.01	0.019	0.15	0.11
Mean difference (%)	-9.97 (-34.3%)***		-0.06 (-12%)***		-50.3 (-80%)***	-48 (-76.4%)***	
t statistics (Std. error)	26.36 (0.38)		16.17 (0.01)		13.46 (0.04)	864.07 (0.06)	
Zinc (Zn)							
Mean ± SEM	4.81 ± 0.072	4.9 ± 0.034	1.05 ± 0.01	1.5 ± 0.01	2.28 ± 0.01	2.57 ± 0.005	8.81 ± 0.023
Std. Dev.	0.31	0.15	0.01	0.01	0.028	0.015	0.097
Mean difference (%)	-0.09 (-1.8%); NS		-0.45 (-30%)***		-6.54 (-74%)***	-6.25 (-71%)***	
t statistics (Std. error)	1.09 (0.08)		110.40 (0.01)		19.9 (0.03)	189.73 (0.03)	
Manganese (Mn)							
Mean ± SEM	4.3 ± 0.06	4.36 ± 0.02	10.90 ± 0.01	11.34 ± 0.01	3.3 ± 0.004	5.91 ± 0.023	5.64 ± 0.01
Std. Dev.	0.23	0.066	0.05	0.04	0.013	0.069	0.044
Mean difference (%)	-0.07 (-1.4%); NS		-0.45 (3.9%)***		-2.3 (-41.5%)***	0.28 (4.8%)***	
t statistics (Std. error)	1.25 (0.06)		25.84 (0.02)		15.26 (0.02)	12.54 (0.02)	

Source: Survey data (2012 & 2013); NS=Not significant; ***Significant at p<0.01

6.2.4 Farmers' perceptions of the environmental effects of large-scale farming

Social surveys were also conducted in 2012, 2013 and 2014 to identify the perceptions of the local people towards the environmental changes that have been observed as a result of large-scale farming. A total of 538 households (100 from Itang, 100 from Makuey, 100 from Abobo, 96 from Dangur and 142 from Bako districts) were selected by a systematic random sampling technique from the villages that have experienced the effects of land-use changes. The exploratory surveys that were conducted in 2011 helped to identify the villages that experienced the effects of land-use change by large-scale farms and to investigate locally relevant environmental variables that should be included in the household survey.

Households were interviewed using a structured questionnaire that constituted 14 items on environmental components expected to change because of land-use change induced by the operation of large-scale farms. The questionnaire was developed using a five-point Likert scale to make the instrument sensitive to the possible responses. Households were asked to rate their perceived impacts as: 1=Highly declined/worsened; 2=Declined; 3=No change; 4=Improved/Increased; and 5=Highly improved/increased. The responses were analysed using mode and median scores. In addition, focus group discussions with key informants – such as elders who have lived in the villages for many years and are knowledgeable about the changes in key environment variables – were conducted to substantiate the household survey. The perception of the local people towards impacts of land-use changes induced by the large-scale farms on various environmental variables are expected to be different due to the relative perceived differences of the values of natural resources to their livelihood (read Chapter 1 for the description of livelihood portfolio of the local people in the three regional states).

In the case of Karuturi in Bako (Oromia), the land-use change affected the local people's access to land for cattle grazing and food crops cultivation, access to water and trees for various purposes. The land-use change in Abobo (Gambella) by Basen Farm changed access to resources such as land for cultivation, grazing land for cattle and trees for different uses. In the case of Karuturi (Gambella), the land-use changes affected the local people's access to pasture, water and fish resources, and forest foods. Availability of pasture and water for livestock are important resources for the Nuer and access to forest foods is important to the Anuak. For the Gumuz in

Benshanguel Gumuz Regional State, foods from the forest are important. To capture these variations, respondents from each local population were represented. The perception of land-users was analysed using descriptive statistics (median and mode scores) and presented in Table 6.7.

Generally, the overall perceived modal value for the 14 items in Oromia, Gambella and Benshanguel Gumuz Regional States was 2, which indicates the declining/worsening of socioeconomic and environmental variables due to the changes in land uses induced by the large-scale farms. The perceived median score for several of the items showed that environmental good/services are declining due to the interventions, which is consistent with the perceived modal values. Availability of pasture land, trees for firewood and charcoal, water for livestock, and wildlife, are all declining due to the change in land-use by large-scale farms.

In Oromia, local people revealed that, except for the items that enquired about quality of soil change, all the environmental variables such as availability of trees (for firewood and shade), water (for human and livestock use), quantity and quality of pasture for cattle grazing have all declined, and the extent of flooding has worsened due to the land-use change by Karuturi Farm. The company dug 22 boreholes and started to irrigate its farm from the Aboko River. Previous access to water for livestock from the Aboko River has been completely blocked for downstream users since the company started using the river for dry-season cultivation. Shortage of water for cattle was mentioned as a serious problem for the livelihoods of the local people (FGD held with five youths on 2 April 2012 and five farmers on 3 April 2012 in Goromitti village, and five farmers on 3 April 2012 in Oda Gibe village on 3 April 2012). The members of the FGDs explained that farmers in the villages used the Aboko River as a source of water for their cattle before their access to the river was completely blocked by Karuturi. Now, they trek their cattle three hours every day to the Gibe River that resulted in, not only body weight loss of the animals, but also spending few hours on farming. Both have brought negative effects on their agricultural production and overall livelihood. The rush for African farmland is reported by Olanya (2012) to have a hidden strategy of securing water access for large-scale commercial agriculture.

Table 6.7: Local people's perception of the impacts of large-scale farms on socioeconomic and environment variables in Oromia, Gambella and Benshanguel Gumuz Regional States

Socioeconomic and environmental variables	Gambella region						Oromia region		Benshanguel region	
	Karuturi Farm/ Anuak Case (n=100)		Karuturi Farm/ Nuer Case (n=100)		Basen Farm/ Settlers case (n=100)		Karuturi Farm/ Highlanders case (n=142)		S&P Farm/ Gumuz case (n=96)	
	Mode (%)	Median	Mode (%)	Median	Mode (%)	Median	Mode (%)	Median	Mode (%)	Median
Availability of trees for firewood	2(100%)	2	2(63%)	2	2(78%)	2	2(100%)	2	2(93.7%)	2
Availability of trees for shade	2(100%)	2	2(63%)	2	2(52%)	2	2(100%)	2	3 (100%)	3
Availability of trees for NTFP	2(100%)	2	3(61%)	3	3(74%)	3	NA	NA	2(100%)	2
Availability of trees for medicine	2(90%)	2	3(58%)	3	2(69%)	2	NA	NA	2(89.6%)	2
Availability of water for humans	2(97%)	2	2(89%)	2	2(82%)	2	2(100%)	2	3 (100%)	3
Availability of water for livestock	NA	NA	2(82%)	2	2(74%)	2	2(100%)	2	NA	NA
Availability of fish resources	2(94%)	2	3(53%)	3	3(97%)	3	NA	NA	NA	NA
Quality of water for human use	2(84%)	2	2(84%)	2	2(75%)	2	2(96.5%)	2	3(100%)	3
Quality of water for livestock	NA	NA	2(94%)	2	2(74%)	2	2(96.5%)	2	NA	NA
Amount of pasture available	NA	NA	2(94%)	2	2(82%)	2	2(100%)	2	NA	NA
Quality of pasture	NA	NA	2(94%)	2	2(63%)	2	2(100%)	2	NA	NA
Quality of soil	3(72%)	3	3(98%)	3	2(70%)	2	2(75.4%)	2	2(83.3%)	2
Wildlife resources (Bush meat)	2(84%)	2	2(88%)	2	2(65%)	3	NA	NA	2(89.6%)	2
Flooding/Water logging	2(92%)	2	2(94%)	2	2(86%)	2	2(100%)	2	NA	NA
Overall mode (%)	**2 (93.4%)**		**2 (84.5%)**		**2 (74.4%)**		**2 (96.8%)**		**2(91.2%)**	

Note: NA= Not Applicable/Important; Mode (%)=Calculated from valid responses; Overall mode (%) =Calculated based on the average percentage of most frequent responses

Source: Survey data (2012, 2013 and 2014)

In Bako, Karuturi converted grazing land with scattered fig and acacia trees into maize cultivation. The perception of the local people was that the clearing of the trees brought significant changes to the micro-climate of the area. Participants of the five FGDs in the four villages mentioned above said that the scattered figs and acacia trees over the grazing fields were used for ritual purposes, shade for humans and cattle and served for community gatherings. After the trees were cleared by Karuturi, the local people complained about a rise in daily temperature and lost shade for ritual and community gatherings. The negative effects of large-scale farming are also reported by Shete (2011).

In Gambella, Karuturi is also blamed for significant environmental damage. It bulldozed indigenous tree species at the Ilia site. Pasture land was cleared to make way for a maize and sugar cane farm at the Jikawo site. It diverted water from Baro River to its sugar cane farm, aggravating flooding in the area. Elderly respondents who were interviewed in Bildak village raised the negative environmental impacts of Karuturi's operation. They said that flooding is aggravated in their village due to the construction of diversion canals, and they are afraid of more flooding that will pose serious environmental problems in the future. Their perception is consistent with the soil bulk density analysis result discussed earlier.

Another environmental concern in Gambella is the likely conflict of large-scale farming with wildlife resources. Gambella National Park, which has not been officially gazetted, partly overlaps with the lease concession of Karuturi Farm. The Park is known to be home to the endangered shoebill stork, the Nile lechwe antelope and the white-eared kob antelope. The world's second largest mammal migration is found here with hundreds of thousands of animals crossing the South Sudanese border through the Boma-Jonglei landscape and returning to Gambella when the weather is right (HoAREC 2013). The local people revealed that wild animals are observed in large-scale farms and their flock is declining (mode value 2) since Karuturi started farming here. Three scouts working for the Gambella National Park who were interviewed on 27 March 2013 also supported the views of the local people saying that "wild animals are seen in the Karuturi Farm and we expect conflict between the farm and the wildlife resources."

In Benshanguel Gumuz Regional State, the Gumuz rely heavily on natural resources for food and incomes. The S&P Farm converted natural forest to plantation, and the local people perceived that the impacts of land-use change by S&P Farm on different environmental variables are negative. The quality of the soil is perceived as having deteriorated due to the shortening of the fallow period after the land transfer to the S&P Company. The practice of applying fertilizers is not common among the Gumuz indigenous population. They rejuvenate the fertility of their parcels through fallowing, instead. Availability of non-timber forest products is perceived to have declined. Harvesting of honey from the forest for household consumption and sale, hunting of different wild animals for bush meat and gathering of different foods from the forest/bush are important among the Gumuz population, but perceived to have deteriorated due to the intervention. Although these variables are more to do with food security issues, the local population mentioned the decline of these products from the forest in connection to the clearing of trees by the large-scale farm (Table 6.7).

6.3 Discussion

6.3.1 Environmental Impact Assessment (EIA) and large-scale farms in Ethiopia

This section discusses the institutional mechanisms available to mitigate the negative effects of large-scale farming on the environment. The Constitution of Ethiopia (see Articles 43, 44 and 92) incorporated important phrases that address environmental issues in development projects (FDRE 1995). The Environmental Protection Authority (EPA) in Ethiopia, an agency mandated to oversee environmental issues, has developed policies, laws, regulations and administrative frameworks to ensure that environmental issues are taken into account before any project is launched (EPA 2012). To this end, different proclamations pertinent to environmental issues[65] were promulgated. As with any development project, the preparation of Environmental Impact Assessment (EIA) documents are compulsory for all large-scale farming projects in Ethiopia. The mandate to oversee EIA was given to the EPA under Proclamation No. 295/2002 (FDRE 2002b). The EPA, however, transferred its mandate of monitoring the EIA of large-scale agricultural farms to the Agricultural Investment and Land Administration Agency (AILAA) in 2009

[65] Proclamation No. 299/2002 (the Environmental Impact Assessment Proclamation), Proclamation No. 541/2007 (the management and utilization of wildlife resources), Proclamation No. 300/2002 (the Environmental Pollution Control Proclamation), Proclamation No. 513/2007 (the Solid Waste Management Proclamation) and Proclamation No. 197/2000 and Regulation No. 115/2005 (the conservation, utilization and development of water resources in the country), which aimed to reduce the negative impact of development projects on natural resources and the environment, are promulgated following the recognition of environmental issues by the Constitution.

(Rahmato 2011). This was done with the justification that the EPA was too weak to monitor large-scale farms while the AILAA was considered to have the needed capacity and opportunity to closely monitor large-scale farms. Stebek (2012, p. 115) also argued that the EPA is 'disempowered' due to the delegation of its duties and responsibilities to sectoral environmental units of different ministries, such as the Ministry of Agriculture, the Ministry of Water and Energy, and the Ministry of Mines, whose major activities involve the utilization of natural resources in one way or another.

Table 6.8: Environmental impact assessment of major large-scale farms in Ethiopia

Large-scale farm	Land size (in ha)	Date land-deal concluded (DD/MM/YY)	Date EIA prepared (DD/MM/YY)	Date project began operation
Karuturi (Gambella site)	100,000	25/10/10	14/12/11	2010
Karuturi (Oromia site)	11,700	2008	no EIA	2008
S&P Energy Solutions	50,000	01/03/10	no EIA	2010
BHO	27,000	11/05/10	30/11/11	Unknown
CLC (Spentex)	25,000	25/12/09	no EIA	2009
Ruchi	25,000	05/04/10	no EIA	2010
Hunan Dafengyuan Agric.	25,000	25/11/10	no EIA	2010
Saber Farms PLC	25,000	10/05/11	no EIA	2011
HORIZONE Plantation PLC	20,000	01/09/12	no EIA	2012
Adama	18516	24/08/10	no EIA	2010
Whitefield	10,000	01/08/10	30/01/11	2010
Sannati	10,000	01/10/10	03/05/11	2010
Saudi Star Agri. Dev. PLC	10,000	25/10/10	31/05/11	2010
Basen Farm	10,000	2008	no EIA	2008
Toren Agro Industries PLC	6000	18/09/11	no EIA	2011
Access Capital	5000	08/10/10	no EIA	2010
Tracon Trading PLC	5000	18/03/10	28/11/11	2010
Mela Agric. Development PLC	5000	12/03/10	12/03/12	2010
Daniel Agri. Dev. Enterprise	5000	26/08/09	19/03/12	2010
State-owned sugar mills[66]	175,000	Not Applicable	no EIA[67]	2011
Green Valley Agro PLC	5000	25/01/12	no EIA	Unknown
Lucci Agric. Development PLC	4003	08/11/09	no EIA	2010

Source: AILAA and agricultural company's documents (2014); Note: The shaded are the cases examined in this study

[66] This includes Omo Kuraz, Tendaho, Arjo-Dedessa, Tana Beles, Kessem Sugar Mills. EWCA (2011) mentioned that the effects of Omo Kuraz sugar plantation on wildlife resources of the area were not studied.
[67] EWCA (2011).

While an EIA is prepared to mitigate any possible negative effects of projects on the environment, evidence to date shows that 63.6% of the large-scale farms that received land for investment have not yet prepared EIA documents. Others (36.4% of the large-scale agricultural projects) prepared EIA documents after project implementation started, which is contrary to the recommendations set out under Proclamation No. 299/2002 (FDRE 2002c). Considering the case studies selected for this study, Karuturi Agro Products PLC prepared an EIA document for its Gambella site in 2011 after it started operation in 2010. The company did not prepare an EIA for its Oromia site (Table 6.8).

Although policies, proclamations and regulations that aimed at reducing the environmental costs of agricultural projects are developed by the EPA, an assessment of EIA document preparation by large-scale farms in Ethiopia revealed that the majority of the companies did not have environmental impact mitigation strategies. Those large-scale farming companies that prepared the EIA document sometime after they started clearing the land might have developed the document as a rhetorical device to silence critiques forwarded by various groups, rather than to mitigate the negative environmental effects of their operations.[68] In this regard, we can argue that the AILAA failed to live up to the expectations of the Ethiopian government to monitor the activities of the large-scale farms to devise and implement environmental impact mitigation strategies. Rahmato (2011) also noted that the AILAA is too weak to accomplish its duties of monitoring large-scale farms in the country related to environmental protection activities. It is, therefore, important to understand the subsequent discussion on the site-specific environmental effects of the large-scale farms in Oromia, Gambella and Benshanguel Gumuz Regional States against this background information.

6.3.2 Implications of the loss of soil organic carbon

Loss of Soil Organic Matter (SOM) is one of the detrimental effects of removal of vegetation cover. It is well documented that SOM is very important for soil quality and soil functions (Campbell 1989; Baldock & Nelson 2000). Among other things, it improves soil aggregation and structure, enhances absorption and water retention capacity, increases soil fertility, improves soil biodiversity, and serves as sink and source of soil carbon. Because of the high content of organic carbon, SOM is often used as a proxy indicator for measuring Soil Organic Carbon (SOC). Soils as a sink for atmospheric carbon, improving SOC, is considered as one of the climate-change

[68] See Deininger *et al*. 2011, Oakland Institute 2011 and Rahmato 2011 for the critiques.

mitigation strategies (FAO 2008). Soil organic carbon improves overall soil functions such as soil structure, water retention capacity, aeration, and soil's resistance to compaction (Liddicoat *et al.* 2010). Therefore, a decline in soil organic carbon implies a decline in the quality of soil (Van Camp *et al.* 2004). For this reason, the established literature suggests increasing the input rates of organic matter with the aim of enhancing the amount of SOC (see Post & Kwon 2000).

The organic carbon that was previously sequestrated in the soils declined by 16–61% because of the land-use changes induced by the large-scale farms. This release is a challenge to the environment. Farming practices that result in a decline in soil's organic carbon-stock below 2% are considered to be unsustainable, since they disrupt the structural stability of soil (Spink *et al.* 2010). Thus, they pose problems to the environment. With the current rate of soil carbon decline due to the land-use changes, most importantly in Gambella and Oromia but also in Benshanguel Gumuz Regional State, the sustainability of the large-scale farms and the functioning of the natural ecosystem might be affected negatively in the years to come.

Land-use change that depletes the soil's carbon pool and accelerates the release of organic carbon into the atmosphere, as in the case of the large-scale farms, has wider implications for climate conditions. Our log-linear analysis, based on metrological data obtained from Bako Agricultural Research Centre for the Bako area, revealed that the maximum mean daily temperature increased, on average, by 1.23^{o}C between 1961 and 2011 ($t= 3.66$, $p<0.001$) and relative humidity decreased by 1% every year ($t= -2.7$, $p<0.01$). Although it is very difficult to associate the rise in temperature and the decline in relative humidity to the land-use changes occurring in Bako because of the large-scale farming, local people linked the rise in daily temperature in their village to the land-use changes induced by Karuturi Farm. Gambella is also a region frequently affected by climate variations such as abnormal flooding (Woube 1999). Unless relevant mitigation strategies are taken, the decline in soil carbon stock due to the land-use changes by the large-scale farms will eventually contribute to the worsening of climatic factors in the region.

Although climate change has both local and global effects, farmers in developing countries, like Ethiopia, with the lowest capacity to cope with the effects of climate change are more vulnerable to it (ILRI 2006; Stige *et al.* 2006). Cheru (2008) also contended that, although Africa has contributed little to climate change, it is one of the regions that has experienced the negative effects of climate change most intensely. Limited capacity of national governments to invest in climate change adaptation measures exacerbates the negative effects of climate change. We

believe that the absence of strategies developed by the large-scale farms to mitigate negative environmental impacts of their farming operations will exacerbate the removal of soil organic carbon, which is also associated with SOC.

6.3.3 The challenges of soil compaction

Soil-bulk density is an indicator of soil structure in general and soil compaction in particular. Land-use change affects soil porosity and compaction, which determines water infiltration, groundwater movements and surface water run-off (Conolly 1998). Cultivation with heavy machinery is one of the main reasons for soil compaction (Arvidsson *et al.* 2000). The analysis results for Gambella and Oromia revealed that the soil's BD increased with increasing soil depth. This was also true for the maize mono cropping of S&P Farm in Benshanguel Gumuz Regional State. Studies also confirmed the inverse relationship between soil BD and infiltration capacity (cf. Osuji *et al.* 2010; Getachew *et al.* 2012). Reduced soil infiltration capacity contributes to surface run-off (Conolly 1998; Alhassoun 2009) and tends to increase the likelihood of flooding (Sparovek *et al.* 2002; Alhassoun 2009). Infiltration also determines ground water storage and has an impact on the hydraulic cycle (Alhassoun 2009). In the dry season, groundwater level will be very low due to the limited amount of water infiltrated during the rainy season. Both effects (i.e. flooding and decline of ground water level) reduce the productivity of the farms and their sustainability.

The large-scale farms, especially in Gambella and Oromia Regional States, frequently experienced abnormal flooding and water-logging that substantially reduced their yields. For example, at the Jikawo site, Karuturi completely abandoned its maize harvest for two consecutive years (2012 and 2013) due to flooding. At Bako, Karuturi achieved only 15–20 qt/ha of maize yield due to water-logging, compared to 60–80 qt/ha maize harvested in the adjacent area. Similarly, the cotton yield level of Basen Farm, on average, declined by 66% (19.07 qt/ha in 2011 to 6.5 qt/ha in 2012) due to flooding and other related challenges. Normal flooding is common on the floodplains of Gambella and is actually required by the indigenous people for their agricultural activities. It brings moist, nutrient-rich soils to their farms. Abnormal flooding patterns are experienced when the same amount of precipitation causes excessive flooding due to land-use changes by human interference (Woube 1999). The key informants of this study also explained that abnormal flooding has posed a threat to their livelihoods. The findings of this study in Gambella are also consistent with the claim made by Woube (1999) and Getachew *et al.* (2012). Woube discovered that, due to the clearing of vegetation by the state-sponsored

resettlement scheme in 1984 and the expansion of mechanized large-scale farms in Gambella, the infiltration capacity of the soils had reduced and flooding had increased. Getachew and his colleagues also documented the negative effects of land-use changes from forests and grazing lands to farmlands on soil's physical and chemical properties in South Ethiopia. In a nutshell, this study found a significant increase in the soil bulk density of the large-scale farms, which is one of the challenges that will hamper the sustainable agricultural production of these establishments.

6.3.4 Soil micro-nutrient decline and the sustainability challenge

Soil micro-nutrients are required by plants in small amounts but they are important in determining plant growth and crop yield (Foth & Ellis 1997). They are very important in sustainable agricultural production (Srinivasara & Rani 2011). Although the large-scale farms increase the application of inorganic macro-nutrients, crop yields will never increase if the availability of micro-nutrients falls below a certain threshold level. Presently, the available Fe and Mn in all the four large-scale farms are above the minimum threshold levels required by plants. But, with the current rate of nutrient uptake of these micro-nutrients (greater than 35%), the stock of these micro-nutrients might fall below the critical level in a few years and the sustainable agricultural production of the farms might be affected.

The plots of Karuturi at Ilia and Bako farm stations are generally deficient in soil Cu and the available stock is below the critical minimum needed for plant growth and development. The land-use change from forest land and grazing land at Ilia and Bako, respectively, to maize mono cropping significantly reduced the stock of Cu in the soil, further worsening the available stock of Cu in both locations. Uchida (2000) argued that Cu is an essential micro-nutrient for the formation of plant enzymes that are important in photosynthesis. The absence of this micro-nutrient in sufficient amount results in stunted and bushy plant growth that will eventually contribute to reduced plant yield. It is worth noting here that Karuturi's maize productivity is far less than the yield level under farmers' conditions, and that the company is bankrupted and closed its farm in Gambella. In the other cases, the plots of Basen and S&P did not exhibit deficiency in soil Cu. However, the land-use changes induced by these farms significantly reduced the stock of soil Cu, and the farms need to watch closely the stock of this micro-nutrient in the future.

Alloway (2008) reported that Gambella and Benshanguel Gumuz regional states are generally mapped for Zn deficiency. But, we did not find sufficient evidence that Zn is deficient in the

large-scale farms we examined. However, with the exception of Basen Farm, Karuturi (both in Oromia and Gambella) and S&P farms have significantly further reduced the soil's Zn. This calls for large-scale farming companies to take precaution measures in their future farming.

In general, a decline in the availability of micro-nutrients below the required levels results in a diminishing marginal return to additional macro-nutrient application. This holds true in the short-run until large-scale farms realize the deficient micro-nutrients and treat the soil. Although it is possible to treat soils with deficient micro-nutrients, the large-scale farms considered in this study, however, operate without the correct mix of professionals who can take appropriate decisions on soil management practices. For instance, Karuturi's farm management is outsourced to Multiplex Company, which has very little experience in SSA agriculture. Basen is operated by a small group of young Ethiopian agriculturalists who have no specialization in soil/environmental sciences. Farms operate when they generate some profit margin. Once their productivity declines due to nutrient imbalances, they will operate below a break-even point, which eventually will force them to abandon operations. The local people will thus remain with unproductive lands paying the environmental costs incurred due to the mismanagement of farmlands by the investors. Hence, the environmental costs associated with the loss of micro-nutrients will be externalized to the local community. At macro level, if production is not sustained due to the continued mining of important micro-nutrients, the goals of the Ethiopian government to transform the agricultural sector will not be achieved.

The large-scale farms considered in this study practised mechanized agriculture with a mono-cropping system. Karuturi cultivated maize and sugar cane. Basen Farm cultivated cotton, and S&P Farm produced maize on some of its plots. Although this study did not analyse the effects of mono-cropping on other environmental parameters (e.g. biodiversity), the disadvantages of the system is documented in the literature. For example, Aggarwal (2006) stated that mono-cropping reduces the resilience of the ecosystems to shocks. He continued to argue that the flow of short-term external capital to the agricultural sector in developing countries targets short-term production goals and ignores the long-term effects on the ecosystem that results in ecosystems changing into an undesirable state. Once the resilience of the ecosystem is disrupted, external capital shifts to other profitable ventures. Therefore, the environmental costs associated with mono-cropping will also be externalized to the local communities.

6.4 Conclusion

Ethiopia is the second most populous country on the African continent. Promoting large-scale plantation farming is one of the strategies adopted by the Ethiopian government to improve the nation's food security and to promote agricultural modernization. Large-scale plantations were intended to increase availability of food grains at low prices for Ethiopia's large population and by improving the purchasing power of the local populations through waged employment on plantations. Despite the potential gains, the results of this study instead suggests that adverse changes in land use, vegetation cover, and soil quality, resulting from land conversion to plantation monocultures, undermine the long-term economic viability and sustainability of commercial agricultural production. Findings have shown that, with the exception of pongomia-pigeon pea intercropping, large-scale plantations reduce soil carbon stock and micro-nutrient concentrations. Moreover, the cultivation practices of the case study plantations have resulted in soil compaction, which has limited the water infiltration capacity of the soil. This worsens surface run-off and allows for abnormal flooding patterns.

Unless appropriate strategies are adopted to monitor and address issues related to soil micro-nutrient content, soil compaction and soil organic carbon and/or organic matter, large-scale plantations are unlikely to fulfil long-term food security objectives of the Ethiopian government since investments will fail, ecological functions will be disrupted, and land will become less productive for future generations. Therefore, environmental protection measures should extend beyond environmental impact assessments. More specifically, the government should (1) ensure that large-scale plantations have the right mix of professionals that can scientifically guide farming operations through appropriate land management, soil-testing and treatment of deficient soil nutrients; (2) establish a land allocation system that accounts for a wider diversity of environmental parameters such as soil properties and vegetation; and (3) ensure plantations retain a greater proportion of trees and vegetation on their concession and recycle crop-residues so as to improve soil organic matter and soil organic carbon.

CHAPTER 7: SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

7.1 Summary

The Ethiopian government embarked on a shift in policy from smallholder-focused agriculture to more commercially oriented large-scale farming as it moved from the first- to the second poverty-reduction strategy programme formulated in 2002 and 2005, respectively. Large-scale farming was expected to contribute to the transformation of the economy and to the commercialization process of smallholder farming. This was to be achieved through technology spillover and inclusion of smallholder farmers in the value chain from production to consumption. Further, it was anticipated that it would address the country's food security problems, earn foreign currency, generate incomes from land rent fees and income tax, and create employment. Although land transfers to large-scale agricultural investment are primarily being seen in lowland areas – such as in Gambella and Benshanguel Gumuz regional states – where population densities are low, areas with high population density like Bako Tibe District have also attracted investors and large tracts of land have been transferred to large-scale farm developers.

Land is a key resource for peasants and agro-pastoralists in all the study sites. The land acquired by the Karuturi, S&P and Basen companies had been previously used by local people as a source of food and livelihoods. Land transfer for large-scale agricultural investment in Ethiopia, however, has been done hastily and without adequate and careful mapping of available land resources. The land identification process largely ignored previous land uses and the suitability of the land for the proposed type of farming. Livestock production, which is a key livelihood source for many agro-pastoralists, is negatively affected and land for the production of crops that are also important for food security has been transferred away from the local farmers. The fact that the local community does not have statutory land rights does not necessarily mean that the land is vacant, but since land belongs to the state under the Ethiopian law, the local people are easily dispossessed of their livelihood resources. This is especially problematic where land is owned customarily by local people, as in the lowlands of Gambella and Benshanguel Gumuz.

Agricultural investment can be an important source of economic growth when tapped properly. However, with the current business model of mechanized, plantation-based large-scale farming adopted by all the study cases, there is very little contribution to the agricultural transformation of the country. Employment generated is very small and technology spillover to smallholder farmers and agro-pastoralists is effectively absent. Contributions in the form of building infrastructure such as roads, schools, health posts, etc. are absent. The results from most of the case studies indicate that food security has worsened and income levels are declining due to the investments. Competing claims over land and the land transfer processes brought conflict between investors and the local people. Sporadic conflicts occur because different levels of government back investors while local people have no recourse in law. While protests of various sorts have occurred in response to the land transfers, they have not brought significant changes to date. When local people do not have adequate support for the investments, the sustainability of the farms will be questionable. Experience from within Ethiopia reveals that farms (e.g. one farm owned by domestic investor in Benshanguel Gumuz and a second one owned by foreigner in Gambella) were set on fire by the local people and the government was not able to hold individuals accountable for the destruction. The sustainable operation of those farms was affected by the damage.

Further, it is important to note here that land transfer for large-scale plantations in Ethiopia attracted the attention of the media, human right groups and researchers due to the huge amount of land – stretching up to 100,000 ha – that the companies acquired, the magnitude of anticipated negative impacts on local people's livelihood and the environment, as well as the investors' ambition and promise to develop large amounts of land in just a few years and the huge expectations of the Ethiopian government that large-scale farming would be a tool of economic and agricultural transformation. However, against the expectations of the Ethiopian government about the contributions of large-scale farming to local economic development, and contrary to the ambitions and promises of the investors to turn the challenges of farming in the Ethiopian context towards opportunities of earning profit, the large-scale investment projects examined in this study have been poorly managed, had low productivity and thus harvested poor yield, and developed only a small proportion of the lands acquired. The apparent failure of notable investors like Karuturi, who attracted the attention of the media and human right groups,

signalled a number of key issues, including: the need for the Ethiopian government to assess the suitability of the lands for the specific type of crop. For example, Karuturi's concessions in Bako and Gambella are suitable for grazing animals and cultivating crops other than maize. Furthermore, the experience of the investor in terms of farming in challenging tropical environments must be examined. For example, the areas in Bako and Gambella have water-logging problems that require specialized farming experience. And, finally, the financial and technical capacity of the investor to develop huge tracts of land in the shortest time period must be looked into.

The impact of large-scale land acquisition on local level food security, on income levels, on selected environmental parameters and on the local economy in general can be summarized using the framework of Bardhan (2006, p. 1394). Bardhan identified four capacities of the poor – 'the poor as self-employed or wage workers, consumers, recipients of public services or users of common property resources' – to analyse the effect of globalization on rural poverty. Investment in large-scale farming is a result of the globalization process, and thus its impacts on various outcome variables can be summarized using this framework.

Smallholder farmers who produce agricultural commodities and who are net-sellers of their production (i.e. in their capacity as self-employed workers) may face stiff competition from large-scale farms that produce similar commodities which they then supply to the local market. For example, Karuturi's large-scale farm in Oromia supplied maize grain to the central market in Addis Ababa and the company's concession in Gambella exported its produce to foreign markets.[69] Thus, both cases had no a price dampening effect on local farmers who produce maize grain and who are net-sellers. While farmers in Bako-Oromia are net-sellers of maize, those in Gambella are net-consumers of maize as their production only complements their livelihoods based on agro-pastoralism, as in the case of the Nuer, or hunting and gathering, as in the case of the Anuak. In the case of Basen and S&P, the commodities produced by the companies were not similar to the agricultural commodities produced by the local farmers, and thus had no price dampening effect. On the other hand, the local people, in their capacity as wage workers, could

[69] Karuturi is reported to have exported about 30,000 tons of its 2012/13 maize production to the Sudan market before it collapsed completely in 2014.

have benefited substantially from the large-scale farms had they created meaningful wage employment. Nevertheless, as discussed in Chapter 4, employment generated from large-scale farms is seasonal and wage incomes are too small to have a meaningful impact on the life of the wageworkers (e.g. the case of Karuturi in Bako). In some of the cases, the benefits from the limited wage employment opportunities accrued to migrant workers from outside the local area and thus local people benefitted very little (e.g. Karuturi in Gambella, Basen in Gambella and S&P in Benshanguel Gumuz).

The local poor, in their capacity as consumers of the products of large-scale farms, could face different impacts. In this regard, Karuturi Farm allowed the Nuer in Makuey district to collect the flood-damaged maize grain for two consecutive years from its Jikawo farm site. Since the loss of grazing land and cultivation plots of the Nuer was compensated for by the maize grain harvested from Karuturi's Farm, the impact of the intervention on the food security status of the Nuer was not significant, despite initially negative signs. In the other farms studied, the local people did not benefit as consumers of the products of the large-scale farms either because the produce was sold outside the local area or the companies produced non-food commodities.

The impacts of large-scale farms can be also viewed by considering the local people in their capacity as users of common property resources. In this respect, the interventions in all the study regions brought a decline in the quality and quantity of different types of natural resources (discussed in Chapter 6). As a result, the interventions undermined the income and food security of the local people whose well-being depends on the use of different types of natural resources (discussed in Chapters 4 and 5).

Finally, the local people in their capacity as recipients of public services (e.g. health, education, different farm inputs, road infrastructure, water, etc.) could be affected either positively or negatively by the interventions of the large-scale farms. On the one hand, the large-scale farms may participate in different community development activities, and therefore may increase the quality and availability of public services. On the other hand, the large-scale farms may decrease the availability of public services through increased use of the services by the concentration of people arriving in the area as a result of the interventions. In the case studies examined here, with

the exception of S&P, no meaningful participation by large-scale farms was observed in the supply of different public services (Chapter 3). In the case of S&P, as a result of their school feeding programme, primary school enrollment rates had improved and the drop-out rate had declined in Kota village of Benshanguel-Gumuz Regional State.

While the Bardhan framework is important for summarizing the impact of large-scale land acquisition on the rural poor (i.e. impact at micro-level), to make the story complete, it is important to examine and summarize the contributions of the interventions at the macro-level. As discussed in Chapter 3, the micro-level impacts of large-scale land acquisition on local economic development, household food security, income levels and on the environment are disappointing. Some macro-economic benefits are, however, anticipated. In the case of Basen Farm, for example, local resources are expropriated for the supply of raw materials to the textile industry. Similarly, before the complete collapse of Karuturi Farm in Gambella Regional State, it brought in foreign currency to the national treasury by exporting 30,000 tons of maize to South Sudan. This raises a question about what resources are being expropriated and for whose benefit (i.e. *development for whom?*). Generally speaking, the local people are the losers, while the investors and the macro-economy are the winners from these types of investment.

7.2 Comparing Impacts of the Large-scale Farm Cases

Although large-scale farms generally brought hardship to the local population, variations in terms of magnitude of impacts are observed among them. The study had the proposition of examining impacts of large-scale farming by comparing case studies based on their geographical location and the type of crop commodities cultivated by the companies. This is because the magnitude of impacts of large-scale farms on the food security and income levels of the local people, and on the environment is expected to be influenced by the geographical location of the large-scale farms (located in highland/midland or lowland areas), and the cultivation of different types of crop commodities (such as food crops, biofuel feedstock and crops for industrial raw materials). The following discussion provides a comparative perspective of the impacts of the large-scale farms based on the two parameters expected to bring differential impacts on the food security and income levels of the local people, and the environment.

7.2.1 Comparison based on geographical location of the large-scale farms

The case studies chosen for this study are from both the highland and lowland due to the aim to examine the differences in impacts of the investments on local level development – food security, income and environment. The highland and midland areas are densely populated in Ethiopia and mixed crop-livestock farming is the dominant livelihood activity. Land scarcity is a major bottleneck in agricultural production and threatens local food security in these parts of the country. In terms of level of infrastructure development and degree of integration to regional and central markets, these areas fare better than the lowland regions. The local people in the lowlands, on the other hand, practise agro-pastoralism, crop production based on shifting cultivation and recession farming, make a living through hunting and gathering, and engage in other livelihood activities such as fishing and small-scale mining. Land availability in these regions is relatively better than the situation in the highlands. However, the areas are characterized by poor infrastructure and climatic conditions that are hostile for living. Both regions are targeted for large-scale plantations and a sizable proportion of farmlands have been acquired by both domestic and foreign investors.

The analyses of data generated from investment projects in the highland and lowland areas exhibited different impact levels. The findings from the case study in Bako Tibe District (representing highland/midland regions) showed disappointing outcomes. Given the fact that land is scarce in the context of relatively densely populated areas, making land available for large-scale agricultural investment undermined local food security and income levels. Employment opportunities are not only limited, but wages are very low given that there is an abundant landless youth who could potentially work as wageworkers on the plantations.

In the lowland regions, the impacts of large-scale plantations on local level food security and incomes were insignificant despite a decline in both. This is related to the availability of land still accessible to local people (e.g. S&P in BGRS) and compensation, which came in the form of an economic trade-off – despite losing access to land, locals could collect maize grain damaged by heavy floods (e.g. the case of Karuturi in Gambella-Nuer). In the other two cases investigated in the lowland parts of the country (Karuturi in Gambella-Anuak case and Basen Farm), significant negative impacts as a result of the interventions on local level food security and income levels

were observed. The highland settlers in Abobo District of Gambella Regional State share common characteristics with the population in other highland/midland regions in the country. Mixed crop-livestock farming is the dominant livelihood system, and access to land is constrained by the intervention of Basen Farm. They are enclaved by the company (Figure 5.1) and additional access to land is limited due to their immigrant status, despite the fact that the large-scale farm has not fully developed the leasehold concession. Due to land shortage, the food security status and income levels of immigrants have worsened. In the case of Karuturi's intervention in Gambella, where the Anuak live, the impact of appropriation of land-based resources on the food security status and income levels was tremendous. Although Karuturi did not fully develop its entire concession in the Anuak's area, the clearing of important tree species that the Anuak depended on meant that the intervention had a negative effect on the food security and income levels of the Anuak.

Negative environmental effects in the form of depletion of organic matter, worsening of soil compaction, declining levels of soil micro-nutrients and clearing of indigenous trees are observed in both the highlands and in the lowlands. This is because all the farms studied have uniformity in their farming operations. They bulldozed indigenous trees, used mechanization that increased soil compaction, planted mono-crops that uniformly extract soil nutrients and are operated by individuals who have very little expertise in natural resource management.

The pace of land development by the companies in the highlands and lowlands went against the expectations of the government and the land-deal contracts. The sluggish performances of the agricultural investment projects had their own impact, either negatively or positively, on the local development of the regions. One can argue that if the agricultural projects were fully developed, the number of jobs created and the amount of revenue generated from corporate income tax that could be used to finance public development projects would have been sizeable. A counter argument is that had there been full development of the large-scale farms, the negative impacts of the projects would have been much greater than the magnitude of negative impacts currently observed. This is likely to be true both in the lowlands and in the highlands. The impacts of large-scale farming in some of the case studies in the lowlands (e.g. Karuturi in Gambella's Nuer case and S&P in BGRS) were insignificant but negative due to local people's

continued access to land-based resources in the areas acquired by the companies but not yet developed. When the companies fully develop their leasehold concessions, the negative impact of the interventions on local people's food security and income levels may well become significant.

7.2.2 Comparison based on type of crop commodity cultivated by large-scale farms

The findings from the case studies revealed that there are differences in the magnitude of impacts among companies that cultivated different crop commodities. This is largely due to differences in the labour absorptive capacity of investment projects and the interaction of the crop commodities with the natural environment. For example, in Gambella Regional State, cotton production by Basen Farm generated better employment opportunities (up to 0.38 jobs per ha) with relatively decent wages compared to the production of food crops by Karuturi, despite the fact that those benefitting from the employment were migrants from the South.

On the other hand, production and harvesting of food crops (e.g. maize in Gambella, Oromia and BGRS) are mostly conducted through mechanization with very limited involvement of local people in wage labour. The only opportunity available for local people in terms of employment is bird watching and, in some limited cases, weeding the maize farm. Production of pongomia trees, on the other hand, engages a limited number of labourers in the period once the tree is established and the seed matures. Hanlon (2011) also reported the limited employment creation potential of biofuels in Mozambique. However, in terms of environmental impacts, production of maize and cotton proved to have adverse environmental impacts compared to the cultivation of pongomia trees and the intercropping of pigeons and maize by the S&P Company. Ellen and Kring (2012) reported that the local food security situation in Mozambique was improved when food crops produced by large-scale farms were supplied to the local markets. In the short-run, this was also observed in Ethiopia's Gambella Regional State. The negative food security impact of losing land for the production of maize by Karuturi in Gambella (i.e. in the Nuer case) was compensated for by the availability of flood-damaged maize grain for local consumption. Karuturi sold its maize harvest from its Ilia site (i.e. the Anuak case) to South Sudan with no meaningful contribution to local food security.

In sum, the negative socio-economic impacts of transferring land for large-scale agricultural investment through the alienation of the local people from land-based resources are worse in the areas where population density and land scarcity are high. Nevertheless, by looking at the trends and the impacts observed so far, it is also possible to argue that the negative impacts of large-scale land acquisition will be significant in the long-run in the lowland regions too. The negative impacts on local level food security and income levels are exacerbated by the limited engagement of local people in employment opportunities in particular and in the agricultural value chain in general, which would potentially compensate for the alienation from land-based resources.

7.3 Factors Determining Performance of Large-scale Farms

Although it is too early to conclude that large-scale farming has failed in the Ethiopian context, based on the extrapolation of early outcomes, one can argue that many of the interventions were not successful. It is, therefore, important to examine why the companies failed to live up to expectations. A number of interacting factors explain the poor performance of large-scale plantations in Ethiopia. The discussion below hinges on the key factors that determine outcomes of large-scale plantation and provides sound explanations based on the specific experiences drawn from the case studies.

7.3.1 Capacity and farming experience of the investor

With the emergence of a new phase of large-scale land acquisition, the literature on impact studies has focused on land acquired by foreign investors and little has been said about the impacts on the local economy by domestic investors. In several countries, including Ethiopia, the size of land destined to domestic capital is huge and it is equally important to assess its impacts. Against this background, this study included a large-scale farm owned by a domestic investor and analysed its impact on the local economy in order to shed light on any possible differences with foreign-owned agricultural investments. In Ethiopia, there is an entrenched government position that foreign investors have the needed finance, technical know-how and technology. They can develop farmlands of any sort in the shortest time period possible, increase the volume of agricultural production locally, contribute to the construction of infrastructure and generate foreign currency through exports. Their technical know-how can be transferred not only to

smallholder farmers, but also to other domestic investors operating around them, thereby enhancing agricultural productivity.

Contrary to these expectations, the pace of land development is disappointingly low for foreign-owned farms compared to domestic ones. For instance, Karuturi and S&P farms developed only 7.2% and 3.7% of their leasehold concessions, respectively, while Basen Farm, a domestic investor, cultivated 35.7% of its acquisition. Again, the anticipation of the government that foreign-owned farms have few financial constraints and can develop what they acquired with little support from domestic banks was misplaced. In support of this argument is the fact that Karuturi received US$ 6.64 million from Ethiopian banks but failed to repay its dues, while the domestic investor received US$ 6.36 million and is paying back the loans to its creditors. As Table 3.1 shows, of the total US$ 71.5 million loans provided to large-scale farming companies, close to 80% of the finance was given to foreign-owned farms. Records show that the amount of duty free machineries and chemicals imported by Karuturi and S&P farms were significantly high (Chapter 3) and yet the companies cultivated only a tiny proportion of their concessions.

The literature on the drivers of large-scale farmland acquisition mentioned the global financial meltdown as one of the factors that has resulted in an unprecedented rush for Africa's farmland. The financial crisis, in retrospect, hindered large-scale farms' access to loans from lending institutions. Thus, large-scale farms were incapable of financing the costs of developing huge tracts of land in just a few years. The AILAA estimated that, on average, developing a hectare of land for crop production requires close to ETB 30,000. As a result, investors like Karuturi and S&P drained their accounts in the process of opening new farmlands often covered by natural forests, bushes and savanna grassland. The costs to these companies of developing the huge tracts of land (50,000–100,000 ha) they acquired should not be underestimated. The loans that Karuturi received (Table 3.1) from Ethiopian commercial banks were simply too small compared to the financial capital needed to develop such huge amounts of land. Similar sentiments were expressed during my interview with the Manager of S&P Company, which was conducted in the company's compound at Kota village on 6 May 2014. Mr. M.V. Sira Reddy explained that despite the company investing close to US$ 16 million, it was only able to develop a small proportion of the farmland it acquired. Explaining the challenges of land clearing, he mentioned

that developing a hectare of land requires clearing, on average, 70 big trees and scattered bamboos. He further noted that although the company requested loans from the Ethiopian banks, they were not approved by the government and the company was forced to reduce its operations due to a shortage of finance.

It is also important to mention the lack of farming experience of foreign investors in tropical agriculture like Ethiopia. For example, Karuturi outsourced its agricultural operation to Multiplex Bio-Tech Pvt. Ltd. This Bangalore-based Indian company is responsible for the selection of crops suitable for the agro-ecology and soil types for the Oromia and Gambella farm stations (Multiplex 2013). The land acquired by Karuturi in both regions has challenges of water-logging and intermittently faces flooding problems. The crop chosen by the company for both its sites, maize, is not suitable for land with these kinds of challenges. As a result, the performance of the company was disappointing. In the case of S&P Farm, the company is a construction conglomerate and has never been engaged in agricultural activities in its history. While the Ethiopian government expected to see the entire concession fully developed within a three-year period, the company remains at the learning-by-doing stage, where it is trying different types of crops for suitability. Moreover, it has not recruited any professionals with experience of farming under Ethiopian conditions. By contrast, Basen Farm, which is owned by a domestic operator, has recruited a few Ethiopian agriculturalists with experience in Ethiopian agriculture, albeit that the professional mix is not ideal in terms of guiding the operation of the farm in a scientific way. The monitoring report conducted by the Ministry of Agriculture in Oromia, Gambella and BGRS also identified the absence of professionals with relevant training in agriculture in the majority of the large-scale farms (see MoA 2011c, 2012 and 2013). In the case of floriculture, however, evidence from Ethiopia showed that foreign-owned farms performed better than domestic-owned farms due to the technical and managerial capabilities of foreign operators in the flower sector (Stebek 2012).

The evidence from the three case studies indicated that the assumption held by the government that foreign-owned farms have the needed financial capital to develop huge land size in the shortest time period is incorrect. Compared to those investors of foreign origin, the domestic-owned Basen Farm developed a relatively higher proportion of farmland and was operated by

agriculturalists who have experience in Ethiopian agriculture, despite the company having similar financial constraints to its foreign counterparts, (as mentioned by the Farm Manager in an interview conducted at Abobo on 16 March 2013). The capacity and farming experience of the investors has thus influenced the performance of the large-scale farms.

7.3.2 Problems related to infrastructure, labour availability and markets

Ethiopia in general and under-developed regions such as Gambella and Benshanguel Gumuz in particular, have poor infrastructure in terms of roads, electricity, access to potable water, and health and education facilities. The availability this type of infrastructures is important for attracting well-qualified human resources. More importantly, road infrastructure is useful for enhancing the efficiency of input-output markets. Improved market efficiency is the transmitting mechanism for investment in road infrastructure to progress in economic development (Worku 2011). Poor road infrastructure increases input and output transportation costs (Dercon *et al*. 2009; Shiferaw *et al*. 2011) and results in fragmented markets (Tybout 2000). This has become one of the formidable challenges facing large-scale farms located in Gambella and Benshanguel Gumuz regional states. The Ministry of Agriculture monitoring report identified poor access to different types of infrastructure as one of a number of pressing problems for large-scale farms in Gambella and BGRS (MOA 2012 and 2013). The managers of the large-scale farms under review here mentioned the high costs of transportation for inputs and outputs as critical challenges to their performance. Basen Farm transports raw cotton to central Ethiopia where private ginneries are located. As a result of the poor road facilities, the costs of transportation are high and flatten the comparative advantage of producing cotton in Gambella. S&P Farm also faced problems in terms of the timely access to farm inputs (fertilizer and improved seeds) and getting good prices for its outputs due to high costs of transportation.

Similarly, poor access to health infrastructure and medicines means that large-scale farms struggle with labourers who are either frequently absent from the field or perform below their labour capacity due to health challenges. The areas where Basen, Karuturi and S&P operate in Gambella and BGRS are known to be infested with malaria and poisonous snakes. Lack of human capital, especially healthy and skilled labour that can guide farming operations in harsh climatic conditions is another crucial factor disturbing the smooth and successful operation of

large-scale farms in Ethiopia. Climate-related variability is colossal and weather extremes are common. Although availability of cheap labour is mentioned as an input that gives Ethiopia a comparative advantage in agricultural investment, agricultural farms operating in remote and under-developed regions like Gambella and BGRS are struggling with the lack of (unskilled and skilled) labour in the area. As mentioned, this is related to the harsh weather conditions and malaria infestations that make migrant labour less interested in working in those areas. At the same time, the negative preoccupations of employers about the local population in Gambella and BGRS regarding their abilities and work ethics contributed to the lack of interest to recruit from the local population, and thus increased the scarcity of labour. As a result, shortage of labour is a detrimental factor in terms of the successful performance of large-scale farms.

At Basen Farm, the Farm Manager explained that the company recruits wageworkers from the Wolaita Sodo area, covering the costs of transportation and accommodation. Due to competition for scarce labour, the unit cost of labour is very high given that labour is abundant in the country. This situation is exacerbated by the large-scale farms operating in the area competing for scarce labour. According to the Farm Manager, labour shortages meant that a number of mature cotton fields were not picked and, subsequently, damaged by the early on-set of rain in April in 2011. In BGRS, the Operations Manager of S&P Farm mentioned that labour scarcity is one of the bottlenecks for the farm's operation. They recruit wageworkers from the Gojjam area, but due to the presence of malaria and snake bites, labourers are not interested in working at the farm. The Grand Ethiopian Renaissance Dam Project being constructed in Guba District absorbs much of the labour available and the performance of S&P Farm, according to the Operations Manager, is severely affected due to the shortage and high costs of unskilled labour.

7.3.3 Institutional and land governance related factors

The poor performances and perhaps the negative impacts of large-scale plantation monocultures in Ethiopia in general and in the study cases in particular have to do with the land governance system established by the government. Firstly, the renewed interest in farmlands by public and private actors happened at a time when Ethiopia was not well-prepared in terms of identifying available resources for large-scale farming. As a result, the land identification process, the selection of investors and the awarding of land to investors was done hastily and failed to take into account local people's livelihoods and the suitability of land for specific crop commodity,

and before putting relevant terms, conditions and provisions on the negotiation table to ensure that large-scale farming meets the expectations of the local people and the government. This haste was largely a result of the Ethiopian government's desire not to miss an opportunity with regards to what it viewed as inward investment in agriculture.

Ethiopia's land tenure system provides all rights to the government and is used to systematically ignore land-uses by local people through customary tenure regimes. Peasants and pastoralists who do not have land certificates are not recognized, and therefore are not eligible for compensation despite their use of the land through customary tenure regimes. The findings from this study show how this has undermined the local food security and income levels and thus increased conflicts and gained very little grassroots support. The lands identified by the AILAA include lands covered by savanna grassland, forests and bushes, and as the AILAA argues, these lands are unused or insufficiently productive.

There is a misconception that all these lands are suitable for crop farming and that establishing large-scale farming on these lands boosts food production. The results from Karuturi in Oromia and Gambella show that the suitability of the land for maize production was not well-studied, either by the AILAA or by the company. As observed during fieldwork, the leasehold concession of the company in both regions is frequently affected by water-logging problems, and so is suitable for crops other than maize. The local people in both regions knew from their experience that the lands are best suited to livestock production, rather than crop farming.

Therefore, the poor performance of the large-scale farms and the negative impacts of the interventions can be linked in part to the lack of an appropriate land-use plan instituted by the AILAA, a governmental structure entrusted with land governance issues. For their part, the investors who acquired lands from the government claim that the leasehold concessions are not of a uniform quality and thus are not suitable for crop production everywhere. Some are hilly and stony (e.g. Basen and S&P farms) and others are wetlands (e.g. Karuturi Farm). However, the land rental tax, the investors complained, is calculated based on the entire land size and on the assumption that the whole area of land is suitable for crop production. Further, the area of land transferred to the investors is based on a rough estimation rather than an actual measurement. A

key informant working in the Office of Agriculture in Guba District who was interviewed in 2010 mentioned that the rather crude method used to estimate the size of land to be transferred to investors was driving along the streets on motorcycles.

Appropriate land identification is only part of the land governance exercise. The identification of capable and committed investors and the awarding of land to the investor by incorporating relevant provisions in the land deal contracts are equally important for a positive performance and impact. In the Ethiopian context, there is a huge gap in terms of identifying the right investor. For example, S&P is a construction conglomerate with no prior experience in agriculture. Karuturi's farming experience was in cut-flower production, not in large-scale plantations in tropical environments. In all three case studies, the size of land transferred to the companies did not take into account the registered capital of the investors. This claim is consistent with the monitoring report by the Ministry of Agriculture (see MoA 2011c, 2012 and 2013).

In some cases, lands may have been acquired for speculative ends, to access loans from banks and to utilize investment incentives provided by the Ethiopian government. In this regard, it was alleged that Karuturi participated in the machinery and tractor rental business using the duty-free privilege provided for investors. Karuturi and Basen are alleged to have diverted loans to other ends than expanding their cultivation. Such problems could be rectified through close monitoring and support by the government. The AILAA neither has the needed capacity, nor has it established strong linkages and coordination with regional and district government organs to closely monitor and take appropriate corrective measures against those that default or to provide support to those in need of it.

During the negotiation process with investors, and as part of the land deal contract agreements, engagement of investors in community development activities and management and conservation of trees, soils, water bodies, etc. is given less focus. Unless the large-scale farms work in tandem with the local people, their sustainable operation will be unrealistic. This was garnered from the key informants interviews with the managers of Basen and Karuturi. That is to say, it is clear that as a business entity they work for profit rather than charity, and they have no plans to engage in

community development. This goes against the expectations of the Ethiopian government, despite the fact that community development was never made part of the negotiations and the signing of the land deals.

Poor linkages among different institutions such as the Ministry of Agriculture and, more specifically, AILAA, the Environmental Protection Authority, the Ethiopian Investment Authority, the Ethiopian Wildlife Authority, agricultural research centres and different regional, zonal and district government structures that have roles, mandates and responsibilities in agriculture and agricultural investment is another challenge to the performance of large-scale farms. Several supporting evidences can be mentioned here as a cursor for this claim.

(1) In the early 2000s, regional states were mandated to hand out farmlands of any magnitude to investors. Later, the mandate to transfer farms greater than 5,000 ha was taken up by the AILAA. Since there was no clear demarcation of the land under the mandate of regional states and the AILAA, there have been cases where the regions and the AILAA have transferred the same parcel of land to different investors, showing the poor linkage between regional and federal structures.

(2) The land identified and handed to Karuturi in Gambella overlaps partially with Gambella National Park. The land identification process by the AILAA did not involve the Ethiopian wildlife authority.

(3) Regional and district revenue offices are mandated to collect land rent, employees income and corporate income taxes. However, since the large-scale farms received lands from federal government, the companies have little linkage with regional and district governments. Equally, the local governments do not have much information about the large-scale farms and therefore do not regularly collect the much-needed fiscal revenue anticipated by the Ethiopian government or provide the large-scale farms with needed support. As the Manager of S&P Farm alleged, for instance, the farm has stronger linkages with the federal government than with the district administration. This was demonstrated by the lack of support they observed when their production was looted by unknown bodies.

(4) Apart from providing investment incentive packages, such as the duty-free import of machineries, the Ethiopian revenue and customs authority has very little control over how imported machineries are used and there is no effective monitoring system. As presented above, Karuturi was allegedly involved in the machinery rental business. This happened because of a weak linkage and information sharing between district/regional administrators, district/regional revenue offices and the AILAA.

(5) The large-scale farms are observed to have weak linkages with federal and regional agricultural research centres as technologies generated by research centres were not adopted by the companies. All these issues affected the performance and outcome of large-scale farms in the study regions.

7.3.4 Socio-economic and natural context

Although previously mentioned in a number of sections, it is important to reiterate the role of socio-economic and natural factors. Compatibility of the interventions with local and social contexts is vital. Compatibility between the local context and the new agricultural investment interventions will facilitate the availability of labour from within the local population. For example, Basen Farm struggled to get wageworkers from outside Gambella since cotton farming is something new to the area. S&P Farm in Benshanguel and Karuturi in Gambella are also facing similar challenges since the local people are less familiar with intensive crop farming. Most importantly, the new investment by large-scale farms provides a chance to integrate local people into the value chain, from production to consumption. The livelihood portfolio of the local people in the lowland areas is dominated by shifting cultivation and agro-pastoralism, which are less compatible with plantation monoculture and thus the model gained very little support from local people. The objective of modernizing the agricultural sector could be achieved if the large-scale investments take into account the local contexts of communities that host investments. It is naive to anticipate technology adoption by smallholder farmers and agro-pastoralists when the interventions by large-scale farms remain different from their livelihood experiences.

Compatibility of large-scale agricultural investments with the natural environment is also important. In the cases examined for this study, investors gave little consideration to the

suitability of lands for the crop commodities they produce. Water-logged/swamp areas may be compatible with fish farming and/or cultivation of paddy that loves water. Against the natural context, however, Karuturi cultivated maize in Gambella. The availability of savanna grassland in Gambella indicates that modern livestock farming might fit better to the natural context than opening up crop fields. The natural conditions in which S&P is operating may be more compatible with honeybee production while at the same time maintaining the natural forest than it is with introducing new crops that are not always suited to the area.

In sum, it is possible to argue that compatibility of the large-scale agricultural investments with the local/social and the natural contexts will enhance the performances of large-scale farms and render positive impacts to the local population as there will be a greater chance for horizontal and vertical integration of the local people with the global food system.

7.3.5 Misconceptions about large-scale land acquisition

The performances of the large-scale farms and their impacts on the local people are affected by misconceptions held by activists, investors and hosting governments. First, there is a widely-held misconception that all large-scale land acquisitions violate country laws and are 'land grabs' The proponents of this view are dubious about the positive contributions of large-scale land acquisitions, and thus campaign to stop it. Such campaigns have slowed down the development of large-scale farming in Ethiopia. Zoomers and Kaag (2014) discussed also this misconception.

Second, the Ethiopian government argues that those lands allocated for investment are insufficiently productive and so allocation of such lands for large-scale investment facilitates the agricultural modernization process. This is a false premise. The government is also under the misconception that livelihoods based on mobility and agro-pastoralism are unsustainable (Schoneveld 2013) and it vowed to change this by promoting large-scale plantation monoculture. The traditional way of life in the lowlands is, however, not necessarily 'unsustainable' and could become a sustainable way of life in its own right if appropriate government support, similar to the level of support provided to smallholder farmers in the highlands, is given. Further, land for biofuel feedstock production is allocated based on the misconception that biofuel crops need barren or less productive lands while the practice under the Ethiopian context (e.g. S&P Farm) showed that the best lands that can be used to produce foods. These misconceptions are used to

promote large-scale farming but had a negative impact on the food security and income levels of the local population.

Third, there is a widely held misconception by investors who assume that arable lands in the Ethiopian lowlands (Gambella and Benshanguel) are fertile and do not require extra farming inputs. The management of the farms I studied are not guided by appropriate soil testing, due to a misconception that macro- and micro-nutrients are adequate. This has undermined their productivity and overall performances. Some of the misconceptions about large-scale land acquisitions are also documented by Vhugen (2010).

In general, large-scale farms in Ethiopia have contributed little to fulfilling development expectations. This is partly because of misconceptions and unrealistic assumptions about the potential contributions of large-scale farming. For example: (i) there is unlikely to be any technology spillover from large-scale, mono-crop and mechanized farming to local people who cultivate crops under a system of shifting cultivation using hand and hoe, and who predominantly practice agro-pastoralism; (ii) it is a misconception to anticipate massive employment opportunities from large-scale capital-intensive mechanized farms. Experiences of foreign-owned, large-scale farms in South Africa indicate that such farms generate few jobs as they are highly capital intensive (Econenergy 2008); (iii) the expectation that large-scale farms will invest in social and physical infrastructure construction is unrealistic when there is no binding contractual agreement between the AILAA and the investor in this regard and given that investments are largely set-up for business motives; and (iv) it is unrealistic to assume that foreign investors have an enormous capital capacity and can easily develop the huge parcels of land that have been transferred to them. It is also unrealistic to expect them to be able to generate instant foreign currency, raw materials and revenue. Therefore, unrealistic and too high expectations about large-scale farming, along with misconceptions and a poor understanding of the obstacles to production in these regions have brought about poor performance by the farms and widened the gap between earlier expectations and ground results, and resulted in poor outcomes.

7.4 Conclusion

The findings of this study divulged that large-scale mechanized farming generally undermined local level food security and incomes, generated little employment opportunities for the local population, deteriorated the local environment, especially in terms of vegetation cover and soil quality, and contributed little to local economic development such as infrastructure construction, technology transfer, and generating fiscal revenue and foreign currency. It is therefore important to be critical at this point that the approach of large-scale mechanized farming contributes little to the economic and agricultural transformation of Ethiopia.

One of the contributions of this study is its effort to critically examine and extend the win-win argument advocated in the 'land grab' literature. While the argument that large-scale investment in agriculture will result in a win-win solution for both investing and hosting countries is theoretically attractive, there are practical shortfalls in the context of Ethiopia. The argument is based on the assumption that large tracts of idle land are available globally and that these can be used for agricultural investment and offer potential to recipient countries.

First, the notion of 'available land' is problematic. The identification of available or marginally productive land for large-scale investment is carried out in Ethiopia using remote sensing mechanisms without sufficient ground truthing. The livelihood system of the population in the lowland parts (e.g. Gambella and Benshanguel Gumuz) of Ethiopia are based on shifting cultivation and agro-pastoralism. These types of livelihood systems are not captured by remote sensing mechanisms unless the GIS maps are checked on the ground through detailed surveys. Abbink (2011) and Nalepa and Bauer (2012) also argued that pastoralists and agro-pastoralists, whose livelihoods are based on mobility and shifting cultivation, can be easily divested of their livelihood resources when land for investment is simply identified through remote sensing. The unused land narrative also refers to lands occupied by pastoralists that are assumed to be insufficiently productive but not necessarily 'empty' (Galaty 2012; Lavers 2012b) and which may have cultural and ecological significance or form part of pastoralists' seasonal herding system (Borras & Franco 2012). This holds true in all the case studies examined in this study. It also refers to land that crosses National Park boundaries or that supports the livelihood of nomadic pastoralists or semi-nomadic people (Nalepa 2013). For example, the land allocated to

Karuturi in Gambella partly overlaps with the Gambella National Park, which has never been gazetted. It can also include land that provides local people with a side-line economic activity, such as collecting honey, wood or other forest products (Abbink 2011), as in the case of the Gumuz and the Anuak in Benshanguel Gumuz and Gambella regional states, respectively.

Second, the Ethiopian government argues that livelihood systems based on extensive livestock production systems are unsustainable and insufficiently productive and therefore can be expropriated for large-scale agricultural investment with little socio-economic trade-off. The lands identified by the AILAA thus included lands that are not necessarily unused, but which are purported to be marginally productive. While efficiency could be enhanced by increasing the productivity of insufficiently productive lands, the outcomes from the transfer of these lands to large-scale agricultural investment in Ethiopia has proved counterproductive. For instance, the investment projects that replaced the mixed crop-livestock system of the local people in Bako Tibe District resulted in a loss-loss-win situation for the local economy. The value of agricultural production (crop and livestock production added together) generated when the land was farmed locally excelled that of the large-scale farm at the district level. By the same token, the income and food security status of local people declined after they had lost access to the land they had used through customary tenure regimes. The land transfer put the local people and the district economy under a loss-loss situation, but enabled the company to make financial gains, resulting in a loss-loss-win scenario. In Gambella, a similar trend is observed, especially in the Basen and Karuturi-Anuak cases.

The findings from this study proved that the win-win scenario didn't happen under the Ethiopian context. I, therefore, argue that the approach of large-scale mechanized farming failed to transform the agricultural sector of the country and to bring the needed economic gains for the local population. In support of this, Borras *et al*. (2013, p. 169) called the win-win argument a ‘regulate to facilitate land deals’ position, frequently held by mainstream economists. De Schutter (2011, p. 250) also argues that although inward investment may be well managed, it has ‘high opportunity cost and less poverty-reducing impact’ compared with situations where the land is put to an alternative use by the local farming community. He has argued that the World Bank’s PRAI are simply instruments to ‘destroy the peasantry responsibly’ and he has suggested

promoting smallholder-focused agriculture that has pro-poor and poverty-reducing effects. He is supported by activist groups who warn that the development model of large-scale plantation agriculture displaces local people from their land, degrades the environment and undermines local food security (Via Campesina 2008; Mersha 2009; McLure 2009; Rice 2009; Fitzgerald 2010; Grojnowski 2010; Mihretie 2010). Their advice is to 'stop and rollback land grabbing' (Borras *et al.* 2013, p. 169). The analyses carried out based on two different land-uses demonstrate that the local economy in general and the food security and income levels of the local people in particular deteriorated when the land is used for large-scale farming, implying the failure of large-scale farming in terms of contributing to local economic development. Therefore, although land in Ethiopia is legally owned by the government, and farmers and pastoralists with customary land ownership right has no legal right and they can be expropriated anytime, it is imperative to take into account livelihood activities of the local people that are based on customary land-ownership before deciding to transfer land for investment.

The emerging literature contends that the type of business model adopted by large-scale farms determines the impact of large-scale farms on the local economy and the environment. Although all the four case studies selected as the object of this study adopted large-scale plantation monoculture as their business model, a cursory review of other forms of business models is useful for shedding light on future research activities. Smalley (2013) argued that contract farming, out-grower schemes and commercial farming increases the vertical and horizontal linkages of the large-scale farms with local farmers. While the experiences of out-growers scheme adopted by Ethiopia's state-run sugar estate showed negative outcomes (Wendimu *et al*. 2015), positive impacts were recorded in the case of Tanzania's out-grower scheme (Smalley *et al*. 2014). In this respect, more research may be needed to examine the impact of other business models in the Ethiopian context. In all the four cases examined, the integration of local people with the large-scale farms is effectively absent due to the type of business model adopted by the farms. Indeed, it rather aggravated conflicts. As already discussed in Chapter 3, for instance, conflicts between Karuturi at Bako and the local people have been common.

7.4.1 Implications for Ethiopia's political economy

Large-scale farms in Ethiopia are intentionally set up in lowland areas where (agro-) pastoralism and shifting cultivation are prevalent. The government believes that these ways of life are

‘unsustainable’ and ‘backward’ and need transforming. Evidence from this study suggests that large-scale farms have contributed little to fulfilling rural development objectives in these regions.

Further, it is argued here that the approach of leasing out farmland for large-scale agricultural investment is risky and that diligent verification of current land-use patterns by local communities should be undertaken. The results of this study can be taken as a prime example of the failure of the classic top-down and non-participatory development approach that has failed to appreciate the local situation. The ‘farmer-first’ development paradigm emerged as a critique of such a top-down agricultural development approach and the findings of this study echo the need to engage with local stakeholders before deciding to transfer land to large-scale investment projects. It is therefore important to thoroughly evaluate local people’s previous land-use patterns and the Ethiopian government should recognize the de facto customary property rights of the local population.

It is also fair to reiterate the background discussion in Chapter 2 and weld it to the findings from the case studies. Ethiopia pursued a federal system and federated states are constitutionally empowered to determine their own development path since its adoption in 1994. The incumbent government argues that the system of federation, based on ethno-lingual lines, appreciates local realities and narrows the development gap prevailed between the centre and the periphery during previous periods of government. The government argues that the country had a centralized political economy in the past, and the lowland areas (the periphery) were not able to decide on their own state of affairs or, more importantly, their development agenda. It is argued, therefore, that the federal system changes this long-standing status quo and delivers equitable development amongst federated states. Contrary to the promises of the Constitution, land-based resources have been centrally managed by the federal government, through the AILAA, since 2008. A key informant who used to work as a senior land administration expert in Amhara Regional State, whom I met during the annual World Bank conference on ‘*Land and Poverty*’, held from 8–13 April 2013 in Washington D.C., mentioned that the AILAA is less capable of the administration of land for large-scale farming compared to, for instance, the Amhara region. But, the federal government instituted the AILAA to administer land for large-scale farming under the

justification that the federated states had poor capacity to administer land for such ends. The aforementioned expert alleged that the transfer of the mandate to administer land from regional states to the AILAA is a breach of the Constitutional rights of the federated states and a centralization of power.

In support of his claim, one can look at the AILAA directives that prioritize the allocation of land for strategic crops (e.g. cotton, sugar cane, palm oil) that have national economic significance (MoARD 2010a), rather than regional or local significance. The preview of the case studies is also in line with the strategy, which does not necessarily benefit the local population or the local economy. For example, Basen's investment (cotton cultivation) makes an important contribution to the national rather than to the regional development in terms of providing raw material for the textile factories that have relied heavily on imported lint cotton. It is therefore possible to argue that the political economy of today's Ethiopia is also based on the expropriation of local resources for the benefit of national goals, as was the case during past government regimes. Therefore, the Ethiopian government should live up to the statements presented in the Constitution as related to providing regional states the autonomy to decide on their own development agenda through the allocation of lands for different investment projects.

7.4.2 Implications for the governance of large-scale farming in Ethiopia

Land governance generally deals with "the rules, processes and structures through which decisions are made about access to land and its use, the manner in which the decisions are implemented and enforced, the way that competing interests in land are managed" (Palmer *et al*. 2009, p.9). This definition includes relevant institutions and statutory and informal actors, such as state, civil society and private sectors that are responsible for the governance of land.

The decision to transfer land for large-scale farming in Ethiopia is largely centralized and top-down and it ignores traditional systems of land governance and undermines competing interests over land. Active engagement of the local people in the identification of land for large-scale farming and in the process of land transfer is rarely done in the Ethiopian context. Further, there are weak linkages among the different tiers of government that determine access to land for large-scale farming and its use. The government's capacity to enforce land-deal contracts is also

weak. The AILAA has been shown to have limited capacity when it comes to the administration of large-scale farms, as is evident from the weak monitoring of large-scale farms and the lack of enforcement of different articles in the land-deal contracts.

The gaps observed in the governance of land for large-scale farming highlights the need for Ethiopia to take into account the following issues in its system of land governance. First, a one-size fits all type of tenure regime will not work for a country like Ethiopia, which has a diversity of culture, identity and systems of livelihood. The statutory land tenure regime that provides for compensation when local people are expropriated from their lands for large-scale farming and/or other public ends only works in those regions in the country where land certification is provided. This land-tenure regime seldom takes into account the situation of those lowland regions of Gambella and Benshanguel Gumuz or those highland areas where land is managed communally without legal title deeds. This suggests revisiting the land policy and recognizing other forms of tenure regimes in the country before deciding to transfer land for large-scale farming.

Second, the government should engage different actors (local people, civil society, etc.) in the process of land identification for large-scale farming and in managing conflicts at times of competing claims over land, rather than simply adopting largely top-down, coercive mechanisms.

Third, as evidenced to date, there has been poor monitoring of the performances of large-scale farms and enforcement of land-deal contracts, a lack of clear demarcation of lands identified for large-scale investments that are under the mandate of the regional governments and the AILAA, which has resulted in the double-transfer of parcels to different investors, and poor land-use planning that has often resulted in poor performances by large-scale farms. The government should, therefore, strengthen the linkages among government structures (e.g. regional, zonal and district land administration organs, regional, zonal and district agricultural bureau, AILAA, etc.) and improve the capacity of the AILAA, which are responsible to decide on access to land and land uses, to monitor performances of investment companies and to enforce contracts, and to provide the necessary support to investors that are engaged in large-scale farming.

Finally, the government should make a careful and close examination of the investors' financial and technical capacity before handing over land for large-scale farming and there should be a proper negotiation that include aspects of corporate social responsibility that can fulfil the expectations of the Ethiopian government.

7.4.3 Reflection on what Investors and Local Governments in Ethiopia should do

Investment in agriculture could yield sustainable profit for investors when there is healthy and friendly engagement of the investor with the local population and the local governments. As has happened in Ethiopia, however, investors acquire farmland from the federal government and implement their projects without meaningful engagement with the local population and the local government. This is reflected in all of the case studies of this dissertation through different levels of conflicts between the local population and the investors. Conflicts negatively harm the sustainable operation of the investments and undermine positive gains from the projects. The benefits of the Principles for Responsible Investment in Agriculture and Food Systems (Committee on World Food Security (CFS) 2014) in terms of reducing the harms to the local population and the environment are clear, despite the fact that its adoption is left for the willingness of different stakeholder including business enterprises. For a sustainable financial gains, investors should take into account these principles when doing farming business in communities whose food security situation can be easily disrupted due to their operations. On the other hand, the local and regional governments in Ethiopia are simply serving as a conduit of decisions made by the federal government when it comes to land identification and allocation for large-scale farming, which is against their constitutional rights. They have very little leverage and sometimes little information about the investment activities happening in the local communities. They should therefore increase their stake in local level development by closely following up the investment activities implemented in the local communities, and should engage with the federal government so as to be part of the decisions that affect their communities.

7.4.4 Implications for the Land Acquisition Debate

Countries in SSA are similar in their level of economic development (e.g. level of infrastructure development, poverty levels, weak land governance schemes, poor quality of human capital, diverse and challenging agroecologies, etc.) that determine outcomes of large-scale farms. The results of this study could therefore have a broader significance for the 'land grab' literature

outside Ethiopia. In this regard, it can be argued that large-scale mechanized farming may generate very little positive outcomes to countries in SSA in terms of transforming the structures of their agricultural sector and overall economy.

The debate on large-scale land acquisition seems to view all countries in the developing South in the same way and it ignores differences in local realities/contexts, specific country laws and regulations and development expectations held by different stakeholders. In some cases, the transfer of land for large-scale farming is done by governments using the national legal machinery (e.g. in Ethiopia), and in other countries access to land is determined by local chiefs/kingdoms (e.g. in Kusawgu of Northern Ghana a biofuel company acquired land from a local chief) or by the market (e.g. in Zimbabwe and Uganda). The land acquisition process in the different countries in the South thus requires a piecemeal approach that takes into account both the actors that are responsible for land transfer and specific country laws. Land acquisition for large-scale farming may not be necessarily bad unless supported by empirical findings. As in this study, researchers dealing with impacts studies of large-scale farms should employ standard impact analysis methodologies, which will provide them the leverage to influence policymakers based on facts on the ground.

In Ethiopia, launching continuous policy dialogue and debate with the government using the empirical findings from this study is important. The debate on large-scale land acquisition in Ethiopia should circulate around changing the country's land-tenure system, which currently ignores diverse land tenure regimes in the country. For centuries, the local population in the lowland regions of the country – such as Afar, Gambella, Benshanguel Gumuz, Somalia and parts of Oromia – has believed that land belongs to them despite the Constitutional claim that all lands belong to the state. Ignoring century-held land ownership claims of the local people and abruptly expropriating land resources to large-scale farming using state laws and regulations is problematic.

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Annexes

Annex 1.1: Distribution of household population in Bako Tibe district, Oromia regional state

Name of Kebele	Household population (N_i)	Category	Sample size (n_i)
Baca Ode Walde	931	Affected	142
Oda Gibe	531	Non-affected in 2012 but affected in 2014	75
Tirkafeta Gibe	592	Non-affected	83
Oda Korma	411	Non-affected	0
Amarti Gibe	852	Non-affected	0
	3317		300

Source: Bako Tibe District Agricultural and Rural Development Office, 2011

Annex 1.2: Distribution of settlers household population in Abobo District, Gambella regional state

Village name	Household population (N_i)	Category	Sample size (n_i)
Mender 7	198	Affected	23
Mender 8/9	423	Affected	49
Mender 11/12	233	Not-affected[70]	0
Mender 13	245	Affected	28
Mender 14	217	Not-affected	65
Mender 17	203	Not-affected	60
Total	**1519**		**225**

Source: Abobo District Agriculture Office, 2013

[70] Mender 11/12 though not affected by Basen farm, there is another domestic farm operating near to it which might bring a biased estimate of impact. Hence, excluded as target population for the data collection

Annex 1.3: Matching algorisms

1. The Nearest Neighbour Matching (NN): the NN picks each treated unit and searches for its match in the control group with its closest propensity scores. This could be done with replacement or without replacement; in the former case, a single control unit could be used several times the closest match to the treated unit. In this study, NN without replacement is applied. The Average Treatment Effect on the Treated (ATT) is then computed as the average outcome difference between all treated and control units that are matched based on their propensity scores. In the case of NN, all treated units will get matches from the control units. But in effect, however, some of the nearest neighbour in the control units might have propensity scores different from the propensity scores of the treated units.

2. Radius Matching (RM): the RM overcomes the drawbacks of NN by specifying the propensity score of nearest neighbour within some radius limits. In the RM each treated unit is matched to the control unit whose propensity score falls within a predefined radius limit. If the radius is set too small, the criteria would be very stringent and some treated units might not get matches from the control units though the quality of the match is high. If the radius is set too big, the ATT would be a biased estimate. The default radius is 0.01 unit.

3. Kernel Matching (KM): in KM, all treated units are matched with a weighted average of the propensity scores of all units from the control category with weights that are inversely proportional to the distance between the propensity scores of treated and control units.

4. Stratification Matching (SS): it divides the propensity scores in an interval and matches treated and control units that have propensity scores falling in that interval. Then the ATT is calculated as the difference between the average outcomes of the treated and the controls falling in that propensity interval. One of the shortcomings of SS is it discards observations in the blocks either of the treated or control units are missing. In effect, it might underestimate the ATT. For details of the different matching algorisms, see Becker and Ichino (2002), Heinrich *et al*. (2010) and Khandker *et al*. (2010).

Annex 3.1: Land Lease Tariff in Ethiopia

Distance of the land from Gedarfi port (Km)	**Land rent value (ETB/ha)**
Starting point	880.42
100	805.42
150	767.92
200	730.42
250	692.92
300	655.42
350	617.92
400	580.42
450	542.92
500	505.42
504	502.42

Source: MoARD (2010)

Annex 3.2: Lists of duty free imports by Karuturi Agro-products PLC (Oromia and Gambella farms)

Reference #	Date	Bill of Loading	Type of import	Quantity
KAP/436/11	11/MAY/11	2300907	ECW-150/260-BG,200X150 SIZE, 1450 rpm COUPLED WITH 30 KVA AL DIESEL ENGIEN, 50 Hz	23
			PROMOTIANAL ITEM - ORGANIZER	25
		2300929	ECM-300/320-BG, 300X300 SIZE,1450rpm, coupled with 62.5 kva AL DIESEL ENGIEN, 50Hz and accessories	10
			ECM-200/320-BG,250X200 SIZE,1450rpm, coupled with 62.5 kva AL diesel engien,50Hz and accessories	22
			ECW -150/260-BG,200X150 SIZE,1450 rpm coupled with 30 kva AL diesel engine ,50Hz and accessories	25
KAP/511/11	03/JUNE/11	08/KGL/11-12	Silencer &connecting pipe for 30kva &62.5kva ashok leyland engine (CRI PUMPS)	80
			Nuts, bolts &washer	55kg
			Packing kit	160
		04/KGL/11-12	LDPE NURSERY BAGS 6 inches (15cms)x 9 inches (23cm) with 300 gauge	2000kg
			LDPE nursery bags 15 inches (38cm) x 18 inches(26cm) with 600 gauge	16000kg
KAP/432/11	28/MAY/11	SHORTAGE 1	PLNTR CNTRL OUTPUT MODULE (POM)	1
			DJ SWITCH SPDT W/WISKER & WIRE	1
			DJ HALL EFFECT SPEED SENSOR CP	1
			NUT HEX JAM 3/4-10 PLT	2
			HOSE 1 ID 200PSI EPDM	12
			CLAMP WRM DRV 16 SS(68-1.5)	8
			25 S BULK FILL COVER SUB ASY	1
			HH3/8R2 360 9/16F JIC 3/4 MORB	2
			CABLE TIE 19X7.25 1.75D 50 LD	300
			CABLE TIE 19X14.25 3DIA 50 LD	100
			SNAP RING 875	25
			LUXURY Swiss cottage tent	6
			Executive safari tent	4
			Army troop tent supervision	4
			Toilet cum bathroom tent	6
			Dining tent	2
			Kitchen tent	1

KAP/321/11	28/APR/11	40/KGL/10-11	Bath tray	6
			LUXURY Swiss cottage tent	4
			Executive safari tent	2
			Army troop tent supervision	2
			Army troop tent supervision	2
KAP/402/11	14/MAY/11	11-12/EX-3019	PVC 3 core flat cable submersible cables(3cx 10 sQMM)	5000
			PVC 4 core flat cable submersible cables(4c x 25 Sqmm,4c x 50 SQ MM, 4C X 70 SQ MM)	5907
KAP/401/11	14/MAY/11	46/KGL/10-11	Wheel loader's model types LG956L	5
			40" HC containers(soc)	5
KAP/404/11	23/MAY/11	GP11153-63	2 S yeild pro planter 31- row	11
KAP/400/11	11/MAY/11	D357977	608C STALKMASTER 8 row chopping corn head	2
			75cm row spacing	2
			temporary surface rust/corrosion protection	2
		D357982	630R -30 FT. rigid cutting platform	2
			Auger with hard faced fliting and full width steel fingers	2
			poly tine pickup real	2
			temporary surface rust/corrosion protection	2
		D357973	608C stalkmaster 8 row chopping corn head	2
			75 cm row spacing	2
			temporary surface rust/corrosion protection	2
		D358215	630R -30 FT.rigid cutting platform	2
			Auger with hard faced fliting and full width steel fingers	2
			poly tine pickup real	2
			temporary surface rust/corrosion protection	2
		D357984	630R -30 FT.rigid cutting platform	2
			Auger with hard faced fliting and full width steel fingers	2
			poly tine pickup real	2
			Temporary surface rust/corrosion protection	2
		D357961-80	608C stalkmaster 8 row chopping corn head	4
			75 cm row spacing	4
			Temporary surface rust/corrosion protection	2

			608C stalkmaster 8 row chopping corn head	2
		D358929	630R -30 FT.rigid cutting platform	2
			Auger with hard faced fliting and full width steel fingers	2
			poly tine pickup real	2
			temporary surface rust/corrosion protection	2
KAP/388/11	11/MAY/11	D357447	4930 SELF PROPELLED SPRAYER(modal year 2011)	1
			380/105R50 IN 168AB R1 OR R1W RADIAL	1
			2X1.1/2 IN STANDARED FLOW SOLUTION PUMP	1
			CHEMICAL EDUCTOR	1
			120FT BOOM HIGH FLOW 1 IN STAINLESS STEEL PIPE 15 IN ON CENTER NOZZEL	1
			LESS BOOM TRAC	1
			LOAD COMMAND READY	1
			LESS FOAM MARKER	1
			COMMON VIEW CAB GREEN STAR AUTO TRAC READY WITH PLUG AND PLAY INCLUADING FACTORY	1
			WHEEL SLIP CONTEROL	1
			UNDERFRAME SHIELD -MACHINES WITH OUT LOAD COMMAND	1
			FIELD VISION XENON HID LIGHTING PACKEGA	1
			AFRIC INCLUDES TEXT FREE DECALS AND ENGLISH OPRETER MANUAL .LESS RADIO	1
			HI FLOW POLY ,20 SPRAY NOZZLE KIT	1
			LOW DRIFT GUALDIAL AIR POLY NOZZLE KIT	1
KAP/375/11	10/MAY/11	110304	620/70 X42 INNER TUBE	1
KAP/375/11	11/MAY/11	10/KGL/10-11	VOLVO CREWLER EXCAVATER MODEL EC210 B	10
			710/ 70 X 42 INNER TUBE	1
			12.5 L -15 TUBE	1
KAP/138/11	09/MAY/11	09/KGL/11-12	VOLVO & BEML SPERA PART	0
KAP/324/11	28/APR/11	D357213	4930 SELF-PROPELLED SPRAYER(modal year 2011)	2
KAP/299/11	27/APR/11	A0141201	YAHAMA MOTORCYCLES	8

KAP/328/11	03/MAY/11	37/A/KGL/10-11	TRACTORS SPARE PART(TOP LIK (13)AND SIDE LINK LH(3))	16
			PLANTER SPARE PART	25
KAP/321/11	28/APR/11	43/KGL/10-11	ASHOK LEYLAND ELECTRIC GENERATING SET	12
KAP/265/11	11 APRI /11	44/KGL/10-11	VOLVO CRAWLER EXCAVATER MODEL EC210 B	7
		39/KGL/10-11	WHEEL LOADER'S	10
			40" HC CONTAINERS	10
		EXP-482-I	ROPS CABIN,MULTI SHANK RIPPER AND HYDROLIC TANK FOR BEML BD65 BULLDOZER	5
		EXP-482-II	BD65 BULLDOZER FITTED WITH BEML ENGINE MODAL BS 125-1 DIESEL ENGINE HAVING HP OF 180@1859 RPM FITTED ANGLE BLADE WITH ROPS CABIN AND MULTI SHANK RIPPER	5
		EXP-482-III	BD65 BULLDOZER FITTED WITH BEML ENGINE MODAL BS 125-1 DIESEL ENGINE HAVING HP OF 180@1859 RPM FITTED ANGLE BLADE WITH ROPS CABIN AND MULTI SHANK RIPPER	5
KAP/111/04/11	4 /APR/11	GP11164-167	2 S yeild pri planter 31- row	4
KAP/215/11	29/MAR/11	ETH11-008	9770 STS RICE COMBINE	8
KAP/125/11	07/MAR/11	36/KGL/10-11	TRACTOR SPARE PART, RAJDOOT SPARES &JCB HOSEPIPES	586
KAP/231/10	15/JAN/2011	EXP-482	BD65 BULLDOZER FITTED WITH BEML ENGINE MODAL BS 125-1 DIESEL ENGINE HAVING HP OF 180@1859 RPM FITTED ANGLE BLADE EXCLUDING ROPS CABIN AND MULTI SHANK RIPPER	5
EM/932/10	14/DEC/11	32/KGL/10-11	VOLVO CRAWLER EXCAVATOR MODEL EC210 B	8
		PL100299	TOYOTA HILUX PICK UP D/CABIN,4WD	5
KAP/657/10	03/NOV/10	131549	4-710 X42 WHEELS AND TYRES	1
			4-380 X34 WHEELS AND TYRES	1
			8-710 X42 WHEELS AND TYRES	1
KAP/657/10	03/NOV/10	18/KGL/10-11	TRACTOR MOUNTED SPREYERS(HTT 50)	20
KAP/F12+F129/11	4/FEB/2011	GP10088	VERTIY TILL 4-SHANK	2
		GP10089	VERTIY TILL 4-SHANK	1
			DITCHER 55 SERIES	7
			VT4360 REPAIR PART KIT	5
Kap/406/11	23/May/2011	03/KGL/11-12	RAJDOOT DIESEL ENGINE PUMP SPARES AND RAJDOOT DIESEL GENERATER SPARES	2340

			5 ROW RIDGE PLANTER FOR MAIZE SOWING ROW TO ROW SPACE 24"	12
			5 ROW RIDGE PLANTER FOR MAIZE SOWING ROW TO ROW SPACE 24"	12
kap/521/10	03/Oct/10	D339651	17'6" MULCH RIPPER	15
		D325450	9430 425TRACTOR RILL	5
			9530 475HP TRACTOR RIL	10
KAP/233/10	8/MAR/10	77/kgl/09-10	6-ROW MAIZE PLANTER	16
KAP/235/10	31/MAR/10	81/KGL/09-10	FOUR DISC PLOUGH	25
		80/KGL/09-10	TRACTOR MOUNTED SPRAYER	5
KAP/277/10	03/MAR/10	B325450	9430 425HP TRACTOR RILL	5
			9530 475HP TRACTOR RIL	10
KJO/6438/1469/02	26/05/2002EC	SPI/EXP/103/09-10	RIGID PVC PIPES /FITTING	0
KAP/198/06/11	20/JUNE/11	962 E 006	113HM011027 HYDROLIC PUMP	1
ET/VH /00106/2011	AUG 1/2011	UT/VHP/INV/004 11-12	TOYOTA PICKUP	1

Data source: AILA

Annex 3.3: Lists of duty free imports by S & P Energy Solution

Reference #	Date	Bill of Loading	Type of import	Quantity
SPES/MOARD-377	13/JUNE/11	113396 AND 113398	SPREYR UG 3000 UNBREAKED	2
SPES/MOARD-333	09/MAY/11	6.2E+09	TRACTOR	2
SPES/MOARD-334	09/MAY/11	2011-066	DISC HARROW MODEL VSL 200-810/26	1
SPES/MOA-269	12/APR/11	6.2E+09	TRACTOR MODAL "XERION 3800 TRAC"-TYPE 781-250	2
SPES/MOA-269	12/APRI/11	F0039/11	TATA LPT1618TC/52 LHD LOAD BODY	1
SPES/MOARD-264	07/APRI/11	2061	DIGITAL SOIL PH METER MODEL ;- PH -220 S	1
			DIGITAL SOILMOISTURE METER MODEL ;- PMS -714	1
			DIGITAL ELECTRONIC WEATHER STATION MODEL;-WS-2800-IT	1
			ANALOGE SOIL PH /MOISTURE METER ZD-06-SAMPLE	1
SPES/MOA-266	11/APRI/11	533437	MOTOR CHAINSAWS AND SPERE PARTS	
SPES/IBA-153	08/FEB/11	PM/179/C/10	CATAPILLAR MODAL D8R TRACK TYPE TRACTOR 0F 305 HP	2
2837	13/MAY/10	Not available	TOYOTA LANDCROSUR	1
			TOYOTA PICKUP HILUX	1
SPES/MOARD-383	15/JUN/11	2205011	ROTERY CALTIVARE MODEL-KG 6000-2	1
			AIR PLANTER MODEL;ED 602-K	3
			AIR PLANTER MODEL;ED 302	2
			FERTILIZER SPREADER MODEL-ZA-M 2201	2

Source: AILAA (2012)

Annex 4.1: Determinants of wage in plantation agriculture (Interaction between schooling and experience, and experience squared included as variables)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.939[a]	.882	.877	.25239

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	118.685	10	11.868	186.320	.000[a]
	Residual	15.861	249	.064		
	Total	134.546	259			

a. Predictors: (Constant), Experience_Squared, Type of crop, Education level, Type of work, Sex of the employee, Age of the employee, Origin, Location of the farm, Schooling_Experience, Years of experience

b. Dependent Variable: lnWage_Day

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.463	.090		27.436	.000		
	Sex of the employee	.084	.037	.054	2.296	.023	.841	1.190
	Education level	.022	.005	.105	4.075	.000	.711	1.407
	Origin	-.125	.063	-.086	-1.996	.047	.252	3.962
	Type of work	.170	.041	.100	4.175	.000	.824	1.214
	Location of the farm	1.071	.064	.721	16.673	.000	.253	3.952
	Age of the employee	.001	.002	.013	.487	.627	.669	1.496
	Type of crop	.155	.055	.085	2.834	.005	.524	1.908
	Schooling_Experience	4.699E-5	.002	.002	.028	.978	.152	6.559
	Years of experience	.026	.018	.119	1.430	.154	.069	14.556
	Experience_Squared	.001	.001	.065	.978	.329	.108	9.299

a. Dependent Variable: lnWage_Day

Annex 5.1: Food basket that gives 2200 kcal per adult equivalent per day for cereal-based farming rural areas of Ethiopia

No	Food item	Quantity
A	***Cereals (in Kg)***	
A.1	Teff	1.63
A.2	Barley	4.24
A.3	Maize	3.82
A.4	Millet	4.53
B	***Pulses (in Kg)***	
B.1	Lentils	0.35
B.2	Horse beans	1.84
B.3	Cow Peas/Grass Pea	0.35
B.4	Chick peas	0.71
B.5	Shiro	0.92
C.	***Vegetables (in Kg)***	
C.1	Gomen	0.21
C.2	Onion	0.35
D.	***Root Crops (in Kg)***	
D.1	Potato	0.14
E.	***Other Food Items***	
E.1	Milk (lt)	0.49
E.2	Coffee (Kg)	0.57
E.3	Sugar (Kg)	0.14
E.4	Salt (Kg)	1.20
E.5	Cooking Oil (lt)	0.28
E.6	Berbere (Kg)	0.85
E.7	Bread (Kg)	0.14

Source: Adapted from S. Dercon and M. Tadesse (1999, p.89)

Annex 5.2: Nutrition based adult equivalent conversion factors

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

Source: Dercon, S and P, Krishnan (1998, p.40)

Annex 5.3: Food security coping strategies adopted by households in Bako Tibe district, Oromia regional state

Coping strategy	Weight for severity score[71]					Average Weight	Severity level
	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5		
Eating cheap but less preferred food	1	1	1	1	1	1.0	Least severe
Limit meal portion	2	2	2	2	2	2.0	Moderate
Buy food on credit	2	3	1	3	2	2.2	Moderate
Decrease meal frequency	2	2	3	2	2	2.2	Moderate
Send children to eat with relatives	3	2	4	3	2	2.8	Severe
Borrow food	3	3	4	2	2	2.8	Severe
Consume seeds	3	4	3	3	2	3.0	Severe
Skip eating whole day	4	4	4	3	4	3.8	Most severe

Source: FGD conducted in Bako Tibe district on 03, 04 and 06 April 2012

[71] **Note**: Severity score is measured as follows: 4=Most severe 3=Severe 2=Moderate; and 1=Least severe

Annex 5.4: Mean weighted CSI score adopted by affected and non-affect households before (2012) and after (2014) Karuturi's intervention, Bako Tibe district, Oromia regional state

	Weighted mean CSI score for affected households (n=75)			**Weighted mean CSI score for non-affected households (n=83)**		
Coping strategy	Before (2012)	After (2014)	% change	Before (2012)	After (2014)	Change
Eating cheap but less preferred food	0.04	0.08	50.0%	0.03	0.035	14.3%
Limit meal portion	0.03	0.16	81.2%	0.04	0.042	4.8%
Buy food on credit	0.02	0.22	90.9%	0.03	0.032	6.3%
Decrease meal frequency	0.01	0.16	93.8%	0.02	0.021	4.8%
Send children to eat with relatives	0.02	0.32	93.8%	0.01	0.01	0%
Borrow food	0.02	0.33	93.9%	0.02	0.02	0%
Consume seeds	0.01	0.27	96.3%	0.01	0.01	0%
Skip eating the whole day	0.01	0.27	96.3%	0.01	0.01	0%
Overall weighted mean CSI score	**0.16**	**1.81**	**91.2%**	**0.17**	**0.18**	**5.6%**

Source: Household survey, 2012 and 2014

Annex 5.5: Food security coping strategies adopted by the settlers and their severity weights in Abobo district, Gambella regional state

Coping behavior/strategies	Weight for severity scores					Average weight	Severity level
	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5		
Reducing meal portion	1	1	1	1	1	1	Least severe
Requesting emergency food aid	3	3	3	3	3	3	Severe
Reducing portion and frequency of meal	3	3	2	3	3	2.8	Severe
Borrowing food from neighbors/relatives	2	2	3	2	2	2.2	Moderate
Skip eating the whole day	4	4	4	4	4	4	Most severe
Hunting and eating game meat	1	1	1	1	1	1	Least severe
Consuming seed stock	4	4	4	4	4	4	Most severe

Source: FGD conducted in Abobo district on February 8, 2013

Annex 5.6: Mean weighted CSI score adopted by affected and non-affected households in Abobo district, Gambella regional state

Coping behavior	Weighted mean CSI score	
	Affected households	Non-affected households
Reducing meal portion	0.22	0.76
Requesting emergency food aid	0.86	0.25
Borrowing food from neighbors/relatives	0.70	0.35
Reducing portion and frequency of meal	1.00	0.30
Skip eating the whole day	0.60	0.11
Hunting and eating game meat	0.50	0.40
Consuming seed stock	0.32	0.01
Weighted overall mean CSI score	4.20	2.18

Source: Household survey data, 2013

Annex 5.7: Food security coping strategies adopted by the Anuak and their severity weights in Ilia village, Gambella regional state

Coping behavior/strategies	Weight for severity scores					Average Weight	Severity level
	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5		
Reducing portion of the meal	2	2	2	2	2	2	Moderate
Reducing portion and frequency of meals	3	3	3	3	3	3	Severe
Looking for food aid	1	1	1	1	1	1	Least severe
Eating with or borrowing food from neighbors/families	1	1	1	1	1	1	Least severe
Skip eating	4	4	4	4	4	4	Most severe
Temporary migration to neighboring areas to search foods from the forest	3	3	3	3	3	3	Severe

Source: FGD conducted in Ilia village on March 10, 2013

Annex 5.8: Mean weighted CSI score adopted by affected and non-affected Anuak households in Gambella regional state

Coping behavior/strategies	Weighted mean CSI score for affected households	Weighted mean CSI score for non-affected households
Reducing portion of the meal	0.41	0.70
Reducing portion and frequency of meals	1.12	0.10
Looking for food aid	0.32	0.22
Eating with or borrowing food from neighbors/families	0.50	0.92
Skip eating	0.53	0.15
Temporary migration to neighboring areas to search foods from the forest	1.22	0.01
Weighted overall mean CSI score	4.1	2.1

Source: Household survey, 2013

Annex 5.9: Food security coping strategies adopted by the Nuer and their severity weights in Makuey district, Gambella regional state

Coping behavior	Weight for severity scores					Average Weight	Severity level
	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5		
Reducing portion of the meal	2	2	3	2	2	2.2	Moderate
Reducing frequency and portion of meal	4	3	3	3	3	3.2	Severe
Eating with or borrowing food from neighbors/families	1	1	1	1	1	1	Least severe
Seeking emergency food aid	3	3	3	3	4	3.2	Severe
Skip eating	4	4	4	4	4	4	Most severe
Consuming seed stock put aside for next planting season	3	3	2	3	3	2.8	Severe

Source: FGD conducted in Bildak village on March 29 2013

Annex 5.10: Mean weighted CSI score adopted by affected and non-affected Nuer households in Gambella regional state

Coping behavior	Weighted mean CSI score for affected households	Weighted mean CSI score for non-affected households
Reducing portion of the meal	0.61	0.62
Reducing frequency and portion of meal	0.22	0.11
Eating with or borrowing food from neighbors/families	0.75	0.72
Seeking emergency food aid	0.27	0.25
Skip eating	0.15	0.11
Consuming seed stock put aside for next planting season	0.33	0.31
Weighted overall mean CSI score	2.33	2.12

Source: Survey data, 2013

Annex 5.11: Food insecurity coping strategies adopted by households in Dangur district, Benshanguel Gumuz regional state

Coping strategy	Weight for severity scores					Average weight	Severity level
	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5		
Buy food by borrowing money	1	1	2	1	1	1.2	Least severe
Borrow food and/or eat with neighbors	1	1	2	1	2	1.4	Least severe
Consume seeds stock	2	2	1	2	2	1.8	Moderate
Limit meal portion	2	2	2	3	2	2.2	Moderate
Decrease meal frequency	3	4	3	3	3	3.2	Severe
Skip eating the whole day	4	4	4	4	4	4	Most severe

Source: FGD conducted in Kota village of Dangur district on April 20 2014

Annex 5.12: Mean weighted CSI score adopted by affected and non-affect households before (2010) and after (2014) S & P Company's intervention, Benshanguel Gumuz regional state

Coping strategy	Weighted mean CSI score for affected households			Weighted mean CSI score for non-affected households		
	Before (2010)	After (2014)	Change	Before (2010)	After (2014)	Change
Buy food by borrowing money	0.28	0.29	1%	0.19	0.27	8%
Borrow food and/or eat with neighbors	0.19	0.20	1%	0.19	0.25	6%
Consume seeds stock	0.34	0.35	1%	0.33	0.34	1%
Limit meal portion	0.34	0.41	7%	0.35	0.36	1%
Decrease meal frequency	0.8	0.93	13%	0.85	0.85	0.0%
Skip eating the whole day	0.07	0.09	2%	0.07	0.07	0.0%
Overall weighted mean CSI score	**2.02**	**2.27**	**25%**	**1.98**	**2.14**	**16%**

Source: Household survey, 2010 and 2014

Annex 5.13: Ranking of income and food sources for the Gumuz in Dangur District, Benshanguel Gumuz regional state

Income and food sources	Ranking
Cultivation of sorghum	1
Cultivation of sesame	2
Gold mining	3
Collection of root crops and vegetables from the forest[72]	4
Collection of honey from wild honey bees	5
Hunting different types of animals	6
Livestock rearing and management	7

Source: Key informants' interview conducted at Kota village on April 23 2014

[72] This include *echa, cici, boya* and pumpkin

Annex 6.1: Major companies that acquired land for biodiesel production in Ethiopia (Typology IV)

S.N	Company Name	Country of Origin	Region	Land size (ha)	Year
1	Adventure Ethiopia Agric. Development PLC	China/South Africa/Ethiopia	Amhara	50000	2007
2	Biomassive AB	Sweden	Amhara	100000	2007
3	BDFC Ethiopia Industry	NA	Amhara	18000	NA
4	Ambasel Trading	Ethiopia	Benshanguel	20000	2007
5	S&P Energy Solution	India	Benshanguel	50000	2010
6	Sun Biofuel Eth	UK	Benshanguel	80000	NA
7	Jatropha Biofuels Agro Industry	NA	Benshanguel	100000	NA
8	IDC investment	Denmark	Benshanguel	15000	2007
9	Sisay Yohannes	Ethiopia	Gambella	100000	2008
10	African Climate Exchange PLC	USA/Ethiopia	Multiregional	100000	2005
11	Africa Sustainable Energy Corporation PLC	Netherlands/USA	Multiregional	20000	2006
12	Ertale Bio Diesel PLC	Britain/Ethiopia	Multiregional	50000	2007
13	A.B.S.A Bio-Fuels PLC	South Africa China/Ethiopia	Multiregional	30020	2007
14	Horizon Plantation PLC	Saudi Arabia /Ethiopia	Multiregional	300000	2007
15	OBM Ethio Renewable Energies PLC	Italy/Ethiopia	Multiregional	50000	2008
16	Ardent Energy Group	USA	Multiregional	10000	2008
17	Petropalm Corp-Ethiopia PLC	Austria/USA	Oromia	50000	2009
18	Yehuda Hayun	Israel	Oromia	8000	2007
19	Green Energy plc	Ethiopia	Oromia	50000	2007
20	Flora Ecopower PLC	Germany	Oromia	6148	2008
21	J.M.B.O Bio Fuel Production PLC	USA/Ethiopia	Oromia	2000	2008
22	Soubra Abdallah Khalid	Lebanon	Oromia	10000	2008
23	Emami Bioteck	India	Oromia	11000	2009
24	Petro Palm Corporation Ethiopia	NA	Oromia	50000	NA
25	VATIC International Business	NA	Oromia	20000	NA
26	Etan Biofuels	Ethiopia	SNNPR	5550	2007
27	Getachew Mulugeta	Ethiopia	SNNPR	25000	2007
28	2A 2S International Business PLC	Ethiopia	SNNPR	60000	2007
29	F.E.P.E.Amaro Bio-Oil PLC	Cyprus/Israel	SNNPR	50000	2008
30	Gereth Modular Fuel & Energy PLC	Germany	SNNPR	5000	2009
31	Global Energy Ethiopia	NA	SNNPR	2700	NA
32	Omo Sheleko Agro Industry	NA	SNNPR	5500	NA
33	Fri-el Green	Italy	SNNPR	30000	2006
34	Agro-Peace Bio Ethiopia PLC	Israel	Somalia	50000	2009
	Total			**1,533,918**	

Source: Shete and Rutten (2014); NA= Data Not Available

Annex 6.2: State and private owned sugar factories and bio-ethanol targets in Ethiopia (Typology IV)

Sugar Factories	**Regional Location**	**Land size (ha)**	**Water Source**	**Production capacity**		**Expected Employment**	**Status**
				Sugar (t/year)	Ethanol (m^3/Year)		
Fincha	Oromiya	21000	Finchaa River	270,000	20,000	Data not available (NA)	Completed in 2013
Metehara	Oromiya	11000	Awash River	130,000	12,500	12,500	Completed in 2013
Wonji/Shoa	Oromiya	25022	Awash River	95,000	20,775	NA	Completed in 2013
Tendaho	Afar	50000	Tendaho River	619,000	55,405	50,000	2015
Omo Kuraz	South Omo, SNNPR	175000	Omo River	278,000	26,162	117,131	Kuraz-One is expected to be completed in 2014
Tana Beles	Amhara and Benshanguel	75000	Beles River	726,000	62,481	50,199	Tana Beles one and two factories expected to be completed in 2014
Wolkayit	Tigray	11000	Zarema and Kalema River	284,000	26,750	NA	2015
Kessem	Afar	20000	Kebena River	153,000	12,500	NA	To be completed in 2014
Arjo-Dedessa	Oromiya	28000	Dedissa River	155,520*	NA	NA	90 percent completed
Hiber Sugar	Amhara	6000	Tana Beles	NA	NA	NA	Implementation started
Karuturi	Gambella	15000	Baro River	N A	NA	NA	At nursery stage
Total		**330,000**					

Source: Shete and Rutten (2014); NA= Data Not Available

Summary

The convergence of food-energy-climate crises, in addition to the goal of increasing the use of biofuels and the growth of carbon markets, have spurred renewed interest in acquiring large swathes of land in the developing South. Due to the abundance of cheap and agro-ecologically suitable land, Sub-Saharan Africa (SSA) in particular has been considered the primary target of these new land-based investments. Ethiopia is one of the top five countries in SSA to welcome investment in large-scale farming. This study examined impacts of large-scale farming in Ethiopia on local economic development, household food security, incomes, employment, and the environment. The study adopted a mixed research approach in which both qualitative and quantitative data were generated from secondary and primary sources. Three large-scale farms (two foreign and one domestic) operating in Oromia, Gambella, and Benshanguel Gumuz regional states were selected as case studies. The selection of the case studies aimed to provide a snapshot of the differential impact of large-scale farming due to differences in crop commodities, geographical location, and origin of investor. Primary data were collected using unstructured, semi-structured, and structured questions, all conducted using a face-to-face interview strategy. The data were analysed both qualitatively and quantitatively using different analysis tools. In two of the cases, a double-difference method of impact analysis was adopted due to the possibility of generating baseline data. In the other two cases, the propensity score matching technique was solely used to estimate impact. The result of the study indicated that large-scale farms generally undermined local level food security and incomes, generated little employment opportunities for the local population, deteriorated the local environment, especially in terms of vegetation cover and soil quality, and contributed little to local economic development, such as infrastructure construction, technology transfer, and generating fiscal revenue and foreign currency. The study concluded that the approach of large-scale mechanized farming contributes little to the economic and agricultural transformation of the nation. Local people generally lose out in respect of land transactions and investments, and they are expropriated from their customary land rights to the benefit of national goals. The outcome contradicts with the ethno-linguistic federal state arrangement of the country in which federated states manage their resources to improve their local development. Although land in Ethiopia is legally owned by the government and farmers and pastoralists with customary land ownership rights have no legal right, it is imperative to take into account livelihood activities of the local people, which are based on customary land-

ownership, before deciding to transfer land for investment. The results of this study also shed light on the need to employ standard impact analysis methodologies so as to influence policymakers at different levels. Further, given the similarities of SSA countries in terms of economic development (e.g. level of infrastructure, land governance schemes, etc.), which determine outcomes of large-scale farms, it can be argued that the model of large-scale mechanized farming generates few positive outcomes to countries in SSA.

Keywords: Large-scale farms; land-grabbing; large-scale land acquisition; impact; food security; income; employment; local economic development; environment; Ethiopia

Samenvatting

De convergentie van voedsel-energie-klimaat crisissen, gevoegd bij het doel het gebruik van biobrandstoffen en de groei van koolstofmarkten te verhogen, heeft geleid tot een hernieuwde interesse grote stukken landbouwgrond in het Zuiden te verkrijgen. Wegens de overvloed van goedkope en agro-ecologisch geschikt land, wordt vooral sub-Sahara Afrika (SSA) beschouwd als het primaire doel van deze nieuwe op land gebaseerde investeringen. Ethiopië is een van de top-vijf landen in SSA om investeringen in grootschalige landbouw te verwelkomen. Deze studie onderzocht de effecten van grootschalige landbouw in Ethiopië op de lokale economische ontwikkeling, voedselzekerheid van huishoudens, inkomen, werkgelegenheid en het milieu. De studie gebruikte een gemengde onderzoeksopzet waarin zowel kwalitatieve als kwantitatieve gegevens uit secundaire en primaire bronnen werden gegenereerd. Drie grootschalige landbouwbedrijven (twee buitenlandse en één binnenlandse) actief in Oromia, Gambella, en Benshanguel Gumuz regionale staten werden geselecteerd als case-studies. De selectie van de case studies had als doel een momentopname van de differentiële impact van grootschalige landbouw als gevolg van verschillen in gewassen, geografische locatie en oorsprong van de investeerder te kunnen bieden. Primaire gegevens zijn verzameld met behulp van ongestructureerde, semi-gestructureerde en gestructureerde vragen, alle uitgevoerd met gebruikmaking van een face-to-face interview-strategie. De gegevens werden geanalyseerd zowel kwalitatief als kwantitatief met verschillende analysemethoden. In twee van de gevallen, werd gebruik gemaakt van een dubbele-verschil methode van effect analyse vanwege de mogelijkheid om basisgegevens te kunnen genereren. In de andere twee gevallen is de *propensity score*

matching techniek enkel gebruikt om de gevolgen te kunnen schatten. Het resultaat van de studie is de indicatie dat grootschalige landbouwbedrijven in het algemeen het lokale niveau van voedselzekerheid en inkomens ondermijnen, weinig werkgelegenheid voor de lokale bevolking genereren, het lokale milieu, met name in termen van vegetatie en de kwaliteit van de bodem, verslechteren, en weinig bijdragen aan de lokale economische ontwikkeling, zoals de aanleg van infrastructuur, overdracht van technologie, en het genereren van fiscale inkomsten en buitenlandse valuta. De studie concludeerde dat de modus van grootschalige gemechaniseerde landbouw weinig bijdraagt aan de economische en agrarische transformatie van de natie. In het algemeen zijn de lokale mensen de verliezers ten aanzien van land transacties en investeringen, en zij worden onteigend van hun traditionele landrechten ten gunste van nationale doeleinden. Het resultaat is in strijd met de etnisch-taalkundige federale staat indeling van het land waarin de deelstaten hun middelen beheren ter verbetering van hun lokale ontwikkeling. Hoewel het land in Ethiopië juridisch eigendom is van de overheid en boeren en herders land in eigendom hebben volgens gewoonterecht en geen wettelijk recht van staatswege, is het noodzakelijk om rekening te houden met de levensonderhoud activiteiten van de plaatselijke bevolking, die gebaseerd zijn op het traditionele grondeigendom, alvorens te besluiten tot overdracht van land in ruil voor investeringen. De resultaten van deze studie werpen ook licht op de noodzaak om standaard impact analyse methodieken toe te passen om zo beleidsmakers op verschillende niveaus te kunnen beïnvloeden. Bovendien, gegeven de gelijkenissen van SSA landen in termen van economische ontwikkeling (bijvoorbeeld niveau van de infrastructuur, land bestuur regelingen, etc.), welke resultaten van de grootschalige bedrijven bepalen, kan worden betoogd dat het model van de grootschalige gemechaniseerde landbouw weinig positieve resultaten voor landen in SSA oplevert.

Keywords: Grootschalige landbouwbedrijven; *land-grabbing*; grootschalige landaankoop; gevolgen; de veiligstelling van de voedselvoorziening; inkomen; werkgelegenheid; lokale economische ontwikkeling; milieu; Ethiopië

Curriculum Vitae

Maru Shete Bekele is born in Bahir Dar (Ethiopia) in 1975. He completed his high school at Tana Haik comprehensive secondary school in 1993. He joined Haromaya University in 1994 for a Bachelor of Science (BSc) studies in Agriculture and graduated with distinction in 1998. Maru earned three different master's degrees: MSC degree in Development Economics, and in Tropical Ecology from the Norwegian University of Life Science, Norway in 2008 and 2010 respectively, and MA degree in Development Studies from the Addis Ababa University, Ethiopia. Maru joined Leiden University as a PhD Researcher in 2011.

Maru is a faculty member of St. Mary's University in Ethiopia where he teaches different postgraduate courses such as Rural Development, Development Economics, Research Methods for Agricultural Economics and Development Economics students, Managerial Economics, and Project Management and Analysis. He also served the University as a Research Director for about five years. In his capacity as a Research Director, in addition to managing the overall research activities of the University, he organized different international and national conferences and instituted an open access institutional repository system for research output management to the University. Maru is an Editor of the Journal of Agriculture and Development, which is a biannual journal published by St. Mary's University.

Prior to joining St. Mary's University, Maru worked for the Amhara Region Agricultural Research Institute (ARARI) as a researcher. He was entrusted with the responsibilities of developing research proposals based on farmers' needs and priorities, implementing research plans and reporting research findings to the ARARI.