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
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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

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[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

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[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),

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[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.
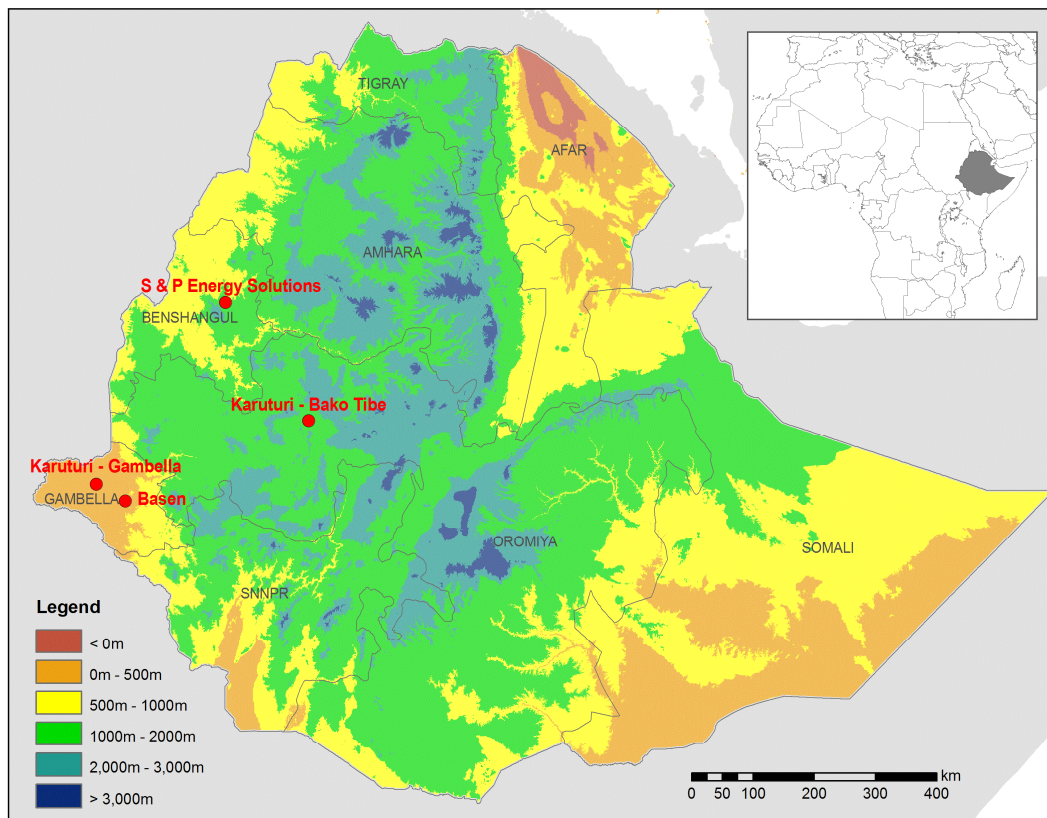

Figure 1.1: Map of study regions and case studies

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]

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[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

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[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°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

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[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).
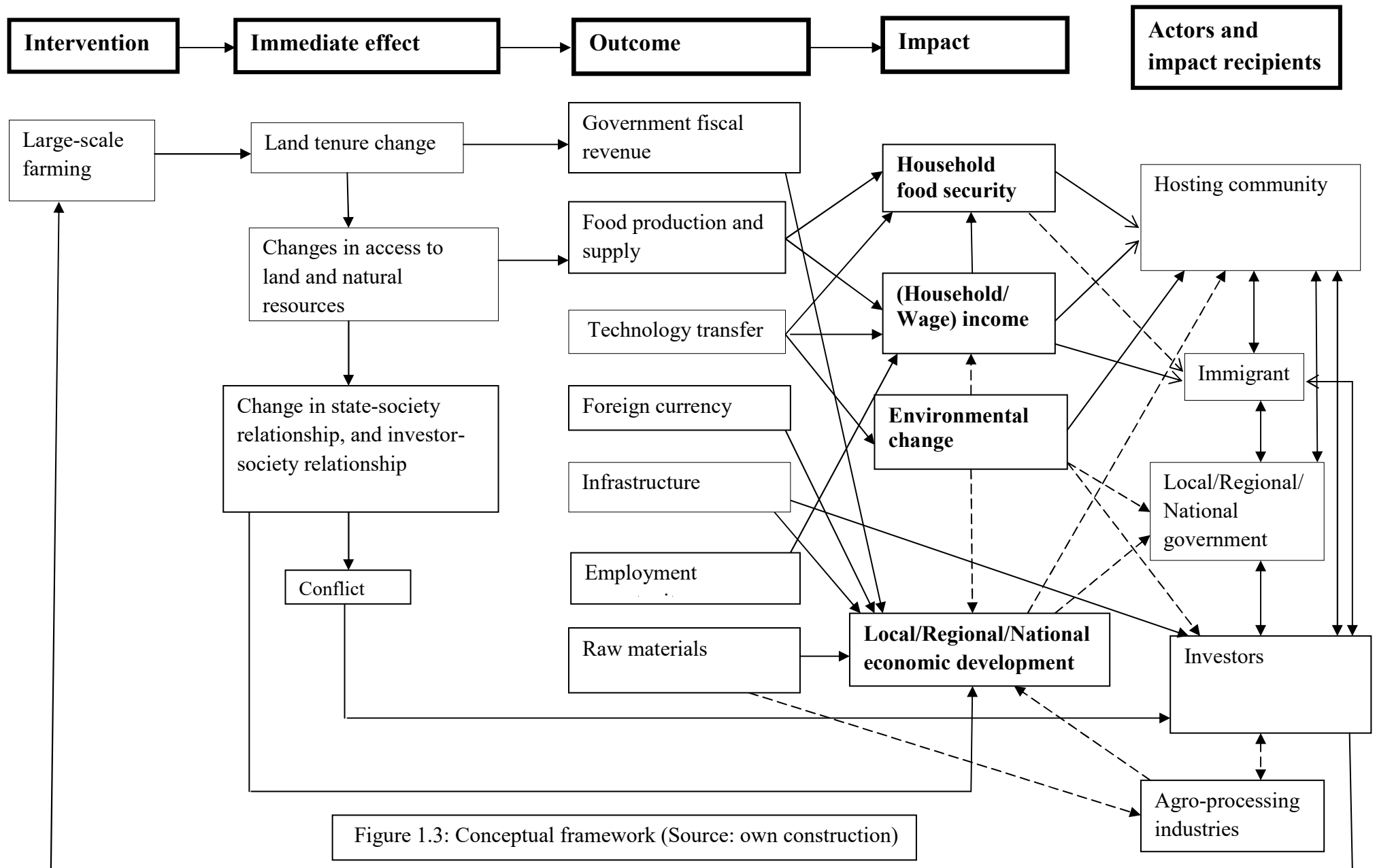

1.5 Conceptual Framework

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.

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[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.

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[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:

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

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 $p(X_i)$ is known, then the Average Treatment effect on the Treated (ATT) can be estimated as follows (Rosenbaum & Rubin 1983):

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

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

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[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.