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Large-scale investment in African farmland and its potential role in unlocking smallholder agricultural growth: Case studies from Zambia

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Submitted in partial fulfilment of the requirements for the degree of

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DECLARATION

I declare that this thesis, hereby submitted in partial fulfilment of the requirements for the Doctor of Philosophy in Agricultural Economics at the University of Pretoria, is my own work and has not been submitted to any other university for the award of a degree.

Parts of the thesis have been submitted for publication in academic journals. Any errors or omissions are my entire responsibility.

Name: Rudo Eusebia Makunike

Signed:

Date:

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Dedication

I dedicate this work to my mother, who raised me to be a hard worker, and to all the women who are mothers, breadwinners and students at the same time. It is not easy balancing all these different responsibilities. May your efforts and resilience be fully rewarded in due time.

ABSTRACT

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By

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Faculty:	Natural and Agricultural Sciences
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Large-scale investments (LSI) in farmland, commonly referred to as "land grabs", have recently attracted widespread interest from various sectors, ranging from academia, activist organisations, donors to national governments. On one hand are proponents who argue that these investments help to fill the investment gap in African agriculture, and on the other are those who see this as nothing more than neo-colonialism. Much of the hype on the LSI in farmland has mostly been negative, with civic activists arguing that these investments disenfranchise smallholder farmers and contribute to their demise. Despite the range of reactions this phenomenon has attracted, there has not been commensurate research producing empirical evidence on whether such investments might contribute to unlocking constraints that hinder growth in the smallholder farming sector or evidence of a mutually beneficial co-existence of the LSI in farmland and smallholder farmers.

This study therefore sought to analyse the potential of LSI in farmland for contributing to smallholder agricultural growth. It sought to do this by answering the following three questions: Can LSI in farmland offer opportunities for smallholders' agricultural growth through vertical and horizontal integration and technology transfer or will they further marginalise them? Do LSI in farmland engage with smallholder farmers in their farming

operations or do they exclude them? Do LSI in farmland consolidate smallholder farmers and crowd them out of markets?

Field work was carried out in Zambia in 2014. Three case studies were analysed and these were selected from the pool of districts with LSI in farmland. The study utilised the Rural Agricultural Livelihood Survey (RALS) data sets for 2012 and 2015 as well as the Land Matrix database for secondary data. A combination of statistical, econometric regression and semi-parametric models (particularly propensity score matching and double differencing) was used to analyse the data. The treatment and control groups for propensity score matching were provided by smallholder farmers in districts with investments, and those in districts without investments, respectively.

Results revealed that there was no difference in agricultural performance of smallholder farmers in districts with investments and those in districts without investments. There is also no evidence of consolidation or displacement of smallholder farmers from the case studies analysed, except where smallholder farmers had settled on state land assuming it to be communal land as none of the land acquired by the investors was communal land for smallholder farmers. This points to a possible preference for brownfields and greenfields investments by the LSI in farmland to avoid negative publicity associated with displacement of smallholder farmers from communal land. The study also noted that LSI in farmland are contributing to the creation of and access to markets by smallholder farmers, rather than crowding them out.

Lastly, the results showed that the investors in the various case studies do engage with smallholder farmers, and that those smallholder farmers who are included in the investors' farming operations perform better in terms of maize gross value, total crops gross value and maize yield per hectare of land than those who are excluded. The study therefore demonstrates that there is potential for LSI in farmland under certain conditions such as provision of input packages and access to technical knowledge through training, to unlock bottlenecks facing smallholder farmers, which may lead to agricultural growth of the latter. This also points to the possibility of LSI in farmland and smallholder farmers to have a reciprocal co-existence.

The implication of these results for policy means that there is need for recipient governments to treat each LSI in farmland deal separately as these investments are not homogenous. This calls for critical anlysis of potential benefits versus the costs and where the benefits outweigh the costs, to put in place measures that encourage horizontal and vertical integration of smallholder farmers in the investors' farming operations. In this regard, an enabling policy environment is important to encourage non-state actors to facilitate access to basic productive goods and services necessary for smallholder growth. This could be realised through fostering public-private partnerships between governments and LSI in farmland to ensure government's active involvement in smallholder development. In addition, governments also have to put measures in place to safeguard the rights and interests of smallholder farmers who face the possible threats of displacement in the event of acquisition of occupied state land or acquisition of communal land through negotiations with local chiefs and authorities.

Key words: Large-scale investments, agriculture, farmland, smallholder farmers, agricultural growth, impact assessment

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ACRONYMS

AGRA	Alliance for Green Revolution in Africa
AU	African Union
AAZL	Amatheon Agri Zambia Limited
ACL	Africa Crops Limited
AfDB	African Development Bank
AOWAF	Altima One World Agriculture Fund
ATT	Average Treatment Effect on the Treated
BSAC	British South Africa Company
CAADP	Comprehensive Africa Agriculture Development Programme
CENAFARM	Central Africa Farming
CFU	Conservation Farming Unit
CSO	Central Statistical Office
DACO	District Agricultural Coordinator
DD	Double Differencing
DRC	Democratic Republic of Congo
FDI	Foreign Direct Investment
FAO	Food and Agriculture Organisation
GALOF	Global Agribusiness Land and Opportunities Fund
IAPRI	Indaba Agricultural Policy Research Institute
IFC	International Finance Corporation
LPI	Land Policy Initiative
LLET	Low Level Equilibrium Trap
LSI	Large-scale investments
LSLBI	Large-scale land based investments
MADA	Mumbwa Agro-Dealers Association
MAL	Ministry of Agriculture and Livestock
MoU	Memorandum of Understanding
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Cooperation and Development
PACRA	Patents and Company Registration Agency
PHS	Post-Harvest Survey

PSM	Propensity score matching
RALS	Rural Agricultural Livelihood Survey
SSA	Sub-Saharan Africa
SEZ	Special Economic Zone
SWFs	Sovereign wealth funds
UNECA	United Nations Economic Commission for Africa
VGGT	Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security
USA	United States of America
ZDA	Zambia Development Agency
ZLT	Zambia Leaf Tobacco
ZNFU	Zambia National Farmers' Union

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

The past few years have seen a rise in large-scale investments (LSI) by foreign investors in farmland, mostly in developing countries. In 2016, it was estimated that an area equal to 630 times the size of Nairobi (Nairobi is 69 600 ha) was involved (Land Matrix, 2016). This phenomenon is popularly known as "land grabs" and has drawn widespread global interest from key players in the field of agriculture and development. It has also attracted widespread responses, mostly negative, from various stakeholders. On the one hand, there are voices of dissention from pro-human and civic rights groups that are protesting vigorously against recipient governments for entering into deals with the investors. Arguments against it are mainly premised on how such investments disadvantage the local farmers and leave them worse off. On the other hand, there are various developmental organisations and technical cooperation agencies who are advocating for this as a way of bringing the much-needed investment in African agriculture, which could grow the agricultural output of smallholder farmers and the rural economy.

Despite the varied responses this phenomenon has evoked, the reality is that these LSI in farmland are real and are unlikely to stop any time soon. Close to ten years ago, Cotula and Vermeulen (2009) noted an increase in direct investment in agricultural land due to various factors such as food security concerns, triggered by the food price crises of 2008 and the global financial crises triggered by the credit crunch. This increase seemed to have reached a peak around 2010 before slowing down from 2011 (UNECA, 2013). It is envisaged that this phenomenon will continue on an upward trend, in the wake of failing global financial markets.

A look at some aspects of these LSI deals seems to suggest that many countries are entering into these deals unadvisedly, as evidenced by cases where they mortgage the land at incredibly low prices and give long tax holidays to investors. For example in Ethiopia, one firm obtained a lease for $6.75 per hectare per year for 300 000 hectares of land, and in Sudan, another firm obtained 600 000 hectares of land for a mere $0.04 per hectare per year (Oakland Institute, 2011a).

With this background, there is increasing concern that these deals will compromise the food security of the local farmers and actually leave them worse off than before the deals were

enforced (Borras & Franco, 2010; Robertson & Pinstrup-Andersen, 2010; De Schutter, 2011). There is also a fear that recipient governments, whose economies in most cases are already fragile, will lose control of their food production systems. Consequently, such deals are viewed by some as some kind of re-colonisation.

While one school of thought supports the idea that these deals are akin to neo-colonialism (Moyo *et al*., 2012; Hall, 2011; Robertson & Pinstrup-Andersen, 2010), another school of thought supports the argument that these large-scale investments in farmland could help fill the investment gap in African agriculture (FAO, 2009a; Liu, 2014). Indeed, it seems true that there is gross underinvestment in African agriculture. Goyal and Nash (2017) note that investment in African agriculture significantly lags behind that of other comparative regions, particularly East Asia, the Pacific and South Asia. For example, only 7% of the total Foreign Direct Investment (FDI) agricultural stock in developing countries comes from Africa, a very minute figure compared with 78% for Asian and 15% for the Caribbean and Latin American countries (ibid., 2017). In this regard, several scholars (Schoneveld *et al*., 2011; Ahlerup & Tengstam, 2015; Baumgartner *et al*., 2015; Sipangule & Lay, 2015; Ali *et al*., 2016; Khadjavi *et al*., 2017) have studied various aspects of the phenomenon of large-scale investments in farmland. However, there is a lack of empirical evidence on whether such investments can be channelled towards unlocking constraints in the smallholder farming sector and whether the LSI in farmland and smallholder farmers might have a reciprocal co-existence. For example, Schoneveld *et al*. (2011), gives an anatomy of large scale investments in plantation agriculture and plantation forestry in sub-Saharan Africa and notes some impacts such as food security threats. Khadjavi *et al*. (2017), analyses changes in the social capital of villages in the vicinity of investors. Although their study notes that villages in close proximity to the investors registered higher social capital than those further away, it does not look at the possibility of channelling this towards unlocking bottlenecks in smallholder agriculture and whether the higher social capital indicates a reciprocal co-existence.

FAO (2009b) notes that it is possible to have deals that mutually benefit both parties when the investors' interests are matched with the developing country's objectives. Suggestions for alternative models (Cotula & Leonard, 2010; Cotula & Vermeulen, 2010) of the investment have been made, although none seems to actually analyse the mechanics of these investment flows and how they might provide a panacea for the many obstacles faced by smallholder farmers in Africa. It therefore seems that there is a genuine exigency for a study that analyses

the latent ability of these LSI in farmland to unlock potential and unleash growth of smallholder African agriculture.

1.2 RESEARCH PROBLEM AND JUSTIFICATION STATEMENT

Smallholder farmers in Africa play a critical role in most of Africa's economies. Wiggins (2009) estimates that about 80% of all farms in Sub-Saharan Africa belong to smallholders, with a contribution towards production being as high as 90% (ibid.) Despite this substantive contribution, smallholder farmers continue to face many challenges in their agricultural production and this is not new per se. Historically, smallholder farmers have faced many constraints which impede their agricultural productivity. These constraints include a deprivation in accessing the markets (both input and output), infrastructure and capital, to name but a few. The World Bank (2005) notes that in most low-income countries, poor physical infrastructure, such as that for transport, power, communications, irrigation and water, greatly impedes agricultural growth and poverty reduction.

The challenges faced by smallholder farmers in Africa could easily be overcome if more resources were put towards investment in the sector. The World Bank (2005) report concludes that there is a need to invest in physical infrastructure in order to realise substantive smallholder agricultural growth. Similarly, Poulton *et al.* (2006) note the need to overcome market access challenges in order to realise growth in the sector. They argue that investment in key public goods such as infrastructure, roads and agricultural research is part of the solution to realising smallholder agricultural growth. Although there is an understanding of the need to invest more resources in the agricultural sector in order to overcome the challenges faced by smallholder farmers, there has been a divergence between theory and practice. The agricultural sector in Africa is still riddled with underinvestment.

The problems of underinvestment in African agriculture (Von Braun & Meinzen-Dick, 2009) and low productivity of smallholder agriculture have been a major concern to many African leaders for many years. Studies have shown that African agriculture has suffered from gross underinvestment despite the fact that the sector is the backbone of many African economies. "Hunger amidst of plenty" in Africa has been attributed to this lack of adequate investment in the agricultural sector. In fact, a report by FAO (not dated) states that investment in African agriculture in sub-Saharan Africa grew by only 0.6% between 1981 and 2000, and that in the

1990s it was actually declining. The same report notes that an increase in investments to the order of USD83 billion per year is required in order for developing countries to attain the required food production needs by 2050. According to Goyal and Nash (2017), Africa's share of agricultural public spending lags behind that of other developing regions. For example, Africa's *a*gricultural spending, as a share of overall public spending, is lower than that of other comparative regions such as East Asia and the Pacific and South Asia (ibid.). It is disturbing to note that African agriculture has suffered gross underinvestment, despite the central role that agriculture plays in economic growth and ultimately eradicating poverty. Hallam (2011), essentially attributes the 2008 food crisis to a lack of investment in agriculture. He further notes that spending on agriculture in developing countries has dropped to just 7% over the past few years and emphasises that this figure is even lower for Africa. Lowder and Carisma (2011) note that between 2003 and 2007, the share of total expenditure in agriculture in Africa was only between 3 – 6%.

Inadequate investment in agriculture seems to be contributing to Africa's inability to meet its current food needs resulting in the continent as a whole having a huge food import bill. As of 2015, this bill was estimated at USD 35.4 billion and it is projected to reach USD 110 billion by 2025 (AfDB, 2016). In addition, Africa's population is increasing, and it is projected that the population of sub-Saharan Africa by 2050 will be 1.5 billion (Seck, 2011). With this projected increase in population, crop production in the region would need to increase by 260% in order to meet the food demand (ibid.). It is therefore argued that in order for the continent to extricate itself from this quagmire of hunger, there has to be a significant increase in investment in the agricultural sector. While many continental policies and frameworks, such as the Comprehensive Africa Agriculture Development Programme (CAADP), have endeavoured to mobilise resources from technical cooperating partners and from domestic sources such as national governments through allocation of 10% of their national budgets to agriculture, the flow of resources from these efforts seem to be too little and too slow. Yet at the same time, foreign direct investment from LSI in farmlands seems to bring the resources needed. In this regard, there is need to explore the potential of LSI in farmland to fill this investment gap, and whether this could result in unlocking the bottlenecks faced by the smallholder farmers.

The potential of LSI in farmland to unlock bottlenecks faced by smallholder farmers seems to be shrouded by the issue of negative publicity given to LSI in farmlands. For example, it is argued that LSI in farmland are pushing smallholder farmers out from the agricultural sector.

According to De Schutter (2011), small-scale producers are the victims of LSI in farmland as they are gradually transformed into "landless or quasi-landless agricultural workers". Displacement of these farmers, who according to De Schutter (2011) are already marginalised and too poor to feed themselves, will further worsen their situation and have disastrous consequences, not only for the agricultural sector, but for the economy as a whole.

From this argument, a picture is painted, of the slow, but sure destruction of the smallholder farming sector through amalgamation of small, family farms into large commercial farms. The picture painted is certainly bleak and worrisome, given that most of Africa's agriculture is largely undertaken by smallholders, who are producing about 90% of Africa's food (Hall *et al.*, 2017). This could have disastrous implications on both food security and the future of smallholder farming. There is the possibility that many small, family farms that characterise much of Africa's farming environment could wiped off the map of Africa's agricultural sector and be replaced by these huge corporate farms as suggested by Borras and Franco (2010). They noted that LSI in farmland will lead to "enclosure … and dispossession and displacement of the rural poor" *from their land.*[1] Dispossession of the smallholders from their means of production (land) pushes them out of farming into the labour market, thus turning labour into a commodity (Harvey, 2011). Borras and Franco (2014) further argue that small farms are being "swallowed up" through the consolidation and expansion of land by purchase or lease by an economically and politically dominant social class, not just in countries in Africa, but in many others like Indonesia, Argentina and Brazil, (ibid., 2010). Deininger and Byerlee (2011) also seem to share these same views. They note that of late, there seems to have been a change in the agrarian structure in many countries with plenteous land being "characterised by rising investment in large scale farming, based on a non-family corporate model".

Hazell (2011) also adds his sentiments by noting the dangers of the rapid transition from small to huge corporate farms that is being promoted by the LSI in farmland. According to this development economist, when small, family farms are rapidly consolidated into large farms, people are quickly pushed off their farms, and without commensurate economic growth and development to absorb the extra labour from agriculture, this will inevitably result in worsening poverty and rural–urban migration (ibid., 2011).

[1]Italicised text is the author's own emphasis.

Several questions emerge from the argument presented of displacement and replacement of smallholder farmers. These are centred on whether or not LSI in farmland are really bringing about the downfall of smallholder farms and if indeed the smallholder sector will gradually be swallowed up by the large corporate farms, and whether or not the corporate farming model will work for Africa. Collier and Dercon (2014), seem to advocate for some kind of "more flexible organisational models" citing the large-scale mechanised models of Brazil as a success. They identify five critical features for Africa's agriculture necessary for the continent to converge with the rest of the developing world in terms of growth and poverty reduction performance. One of these is an increase in agricultural production. They argue that radical economic transformation cannot be achieved by the smallholder farming model and "too much focus on smallholders may actually hinder large-scale poverty reduction" (ibid., 2014).

Although LSI in farmland may have some positive aspects, the current perception is that such investments are detrimental to smallholder farmers and are akin to neo-colonialism (Moyo *et al*., 2012; Hall, 2011; Robertson & Pinstrup-Andersen, 2010). "Predatory" and "parasitic" are some of the words used by Moyo *et al*., (2012) for example, to describe such investments. However, it is important to provide a balanced picture, and clarify whether such investments are truly as depraved as has been generally portrayed in some of the literature available. Given that LSI in farmland do bring investment in agriculture, there is need to explore the potential of such investment to unlock the bottlenecks faced by the smallholder farmers.

1.3 HYPOTHESIS AND OBJECTIVES

A few quantitative studies have endeavoured to analyse the impact that large-scale land investments have on smallholder farmers, perhaps in a bid to find evidence that LSI in farmland could benefit smallholder farmers. One such study by Baumgartner *et al*. (2015), analysed the impact such investments had on prices, employment and incomes of smallholder farmers in Ethiopia. Using nationwide data on investment licences issued between 1992 and 2011 for agricultural land of at least 100 ha, and regional data on land parcels requested by and issued to investors in the Gambella region of Ethiopia in 1999 and 2000, the authors simulated, using a mathematical programming model, the impacts of the investments on livelihoods and incomes of the local farmers, attributed to changes in access to land. Their findings revealed that there would be a reduction in income share of agriculture due to reduced access to farming land and forest land arising from the investor's operations. However, they predicted that this

would be offset by an increase in overall income by more than 50%, (rising above the poverty line of $1.25/day) as a result of wage employment. The researchers also noted that the share of agriculture in livelihood strategies of the local farmers fell as they cultivated less land due to wage employment and that this would consequently negatively affect supply of food locally.

Another study by Sipangule and Lay (2015) analysed the impact of foreign-owned huge land investments in Zambia on smallholder productivity, fertiliser usage and wage employment. The study used two nationally representative household data sets from the years 2000 and 2010. The researchers analysed the data using double differencing methods, and they found that smallholder farmers located in districts with foreign large-scale agricultural investments were not worse off than their counterparts in districts without investments. They noted that there was a convergence of productivity levels between the two groups of farmers and concluded that there were no disruptive effects on the district-level smallholder economy as a result of the large-scale land acquisitions in agriculture (ibid.).

In another study, Ali *et al.* (2016), analysed the nature and magnitude of spillovers from large farm establishments in Ethiopia using inter-temporal changes in the closeness and exposure of the smallholders to large farms. The researchers used smallholder agricultural production survey data sets for the 2003/4 to 2013/14 period. Their findings revealed that there were positive spillovers on fertiliser use, yields and improved seed usage for maize farms with closer proximity to large commercial farms, which the authors explained could be attributed to the transfer of crop-specific technology. These positive spillovers were mostly within a radius of 25 km. In addition, the presence of large farms also boosted yields by smallholder farmers during periods of drought. The study, however, established that the presence of large farms did not have any impact on local job creation, possibly due to the mechanised nature of large farms (ibid.). Although the study revealed some positive impacts, these were modest and this raises the caution that the positive impacts should not detract the responsibility of governments to provide public goods for the support of smallholder production.

In yet another study, Ahlerup and Tengstam (2015) asked whether the land-poor people benefit from agricultural investments in Zambia. The researchers used supplemental surveys and the Zambia Post-Harvest Surveys for 2001, 2004, and 2008 to analyse how agricultural investments impact on smallholder farmers. Their results indicated that the presence of

investors positively affected farm wage incomes for the smallholders, particularly for those with smaller pieces of land.

Findings from the impact studies have been quite varied. While the studies analysed above revealed mostly positive effects, others have indicated negative impacts. For example, contrary to the findings of Baumgartner *et al*. (2015) on incomes and wage employment, a study by Kleeman and Thiele (2015) on the implications of LSI on rural welfare showed a reduction in smallholder wage income and an increase in food prices where the investor engaged in a capital intensive staple food production model. Ambiguous results were realised in the case of a labour intensive cash crop model. Similarly, Shete and Rutten (2015) showed that smallholder farmers in the vicinity of a LSI in Oromia region of Ethiopia, were faced with income loss and reduced food security as a result of the presence of the LSI.

Adding onto the negative impact picture is Chu (2012), whose studies in Zambia noted that although local communities benefited from wage employment by the investor, they had become increasingly dependent on it, posing a danger for their livelihoods. Kachika (2010) concludes that "land grabbing" is negatively affecting livelihoods of smallholder farmers in Ghana, Ethiopia, Mali, Mozambique, Senegal and Tanzania. Likewise, Schoneveld *et al.* (2011), reported a 67% reduction in livelihood strategies and a 61% reduction in landholdings size for smallholder farmers in Ghana as a result of a biofuel plantation.

Previous studies have established that LSI in farmland result in reduction in wages and incomes of smallholder farmers (Baumgartner *et al.*, 2015; Kleeman and Thiele, 2015), loss of livelihoods (Schoneveld *et al.,* 2011), reduced food security (Shete and Rutten, 2015), displacement of smallholder farmers (Makki, 2014: Joala *et al*., 2016) and crowding out of markets (De Schutter, 2011). However, there is still need to understand whether these findings apply to all investors, in all regions and all investment strategies. Could the outcomes differ if investors deliberately engage with smallholders to ensure that there is room for co-existence and thus benefit from these engagements? And what investment model could lead to growth in the smallholder agriculture sector? This can be tested by considering the production outcomes of small farmers in the immediate sphere of influence of these investments. To help answer these questions, this study will test the following hypotheses:

- Smallholder farmers in LSI areas have higher gross value per hectare of maize, than those in regions or districts without any LSI

- Large-scale investors in farmland do not engage[2] or seek to build linkages with the smallholder farmers in their vicinity
- LSI in farmland do not destroy smallholder agriculture and the two can co-exist

Table 1.1 summarises the hypotheses, research questions, and objectives.

Table 1.1: Objectives, research questions and hypotheses

Objective	Research questions	Hypothesis
To investigate the potential of large-scale investment in farmlands to unleash smallholder agricultural growth	Can LSI in farmland offer opportunities for smallholders' agricultural growth through vertical and horizontal integration and technology transfer or will they further marginalise them?	Smallholder farmers in LSI have higher gross value per hectare of maize, than those in regions or districts without any LSI do.
	Do LSI in farmland engage with smallholder farmers in their farming operations or do they exclude them?	Large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers in their vicinity.
	Do LSI in farmland consolidate smallholder farmers and crowd them out of markets?	LSI in farmland do not destroy smallholder agriculture and the two can co-exist.

Source: Author

[2] The term "engagement" is used to define the interaction that LSI in farmland have with smallholder farmers and their inclusion or exclusion in the former's investment operations.

The argument underlying the first hypothesis that "*smallholder farmers in LSI areas have higher gross value per hectare of maize, than those in regions or districts without any LSI*" is informed by the institutional economics theories which recognise the presence of externalities in economic transactions. Largely borrowing from the ideas of Kirsten *et al*. (2009) the study postulates that LSI in farmland can lead to smallholder agricultural growth through positive externalities such as improved access to the markets, credit, technology and infrastructure. This concept is presented in Figure 1.1.

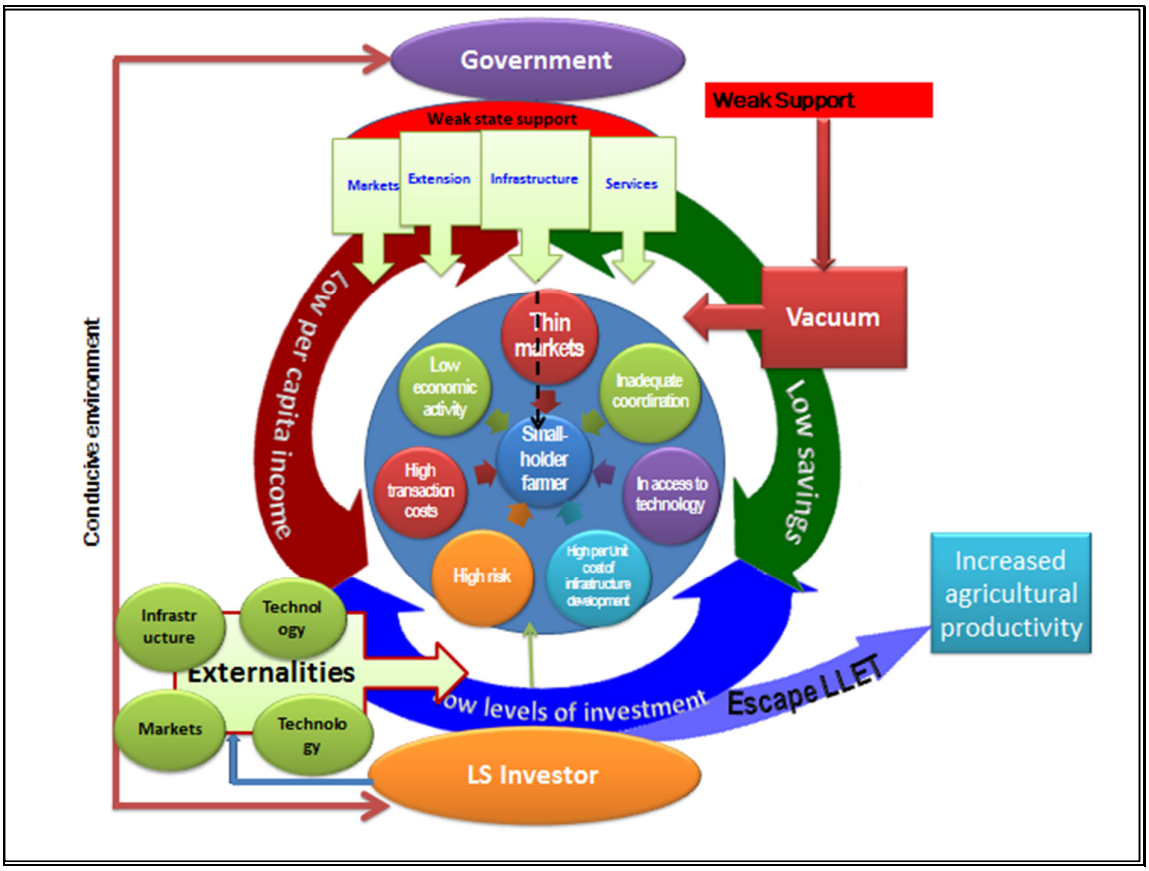

Figure 1.1: Conceptual framework

Source: Author

Generally, smallholder farmers operate in a very difficult environment, characterised by high transaction costs due to a number of self-reinforcing problems, such as lack of access to markets, technologies and services, which lead to low levels of economic activity. Input and output markets are often missing or unreliable (Delgado, 1999). But, how does the smallholder farmer find himself in this situation? The literature reviewed suggests that the underlying problem is that most African governments are fragile and weak, characterised by predatory

behaviour by their political elites. As argued by Kirsten *et al*. (2009), the state has a role to play in terms of the provision of basic key elements, such as education, infrastructure, credit, and extension services, required to ensure smallholder agricultural sector development. But because of the weakness of some states and the predatory behaviour of their political elites, these basic key elements are either inadequately provided or are missing, thereby creating a vacuum in terms of service delivery. As shown in Figure 1.1, because of this vacuum, smallholder farmers find themselves operating in an environment characterised by thin markets, inadequate coordination and high transaction costs that will force them into what Kirsten *et al*. (2009) call a low-level equilibrium trap (LLET).[3] This is a term used to describe a situation in which the constraints faced by the smallholder farmers, the lack of incentives to invest, and a stagnant economy all reinforce each other, and a farmer finds himself or herself in this trap (ibid.). Because of this harsh environment, there are low levels of investment, leading to low per capita income and low savings. All these factors reinforce each other in a vicious circle, trapping the smallholder farmer in this brutal LLET. However, there is a possibility for the externalities from the LSI in farmland to break this vacuum and bring improved access to markets, capital, technologies and infrastructure. Flooding out this vacuum with positive externalities from the LSI would create the necessary environment that unlocks the constraints faced by the smallholder farmers, thereby unleashing their agricultural potential, leading to increased agricultural productivity, increased household food security and incomes, and consequently reduced incidence of poverty. Application of institutional economic theory in market development tells us that the degree of internalisation of costs or benefits of an investment is proportional to the investment (Poulton & Lyne, 2009). Applying the same theory to the LSI context implies that the LSI, similarly, due to economies of scale, are able to absorb the high transaction costs (Hazell *et al.*, 2007) and improve access to markets, technologies, infrastructure and credit, which will consequently lead to reduced transaction costs and increased profits for the smallholder farmers, thereby providing a huge incentive for them to continue with production.

This study makes a second hypothesis that "*large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers in their vicinity"*. This comes from the understanding that that investors are profit-seeking and would avoid engaging in any activity

[3] The LLET is characterised by low economic activity, huge transaction costs, high risks, thin markets, lack of access to production and/or processing technology, and high per-unit costs of infrastructural development.

that could reduce their profits. Engaging with smallholder farmers in their farming operations could entail a cost which could result in a reduction in their profits. This hypothesis informed largely by the ideas of Li (2010) and Hall *et al.* (2015), on what determines whether or not investors incorporate smallholder farmers in their framing operations. Hall *et al.* (2015) note that when there is a need for both land and labour, the investor tends to include the smallholder farmers in their farming operations. Li (2011) on the other hand argues that when investors have access to cheap land, there is no incentive for them to incorporate smallholder farmers. However, if the rent paid by investors for the land is equal to the loss of livelihoods of displaced smallholder farmers, then this would act as a deterrent and force investors to engage with them through contracts. Given that investors often access cheap land as was the case in Ethiopia and Sudan (Oakland Institute, 2011a) and Mozambique (Li, 2011) and that most of their production is capital intensive rather than labour intensive, this is a perfect combination for exclusion of the smallholder farmers, hence the hypothesis that LSI in farmland do not engage smallholder farmers.

The third hypothesis made by this study is that "*LSI in farmland do not destroy smallholder farmers and the two can co-exist"*, even though some studies (Kugelman & Levenstein, 2009; Hall *et al*., 2017b; Araghi, 2000; Moyo *et al*., 2012) have noted the potential of LSI in farmland to destroy smallholder farmers. With this last hypothesis, this study seeks to explore the possibility of a reciprocal co-existence between LSI in farmland and smallholder farmers that results in increased smallholder agricultural growth. This hypothesis is informed by understanding that contemporary farmland investors have often been likened to the colonial kind of large-scale agricultural investments which saw many smallholder farmers being moved off the productive land they had occupied for generations to make way for investments such as plantation agriculture and large-scale commercial farms (Kugelman & Levenstein, 2009; Smaller & Mann, 2009). However, many LSI in farmland would want to be portrayed in positive light and avoid negative publicity that has been associated with such investors. Indeed Cotula (2009) notes that many African governments are encouraging investors to incorporate smallholder farmers in their farming operations and the investors are willing to comply with these requests for strategic reasons. From this understanding, it therefore seems plausible that LSI in farmland would look for opportunities to co-exist with the smallholder farmers.

1.3.1 Testing the hypotheses

In order to test the first hypothesis, that *Smallholder farmers in LSI areas have higher gross value per hectare of maize, than those in regions or districts without any LSI*, the study used t-tests to see if there were any differences in the means of various production variables between the farmers in investment districts and those in non-investment districts. In addition, a combination of propensity score matching (PSM) and double differencing (DD) methods were used.

To test the second hypothesis, *Large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers in their vicinity;* the study used a combination of qualitative and quantitative statistical tools, as well as econometric methods of impact evaluation.

For the third hypothesis, *LSI in farmland do not destroy smallholder agriculture and the two can co-exist,* the study used an agrarian political economy perspective to gain an understanding of how the various investors relate with the smallholder farmers and what could motivate actions towards displacement of smallholder farmers or their inclusion in the investment operations.

1.4 STUDY OUTLINE

The remainder of this thesis follows the structure below:

Chapter 2 gives a detailed understanding of LSI in farmland globally, continentally and nationally. It also exposes the nature of these investments, and the scale and impact on smallholder farmers as recorded in various literature bodies. It looks at the debate on creation of enclaves, dispossession and agrarian change in the context of LSI in farmland. Chapter 3 gives an overview of LSI in farmland within the context of Zambia. It gives a historical perspective of land acquisitions and how this unfolded with the post-colonial governments in power. Chapter 4 gives an overview the methods and data used and describes the location of the study and selection of cases studies. Chapter 5 gives the methodology and analytical framework employed by this research. Chapter 6 presents results from the study on the impact of the presence of LSI in farmland on smallholder agricultural production. It analyses key

production variables between groups of smallholder farmers who have LSI in farmland in their districts and those without. Chapter 7 presents results from the study on linkages between LSI in farmland and smallholder farmers, their engagement strategies, and how they impact on smallholder agriculture production. Chapter 8 is also a results chapter and presents research results regarding the crowding out of markets of smallholder farmers by LSI. It analyses the potential for a reciprocal co-existence. It discusses how and under what conditions both LSI and smallholder farmers can co-exist, and the future of small, family farms in the wake of LSI in farmland. Lastly, Chapter 9 presents a summary of all the research findings from this study, the conclusions, policy and research recommendations made, and areas for further study.

CHAPTER 2: UNDERSTANDING LARGE-SCALE INVESTMENTS IN FARMLAND IN AFRICA

2.1 INTRODUCTION

Most of the hype on large-scale investments (LSI) in farmland has been focused on the African continent, giving readers the impression that most of these LSI in farmland take place in Africa. A study by Anseeuw *et al*. (2012) puts the estimates of Africa's contribution to the global LSI in farmland at between 35% and 68%. Some authors, like Kugelman & Levenstein, (2009) generally believe that these investments driven by resource-rich governments. However, it is increasingly recognised that there are other investors such as state-owned companies, equity funds and private sector companies (Wily, 2012; Edelman *et al*., 2013; Oakland Institute, 2012; Borras & Franco, 2012; Cotula *et al*., 2009; Daniel, 2012). This chapter gives an in-depth review on some of these issues in order to give the reader a clearer picture of the importance of LSI in farmland in Africa in general.

Through desk and literature reviews, this chapter critically analyses the nature and extent of LSI in farmland, globally and continentally. It also gives a detailed situational analysis of the phenomenon and its importance in the global debate. It sheds light on some of the debates on LSI in farmland, such dispossession and creation of enclave economies.

2.2 HOW WIDESPREAD ARE THE LAND DEALS IN THE WORLD?

Many scholars have focused their attention on global large-scale land investments in Africa, but the phenomenon goes beyond Africa, with a worldwide occurrence. Liu (2014) notes that countries targeted by investors are among the poorest in the world and they are characterised by weak land institutions. A survey of literature reveals that large-scale land investments, whether in agriculture or not, have occurred in different parts of the world, such as the post-Soviet Eurasia, Southeast Asia and Latin America, and in some big countries such as China, Russia, India (Edelman *et al.*, 2013) South Korea and the gulf states (Hall, 2011). It seems that the distribution of these LSI is heavily skewed towards Africa, and this could justify why Africa has been given the most attention in this regard.

The analysis, using data from the Land Matrix database, shows that there is a total of more than 43 000 000 ha involved in the contracts of successful[4] land deals. Of this, Africa's share is about 20 156 478 ha (47%). With a global share of about 47% in terms of area, Africa arguably remains the biggest player in this global phenomenon. Following behind with a margin of more than 25% is South America, accounting for about 19% of the global total. Asia sits at about 12%, Oceania 9%, Russia 8% and lastly, Europe at about 6% of the global total. Table 2.1 gives more details about these deals.

Table 2.1: Share of contract size by geographic region

Target region	Contract size (ha)	Global share
Africa	20 156 478	46.59%
Asia	5 138 948	11.88%
Europe	2 761 365	6.38%
Oceania	3 812 194	8.81%
Russia	3 347 912	7.74%
Central America	4 1 943	0.10%
South America	8 007 833	18.51%
Global total	**43 266 673**	**100%**

Source: author – computed from Land Matrix data[5]

In 2016, it was estimated that globally, an area equal to 630 times the size of Nairobi (Nairobi is 69 600 ha in extent) was involved in large-scale land acquisitions (Land Matrix, 2016), a significant reduction from initial estimates of close to 200 million by Anseeuw *et al.* (2012). This revised figure followed verification of the data and screening of unreliable or unsubstantiated data. The global total area involved now stands at more than 43 million hectares.

In terms of successful deals/contracts entered into, the Land Matrix database records 1238 successful land acquisition deals globally, as of June 2016. Of these, 515 (42%) were in Africa, 349 (28%) in Asia, 211 (17%) in South America and 101 (8%) in Europe. The Caribbean and Middle East constitute the other 1%. This is shown in Table 2.2.

[4] A successful deal is defined as one whose contract has been concluded and is operational.
[5] Where details of contract size (ha) was missing, production size (ha) was used as the estimate value.

Table 2.2: Share of deal count by target region

Target region	Deal count	Share (%)
Africa	515	41.60%
Asia	349	28.19%
Europe	101	8.16%
Middle East	1	0.08%
Caribbean	2	0.16%
South America	211	17.04%
Central America	17	1.37%
Oceania	42	3.39%
Total	**1 238**	**100.00%**

Source: author – computed from Land Matrix data

Clearly, Africa remains a leading player in the area of large-scale land investments and has greatly contributed to the increase in the hype regarding LSI in farmland over the past few years. However, the increase in interest is not because this is a new phenomenon as such, as concurred by Smaller and Mann (2009), McMichael (2012), Margulis *et al*. (2013), Moyo *et al*. (2012) as well as Baglioni and Gibbon (2013). These agree that this is not a new occurrence per se, but it has existed from the colonial times, albeit in a different form and extent (Kugelman & Levenstein, 2009).

2.3 PREVIOUS INVESTMENTS IN FARMLAND

Although the phenomenon of LSI in farmland has been receiving widespread attention and publicity in international media, it is not a new phenomenon in isolation, as it has existed since the colonial period. Smaller and Mann (2009) cite examples of large foreign-owned tea, sugar, cocoa and other export crop plantations in various locations in Latin America, Africa and Asia, and they note that many of these are remnants of the colonial era. Wily (2012) cites examples of the late 19th century and early to mid-20th century colonial land rushes in Africa that dispossessed the natives of their land and notes that the contemporary LSI (land grabs) simply represent a resurgence of the capture of the rights of the locals by capitalist investors. The author, however, notes that current investors are "more global and diverse than their 1880s counterparts" (ibid.). Kugelman and Levenstein (2009) also buttress the views of Smaller and Mann (2009). They note that land grabs are "simply reappearance, in a new form, of a phenomenon that has occurred for centuries". However, Kugelman and Levenstein (2009)

further emphasise that the only difference between the "colonial era" foreign investments in farmland and the current ones is the nature that these current investments now take. These differences are noted in Table 2.3.

Table 2.3: Current vs colonial-era large-scale investments in farmland

Current investments	Colonial era investments
They are of a much larger scale in nature	Much smaller scale
Emphasise staples instead of cash crops	Were mainly cash crops
Agreements form the basis for concluding the deal	Deals were forcibly concluded through use of a gun
Government-led investments are at the forefront	Government-led investments were not that prevalent

Source: Author; based on text from adopted from Kugelman & Levenstein (2009)

Although Kugelman and Levenstein (2009) note that current investments are more spearheaded by government-led investment, this does not seem to be the case. It appears, rather, that most contemporary investments are private sector led, with private equity, pension and hedge funds involved. Data from the Land Matrix database of large-scale farmland investments in Zambia seems to confirm this. The study notes that all the 24 operational investments recorded were private sector led. The question, then, is that if the investors are mostly from the private sector, what then is really driving this global interest in farmland? The literature reviewed, seems to point to three key issues.

2.4 DRIVING FORCES OF LARGE-SCALE INVESTMENTS IN FARMLAND

Three major drivers of large-scale investment in farmland seem to emerge in the literature sources reviewed. These are food security concerns, energy/fuel concerns, and financial security concerns. Generally, it is believed that the private sector, being driven by speculative tendencies of increases in the prices of agricultural commodities, and some governments, being concerned about the security of their food and energy requirements in the long term, are the underpinning causes of the recent spate of large-scale investments in farmland, as elucidated in subsequent sections of this chapter.

2.4.1 Energy security

A look at the trends in land grabs shows a peak in 2009. This coincides with the fuel price shocks which seemed to have triggered the diversion of some food stocks towards biofuel production (Anseeuw *et al.*, 2012). It appears that this gave the impetus for states to acquire land for biofuel production in order to meet their energy requirements. According to Schoneveld (2011), underlying this energy security driver is the perception of investors that there will be an increase in demand for biofuels in the long term by industrialised nations. Kugelman and Levenstein (2009) also attribute the increase in large-scale investments in farmland to the biofuels boom. Smaller and Mann (2009) also share the same views with regard to food and energy security as being the drivers for the large-scale investments in farmland. Although they highlight the point that the high oil prices of 2007/2008 seem to have triggered private-sector investments in energy crops, they note that this phenomenon seems to be driven more by food security concerns than economies of scale, characteristic of the foreign-owned, colonial-era plantations. This is in contrast with what Anseeuw *et al.* (2012) point out. These latter authors ascertain that about 40% of all acquisitions are for biofuel production, followed by 25% for food crop production. But, generally, many scholars are in agreement regarding the contribution of biofuel to the spike in demand for agricultural land. Borras *et al.* (2010) give a succinct analysis of the biofuel boom. They note three major factors spurring the biofuels boom, namely the need to reduce dependence on Middle Eastern oil, which is driving governments to develop biofuel industries to improve energy security; agribusinesses being drawn by the prospects of a new profit frontier in the face of rising costs; and the need to address environmental concerns (such as climate change concerns). Policy commitments, such as the EU renewable energy targets, also contribute to the burgeoning biofuel drive.

Analysis of the Land Matrix database seems to concur with the bio-fuel arguments presented in the literature. The Land Matrix database shows 25 operational deals in large-scale investments in farmland in Zambia. Of the 25, 36% (9) of them are in biofuel production. The study also notes that, globally, about 18% of the recorded deals are for biofuel production.

2.4.2 Financial security and financialisation of the global food system

Hallam (2011) notes that for some investors in countries that do not have food security concerns, large-scale investment in farmland in land-rich countries presents an opportunity to

grow food as a way of portfolio diversification and cushioning those countries against risks posed by instability in the equity and bond markets. In the same manner, Anseeuw *et al.* (2012) note that the demand for land-based commodities is not the only driving force behind large-scale land acquisitions, but speculation regarding rising land values as well. These speculators are both national and multinational actors, for example hedge funds.

Financial security concerns have resulted in massive global mobilisation of finance for investment in the food and agriculture sector. This is often referred to as "financialisation[6]" of agro-food systems and it has ignited scholarly interest in this regard. It is noted that there has been an increase in the financialisation of agriculture and food systems over the past few years (Ouma, 2014; Clapp & Isakson, 2018; Ouma, 2016; Clapp, 2014). David Harvey (2011) gives an account of how the global financial crisis of 2007/2008 paved way for financial institutions to look to distant shores for more stable and profitable investments. He notes that "export of capital and cultivation of new markets around the world" was seen as part of the solution to the crisis. Driven by capitalist tendencies, wealthy individuals, corporations and other government supported companies started buying up land mostly in Africa and Latin America (ibid.) This gravitation of international capital markets towards agriculture would provide them with a safe haven for investment (McMichael, 2012). Concern is raised about how this is re-structuring the whole agro-food industry. Due to the increasing involvement of global finance in large-scale investments in land and agriculture, McMichael (2012) notes that "land grabs" should be viewed as more than just "a contemporary enclosure of land for capitalist expansion" due to the interplay of financialisation. Anseeuw *et al.* (2012) note that investors are financing the entire agricultural value chain, subsequently giving them control over production decisions. Production decisions are therefore influenced by global finance as agriculture and its products are absorbed into the finance chain (Lawrence *et al.*, 2015). An example cited is that of the largest four grain producers who are controlling 90% of global grain trade (ibid.). McMichael (2012) further notes that these decisions are driven by profiteering goals and do not necessary reflect a balance between food and fuel needs and have no regard for environmental considerations. There is therefore concern that as global finance and corporate investors are increasing investments in agriculture and its products, the capital flows are pushing production systems towards a sub-optimal direction Anseeuw *et al.* (2012).

[6] The term "financialisation" is used to define "the increasingly important role played by financial markets" within the economy (Lawrence *et al.*, 2015).

Much of the debate on the financialisation of agriculture and the food sector is also about how it is restructuring the sector. It is argued that global finance has made it possible to acquire cheap land, labour and water by capitalising on off-shore food production areas for speculative purposes and this is contributing to the restructuring of the whole agricultural architecture (Lawrence *et al*., 2015). Financialisation has thus paved way for capital accumulation in the agricultural and food sector (Clapp, 2014; Clapp & Isakson, 2018). There are concerns that financialisation of entire agricultural value chains will spell disaster for the smallholder farmers in recipient countries. McMichael (2012) calls this the "global ordering of international food production" and there are concerns that this is weakening the smallholder farmers, thrusting them into the labour markets, thus leading to their demise. Despite these concerns, there are those, such as the World Bank, the Food and Agricultural Organisation (FAO) and the Alliance for Green Revolution (AGRA) who contend for financialisation as a way of bringing about development (ibid.).

2.4.3 Food security

In early 2008, there was a global food crisis resulting in spiralling, rising food prices which triggered food riots in many countries of the world. Many nations had their food security status greatly compromised and this compelled those nations that were land-poor to seek opportunities to acquire land in countries richly endowed with land and to externalise their food production needs for the benefit of their populations (Kugelman & Levenstein, 2009). In addition to the high food prices, Hallam (2011) notes that policy-induced supply shocks due to export controls fuelled the fear of dependency on world food markets for food supply. It is noted that players such as China with a burgeoning population were greatly concerned about food security issues and also joined the global rush for farmland. Schoneveld (2011) also asserts this, pointing out that demand for food, particularly in South Asian and Middle Eastern countries where land is in short supply, is driving the quest for land acquisitions in southern Africa. Hall (2011), however, questions the validity of the food security arguments, citing the case of southern Africa where the prevalence of land acquisitions is attributable to other purposes, apart from food production. These conflicting views still remain.

From the Land Matrix database (2016), it is noted that there are 31 investments recorded for Zambia and of these, 26 (83.9%) are in food production and 9 in biofuels production. Of the 26 that are producing food crops, 14 (53.8%) do so exclusively, while the other 12 are also

producing either livestock or biofuels, or a combination of both. Table 2.4 shows this in more detail. This, therefore, seem to support the food production argument although the Land Matrix database does not indicate whether these investors are growing the food for the export or local markets.

Table 2.4: Intention of investor in Zambia

Investor Intention	Count
Biofuels only	5
Biofuels, Food crops	4
Food crops only	14
Food crops, Livestock	8
Total	**31**

Source: author, computed from Land Matrix database

Figure 2.1 also shows that those exclusively producing food crops have the biggest percentage share at 45%, while food crops and livestock follow behind at 26%. However, it is important to note that although there are eight recorded cases of biofuel production, only three of them are operational, and the other five have been abandoned. Reasons cited in literature for the abandonment of such biofuel projects are sustainability and the conflict between food and fuel needs (Hall, 2011). According to GRAIN (2018), between 2007 and 2017, there was a record of about 135 food crop production land deals that had failed. These failures ranged from land deals that never materialised to those in which farm production failed to take off. GRAIN (2018) notes that land deals fail for several reasons such as when the government cancels or severely scales back the concession or permit; investor withdrawal due to financial losses or other negative consequences; grassroots opposition to the land deals and investor bankruptcy. In some instances, conflicting motives amongst the different parties involved could result in a land deal failure as was the case in a failed Jordanian land deal in Sudan, Hopma (2015) and this ultimately affected the financing of the deal when the investor pulled out.

A cause of concern presented is that when land deals fail, the land does not go back to the community but is passed on from one investor to another (Grain, 2018). The new investor may be worse than the previous one and refuse to honour any obligations or commitments that had been made by his predecessor (ibid.). Thus, smallholder farming communities are alienated from their land forever.

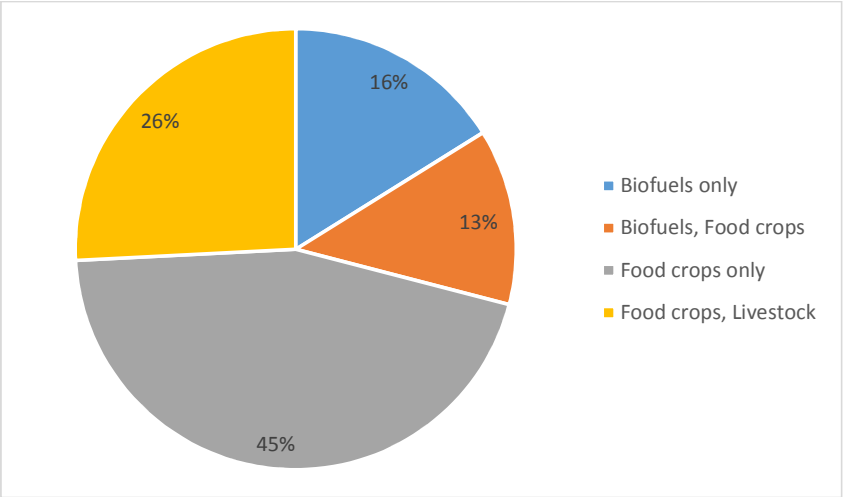

Figure 2.1: Investor intentions in Zambia

Source: Author – computed from Land Matrix data

The evidence seems to point that food security concerns are indeed a major driver for the large-scale land acquisitions in Zambia as depicted in Figure 2.1. So, if food security is major driver of the LSI in farmland, the question that then arises is whether investors who are into food production are growing the food and shipping it back to their countries, or whether they are producing for the domestic market.

It was noted earlier that there is a general notion that investor countries are growing food in recipient countries for export back to their own countries (Daniel, 2011; Anseeuw *et al*., 2012). With this perception, there are concerns that recipient countries are more and more internalising the costs of global resource scarcity to the benefit of the investors. A discussion in Chapter 7 will show whether this is indeed the case in Zambia. The other notable driver of LSI in farmland in Zambia is bio-fuel needs as depicted by Figure 2.1.

This section has shown that food, fuel and finance (3Fs) are the major drivers of the escalating large-scale investments in farmland. An understanding of the nature of these deals and how they unfold would be important to give a better understanding of the basis of the arguments presented by proponents and contenders of LSI in farmland.

2.5 THE NATURE OF THE DEALS

According to White *et al.* (2012), an investment deal is simply an outline of concrete agreements between agro-investors and local governments, made for the purpose of leasing or purchasing land. Cotula and Vermeulen (2009) add that it is more common to have leases or concessions than land sales.

It has been noted that land deals may be embodied in one or more contracts (Cotula & Vermeulen, 2009). They can take the form of a framework outlining key aspects of the land deal, or they can be instruments with some aspects that allow the transfer of the land to the investor (ibid., 2009). These contracts are often supported by other legal texts, such as national laws on aspects such as land, environment or natural resources.

Several authors (Robertson & Pinstrup-Andersen, 2010; White *et al.*, 2012; German *et al.*, 2011; Nolte, 2014; Meinzen-Dick & Markelova, 2009) have noted that the way in which the deals are structured and finalised is often shady, secretive and non-consultative. A lack of transparency on these deals often causes corruption and a misdirection of benefits towards the elites (Cotula & Vermeulen, 2009). The contracts are often flawed and in favour of the investor. For example, in Mozambique, the law does not make it mandatory for the investor to consult with the local communities before land transfers are made (ibid., 2009), which automatically places the local communities at a disadvantage. Because of the lack of transparency, communities are sometimes not consulted, giving rise to tensions. An example is that of Liberia where lack of involvement of the locals in the concession and consultation on compensation led to significant strife which affected the particular project (Deininger *et al.*, 2010).

Criticisms of these deals also arise from the perceived imbalances in the deals, with benefits highly skewed towards the investor. White *et al.* (2012) note that sometimes the legal frameworks (such as the bilateral investment treaties) in which these deals are enshrined aggravate the imbalances and result in all the benefits accruing to the investor, to the detriment of the community or host government that will shoulder the risks.

It has also been noted that some deals give extensive rights to investors, with seemingly little benefit for the host government and local communities whose land is often mortgaged in the deals (Cotula, 2011). Benefits to investors take various forms such as long lease periods (ibid.),

at minimal prices which are often not reflective of the true land value, and long tax exemption periods (tax holidays). For example, for some land deals in Ethiopia, land rental is as low as USD 2 per hectare per year, and USD 5 per hectare per year in Liberia (ibid.). Cotula (2011) notes that most of these contracts are "long-term land leases on land owned or managed by the state". The benefits to the host government often include the rental fees, and development of infrastructure such as dams, irrigation and processing plants. While the benefits for the local communities may not be clearly and specifically articulated in some of the contracts, Cotula (2011) further notes that benefits for the local communities may include job creation in agriculture, processing, and other value chain relations.

These deals certainly appear to favour the investor at the expense of the recipient governments or communities. But, it is important to understand if generalisations can be made across the board regarding the nature of the deals. It may be useful to first understand the players involved and analyse their interests and intentions in order to draw some inference in this regard.

2.6 THE PLAYERS IN LARGE-SCALE INVESTMENTS IN FARMLAND

The characteristics of the investors and the investment deals may vary from one country to another, but it is generally accepted that there are some common features which these investments share.

2.6.1 The players

Cotula *et al.* (2009) note that there are two major players in the most basic form of farmland investments. On one hand is the foreign investor, and on the other is the host government.

Governments are normally the land providers, although private landholders have also been targeted by investors as in the case of Brazil (Cotula & Vermeulen, 2009). In Africa, the land provider is almost predominantly the government, mostly because more often than not, they are the formal owners of the land (ibid.). Borras *et al.* (2010) also note that it is the state actors that are responsible for "providing and sanctioning" the land acquisitions.

It is now widely accepted that both public[7] and private[8] sector investors are involved in the LSI in farmland (Liu, 2014), contrary to the views of Kugelman and Levenstein (2009). There is a notion that rich foreign governments are the major investors in these land deals. However, a review of the literature (and of the deals listed in the Land Matrix) reveals that there is a wide spectrum of investors involved in undertaking investments in farmland in Africa. These include both government-led and private-sector investors. According to FAO (2009a), most of the investors are in the private sector. For example, most of the land deals in Madagascar, Mali, Ethiopia and Ghana were private-sector deals (Cotula & Vermeulen, 2009). Private sector investors are often constituted in the form of holding companies or investment companies (FAO, 2009a) and they provide finance and other support to private investors or directly (ibid.). In the analysis of the Zambian deals in this study, all of the 24 investors are private companies and none is from national governments. (See Annex 1).

Although the bulk of investors in the land deals appear to be from the private sector, governments and sovereign wealth funds (SWFs) are also playing an increasingly important role. The OECD (2010) notes that a great share of the investment in Africa in agriculture is from sovereign wealth funds. These are government funds which are not under the direct control of the legislatures or civil services.

Governments may also create funds to provide financial support to private investors in land deals, for example the Abu Dhabi fund for development (Cotula & Vermeulen, 2009). Cotula and Vermeulen (2009) do not rule out government-to-government investment deals, but note that these are very rare. Both the land provider and the investor are motivated by incentives presented in the land deal contracts and these contracts are often said to be lop-sided, in favour of the investor.

In addition to the land provider and the investor, two other key players in the land deals cited in literature are the local communities and the insurer (Cotula, 2011). Each of these players have different interests, and the relationship between them differs from one deal to another (ibid., 2011).

[7] Examples include investment funds, pension funds, hedge funds, agricultural and agro-industrial companies (Liu, 2014)

[8] Examples include governments, sovereign wealth funds and other state-owned companies (Liu, 2014)

Given the above, it is clear that there is a wide spectrum of investors with diverse backgrounds involved in large-scale land acquisitions and it will be important to understand where exactly they come from and what is their intention is. An appreciation of their origins may help us to draw a clearer picture about what their intentions might be.

2.6.2 Origin of the investors

It is generally believed that the investors are from rich, developed countries targeting countries in the global south as noted by Shete and Rutten, (2015). The United Nations Economic Commission for Africa (UNECA), (2013) however notes that investors in Africa are largely from western countries. Data from the land matrix shows that the United Kingdom is the biggest investor (in terms of number of land deals) and the United States of America (USA) leads in terms of the total size (ibid.).

Contrary to the general belief that investors are only from rich, developed countries, the UNECA (2013) notes that emerging economies are also playing a key role. Examples cited include South Africa, India and China. Of the 24 investors in Zambia registered on the Land Matrix database, 10 (41.7%) are from African countries (Zimbabwe – 4, and South Africa – 6).

There are also rich Asian and Middle East countries actively engaging in large-scale land acquisitions. Analysis of the Land Matrix data shows that the biggest investors, globally, are from Asia, followed by Europe and then Africa. These three constitute more than 73% of all global land deals. Table 2.5 gives more details on this.

Table 2.5: Investor by region

Investor region	Deal count	Share (%)
Caribbean	16	1.04%
Oceania	9	0.58%
Asia	520	33.74%
Europe	436	28.29%
Africa	176	11.42%
Central America	8	0.52%
Middle East	102	6.62%
Northern America	168	10.90%
South America	76	4.93%
Unknown	30	1.95%
Total	**1541**	100.00%

Source: Author, computed from Land Matrix data

It is interesting to note that investors from Africa play a big part, with a share of about 11% globally, which is contrary to the belief that Africa is at the mercy of western investors, internalising costs of investments to the benefit of foreign, western investors.

From these statistics, it is clear that Africa, ranking third, is a key player in the global discourse on large-scale investments in farmland. However, it is will be important to understand some of the debate surrounding LSI in farmland regarding their impact on small holder farmers.

2.6.3 Overview of large scale investments in farmland and their impact on smallholder farmers

The impact of LSI in farmland on smallholder farmers varies greatly, depending on the underlying factors such as the business model and commercial viability (FAO, 2013; Von Braun & Meinzen-Dick, 2009; Liu, 2014). However, the debate on large scale investment (LSI) in farmland has mainly been centred on how such investments disenfranchise the smallholder farmers. For example, Anseeuw *et al.* (2012) note that "land grabs" jeopardise the land resource rights of smallholder farmers. They also note that the poor are likely to be the most negatively affected group due to different power dynamics amongst those involved in LSI in farmland, (investors, governments, local country elites and local communities). These negative impacts are huge where local land rights are unclear, (Deininger *et al*., 2011).

The main argument presented in literature is that LSI in farmland target smallholder farmland as it is often easier to access due to insecure tenure. In this regard, investors seem to target countries with weak governance systems (Deininger *et al*., 2011), leading to deprivation of community rights and often inadequate compensation. Anseeuw *et al.* (2012) buttress this by pointing out that due to weak legal protection under customary tenure, communities are left vulnerable to dispossession. These views are confirmed in an empirical study conducted by Nolte (2014) in Zambia, which showed that land users were marginalised by the land acquisitions due to weak enforcement of rules, which is characteristic of poor governance. Similarly, a study by FAO (2013) which analysed impact of large scale land-based investments in several countries in Africa, Asia and Latin America noted that the impacts were negative where the land rights were insecure and poorly specified.

Literature is replete with examples of how smallholder farmers have been victims, rather than equal partners in the LSI in farmland deals. Negative impacts noted by Liu (2014) include threats to food security of host countries, displacement of smallholder farmers, loss of grazing land, degradation of natural resources and loss of livelihoods for local communities, leading to social disintegration. Loss of grazing land as a result of increased commercial pressure on land by a foreign investor in Bechera community, Ethiopia, was also reported in a study by Fisseha (2011). This subsequently had a negative impact on the local community's livelihoods. Displacement of communities from their land has also been noted in Zambia (Chu *et al*., 2015), in Ethiopia (Makki, 2014) and in Mozambique (Joala *et al*., 2016). Shete and Rutten, (2015) also investigated the impact of large-scale agricultural investments on incomes and food security in Oromia region of Ethiopia and noted that the smallholder farmers experienced loss of income and reduction in food security under competing land claims and high population densities. Although empirical studies such as these have shown the negative impacts of LSI in farmland, there are still arguments contending for LSI. For the proponents of LSI in farmland, improvement in food security is often cited as one of the positive impacts from such investments (Cheru and Modi, 2013). However, Daniel and Mittal (2009) note that there is actually a disconnect between large-scale agricultural investments and food security objectives, citing examples of some governments of the Middle East and Asia acquiring land to stabilise food supplies in their countries.

Whilst literature reviewed highlights the negative impacts of LSI in farmland on smallholder farmers, there have also been cases were positive impacts have been reported. Even though it is possible to realise either positive or negative impacts, depending on the type of investment model pursued, there is very little evidence on the benefits, especially in the short term (Liu, 2014) and benefits are unlikely to be realised where the investment leads to creation of enclaves (Cheru & Modi, 2013). However, Liu (2014) notes that it is possible to realise positive impacts from large scale agricultural investments, particularly in cases where the smallholder farmers remain in control of their land and are involved in the investments as equal partners. These benefits are likely to be in the form of employment (Liu, 2014; Deininger & Byerlee, 2011). Benefits could be realised through provision of goods and services, employment, access to technology and markets and payment of taxes to government (Deininger & Byerlee, 2011). Empirical evidence from a study by Joala *et al.* (2016) lends support to this observation. They noted that smallholder farmers in Mumbwa district of Zambia had access to input and output markets, received training from the investor and had opportunities created for them to

participate in the investor's outgrower scheme. The World Bank/UNCTAD study (2017) examined the impact of large scale agricultural investments in Ethiopia, Tanzania, Mozambique and Cambodia and noted that the most positive impact on the communities was employment, with its trickle down effects of increased incomes and local savings, leading to improved livelihoods. The study however does not make income comparisons between households employed by investors and those that continued working on their family farms. Other benefits noted are skills transfer through training as well as social corporate responsibility activities such as road maintenance.

Even though literature cites examples of positive impacts, these are thought to be outweighed by the negative impacts (Liu, 2014). This is supported by evidence from case studies conducted by Cheru and Modi (2013), which showed that the negative impacts far outweighed the benefits gained from large scale agricultural investments. With both proponents and opponents presenting strong arguments regarding the impacts of LSI on smallholder farmers, the debate still rages and literature thus seems to be inconclusive regarding this matter.

2.6.4 Engagement models between large-scale and small-scale farmers

Even though literature seems inconclusive regarding the impacts of LSI in farmland, what seems to come out clearly is that the extent and nature of the impact is dependent on the kind of investment model and the degree to which smallholder farmers are included/excluded from the investment operations.

Literature informs us that large-scale commercial framing models were introduced to Africa through colonialism and local communities were dispossessed of their land in the process (Hall *et al*., 2017a). Since then, these large-scale agricultural investors have engaged with smallholder farmers using the large-scale farming models introduced from the colonial period. Examples of these models include contract farming and outgrower schemes; plantations and estates and independent large-scale and medium-scale commercial farming models. Investors employ different types of large-scale farming models depending on the nature of business they are pursuing. The models they pursued will affect the smallholder farmers in different ways.

The plantation model for example was characterised by growing of one crop, with central management and relied on hired labour. Contract farming on the other hand consisted of either a verbal or written contract for smallholder farmers to supply produce to the large-scale farmer at a pre-determined price and time. Variants to this included the nucleus estate with smallholder outgrower farmers supplying produce to the estate (Smalley, 2013). The independent commercial farming model consisted of a private large-scale or medium-scale farmer who would engage labour on a seasonal or permanent basis. Presently, there seems to be an increase in this type of farming model largely due to expanding indigenous middle class constituting emerging[9] farmers (Smalley, 2013; Sitko & Jayne, 2014; Jayne *et al.*, 2014). The medium-scale farmers actually control more land than the large-scale commercial farmers in Zamia, Ghana and Kenya (Jayne *et al.*, 2014). Like the colonial era individual commercial farmers, these are said to be accumulating but from below (Hall *et al.*, 2017b).

Much of the discussion regarding the different types of farming models through which the large-scale agricultural investors engage with the local farmers is about how the different types of models impact differently on the smallholder farmers. Plantation/Estate farming for example, is deemed to be one of the worst kind of models regarding its impact on the smallholder farmers. It is given as one typical example of accumulation by dispossession as it often involves taking over the land and displacing the local smallholder communities (Smalley, 2013; Hall *et al.*, 2017b). It also critiqued for its disengagement from the local economy in that it fails to promote strong forward and backward linkages yet uses local resources (labour, land) for output whose value chains are embedded in global markets (ibid.). In addition, plantation agriculture is also associated with declining productivity in the medium term (Anseeuw *et al.*, 2012).

Contract farming on the other hand, has been hailed as an ideal model for agricultural restructuring and commercialisation which can positively benefit smallholder farmers (Cotula *et al.*, 2009; von Braun & Meinzen-Dick, 2009). Several benefits such as technology and productivity enhancement are associated with contract farming (Little & Watts, 1994). Little and Watts (1994) also allude to the emergence of a prosperous smallholder middle class enjoying income benefits from contract farming. However, they note that social impacts often outweigh the income benefits. Contract farming often targets middle level smallholders and

[9] These are defined as holders of between 5 and 100 hectares (Jayne *et al.*, 2014; Sitko and Jayne, 2014).

excludes the very poor, creating social imbalances and differentiation (Little & Watts, 1994). Rural inequality within the outgrower community is further promoted when poor indebted farmers are evicted (ibid.). A study by Hall *et al*. (2017b) which analysed the impacts of different agricultural commercialisation models on labour, livelihoods, land and local economic linkages in Zambia, Kenya and Ghana had mixed results which supported neither of the contradictory views of Little and Watts (1994) and those of Cotula *et al*. (2009) and von Braun and Meinzen-Dick, (2009) on contract farming. For example, in Kenya, the study revealed that outgrowers involved in contract farming were poorer than their counterparts who were not part of the outgrower scheme. On the other hand, outgrowers in Zambia and Ghana were better off than non-participating households.

Independent commercial farming models also have their origins in the colonial history of accumulation. They are now being characterised more and more by an expansion of local, middle class elites investing off-farm income into farming (Hall *et al*., 2017b; Jayne *et al*., 2015). There is potential for these models of farming to contribute to local economic development through job creation and re-investment into the local economy (Smalley, 2013; Matenga & Hichaambwa, 2017). Evidence from the study by Hall *et al*. (2017b) indicated that these farms are better in terms of job creation and stimulation of local economic development than the plantations and outgrower farming models. However, caution is given, about the cumulative potential of this type of farming model to dispossess smallholders through land purchases, leases and consolidation (ibid.).

2.7 LSI CREATING ENCLAVES OR CO-EXISTENCE?

The preceding section noted that some of the investment models dispossess/have the potential to dispossess local smallholder farmers. Some scholars (Kugelman & Levenstein, 2009; Hall *et al.*, 2017b), have stated that contemporary LSI in farmland, just like the colonial style large scale commercial farmers are disposing local farmers, howbeit in the latter, with the full sanctions of their governments. Adding to these sentiments is Araghi (2000), who notes that many people in agriculture have been dispossessed and displaced from their land in the name of development for the past several decades. Moyo *et al*. (2012) have described contemporary LSI in farmland as a continuation of "primitive accumulation". This term is defined by Oya (2013) as the alienation of workers from their means of production, particularly land. Oya (2013), like Moyo *et al*. (2012) believes that this is an on-going process and it is slowly, but

surely transforming the whole agricultural landscape towards "capitalist forms of farming". Primitive accumulation seeks to separate the workers from their land and commodify it (Moyo, *et al*., 2012), thereby exercising hegemony over local communities. Harvey (2003) calls this "accumulation by dispossession" and notes that this is characterised by several factors such as commodification and privatisation of land, displacement of local farmers and conversion of different types of property rights into private property rights. A growing body of literature (White *et al*., 2012; Moyo *et al*., 2012; Makki, 2013; Hall, 2013; Li, 2010), seems to suggest that LSI in farmland are creating enclosures of land and resources in recipient countries. The argument is that investors, driven by capitalistic tendencies are creating enclosures in recipient countries by consolidating/concentration of smallholder farmland, or "unutilised[10]" statutory land into their own little havens at the expense of poor smallholder farmers and recipient government. Scholars (Li, 2011; Hazell, 2011) argue that the enclosures promoted by contemporary agricultural investors are pushing people out of agriculture, creating surplus labour which is not readily absorbed elsewhere thereby worsening the economic impact of recipient governments.

As noted above, it seems that LSI in farmland are bringing about agrarian change in Africa by gradually transforming the agricultural landscape through consolidation of smallholder land into large corporate farms. This view presented by writers such as Oya (2013) has created a spark in the debate about large farms and small farms and which model will work best for Africa.

2.8 PERSPECTIVES ON LARGE-SCALE INVESTMENTS IN FARMLAND AND THE SMALL FARM VS. LARGE FARM DEBATE

The literature available indicates that there are opposing views/mixed reactions from various scholars and technocrats with regard to how large-scale investments in farmland affect smallholder farmers. Several viewpoints are presented in the literature and these are discussed below.

[10] Land often referred to as unutilised may be unoccupied but will be serving other purposes, e.g. pastures, water, timber and non-timber forest products. Manipulation of the legal system classifies untitled land as unowned even though communities may be traditionally occupying and using them. The state thus becomes the default legal owner of such lands (Wily, 2012).

Arguments about dispossession and accumulation are presented by various scholars (Wily, 2012; White *et al*., 2012; Hall, 2011) who also argue that large-scale investments in farmland are bad and akin to neo-colonisation. It is argued that such investments are dispossessing the smallholder farmers of their most vital productive resource base – land, to make way for large-scale farms. Besides the threat of dispossession, De Schutter (2011) notes, small-scale farmers could be faced with increased competition in their markets due to the expansion of large-scale investments in farmland.

Another school of thought (Hazell *et al*., 2007; Hazell, 2011; Wegner & Zwart, 2011) argues against large-scale investments in farmland from an efficiency point of view. The stance taken by this school is that if LSI in farmland will result in the transformation of the agricultural sector through the amalgamation of small farms into huge corporate farms, then this would not work for Africa. The argument presented is that small farms are more efficient and are better at delivering Africa's developmental needs than the large corporate farms promoted by land grabs.

There have been debates regarding which particular farm size would lead to the most significant agricultural and economic growth. However, Cheru and Modi (2013) note that the small-scale versus large-scale farmer debate does not adequately address the underlying factors of agricultural productivity such as political and institutional blockages. Writers like Wegner and Zwart (2011) note that smallholder farmers are more efficient than large-scale farmers are in terms of production per hectare. Hazell (2011) adds his voice to these sentiments. He notes several advantages of small-scale farms, such as greater economic efficiency, contribution to employment creation, poverty reduction, and food security. According to Wegner and Zwart (2011), about 500 million smallholder farmers globally support about a third of the global population. Hazell (2011) further argues that the development of small-scale farms will lead to a "win-win" outcome in terms of growth and poverty reduction because a large share of the rural poor is accounted for by the small farms. He cites the Asian green revolution as a case in example. Development of the smallholder sector in Vietnam, for example, led the country to move from being a net food importer to a net food exporter (Wegner & Zwart, 2011).

While Wegner and Zwart (2011), like Hazell (2011), advocate for the small farms based on their efficiency. Hazell (2011) goes on further to note that small farms gradually become replaced in the long run, and notes that this transition is faster in Africa than it is elsewhere.

While there is this argument in favour of small farms, there is on the other hand another school of thought e.g. (Collier & Dercon, 2014) that argues for the LSI in farmland, based on the large farm models. They seem to believe that large-scale farmland investors could constitute a panacea for the challenges faced by African agriculture. Their rational is that if LSI in farmland results in transformation of small, family farms into large, corporate farms, then Africa must be on the right track because large farms will lead to agricultural revolution and subsequent growth. This school of thought believes that large, corporate farm models are the best way to accelerate agricultural growth and development, and ultimately economic growth, and that small farms do not seem to have any significant role to play. These experts base their arguments on the revolution of the agricultural sector through large-scale corporate farms that has been experienced in some countries in the world. Deininger and Byerlee (2011), for example, note that credit for the Latin American agricultural revolution is accorded to the large-scale farm model they adopted. According to these authors, there was increased global demand for products such as soybean, sugar and meat following the liberalisation of agriculture and trade in the 1980s. Consequently, some Latin American countries, such as Brazil, Paraguay, Argentina and Uruguay, capitalised on this growing demand by engaging in massive land expansions for both crops and livestock production. Less than two decades later, the cattle population had more than doubled and the expansion of soybean and other crops in the *cerrado* (savannah) region resulted in increased production and exports (ibid., 2011). The economies of scale realised, plus downstream value addition, created a competitive advantage for them.

Similar experiences in Russia, Ukraine, and Kazakhstan are also noted by Deininger and Byerlee (2011). The same authors also take note of the success of the South East Asia perennial crop sector, which is characterised by the plantation model of large-scale farming. For example, Malaysia and Indonesia have huge tracts of palm plantations and account for about 90% of the world's palm oil production (ibid., 2011). The results realised by these Asian countries in transforming their economies and reducing poverty through large-scale farming gave further impetus for reinforcing the *large-scale farming* development model (ibid., 2011).

Collier (2008) and Collier and Dercon (2014) also echo the sentiments of Deininger and Byerlee (2011). They cite the successes of the Brazilian agricultural revolution as a reason for implementing large farm models. Cheru and Modi (2013) seem to share the perspective of Deininger and Byerlee (2011). They consider countries such as Brazil, China and India to be

highly successful noting the agricultural-led development strategy they pursued, contributing to poverty within a short time period.

According to Collier and Dercon (2014), small farms will not result in significant agricultural growth and development. They argue that too much focus on smallholders may actually hinder large-scale poverty reduction measures (ibid., 2014). The same authors further argue that although smallholders may be efficient in what they do, this reason alone is not sufficient to warrant the focus on smallholders as being the agents of growth in agriculture. They contend that the smallholder farm model is flawed in that key areas of potential economies of scale, such as skills and technology, finance, and access to capital, markets and trading, are not intrinsic to the small farms, and that a large size facilitates commercialisation (ibid., 2014). These arguments are used as justification for the LSI in farmland. Although Collier and Dercon (2014) and Deininger and Byerlee (2011) consider the Brazilian agricultural revolution based on the large-scale farm model as a success, they do not consider the negative environmental impact this has had on the country unlike Cheru and Modi (2013) who note that agricultural development in the *Cerrado* region was fraught with "long lasting negative social and environmental consequences".

On the other side of the debate are writers such as Hazell (2011) who strongly counter the pro-large-scale farm argument by arguing that people are quickly pushed off their farms when small, family farms are rapidly consolidated into large farms, and that without commensurate economic growth and development to absorb the extra labour from agriculture, the inevitable result is worsening poverty and rural–urban migration (ibid., 2011).

The literature reviewed, therefore, seems to be inconclusive with regard to whether large-scale or small-scale farming is the way to go for Africa. However, observations reveal that most of Africa's agriculture has been driven by small-scale farms, with varying degrees of success, depending on the model pursued. The debate on small vs. large scale farms is therefore outdated and not productive. The focus should rather be on ways and means and policies to allow farms of different scales to co-exist without any policy or programme being biased towards a specific group of farmers.

Despite the debate being inconclusive, it has been useful in painting an insightful picture regarding LSI in farmland at the global level. It will however be important to get insight into

how the LSI in farmland picture unfolds at country level. The following section gives a more detailed analysis of the Zambian situation in order to get a country perspective on the importance of large-scale investments in farmland.

2.9 SUMMARY

This chapter has shown that the phenomenon of large-scale investments in farmland is not new per se, as it has existed since the colonial period, albeit then on a smaller scale. It has also shown that even though the investors may share common drivers for engaging in these investments, they are not homogenous in nature. What has emerged from this chapter is a theory on the driving forces behind LSI in farmland such as the financialisation and corporatisation of the global food system. The chapter also noted some of the global debates on LSI in farmland such as creation of enclave economies and impacts of LSI in farmland including consolidation of smallholder farmers. In addition, this chapter has also noted that Africa is a major player in the global discourse on large-scale land acquisition, continent wise. Lastly, the chapter has shown that there is an agrarian change taking place due to LSI in farmland. However, there remains mixed views amongst various scholars regarding the impacts of LSI-induced agrarian change, on smallholder farmers, particularly with regards to creation of enclaves and dispossession as well as the overall welfare of the smallholder farmers.

CHAPTER 3: LARGE-SCALE INVESTMENTS IN FARMLAND IN ZAMBIA – A HISTORICAL OVERVIEW

3.1 INTRODUCTION

This chapter gives a historical overview of LSI in farmland in Zambia, from the colonial era to the present day. It also situates Zambia within the global discourse on LSI in farmland and looks at Zambia's share in this phenomenon, both continentally and globally. Zambia has been said to be an investor friendly destination due to its pro-investor policies (German & Mwangi, 2013) which have "facilitated access to customary land for investors" (Honig & Mulenga, 2015) and it is important to understand how widespread this phenomenon is in the country as well as the nature of these investors and their investments.

A historical analytical framework is applied in this section in order to understand the importance of Zambia in the global and continental discourse on large-scale investments in farmland. As noted by Edelman *et al.* (2013), pre-existing socio-political issues and patterns of land tenure and land use mould the space in which large-scale land investments occur, hence the need to have a historical perspective. Such a perspective allows for a more profound analysis and appreciation of specific issues characterising current land investments (ibid.).

The study has earlier noted the argument presented by some scholars that the issue of large-scale investments in farmland is not a new phenomenon per se, as it has existed previously, albeit, in a different format. A historical perspective on this phenomenon in Zambia seems to support the postulation of these scholars.

3.1.1 Pre-independence scenario

Literature shows that large-scale investments in farmland in Zambia, as in many other parts of Africa, have been in existence since the colonial era through acquisitions of land, mainly for plantation agriculture. There seems to be a dearth of information on large-scale land acquisitions in Zambia during the colonial period. However, the literature reviewed indicates that during the colonial era, the colonial government put laws in place that favoured white settler acquisition of huge tracts of land for agricultural purposes. British law was introduced by white settlers in 1890 to govern and administer land use and access in Zambia (Brown,

2005). In 1921, the British South Africa Company (BSAC) took over the administration of the country and divided the land into different categories for the settlers and for the natives, namely crown lands, native reserves, and trust lands. Crown lands were state lands, apportioned to the white settlers and comprised the most fertile lands, whereas the land allocated to the black natives was called native reserves and comprised less fertile and less valuable land. The third category of land put in place comprised all the unallocated land such as forests, game areas and unutilised crown lands (ibid.). This was called trust land. It is this categorisation of land that Zambia then inherited at independence in 1964.

The crown lands comprised the area cutting from Choma district in the south, through Kabwe in the Central province, up to the north towards the boarder with the Democratic Republic of Congo (DRC). This is depicted in Figure 3.1. A good railway line was built along this belt and provided a good transport connection to Katanga in the DRC (Simpson, 1985). Other parts of State Land were parts of the Eastern Province around Chipata, and around Mbala in the north.

White farmers were thus encouraged to settle in these more healthy and fertile areas of the country. To date, it can be seen that most commercial farms in Zambia are mainly located along this belt that comprised the state lands (Adams, 2003).

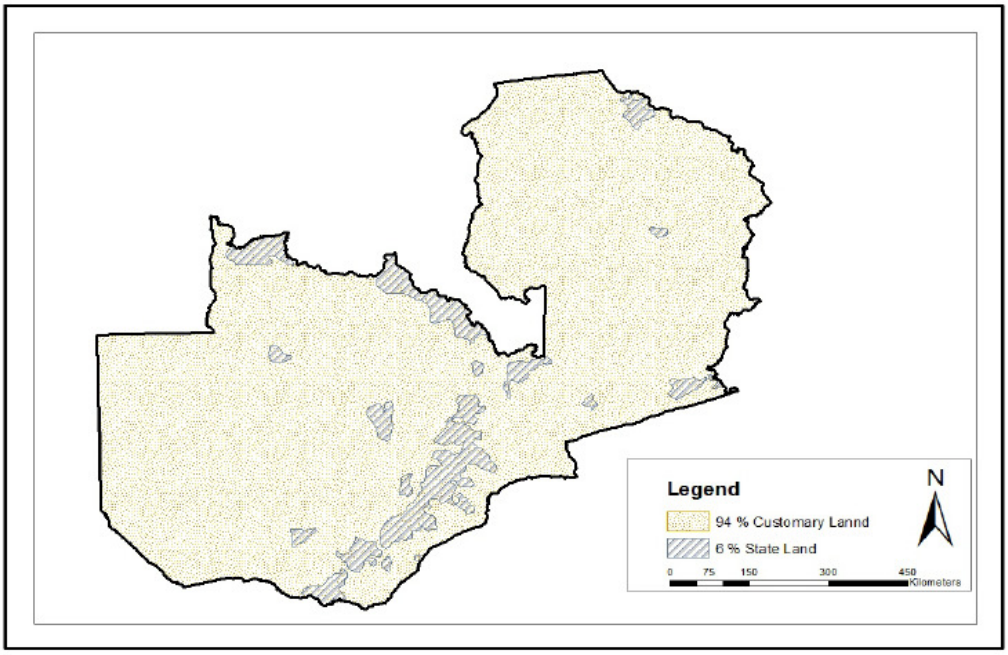

Figure 3.1: Customary and State land in Zambia

Source: Sidle (1971), cited in Chileshe and Shamaoma, (2014)

Although the colonial government put land laws in place that favoured the white settlers, with the hope of attracting many of them, the demand for large tracts of agricultural land was not that high, as most European settlers favoured Zimbabwe (then Southern Rhodesia) which proved to be a more attractive investment destination than Zambia (Scott, 1995). The projected influx of white settlers did not happen and as few as 504 white settler families were in the country by 1921 (Simpson, 1985). There was, therefore, little settler agriculture undertaken during the colonial era until around 1950 (Scott, 1995).

The Oakland Institute (2011b) also notes that several factors, such as stringent marketing policies and regulations on expatriation of profits, led to the emigration of large-scale foreign farmers to more attractive neighbouring countries such as Zimbabwe and South Africa. Between 1961 and 1980, the number of European (settler) farms in Zambia declined from 1185 to about 300 (ibid.). Several other factors could have contributed to the decline in number of white settler farmers as we see in the subsequent section.

Although Zambia seemed to have little foreign large-scale acquisition of farmland, the laws put in place by the colonial masters, which were then carried over to the post-independence

period, are said to have paved the way for the contemporary farmland investments (Nolte, 2014) as shown in the following section.

3.1.2 Post-independence scenario

After the 1964 independence from British rule, access to and use of land in Zambia continued to be governed by the colonial laws. The new government, under the leadership of the then president Kenneth Kaunda, sought to reverse the injustices of the colonial period and passed a law that allowed for the nationalisation of all land, including land that was occupied by white commercial settler farmers. This pivotal shift in policy and change in the land tenure regime could have also contributed to the decline in the number of white settler farmers noted earlier. Nationalisation of land transformed the crown lands into state land, but the other two categories were not changed (Ngo'mbe & Keivani, 2013). The new government, however, gave more recognition to the role of chiefs in the distribution of land under their jurisdiction in the trust and reserve lands (Brown, 2005).

The nationalisation of land was targeted particularly at bringing under the presidential gamut, land held by absentee landlords (Ngo'mbe & Keivani, 2013; Brown, 2005). The process of nationalisation of land was made possible by the Land Acquisition Act of 1970. President Kaunda was a strong advocate of socialism (Ngo'mbe & Keivani, 2013) and in 1975, he enacted the Land (Conversion of Titles) Act of 1975. This Act abolished freehold titles and vested all land within the president of the country. Stricter conditions were introduced to curb control of land ownership by foreigners (ibid.). Through the 1975 Act, value of land was scrapped off thus suppressing the market for land. Only improvements on land could be bought and sold, and not the actual land (Brown, 2005). This Act was heavily criticised for suppressing land markets and driving property prices up (Ngo'mbe & Keivani, 2013). This prompted the new political party that took over power in 1991 to embark on a series of actions and nationwide consultations geared towards policy reforms. This was also due to mounting pressure from donors for Zambia to implement land policy reforms as part of the restructuring of its international debt (Brown, 2005). As such, the reforms had heavy influence from donors. A national workshop was held in 1993 to debate the land policy reform Bill. There was widespread opposition to the bill. Brown (2005) notes that there were nationwide protests which were, in some cases violent. Local chiefs were in particular against the Bill as it was perceived to diminish their authority as more and more land under their jurisdiction was

relinquished due to conversion of title. According to Brown (2005), once land is converted to leasehold, it cannot be changed back to customary tenure. Despite the nationwide opposition, the government repealed the 1975 Land (Conversion of Titles) Act then went ahead and passed the Bill into law, enshrined in the Lands Act, no. 29 of 1995. The 1995 Land Act brought about drastic reforms in land governance and administration.

This Act in principle reversed all the post-colonial reforms till 1991 that had been put in place by the government of President Kenneth Kaunda. It was possible for individuals to own titled land once again. There were four key provisions made by the 1995 Lands Act noted by Brown (2005):

i. It significantly strengthened the property rights of titleholders on state land
ii. It eased restrictions on land-ownership by foreigners, making it possible for them to acquire title to land
iii. It created a lands tribunal to protect leaseholders and customary rights holders from abuse
iv. It made some changes to the administration of customary land tenure. Reserve and trust lands were now called customary areas and recognised existing land rights in customary areas. However, it made it easier for both locals and foreigners alike, to acquire private title to customary land.

The last point noted above, on the conversion of customary land rights, provides the basis for major criticisms presented by opponents of LSI in farmland. According to Brown (2005), "the Act is designed to permanently diminish the amount of land held under communal tenure and to open up more land for investment". The 1995 Land Act was meant to address the imbalances of the colonial period in terms of access to and use of land. However, this Act has created an outcry amongst many civic activists in Zambia as it is said to have paved the way for the current large-scale land acquisitions (Nolte, 2014; Ngo'mbe & Keivani, 2013). The Act, for example, made it possible for foreigners to acquire title to land (Brown, 2005). Nolte (2014) also notes that in addition to easing the previous restrictions on foreign investors, the 1995 Land Act also made it possible for customary land to be converted to state land, thus potentially reducing the amount of land under customary tenure. The reserve and trust lands were classified as customary lands. Brown (2005) notes that the Act made it possible for foreigners to gain private

title to customary land, just as it made it possible for any Zambian living on customary lands to get private title on customary land (ibid.).

3.2 THE PROCESS OF ACQUIRING FARMLAND IN ZAMBIA

Previous sections of this chapter noted that the 1995 Lands Act of Zambia is said to be facilitating the acquisition of customary lands by foreign investors, although this is not because the local smallholder farmers "own" their land. All land in Zambia is in fact under the custody of the president, and it is classified under two types of categories; namely state land, governed by leasehold; and customary land, governed by customary tenure. It is widely reported (Chileshe & Shamaoma, 2014; Van Loenen, 1999; Adams, 2003) that about 94% of Zambia's land is under customary tenure, giving the impression that should an investor be interested in acquiring customary land, it is available in abundance. This statistic, as well as the distribution of customary land as presented in Figure 3.1 has been challenged by Sitko *et al.* (2015) who note that the figure of 94% has not been revisited since independence and fails to take into account further development such as the creation of national parks, forest reserves and urban settlements. They estimate that a more realistic figure for land under customary tenure is 54%. The committee on Agriculture and Lands (2009), cited in German *et al.* (2011) gives a slightly lower figure of about 37%, which it notes is under the jurisdiction of traditional authorities, and this is the land that most investors prefer to target for investment as it is easier to gain access to than that under the state (ibid.). Subsequent sections will show whether this is indeed true of Zambia.

Acquisition of land in Zambia, whether state or customary, is mainly governed by the 1995 Lands Act and there are three main entry points through which an investor can acquire land in Zambia (Nolte, 2014). These are through the Zambia Development Agency (ZDA), through the owners of state land, and thirdly, through the village headmen and chiefs. An interview with a ZDA official revealed that the ZDA provides guidance to the investor throughout the whole process of land acquisition and helps the investors to identify available land suitable for investment. Apart from this, the investors may also approach those who already own titled state land for direct negotiations. For customary land, the investors can negotiate directly with the

traditional authorities or they can acquire it through the farm blocks[11] established by government.

According to German *et al.* (2011), an investor interested in acquiring land in Zambia first has to get a provincial certificate, which gives the investor leasehold title, valid for up to 14 years. After only 6 years of holding the provincial certificate, the investor is then free to apply for a 99-year certificate of title. Acquisition of land held under customary domain is the category that has come under serious criticism, due to potential displacement of local smallholder farmers, which renders them landless and worsens their already vulnerable condition.

3.2.1 Acquisition of customary land

When an investor is interested in acquiring customary land, it approaches the chief, who in consultation with the village headman, gives his consent (German *et al.*, 2011). If the investor's request is approved, the chief then gives the investor a letter of approval. The investor then demarcates the land and sketches the demarcation on a map which it then takes to the District Council. The District Council then issues a letter of recommendation to the investor for the Commissioner of Lands. The Commissioner then approves the request, if it is not for more than 1000 ha, which latter requests are referred to the president for approval (ibid.).

Leasehold can only be acquired in state land. A parcel of customary land has to be first converted to state land and be identified in an instrument of title (Nolte, 2014). In cases where the leasehold acquired by the investor is over what was customary land, the state then becomes the administrator and owner of the land. However, once converted to state land, the land cannot be re-converted back to customary land, even after the expiry of the leasehold. This effectively means that the area under customary jurisdiction is progressively reduced, and that more people lose their customary land rights. Under the 1995 Lands Act, it is possible for foreign nationals that hold permanent residency and an investor certificate from the Zambian Development Agency (ZDA) to have land set aside for their investment interests (ibid.). In this way, the Act is said to permanently reduce the amount of customary land and to make more land available for investors (Brown, 2005).

[11] Farm blocks are prime agricultural lands, set aside by government for agricultural development and allocation to investors. The government provides basic infrastructure such as roads and electricity.

German *et al.* (2011) further note the weakness of the current Lands Act in that there is no legal provision for compensation for land users' loss to access to and use of their land. However, the Lands Act of 1995 says that a chief must give consent and indicate in his approval letter that he has consulted with his subjects and that there is no opposition to the request. In cases where the land was compulsorily acquired by the state, compensation must be given in cash or in kind (at market value of the property). But whether or not the local communities are consulted is really at the chief's discretion.

There is provision, however, for dispute resolution for those with grievances. These disputes can be taken to the Land Tribunals and the High Court. The 1995 Lands Act is thus said to be a key facilitator in the large-scale land acquisition in Zambia, to the detriment of the smallholder farmers.

3.2.2 Impact of the 1995 Land Act

Ngo'mbe and Keivani, (2013) note that the 1995 Land Act aimed at reviving investor confidence and boost the land market, with the hope of subsequent economic growth and poverty reduction. However, what was noted after the enactment was a mixed bag of results. Although the 1995 Land Act was meant to address the imbalances of the past and spearhead economic growth through, Brown (2005) notes that the Act benefited foreign investors and local elites more than the rural poor, mainly for two reasons namely; possible ignorance of land administration technicalities amongst the rural poor and the prohibitive costs[12] of conversion of title. One of the main objectives of the 1995 Land Act was to promote foreign investment in the lands sector. For example, under the Kaunda regime, all land dealings had to go through the presidency for presidential consent (Ngo'mbe & Keivani, 2013), whereas under the provisions of the 1995 Act, "the bureaucratic hurdles to acquiring and transferring titles (were reduced to mere formalities" (Brown, 2005). The easing of land acquisition under the 1995 Act is thus perceived, as one of the reasons for the significant increase in the amount of land in Zambia owned by foreigners (ibid.).

The 1995 Land Act is also perceived to have facilitated the proliferation of land speculation whereby an investor pays little or nothing for the customary lands they convert through bribing

[12] In 2005, it cost at least $100 for survey drawings and lease fees in addition to travel costs to Ministry of Lands headquarters in Lusaka or Ndola for initial conversion to a 14-year lease (Brown, 2005).

local chiefs. Due to the discrepancies between the value of the land and the low cost of acquisition, foreign investors and local elites alike, have exhibited rent-seeking behaviour and reaped huge profits by acquiring the land for very little and then selling it at a significant profit once title has been acquired (Brown, 2005). Speculation has also resulted in increased "absent" landlords.

It is also noted that that the 1995 Land Act has facilitated displacement of many households and enclosure of common property resources (Brown, 2005). This is particularly the case where the chief is unwilling to protect the interests of those sitting on customary land for one reason or another, or is unaware that the land under consideration is occupied, and gives consent for conversion of title to the investor. Once land has been converted, the title holder is strongly protected by the law and an "illegal" occupant of titled land can be evicted. Incidence of conflicts and resistance have also been noted between the villagers, their chiefs and the investors (ibid.). In addition to conflicts, the Act is also perceived to have resulted in maladministration of land and rendered the whole system subject to corruption (Brown, 2005). For example, the Act gives the chiefs the authority to approve requests for tenure conversions and this leaves them vulnerable to corruption through payment of bribes by investors. By and large, the 1995 Land Act has not resulted in what it was meant to achieve as noted by the Government of Zambia in its Poverty Reduction Strategy Paper (PRSP), (2002-2004)[13]. There is still a stalemate amongst the different stakeholders. The 1995 Lands Act was hurriedly pushed[14] through parliament and therefore lacks public support (Adams, 2003). Since then, Zambia has produced several drafts of its land policy, the latest one being the December 2017 version which was tabled for validation in February 2018. As of March 2018, this latest draft had not been validated as it was rejected by the local chiefs citing the tempering of their chieftaincy (Munshifwa, 2018). It remains to be seen when the revised draft policy documents

[13] "The Land(s) Act of 1995 was aimed at attaching value to land and enhancing security of tenure, thereby creating land markets and initiating major economic activities. It removed two obstacles to land markets: it allowed state land to be sold and customary land to be leased, with the consent of the chiefs. However, very little progress has been made in market development for land, titling both customary and state lands, and setting up a land administration system and procedure to meet the demands of such a complex task. It is therefore important to find out what the real issues are and start addressing them. The starting point will be a review of the situation to identify appropriate interventions and instruments" (Government of Zambia, 2002).

[14] "The provisions of the Land Act and the un-democratic manner in which it was drafted and passed into law, have led to continued and widespread animosity to the Act by many civil society organisations, opposition politicians and many traditional leaders" (Brown, 2005).

will be validated and what provisions will be made to ensure the local chiefs' authority is not diminished.

The section above has shown, how the 1995 Lands Act is perceived to have facilitated large-scale land acquisitions in Zambia and has depicted, from literature reviewed the process of land acquisition in Zambia. However, it will be critical to see how demand for agricultural land has changed over time in the post-independence period.

3.2.3 Demand for agricultural land in Zambia

Although Brown (2005) has noted that contemporary land acquisitions have been facilitated by the 1995 Land Act, the peak in demand for large-scale farmland investment in Zambia could have been triggered by other global factors. In the wake of rising food and fuel prices, Zambia's attractive investment policies could have also contributed to the surge in demand for large tracts of agricultural land.

It noted earlier that from around 2008, there was an increase in demand for huge tracts of agricultural land by mainly foreign investors, all over the world, and in Zambia, a similar trend is also noted. From the study, it is noted that between 2003 and 2015, there have been 31 large-scale foreign investments in farmland in Zambia (see Figure 3.2).

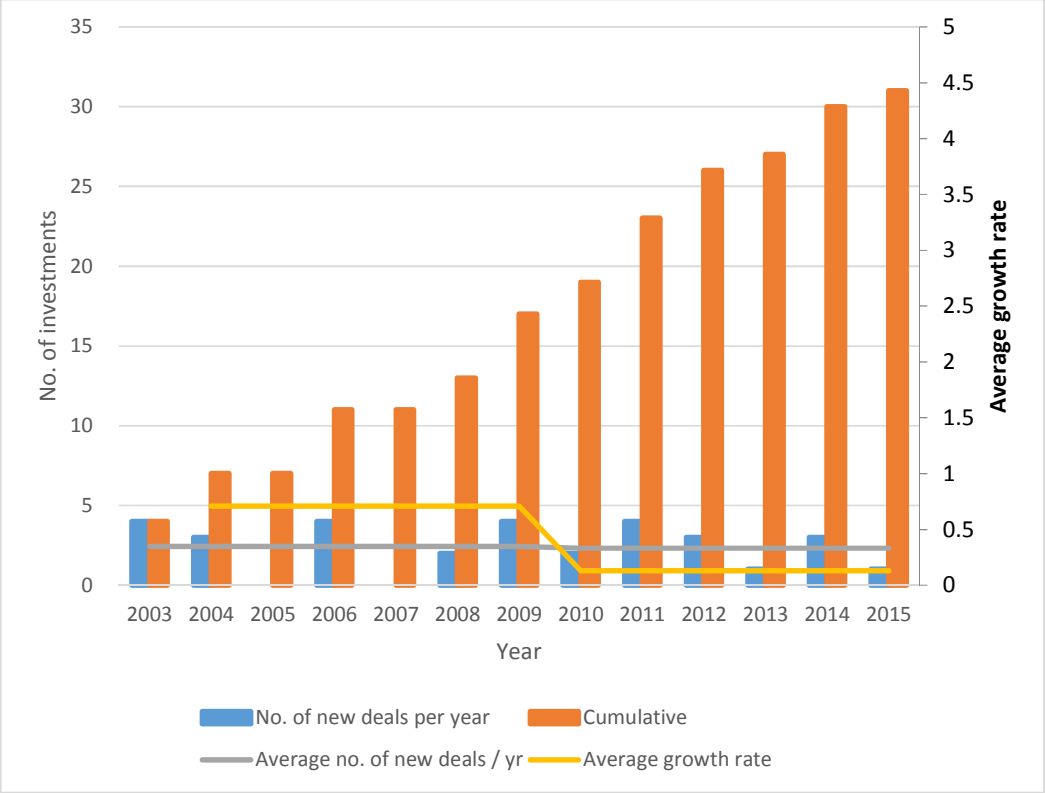

Figure 3.2: Agricultural investments 2003-2015

Source: computed from Land Matrix data

Figure 3.2 shows that the number of new deals per year fluctuated between 2003 and 2015. However, this seems to have been highest in the years 2003, 2006 and 2009 and was lowest in 2015. Average growth rate of new land deals was more or less stable, as slightly below 1, between 2003 and 2009 before sharply decreasing to almost zero from 2010, at which it then plateaued until 2015.

Data on pledged agricultural investments from the Zambia Development Agency (ZDA) also shows a similar trend (Figure 3.3).

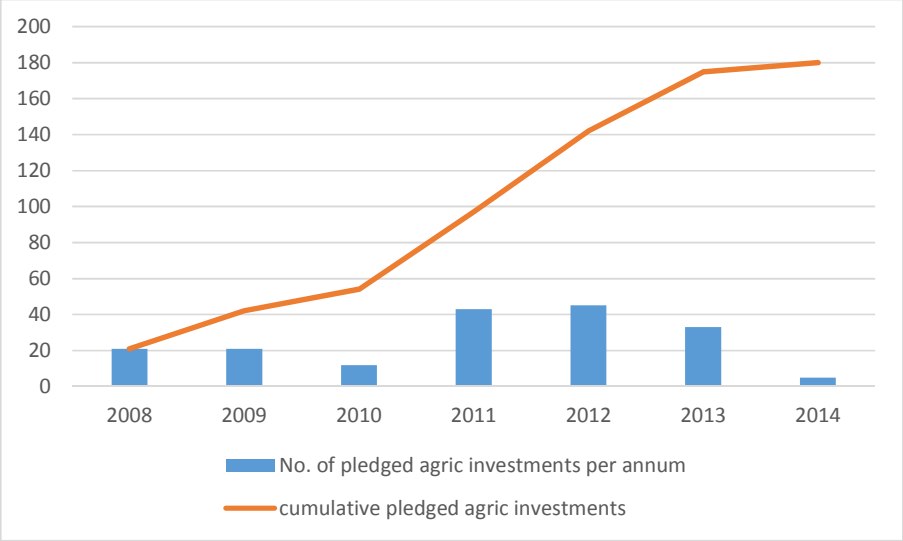

Figure 3.3: Pledged investments by foreign investors in Zambian agriculture: 2008-2014

Source: computed from ZDA data

Figure 3.3 shows a decline in the number of pledged agricultural investments between 2009 and 2010, but this suddenly rises sharply in 2011, and peaks in 2012 before going down. The data from ZDA is for all pledged agricultural investments, but it does not distinguish between those in farmland and those that may be operating further up in the value chains. It also does not show which of the pledged investments are actually operational.

Preceding sections in this chapter noted that these investors are both inter-continental and trans-continental, and that not all investors are foreign. However, it is generally believed that foreign investors have a key role to play in the increase in demand for agricultural land. The section below helps us to understand the extent and nature of these LSI in farmland in Zambia.

3.3 LOCATION OF AGRICULTURAL INVESTMENTS IN ZAMBIA

Findings from the review of land deals in Zambia reported in the Land Matrix indicate that there is a total of 31 large-scale farmland deals which have been concluded in Zambia as of August 2016. These deals are located in 21[15] out of the 75 districts in the country. However, of

[15] Chibombo, Choma, Chongwe, Kabwe, Kafue, Kasama, Kalomo, Kawambwa, Kazungula, Kitwe, Livingstone, Lusaka, Mazabuka, Mbala, Mkushi, Mpika, Mpongwe, Mumbwa, Mungwi, Serenje, Solwezi.

these 31[16] concluded deals, 6 have been abandoned and are no longer operational, leaving 25 operational deals, located in 17 districts. Of the 6 abandoned deals, 5 of them were bio-fuel investments and 1 was in food crop production. Figure 3.4 shows locations of the LSI in farmland in Zambia.

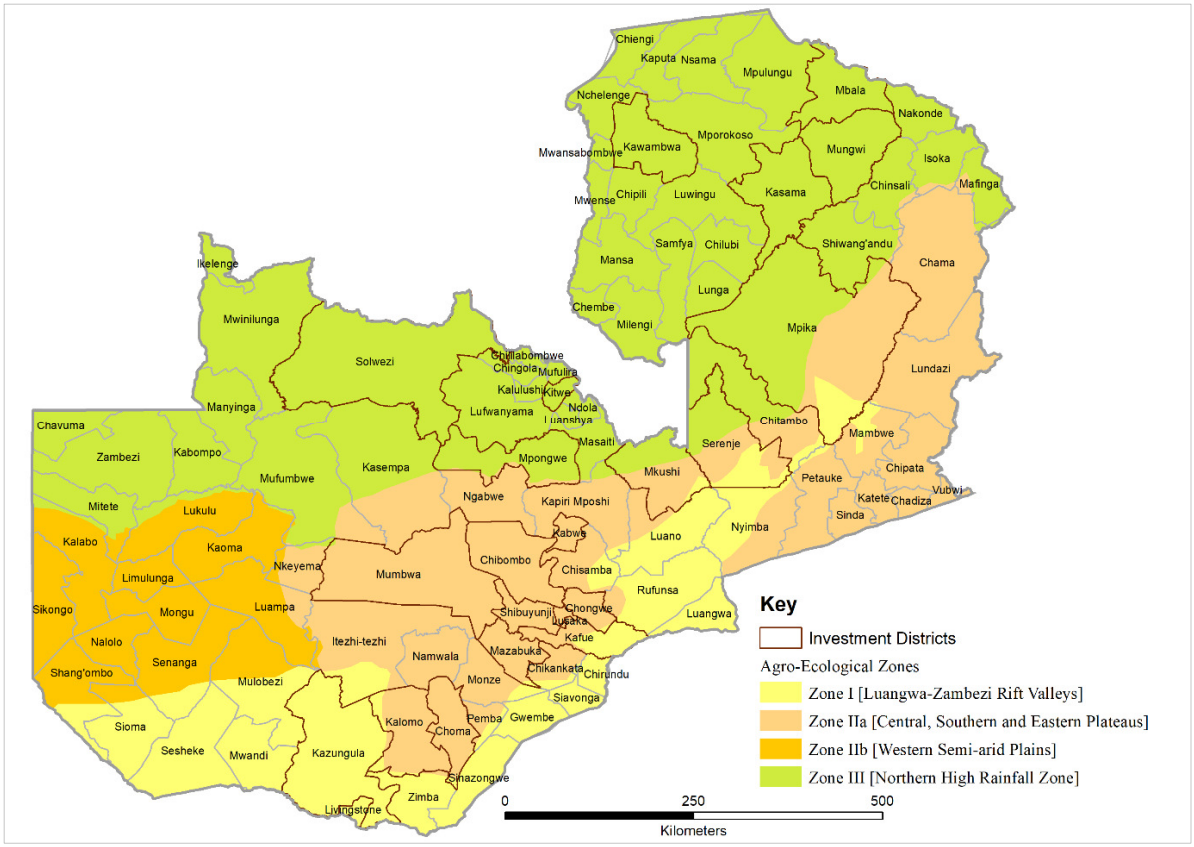

Figure 3.4: Investment districts and agro-ecological regions

Source: Author, based on Land Matrix data

The total number of investors may be less than the total number of investments, as some of the investors have multiple investments in other districts as well. The study notes that the 17 districts in which these operational investments are located are mostly in agro-ecological regions IIa and III (Table 3.1). These are high rainfall areas with clayey soils which are suitable for rain-fed agriculture (Table 3.2). Figure 3.4 shows that the districts without investments are mostly located in agro-ecological regions I and IIb, which are in stark contrast with regions IIa and III in which the LSI in farmland are located. Agro-ecological region I has much less rainfall

[16] Six of these deals also appear on the ZDA list

(less than 700 mm/year) although it has good clayey soils, and region IIb has sandy soils, although it has good rainfall (800–1000 mm/year). While most of the investments are in regions IIa and III, there are two investments located in region I. This could possibly be because of proximity to water resources (the Zambezi River) for irrigation purposes.

Table 3.1: Location of operational and abandoned land investments in Zambia by agro-ecological zone

Province	District Location of investment	Number of investments	Agro-ecological region	Average rainfall (mm/year)	Soil type
OPERATIONAL INVESTMENTS					
Central	Chibombo	2	IIA	800–1000	Clayey
Southern	Choma	3	IIA	800–1000	Clayey
Lusaka	Kafue	1	IIA	800–1000	Clayey
Northern	Kasama	1	III	1000–1500	Clayey
Southern	Kalomo	1	IIA	800–1000	Clayey
Luapula	Kawambwa	1	III	1000–1500	Clayey
Southern	Kazungula	1	I	Less than 700	Clayey
Copperbelt	Kitwe	1	III	1000–1500	Clayey
Southern	Livingstone	1	I	Less than 700	Clayey
Lusaka	Lusaka	2	IIA	800–1000	Clayey
Southern	Mazabuka	1	IIA	800–1000	Clayey
Northern	Mbala	1	III	1250	Clayey
Central	Mkushi	3	IIA	800–1000	Clayey
Copperbelt	Mpongwe	1	III	1000–1500	Clayey
Central	Mumbwa	3	IIA	800–1000	Clayey
Northern	Mungwi	1	III	1000–1500	Clayey
Central	Serenje	1	IIA	800–1000	Clayey
ABANDONED INVESTMENTS					
Lusaka	Chongwe	1	I	Less than 700	Clayey
Central	Kabwe	1	IIA	800–1000	Clayey
Northern	Kasama	1	III	1000–1500	Clayey
Muchinga	Mpika	1	III	1250	Clayey
Central	Serenje	1	IIA	800–1000	Clayey
North-Western	Solwezi	1	III	1250	Clayey

Source: Author's compilation

Table 3.2: Zambia's agro-ecological zones

Agro-ecological region	Average annual rainfall	Soil type
I	Less than 700 mm	Clayey
IIa	800–1000 mm	Clayey
IIb	800–1000 mm	Sandy
III	1000–1500 mm	Clayey

Source: Author's compilations based on the Zambia Agriculture, Livestock and Fisheries Sector Profile, 2011

Although most of the investments are located in agro-ecological regions IIa and III, we also notice a certain pattern in terms of their distribution. There seems to be a concentration of the investments along the north–south corridor that was previously developed by the colonial masters as crown lands (Figure 3.4). This was the area were the few European immigrants who came to Zambia settled. This area is generally well serviced by good road and rail networks. This seems to support the postulation that the location of large-scale investments in farmland is influenced by agro-ecological zones, as well as by the size of the road network. Nevertheless, could other factors such as type of land tenure also influence the location of LSI in farmland?

It has previously been speculated that investors favour land under customary tenure, as this is easier to acquire (German *et al.,* 2011). However, study findings seem to contradict this. From Figure 3.4, it has been noted that the distribution of the investors seems to follow the north–south "crown lands" corridor. Clearly, this land was not under customary tenure as this corridor was later transformed into state land after independence (Figure 3.1). So, it appears that the concentration of LSI in farmland along this belt could be attributable to other reasons already noted, such as the good agro-ecological conditions and the existence of a relatively well-developed road and rail infrastructure which is critical for ease of access to markets for any commercial agricultural venture, rather than because of the land tenure system in place.

3.3.1 Origin of investors in Zambia

In preceding sections, it was noted that, globally, the largest share of investors comes from Asia (33.7%), followed by Europe (28.3%), while Africa comprises a very small percentage at 11.4%. Although Asia seems to be the global leader as an investor region, it does not appear to be so in the case of Zambia. In fact, Asian countries only comprise 24% of the total number of investments in Zambia (Figure 3.5). European countries comprise the largest share at 39%, followed by African countries at 34%, and lastly the USA at a mere 3%.

Using data from the Land Matrix on LSI in Zambia, it was established that although most (66%) of these foreign investors came from abroad, others (34%) came from as close as Zimbabwe and South Africa. It has been documented (Oakland Institute, 2011b) that following the controversial fast track land reform programme in Zimbabwe in the early 2000s, many of the Zimbabwean farmers relocated to Zambia to escape the hostile environment. Hall (2011) also indicates that many white South African farmers decided to relocate to Zambia due to

several economic and political pressures they faced, such as the de-regulation of the agricultural industry which came with the advent of the post-apartheid government.

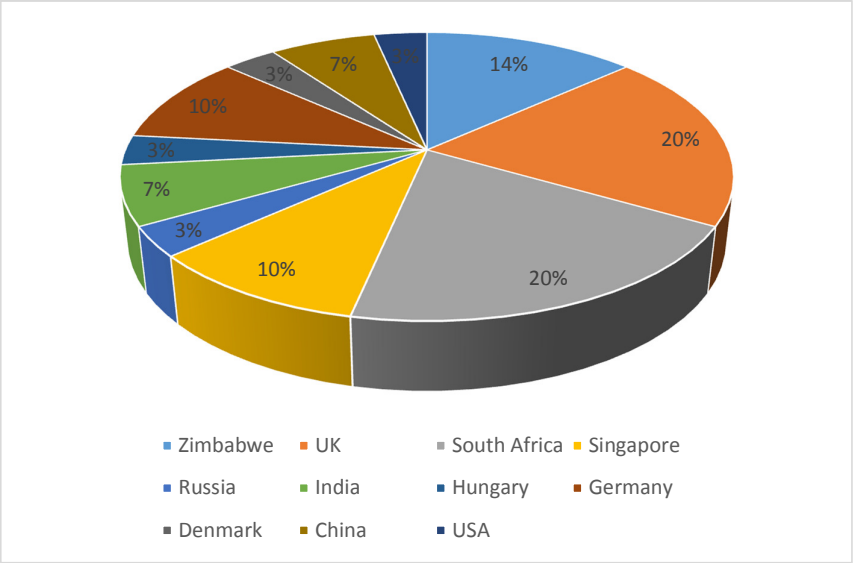

Figure 3.5: Share of land investments in Zambia (as % of land area) by country of origin of the investor

Source: computed from Land Matrix data

3.3.2 Size of the investment deals in Zambia

In earlier sections of this study, it was noted that, globally, a total area equal to more than 43 million hectares is involved in large-scale land acquisitions. In Zambia, it has been noted that the LSI in farmland are located in 21 of the 75 districts in the country. These deals vary in magnitude and nature. In total, the 31 deals (including the 6 abandoned deals) represent an area equal to 494 804 ha in contract size. Table 3.3 shows this in more detail. This shows that about 1.1% of the 42 million hectares of total arable land is in Zambia. The size of the deals range from 400ha to just below 40 000ha and the investors engage in production of both food and biofuel crops as well as livestock.

Table 3.3: Size of land deals by investor

District	Investor name	Intention	Contract size (ha)
Mkushi, Mpongwe	Agrivision Africa (Pty) Ltd	Food crops	16 916
Mumbwa	Agro Commodities Limited, Unknown investor (British Virgin Islands)	Biofuels, Food crops	5 000
Kazungula	AG-Zam	Biofuels, Food crops	15 000
Mkushi	Altima one world agricultural fund	Food crops	5 000
Mumbwa	Amatheon Agri Holding N.V., Toyota Tsusho Co.	Food crops	2 700
Mumbwa (Kaindu)	Amatheon Agri Holding N.V., Unknown non-controlling interests	Food crops, Livestock	38 760
Mkushi	Ambika	Food crops, Livestock	1 700
Serenje	*Bonafarm Group	Food crops	9 350
Mazabuka	Crookes Brothers Ltd	Biofuels, Food crops, Renewable Energy	440
Lusaka	Denbia	Food crops, Livestock	3 000
Livingstone	Emvest	Food crops, Livestock	2 513
Mpika	*Ferrostaal AG	Biofuels, Industry	300 171
Chibombo	Herdon Investments	Food crops	650
Choma, Kalomo	Hawkwood Capital LLC	Food crops, Livestock, Non-food agricultural commodities	2 7087
Kitwe	HuaYong Overseas (Beijing) Agricultural Science and Technology Co., Ltd.	Food crops, Livestock	612
Kafue	Infra Co Limited	Food crops	1 575
Lusaka	Lin Changming	Food crops	400
Kawambwa	Macdom Investments, Agricultural Rural Development Authority of Zimbabwe (ARDA)	Biofuels, Food crops	30 000
Choma	Munyati Farming Ltd	Food crops	3 500
Chongwe, Solwezi, Kasama	*NEOS Resources PLC	Biofuels	860
Choma	Nkanga Farms Limited	Food crops, Non-food agricultural commodities	11 000
Serenje (Mpande)	Tiso Blackstar	Food crops, Livestock	990
Kabwe	*Unnamed investor 109, Unnamed investor	Biofuels	12 000
Chibombo	Vixers Farming	Food crops	1 200
Kasama, Mbala, Mungwi	Olam International Ltd.	Food crops	4 380
Total (ha)			**494 804**

Source: Computed from Land matrix

** indicates abandoned investments*

3.3.3 Zambia within the global discourse of large-scale investments in farmland

In the previous section, it was noted that large-scale investments in farmland have been on a steady increase over the past few years, not just globally, but in Zambia as well. Zambia as an African country has received much attention from both media and researchers alike and this section will show the extent of Zambia's involvement in the global and continental radar of large-scale investments in farmland.

Zambia has been said to be a prime investment destination owing to several factors such as favourable investment policies, political stability, and presence of abundant land and water resources (Oakland institute, 2011b). In fact, Zambia boasts of having about 40% of the total underground water reservoirs in central and southern Africa (Zambia Development Agency). Of the 75 million ha of land Zambia has, close to 60% of this has medium to high potential for agricultural production (ibid.). Despite these favourable conditions, Zambia does not seem to be a top player in large-scale agricultural investments globally, continentally, or regionally (see Table 3.4).

Table 3.4: Zambia's share of LSI in Africa and the world

Geographic region	Contract size (ha)	Share of global total
Zambia	494 804	1.14%
Africa	20 261 508	46.88%
Global	43 217 375	100%

Source: computed from Land Matrix data

Globally, Zambia's share of large-scale land acquisitions is about 1% of the total contract size, while Africa as a whole contributes 47% of all the land included in the global contracts (Table 3.4). Of the 20 261 508 ha under the contracts in Africa, Zambia's share is just 2%.

In the East African region, under which it is classified in the Land Matrix database, Zambia's share, at 7% is well below that of the leading country, Mozambique, which takes up about 45% of the regional contribution, followed by Ethiopia with an 18% share (Figure 3.6).

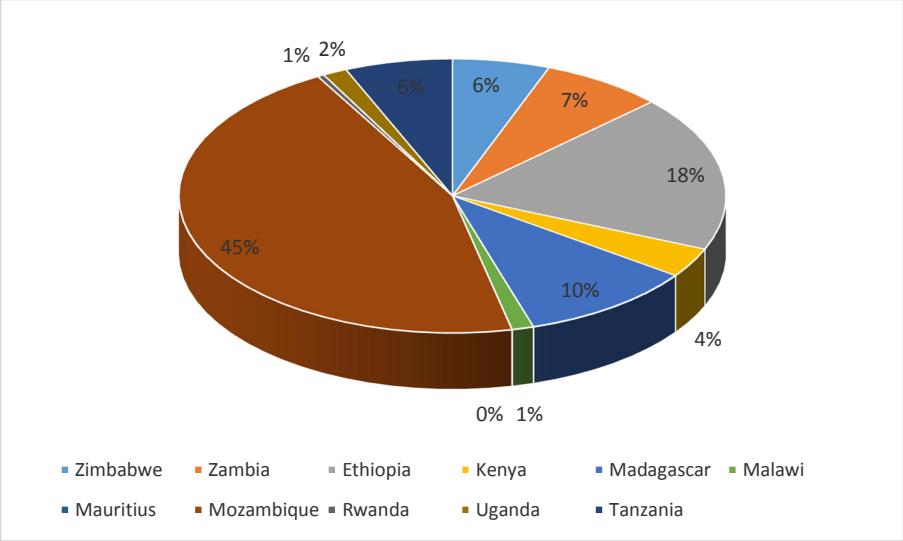

Figure 3.6: Zambia's share of land deals by contract size (% of ha) in East Africa

Source: computed from Land Matrix data[17]

Despite this seemingly low contribution to large-scale farmland investments in the continent and in the region, Zambia seems to present opportunities which might attract more investments in the near future owing to factors noted earlier on, such as investor-friendly policies, abundant productive resources, and pro-investment (1995 Lands Act) land legislation.

3.4 SUMMARY

The chapter has noted the historical overview that preceded contemporary LSI in farmland in Zambia. It highlighted how different post-colonial political regimes have tried to resolve the land imbalances of the past and how their subsequent actions impacted directly on local land ownership dynamics and land acquisitions by foreigners. The chapter also noted that even though Zambia's investor-friendly policies are meant to attract investment into the country, these policies may somewhat disadvantage local communities, according to the dictates of the Lands Act of 1995, which has been a major source of controversy across different sectors. Lastly, this chapter has also demonstrated that Zambia, as a country, although it may have

[17] Zambia is classified under East Africa in the Land Matrix database and does not explain why it is classified thus, instead of being under Southern Africa. The study notes that the same classification is used by the UN statistics division and assume this is what was adopted by the Land Matrix database.

favourable investment conditions to attract foreign investors in farmland, it is not the biggest player on the continent and in the East African region.

CHAPTER 4: METHODOLOGY, DATA AND DESCRIPTION OF STUDY AREA

4.1 INTRODUCTION

This chapter discusses the methodology employed by this study and is divided into four parts. The first part gives an overview of the methodological approach taken by this study. This is then followed by a description of the type of data used and their sources. The third part describes the location of the study and the last section describes how the case studies were selected.

4.2 METHODOLOGICAL OVERVIEW

The study was undertaken in Zambia and field work was conducted in May and October of 2014. It employs a combination of case study analyses and a desk review of existing literature in order to understand the nature of LSI in farmland in Africa in general and in Zambia, specifically. It utilises the Land Matrix database to draw statistics on farmland investments at global, continental, and country (Zambia) levels. The Land Matrix database is an online global observatory on large-scale, land-based investments that provides information on investors and recipient countries. It provides global data on land deals by country and by region for both investment and investor countries. It gives details of investor names and the size of the deals (intended, contract and production sizes), as well as the type of agricultural activity involved.

Evidence was gathered from three case studies namely; Africa Crops Limited in Choma district, Amatheon-Agri in Mumbwa district, and CENAFARM in Mkushi district. A detailed description on these is given in subsequent sections of this chapter. Interviews with investors and managers of investment operations were conducted in order to understand the operations of these investors and their relations with smallholder farmers. Smallholder farmers in the vicinity of the investors were also interviewed in order to understand their relationship with the investors and how they have been impacted by the presence of the investors. The study also analysed data sets from the Land Matrix database (2016) and the Zambia Development Agency (ZDA), as well as the Rural Agricultural Livelihoods Survey (RALS) for 2012 and 2015 and makes a comparison between groups of farmers in districts with LSI in farmland and those in districts without.

4.2.1 Secondary data collection and description of data sets used

This study relied heavily on the available data sets from previous household surveys in the study areas. Specifically, this study utilised data from the 2012 and 2015 Rural Agricultural Livelihoods Survey (RALS). The RALS is conducted by the Ministry of Agriculture and Livestock (MAL) in collaboration with the Central Statistical Office (CSO), with technical support from the Indaba Agricultural Policy Research Institute (IAPRI) and the Michigan State University. It is nationally representative and provides policy-relevant information which cannot be collected in the annual government agricultural surveys. The RALS data set is nationally representative and has data on rural households farming 20 ha of land or less (Sitko *et al*., 2015). The data sets contain information on household demographic data such as size of household, education level, age of head of household. They also have information on crop production, consumption and marketing activities, number and size of fields, fertiliser and seed usage, agro-dealer services, livestock production activities, off farm income, and food security status.

From the RALS database, districts with the LSI in farmland were first identified and then from these, three districts in which the three case studies were located were then selected. These acted as the treatment group. Another six districts in which there were no LSI in farmland were then selected to act as the control group. These were in the same agro-ecological zones with similar attributes to the treated districts. The data which was analysed was on the farmers' production activities for maize, the staple crop popularly grown by the smallholder farmers.

The study also utilised data from the Land Matrix, a global open-source observatory on large-scale, land-based investments. This database gives details of target countries and investors, their origin, size of their investments, and their investment focus. The data set used includes deals from the year 2000 up to 2015. It covers deals that have been initiated since the year 2000 and have a minimum size of 200 ha. Based on this, this study refers to a large-scale investment in farmland as a deal in farmland with a minimum size of 200 ha. In addition to the Land Matrix database, the study also utilised the Zambia Development Agency (ZDA) database on pledged agricultural investments.

4.2.2 Primary data collection

Unstructured interviews were used to collect qualitative data from key informants such as farmer leaders, extension workers, local authorities, government officials, district agricultural coordinators of the Zambia National Farmers' Union (ZNFU), and investors and managers of investment operations. In addition, focused group discussions were held with groups of farmers in each of the study areas, which provided an in-depth source of qualitative primary data to support the objectives of the study. These interviews were conducted in May 2014 and were important to get additional information that is not available on the RALS data sets, such as land acquisitions, smallholder relations with investors, investment strategies and information related to accessing input and output markets by the smallholder farmers.

Unstructured interviews with investors were meant to solicit information on their farm and general farming activities; farm establishment and land acquisition; production models and linkages with smallholder farmers; marketing activities; and employment and corporate social responsibility activities. ZNFU district agricultural coordinators were able to give insights into the farming operations of large-scale investors and report on relations between the smallholder farmers and their large-scale counterparts. Government officials, including those from the Zambia Development Agency investment arm, were able to provide insights into the general agricultural investment information, land tenure information, farmland investment process, and the process of land acquisitions by large-scale investors.

The focus group discussions with local farming communities provided information on general land allocation and access to land by the smallholder farmers; the involvement of village authorities in the allocation of land, both to local farmers and to large-scale investors; general farming activities, access to input, output and credit markets; and relations with large-scale investors.

4.3 DATA ANALYSIS

The study used the 2012 and 2015 RALS database and applied a combination of the propensity score matching (PSM) and double differencing (DD) methods to estimate the treatment effect of LSI in farmland on smallholder farmers. It compares outcomes for two groups of farmers; those that were located in districts with LSI in farmland (treatment group) and those located in

districts without LSI in farmland (control group). It measures impact in two ways. Firstly, a comparison is made between those smallholder farmers in districts with LSIs and those in districts without in terms of changes in the outcome variables. Secondly, impact is measured in terms of changes in outcome variables between farmers who are deliberately engaged[18] by LSIs in their farming operations and those that are not so engaged. This is because, as hypothesised in the conceptual framework in Chapter 1, the engagement or lack of engagement of the smallholder farmers by the LSI could determine the extent of the positive spillovers emanating from the investment.

One way of determining if treatment and control groups are statistically indistinguishable is by checking whether difference between the averages (means) of the variables of interest is statistically significant. In this regard, this study utilised the two sample t-test to first ascertain the statistical indifference between the two groups and then to get a general overview of the likely impact of the treatment, before then using the PSM and DD methods to estimate the impact of the presence of LSI on production. Descriptive statistics were used to get a general feel of the key variables influencing production between the control and treatment groups. These analytical methods are presented in more detail in Chapter 5.

4.4 STUDY LOCATION

The study was undertaken in three districts, namely Choma, Mkushi and Mumbwa in Zambia, in which there are large-scale investments in farmland. Choma district is located in the southern province of Zambia. It is in agro-ecological zone IIa, with an annual average rainfall of 840 mm per annum. According to the Zambian Ministry of Agriculture Food and Fisheries (1998), the district is predominantly characterised by smallholder farmers, making 84% of the total farmers, medium-scale farmers constituting 15.6%, and large-scale farmers accounting for 0.4% of the total number of farmers.

Mkushi district is in Zambia's central province. It lies approximately 95 km from the railway line that leads from Zimbabwe and the town of Livingstone in the south (Chu, 2013). According to the Central Statistical Office of Zambia (2011), the district has a population of 151 803

[18] This term is used to define the interaction (e.g. input, market, credit and training support) that LSI in farmland have with smallholder farmers and their inclusion or exclusion in the former's investment operations (Makunike & Kirsten, 2018).

people. The Mkushi farm block in Mkushi district is located immediately south-east and south-west of Mkushi town and is about 77 000 ha in size (Wydha Consulting, 2012). It was established in the 1950s by the then colonial government for the European tobacco farmers (Woode *et al*., cited in Chu, 2013). Mkushi has large commercial agricultural farms and has, in the recent past, attracted many international investors in the agricultural sectors.

Mumbwa district lies about 150 km west of Zambia's capital city of Lusaka in the Central province of Zambia. Its total land area spans over 23 800 square kilometres, which is about 25% of the Central province (Connect Africa, 2009). Of this, 12 600 square kilometres are arable and the rest comprises national parks, game management areas and forests (ibid.). Mumbwa's population relies heavily on subsistence agriculture, and traditionally focused mainly on maize and cotton. However, in the past few years, there has been an increase in the production of soya beans. This is attributed to promotion by government as a result of agribusiness boom in the area (Joala *et al*., 2016). Others have directly attributed this to the presence of Amatheon Agri Zambia Limited (ibid.). This seems to be true as Amatheon Agri provides a market for soya beans to the smallholder farmers as shall be seen in the following chapter. Hichaambwa *et al*. (2014) also noted that Amatheon Agri was one of the main buyers of soya beans. They also note the presence of agro-dealers such as Mumbwa Agro-Dealers Association (MADA) who are involved in the collection and marketing of soya beans. So indeed, agribusinesses in Mumbwa seem to have created big soya bean value chains linked all the way to markets in Lusaka (Joala *et al*., 2016).

[19]Six other districts were chosen for the non-treated group. Literature (Khandker *et al.*, 2010; Godtland *et al.*, 2004) recommends that the non-treated group should be as similar as possible to the treatment group. In this regard, care was taken to ensure that only those districts with similar agro-ecological characteristics to the treatment group were chosen (Table 4.1).

[19] These are Itezhi-tezhi, Kapirimposhi, Kasempa, Masaiti, Namwala, Nyimba,

Table 4.1: Agro-ecological characteristics of treatment and control groups

Province	District Location of investment	Agro-ecological region	Average rainfall (mm/year)	Soil type
Investment districts				
Southern	Choma	IIA	800–1000	Clayey
Central	Mkushi	IIA	800–1000	Clayey
Central	Mumbwa	IIA	800–1000	Clayey
Non-investment districts				
Copperbelt	Masaiti	III	1000 – 1500	Clayey
Southern	Itezhi-tezhi	IIA	800–1000	Clayey
Central	Kapirimposhi	IIA	800–1000	Clayey
North-west	Kasempa	III IIA	1000 - 1500 800 - 1000	Clayey
Southern	Namwala	IIA	800–1000	Clayey
Eastern	Nyimba	IIA I	800 - 1000 <700	Clayey

Source: Author's compilations based on the Zambia Agriculture, Livestock and Fisheries Sector Profile, 2011

Figure 4.1 gives details of the study location. It was noted earlier that Zambia has 75 districts that fall into different agro-ecological regions, each suitable for production of different types of crops. Twenty-one (21) of the 75 districts have large-scale investors and the rest do not have. The districts without investments provide a comparison region or control area for the investigation, and those with investments are the treatment group.

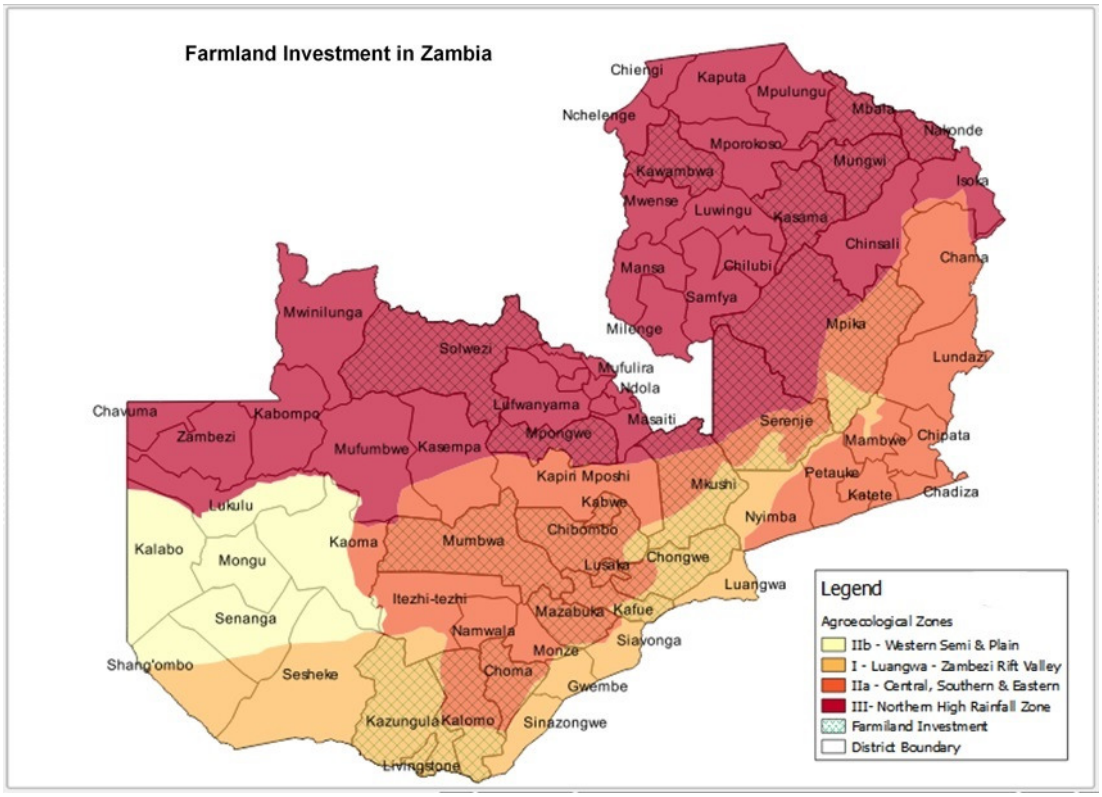

Figure 4.1: Map showing districts with (shaded & crossed) and without (shaded & non-crossed) investments

Source: Author, based on Land Matrix data

4.5 SELECTION AND DESCRIPTION OF CASE STUDIES

This study also analysed three cases drawn from the pool of districts with LSI in farmland. These are Africa Crops Limited (ACL), located in Choma district in the Southern Province; Amatheon Agri Zambia Limited (AAZL) in Mumbwa district in the central province, and Central Africa Farming (CENAFARM) in Mkushi district, also in the central province. All these are in agro-ecological region IIa, except for part of Mkushi which is in region IIb. These three cases were selected based on the availability of information and the willingness of the investors to participate in the study.

In identifying the case studies, a list of all large scale agricultural investors based on the Land Matrix database was compiled. From this initial list, all non-operational[20] investors were then

[20] For the purposes of this study, an operational investment is defined as one that is engaged in production

dropped. Each of the remaining operational investors was contacted either telephonically or via email. It must be noted that due to the sensitivity of the subject matter, many investors fearing negative publicity which could jeopardise their operations were not willing to cooperate with the study and simply shied away or gave a cold shoulder. Therefore, the three afore mentioned investors (ACL, AAZL and CENAFARM were then selected based on the responses received, the willingness of the investors to participate in the study and the availability of information. It must be highlighted that at the time of identification and selection of case studies, not all information regarding land acquisition by the investors was available. Due to the non-random selection of the investors, there is a possibility of bias and the results may not be representative of all investors but are thought to serve as an example to dispel some of the notions regarding land acquisition by investors. It is for this reason that the secondary data from the RALS survey was used to establish more generalisable findings that go beyond the specifics of these cases.

Subsequent sections of this chapter give a detailed descriptions of these case studies. These case studies will be re-visited later in Chapter 6 to see how their different farming models engaged with the smallholder farmers in their vicinity and in Chapter 7 to see their contribution to the consolidation of smallholder farmers.

4.5.1 Africa Crops Limited

Africa Crops Limited (ACL) is an investment by the fund of the British-based investment fund management company, Hawkwood Capital which was established in 2008 “to buy, develop and farm agricultural land in Africa” (ACL, 2014). According to records from the Zambian Patents and Company Registration Agency (PACRA), ACL was incorporated in October 2007, with German, British and Zimbabwean Directors. The fund has 25 farms in three farm blocks in central and southern Zambia under its ownership. Reports also indicate that ACL is heavily supported by the Deutsche Bank, through its investment arm, DWS. According to Chu (2012), land acquisitions have in this regard taken place through the DWS Global Agribusiness Land and Opportunities (GALOF) fund, established in 2007.

Africa Crops Limited (ACL) in Choma district, pursues an independent large scale commercial farming model with tenant farmers. It emerged from interviews with the company management that the land acquired by ACL in Choma had previously been commercial farms established on statutory land. This was also confirmed by the Zambia National Farmers' Union (ZNFU)

coordinator for Choma. The farms were previously owned by Zambia Leaf Tobacco (ZLT) before ACL acquired them in 2008. Chu (2012) gives an account of the history of land ownership in that area which shows that the land on which ACL operates had been isolated from the smallholder farmers for a long time before ACL commenced its operations. At the time that ACL began its operations, there were no smallholders occupying that land, except a few "squatters" which company management indicated were resettled elsewhere without giving specifics, except that they were given compensation for their dwellings.

4.5.2 CENAFARM

CENAFARM, on the other hand, is a regional farming company owned by Altima partners, an investment fund investing about 40% its resources in agriculture through both private equity and unlisted positions. Altima partners is partially financed by the International Finance Corporation (IFC) and has several investment vehicles namely; Altima One World Agricultural Fund, Altima Farmland Fund, and Altima Agriculture Equities Fund (Oakland institute, 2012). According to Angus Selby (2011), the CENAFARM investment was established in 2009 through a "Zambia farming vehicle based on a Zimbabwean company established in 1974". At the time of research (2014), it had 5000 ha under management. The company grows maize, soya beans, wheat and beans which are sold in domestic markets.

Farming operations in the area where CENAFARM is currently located started around 1996. The land on which CENAFARM is located was once public land owned by the government. This was part of the Mkushi farm block in Mkushi district in Zambia's Central Province, which was set aside by the colonial government in the 1950s for European tobacco farmers, mainly former veterans. It comprises 176 000 ha (Woode *et al.*, cited in Chu, 2013).

Farm blocks in Zambia were initially started by the colonial government to promote commercial agriculture through settlement schemes (Matenga & Hichaambwa, 2016). Development of many of these farm blocks had been through conversion of customary land to statutory land during the colonial period (Chu & Phiri, 2015). After independence, the government moved to promote these farming blocks by establishing them as central commercial entities with linkages to smallholder farmers through an out-grower scheme. Mkushi farm block was one such farm block, originally established during the colonial period on crown land. Although agricultural activity in the farming block had been relatively modest

until recently, Mkushi currently produces the largest proportion of Zambia's wheat (40%) and soybeans (21%), and is the sixth-largest district maize producer (Chu, 2013).

4.5.3 Amatheon Agri Zambia Limited

AAZL is a Zambian-registered company owned by a German agribusiness and farming company group, Amatheon Agri Deutschland BV, based in Germany, which has several agri-business operations in sub-Saharan Africa. The Group's was established in 2011 and it is headquartered in Berlin, German, with operations in three sub-Saharan African countries.

The area where Amatheon Agri Zambia Limited (AAZL) established its farming operations is in the Big Concession farming block in Mumbwa district. This is a 260 000-hectare block of land in Zambia which had previously not been farmed very heavily. The Big Concession farming block has been state land for several years and has experienced pressure due to an influx of migrants from various areas. It was initially delineated as a farming block for future agricultural development by the then colonial government in the 1960s. Since the delineation, a number of leasehold titles had been issued on the land within the farm block (Amatheon Agri Environment Impact Statement, 2013). Although the land had been demarcated for future agricultural production as a special economic zone (SEZ), there had been no commercial farming development for years. Consequently, some smallholder farmers had settled on it, assuming it was customary land (Nolte & Subakanya, 2016; Chu & Phiri, 2015). The land that AAZL acquired was therefore statutory land, but it was already occupied and this has caused some tension in the area (Joala *et al*., 2016). Demarcation of boundaries between statutory and customary land in the area is also not clear (Joala *et al*., 2016; Chu & Phiri, 2015). Those farmers who had leaseholds therefore willingly sold their land to AAZL. AAZL thus consolidated its land by acquiring individual titled land based on free will. During the focus group discussions, it emerged that the money paid to those who sold their land was so little they could not purchase a similar piece of land with it. Joala *et al*. (2016) note that such farmers ended up seeking land from nearby villages and renting farm land.

4.6 SUMMARY

This chapter has given an overview of the methodology utilised by this study. It has also noted the type of data used and their sources. A detailed description of the study location, selection

of the case studies and history of land occupation in the case study areas. It also noted some of the shortcomings in the selection of the case studies.

CHAPTER 5: METHODOLOGICAL CHALLENGES RELATED TO ESTIMATING THE IMPACT OF LARGE-SCALE INVESTMENTS IN FARMLAND

5.1 INTRODUCTION

Impact evaluation of LSI in farmland is difficult, mainly for two reasons – the sensitivity of the issue, and data requirements. Because of the widespread negative publicity that this phenomenon has received over the years, investors are often sensitive about what they say and whom they talk to, and accordingly they are often not willing to participate in such studies. Those that are willing to do so exercise a high degree of caution and may not provide complete or certain information if it is considered risky to their business. This makes it difficult to present a complete and detailed picture of the investments. Such studies also require detailed smallholder household-level data, which is quite taxing to collect. Compounding this problem is the fact that many African governments have non-computerised land registry systems which are often not centralised in the same place (Schoneveld, 2011). This presents a mammoth task to any data analyst. However, if there are existing nationally representative household agricultural surveys, these might provide a good source of information. However, the issue of reliability and accuracy of such databases often comes into question. Sipangule and Lay (2015) note that official data is also often very difficult to obtain.

In addition to data and information problems, impact evaluations of LSI in farmland are also difficult due to the nature of the studies, i.e. they are non-experimental and not randomly assigned. In a non-experimental study, where the programme/intervention is already on-going, impact evaluation is thus said to be *ex-post*, and the programme is taken to be non-randomly assigned (Ravallion, 2005). This presents many challenges, particularly in trying to identify a suitable comparison group, as will be seen in the subsequent sections.

Apart from data and information needs, estimating impact is also difficult because of attribution problems. These could arise due to presence of other observable or unobservable characteristics which could affect changes in the desired outcome. Any impact evaluation technique therefore has to take into account such characteristics to ensure accurate isolation and estimation of the contribution of a particular intervention to the desired outcomes. Fortunately, there are ways to deal with attribution as shown in subsequent sections.

This chapter discusses some of these methodological challenges encountered in estimating the impact of a programme in non-experimental studies and describes the methodological approach employed by this study to meet its objectives and to overcome these challenges. It also presents the theoretical foundations of the analytical framework used to analyse the data.

5.2 IMPACT ESTIMATION IN NON-EXPERIMENTAL STUDIES

The estimation of impact in non-experimental research designs such as this one is not as easy as it is in typical experimental studies. Several authors assert that the central issue in impact evaluation of programmes is the issue of the creation of a reliable counterfactual.[21] According to Gertler *et al.* (2011), in programme evaluation, the programme impact is measured by the difference in the outcomes (Y) for the same individual, with and without the programme. But practically, it is not possible to measure the same individual in two different states. In addition, simply measuring the difference with and without the programme could produce a counterfeit comparison that would result in estimation bias, as there are likely to be unobservable time-variant factors that would result in either underestimation or overestimation of the programme's effect. The central issue in impact evaluation is therefore the need to have data on outcome variables from the counterfactual in order to be able to estimate this impact. This is often referred to as the problem of the missing counterfactual. It is therefore important to use robust methods to estimate the counterfactual and ensure that it is as similar as possible to the treated.

Khandker *et al.* (2010) identify several methods of addressing the problem of the missing counterfactual, such as randomised evaluations, matching methods, double difference methods, instrumental variable methods, and regression discontinuity design methods. These are quasi-experimental (non-random) methods that are often used in impact evaluations when an experimental design cannot be used to generate treatment and comparison groups (Baker, 2000). The treatment and control groups in this case are usually selected by non-random methods (ibid.), as is the case with this study. Lack of randomisation in quasi-experimental studies is often a source of many problems. Non-randomisation means that there is selection bias owing to systematic differences between the treatment and control groups. Subsequent

[21] The counterfactual is an estimate of what the outcome (Y) would have been for a programme participant in the absence of the programme (P) (Gertler *et al.,* 2011).

sections will discuss how this study deals with the potential selection bias on the analytical framework.

5.2.1 The impact estimation problem

The problem at the centre of this investigation is a causal-inference problem, whereby the study sought to estimate the impact of the LSI in farmland on the growth of smallholder farmers. According to Gertler *et al.* (2011), the impact (α) of a programme can be thought of as the "difference in outcomes (Y) for the same individual with and without participation in a program". In impact evaluation studies, the problem in hand is that of "filling data on the counterfactual (potential outcomes)" [22] (Godtland *et al.*, 2004), that is; what would production levels have been like if the farmers had not been treated, in other words, if there were no LSI in farmland in their district?

This study sought to estimate the impact of large-scale investments (LSI) in farmland on smallholder agricultural growth. The rationale is that, as a result of positive externalities, LSI in farmland would bring access to markets, credit, infrastructure and knowledge/technology that are necessary to unlock smallholder agricultural potential, leading to increased agricultural growth, leading to increased household food security, increased incomes, and reduction in poverty. The main question this study is investigating is: "What is the causal effect of LSI in farmland on growth (G)[23] of smallholder farmers"?

The causal effect of LSI in farmland on an outcome of interest growth (G) is measured by the formula:

$$\alpha = (Y \mid LSI = 1) - (Y \mid LSI = 0). \qquad (5.1)$$

In other words, the causal impact (α) of a programme (LSI) on an outcome (G) is the difference between the outcome (G) with the investment (i.e., when LSI = 1) and the same outcome (G) without the investment (i.e., when LSI = 0).

[22] Text in parenthesis the author's own emphasis.
[23] For the purposes of this study, growth (G) is defined as the change in gross value per hectare of land

So, in this case, the causal impact of the LSI (α) is the difference between a farmer's gross value per hectare of maize (proxy for Growth [G]) when there are LSI (in other words, when LSI = 1) and the same farmer's Growth [G] at the same point in time if the LSI were not there (in other words, when LSI = 0).

By measuring the growth (G) for both with the LSI and without the LSI, it becomes easier to answer questions regarding the impact of the LSI on smallholder agricultural growth. However, simply measuring changes in the desired outcomes with and without the LSI will give us biased results due to a number of unobservable time variant factors which may not be accounted for. Moreover, it is not practically possible to measure the same person in two different states (with the programme and without the programme) at the same point in time. Gertler *et al.* (2011) call this the counterfactual problem and certain methods have to be employed to overcome this problem. Randomisation of programme placement would be the best way to create a counterfactual comparison group. However, since randomisation is not always possible for several reasons, including political ones, other methods of ensuring a credible counterfactual have to be used. Leeuw and Vaessen (2009) suggest that matching techniques, such as propensity score matching (PSM), could be used as a second-best alternative to randomisation for creation of a comparison group. But even with a good counterfactual in place, there still remain questions of how one can plausibly attribute changes in the outcome variable to a particular programme, as there could be other factors contributing to the observed changes. This is referred to as the attribution problem.

5.2.2 The question of attribution and controlling for other factors

The question of attribution is one of the major issues in non-experimental, impact evaluation research designs and is often said to play a central role (Leeuw & Vaessen, 2009). Attribution problems arise due to the presence of other observable or unobservable time-variant characteristics which may affect the outcome variables of the groups. This makes it difficult to attribute changes in outcome variables to a particular intervention. It is about establishing the extent to which the intervention is responsible for the observed changes in the desired outcome indicator. It therefore becomes necessary to both isolate and accurately estimate the contribution of a particular intervention so that one can establish causality from the intervention to the outcome (ibid.). Fortunately, there are ways of dealing with that problem.

Literature (e.g. Winters *et al.*, 2010) suggests that one way of dealing with the attribution problem is by analysing some observable baseline characteristics and seeing if there are similarities or differences between the two groups. In trying to fill data on the counterfactual, it becomes necessary to identify a suitable control group of farmers completely outside the LSI investment areas, whose outcomes generally provide an unbiased estimate of the outcomes that participants in the programme would have had in the absence of the programme (the LSI in farmland). It is important to ensure that these farmers are similar to the participating group "in observable characteristics" (Godtland *et al.*, 2004). Analysing attribution also requires the creation of a credible counterfactual, and methods such as PSM could be employed, as seen from preceding sections of this chapter.

5.3 METHODOLOGICAL APPROACHES IN IMPACT ESTIMATION STUDIES

A comparable study by Sipangule and Lay (2015) used double differencing methods to estimate the impact of LSI in farmland on smallholder productivity. The double difference method allows for time-invariant differences between the control and treatment group (Gertler *et al.,* 2011) by assuming that that there are no unobserved time-invariant selections. As argued by Khandker *et al.* (2010) and Ravallion (2005), it seems *quite "implausible that the selection-bias (due to unobserved heterogeneity) is time invariant*", therefore should there be any unobservable time-variant factors, the double difference method renders biased results. Bias will exist when inter-temporal changes are a function of initial conditions that also influenced programme placement (Ravallion, 2005).

Another problem likely to arise with the use of the double difference method is serial correlation associated with multiple cross-section analysis. In the study by Sipangule and Lay (2015), they address the issue of serial correlation by using clustered standard errors at the district level. However, they fail to control for possible bias from time-variant unobservables. Their analytical work could have been improved by using the double difference methods with a combination of other methods such as propensity score matching and instrumental variables.

5.3.1 Choice of impact estimation method

Literature (Blundell & Dias, 2007; Gertler *et al.,* 2011; Khandker *et al.,* 2010; Ravallion, 2005), identifies several methods for the evaluation of quasi-experimental programmes, and each of

the impact evaluation methods noted above have their pros and cons. These earlier studies reveal that there is no one best impact evaluation method to use, and that the choice of method should be guided by certain criteria. According to Blundell and Dias (2007), the choice of the method used depends on three keys issues, namely the fundamental evaluation question to be answered, the available data type and quality, and the mechanism for assigning the individuals to the programme, i.e. the "assignment rule". In programmes where there was no clear assignment rule or where there is likely to be bias from non-randomised programme placement, it is important to carefully choose methods that will help create a reliable counterfactual.

A robust quantitative impact evaluation method should try to address the following three related issues (ibid.), namely:

- The establishment of a counterfactual
- The elimination of selection effects and thus eliminate systematic differences between the treatment and control groups
- A solution for the problem of unobservables. Omission of any unobservable variable can lead to biased results.

The choice of method for estimating impact in this study was based on the relative virtues of the different methods, in addressing various aspects of validity. In this regard, this study chose to utilise a combination of the double difference method with propensity scoring method. The theoretical foundations on the choice of these methods are detailed in subsequent sections.

5.4 ANALYTICAL FRAMEWORK

This study employed the use of a combination of double differencing (DD) and propensity score matching (PSM) methods to estimate the impact of the LSI in farmland on smallholder agricultural growth. Literature (Khandker *et al.*, 2010; Hoken & Su, 2015) notes that the DD method can give better estimation if it is combined with the propensity scoring method (PSM). In this regard, literature is replete with examples of studies that have employed a combination of PSM and DD methods to estimate programme impact using panel data (Ninh *et al*., 2016; Nguyen, V.C, 2012; Hoken & Su, 2015).

The study noted earlier that one method of overcoming the counterfactual problem is the use of matching methods, and given this, this study employed the use of the double difference method combined with propensity score matching (PSM) method, using the nearest neighbour technique to create the counterfactual. The Average Treatment effect on the treated (ATT) was then estimated to assess the impact of the large-scale investments (LSI) in farmland on smallholder agricultural growth. The ATT thus estimates the average gain in the desired outcome (gross value per hectare of maize) from treatment for those who were treated, i.e. the group of farmers in investment areas.

A comparison was drawn between two groups, that is, those smallholder farmers in districts with large-scale investors in farmland, serving as the treatment group, and smallholder farmers located in districts where there are no large-scale investors in farmland, serving as the control group. The section below gives the relative merits and de-merits of the double difference and PSM methods.

5.4.1 Theoretical foundations of propensity score matching

In non-experimental research designs, assignment to programme participation (treatment) is often non-random (Winters *et al.*, 2010) and this can lead to biased estimates of programme impact due to self-selection bias. Apart from treatment status, it is possible that the treated and non-treated may differ in other characteristics that affect both participation and the outcome variable of interest (ibid.). This means that the treated and non-treated do not have the same probability of participation. There is therefore need to employ certain techniques to ensure that the correct counterfactual is identified.

Propensity score matching (PSM) is one method identified in literature that can be used to overcome the problem of the missing counterfactual. It should be noted, however, that this counterfactual should be as similar as possible to the treatment group in terms of observed pre-intervention characteristics (Khandker *et al.*, 2010; Ravallion, 2008). The counterfactual are those non-participants who would have the same probability of participation as the participants have. PSM uses the probability of participating in the treatment, based on observed different characteristics, to construct a counterfactual (control group). This probability (score) is then used to match participants to non-participants and a comparison of the average difference in desired outcomes between the two groups is then made in order to calculate the treatment effect.

PSM, therefore, allows us to select a counterfactual that looks like the treatment group in every way except for programme participation (Ravallion, 2003). An assumption made is that the differences in participation are based only on differences in observed characteristics. This assumption then makes it possible to measure the treatment effect using PSM in non-randomised studies (ibid.).

Although PSM is good at creating a credible counterfactual, its drawback is that it does not help solve for potential endogeneity which could result from omitted unobserved variables. However, combining PSM with double differencing can correct for time-invariant unobservables (ibid.).

Theoretically, the probability, P, of participating in the programme, based on observed characteristics, X, is calculated as follows:

$$P(X_i) = Pr\,(T_i=1/X_i)\ 0<P(X_i)<1 \qquad (5.2)$$

where X is a vector of pre-intervention covariates and T denotes the treatment status taking a value of 1 with treatment, and 0 with no treatment.

Khandker *et al.* (2010) identify two necessary assumptions in order to identify the programme effect using PSM. These are:

The conditional independence assumption:
This assumption is also sometimes referred to as the unconfoundedness assumption. It states that for a given set of observed characteristics, X, that are not affected by the treatment, T, potential outcomes, Y, are independent of the treatment assignment.

Mathematically, this is presented as:

$$(Y_i^T, Y_i^C) \perp T_i \mid X_i$$

where Y_i^T = outcomes for the treatment group and Y_i^C = outcomes for the control group.

This assumption essentially says that participation or programme uptake is sorely based on observed characteristics, i.e. unobserved factors do not affect participation. The values taken by Xi are thus assumed to be unaffected by treatment. So, in PSM, the probability of participation is conditioned on the observed explanatory variables of participation. Under this unfoundedness assumption, exact matching on P(X) therefore eliminates the selection bias (Ravallion, 2008) and gives everyone (treated and non-treated) the same probability of participation.

In propensity score matching, the treatment effect can be measured by either the average treatment effect (ATE) or by the average treatment effect on the treated (ATT)/TOT. The ATE measures changes in desired outcome indicators between the treated and the untreated (control) group over time, before and after the programme, whereas ATT measures the impact of the programme on the treated participants.

When estimating the ATT, a weaker assumption is required. This assumption states that, given a set of observed covariates, X, the potential outcome for the control group is independent of the treatment assignment. Mathematically, this is represented as: $Y_i^C \perp T_i \mid X_i$. The conditional independence assumption is a very strong one, and if it is violated due to the presence of other unobservable characteristics determining programme participation, then the suitability of the PSM method falls into disarray.

The common support assumption:

This is sometimes referred to as the overlap condition. This condition requires that there be a substantive region of common support. This is the region where there is an overlap in the distribution of the probability scores of the treatment and control group. PSM requires that the treatment units be similar to control units in observed characteristics, so if there are control units that do not match, they will be dropped. Only the units that match will remain in the region of common support. It is only in this region of common support that inferences about causality can be drawn (Khandker *et al.*, 2010).

Provided the two assumptions made above hold, it is then possible to calculate the PSM estimator for the average treatment effect on the treated (ATT) as the mean difference in Y over the common support, weighting the comparison units by the propensity score distribution of participants (ibid.). The assumptions made by matching ensure that there are no differences

between the two groups, save for programme participation, thus in a way, PSM re-establishes experimental conditions in a non-experimental setting (Blundell & Dias, 2007).

5.4.2 Selection of the control group

In this study, the 2012 and 2015 Rural Agricultural Livelihoods Survey (RALS) data sets were used. The treatment group was defined as the smallholder farmers located in the districts with LSI in farmland, while the smallholder farmers in districts without large-scale investments acted as the control group. The presence of the LSI in farmland is therefore the treatment in this case. The smallholder farmers, by virtue of being located in an area with LSI in farmland, are thus said to be participating in the treatment. This choice of this variable presence some limitations in that it does not take into account possible spill over effects of the investments on some of the smallholder farmers who may be in non-investment districts. A better variable would have been distance of household from the location of the investor. However, this variable was not available from the dataset utilised.

As noted earlier, propensity score matching (PSM) requires that the treatment group be similar to the control group in observable characteristics. In this regard, districts with similar agro-ecological characteristics were chosen to ensure that the groups are similar save for the treatment. Whilst it is true that investors would naturally prefer investing in areas with high agro-ecological potential, we noted that there were some districts without LSI in farmland although they had similar agro-ecological zones as the ones with LSI in farmland. It is therefore possible that there could have been other unobserved factors that might have influenced the investor to choose particular districts. These unobserved differences introduce potential bias in the analysis and inference and assignment of attribution. In this regard fortunately, the analytical methods chosen (PSM combined with double differencing) takes care of such potential bias as described in the subsequent sections of this chapter.

5.4.3 Estimating the treatment effect on the treated

In estimating the ATT, the problem that arises is that it is not possible to observe the same individual in two different states i.e. with and without the programme. The propensity scoring method (PSM) fortunately makes it possible to create the counterfactual. The propensity score P(X), was therefore calculated first, on all observed covariates that jointly affect participation

and the desired outcome, growth. In this case, maize gross value per hectare is used as a proxy for growth.

According to Ravallion (2003), the generic PSM estimator for ATT is presented as:

$$\Delta\bar{Y} \sum_{j=1}^{T} \omega_j \, (Y_{j1} - \sum_{i=1}^{C} W_{ij} \; Y_{ij0}) \qquad (5.3)$$

where:

Y_{j1} is the post-treatment outcome variable for the j[th] observation/household,

Y_{ij0} is the outcome indicator of the i[th] non-treated matched to the j[th] treated,

T is the total number of treatments,

C is the total number of non-treated households,

ω_j's are the sampling weights used to construct the mean impact estimator,

W_{ij}'s are the weights applied in calculating the average income of the matched non-participants.

Ravallion (2003) recommends using a regression adjusted estimator in order to avoid contamination by the endogeneity of access to the programme. Therefore, the regression model for PSM for participation in the LSI in farmland was run only on the matched counterfactual. The adjusted impact estimator thus becomes:

$$\Delta\bar{Y} = \sum_{j=1}^{T} \omega_j \; [(Y_{ij} - X_j\hat{\beta}) - \sum_{i=1}^{C} W_{ij} \; (Y_{ij} - \; X_i\hat{\beta}_0)] \qquad (5.4)$$

where $\hat{\beta}_0$ is the Ordinary Least Squares (OLS) estimate for the matched non-treated group.

5.4.3.1 Model specification for treatment

In order to calculate P(X), the probability of receiving treatment, the samples of both the treatment and control groups were first pooled together and the probability was estimated on all observed covariates X, in the data that are likely to determine the treatment. In this case, the data items likely to determine the location of the investment (treatment) were identified as size of road network (proxied by distance to input market) , household size, farm size, age of head of household, land tenure type, and level of education of head of household. Although agro-

ecological conditions certainly influence location of agricultural investments, this variable was not used because the treatment and control groups were selected from districts with similar agro-ecological conditions to ensure similarity as required by the dictates of PSM. In addition, this variable was dropped by the stata software, possibly due to lack of variation. The study however acknowledges the possibility of potential bias should there be interaction of the time variables such as rainfall and soil quality with the outcome variable. The model constructed for treatment is as follows:

$$TRTLSI = f\,(Hh\_size, Educ\_hh, FmSz\_ha, Hhhead\_age, Ten\_ctitled, Dist\_mkt) \qquad (5.5)$$

where:
TRT_{LSI} is treatment,
Hh_size is the size of the household,
Educ_hh is education level of the head of household,
FmSz_ha is the farm size in hectares,
Hhhead_age is age of household head
Ten_ctitled is titled former customary land
Dist_mkt is the distance to input market

This estimate was constructed from a logit model as the study was interested in comparing outcomes for households that were treated and the ones that were not treated. After estimating the treatment equation, the predicted values of treatment were then derived from this equation. This is the propensity score P(X) that each household is given, mathematically written as:

$$\left(\hat{P}(X\middle|T=1\right) = \hat{P}(X) \qquad (5.6)$$

Literature shows that bias in PSM estimation can be limited by observing three fundamental provisions, namely the same data source should be used for both the treated and non-treated; a representative sample survey of eligible units in the treated and non-treated groups should be used; and lastly, the sample of eligible non-treated units should be larger than the sample of the treated (Khandker *et al.*, 2010). Additionally, the treated and non-treated should be facing the same economic incentives that might influence treatment.

5.4.3.2 Identifying region of common support and balancing tests

Once the propensity scores were calculated, the region of common support was then defined. This is the area were the probability score distribution for the participants and non-participants overlap. The statistical software used (Stata) easily calculates this and drops all those observations that fall outside of the region of common support. It is important for matching to balance the distribution of the variables in the treatment and control groups. To rule out the possibility of having the P scores different from the mean of X, some balancing tests were carried out. Similar P scores must be based on similar observed X covariates. When this is the case, the treatment and comparison groups are said to be balanced, i.e. their distributions are similar and the balancing property is satisfied.

5.4.3.3 Matching participants and non-participants

The treatment and control groups were then matched on the basis of the P scores. Several methods of matching are presented in literature, and this study chose to use the nearest neighbour technique. In this method, each unit in the treatment group is matched to a comparison unit that has the closest P score. This was easily calculated using the Stata software. Firstly, the PSM was applied to the data in the first period and then the double difference method was performed on the matched group. Traditionally, the DD uses parametric linear regressions, however, the DD-PSM estimates the treatment effects semi-parametrically.

5.4.3.4 Pros and cons of the propensity score matching method

The propensity score matching (PSM) method is a good method for estimating impact, provided the conditions of conditional independency and region of common support are met. It was noted earlier that PSM is a good method for helping to fill the counterfactual problem. This is especially so if selection bias from unobserved characteristics are likely to be minor. In this case, it was relatively easy to identify characteristics which might influence the investor's decision for the location of an investment. In any agricultural project, an investor is interested in factors that would affect production outcomes, such as agro-ecological conditions, road network, and availability of labour, if the production is going to be labour intensive.

According to Khandker *et al.* (2010), PSM has fewer restrictions on the functional form of the treatment equations because of its semi-parametric nature. In other words, PSM does not rely

on the functional form of the outcome, thus freeing it from the assumptions of the functional form such as multicolinearity (Nguyen, 2012). It also makes fewer assumptions about the distribution of the error terms. PSM is advantageous in that it does not require baseline data and it can work with cross-section data, although the conditional independence assumption will have to be met. In its computational work, PSM drops some observations which fall out of the region of common support to ensure that only those with similar scores are matched. This increases the prospect of having sensible comparisons, thereby curtailing bias in the programme impact (ibid.).

The drawback is that if there is not a sufficiently large sample of the control group from which to draw the comparisons, the dropping of some observations may actually increase bias. Another disadvantage is that, should there be other unobserved characteristics influencing treatment/programme participation, the conditional independence assumption is violated, rendering the PSM method inappropriate. It therefore does not offer much help in addressing the potential endogeneity bias (Leeuw & Vaessen, 2009). Bias with the use of PSM may also arise from dropping non-participants systematically different from those retained. Literature (Khandker *et al.*, 2010), however, notes that this could be easily overcome by using large samples with adequate variation for a representative sample.

It should be noted that if there are some unobservable characteristics affecting participation and outcomes, the PSM estimator renders biased results because the conditional independence assumption is violated. But as noted earlier, the DD method can help overcome this challenge as it can control for unobservable characteristics like farmer's skill, that are time-invariant.

5.4.4 Theoretical foundations of the double differencing method

The double difference (DD), also called difference-in-differences methods compares a treatment and comparison group (first difference) before and after a program (second difference). An assumption made by the DD methods is that there is unobserved, time invariant selection. As previously noted, there is potential for selection bias with DD methods and some variants of the DD that use a combination of other approaches such as the instrumental variables and Propensity Score Matching (PSM), have been introduced over the years to account for potential sources of selection bias.

DD methods rely heavily on existence of baseline data, but where a baseline might not be available, a triple-difference method with an entirely separate control after program intervention (that is, a separate set of untreated observations) can be used as an alternative calculation of the program's impact (Khandker *et al.*, 2010).

By estimating the counterfactual for the change in outcome for the treatment group by calculating the change in outcome for the comparison group, the double difference method allows us to take into account any differences between the treatment and comparison groups that are constant over time (Gertler *et al*., 2011). The advantage with the double difference method is that it is useful for programmes that cannot be randomly assigned (as is the case with the LSI in farmland).

Simply observing the change in smallholder growth before and after the intervention (LSI) for areas affected by the programme will not really help us determine the causal impact because there are many other factors that are likely to influence growth over time. At the same time, if we compare areas that received and did not receive LSI (with and without programme comparison), some problems might be encountered if there are some unobserved reasons why some areas received the treatment and others did not and this may cause selection bias problem. The double difference method provides a solution to this. According to Gertler *et al.* (2011), it is possible to combine the two methods (before and after and with and without) and compare the before and after changes in the desired outcomes for the treated group (A) with the before and after changes for the untreated group (B). The first difference (A) will then control for factors that are constant over time in that group since we are comparing the same group to itself. But we still face time varying factors that may affect growth over time. The second difference (B) will capture these by measuring the before and after change in desired outcomes for the untreated group, but that was exposed to the same set of environmental conditions. With these calculations A and B, we can then clean the first difference A of the time varying factors that affect the desired outcomes by subtracting the second difference. By so doing we eliminate the main source of bias. So by combining the before and after comparisons and comparisons between the treated and untreated, the double difference method helps us produce a better estimate of the counterfactual (ibid). Mathematically, the average treatment effect on the treated (ATT) when using the traditional DD with PSM is presented as follows:

$$ATT_{(X)} = E(Y_{1S} \mid X, D=1) - E(Y_{0S} \mid X, D=1) \quad (5.7)$$

Where:

ATT is average treatment effect on the treated

$Y_{1S\ is}$ the post-intervention outcome variable for the treated group

Y_{0S} is the post-intervention outcome variable for the control group

D is the treatment dummy

The assumption made by the DD with PSM is that the expectation in outcome variables, conditional on X, between the treatment and control groups is the same across time, i.e. it is time-invariant. Mathematically, this is shown as:

$$E(Y_{0F} | X,D=1) - E(Y_{0F} | X,D=0) = E(Y_{0S} | X,D=1) - E(Y_{0S} | X,D=0) \quad (5.8)$$

Where Y_{0F} is the pre-intervention outcome variable

So essentially, there is no time effect on the outcomes for the treatment and control groups. According to Nguyen (2012), it then becomes possible to identify $ATT_{(X)}$ because:

$$ATT_{(X)} = E(Y_{1S}| X,D=1) - E(Y_{0S}| X,D=1) - [E(Y_{0F}| X,D=1) - E(Y_{0F}| X,D=0)] + E(Y_{0S}| X,D=1) - E(Y0_{S}| X,D=0)]$$
$$=[E(Y_{1S}| X,D=1) - E(Y_{0S}| X,D=0)] - [E(Y_{0F}| X,D=1) - E(Y_{0F}| X,D=0)] \quad (5.9)$$

Bias from time varying factors/selection on observables is thus eliminated by subtracting the second difference. The matching estimator $ATT_{(X),}$ therefore measures the difference in the differences in the outcome variable of interest, between the treatment and control groups, in pre-intervention and post-intervention periods.

5.4.4.1 Mathematical specification of the model

The objective of the proposed estimation model is to measure the impact of LSI in farmland on agricultural growth[24] of those smallholder farmers who participate in (are affected by) the LSI in farmland program. In this study, those smallholder farmers in districts where there are

[24] This is defined and measured as gross value per hectare of maize

LSI operations constitute the treated while those farmers that are in districts where there are no LSI operations constitute the control group.

LSI in farmland is thus considered as the "treatment". Mathematically, the model is specified as follows:

$$Yi = \alpha + \beta Ti + \gamma ti + \delta (Ti*ti) + \varepsilon i \quad (5.10)$$

where the coefficients α, β, γ and δ are all unknown parameters and εi is a random, unobserved error term that contains all determinants of smallholder agricultural growth, Yi, omitted by the model.

The two groups are indexed by treatment status, T = 0 or 1, where 0 indicates the control group and 1 indicates the treatment group and where:

α = constant term,
β = specific effect of the treatment group, which accounts for average permanent differences between the treatment and control groups,
γ = time trend. This is common to both the treatment and control groups, and
δ = small holder agricultural growth effect of the LSI (treatment).
Ti = 1 if individual is in treatment group and 0 if individual is in control group. So Ti is a dummy variable
ti = 1 if individual is in post treatment period and 0 if in pre-treatment period

The coefficient δ is the difference-in-difference estimator. This is the coefficient on the interaction between Ti and ti and it measures the effect of the dummy variable.

With this model estimation, this research aimed to find a "good" estimate of δ, given the available data. The magnitude of the change in observed outcomes of the treatment group vis-à-vis that of the control group is determined by the sign of the coefficient δ and the size of δ will indicate the extra change in observed outcome the treatment group had.

In this model specification, the dependent variable, Yi, is a continuous therefore the difference-in-difference estimator is the ordinary least squares (OLS) estimate of δ. The T-statistics will thus indicate the statistical significance of the coefficient δ from 0 (Omilola, 2009).

5.5 SUMMARY

This chapter gave an overview of the methodological problems of impact evaluation of LSI in farmland and how this study has approached these technical difficulties to estimate the impact of LSIs on smallholder farmers in the vicinity of the investment. It also gave an in-depth analysis of the theoretical underpinnings of the analytical framework used to analyse the data. The conclusion thus drawn regarding estimation of impact is that there is no one single best method. Each of the different methods have pros and cons and the one chosen should be informed by the kind of data available, the objectives of the study and the programme assignment rule. Since the study is based on a non-randomly assigned programme, selection of a method that creates a reliable counterfactual was critical, hence the choice to use of propensity score matching, combined with double difference methods, statistical and econometric regression models to analyse the data.

CHAPTER 6: IMPACT OF LARGE-SCALE INVESTMENTS IN FARMLAND ON SMALLHOLDER AGRICULTURAL GROWTH

6.1 INTRODUCTION

One of the major arguments presented by the proponents of LSI in farmland is that these investors can help to unlock bottlenecks that impede smallholder agricultural growth such as poor access to input, output and credit markets, as well as poor access to technology, infrastructure, and extension services. Improving access to these basics would then provide a solid stimulus for agricultural growth among smallholder farmers in close proximity to the LSI. This is the hypothesis tested by this chapter. Data from smallholder surveys were utilised to establish whether there are any differences in agricultural growth between the farmers in investment districts and those in non-investment districts that might be attributed to the presence of LSI in farmland. Gross value per hectare of maize is used as a proxy for growth. This chapter tests the hypothesis that smallholder farmers in LSI have higher gross value per hectare of maize, than those in non-LSI areas do.

6.2 METHODOLOGY AND DATA SOURCES

The study identified all districts which have large-scale investments in farmland, and those without. Cases were then selected from those districts with large-scale investments, using purposive sampling design, based on the willingness of the investors to participate in the study. These cases were from three different districts. Smallholder farmers in these three districts then acted as the treatment group. From the districts without investments, six[25] districts were selected to act as the control group.

The study used the 2012 and 2015 Rural Agricultural Livelihoods Surveys (RALS) data sets. A combination of the double difference method and propensity score matching method (PSM), using the nearest neighbour approach was then employed, to estimate the treatment effect of the LSI on smallholder agricultural growth. The study uses gross value per hectare of maize[26] as a proxy for growth. The treatment group was defined as the smallholder farmers in the

[25] There are more observations in the control group than in the treated group to increase chances of finding very close matches

[26] Maize was chosen because it is the staple food crop and is commonly grown by smallholder farmers

districts with large-scale investors in farmland, while the smallholder farmers in districts without large-scale investments provided the control group. A comparison was drawn between these two similar groups of smallholder farmers in investment and non-investment districts. One of the requirements in choosing a good counterfactual is the need to make sure that it is as similar as possible to the treatment group in observed characteristics, save for the treatment (Khandker *et al.*, 2010; Godtland *et al.*, 2004). Therefore, in choosing the districts with and without investments in farmland as the treatment and control groups, respectively, the study assumes that availability of government support services to the smallholder farmers is similar across the districts. Districts with similar agro-ecological potentials were also compared (Table 4.1). The analytical methodology employed (combined double difference and propensity score matching), described in Chapter 5, also improves robustness of the analytics in that the PSM ensures that all comparison units that are not similar in observed characteristics (i.e. that do not match) with the treatment are dropped. The comparison is thus made only on those units that fall within the region of common support.

6.3 HOUSEHOLD CHARACTERISTICS

6.3.1 Descriptive statistics of households

In order to present a clearer understanding of the nature of the data at hand and the farming households, some descriptive statistics of key variables analysed between the two groups of farmers are presented below. The descriptive statistics also help to establish similarity or differences between the two groups being analysed.

6.3.1.1 Household characteristics

The majority of the households in the study area are male headed. For the purposes of this study, a household head is defined as the person in the household who is responsible for making decisions for the household. This variable is important as household heads often make decisions regarding farming activities such as whether or not to engage in on-farm wage employment or harness the whole family to work on the family farm. Table 6.1 shows that about 89% of the households are headed by a man. About 60% of these household heads are married monogamously, while about 9% are divorced and 18% are in polygamous relationships, with the majority of those in polygamy in the treatment group.

Table 6.1: Household headship and marital status of treatment and control groups

	Treatment	Control	Pooled
N	816	518	1334
% Male headed	93.74	83.24	89.26
% Married (monogamy)	62.23	58.86	60.49
% Polygamy	25.12	11.10	17.86
% Divorced	2.31	14.72	8.73
% Others	10.34	15.32	12.92

Source: computed from RALS database, 2012 & 2015

Table 6.2 further shows that the average household size is about 7 members. The treatment group, however, has a larger average household size of about 7 persons, compared with 6 persons for the control group. Statistical tests (t-test) conducted reveal that these are significantly different from each other. For both groups, the heads of households have at least a primary school level of education, with an average of 7 years of schooling across both groups. Household heads in the control group have an average of 6 years of schooling, compared with 7 in the treatment group.

Table 6.2: Household characteristics of treatment and control groups

Household characteristic	Treatment	Control	Combined	t-value
N	816	518	1334	
Household size	7.1	6.3	6.8	5.767***
Household head education level (years)	6.8	6.1	6.5	4.106***
Age of house hold head	49.0	47.4	48.2	2.707**
% Male headed	93.74	83.24	89.26	7.131***

Source: computed from RALS database, 2012 & 2015

Results also indicate that the heads of households are middle aged, with an average age of 48 years (Table 6.2). There is a difference of almost 2 years in the average age of the heads of households between the treatment and control groups, with an average of 49 and 47 years, respectively, and the difference is statistically significant at 5% level of significance.

6.3.1.2 Farming characteristics

The households in the study area are classified as smallholder farmers. In Zambia, smallholder farmers are defined as those that are cultivating between 1 and 20 ha of land. This category of smallholder farmers is further divided into small-scale farmers, cultivating between 0.1 and

4.99 ha of land, and emerging farmers, with land holdings of between 5 and 20 ha (Sitko & Jayne, 2014; Government of Zambia, Ministry of Agriculture and Livestock, 2013). The farmers grow various crops such as maize (the staple and most dominant crop), groundnuts, soya beans, cassava, roundnuts, cowpeas, millet, sorghum, and cotton.

In order to appreciate the nature of the two groups of farmers, some basic production characteristics are analysed to see if there were any similarities or differences. The results (Table 6.3) reveal that the households in the investment districts generally had slightly higher mean statistics for use of maize hybrid seed; maize yield and maize gross value than those in non-investment districts had. However, these differences are all significant, except for maize yield.

Table 6.3: Mean statistics of some baseline characteristics

	2012			2015			Pooled sample		
	Control	**Treatment**	**t-value**	**Control**	**Treatment**	**t-value**	**Control**	**Treatment**	**t-value**
Area of maize planted (ha)	1.48	1.85	5.6364***	2.00	2.00	0.0442	1.84	1.67	2.0629**
Maize yield (kg/ha)	2 231.04	2 776.32	8.437***	2 646.66	2 595.19	1.3249	2 413.76	2 420.04	0.09
Maize gross value (ZMW/ha)	6 853.16	6 895.05	0.1087	7 484.53	7 979.732	1.6006	5 466.04	6 159.09	1.6586*
Total crops gross value (ZMW/ha)	7 969.97	9 224.76	2.9641***	9 200.45	10 557.34	4.0964	8 367.19	10 148.25	3.2881***
Total Maize seed (kg)	33.97	42.01	5.7671***	46.48	45.10	1.0597	42.58	37.31	2.6756***
Mean seed (kg/ha)	28.46	25.71	7.2015***	24.05	23.16	6.1265***	25.34	24.01	2.6605***
Distance to market (km)	17.86	26.50	11.4395***	19.20	23.48	6.5677***	18.18	28.26	7.2475***
Total top fertiliser (Kg)	234.94	245.93	0.3716	227.45	195.73	1.4426	230.58	218.68	0.66
Total basal fertiliser (kg)	231.36	252.43	0.7014	229.34	215.46	0.5935	229.72	233.10	0.18
N	1172	627		627	468		2496	468	

***Significant at 1% ** Significant at 5%, *Significant at 10%

Source: author's own computations from RALS database.

6.4 ESTIMATING THE EFFECT OF INVESTMENT ON FARMERS IN THE INVESTMENT DISTRICTS

This study sought to estimate the effect of LSI in farmland on smallholder agricultural growth, using gross value per hectare of maize as a proxy for growth. In order to ascertain the impact and check for consistency, the impact on maize yield is also tested. Impact on other production variables that influence gross value, such as usage of hybrid seed, basal and top dressing fertiliser, and maize seed usage is also tested. As argued in Chapter 1, the underlying rationale is that LSI in farmland might bring about smallholder agricultural growth as a result of positive externalities, such as improved access to input and output markets, infrastructure, and technical know-how. For this estimation, a combination of double differencing and propensity score matching (PSM) methods are used.

There are 3 main steps in PSM, namely (i) estimating the treatment/participation equation, (ii) defining the region of common support and balancing tests, and lastly, (iii) matching participants to non-participants. Estimating the treatment equation helps in identifying the determinants of the treatment, for isolation of impact.

6.4.1 Estimating the treatment equation

The treatment equation is estimated by first identifying the determinants of location of large-scale investments in farmland. Farmers, likewise LSI in farmland, are inclined to choose areas with good agro-ecological conditions, such as high rainfall (for rain-fed agriculture), good soils suitable for high-intensity agriculture, and suitable temperatures to conduct their farming business. It is also assumed that areas that have good rail and road infrastructure are a major attraction for investors, as they make transportation of goods and inputs much easier. Other factors that have been postulated to influence location of LSI in farmland household size, with the assumption that larger household sizes mean better availability of labour for the farms. This is based on the assumption that the investment is labour intensive and not highly mechanised. This can be the case for highly labour intensive cash crops such as tobacco. For this reason, household size is included as a proxy for labour availability. Assuming that the investor would want to acquire land by amalgamation of individual title holders, it may also seem plausible to include farm size as a determinant. If the investor has plans to incorporate the smallholder farmers into its farming activities through an out-grower scheme, for example, the education

level of the head of household might be a factor to consider, as this may mean easier assimilation of knowledge transferred and provided through training. It has been postulated (German *et al.,* 2011) that communal lands are an investor favourite due to weak/insecure tenure systems. As such, the type of land tenure system or security of tenure could also influence the location of investment as noted by German *et al.* (2011). This is premised on the assumption that areas with insecure tenure systems such as communal lands, would be highly attractive to investors, as it is easier to acquire that land. Although it was noted earlier that not all investors target customary land, as evidenced by the distribution of investors along the "crown lands" corridor which was converted to state land after independence, and a study by Schoneveld (2011) also noted there was no statistically significant correlation between location of investor and tenure security, type of tenure (titled former customary land) was included in the treatment equation to see if this is consistent with what has been postulated. Interviews with investors regarding their choice of location for investment also pointed to factors like good road network and excellent agro-ecological conditions as some of the factors for choosing a particular location for investment. However, the estimation equation used in this study does not include an agro-ecological zone variable as there was no variation across the districts. With this general understanding of possible factors that would determine the location of the LSI in farmland, the following model (equation 5.5) identified in Chapter 5 was estimated for programme participation:

$$TRT_{LSI} = f(Hh\_size, Educ\_hh, FmSz\_ha, Hhhead\_age, Ten\_ctitled, Dist\_mkt) \qquad (5.5)$$

where:

TRT_{LSI}: treatment, with a value of 1 for the treatment group and 0 for the control group

Hh_size: the size of the household,

Educ_hh: education level of the head of household,

FmSz_ha: the farm size in hectares,

Hhhead_age: age of household head

Ten_ctitled: titled former customary land

Dist_mkt: distance to input market

Using Stata software, a logit regression model of treatment was run against the identified variables described above.

Table 6.4: Determinants of treatment

Treatment	Coefficient	Standard Error	Significance
Farm size (ha)	0.054182	0.0203007	0.008***
Tenure (titled former customary land)	-0.0172249	0.011123	0.121
Household head age (years)	0.0129256	0.004074	0.002***
Distance to input market (km)	0.0198152	0.0025379	0.000***
Household size	0.0465117	0.0196849	0.018**
Household head education (years)	0.0040414	0.0180617	0.823
Constant	-1.030704	0.2779125	0.000***
N = 1426			

Source: author's own computations

***Significant at 1% ** Significant at 5%, *Significant at 10%

The results (Table 6.4) indicate that farm size, level of education of head of household, age of head of household, household size and distance to input market all have a positive impact on treatment. These determinants are all significant, except for the education level of the head of household. The land tenure variable (titled former customary land) has a negative influence on location of investor, but this is also insignificant. Some of the variables are however dropped in the next iteration as they do not satisfy the balancing property. The insignificance of land tenure type could be because the investors are not primarily focusing on acquiring customary lands even though they might that have had conversion of title, contrary to what has been previously postulated, but are rather going for existing, previously established commercial farms on state land, as was the case in all of the three case studies analysed. The study earlier noted the postulation that LSI in farmland would be interested investing in areas with good labour supply. The significance of household size (proxy for labour availability) could mean that investors' operations may be labour intensive as was the case with one of the investors who was growing tobacco.

Several iterations of the model above were made until the balancing property was satisfied. The logistic regression model was then used to generate propensity scores. Although the education level of the household level contributes to the choice of investment location, based on assumptions noted earlier, this was not included in the model that satisfied the balancing property as there was no overlap.

The robustness of the logistic model that satisfied the balancing property was tested using the Hosmer-Lemeshow (H-L) test for goodness of fit and model chi-squared test. Results (Table 6.5) show that this was a good model for predicting treatment.

Table 6.5: Model parameters

Treatment	Coefficient	Standard Error	Significance
Farm size (ha)	0.032704	0.0128347	0.011
Distance to input market (km)	0.0174203	0.0022841	0.000
Household head age (years)	0.013135	0.0037834	0.001
Household head education (years)	0.0402406	0.0159508	0.012
Constant	-0.9512498	0.2362373	0.000
Model Chi square *113.78 (p=0.0000)**** *Log-likelihood* *-1038.7523* ***H-L Chi square*** *8.33 (p=0. 4022)*			
N = 1642			

Source: author's own computations

***Significant at 1% ** Significant at 5%, *Significant at 10%

The H-L test determines whether the fitted model adequately describes the observed outcomes. By rule of thumb, if the H-L statistic is not significant, then it means the model is robust. The H-L statistic is 8.33, with a p-value of 0.4022. The model chi squared test is also significant at 1% (p=0.0000). Both the model chi squared test and the H-L statistic thus show that the model includes all covariates that might have influenced treatment. This means that the model can therefore correctly estimate the probabilities of household participation, and generate propensity scores (Mapila, 2011).

6.4.2 Matching treated to non-treated.

After defining the treatment equation, matching the treated to non-treated was done then using the PSM method. The propensity score, i.e. the conditional probability of receiving treatment, given pre-treatment characteristics (Rosenbaum & Rubin, 1983), selects the comparison / control group, based on their propensity scores, given by equation 5.2 identified in Chapter 5:

$$P(X_i) = Pr\,(Ti=1|Xi)\ 0<P(Xi)<1 \qquad (5.2)$$

where X is a vector of pre-intervention control variables.

In Chapter 5, the generic PSM estimator (Ravallion, 2003) was identified for the average treatment effect on the treated (ATT) as:

$$\Delta\bar{Y} \sum_{j=1}^{T} \omega_j \,(Y_{j1} - \sum_{i=1}^{C} W_{ij}\ Y_{ij0}) \qquad (5.3)$$

where:

Y_{j1} is the post-treatment outcome variable for the j^{th} observation/household,

Y_{ij0} is the outcome indicator of the i^{th} non-treated matched to the j^{th} treated,

T is the total number of treatments,

C is the total number of non-treated households,

ω_j's are the sampling weights used to construct the mean impact estimator,

W_{ij}'s are the weights applied in calculating the average income of the matched non-participants.

The estimation of impact using the PSM requires that both the treatment and control groups face the same economic conditions, and estimation is based on all observed covariates that might influence the outcome variable, in this case, gross value per hectare of maize. It was noted that the groups of smallholder farmers in the investment and non-investment districts were both receiving support from the government-led Farmer Input Support Programme (FISP). The FISP is a social intervention programme implemented by the government of Zambia since 2009 as part of its poverty reduction strategy. It aims to increase production of maize by smallholder farmers through the provision of seed and fertiliser (Mofya-Mukuka *et al.,* n.d.). In order to minimise bias in the estimation of impact, a dummy variable for access to FISP was included in the estimation.

When matching the units, it is important to ensure that treatment and control units have similar comparison variables in the propensity score distribution. The model for the PSM estimator was run in Stata and those observations that had the same probability distribution were singled out, and those that did not were dropped. Thus, all the households with a similar probability distribution were selected, and differences in outcome variables were analysed for only these comparable households.

6.4.3 Defining region of common support and balancing distribution of treatment and control variables

The existence of a common support region is one of the critical assumptions in PSM, necessary for estimation of impact. The region of common support is the area where there is an overlap in the distribution of the probability scores of the treatment and control groups. This region of common support provides us with a pool of units that have similar probability of receiving treatment. Khandker *et al*. (2010) note that even though the units that fall within the region of

common support may have similar probability distribution based on similar observed variables (X), if misspecification exists in the participation equation, this will imply that they are not necessarily observationally similar. It is therefore important to test for systematic differences in the covariates. Certain balancing tests, as described by Smith and Todd (2005), may be conducted to check whether the average propensity score and the mean of the observation (X) are the same, within each quantile of the propensity score distribution (Khandker *et al*., 2010). If there is misspecification of the participation equation, the balancing property will not be satisfied and the results will be biased. Balancing thus implies that units with the same propensity score have the same distribution of observable characteristics, independently of treatment status, meaning that for a given propensity score, treatment assignment is random (Becker & Ichino, 2002; Urkaregi *et al*., 2014). PSM thus deals with the potential bias associated with non-random assignment of treatment in non-experimental research designs.

Figure 6.1 shows the distribution of the propensity scores as well as the region of common support.

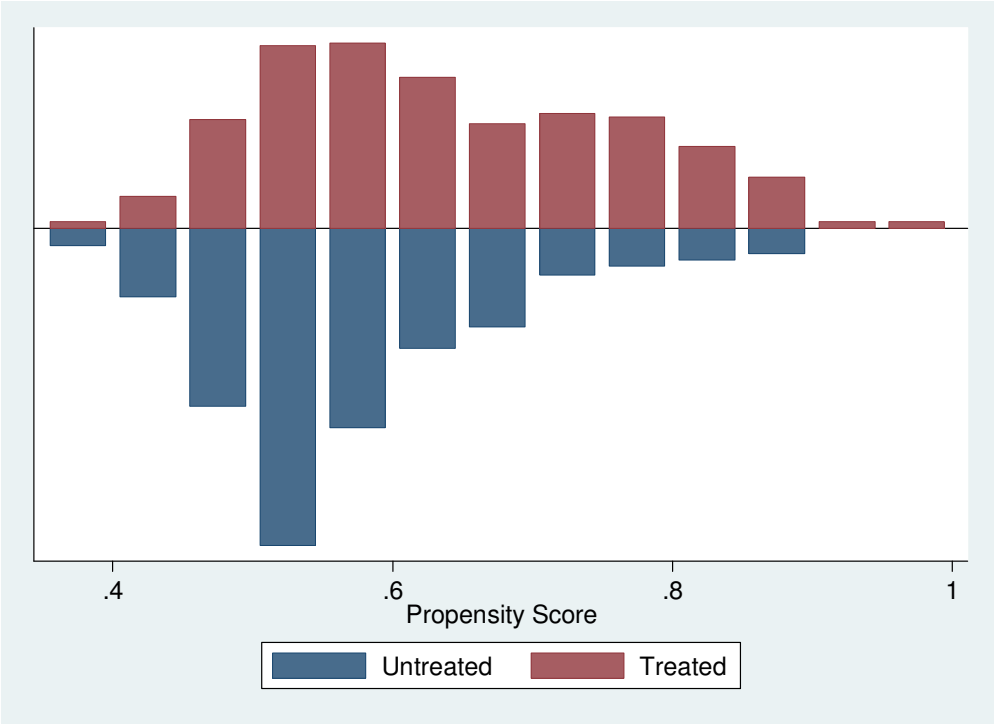

Figure 6.1: Propensity score distribution and region of common support

Source: author's computation from RALS database

As can be seen from figure 6.1, there is significant overlap between the treated and untreated samples, indicating that the common support condition is satisfied.

In this regard, after identifying the region of common support, balancing tests were then carried out, using stata software, to rule out the possibility of having the P scores different from the mean of X. The balancing property was satisfied by the covariates: farm size, age of household head, education level of household head and distance to input market, as presented in Table 6.5.

6.5 ESTIMATION OF IMPACT IN NON-EXPERIMENTAL RESEARCHDESIGNS

One of the major issues in non-experimental, impact evaluation research designs is the question of attribution. In other words, it is important to take measures to ensure that the impact measured can be attributed to the treatment. Propensity Score Matching (PSM) is one method that has been suggested by Rosenbaum and Rubin (1983) as a way of reducing bias in evaluation of impact in non-experimental research designs with observational data. Having conducted the t-tests on various production variables, propensity score matching (PSM), was then carried out using the nearest neighbour technique to try to estimate the impact of the treatment (investment) on the smallholder production outcomes.

Matching methods such as the propensity score matching (PSM) are commonly used in situations where there are no pre-determined assignment rules for programme participation or where the programme is implemented selectively (Ravallion, 2005). In PSM, a group that is as similar as possible in characteristics to the treatment group is identified, based on certain observed characteristics (Khandker *et al.*, 2010). This group then constitutes the counterfactual. This statistical comparison group is based on a model of the probability of participating in the treatment, using observed characteristics. Participants are then matched to non-participants on the basis of this probability ('propensity score'). A key assumption thus made in PSM is that participating and non-participating units are similar in terms of any unobserved variables that might affect both the probability of participating in the programme and the outcome (Y) (Gertler *et al.*, 2011).

6.5.1 Impact of LSI on key production variables

This study postulates that smallholder farmers in investment districts have higher maize gross value per hectare, than their counterparts in districts without investments have. This is tested in two ways. Firstly, t-tests for comparison of means are used to see if there is any difference in this production variable and if this difference is significant. Then secondly, propensity score matching (PSM) and double differencing methods (DD) are used to see the impact on maize gross value per hectare of maize for farmers in the investment districts.

The gross value of maize per hectare of land is influenced by other factors that influence maize production output such as use of inputs like fertilisers and seed. Proponents of LSI in farmland such as FAO (2009a) often assume that the investors improve smallholder farmers' access to inputs such as fertilisers and seed. In this regard, differences in these production variables that influence maize gross value were also analysed. This was done by testing for the significance of the differences in the usage of the inputs between the two groups of farmers.

Table 6.6: Mean Difference in key variables between smallholder farmers in investment and non-investment districts, pooled sample

	Variable mean			Absolute t-value
Variable	**No Investment (1)**	**Investment (2)**	**Difference (2-1)**	
N	N=1162	N=1083		
Area of Maize planted (ha)	1.84	1.67	-0.17	2.0629**
Maize Yield(kg/ha)	2 385.74	2 419.64	33.90	0.4518
Maize gross value ([27]ZMW/ha)	5 466.04	6 159.09	693.05	1.6586*
Total crops gross value (ZMW/ha)	8 367.19	10 148.25	1 781.06	3.2881***
Total Maize Seed (kg)	42.58	37.31	-5,27	2.6756***
Mean Maize seed (kg/ha)	25.34	24.01	-1.33	2.6605***
Use of maize hybrid seed (%)	72.66	86.29	13.63	22.7617***
Total basal fertiliser (kg)	229.72	233.10	3.38	0.18
Access to FISP (%)	69.26	49.76	-19.50	24.9929***
Distance to input market (km)	18.18	28.26	10.08	7.2475***

Source: computed from RALS database, 2012 & 2015

[***]Significant at 1% significance level, [**] Significant at 5% significance level, [*] Significant at 10% significance level

[27] The Zambian Kwacha (ZMW) was at an exchange rate of about USD1: 8.6 in 2015. The Zambian Kwacha (ZMK) was rebased in 2013 and replaced with ZMW.

The results (Table 6.6) of the t-test for comparison of means indicate that there is very little difference (2.61 kg/ha) in the total basal fertiliser usage for smallholder farmers in investment districts and non-investment districts, in favour of the former and. These differences are however insignificant and can be considered to be the same.

In terms of usage of maize seed per hectare of land, the results indicate that the farmers in investment districts use less seed than those farmers in non-investment districts. This difference of 1.33kg is statistically significant at 1% level of significance. The results also show that a higher percentage (69.26%) of farming households in non-investment districts have access to the Farmer Input Support Programme (FISP) than their counterparts in the investment districts (49.76%). This could explained the higher maize seed usage by the farming households in non-investment areas. The conclusion therefore is that the farmers in non-investment districts use significantly more maize seed than those in investment districts. However, when it comes to hybrid seed usage, the opposite is true. There is a 13.63% difference in usage of hybrid seed between the two groups of farmers in favour of the farmers in the investment districts, and this is highly significant at 1% level of significance. This supports the postulation that LSI bring increased access to better quality inputs. This is also in line with what was noted earlier in Chapter 4, that two of the three investors analysed engaged smallholder farmers in out-grower schemes where they provide a standard input packages with inputs such as seed, fertiliser and chemicals.

As noted above, FISP could have contributed to the higher usage of mean maize seed per hectare for farming households in districts without investments as a larger number of them (69.26%) had access to FISP compared to 49.76% for households in districts with investments. However, this does not translate to commensurate increases in maize yield or increases in gross value per hectare of maize and total crops gross value per hectare. This points to other possible underlying factors. For example, it may be that smallholder farmers in non-investment districts could be lacking proper farming skills, which their counterparts in investment districts may be getting from investors.

Overall, these results point to higher productivity in the investment districts as indicated by the higher gross value per hectare of maize and maize yield. Although the farmers in investment districts use less maize seed and have a 20% lower access to FISP than their counterparts in non-investment district, they still perform better. This could possibly be because of better

farming practices from skills transfer and access to better technology diffused from the investors to the smallholder farmers.

The t-tests helped to paint a general picture regarding the performance of the two groups of smallholder farmers, which seems to suggest that the farmers that are in districts with investors perform better in terms of their use of hybrid maize seed and subsequently have higher maize yield and gross value per hectare of maize and gross value per hectare of all crops, than those in districts without investors do. However, they do not imply causality and it will be important to analyse these differences using semi-parametric methods to see whether the changes could be attributed to the presence of the investors. This is analysed in the subsequent section.

6.5.2 Impact of LSI on smallholder agricultural production

Maize gross value per hectare is used as a proxy for growth in agricultural production and this is expected to be higher in the districts with investments due to the assumption of positive externalities that bring improved access to quality inputs, which subsequently result in increased yields. Gross value per hectare of all crops is also measured in order to strengthen the analysis on growth in agricultural production and check for consistency in the results.

The double differencing (DD) method was used to estimate the impact of the investors on smallholder farmers' performance. This was combined with propensity score matching (PSM) to improve the robustness of the estimation method. Firstly, PSM using the nearest neighbour technique was applied to the baseline data in order to deal with the observable heterogeneity in the initial conditions and then create a counterfactual for impact analysis. The DD method was then applied to the matched group in order to assess the impact of the LSI in farmland on gross value per hectare of maize for farmers in the investment districts. Using the DD method, the average treatment effect on the treated (ATT) was then calculated. Gross value of maize per hectare was modelled against farm size, age of household head, distance to input market and household head education level. To strengthen the analysis and ascertain the impact of treatment on production, the model was also run on gross value of all crops as well as on yield. Table 6.7 shows the results of this estimation.

The results indicate that in the year 2012, smallholder farmers in districts with investments had a 19.6% higher maize gross value per hectare of land than their counterparts in districts without

investments. This difference was significant at 1% level of significance. In the year 2015, there was a marginal increase in gross value per hectare of maize for both groups. However, the difference in maize gross value falls over time. Indeed, farmers in investment districts recorded a 7.1% higher gross value per hectare of maize (down from 19.6% in 2012) than their counterparts in non-investment districts, but this is not statistically significant. These results resonate with the studies of Sipangule and Lay (2015), who noted a convergence in the production outcomes between investment districts and non-investment districts. Overall, the difference in difference estimator indicates a decline of about 12.4% in gross value per hectare of maize for farmers in investment districts. This decline is however statistically insignificant, therefore LSI in farmland have no impact on the gross value per hectare of maize for smallholder farmers.

Table 6.7: Impact of LSI on outcome variables for the treated group

	2012			2015			Difference in difference
Outcome variable	**Control**	**Treated**	**Difference**	**Control**	**Treated**	**Difference**	
ln Maize Gross Value	7.786	7.982	0.196*	7.942	8.013	0.071	-0.124
ln Total crops gross value	7.933	7.914	-0.02	8.109	8.123	0.014	0.033
ln mean maize seed	3.236	3.248	0.013	3.245	3.225	-0.019	-0.032
ln Maize yield	7.709	7.603	-0.106	7.771	7.701	-0.069	0.036

Source: author's own computations, based on RALS 2012 & 2015

****Significant at 1% significance level, ** Significant at 5% significance level, * Significant at 10% significance level*

In terms of total crops gross value, farmers in investment districts had a 2% less total crops gross value than their counterparts in non-investment districts. Overtime, this difference increases marginally to 1.4% and overall the DD estimator shows a 3.3% increase in total crops gross value for farmers in investment districts. All these differences are however not significant. Therefore LSI in farmland have no impact on the total crops gross value for smallholder farmers. In terms of maize yield, over time, the DD estimator shows an increase of 3.6% in maize yield for farmers in investment districts. Again this difference is not significant.

Similar results are obtained with regards to mean maize seed usage. Non-investment farming households had higher mean maize seed usage than their counterparts in investment districts in

both 2012 and 2015. Overall the DD estimator shows a reduction of 3.2% in mean maize seed usage for households in investment districts. This is however insignificant and the presence of the LSI can be considered to have no impact on maize seed usage for farming households in investment districts.

Overall, these results are inconsistent with the *a-priori* expectations of better performance by those smallholder farmers in investment districts, rather than those in non-investment districts due to positive externalities emanating from investor operations. Although the results are not in line with the *a-priori* expectations, they are consistent with the findings of Sipangule and Lay (2015) who conducted a similar study in Zambia and noted a convergence between the production outcomes of smallholder farmers in investment and non-investment districts. Ultimately, the investors in farmland had no impact on the production outcomes of smallholder farmers.

The conclusion therefore is that LSI in farmland have no impact on total gross value per hectare of crops, gross value per hectare of maize and maize yield for farming households in investment districts. The insignificance of this could be because of the support on maize production which smallholder farmers are receiving through the farmer input support programme (FISP), as noted earlier.

6.6 CONCLUSION

This chapter sought to analyse the impact of LSI in farmland on smallholder production activities. In particular, it sought to test the hypothesis that smallholder farmers in LSI districts have higher gross value per hectare of maize than those in non-LSI areas.

Using t-tests and semi-parametric methods, this chapter has shown that there are differences in performance of smallholder farmers under different treatment statuses, with those farmers in investment districts using more basal fertiliser and more hybrid maize seed and having slightly higher maize yield and gross value per hectare of crops and per hectare of maize, than those in non-investment districts. The higher usage of quality inputs in the investment districts is in line with the study's postulation and explains the commensurate increases in gross value per hectare of maize and gross value per hectare of all crops.

The results indicated insignificant differences in the means of maize gross value and maize yield possibly because of FISP which is providing input support on maize. This chapter has also shown that the presence of LSI in farmland accounts for very marginal changes (-12.4% and 3.3%) in gross value per hectare of maize and gross value per hectare of all cross respectively, by smallholder farmers, but these changes are statistically insignificant. This could also be because large scale farming was already on-going in two of the districts (Mumbwa and Choma). Smallholder farming households therefore appear to have no impact from the presence of the LSI in farmland. The results also indicate that there are no negative impacts either, contrary to the general notion that LSI in farmland negatively affect smallholder farmers.

These results show the amalgamated effect of the presence of LSIs in farmland on production activities of smallholder farmers in investment and non-investment districts. The study noted earlier that in two of the three cases, there was no displacement of smallholder farmers as the land had been alienated from the communities during the colonial period and large scale commercial farming had already been on-going in the area. It would therefore be important to see how performance differs on a case by case basis. The following chapter analyses the same production variables for smallholder farmers in districts with investments only. It would also be interesting to know whether the results noted could be related to how the investors engage with smallholder farmers. In this regard, the following chapter also analyses the performance of the smallholder farmers under different engagement strategies in order to see if there could be different results from what was noted in this chapter.

CHAPTER 7: LARGE-SCALE INVESTOR – SMALLHOLDER FARMER ENGAGEMENT DYNAMICS

7.1 INTRODUCTION

It was noted earlier that there are negative perceptions surrounding large-scale investors in farmland and how these investors are said to be only concerned about making profits without any considerations for, or seeking to engage with their neighbouring smallholder farmers. But, is it really true that LSI in farmland mind their own business, are only interested in profit seeking, and do not seek to involve or engage with their smallholder counterparts in one way or another? Do they really operate in this 'vacuum' where they mind their own business? Given this notion, the study postulated that large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers in their vicinity.

This chapter seeks to test the above hypothesis that large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers. The relationship between the large-scale investors in farmland and the smallholder farmers, and how the investors impact on the latter's production activities is explored. This chapter provides an in-depth analysis of the different types of linkages between large agro-investors and smallholder farmers, and analyses the potential for such investments to unlock smallholder agricultural production and future livelihood prospects. Lastly, it presents results of the performance of smallholder farmers under different engagement strategies by the investor, which allows us to draw some inference about the relationships between the investor and the smallholder farmers.

7.2 METHODOLOGY AND DATA SOURCES

The study gathered evidence from the three case studies in Zambia described earlier. These are Amatheon-Agri Zambia Limited (AAZL) in Mumbwa district, CENAFARM in Mkushi district and Africa Crops Limited (ACL) in Choma district. Interviews with investors and managers of investment operations were conducted in order to understand the operations of these investors and their relations with smallholder farmers.

Qualitative primary data was collected through interviews with key informants such as farmer leaders, extension workers, local authorities and various government officials, and district

agricultural coordinators of Zambia National Farmers' Union (ZNFU). Focus group discussions were held with groups of farmers in each of the study areas which also provided an in-depth source of qualitative primary data to support the objectives of the study. The 2015 Rural Agricultural Livelihoods Survey (RALS) provided the secondary data set on which the analysis was based.

7.2.1 Definition and classification of engaged smallholder farmer

The definition of smallholder farmer given by the government of Zambia was noted earlier in Chapter 2 as being those farmers who are cultivate between 1 and 20 ha of land. This is the same classification adopted for this study. Makunike and Kirsten (2018) define engagement as the interaction, such as; input, market, credit and training support, that LSI in farmland have with smallholder farmers and their inclusion or exclusion in the former's investment operations. Using evidence drawn from three LSI case studies in farmland, this chapter provides an in-depth analysis of the different types of engagements and linkages between LSI in farmland and smallholder farmers, and analyses the potential of such investments to unlock smallholder agricultural production.

In order to analyse the effect of engagement of smallholder farmers by LSI in farmland, those districts in which there were LSI in farmland were selected and then from these, those districts in which the LSI in farmland had a deliberate engagement strategy (through the out-grower scheme) and those that did not were identified. The districts that involved smallholder farmers through an out-grower scheme thus served as the treatment group, and the ones that did not, served as the control group. An analysis of the performance of smallholder farmers was then made between these two groups of smallholder farmers (the engaged and the non-engaged).

This analysis sought to test the hypothesis that large-scale investors in farmland are, profiting-seeking entities who do not engage or seek to build linkages with the smallholder farmers. In this regard, the double differencing (DD) method combined with propensity score matching method (PSM), using the nearest neighbour approach was employed, to estimate the treatment effect of the LSI on smallholder agricultural growth between farmers who are engaged, and those not engaged, by the LSI in farmland. A comparison was drawn between these two similar groups of smallholder farmers in the investment districts, with smallholder farmers who are

engaged serving as the treatment group, and those who are not deliberately engaged serving as the control group.

7.3 ENGAGEMENTS BETWEEN LARGE-SCALE INVESTMENTS IN FARMLAND AND THE SMALLHOLDER FARMER

The engagements and relationships between the large-scale agricultural land investors and the smallholder farmers have always been treated with suspicion since the colonial era. During the colonial period, colonial governments encouraged settlers to drive local smallholder farmers off their land. They redrew boundaries and many were forced into marginal lands unsuitable for agricultural production. Due to loss of livelihoods, many were forced to become farm labourers for the very same colonial masters who drove them off their land. A similarity is painted by some scholars (Kugelman & Levenstein, 2009; Smaller & Mann, 2009) between the colonial-era forcible dispossession of land and the current wave of LSI in farmland.

With this comparison given in literature between colonial-era farmland investments and current large-scale investments in farmland (LSI), there is increasing concern that the LSI in farmland are more detrimental than beneficial to the smallholder farming communities in Africa, and compromise the food security of the local farmers, leaving them worse off than before the investment came into existence.

7.4 ENGAGEMENT OF SMALLHOLDER FARMERS BY INVESTORS IN ZAMBIA

Since the colonial period, engagement between the large-scale investors (LSI) in farmland and the smallholder farmers has largely been through four different types of farming models, namely individual large-scale commercial farming, plantations, contract farming, and out-grower schemes. Under the plantation farming model, the investor usually grew one main cash crop and engaged with local communities through the provision of wage employment, often with squalid working conditions. Plantations were centrally managed. Smalley (2013) notes that in such a model, grazing land as well as land used by women and new immigrants in a community is vulnerable to takeover by plantations.

Under the independent large-scale commercial farming system, the relationship between the investor and the smallholder farmer is mainly that of employer/worker whereby smallholder farmers would seek seasonal employment at the large-scale farming entity to augment their incomes, while a few were lucky enough to be hired as permanent labour. However, it is noted by Smalley (2013) that independent large-scale commercial farms create more local linkages than plantations do.

With contract farming, the investor enters into an agreement, either oral or written, with the local farmers to grow a particular crop and supply produce to a buyer. Contract farming had a couple of variants. For example, it could take the form of a nucleus estate with several out-grower farmers augmenting production at the central estate. In the contract farming model, the investor usually provides inputs and services to the contracted farmers, usually on credit. The smallholder farmers may be organised into groups or cooperatives.

Historically, it has been through these four main models that smallholder farmers have been engaged by LSI in farmland, but how relevant are these models in the present day? This study notes that these models are still applied by present-day large-scale investors in farmland, as described in the subsequent section.

7.5 ENGAGEMENT DYNAMICS BY AFRICA CROPS LIMITED

Africa Crops Limited (ACL) started its farming operations in 2008 and uses a unique farm model that incorporates tenant farming. It has joint ventures with tenant farmers (large-scale commercial farmers) of different nationalities. Management would not disclose the nationalities of these farmers, but it is believed that many of these are former Zimbabwean farmers. Indeed, Chu (2012) confirms this belief, noting that upon the collapse of the Zimbabwean Virginia tobacco industry in 2004/2005 due to the land reform programme, Zambia Leaf Tobacco (ZLT) invited many of these Zimbabwean farmers to manage tobacco plantations in the southern province. When ZLT pulled its assets out of Zambia in 2008, ACL then bought these remaining assets. The Zimbabwean farmers installed by ZLT continued to manage the farms, even after ZLT's exit. It therefore seems that ACL's core business is tenant farming with the ex-Zimbabwean farmers and only engage with smallholder farmers through wage employment (permanent and seasonal).

ACL does not seem to have a deliberate strategy for engaging with smallholder farmers in the vicinity of its farming operations, except through provision of permanent and seasonal labour. According the ACL, the investor employs about 1 700 people from local communities on all its farms (including those in two other districts), and up to about 3 000 in peak seasons. Although ACL does not have a deliberate engagement strategy with the smallholder farmers, the company management advised that they have some social corporate responsibility programmes which are benefiting smallholder farmers. There is a strong emphasis on corporate social responsibility, with each farm supporting up to 100 people and providing schools, health centres and living quarters. ACL has established a sister company, Green Solutions, a buying and selling company that buys farm inputs and shares sales discounts with the farmers. A transport logistics business also helps transport inputs and outputs to and from the markets, although it was not clear whether the transport logistics service provides service to its tenant farmers only. Another important role of Green Solutions is in brokering seasonal finance for its farmers, and it sells wheat, tobacco and soya. It sometimes engages in forward contracts, if there is an opportune moment to do so.

From the information gathered, it seems that there is no direct formal linkage between Africa Crops Limited and the smallholder farmers. However, smallholders can be said to benefit from the existence of ACL Choma farms through spillover effects. One of the major obstacles faced by smallholder farmers is the lack of access to markets, mainly attributable to the precarious state of the roads that is common in many rural settings. ACL is maintaining the roads in their area throughout the year, a role which it has taken over from the council. The role taken up by ACL in grading and maintaining roads goes a long way towards alleviating this problem, as the condition of the roads is said to have improved since ACL assumed the maintenance role. In addition to the construction and maintenance of roads, ACL is said to be providing easy access to farm inputs, at a relatively cheaper price than other dealers in the area, through its sister company, Green Solutions. However, analysis of the various input prices from different dealers in the area prove otherwise. Table 7.1 gives a comparison of input prices between Green Solutions and other agro-dealers in the Choma district.

Table 7.1: Input prices in Choma as of January 2017

Company	Input	Price (Zambian Kwacha - ZMW)
Green solutions	Fertiliser Basal (compound D)	410
	Top dressing – Urea, 50 kg	332
	Soyabean seed – 25 kg	480
	Maize seed – 10 kg	270
Arupee	Fertiliser basal (compound D)	253
	Top dressing – Urea, 50 kg	229
	Soyabean seed – 25 kg	450
	Maize seed – 10 kg	250

Source: author's investigation

Although Green Solutions is said to be providing inputs at a relatively lower price, this does not appear to be so, as shown by Table 7.1. It may be making the inputs more easily available, albeit, at a higher price.

ACL's farmers have invested in infrastructure such as dams, with open access allowed to neighbouring smallholder farmers. Chu (2012) notes that this may have created some positive benefits for smallholder farmers, such as increased access to water with resultant increases in yields and crop diversification to include other crops such as vegetables.

7.6 ENGAGEMENT DYNAMICS BY CENAFARM

CENAFARM was established in 2009 and its business model is centred on building a vertically integrated platform, comprising core commercial farming–processing hubs, with smallholder out-grower schemes surrounding it. This model is based on skills transfer and market and/or service provision to the surrounding smallholder farmers. By pursuing this model, CENAFARM hopes to be able to tackle the bottlenecks that impede smallholder agricultural production.

CENAFARM engages with the smallholder farmers through its subsidiary company called Agri-enable. According to Selby (2011), the goal of Agri-enable is to lead the integration of smallholder agriculture into the formal market place. He notes that there are several challenges facing smallholder farmers in their farming activities, which keep them locked into a vicious cycle of poverty. Challenges include unclearly defined land and water rights, poor access to

input and output markets, poor access to technologies, credit and extension services, and sub-optimal and inefficient production techniques. These are the challenges that the CENAFARM's Agri-enable initiative endeavours to address, through what they refer to as a "multiple "medicine" approach to each of these problems (ibid.).

Agri-enable's strategy involves fostering the creation of commercial hubs which will help unlock most of these bottlenecks. Agri-enable has established an out-grower and service provision scheme for smallholder farmers that includes retailing of farm inputs, service provision for smallholder farmers to get access to a set of key services, purchase, processing and sales, including purchasing of smallholder output for cash or exchanging them for inputs of an equivalent value, and provision of technical assistance.

Agri-enable also has demonstration plots where lead farmers are trained, and they in turn train other follower smallholder farmers. Agri-enable partners with established experts in this regard. For example, it has partnered with the Conservation Farming Unit (CFU) in transferring conservation agriculture techniques among small-scale farming communities in Zambia. Management would not provide further details on Agri-enable's training activities for smallholder farmers, as it was said to be undergoing some changes. As of early 2016, Agri-enable's management advised that the initiative had been shelved owing to certain operational reasons they could not disclose.

7.7 ENGAGEMENT OF SMALLHOLDER FARMERS BY AMATHEON AGRI ZAMBIA LIMITED

Amatheon Agri Zambia Ltd. (AAZL) was established in 2012 as a commercial large-scale irrigated farming investment which directly manages its own farming operations. It has established an out-grower scheme where, at the time of study (2014), it was engaging with about 140 smallholder farmers. Interviews with the company's management revealed that as of mid-2016, the company was engaging with a massive 10 000 smallholder farmers in its out-grower scheme.

According to interviews with AAZL's management, the company has a deliberate engagement strategy with smallholder farmers. It has a unique out-grower scheme that involves four parties, namely AAZL, a local bank called ZANACO, a local Non-Governmental Organisation (NGO)

called Musika, and the smallholder farmers themselves. According to AAZL, this quartet arrangement is meant to improve the lives of the smallholder farmers through the provision of access to input and output markets, production skills, and credit and extension services. In this quartet arrangement, each of these four parties has a critical role to play in the out-grower scheme.

The out-grower scheme

The 10 000 smallholder farmers growing soya and maize for the AAZL out-grower scheme are selected with the help of field facilitators, based on their production capacities. Management stated that the farmers should be able to produce a minimum of at least 10 bags of maize. The smallholder farmer's production track record and attendance at training sessions are some of the criteria used for selection.

The out-grower farmers, in total, are cultivating a combined total of about 25 000 ha of land, based on an estimated average farm size of about 2.5 ha. This is 8 times more than the 3 000 ha arable under AAZL management. It therefore certainly looks like these smallholder farmers are greatly contributing to production output of AAZL. In terms of output contribution, this translates to about 23 metric tonnes of maize and 450 metric tonnes of soya, as of June 2016.

Training of smallholder farmers

The local NGO, Musika, provides the lead in training the smallholder farmers on different production skills. According to an interview with Musika's management, its focus is on stimulating private-sector investment in the smallholder market. AAZL states that the goal of this cooperation is to improve smallholders' market access and agricultural productivity through improving access to input markets by establishing a farm shop selling inputs in the rural area, and the establishment of output markets. Through Musika, AAZL provides business education training to its smallholder farmers, through which they are trained in business management in general, as well as in conducting farming as a business.

The training programme is rolled out through field facilitators and lead farmers who are trained, and in turn train, other farmers. Each lead framer has about 50–100 other farmers under him or her. AAZL is also partnering with the Conservation Farming Unit (CFU) in providing training to its local farmers on conservation farming techniques.

Access to credit

In its out-grower scheme, AAZL offers marketing contracts to smallholder farmers, and has a partnership with ZANACO, a local bank providing credit to smallholder farmers. In this contract farming arrangement, AAZL plays a brokering role for finance. It screens potential beneficiary farmers, with the assistance of field coordinators, based on pre-set criteria such as production track record and attendance at training meetings. AAZL then recommends these farmers, whom it has contracts with, for credit with ZANACO. In this regard, Amatheon-Agri takes 50% of the risk, which it shares with ZANACO. Once the smallholder farmers have been approved for loans by ZANACO, they pay a 50% deposit to the bank and AAZL then provides the farmers with a standard input package, which they take on credit. Through the Memorandum of Understanding (MoU) that AAZL has with ZANACO and the farmers, the company is authorised to collect the remaining balance of 50% on behalf of ZANACO at harvest time, when farmers come to sell their produce at the AAZL depots.

Access to input and output markets

AAZL has established mobile selling units where local farmers can come to buy the inputs. There is a mark-up (commission) of 15% which AAZL levies on the inputs to defray expenses. These mobile selling units are also open to other non-out-grower farmers.

In terms of the output market, AAZL has established fixed and semi-mobile output market depots where their contract farmers can come to sell their produce. Like the input selling units, selling of output at these depots is open to anyone, and is not necessarily restricted to the contract farmers. According to interviews with company management, AAZL offers competitive, market-related prices. They use a pricing system that takes into account the distance between the nucleus farm and the collection point. For example, as of mid-2016, the company would buy a 50 kg bag of maize for 100 Zambian Kwacha ([28]ZMW), if sold at the parent depot. The price reduces to 95 ZMW for a 30 km-radius, and 90 ZMW for a 70 km-radius. Table 7.2 shows a comparison of prices of maize and soya (the two major crops that AAZL buys from smallholder farmers) in Mumbwa district. For soya, AAZL buys a 50 kg bag for 240 ZMW.

[28] 1 USD was about 9 ZMW as of June 2016

Table 7.2: Soyabean and maize prices (ZMW) in Mumbwa district

Commodity	Average market price ZMW/ton	AAZL price ZMW/ton
Maize	1 700	2 000
Soya (Kabwe)	4 600	4 800

Source: Zambia National Farmers Union and interview with AAZL management

It is important to note that commodity prices differ from one district to another, depending on several factors such as the supply in that particular district and availability of transport for movement of commodities from one region to another. Table 7.3 gives a comparison of maize and soya prices among the districts under consideration in this study. Some of the data was not available from the source. In that case, the district price was estimated, based on the price in the neighbouring district. These estimated prices are shown in parentheses in Table 7.3.

Table 7.3: Average soyabean and maize prices (ZMW) in other districts

District	Commodity average market price ZMW/ton	
	Maize	Soyabean
Choma	1 550	3 000
Itezhi-tezhi	1 800 (Monze)	4 700 (Monze)
Kapirimponshi	1625	3250
Kasempa	1 500 (Solwezi)	3 500 (Solwezi)
Masaiti	2 210 (Mpongwe)	5 050 (Mpongwe)
Mkushi	1 880	4920
Mumbwa	**1 700**	**4 800 (Kabwe)**
Namwala	1 800 (Monze)	4 700 (Monze)
Nyimba	2 290 (Petauke)	4 705 (Petauke)

Source: author, compiled from Zambia National Farmers Union data

Other commodities sold at AAZL depots include sunflowers, groundnuts and cowpeas. AAZL pays its farmers on the second day after delivery to allow a day for processing the sale. It is important to note that although AAZL is providing output depots, it is not the sole provider, as there are other "middlemen" who come to buy from the smallholder farmers. AAZL management, however, reported that although they are not the only buyers of soya and maize in the district, they have not yet experienced any problems with defaulters, probably because of the comparative pricing system it has, as shown by the prices noted above.

7.8 FARMING CHARACTERISTICS OF SMALLHOLDER FARMERS IN THE INVESTMENT DISTRICTS

The households in the three investment districts share some similar trends in terms of their farming characteristics although there are some variations in some of them. For example, the farm size seems to increasing across the three districts over time (Table 7.4). This is quite unusual, given pressure on land that is associated with subdivision of family plots as bequeathment for grown up male children as they start their own families in rural households. Indeed in chapter 3, it was noted that Mumbwa district for example has come under immense pressure due to an influx of migrants from other districts in Zambia, (Chu & Phiri, 2015). This unusual increase could possibly be due to farmers taking up farming on plots of those who might have abandoned them to take up wage employment on the large scale farming investments in the area. However, this study could not establish causality and further study is required to verify this unusual trend.

Some similarities were noted in household characteristics for farming households in Mumbwa and Choma, in the preceding section. However, the districts are quite different in terms of their farming characteristics including access to input market. Table 7.4 shows that distance to input market seems to reduce over time. Mkushi and Mumbwa have the shortest distances at about 17km and 22km respectively, compared with about 36km for Choma. This could be because of facilitation of access to input market by the LSI in Mkushi and Mumbwa districts unlike in Choma district, as noted in chapter 6.

The distance to input market however does not seem to be related to input usage as there are varying quantities of maize seed and fertiliser usage across the three districts with Mkushi having the highest mean maize seed usage per hectare of land, followed by Mumbwa then Choma. A similar trend is noted in terms of maize yield, again with Mkushi having the highest, followed by Mumbwa then Choma farmers. Table 7.4 also shows that maize gross value and total crops gross value both increase over time across all the three districts.

Table 7.4: Household farming characteristics by district

Farming characteristic	Mkushi district			Mumbwa district			Choma district		
	2012	2015	Pooled	2012	2015	Pooled	2012	2015	Pooled
Farm size (ha)	2.86	3.76	3.24	5.30	5.44	5.37	5.17	5.34	5.26
Total Maize seed (kg)	39.58	37.96	38.91	48.81	56.05	52.49	37.48	38.65	38.07
Mean seed (kg/ha)	27.38	24.39	26.14	26.55	23.27	24.88	23.24	22.21	22.72
Distance to input market (km)	17.59	15.71	16.83	25.42	18.28	21.89	36.36	35.37	35.90
Mean basal fertiliser (kg/ha)	155.30	139.61	147.94	130.00	83.88	104.44	186.65	132.82	159.56
Mean top fertiliser (kg/ha)	155.76	138.26	147.55	119.87	74.89	92.52	182.15	130.74	155.73
Total top fertiliser (Kg)	233.64	216.67	225.68	237.10	190.08	208.51	259.96	188.52	223.24
Total basal fertiliser (kg)	232.36	224.12	228.50	247.79	224.37	234.82	266.27	199.79	232.82
Area of maize planted (ha)	1.61	1.69	1.64	2.18	2.46	2.33	1.74	1.73	1.74
Maize yield (kg/ha)	3 134.57	3 264.97	3 188.55	2 641.97	2 557.04	2 598.77	2 565.88	2 185.87	2 374.02
Maize gross value (ZMW/ha)	6 606.15	7 897.08	7 140.57	5 124.43	8 684.85	6 935.33	8 964.10	7 311.56	8 129.77
Total crops gross value (ZMW/ha)	7 807.89	10 289.11	8 835.07	9 262.14	12 130.08	10 720.83	10 556.37	9 123.16	9 832.78

Source: author's own computations, based on 2012 & 2015 RALS databases

7.9 PERFORMANCE OF SMALLHOLDER FARMERS UNDER DIFFERENT ENGAGEMENT STRATEGIES

One of the major arguments presented by the proponents of LSI in farmland is that these investors help to unlock bottlenecks in smallholder agricultural productivity by improving access to input, output and credit markets, as well as improving access to extension services through diffusion of technical know-how. In this regard, the impact is likely to be more positive, if the smallholder farmers are engaged in the investor's farming operations. In identifying the engaged and non-engaged farmers, the study makes the assumption that if the investor includes the smallholder farmers in the district in his farming operations, through the out-grower scheme, this implies that those farmers in the district are engaged. However, this does not necessarily mean that all smallholder farming households are included as the investors have certain criteria of choosing who to include in their out-grower schemes. From the interviews with the investors, it emerged that two of the three investors (AAZL and CENAFARM) included smallholder farmers through the out-grower schemes.

Some of the descriptive statistics are analysed below in order to get some insights about these investors, and then test the difference in means of key production variables to see whether there are indeed any benefits for those farmers who are involved in the investor's farming activities. Although the study seeks to test the impact of engagement on gross value of maize, impact on other production variables that influence gross value of maize such as usage of fertiliser and maize seed and maize yield are also tested to see if there is consistency in the results.

7.9.1 Engagement and usage of basal fertiliser

Results of the t-test for comparison of means (Table 7.5) indicate that, overall, there is a decline in basal fertiliser usage over time, across both groups of farmers, with those who are not engaged having slightly higher usage (232.82kg) than those who were engaged (232.01kg). The difference between these two (0.81kg) is very small and is negligible as it is statistically insignificant. Therefore engagement of farmers does not seem to have any influence on their fertiliser usage. This is contrary to a-*priori* expectations, as the farmers who are engaged receive input support from the investors as part of the outgrower scheme. However, other factors such as the government's FISP noted earlier could be responsible for the negligible differences in fertiliser usage.

Table 7.5: Mean statistic of key variables between engaged and non-engaged farmers in investment districts

Variable	2012			2015			Pooled sample		
	Not engaged	Engaged	t-value	Not engaged	Engaged	t-value	Not engaged	Engaged	t-value
	(N =1015)	(N= 2007)		(N = 1035)	(N =1755)		(N =2050)	(N=3762)	
Total Maize seed (kg)	37.48	44.29	3.6707***	38.65	48.91	5.3859***	38.07	46.45	6.3012***
Mean seed (kg/ha)	23.24	26.95	7.9600***	22.21	23.71	7.5586***	22.72	25.44	10.4291***
Hybrid seed usage (%)	80.65	91.16	81.8729***	75.86	89.80	21.6002***	78.33	90.53	75.9696***
Total basal fertiliser (kg)	266.27	240.28	0.4672	199.79	224.27	0.6844	232.82	232.01	0.0246
Area of maize planted (ha)	1.74	1.90	1.9248*	1.73	2.16	4.9045***	1.74	2.02	4.7154***
Maize yield (kg/ha)	2 565.88	2 882.75	4.5679***	2 185.87	2 836.58	10.4906***	2 374.02	2 861.21	10.4193***
Maize gross value (ZMW/ha)	8 964.10	5 848.68	7.469***	7 311.56	8 373.78	2.1752**	8 129.77	7 026.66	3.4364***
Total crops gross value (ZMW/ha)	10 556.37	8 551.32	4.3399***	9 123.16	11 403.13	4.2339***	9 832.78	9 881.71	0.138

Source: Author's computations from RALS 2012 & 2015

***Significant at 1%, ** significant at 5%, * significant at 10%

7.9.2 Engagement and maize seed usage

Results (Table 7.5) also indicate that there is a decline in maize seed usage over time across both groups of farmers. However, farmers who are engaged in an outgrower scheme with the investing company use more maize seed per hectare than those who are not engaged do (25.44kg and 22.72kg respectively). There is a difference of 2.72 kg and it is highly significant at 1% level of significance, leading to the conclusion that farmers who are engaged use significantly higher maize seed per hectare than those who are not engaged do.

7.9.3 Engagement and usage of hybrid seed

Similar to the trend noted in maize seed and basal fertiliser usage, use of hybrid seed declines over time across both groups of farmers. However, a higher percentage of farmers who are positively engaged with investing companies (90.53%) use hybrid maize seed than those who are not engaged (78.33%). This might be because the investor facilitates ease of access to hybrid seed through provision of input packages, or are just creating input markets in the area. This difference is highly statistically significant at 1% level of significance meaning that a higher percentage of farmers who are engaged use significantly more hybrid seed than those who are not engaged do. This result is again in line with the study's *a-priori* expectations.

In preceding sections of this chapter, it was noted that those LSI in farmland that involve smallholder farmers in their farming activities improve access to inputs through the provision of farm shops and mobile selling units. The standard input package provided to the farmers in the out-grower scheme also means that farmers have access to superior inputs which ultimately leads to higher yields as seen in the subsequent section below.

7.9.4 Engagement and maize yield

The results (Table 7.5) indicate maize yield follows a similar declining trend over time and overall, smallholder farmers who were engaged by LSI in farmland in their farming operations achieved higher mean maize yield and total crop gross value per hectare than their counterparts who were not engaged by the investor did. The higher yields and gross value recorded by farmers who are engaged could be explained by the higher usage of hybrid seed, which is

superior to seed kept from previous harvests or other sources. These results are in line with the study's *a priori* expectations of a higher yield for farmers who are engaged.

The higher mean yield could also be because the farmers are using better farming techniques which they are trained in by the investor. Preceding sections of this chapter earlier noted that both CENAFARM and Amatheon Agri Zambia Limited provide training for their farmers in certain agricultural production techniques. It was also noted that the engaged farmers have higher hybrid seed usage. This might also be because of the ease of access to quality seeds facilitated by the investor through the establishment of the farm shops. The differences in maize yield are statistically significant at 1% level of significance. However, differences in the total crops gross value are insignificant leading to the conclusion that there is no difference in the gross value of maize and crop production between the two groups of farmers as a result of engagement by the LSI in farmland.

The t-test analysis helped to paint a picture of possible relationship between the engagement and production outcomes of the two groups of farmers. However, in order to establish causality, semi-parametric methods were used as discussed in the subsequent section.

7.10 IMPACT ON CROP PRODUCTION

A combination of double differencing (DD) method with propensity score matching (PSM) using the nearest neighbour technique was used to estimate the impact of the LSI in farmland on gross value of maize per hectare of land for farmers in the investment districts. The average treatment effect on the treated (ATT) was then estimated on various production outcomes. Table 7.6 shows the results of this estimation.

Table 7.6: Impact of engagement on crop production for the treated group

	2012			2015			Difference in difference
Outcome variable	**Not engaged**	**Engaged**	**Difference**	**Not engaged**	**Engaged**	**Difference**	
Maize gross value (logs)	6.972	6.007	-0.965***	6.819	6.417	-0.403***	0.563***
Total crops gross value (logs)	7.313	6.684	-0.629***	7.244	6.938	-0.307***	0.322***
Basal fertiliser (logs)	3.879	3.752	-0.127*	3.743	3.622	-0.121	0.006
Maize yield (logs)	6.752	6.722	-0.030	6.694	6.753	0.059**	0.089**
Maize seed (logs)	2.351	2.419	0.068	2.423	2.465	0.042	-0.026

Source: author's own computations based on 2012 & 2015 RALS database

The results indicate that over time, there is an increase of 56.3% in maize gross value per hectare of land for the farmers who were engaged. This increase is highly significant at 1% level of significance. Similar results are also noted in terms of total crops gross value which registered an increase of 32.2% over time, for the farmers who were engaged.

Other variables that influence the gross value of maize also indicate an increase. For example, there was a 0.6% increase in usage of basal fertilisers for those farmers in the districts where the smallholder farmers were engaged. This small increase is however insignificant meaning that engagement had no impact on basal fertiliser usage.

Contrary to *a-priori* assumptions, the results indicate that there was a reduction in the usage of maize seed by 2.6%. Given that this study noted earlier that those farmers who are engaged by the LSI in an outgrower scheme receive a standard input package, one would have expected an increase in maize seed usage by the farmers who were engaged. However, there could be other factors that could have contributed to this observation. For example, the possibility of farmers selling seed received in order to meet short term financial requirements. However, further study is required to ascertain whether smallholder farmers indeed use the inputs they receive from the investors on their plots or whether they sometimes sell them for short term financial gain. Although the results indicate a decline in maize seed usage, this is not statistically significant implying that engagement by LSI has no impact on maize seed usage.

The increase in the usage of basal fertilisers and maize seed seem to translate to a commensurate increase in maize yield. Results in Table 7.6 indicate that there was an 8.9% increase in maize yield as a result of engagement. This increase is statistically significant at 5% level of significance and is in line with a-priori expectations.

7.11 CONCLUSION

This chapter has provided an in-depth analysis of the different types of linkages between LSI in farmland and smallholder farmers, and has shown that LSI in farmland have a potential to unlock bottlenecks in smallholder farming by improving access to markets and transferring of technology. The chapter has also shown that LSI in farmland do engage with smallholder farmers, proving wrong the hypothesis that these investors are profiting-seeking entities who do not engage, or seek to build linkages, with the smallholder farmers.

This chapter has also shown that some of the investors have a deliberate plan to engage with and involve smallholder farmers in their farming activities, particularly through the out-grower schemes, while others do not deliberately engage with the smallholder farmers, save through wage employment. Results have also shown that the performance of smallholder farmers differs under different engagement regimes. Variations in maize yield, maize and total crops gross value and quantity of maize seed per hectare were recorded between farmers that are engaged and those that are not engaged, in favour of the engaged. This therefore means that the mere presence of LSI in farmland does not necessarily imply impact on the smallholder farmers in close proximity to them unless there is a decent and positive engagement strategy.

These results shall be used again in Chapter 8 to answer the question of a possible co-existence model for LSI in farmland and smallholder farmers.

CHAPTER 8: LSI AND CONSOLIDATION OF SMALLHOLDER FARMS

8.1 INTRODUCTION

As previously noted, one of the strong criticisms of LSI in farmland is the destruction of smallholder agriculture. The major concern among the opponents of LSI is that these investments dispossess smallholder farmers of their land. With the loss of their major productive asset, this vulnerable group of farmers lose their means to put food on the table; they become landless and are driven out of farming; they lose their communities and the socio-cultural cohesion is lost.

Large-scale investors in farmland are accused of facilitating the demise of smallholder farmers through the consolidation of small, family farms and crowding the smallholder farmers out of markets. McMichael (2012) notes that there is a "global ordering of international food production" by these investors which is pushing smallholder farmers off their land and thrusting them into the labour markets, thus leading to their demise. Several questions arise from this widespread notion. Does the presence of LSI in farmland mean the destruction of the smallholder farming sector? Are all LSI consolidating small farms, consequently leading to the demise of smallholder agriculture? Is it possible that large-scale investors in farmland can co-exist with smallholder farmers? If yes, how and under what conditions, and what would be the best model for co-existence?

This chapter endeavours to answer these questions and test the hypothesis that LSI in farmland does not destroy smallholder agriculture and that the two can co-exist. This chapter also discusses how and under what conditions both LSI and smallholder farmers can co-exist, and what the future of small, family farms in the wake of LSI in farmland might be. Conclusions are drawn on whether or not it is possible for smallholder farmers to co-exist with the LSI in farmland.

8.2 THEORY BEHIND CONSOLIDATION, DISPLACEMENT AND DISPOSSESSION OF SMALLHOLDER FARMERS

Underlying the issue of consolidation and destruction of small, family farms is the debate of large versus small farms which was reviewed in Chapter 2. From the arguments noted earlier,

the implication is that if LSI in farmland are consolidating and destroying small, family farms, then this will inevitably lead to structural transformation of the African agrarian sector. The concern then is whether small, family farms will eventually be replaced by huge corporate farms, and whether this model will work for Africa. With this argument against the consolidation of small, family farms that contributes to the demise of smallholder farming sector being presented against LSI in farmland, it is interesting to note that evidence from this study seems to paint a different picture, as seen in subsequent sections of this chapter.

In order to add to the debate and to provide additional evidence, this study reviewed three case studies, namely Africa Crops Limited (ACL), Amatheon Agri Zambia Limited (AAZL) and CENAFARM, in three different districts in Zambia in order to understand whether the investors' acquisition of land and their operations are contributing to the destruction or strengthening of the smallholder farmers. Interviews were held with managers of investment operations, as well as with smallholder farmers, district agricultural officers, and field facilitators of the Zambia National Farmers Union (ZNFU). However, before discussing results from the review and the interviews, it will be critical to first look at some of the predominant thoughts regarding the issue of consolidation of smallholder farmers.

Several authors (Li, 2010; Ince, 2014; Wily, 2012) who have painted a picture of LSI as capitalists displacing smallholder farmers from their land, largely borrow their ideas from the Marxist theories of accumulation by dispossession. The arguments presented point to the emergence of the capitalist farmer, driven by nothing but accumulation through dispossession. Hall *et al*. (2015), however, note that not all large-scale investments are about capital accumulation, dispossession and displacement. They argue that when there is a need for both land and labour, the investor tends to "incorporate rather than exclude" the smallholder farmers (ibid.). This implies that exclusion and displacement of smallholder farmers is likely to happen when the investor has no perceived need for labour. Although this is a plausible intuition and logical deduction, there might be a divergence between theory and practice. Inclusion through wage employment for example, does not necessarily mean that the farmer is not displaced. Indeed, the farmer may be included by the LSI through wage employment and still be displaced. It is also possible for the farmer to be displaced first and then seek wage employment with the LSI. Li (2011), presents an interesting theory concerning the perceived displacement of smallholder farmers by LSI. She points out that investors often have access to cheap land, for example, as in the case of Mozambique where the land rents are a mere 60c per hectare.

She essentially argues that if investors were to pay rents that are equal to the loss in livelihoods of smallholder farmers when they are displaced by the investors, these rents would be so high as to discourage investors from displacing the smallholder farmers, and they would rather engage them in contracts. This thus implies that the cheap cost of land is a key driver of the displacement and dispossession of smallholder farmers.

This chapter borrows from the agrarian political economy perspectives in addition to evidence gathered in the field, to analyse the behaviour of the investors; how their operations are affecting smallholder farmers; and the potential of displacement and destruction of smallholder farmers by the LSI in farmland. This study applies these arguments to the case studies analysed in this chapter in order to understand what motivates the LSI to displace smallholder farmers, and under what conditions this could happen. With this background, the study presents a possible framework for land acquisitions and displacement of smallholder farmers (Figure 8.1).

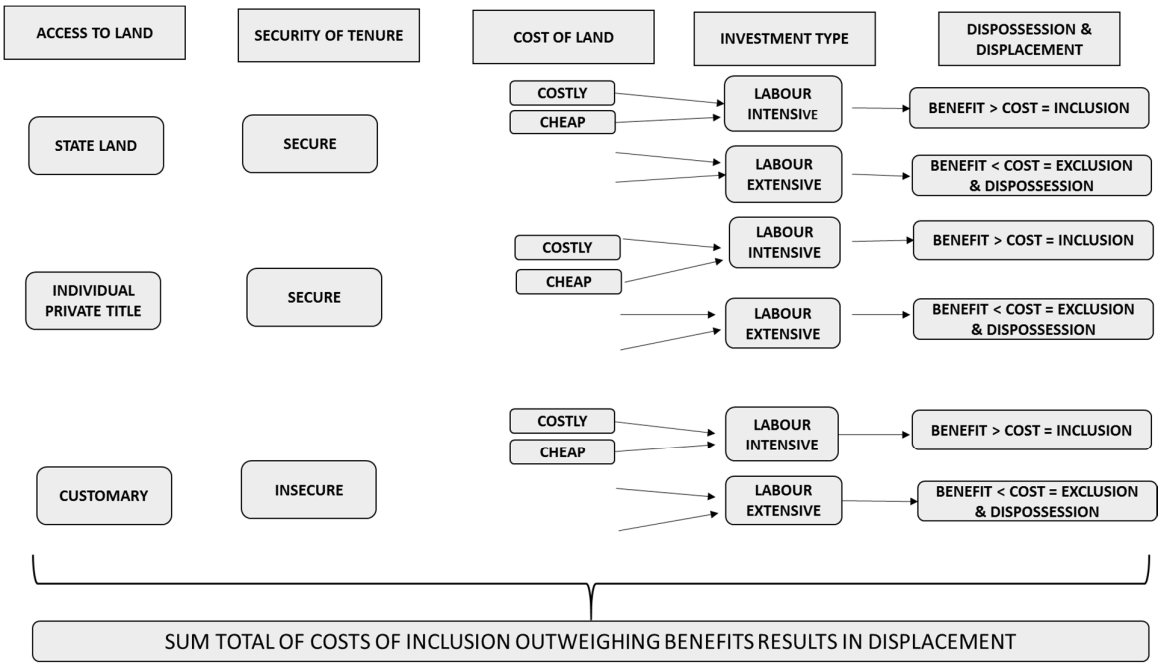

Figure 8.1: Conditions under which displacement and dispossessions could occur

Source: author

In the cases analysed, there are two different types of lands in which LSI in farmland are acquired, namely state land and individually titled land[29]. These are governed by different tenure regimes, which could be either secure or insecure. In the case of Zambia, it was noted that customary land does not have security of tenure and the smallholder farmers living on it have usufruct rights. Based on the ideas of Hall *et al*. (2015) and Li (2011), the first scenario under which displacement and dispossession could occur is where the cost of land is cheap (i.e. the rents investors pay do not equate to the cost of loss of livelihoods due to displacement), and the investment is labour extensive, i.e. there is no perceived need for labour, which serves as an incentive for the investor to displace the smallholder farmers and exclude them from its investment operations. If, on the other hand, the cost of land is expensive and labour is needed, then the investor will be forced to include the smallholder farmers in its investment operations, and displacement does not happen. The second scenario under which displacement and dispossession might occur is where the land is costly and the investment is labour intensive. Because the land is expensive and labour is needed, the investor will include the smallholder farmers in the investment operations instead of displacing them.

Both scenarios presented above can occur on different types of land acquired, and under different types of tenure regimes. Taking into consideration all the associated costs of land acquisition, the study also postulates that the investor is a rational, profit-seeking economic agent who will not willingly displace the smallholder farming community if the sum total of the perceived costs of displacement outweigh the benefits of incorporation. With this rationale, a presentation is made below the analysis of the investors' operations and their contribution to the consolidation of smallholder farmers. Mixed results emerged from the study, as will be seen in the subsequent sections.

8.3 CONSOLIDATION OF SMALL, FAMILY FARMS INTO HUGE CORPORATES

Acquisition of land by LSI in Zambia is achieved through three main ways, as noted in Chapter 3. An investor can acquire state land through the Zambia Development Agency (ZDA), which is the custodian of state land. State land can be land set aside/designated for commercial farming enterprises such as the farm blocks. Secondly, an investor can acquire private, titled

[29] Due to absentee landlords and land of clarity on boundary demarcation in Mumbwa, some of the smallholder farmers had settled on this land assuming it to be customary land

land through direct negotiations with the title holder, and lastly, the investor can negotiate directly with the traditional authorities for smallholder land, in which case the smallholder farmer is then displaced from his/her farm. The case studies analysed in this study acquired either state land or individual titled land, some of which had been previously "unutilised" and largely unfarmed.

Whilst it is not the aim of this study to attest what constitutes a "land grab" or to prove that LSI in farmland are bringing about structural transformation in the agricultural sector, the study does notes that, the case studies do not constitute direct land grabbing from the smallholder farmers as the land that was targeted by the investors were primarily brownfields[30] and green fields[31]. The selection of the cases was not based on whether or not they targeted communal land or state land, but was based on willingness of investor to participate in the study as explained in detail in Chapter 3. In this regard, there could be some degree of bias and the results need to be interpreted with caution and should not be extrapolated to all LSI in farmland. However, these cases serve as a good example to show that not all LSI in farmland target customary land as has been postulated by some.

8.3.1 Land acquisition by Africa Crops Limited

While it has been reported that smallholder farmers have been displaced from their farms, as was the case in Ethiopia's Gambella region (Oakland Institute, 2011a), in Chief Mwemba's area near Lake Kariba, and Chief Mukonchi's area near Kapirimposhi District in Zambia (Brown, 2005), this does not appear to be the situation in the case of Africa Crops Limited (ACL).

As noted earlier, in Chapter 4, ACL acquired land that had previously been used by commercial farms, established on statutory land. The farms were previously owned by Zambia Leaf Tobacco (ZLT) before ACL acquired them in 2008. As such, there were no records of displacement of local communities as a result of ACL's investment. Since the land had been alienated from smallholder farmers during the pre-independence times, it is possible that displacement of smallholder farmers could have taken place at that time and not necessarily when ACL acquired the land. However, it emerged from interviews with company

[30] Previously established farmland
[31] Land that has not been previously farmed

management that although ACL had acquired previously established commercial farms, there were some families which had occupied some land within these farms and had remained there even after the acquisition. The situation was, however, resolved amicably and the families were resettled elsewhere, with compensation paid for their dwellings.

8.3.2 Land acquisition by Amatheon Agri Zambia Limited

Amatheon Agri Zambia Limited (AAZL) acquired its land by consolidating individual titled land on statutory land in the Big Concession farming block. As noted in Chapter 4, there had been no commercial farming development in this area for years (Nolte & Subakanya, 2015; Chu & Phiri, 2015) and subsequently, some smallholder farmers had settled on this "unutilised' land. Local chiefs also allocated people land in this area as there was no clear demarcation of boundaries between statutory land and communal land, which resulted in tensions and subsequent dislocation of some smallholder farmers when AAZL acquired the land. Chu and Phiri (2015) note that this area is characterised by absentee landlords. It has further been noted that Mumbwa district, in which AAZL is located, has come under extreme pressure from competing demands such as tourism, mining and conservation (ibid.). Traditional leaders have been allocating land to new and old households, and it is not certain that they have clear knowledge of the boundaries between customary and statutory lands (Nolte & Subakanya, 2016; Chu & Phiri, 2015).

From the interviews with the company and other stakeholders, it emerged that Amatheon Agri Zambia Limited acquired its land through the purchase of many different individually titled plots, but this land had not been previously farmed. The smallholder farmers interviewed however noted that AAZL acquired "state" land, but there were some families who had been displaced and were paid 750 ZMW per hectare of land[32]. Upon further enquiry, the smallholder farmers were not sure whether it was state land or individual titled land. The payment of 750 ZMW could not be verified by AAZL. Chu and Phiri (2015) however confirm that land acquisition by AAZL was through amalgamation of individual titled land.

Many people had, however, illegally settled on this land and would be affected by the establishment of the farming operation. In its EIA statement (2013), the company noted that

[32] Interview with smallholder farmers in Mumbwa, 20 May 2014

29 households were potentially affected directly by the investment and could require relocation. However, information from the AAZL website (2014) indicated that only 5 families were resettled during phase 1 of development. In the second phase of development and land acquisition, 16 households were affected. AAZL endeavours to avoid resettlement and find alternatives, where possible. In this regard, the investor indicated that it redrew the boundaries and redesigned centre pivot locations to ensure that the households would not be displaced from the land they were already occupying, in accordance with the International Finance Corporation's (IFC) performance standard guidelines.[33] The result was that, out of the 16 families, 14 would not be displaced and only 2 needed to be resettled. AAZL further states that formal signed agreements were entered into with these 14 households to have land titles transferred to them in their names. These 14 families are also now part of the company's out-grower scheme. Only two families from phase 2, therefore, needed to be resettled, making a total of 7. At the time of interviews (2014), AAZL was said to be building 7 houses for these 7 families.

According to AAZL, although it re-settled the households that it had displaced, legally, they were not required to do so, as those displaced were on land to which they did not have any legal rights before the displacement. The displaced people were re-settled on state land, with the provision of titles, and AAZL did this at its own expense as part of their Corporate Social Responsibility (CSR). Compensation was based on the valuation of the dwellings, as well as the fields using the IFC's guidelines on land acquisition and involuntary resettlement. No reference was made to the Food and Agriculture Organisation (FAO) voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security (VGGT) nor the African Union (AU) framework and guidelines and its guiding principles large-scale land based investments (LSLBI). It also emerged from the focus group discussions that the affected communities were not consulted prior to the decision to resettle and compensate them.

8.3.3 CENAFARM operations

[33] This is IFC's guideline on Land Acquisition and Involuntary Resettlement.

The land acquired by CENAFARM was part of the Mkushi farm block delineated by the colonial government for former war veterans. Since the land acquired by CENAFARM was former state land, it does not appear that any displacement of smallholder farmers took place at the time of acquisition. An interview with the Mkushi District Agricultural Coordinator (DACO) confirmed that there was no record of displacement of smallholder farmers which had taken place as a result of CENAFARM's acquisition of land.

Interviews with smallholder farmers in the area, as well as the Zambia National Farmers' Union (ZNFU) field facilitators in the district, also indicated no history of displacement of smallholder farmers by CENAFARM. Smallholder farmers interviewed indicated that that there are two types of lands that investors can acquire in Mkushi, namely customary land and state land. One of the smallholder farmers interviewed stated that "those with titled land can sell to whoever is willing to buy it. Some of the investors are offering $1 000 per hectare to buy the land, but the process of getting a title is costly for many of us. One needs about 10,000 ZMW (about $790) to get surveyor maps only[34]". The sentiments of this smallholder farmer resonate with Brown (2005) who noted the prohibitive costs for title conversion with about $100 needed just to get the survey drawings in 2005.

Although there was no displacement of smallholder farmers as a result of CENAFARM's land acquisition, it is most likely that it took place much earlier when the land was alienated from the smallholder farming communities during the development of the Mkushi farm block during the colonial period.

8.4 EXTERNALISATION OF PRODUCTION AND CROWDING OUT OF MARKETS

One of the arguments presented by the opponents of LSI in farmland is that investors are driven by profit seeking tendencies (McMichael, 2012) and are growing food for export to their own countries (Daniel, 2011; Wiggins *et al*., 2009; Anseeuw *et al*., 2012). In addition, because of the comparative advantages they enjoy due to economies of scale, there is potential for the LSI to compete with smallholder farmers on the markets, and thereby crowd them out. However, this argument does not seem to be true of the investors interviewed by this study.

[34] Respondent, Mkushi smallholder interview, 22 May 2014

8.4.1 Africa Crops Limited

The farms of Africa Crops Limited (ACL) predominantly focus on growing tobacco and other crops, such as wheat and soybean. Chu (2012) notes that the ACL farmers are unwilling/unable to compete with smallholder farmers in growing maize due to the heavy government subsidies for maize received by the smallholder farmers. Interviews with members of the company management revealed that the tobacco grown by its farmers is under contract to larger local tobacco purchasers, and so there does not seem to be any externalisation of production. Because of the separation of the tobacco and maize predominantly grown by the smallholder farmers, there does not appear to be any crowding of smallholder farmers out of markets by ACL.

8.4.2 Amatheon Agri Zambia Limited

As noted earlier, Amatheon Agri Zambia Limited (AAZL) grows mostly soybean and maize. According to AAZL, their produce is sold to both local (within Zambia) and regional African markets. Although the company is growing crops similar to those grown by smallholder farmers (maize and soya), there does not seem to be any smallholder farmers who have been crowded out of the output market. It seems, rather, that AAZL is contributing to the improvement of access to output markets through the establishment of output depots where locals can sell their produce, as noted in Chapter 6. These output depots are not only made accessible to AAZL's out-grower farmers, but are open to any other smallholder farmers in the vicinity.

8.4.3 CENAFARM

CENAFARM grows maize, wheat, beans and soya. According to the Agri-enable model, the output from the main hub is directed at local domestic markets. Produce is sold through a broker who is based in the capital city of Lusaka. Smallholder farmers commonly produce maize and soya, and one is prompted to think that they might be competing with the smallholder farmers in the maize and soya markets. Since CENAFARM is producing for the local domestic market, it might also seem as though they may be competing with smallholder farmers for the same local domestic market. However, CENAFARM seems to be pushing the demand side of the business through the creation of processing plants for maize and wheat milling. They have also

established bakeries for baking the flour into bread for the local market, creating further demand for the smallholder farmers' output.

8.5 POTENTIAL MODEL FOR CO-EXISTENCE

It was noted earlier that some opponents of LSI in farmland argue that such investors destroy smallholder agriculture and that it is not possible for the two to co-exist. However, results from the three cases studied in this research have indicated that not all LSI are consolidating small farms and driving smallholders off their land, although there have been incidents of a few families who had to be resettled. Indeed, Deininger *et al*. (2011) and Cotula and Leonard (2010) noted that LSI in farmland do not necessarily have to result in consolidation of smallholder land as there are other viable options for co-existence. Cotula and Leonard (2010) note that such collaborative business models as the ones in which both the investor and the smallholder farmer "genuinely share value" between them. This in turn is determined by the extent of inclusiveness of the model. Table 8.1 summarises observations about the investors and their effect on the smallholder farmers.

Table 8.1: Summary of key findings about the investors

District	Investor	Engagement	Land acquired	Creating output market	Displacement record	Maize seed (kg)	Maize yield (kg/ha)
Choma	ACL	No	State	No	Yes*	22.72	2 374.02
Mkushi	CENA FARM	Yes	State	Yes	No	26.14	3 188.55
Mumbwa	AAZL	Yes	individual titles	Yes	Yes*	24.88	2 598.77

Source: compiled from study results

**families illegally occupying statutory land*

Indeed in the case of ACL and CENAFARM, these investors acquired previous state land and there was no record of displacement of smallholder farmers at the time of acquisition, except for some families illegally occupying the statutory land in Choma (Table 8.1). CENAFARM has actually incorporated smallholder farmers into their farming activities through the out-grower schemes. Displacement of smallholder farmers was noted in the case of AAZL as well, even though the land acquired was individual titled land. As noted earlier, due to the ignorance of local chiefs regarding demarcation of boundaries as well prevalence of absentee landlords

in Mumbwa, some smallholder farmers had settled on the land assuming it to be communal land. These families were subsequently re-located when AAZL began its farming operations. Similarly, AAZL, also incorporated these smallholder farmers into its farming operations through the out-grower scheme.

As can be seen from Table 8.1, both CENAFARM and AAZL have incorporated (engaged) smallholder farmers in their farming businesses and these smallholder farmers seem to perform better in terms of usage of maize seed and have higher maize yield. Chapter 6 also noted that there were significant differences in total crops gross value, maize gross value, use of hybrid seed and maize yield between farmers that were engaged and those that were not engaged in favour of the engaged farmers. This seems to point towards a model for mutually beneficial[35] co-existence.

The models presented by CENAFARM's Agri-enable and AAZL provide examples of possible co-existence between smallholder farmers and large-scale agricultural land investors. Given the positive maize yield and maize gross value results of farmers in Mumbwa and Mkushi districts where farmers are engaged, the study concludes that a model that integrates smallholder farmers vertically and horizontally, and in the process tackles the constraints to smallholder growth such as access to input and output markets, credit and extension services, provides the best model for the mutually beneficial co-existence of smallholder farmers and large-scale investors in farmland.

8.6 CHAPTER SUMMARY

This chapter sought to test the hypothesis that LSI in farmland does not destroy smallholder agriculture and that the two can co-exist. It also sought to answer the question of whether the presence of LSI in farmland means the destruction of the smallholder farming sector, and whether all LSI are consolidating small farms, consequently leading to the demise of smallholder agriculture. It also sought to establish the possibility of co-existence between large-scale investors in farmland and smallholder farmers, and identify the best conditions and model for co-existence.

[35] In this study, a mutually beneficial model is defined as one in which there are mutual benefits to the parties involved, that is, both the investor and the smallholder farmer

The study has established that although some LSI might acquire their land through consolidation of small, titled land, not all investors are using this method to acquire their land. From the three case studies analysed, two of them acquired previous state land and there was no record of displacement of smallholder farmers at the time of acquisition, except for those smallholder farmers that had been illegally occupying the land, assuming it to be communal land. As such, one cannot simply paint all LSI in farmland with the same paint brush and conclude that they are responsible for the demise of smallholder farmers. The study has shown that some of the investors actually have strong corporate and social responsibility plans that incorporate smallholder farmers into their farming activities.

The study has also dispelled the notion that all LSI are crowding smallholder farmers out of their markets. This study established that the investors analysed in the study are rather creating a market for smallholder farmers' produce and are helping to improve their access to both input and output markets through the establishment of input and output depots.

Lastly, this chapter established that a mutual co-existence between LSI in farmland and smallholder farmers where both parties benefit from the relationship is possible. Through the incorporation of smallholder farmers horizontally and vertically in their farming activities, LSI in farmland can thereby help smallholder farmers to improve their production.

CHAPTER 9: SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

This chapter summarises the thesis and notes the delimitations of this study. It presents the major findings from the study and draws relevant conclusions. Policy recommendations based on the study findings are also made.

9.1 SUMMARY

9.1.1 Background and problem statement

The issue of large-scale investments (LSI) in farmland by resource-rich countries in mostly developing countries has drawn world-wide attention for some time now. This issue is commonly referred to as "land grabs", and has been a field of interest which has evoked debates on the subject among various scholars. One school of thought sees this as a way of filling the gap in investment in African agriculture, while another sees this as nothing more than neo-colonialism. Arguments against the LSI are mainly premised on the notion that they disenfranchise smallholder farmers by crowding them out of markets and dispossessing them of their land, leading to their demise.

While some claims have been made that these LSI can help fill the investment gap in African agriculture, there is a lack of empirical evidence on the potential of such investments to unlock constraints in the smallholder farming sector, and on the possibility of a mutually beneficial co-existence between the LSI and smallholder farmers. It may be possible that these investors can unlock smallholder growth because of positive externalities such as improved access to markets, extension, technology and credit. Although LSI in farmland may have some positive aspects, the current perception is that such investments are very bad and are akin to neo-colonialism. However, it is important to offer a balanced picture and provide evidence to see if such investments are truly as bad as has been generally portrayed in most of the literature available.

9.1.2 Study purpose

Given the above, this study sought to investigate the potential of large-scale investments (LSI) in farmland to unleash small-holder agricultural growth. It postulated three hypotheses to help it achieve the objective, as follows:

- Smallholder farmers in LSI areas have higher gross value per hectare of maize, than those in regions or districts without any LSI.
- Large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers in their vicinity.
- LSI in farmland do not destroy smallholder agriculture and the two can co-exist.

The argument made by this study was that there is potential for LSI in farmland to unleash smallholder agricultural growth through positive externalities that remove bottlenecks, such as poor access to input and output markets, technology and infrastructure.

9.1.3 Methods and procedures

The study made use of an existing database on the rural agricultural livelihoods survey (RALS), as well as the data available from the Land Matrix global observatory on land grabs. This secondary data was supplemented by primary data collected through key informant interviews and focus group discussions.

The data was analysed using a combination of analytical methods, including t-tests and propensity score matching for average treatment effects and double differencing methods. The three hypotheses were tested using various methods, as follows:

Hypothesis 1: Smallholder farmers in LSI areas have higher gross value per hectare of maize, than those in regions or districts without any LSI.

The first hypothesis sought to prove that smallholder farmers in areas with LSI in farmland perform better in terms of maize gross value per hectare of land than their counterparts in districts without investments do. This was tackled using quasi-experimental methods of impact evaluation, namely the double differencing method combined with the propensity scoring

method because of its ability to deal with bias associated with non-random programme participation. This was complemented with t-tests for comparison of means for different production variables between the farmers in investment districts, and those in non-investment districts.

Hypothesis 2: Large-scale investors in farmland do not engage or seek to build linkages with the smallholder farmers in their vicinity

The second hypothesis sought to establish whether LSI in farmland give consideration to, and engage with, the smallholder farmers in their vicinity, contrary to the general belief that they are not interested in deliberately engaging with them. It also sought to establish whether those farmers who are engaged by the LSI in farmland perform better than those who are not engaged do. To tackle this hypothesis, the study used a combination of qualitative and quantitative statistical tools, as well as econometric methods of impact evaluation.

Hypothesis 3: LSI in farmland do not destroy smallholder agriculture and the two can co-exist.

The third hypothesis sought to prove that not all LSI in farmland are consolidating smallholder farms into huge corporate farms, and to show that under inclusive models that integrate smallholder farmers horizontally and vertically, it is possible for large corporate farms and smallholder farms to co-exist in a mutually beneficial relationship that results in increased smallholder agricultural growth.

In order to test this, the study used an agrarian political economy perspective to gain an understanding of how the various investors interviewed relate with the smallholder farmers, and what could motivate their actions towards including smallholder farmers, or displacing them from their land.

9.2 DELIMITATIONS

This study was specific to the African context and drew on three cases from Zambia. It did not cover all documented or reported cases of LSI in farmland in Zambia, but rather looked at three particular cases, based on the willingness of investors to participate in the study.

The study was interested in the potential of LSI in farmland to unleash growth among smallholder farmers, and not in growth in the whole of the agricultural sector or the whole economy. Since the study is focused on the smallholder farming sector, this limited the target population to smallholder farmers, both in the districts with investments, and in selected districts without LSI in farmland.

9.3 MAJOR FINDINGS, DISCUSSION AND CONCLUSIONS

Two distinct set of results with regards to agricultural performance of smallholder farmers were noted. Firstly, LSI in farmland had no impact on smallholder production in general. However, when the farmers were incorporated into the investors' farming operations through an outgrower scheme, there was a clear positive impact in terms of maize gross value and total crops gross value.

9.3.1 LSI in farmland and performance of smallholder farmers

The study findings show that LSI in farmland have no significant impact on, and do not interrupt smallholder agricultural production. Performance was measured against gross value per hectare of maize production, crops gross value, usage of hybrid seed, and average basal fertiliser per hectare. The study noted that a higher percentage of smallholder farmers in investment districts use hybrid maize seed and more basal fertiliser, and have higher gross value of maize, gross value of crops and maize yield than their counterparts in districts without investments have.

Looking at the impact of the investor on crop production by the smallholder farmers, an increase of 3.3% on gross value of all crops and a decrease of 12.4% on maize gross value was noted. The insignificant differences in total crop gross value, maize gross value and maize yield lead us to conclude that LSI in farmland have no major impact on the production activities of smallholder farmers. This finding could be due to the fact that most smallholders are recipients of the state funded farm input subsidy programme (FISP). The results also indicate that there were no negative impacts either on smallholder production. These results echo the findings of Sipangule and Lay (2015) who found no disruptive effects of large scale land acquisitions on smallholder farmers at the district level.

The study has noted that smallholder farmers in investment districts have higher input usage, which imply better access to input markets. This seems to have translated to a commensurate increase in maize gross value per hectare of land as smallholder farmers in districts with investments performed better in terms of this variable. These results seem to back the arguments of LSI proponents who contend that LSI can bring about improved access to inputs.

These findings have critical implications for the development of smallholder agriculture. Literature notes that smallholder farmers play a fundamental role in African economies. In 2009, Wiggins (2009) estimated that the bulk of the farming system in sub Saharan Africa (SSA) comprised smallholder farmers[36], representing about 80% of all farms, with an average land size of 1.6ha. In SSA, smallholder farmers play a critical role, not only in the agriculture sector, but in the economy as a whole. The share of production from smallholder farmers is highly estimated, going up to 90% (ibid.). These statistics highlight the fundamental role played by smallholder farmers in African agriculture and yet, this sector is riddled with many bottlenecks that hinder productivity increase, as noted earlier. Wiggins *et al.* (2009) note that a key issue in increasing smallholder productivity is provision of services, inputs and markets. There are high transaction costs associated with provision of these basic necessities which state agents are no longer able to shoulder (ibid.). If government agents are no longer able to play this role, then certainly, there is need to explore other ways of making these basic necessities available to farmers. For example, governments could tap into the potential for improved access to the basic productive goods and services made available by the LSI in farmland as evidenced by this study's results. Indeed, Poulton and Lyne (2009) recommend several solutions to this, one of which is engagement of farmers through contract farming. The subsequent section discusses how engagement of smallholder farmers by LSI in farmland impacted on their production outcomes.

9.3.2 Impact of engagement of smallholder farmers in agricultural production

Secondly, the study found that LSI in farmland, although being profit-seeking entities, and focused mainly on their own interests, do engage with smallholder farmers in their immediate vicinity. The study found that those smallholder farmers who were deliberately engaged by the investors, and integrated into their farming activities, showed better performance in their

[36] For the purposes of this study, the term smallholder refers to those with less than two hectares of land.

agricultural production. They registered a 32.2% increase in gross value of crops and 56.3% increase in gross value per hectare of maize. They also registered higher usage of hybrid seed. These results are an indication of the potential of LSI in farmland to unleash smallholder agricultural production, when they are incorporated into the investor's farming operations through horizontal or vertical linkages.

Smallholder farmers have historically faced several constraints to their farming activities due to the nature of the environment in which they operate, which is characterised by thin markets and high transaction costs because of the vacuum created by the lack of service delivery by the government (Kirsten *et al*., 2009). The argument informing the hypotheses made by this study was that LSI in farmland, due to economies of scale, are able to absorb the high transaction costs and improve access to markets, technologies, infrastructure and credit, which will consequently lead to reduced transaction costs and increased profits for the smallholder farmers, thereby providing a huge incentive for them to continue with production. The results of better agricultural performance by the farmers who are engaged are an indication of creation of an enabling environment by the LSI in farmland through the provision of improved access to input and output markets, skills for agricultural production, brokering for credit, and access to technologies and infrastructure.

The displacement of the vacuum by positive externalities from the LSI in farmland created the necessary environment that unlocked the constraints faced by the smallholder farmers, thereby improving their agricultural production. These results have also demonstrated the possibility of a mutually beneficial co-existence between the LSI in farmland and smallholder farmers, contrary to the arguments that have been presented in literature that large corporate investors in farmland destroy smallholder farmers. The differences in agricultural performance noted between the farmers who were engaged and those who were not engaged is a clear indication that the mere presence of an investor in a particular area will not automatically lead to improved agricultural performance by smallholder farmers unless deliberate action is taken to incorporate them vertically and horizontally in the investment operations.

9.3.3 Consolidation of smallholder farmers and crowding out of markets

Thirdly, this study dispelled the notion that all LSI in farmland are crowding out smallholder farmers and destroying the smallholder farming sector through consolidation of their land. As

has been noted, two of the three investors analysed had established their operations on previous state land, contrary to the notion that LSI in farmland prefer to acquire customary land held by smallholder farmers. It was noted that this might be because some investors prefer acquiring previously established farms on state land to avoid the negative publicity associated with the displacement and re-location of smallholder farmers. Although one of the three investors acquired individually titled land, some of which had been settled on illegally by some communal farmers who were then subsequently displaced when the investment started its operations, a generalisation cannot be made that this is true of all investors.

The study also noted that although some of the investors are growing crops similar to those grown by smallholder farmers (mainly maize and soybeans), these investors are not competing with smallholder farmers for markets and they are not crowding them out. Rather, they are helping to create markets and facilitating ease of access for them. The study noted the proliferation of the soya bean value chain in Mumbwa, which could be attributed to the promotion of soya bean by AAZL. Indeed, AAZL has moved beyond just primary production, to merchandising and processing. It also noted the role of CENAFARM's Agrienable in the merchandising and processing of farm produce. These seem to be cases in example of the "farm to fork" scenario operating across the entire agriculture value chain, which Anseeuw, *et al.* (2012) note gives the investors control over agricultural production decisions.

The study noted the involvement of investment funds in two of the LSI cases; CENAFARM and ACL. CENAFARM is financed by the investment fund Altima and ACL by the investment fund Hakwood Capital. This resonates with the financialisation arguments noted earlier presented by Ouma (2014), Clapp & Isakson (2018), Ouma (2016), Clapp (2014) and Harvey (2011). This further gives substance to the arguments of Lawrence *et al.* (2015) about global finance influencing production decisions. This could easily lead to oligopolies, as is the case with global grain trade where 90% of it is being controlled by four grain producers (ibid.). This leaves both the consumer and the smallholder procucers at the mercy of these global capitalist investors. In this study however, it was not possible to draw conclusions regarding the role and impact of these investment funds on the smallholder farmers due to data limitations.

The study has also dispelled the notion that all foreign investors that are growing food crops are externalising production at the expense of recipient governments and their smallholder farmers. Again, these results point to the possibility of co-existence between the LSI in

farmland and smallholder farmers in a mutually beneficial way. Such a model would incorporate smallholder farmers horizontally and vertically in the investors' farming activities.

9.4 CONCLUSION

In conclusion, the study notes that not all LSI in farmland are bad and they should therefore not be treated as a homogenous entity. Although the study noted that there was no impact on smallholder performance as a result of the presence of LSI in farmland, this study has demonstrated that LSI in farmland have the potential to unleash smallholder agricultural growth by improving access to input and output markets by smallholder farmers, improving smallholder farming skills through training, and facilitating access to credit when the smallholder farmers are incorporated in the investor's farming operations. Access to these basic key production elements represents some of the major challenges associated with smallholders' daily farming activities.

This study has contributed to the academic field by presenting an alternative developmental framework to the standard commercialisation process of smallholders. It has also contributed immensely to the existing body of literature on LSI in farmland in Africa in that while many studies have tackled this subject within a broad context, this study has narrowed the subject down to a country-specific level, and within the context of Africa. It has also contributed to the body of literature in terms of how the inclusion of smallholder farmers in the investor's farming operations might impact on their performance. It has also provided empirical evidence that LSI in farmland do not disrupt smallholder farming activities contrary to the general belief that their presence contributes to the demise of the smallholder farmers.

9.5 POLICY RECOMMENDATIONS

The policy recommendations arising from this study are underpinned by the understanding that LSI in farmland are real. They have been there in the past, though in a different form, and are likely to remain in the near future. Recommendations are also informed by the understanding that smallholder agriculture still continues to underpin many of Africa's economies.

9.5.1 On investment in African agriculture

Firstly, the study has noted the problem of underinvestment in African agriculture that is cited in literature, and has noted the bottlenecks faced by African smallholder farmers in their farming activities and the potential role that LSI in farmland can play in terms of unlocking these bottlenecks. It was also noted that many African governments are too weak to provide the necessary goods and services to unlock these bottlenecks (Kirsten *et al*., 2009). In this regard, governments need to create an enabling policy environment for other players to fill this gap, at the same time without disenfranchising the smallholder farmers. Central to this is the provision of support to smallholder farmers, including support through provision of training on better farming techniques, for a certain period until they are buoyant. Indeed history has shown that if smallholder farmers are supported, this could result in major shifts in agricultural productivity. For example, after independence from colonial rule in 1980, the government of Zimbabwe embarked on policy reforms to ensure access to markets, credit and research and extension by smallholder farmers. The result was that smallholder farmers experienced what Rukuni and Eicher (1994) called "a mini production revolution".

An enabling policy environment will also make it possible to tap into the potential for improved access to the basic productive goods and services made available by the LSI in farmland as evidenced by this study's results.

A conducive policy environment should be able to realise win-win scenarios for both the investor and the smallholder farmer. This study noted that in a bid to attract investors, countries such as Zambia have put in place "investor-friendly" legislation that may compromise the rights of smallholder farmers and may lead to their displacement.

Although this study has noted that there was no displacement of smallholder farmers as a result of the LSI in farmland operations analysed, it was noted from other studies reviewed that displacement of smallholder farmers does take place in some instances. This means that recipient governments should not be quick to dismiss or to accept LSI in farmland deals. There is need for critical analysis to weigh out the benefits versus the costs of such a deal, in terms of all the stakeholders concerned – the recipient governements, the investors and most importantly, the smallholder farmers in the vicinity of the investments. LSI in farmland should therefore not be painted with the same paint brush as they are not homogenous in nature, i.e.

in terms of how they are structured and designed to operate. As noted in literature (Wiggins, 2009), most of the food produced in Africa is by smallholder farmers, so they still continue to play a critical role in Africa's economies. In this regard, there is need for recipient governments to safeguard the interests of these smallholder farmers to ensure that they are not disenfranchised. It is important for African governments to put measures in place to safeguard the rights of smallholder farmers. It is also highly recommended that African countries should make use of the guiding principles on large-scale land-based investments that have been put in place by the African Union and the Economic Commission for Africa.

9.5.2 Models for co-existence

Not all LSI in farmland are as depraved as has been depicted in literature. Liu (2014) advocates for inclusive business models and notes that the best models are the ones that include smallholder farmers as equal business partners and leaves them in control of their land. Caution is however given about the high transaction costs of inclusive business models which leads to their fragility in the short term, calling for the need for third party brokerage (ibid).

The study has shown that the models of engaging smallholder farmers presented by CENAFARM's Agri-enable and AAZL led to improved agricultural production among the smallholder farmers. Although farming decisions by LSI in farmland could be driven by profiteering goals as noted by McMichael (2012), the examples of inclusion of smallholder farmers noted by this study are an indication of the potential for a reciprocal co-existence. In this regard, African governments could put in place mandatory guidelines or incentives for investors to ensure the inclusion of smallholders in their farming activities, apart from wage employment. The terms of inclusion would need to be crafted in a way that ensures benefit for both parties. In this regard, there may be need to foster an independent third party broker to ensure this happens as suggested by Liu (2014). It has to be noted however, that governments should not relegate the issue of smallholder agricultural development to LSI in farmland. Although the study has noted that these investors have a potential to improve smallholder production, the governments have a critical role to play, and they remain ultimately responsible. In this regard, not only should governments provide incentives for smallholder inclusion, but they could also foster public-private partnerships between governments and LSI in farmland to ensure government's active involvement in smallholder development.

9.6 AREAS FOR FURTHER STUDY

The study covered a few areas of research regarding the impact of LSI in farmland, and was certainly not exhaustive in terms of what could have been covered, due to data limitations. The following are some of the aspects that might be considered in future research.

9.6.1 Spatial effects of LSI on smallholder farmers

While this study has endeavoured to elucidate the impacts of LSI in farmland on smallholder agricultural production, there is still a need for further research that looks at longer inter-temporal and spatial dimensions to examine the impact over a longer time period, and how this impact changes with distance from the investor. It is likely that the impact on farmers will depend on their proximity to the investor, and that this impact would be expected to dissipate with distance. It is also possible that, over a long period of time, the results realised may change as investors adjust their operations and *modi operandi* in response to various stimuli in the operational environment. Estimating the impact several years later would help to see whether the investor's impact is sustained, reduces, or increases in the long term and whether positively or negatively.

9.6.2 Impact of LSI on local economic development

This thesis has dispelled the notion of the externalisation of food production by all foreign investors that are growing food crops. If production is therefore feeding into the local markets, there may be a possibility of positive externalities on the local economy, as well as on smallholder farmers. In this regard, future research may need to look at the impact of LSI in farmland on local economic development and at how it might affect the wider economy.

A great of literature analysed noted the involvement of financial investors in promoting LSI in farmland thereby contributing to the finacialisation of food production and the commodification of land. Future studies could focus on the extent or degree of involvement of LSI in farmland in these aspects as well as subsequent impacts on food production by reciepient governments.

9.6.3 Impact on access to credit

The study noted that one of the investors brokered for credit for the farmers incorporated in its out-grower programme. Access to credit allows farmers to expand and intensify their farming operations, increase production, and subsequently their returns. It will be important to know the degree to which LSI influence/improve access to credit, and how this affects the performance of the smallholder farmers.

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Annexures

Annex 1. Investor type and country of origin

District	Investor name	Investor country
Kawambwa	Agriculture and Rural Development Authority (ARDA)., Macdom and Rating Investments	Zimbabwe
Mkushi	Agrivision Africa (Pty) Ltd	South Africa
Mpongwe	Agrivision Africa (Pty) Ltd	South Africa
Mumbwa	Agro Commodities Limited, Unknown investor (British Virgin Islands)	India, British Virgin Islands
Kazungula	AG-Zam	South Africa
Mkushi	Altima one world agricultural fund	United States of America
Mumbwa	Amatheon Agri Holding N.V., Toyota Tsusho Corporation	Germany, Japan
Mumbwa	Amatheon Agri Holding N.V., Unknown non-controlling interests	Germany
Mkushi	Ambika	Russian Federation
Serenje	Bonafarm Group	Hungary
Mazabuka	Crookes Brothers Ltd	South Africa
Lusaka	Denbia	Denmark
Livingstone	Emvest	South Africa
Mpika	Ferrostaal AG	Germany
Choma	Hawkwood Capital LLC, DWS GALOF, Tanzania Breweries	United Kingdom of Great Britain and Northern Ireland, Germany, United Republic of Tanzania
Kalomo	Hawkwood Capital LLC, DWS GALOF, Tanzania Breweries	United Kingdom of Great Britain and Northern Ireland, Germany, United Republic of Tanzania
Chibombo	Herdon Investments	United Kingdom of Great Britain and Northern Ireland
Kitwe	Hua Overseas (Beijing) Agricultural Science and Technology Co., Ltd.	China
Kafue	InfraCo Limited	United Kingdom of Great Britain and Northern Ireland
Lusaka	Lin Changming	China
Choma	Munyati Farming Ltd	Zimbabwe
Chongwe	NEOS Resources PLC	United Kingdom of Great Britain and Northern Ireland
Kasama	NEOS Resources PLC	United Kingdom of Great Britain and Northern Ireland
Solwezi	NEOS Resources PLC	United Kingdom of Great Britain and Northern Ireland
Choma	Nkanga Farms Limited	Zimbabwe
Kasama	Olam International Ltd	Singapore
Mbala	Olam International Ltd	Singapore
Mungwi	Olam International Ltd	Singapore
Serenje	Tiso Blackstar	South Africa
Kabwe	Unnamed investor 109, Unnamed investor	India, Zambia
Chibombo	Vixers Farming	Zimbabwe

Source: Computed from Land matrix