THE ROLE OF AGRICULTURAL SUPPORT PROGRAMMES ON THE LIVELIHOODS OF SMALLHOLDER MAIZE FARMERS IN LESOTHO: ASSET UTILISATION, PRODUCTIVITY AND PERCEPTIONS

A thesis submitted in partial fulfilment of the requirements for the degree of

MASTER OF COMMERCE IN FINANCIAL MARKETS

(Half thesis)

By

TAOLE MOHLAHATSA

15M5178

Department of Economics and Economic History

Rhodes University

May 2018

SUPERVISOR: PROF. TSITSI EFFIE MUTAMBARA

CO-SUPERVISOR: MS. SANDILE PHAKATHI

ABSTRACT

The agricultural sector is widely considered an important contributor to economic development in least developed countries. It plays an important role in Lesotho and has been the backbone of rural activities and the prime employer of Basotho citizens. Smallholder farming is recognised by the government of Lesotho as a vehicle for addressing food security and poverty reduction. Maize is the principal staple crop produced by about 90 percent of farmers in Lesotho and it constitutes about 80 percent of the Basotho diet. Maize production is highly affected by climate change and is characterised by fluctuating yields because of erratic rainfall. In addition to unfavorable climate change, smallholder farmers in Lesotho experience challenges such as lack of farming inputs, limited access to markets and limited financial capital. These constraints confine them to a life of subsistence farming with low production and increased incidences of poverty.

The government of Lesotho has intervened in the smallholder agricultural sector to stimulate production and productivity by introducing some agricultural programmes such as (i) the National Fertiliser and Input subsidy, (ii) the Smallholder Agricultural Development Programme, (iii) the National Block Farming, and (iv) the Integrated Watershed Management Programme. However, despite such government interventions, production in the smallholder agricultural sector continues to face recurring constraints. Studies on the National Block Farming Programme have showed that the programme has had limited impact on the livelihoods of smallholder farmers. Furthermore, farmers believe the Integrated Watershed Management Programme has a biased selection criteria as selection of areas is influenced by politicians who favour areas where they have a large political following and marginilise other areas. These concerns have also led to low participation rates in such programmes as wealthier, large scale farmers capture most of the benefits of government programmes. Disproportionate benefits of agricultural programmes to smallholder farmers imply that they continue to face the same constraints in production and have to find alternative ways of maintaining production and selling excess produce to sustain their livelihoods.

The main goal of this research is therefore to study the livelihoods of smallholder maize farmers in Lesotho and how agricultural support programmes influence their production of maize. The study adopted a pragmatic mixed methods approach with a qualitative dominant sequential design. Accordingly, both quantitative and qualitative data was used to address the research

goal. Quantitative data collected from the Lesotho Bureau of Statistics and the World Bank was used for trend analysis on maize productivity, temperature and rainfall over the period 1980-2016. Qualitative primary data was collected by conducting focus group discussions with smallholder maize farmers and key stakeholder interviews using the sustainable livelihood framework as a conceptual guide. The study comprised of a total of 85 research participants consisting of 75 smallholder maize farmers and 10 key stakeholders. Farmers were selected from 10 key maize producing areas in Leribe and Mafeteng districts in Leribe.

Results revealed fluctuating maize productivity and productivity growth rates where such fluctuations are caused by government intervention and natural calamities in the form of erratic rains and dry spells. Droughts and late arrival of subsidised inputs are the chief constraints to maize production. In relation to livelihood assets, human and social assets are the more available assets relative to other assets (financial, natural and physical) of the sustainable livelihood framework. Furthermore, the National Fertiliser and Input subsidy Programme and the Smallholder Agricultural Development Programme are the most beneficial programmes to farmers' livelihoods as they increase the accessibility of limited livelihood assets and therefore allowing farmers to achieve their livelihood goals. In contrast, the National Block Farming and the Integrated Watershed Management Programme are the least beneficial programmes to farmers' livelihoods and are biased in their geographical targeting criteria.

The study recommends that the government revises all selected support programmes in this study in areas warranting improvements so as to fairly and efficiently allocate resources that meet the needs of farmers. The study also recommends that farmers put more effort in adopting new technologies and strategies to improve production of maize in areas where government intervention has failed.

DECLARATION

I, Taole Mohlahatsa declare that the work produced in this thesis is my own and that all citations and references used have been acknowledged. Also, this thesis has not been submitted to any other academic institutions.

Taole Mohlahatsa

Signed: ……. Date: …….

ACKNOWLEDGEMENTS

I would firstly like to thank God who has held my hand throughout this journey of learning and discovery. I would also like to thank my family who have supported me in every way possible.

To my supervisors, Prof Tsitsi Effie Mutambara and Ms. Phakathi, I am forever grateful for all your comments, inputs and support and I shall take all that I have learned from you in my future endeavors. Lastly, I would like to send a special thank you to the staff in the Ministry of Agriculture and Food Security in the Mafeteng and Leribe districts of Lesotho. I am also sincerely grateful to all the farmers and stakeholders who have sacrificed their time to participate in this study with warm hearts and open arms.

LIST OF ACRONYMS

ADF	African Development Fund
ASS	Agricultural Sector Strategy
CBL	Central Bank of Lesotho
DAFF	Department of Agriculture, Forestry and Fisheries
DFID	Department for International Development
FAO	Food and Agriculture Organisation
GEF	Global Environmental Facility
GDP	Gross Domestic Product
ICP	Intensive Crop Production
IDS	Institute for Developmental Studies
IFPRI	International Food Policy Research Institute
IFAD	International Fund for Agricultural Development
IITA	International Institute of Tropical Africa
IOD	Overseas Development Institute
LASR	Lesotho Agricultural Situation Report
LBOS	Lesotho Bureau of Statistics
LDS	Lesotho Demographic Survey
LMS	Lesotho Meteorological Services
LTDC	Lesotho Tourism and Development Corporation
LVAC	Lesotho Vulnerability Assessment Committee
MAFS	Ministry of Agriculture and Food Security
NAPFS	National Action Plan for Food Security
NGO	Non-government Organisation
OECD	Organisation for Economic Co-operation and Development
SSA	Sub-Saharan Africa

SADP	Smallholder Agricultural Development Programme
SLF	Sustainable Livelihood Framework
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
WTO	World Trade Organisation

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1 Context of the Research

Development in the agricultural sector is widely seen as a symbol of economic success due to its direct effects on poverty reduction, employment creation and food security (Maiyaki, 2010). The agricultural sector has the most impact on developing regions of the world, especially in the smallholder agricultural sector as it contributes more to rural poverty reduction and food security (Livingston *et al.*, 2011). According to IFAD (2011), there are more than 500 million smallholder farms in the world and about 2 billion people who depend on smallholder farms for their livelihoods. In Sub-Saharan Africa (SSA), the smallholder agricultural sector has long served as a dominant economic activity and contributes about 80 percent of the food supply (Livingston *et al.*, 2011).

Agriculture plays an important role in the livelihoods of the poor in Lesotho (Sandrey *et al.*, 2005). According to NAPFS (2006), smallholder farming is considered a key activity in addressing the goals of food security, poverty reduction and improved income distribution laid out in the 2003 Agricultural Sector Strategy Plan. However, production in smallholder farming is characterised by outdated input technologies where most farmers are subsistence producers under rain-fed conditions with limited access to markets (UNDP, 2013; Maseatile, 2011). Ntai (2011) notes that farmers in Lesotho receive little training on irrigation management and consider investing in irrigation systems a risky venture. Nevertheless, education and training on irrigation and water conserving strategies have become necessary to cope with prevailing climate changes (Stevens and Ntai, 2011).

In addition to hostile climate changes, smallholder farmers typically experience challenges such as limited farm inputs, limited financial capital and insecure land tenure which condemn them to low input-output subsistence production (Gollin, 2014; Livingston *et al.*, 2011). Afenyo (2012) found that smallholder farmers are the poorest farmers in SSA and are not producing significant output. In response to the poor performance of smallholder farmers, governments in SSA have intervened by introducing agricultural support programmes to stimulate production and productivity (Stewart *et al.*, 2014). Despite government efforts, smallholder farming in SSA remains in a state of underdevelopment (Sinyolo *et al.*, 2014; Muchara *et al.*, 2014; Jayne and Rashid, 2013).

Afenyo (2012) points out that most agricultural programmes that support smallholder farmers do not fully address their needs. Some programmes are scale neutral and are often scattered in different geographical areas, which denies farming communities the synergies needed to support each other (Gollin, 2014). This also makes it is difficult to identify and study programmes that specifically target certain types of farmers. Ricker-Gilbert *et al.* (2013) and Barrett *et al.* (2010) found that in practice agricultural programmes targeting smallholder farmers fail to support them as benefits are absorbed by large-scale farmers with superior access to credit and insurance. In such cases, smallholder farmers settle for disproportionate benefits of agricultural programmes and therefore struggle to sustain their livelihoods.

According to Kollmair and Gamper (2002) and Chambers and Conway (1991), theory on the sustainable livelihood framework[1] (SLF) states that a livelihood is sustainable if it is impervious to shocks and stresses while enhancing the acquisition of livelihood assets to preserve a way of life. Disproportionate benefits of agricultural programmes to smallholder farmers therefore imply that they continue to face the same constraints in production and cannot cope with stresses and shocks to sustain their livelihoods.

In Lesotho, the Ministry of Agriculture and Food Security (MAFS) is the main institution which formulates and implements agricultural policies. It assumes a facilitative position in supporting smallholder farmers by enhancing their farming practices and designing development programmes that target activities aimed at food production (NAPFS, 2006). The main agricultural activities are in crop and animal farming sub-sectors. Crop production is dominated by three main staple food crops, which are maize, sorghum and wheat, and occupy 60, 20 and 10 percent of arable land respectively (ADF, 2006). These crops are mostly grown by smallholder farmers for household food security under rain-fed conditions (FAO, 2016).

Maize is the country's principal staple food and constitutes about 80 percent of the Basotho diet and it is also used as animal feed and as raw input for the country's milling companies (Morojele and Sekoli, 2016). However, maize production in Lesotho is seasonal and unable to satisfy local demand, and since the 1930s, Lesotho has been a net importer of maize (Maseatile,

[1]The sustainable livelihood framework is a tool that can be used in evaluating interventions affecting rural livelihoods from the perspective of the target population. It draws on the notion of multidimensionality to holistically improve the understanding of poor people's livelihoods and can be used as framework for analysing causes of poverty (DFID, 1999; Adato and Meinzen-Dick, 2003).

2011). According to LBOS (2015) and Ulrichs and Mphale (2016), recurring deficits in maize production in Lesotho are primarily caused by climate shocks such as hail storms, droughts and heavy rains which farmers have little control over.

The government of Lesotho has implemented several support programmes[2] aimed at increasing agricultural production and reducing vulnerabilities faced by farmers (Ulrichs and Mphale, 2016; WTO, 2015; NAPFS, 2006). However, Molatoli and Xiaojun (2016) and Ulrichs and Mphale (2016) found that some agricultural programmes such as the National Block Farming Programme and the Integrated Watershed Management Programme marginalise poor farmers and have politically motivated targeting criteria. Such concerns have led to some farmers being reluctant to participate in government support programmes and are therefore not receiving significant benefits from the programmes. This research therefore seeks to study the livelihoods of smallholder maize farmers in Lesotho and investigate how agricultural support programmes influence their production of maize.

1.2 Problem Statement

In Lesotho, reluctance of some farmers to participate in support programmes is mainly because farmers have little confidence in the government and believe that the government does not have their best interests at heart, so they opt to practice farming without government intervention (Ulrichs and Mphale, 2016; CBL, 2012). It can be argued that some farmers in Lesotho are characterised by the chayanovian model of peasant farmers. According to Karodia (2014), a chavanovian farming model is a model that characterises farmers as reluctant to participate in new agricultural interventions and technology ventures because of fear of adverse outcomes to their livelihoods such as low production brought by alternative farming techniques.

Reluctance of smallholder farmers to participate in agricultural interventions may also be caused by a one size fits all approach to agricultural intervention. In Lesotho, a remedy to this problem maybe to undertake studies that consult with the target population (smallholder farmers) of agricultural programmes to assert if such programs influence farmers' livelihoods in a way that they were intended to. In so doing, the government can identify needs of different

[2]These programmes are: i) the National Block Farming Programme; ii) the National Fertiliser and Input Subsidy Programme; iii) the SmallHolder Agricultural Development Programme (SADP); and iv) the Integrated Watershed Management Programme.

farming communities and thus frame programmes in a way that caters to the unique diversity of farming communities (i.e the heterogeneous nature of farming communities).

1.3 Significance of the Study

In Lesotho, research on crop production has been more on identifying and building on production constraints as well as proposing new interventions to promote efficient crop production and food security. However, recent studies on maize production in Lesotho by Morojele and Sekoli (2016) and Maseatile (2011) have analysed maize production and productivity but overlooked the role of agricultural programmes that target smallholder maize farmers. Furthermore, these studies have also overlooked how low crop production may be attributed to the failure of programmes in addressing production constraints, particularly constraints in growing staple crops which most of the population depend on for food and income.

This study adopts the sustainable livelihoods framework (SLF) as a conceptual guide. By adopting this framework, an in-depth investigation can be made on the role played by agricultural programmes on farmers' livelihoods. The SLF is people centred, meaning that investigations are more focused on the target population. In its simplest form, the SLF states that people operate in a context of vulnerability and they therefore require a portfolio of livelihood or capital assets to achieve their livelihood goals and hence sustain their way of life (DFID, 1999). These assets are natural, social, human, physical and financial assets. The SLF was then used to bring to light production constraints faced by smallholder maize farmers and whether agricultural support programme enhance the availability of capital assets to improve their livelihoods. Upon completion, this study will potentially help researchers and policy makers in designing efficient and scale-specific interventions that target smallholder maize farmers in Lesotho.

1.4 Goals of the Study

The goal of this study is to investigate the role of agricultural support programmes on the livelihoods of smallholder maize farmers in Lesotho. This will be achieved by addressing the following sub-goals:

- Investigate the availability and use of livelihood assets in smallholder maize farming
- Analyse the trend of maize productivity and productivity growth after implementation of agricultural support programmes
- Investigate farmers' perceptions on the influence of agricultural support programmes on their livelihoods

1.5 Research Outline

The remainder of this study consists of four chapters. Chapter 2 provides a review of literature on the smallholder agricultural sector and factors influencing smallholder maize production. The chapter also provides an overview of Lesotho's agricultural sector and agricultural programmes that support smallholder farmers. Chapter 3 outlines the research methodology which explains the study areas, data collection methods, the conceptual framework used and data analytical methods. Chapter 4 presents results and discussions on the use of livelihood assets, maize productivity and farmers' perceptions on the influence of agricultural programmes on their production of maize and hence their livelihoods. Lastly, Chapter 5 presents conclusions and policy recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews some of the literature on smallholder agriculture in Sub-Saharan Africa. The chapter also discusses Lesotho's agricultural sector, highlighting the agricultural policy, farming practices and maize production. Discussions and debates on factors influencing smallholder maize production are also presented as well as an overview of selected agricultural programmes that support smallholder farmers in Lesotho.

2.2 Definition of Terms

The key concepts in this study are 'smallholder farmers' and 'agricultural programmes' and are explained in the following sub-sections.

2.2.1 Smallholder Farmers

According to Stewart *et al.* (2014), DAFF (2012) and Nagayets (2005), there is no universal definition for smallholder farmers as this depends on the research context, country and even ecologocial zones. However, an acceptable definition is one that encompasses shared characteristics of smallholder farmers such as limited financial capital, limited market access, low input technologies and high exposure to risk (DAFF, 2012; Chamberlin, 2008). FAO (2012) defines smallholder farmers as farmers who manage less than 1 hectare to 10 hectares of land using family labour. Salami *et al.* (2010) on the other hand defines smallholder farmers as farmers cultivating less than two hectares of land and owning a few herds of livestock.

According to Nagayets (2005), smallholder farmers can also be defined based on type of farm operations and resource endowment. Accordingly, Hazell *et al.* (2007) and World Bank (2003) define smallholder farmers as farmers whose production is subsistence oriented, primarily producing staple foods for household consumption with limited resources such as capital, skills and equipment. Lahiff and Cousins (2005) found that they produce relatively few products on homestead gardens, demarcated fields or on open rangelands. Smallholder farming can be under irrigated or rain-fed conditions. Those under irrigation are further categorised into home gardeners, community gardeners, independent irrigators and scheme irrigators (Du Plessis *et al.*, 2002; Crosby *et al.*, 2000; De Lange, 1994 cited in Van Averbeke and Mohamed, 2006).

However, Cairns *et al.* (2013) notes that smallholder farmers in SSA mostly grow staple crops such as maize under rain-fed conditions with limited inputs.

As stated in Chapter 1, Section 1.1, smallholder farming in Lesotho is characterised by low input-output traditional farming systems that are dependent on rainfall (Mekbib *et al.*, 2011; NAPFS, 2006). Production is mostly on a subsistence basis where farming households rare animals and/or practice crop farming on demarcated fields where land preparation is typically powered by draft animals and free family labour. Given the various definitions of smallholder farmers, this study defines them as small-scale, subsistence farmers operating on demarcated fields under rain-fed conditions and owning a few herds of livestock.

2.2.2 Agricultural Programmes

Agricultural programmes are measures taken by governments, private companies and non-government organisations (NGOs) to support farmers and promote development through a series of actions including agricultural extension and training, credit systems, input subsidies, and product marketing. According to Groupe AGECO (2015) and Bienabe *et al.* (2004), agricultural programmes differ between countries, but in general, they are implemented to provide agricultural producers with a safety net and to create a stable, predictable sector that encourages investment, production development and creation of new markets.

2.3 Smallholder Agriculture in Sub-Saharan Africa: Agricultural Performance and Opportunities

According to Livingston *et al.* (2011), SSA relies more on agriculture than any other developing region of the world and because of its abundant labour supply, it has the greatest potential for smallholder agricultural production. However, SSA is mostly populated by poor people who live in rural areas and together with South Asia, SSA has the highest incidence of rural poverty and hunger (IFAD, 2010). A substantial portion of rural people in SSA are smallholder farmers that make a living from farming (Kibirige, 2013). Hazell *et al.* (2007) therefore argues that development in smallholder agriculture in SSA is key in contributing to rural poverty reduction and can also significantly contribute to economic growth.

According to Staatz *et al.* (2007), agriculture in SSA (excluding South Africa) accounted for 62 percent of the employed population and generated 27 percent of gross domestic product

(GDP) in 2005. World Bank (2010) found that agricultural GDP growth in SSA has been on a rise in the past few decades. Livingston *et al.* (2011) notes that the rise in agricultural GDP growth in SSA occurred because of an increase in cultivation of land with crop production potential (recorded at 800 million hectares in 2005). Furthermore, FAO (2009) notes that SSA is the second region (after Latin America) with the highest potential for cropland expansion. Table 2.1 below shows the growth in agricultural GDP of other developing regions compared to SSA in the 1990s and 2000s.

Table 2.1: Agricultural GDP growth (%) of selected developing regions in the 1990s and 2000s

	1990s	**2000s**
Sub-Saharan Africa (SSA)	2.7	3.0
Asia and the Pacific (ANP)	3.6	3.9
Latin America and the Caribbean (LAC)	2.1	3.3

Source: World Bank (2010).

Table 2.1 shows that agricultural GDP growth in SSA increased from 2.7 percent in the 1990s to 3.0 percent in the 2000s. In ANP, agricultural GDP growth was recorded at 3.6 percent in the 1990s and 3.9 percent in the 2000s. LAC recorded agricultural GDP growth of 2.1 percent in the 1990s and 3.3 in the 2000s. According to Livingston *et al.* (2011), global and regional demand for agricultural produce for consumption and industrial use has risen. IFAD (2011) argues that the smallholder agricultural sector can satisfy this demand because with sufficient support, smallholder farmers can feed the world. UNCTAD (2017) states that unlocking the potential of smallholder farmers rests on policy makers creating opportunities beyond the boundaries of household food security. This implies that agricultural support from policy makers should incentivise smallholder farmers to branch out into business-oriented production. Compared to other developing regions, smallholder farmers in SSA are positioned to benefit the most from improving opportunities in agricultural developments. This is because the world has turned to SSA as a major source of food supply because of its relatively abundant land resources, flexibility of its labour supply and low production costs associated with smallholder farming (Livingston *et al*., 2011; Salami *et al.*, 2010).

According to Salami *et al.* (2010), Africa's agricultural sector has recently attracted large scale land investment from foreign investors. These investments have created opportunities for the transformation of farming in Africa through the transfer of information, employment creation

and improved irrigation infrastructure. Such developments in agriculture have enabled farmers to increase agricultural production and engage in agribusiness. Agricultural developments in smallholder agriculture have also created opportunities for women farmers. According to Gollin (2014), the smallholder agricultural sector is one of the main sources of livelihoods for women. They make up over half of the agricultural work force in SSA and are usually responsible for key production activities such as weeding, harvesting and processing. However, Afenyo (2012), Darroch and Mushayanyama (2006) and IFPRI (2005) argue that governments in SSA can create more opportunities for smallholder farmers by linking appropriate markets with indigenous crops such as maize, sorghum, cassava, millet and yams which are often what smallholder farmers produce.

2.4 An Overview of Lesotho's Agricultural Policy

In Lesotho, the government oversees most agricultural activities and provides most of the capital needed in the sector (Mphahama, 2011). The country is primarily devoted to promoting agricultural growth in areas where it has comparative advantage. Makenete (1996) found that the government of Lesotho had tried to protect farmers by imposing restrictions on imports of goods that can be produced locally and efficiently, thus increasing competitiveness of local farmers in the international arena. According to ASS (2003), these products which the country had comparative advantage in were wheat, maize, sorghum, livestock, milk products and eggs. Also, import quotas were some of the measures of protection used on these products.

The decision to focus on agricultural goods that the country has comparative advantage in was taken to ensure food security in certain products (mentioned above) which were most likely to become competitive in the medium to long term (IMF, 2008). Also, the decision was motivated by the objective of fostering an efficient production structure that aims to maximise output and growth while improving welfare and food security by making food available to consumers at competitive prices (ASS, 2003).

Nevertheless, the government recognises that benefits of agricultural policies should be able to trickle down to the poor by attaining food security and poverty reduction at community and household level. It also acknowledges that increased share of agriculture in GDP signals potential to increase output (through input related linkages) in other sectors in the economy (ASS, 2003). For this reason, most agricultural policies are framed such that they maximise

output through commercialisation and developing input-output linkages with other sectors (Ulrichs and Mphale, 2016).

According to Annor-Frempong (2008) and ASS (2003), agriculture in Lesotho has gone through major policy changes since the 1995 policy reforms and many ineffective interventions such as direct government participation in production and marketing activities have been abandoned since then. Major policy reforms included removing bans on importation of flour, discontinuing the issuance of import permits for grains and disinvestment in public sector agro-industries. According to ADF (2006), by 1997, the government had completed deregulation of the grain market, including some staple grains such as maize and wheat. However, there has been little divestiture on agricultural parastatals and various agricultural items such as fruits, vegetables and livestock are still under some form of government control (ADF, 2006).

From the early 1980s to the early 1990s, Lesotho's food security policy was to achieve full self-sufficiency in its major food crops, i.e maize, wheat, sorghum, peas and beans. This strategy was adopted due to the need to achieve and maintain adequate food supply for the rural population. It was also a contingent strategy to ensure national food security during the Apartheid regime in South Africa which had a possible threat of closing boarders with Lesotho (ASS, 2003).

However, as opposed to stimulating agricultural output, regulation tools such as short-term subsidies promoted a dependency syndrome among farmers which discouraged productive work and lead to market distortions (ASS, 2003). Following the Sixth National Development Plan, spanning the period 1995-1999, the policy of self-sufficiency was formally abandoned. The subsequent policy strategy, as stated above, was the promotion of food security by promoting the production of agricultural goods that Lesotho has a comparative advantage in. Accordingly, transitionary policies were implemented in the agricultural sector to create a competitive, efficient and open market-oriented production structure. These policies included privatisation of government enterprises, liberalisation of trade and market legislation and a revaluation of agricultural subsidies (ADF, 2006; ASS, 2003).

2.5 An Overview of Livelihood Farming Activities in Lesotho

According to WTO (2015), the agricultural sector in Lesotho accounted for about 6.4 percent of GDP in 2013 and is one of the most important sectors in the country. It supports the livelihoods of about 85 percent of the population and is the backbone of rural activities (Maseatile, 2011). Farming activities are categorised as crop farming, livestock farming, agricultural services and forestry. Figure 2.1 below shows average contributions of farming activities to agricultural GDP in 2004 constant prices.

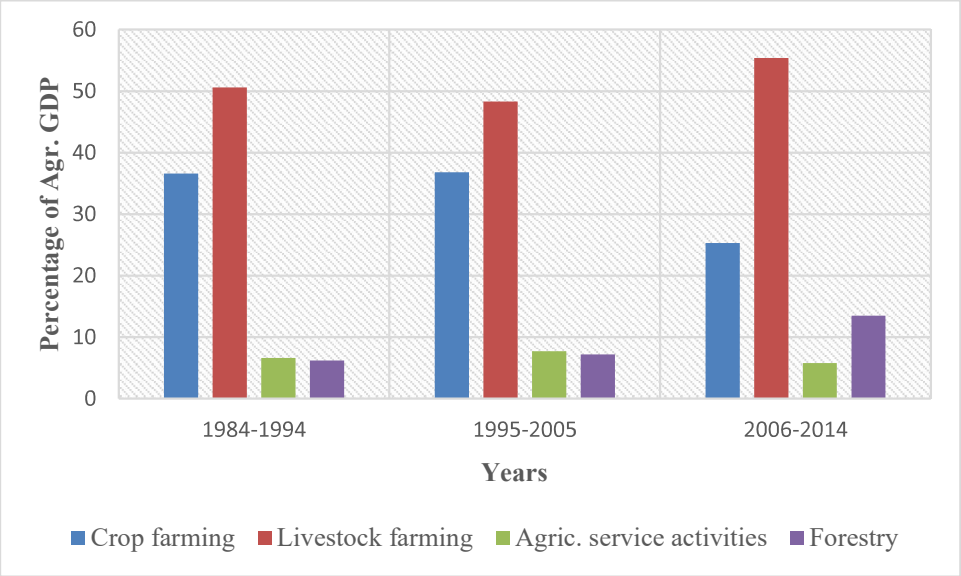

Figure 2.1: Agricultural GDP by farming activities in Lesotho (1984-2014)

Source: CBL (2018).

Figure 2.1 shows that over the period 1984-2014, livestock and crop farming contributed more to agricultural output and averaged 51.2 and 33.4 percent, respectively. Forestry and service activities contributed less and averaged 8.7 and 6.8 percent, respectively. Accordingly, livestock and crop farming are the dominant farming sub-sectors and production involves a strong interaction between livestock and crop mixed farming (Motsoari *et al.*, 2015; ADF, 2006). This means that livelihood goals of farmers are not limited to activities in one sub-sector.

2.5.1 Livestock Farming

According to Motsoari *et al.* (2015), livestock in Lesotho is essential for farmers to maintain food security. Cattle, sheep and goats are the most common animals reared by livestock

farmers. However, many households also own horses, donkeys and chickens (Mphahama, 2011). These animals are reared for consumption, manure for crop production, payment in kind and for sale during financial stresses to purchase inputs for production (Maseatile, 2011). Animals such as cattle and mules are also reared to provide draft power for land preparation (UNDP, 2013). Small stock (sheep and goats) is also kept for wool and mohair and these products are Lesotho's main agricultural exports (LASR, 2011). In addition to income from the sale of wool and mohair, sheep and goats are reared in large numbers because a high percentage of land in Lesotho is best suited for extensive small stock production (LASR, 2011; WTO, 2015). However, ASS (2003) found that livestock production is generally constrained by widespread stock theft and limited vaccination controls at regional and district levels.

2.5.2 Crop Farming

As mentioned in Chapter 1, Section 1.1, the crop farming sub-sector in Lesotho is important as it significantly contributes to employment creation and poverty reduction in rural communities (UNDP, 2013; ADF, 2006). Production is mostly characterised by rain-fed cereal production and homestead vegetable farming (NAPFS, 2006). Major cereal crops include maize, sorghum, wheat, beans and peas (LASR, 2013). Common vegetables include cabbages, spinach and pumpkins and are mostly grown on homestead gardens (Mekbib *et al.,* 2011; Mphahama, 2011). Cereal production is mostly practiced by smallholder farmers in remote rural villages where farming households are poorly linked to formal markets and generally make loses. Farming in such areas is mostly on a subsistence basis and profits made from sale of excess produce usually fall short of general household needs (FAO, 2016; UNDP, 2013).

2.6 Maize Production in Lesotho

According to IITA (2017) and Cairns *et al.* (2013), maize is the principal staple food in Eastern and Southern African countries and it is mostly grown by smallholder farmers under rain-fed conditions. It is an important part of caloric intake for rural and urban populations and it is also used as animal feed. In Lesotho, maize is produced by the majority of farming households and it is the most produced crop among the 5 main staple crops grown in Lesotho. Table 2.2 below presents production[3] in metric tonnes (mt) of the 5 main staple crops in Lesotho over the period 2000-2015. As shown in Table 2.2, maize has consistently been the most produced crop among

[3] Maize production was measured as total crop output obtained from harvested fields.

the 5 main staple crops over the period 2000-2015. It accounted for 72 percent of total production in this period, thus making it a principal staple crop followed by sorghum, wheat, beans and peas.

Table 2.2: Production in metric tonnes (mt) of the 5 main staple crops grown in Lesotho (2000-2015)

Years	Maize	Sorghum	Wheat	Beans	Peas
2000	158,189	45,354	50,755	12,367	3,251
2001	111,205	11,919	18,958	7,241	3,041
2002	85,032	11,953	13,109	11,169	1,302
2003	80,998	11,482	11,647	8,569	1,498
2004	100,723	18,527	2,050	8,784	946
2005	76,908	12,188	2,980	5,350	646
2006	60,312	7,837	1,265	6,141	647
2007	59,651	10,189	2,411	3,185	499
2008	57,126	10,515	4,901	3,452	540
2009	128,215	23,830	1,032	8,899	302
2010	73,390	9,606	20,065	7,102	673
2011	42,471	4,673	10,516	5,531	936
2012	86,304	20,405	12,624	3,357	557
2013	90,072	9,844	12,401	2,400	87
2014	65,636	9,529	6,652	4,382	330
2015	19,181	1,159	3,975	1,394	234
Total	**1,295,413**	**219,010**	**175,341**	**99,323**	**15,489**
Average	**80,963**	**13,688**	**10,959**	**6,208**	**968**

Source: LBOS (2017).

Furthermore, FAO (2016) found that maize constitutes about 80 percent of the Basotho diet and is consumed in various forms, either roasted or boiled but mostly as a thick porridge (maize-meal pap). According to FAO (2016) and Morojele and Sekoli (2016), maize produce is mostly sold to supermarkets, milling companies, government schools, community members and seasonal street vendors.

Records show that maize production in Lesotho began to fall during the 1920s because of declining performance of the agricultural sector, and by the 1930s, Lesotho became a net importer of maize. Since then, there has been an imbalance between maize demand and supply (Maseatile, 2011). Figure 2.2 below presents a graphical trend of maize production in Lesotho over the period 1980-2015.

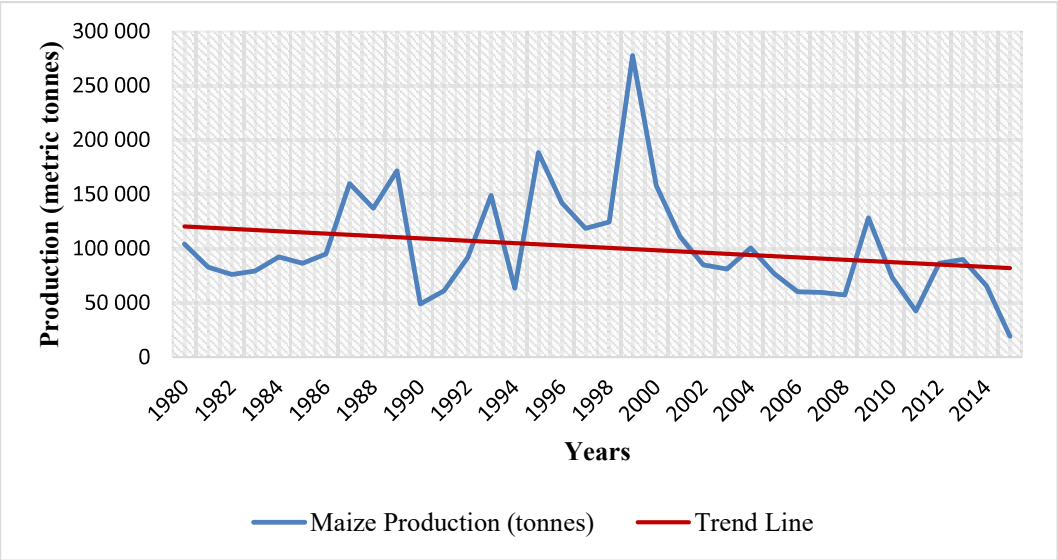

Figure 2.2: Maize production trend in Lesotho (1980-2015)

Source: LBOS (2017).

The graph shows a fluctuating trend that is on a general decline. Production averaged 108, 498mt, 126, 576mt and 80, 963mt during the periods 1980-1989, 1990-1999 and 2000-2015 respectively. The highest production was recorded in 1999 at 277, 685mt and the lowest was in 2015 at 19, 181mt. The peak in 1999 is attributed to the agricultural policy reforms that started in 1995 to 1999 which included the deregulation of the maize market (ADF, 2006; ASS, 2003). The trough in 2015 on the other hand is attributed to the 2015/2016 El Nino drought (caused by dry spells and erratic rains) that negatively affected rain-fed maize production (LVAC, 2016). Other factors that can influence maize production are presented in the section below with a focus on smallholder maize farming.

2.7 Factors Influencing Smallholder Maize Production

As stated in Section 2.3, smallholder famers in SSA can be key drivers of agricultural growth and poverty reduction. However, their potential can only be achieved if the challenges they face are addressed. Baloyi (2010) argues that there are several factors or challenges which constrain smallholder farming and limits farmers from expanding production and accessing formal markets. These factors are discussed in the sections below and classified according to the five livelihood or capital assets of the SLF. Figure 2.3 shows the SLF asset pentagon and the five types of assets upon which people build their livelihoods on. These are human, natural,

financial, physical and social assets. They are summarised below according to the theory of the SLF[4].

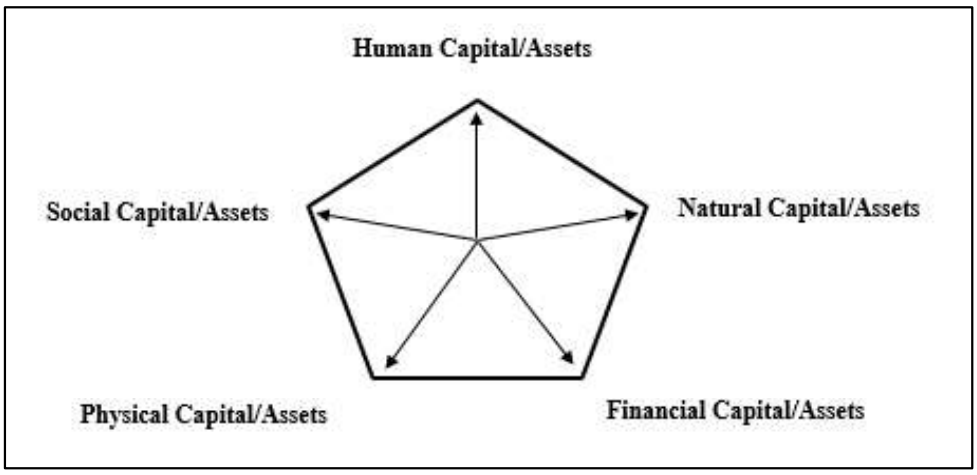

Figure 2.3: The SLF asset pentagon

Source: DFID (1999).

Notes: Human Assets: skills, knowledge, good health and ability to pursue different livelihood strategies.

Natural Assets: natural resource stocks such as land, water, wildlife and biodiversity.

Financial Assets: financial resources available to people which include salaries, wages, savings, access to credit and pensions.

Physical Assets: resources created through the economic production process such as roads, bridges, power lines and tools and equipment.

Social Assets: social resources such as networks, membership to organisations and relationships of trust.

2.7.1 Climatic Conditions

According to LVAC (2016), smallholder agriculture is highly affected by climate shocks such as floods, hail storms and droughts, which limits agricultural production. These shocks are classified as natural assets in the SLF pentagon in Figure 2.3. In Africa, climate change caused by global warming is one of the biggest causes of reduced agricultural production (Salami *et al.*, 2010). Crop and livestock farming in rain-fed conditions is heavily affected by climate changes and is therefore susceptible to weather variations. According to Easterling *et al.* (2007), the impact of climate change on agriculture can be caused by high levels of carbon

[4] The sustainable livelihoods conceptual framework (SLF) is presented in Chapter 3, Section 3.4.

dioxide in the atmosphere, transpiration regimes and higher than normal temperatures. Daryanto *et al.* (2016) and Rampokanyo (2012) argue that droughts caused by higher temperatures and erratic rains pose a greater threat on global food sources and are the main cause of rain-fed crop failure.

Prolonged droughts in developing regions often cause famine, epidemics and drying of perennial streams. This was the case in Southern Africa where extreme drought and erratic rains brought by the 2015/2016 El Nino phenomena negatively affected crop production. Several countries including Malawi, Zimbabwe, Swaziland and Lesotho experienced heightened levels of food insecurity and averaged a deficit of about 1.7 million tonnes of cereal production in the 2014/2015 harvesting season (LVAC, 2016). In Lesotho, the drought also resulted in a fall in area planted of five major crops (maize, sorghum, wheat, beans and peas) from a total of 161, 330 hectares in the 2014/2015 season to 111, 306 hectares in the 2015/2016 season (LBOS, 2016). According to FAO (2016), the fall in area planted in 2014/2015 ultimately lead to a decrease in seed security in the 2016/2017 season. Furthermore, LBOS (2015) and Mekbib *et al.* (2011) found that erratic rainfall is one of the main climatic factors influencing maize productivity in Lesotho since production is closely related to the uneven nature of rainfall.

Maseatile (2011) used the stochastic frontier function (SFA) to empirically measure maize productivity in Lesotho and found low levels of productivity which were attributed to hostile climate changes, soil erosion and poor water resource management. Other studies in Africa[5] revealed similar maize production and productivity trends. In countries such as Kenya, Nigeria and Swaziland, maize is a principal staple crop grown by smallholder farmers under rain-fed conditions, making productivity highly vulnerable to climatic changes. Furthermore, in studying productivity trends of cereal crops in Nigeria, Mairiga (2014) found fluctuating productivity and productivity growth rates of maize[6] and concluded that fluctuations were predominantly caused by the subsistence nature of maize farmers and dependence on rainfall, which farmers had no control over. Erratic rains and periods of mild to severe dry spells were also found to contribute to fluctuating maize yields in the Republic of Zambia (Barron *et al.,* 2003).

[5] Mairiga (2014); Oseni and Masarirambi (2011); Liu and Myers (2009).

[6]Productivity was expressed on annual maize yield basis, calculated as output in kilograms over area harvested (kg/ha). Productivity growth of maize on the other hand was calculated using the following growth ratio: $(P_1-P_0)/P_0$ where Y_1 = current year's yield rate; Y_0 = previous year's yield rate.

2.7.2 Land Availability

With respect to the SLF pentagon in Figure 2.3, land is classified as a natural asset as it forms part of the natural resource base. According to Livingston *et al.* (2011), one of the primary challenges in scaling-up smallholder agricultural production in Africa is limited arable land. In some occurrences, arable land maybe present but not cultivated as this land may be used for grazing and forestry to preserve natural ecosystems as opposed to agricultural production. In other instances, arable land may be available but inconsistencies and uncertainty around land tenure policies may limit agricultural growth. Simbizi *et al.* (2014) defines land tenure policy or land tenure system as a set of formal or customary laws that govern the rights to use, control and transfer land. Benefits of a secure land tenure[7] system include increases in credit (as land can serves as collateral), increases in land transactions, reduction in land disputes and increases in agricultural investment (Feder and Noronha, 1987; Barrows and Roth, 1990, cited in Roth and Haase, 1998). In contrast, insecure land tenure can have negative effects such as low land holdings, increased food insecurity and poor development in agriculture (Salami *et al.*, 2010).

Land tenure insecurity is particularly detrimental to smallholder farmers that are typically characterised by limited financial capital and information. Siba (2015) argues that in SSA, the land tenure system is unstable and acts as a disincentive for long-term investment in agriculture and defers allocation of land to large-scale, high income farmers. Salami *et al.* (2010) argues that in such instances, poor smallholder farmers are at a disadvantage as they usually don't know their rights to land ownership and mechanisms pertaining to temporary transfer of land and its use as collateral. Roth and Haase (1998) also argue that the informal system of allocation of land by chiefs and headmen contributes to land tenure insecurity in rural areas. Under this informal system, renting-out land is considered risky as the procedure is mostly based on the trust of local officials and renters with no formal documentation.

2.7.3 Access to Financial Assets

According to Lowitt *et al.* (2015), smallholder farmers are generally constrained by lack of financial assets (financial capital), which affects their ability to acquire modern farm tools and equipment to scale-up production and diversify produce. Apart from low household income,

[7]Land tenure security as defined by Roth and Haase (1998) is "the individual's perception of his/her rights to a piece of land on a continual basis, free from imposition or interference from outside sources, as well as the ability to reap the benefits of labor or capital invested in land, either in use or upon alienation".

lack of financial assets is caused by limited access to credit. Zwelendaba (2014) and Kloeppinger-Todd and Sharma (2010) found that financial institutions offer loans to creditworthy farmers, while rural smallholder farmers typically don't receive such services. However, studies have identified ways of addressing this issue among smallholder farmers. Fenske (2011) argues that having a strong or stable land tenure policy can benefit farmers in this regard as the ability to use land as collateral is one of the few ways poor farmers can have access to credit. One other way is by joining formal groups or associations and collectively applying for loans under joint collateral (Nxumalo, 2014).

Financial capital stock such as cash transfers can also be used as tools in developing countries to reduce poverty and food insecurity (Garcia and Moore, 2012). Such transfers were found to increase the purchasing power of farming households and solve the financial constraint of acquiring inputs (Bezu and Holden, 2008). In Lesotho, the government usually undertakes this kind of intervention by providing food subsidies and cash for work programmes to protect the old and vulnerable in times of severe food insecurity (CBL, 2012). WTO (2015) found that this kind of intervention was employed in 2009 and 2010 where farmers that qualified as vulnerable received vouchers worth M810.00 (R810.00)[8] to buy seeds and fertilisers.

Ranyakane (2014) also found that in Lesotho, the older generation is increasingly relying on government cash transfers (old age grants) to purchase farm inputs to maintain agricultural production. This can be explained by Sinyolo (2015) who found that households in rural areas are mostly headed by the elderly because the younger generation migrates to non-farming sectors in urban areas to look for employment. This leaves the older generation that entirely survives on agriculture in a desperate situation to achieve food security. Consequently, rural pensioners in Lesotho designate a portion of their old age grants to purchase seeds strictly for household food security (Ranyakane, 2014). However, cash transfers can also have unintended negative effects on rural farming households. Sinyolo (2015) found that cash transfers reduce productive work and act as a disincentive for rural farmers to commercialise and often create a dependency syndrome among family members.

[8] The Loti and Rand are pegged currencies on a 1:1 basis.

2.7.4 Access to Inputs

According to Ogang (2014), agricultural inputs play a fundamental role in farming and are classified as physical assets which are used in agricultural production to sustain livelihoods. Inputs can be categorised as primary inputs (i.e seeds, manure and farming tools), capital inputs (i.e, tractors and irrigation systems) and agro-chemical inputs (i.e herbicides, fungicides and pesticides). Belt *et al.* (2015) argues that for high production to be sustained, inputs must be accessible, affordable and properly used. However, Sheahan and Barrett (2017) found that in SSA, there is limited use of capital and agro-chemical inputs by smallholder farmers and they are therefore forced into low input-output production. Baloyi (2014), Chirigo (2014) and IFAD (2009) attribute limited use of inputs to limited access to credit and high costs of modern farm inputs. Lack of market information pertaining to market demand also contributes to limited access of inputs (Kloeppinger-Todd and Sharma, 2010). As a result, most farmers resort to informal groups comprised of other farmers, friends and neighbours for acquisition of primary farming inputs such as home saved seeds, draft powered ploughs and planters (Ogang, 2014).

2.7.5 Access to Formal Markets

According to Gollin (2014), smallholder farmers are often constrained in integrating into commercial marketing channels. This is because smallholder farmers struggle to consistently sell to supermarkets chains and other formal sector retails. Chamberlin (2008) found that most smallholder farmers don't have a fixed marketable surplus to satisfy local supermarket demand because they usually experience low output production and are subsistence oriented. Furthermore, Ehui (2016) and Salami *et al.* (2010) found that smallholder farmers are unable to consistently comply with quality monitoring standards demanded by high value retail outlets. In general, smallholder farmers are perceived to be high cost, high-risk farmers by formal retailers while large-scale producers are perceived to be more reliable as they are more predictable and can consistently supply quality produce.

Rural farmers that have stable production may also face difficulties in delivering their produce due to their remoteness and poor transport infrastructure. In such cases, smallholder farmers (that are already resource poor) may have to incur large transaction costs to deliver their produce to market destinations, which further adds to the limitations in accessing formal markets (Chapagain and Raizada, 2017; Sipoko, 2014). Limitations in accessing markets suggest that smallholder farmers lack both financial and physical assets. Lack of financial

assets implies that farmers cannot invest in production to guarantee stable supply. While, lack of transport infrastructure in the form of roads and bridges (physical assets) creates missed opportunities to physically access formal markets.

2.7.6 Human and Social Capital

According to Bienabe *et al.* (2004), smallholder farmers have limited information about market demand and usually rely on community members to obtain information that is usually not accurate or certified. Khapayi and Celliers (2016) also found that emerging farmers have limited access to market information and rely on self- research, family members and other farmers which are usually unreliable information sources. Sipoko (2014) and Louw *et al.* (2008) found that because of lack of information, farmers miss the opportunity to acquire information about market demand for agricultural produce which limits their competitiveness in formal markets. Furthermore, lack of market information about potential buyers, and competitive market prices turn smallholder farmers into price takers with little bargaining power (Baloyi, 2010; Kawa and Kaitira, 2007).

As stated in Section 2.7.3, farmer groups or associations can increase the chances of acquiring loans in smallholder farming. Lowitt *et al.* (2015) and Kumwenda *et al.* (2013) note that farmer associations reduce the cost of acquiring inputs and information necessary to penetrate formal markets and increase bargaining power. Furthermore, forming groups or associations makes facilitation and capacity building easier as farmers in existing groups already know how to work with each other in solving problems they face (Ndlela, 2015). Kloeppinger-Todd and Sharma (2010) further found that information acquired by members of one group or association in a community can be shared to farmers in another community who are themselves group members, thereby disseminating valuable information to different farming communities.

According to IFPRI (2005), good health and education also have a positive effect on farming because of quality/healthy labour supply and acquisition of credible information. Wiggins *et al.* (2010) found that rural farming households that are more educated are often in a better position to take advantage of agricultural opportunities and access better markets. However, Salami *et al.* (2010) found that rural smallholder farmers are often undereducated and struggle to meet the requirements necessary to compete in formal markets. Furthermore, IFPRI (2005) found that literacy rates and life expectancy rates in rural areas are often below national averages and because of their remoteness, farmers are limited in relation to medical services.

Consequently, little income is invested in agricultural production as household income is used for consumption, medical services and transport costs.

2.8 Government Support to Smallholder Farmers in Lesotho

According to Afenyo (2012), smallholder farmers in SSA have been recipients of several forms of agricultural support motivated by poor performance of small-scale farmers and lack of improvements in the smallholder agricultural sector. Support for smallholder farmers in SSA has been in the form of acquisition of productive inputs and technology, infrastructural support and access to credit and information. Except for once-off interventions contingent on hostile weather conditions, support to smallholder farmers in Lesotho is largely on improving accessibility of inputs, scaling-up agricultural production, increasing market access and land preservation. Ulrichs and Mphale (2016), WTO (2015), NAPFS (2006) and ASS (2003) have identified four programmes through which the government of Lesotho supports smallholder farmers. These programmes are: i) the National Block Farming Programme; ii) the National Fertiliser and Input Subsidy Programme; iii) the Small Holder Agricultural Development Programme; and iv) the Integrated Watershed Management Programme. These programmes are discussed below with specific attention given to how they support smallholder crop farmers and their short comings.

It is also worth noting that in 2012, the government of Lesotho launched the Intensive Crop Production (ICP) scheme in response to the 2011 floods. The scheme involves three components, i) a sharecropping system between the government and field owners; ii) distribution of subsidised seeds and fertilisers to farmers nationwide; and iii) offering state-owned tractor services to farmers at subsidised prices (WTO, 2015). The ICP scheme incorporated services offered by the National Block Farming Programme and the National Fertiliser and Input Subsidy Programme to aid farmers in coping with shocks caused by climate changes.

2.8.1 National Fertiliser and Input Subsidy Programme

This programme aims to improve the welfare of rural households and spur crop production in Lesotho by reducing the purchase cost of inputs such as hybrid seeds and fertilisers by approximately 30 to 50 percent of the total retail cost (Ulrichs and Mphale, 2016). Liu and Myers (2009) found that the input subsidy programme offers farmers facing financial

constraints an opportunity to acquire inputs at low costs when other alternatives such as in-kind payments and loans from friends and relatives have failed. However, in Lesotho, there is evidence of inefficiency in this subsidy programme. FAO (2016) found that farmers often receive inputs late into the planting season. This is because of late delivery of inputs to farmers caused by long queues and cumbersome acquisition procedures as a result of having one warehouse that stores and supplies inputs to the entire country. Ulrichs and Mphale (2016) and Mohlatsane *et al.* (2009) also found that the programme lacks an explicit pro-poor targeting strategy as most poor farmer still find it expensive to purchase subsidised inputs.

Furthermore, smallholder farmers in Lesotho are marginalised compared to large-scale resource-rich farmers that can afford transaction costs to access inputs and have more market access to generate income from surplus produce (Molatoli and Xiaojun, 2016). In a study of agricultural inputs subsidies in Malawi, Dorward and Chirwa (2011) found that affordability of subsidised inputs is a problem for poor farmers because they cannot afford them during cropping seasons as they have to invest in labour and other inputs. Furthermore, Denning *et al.* (2009) also found that the Malawian subsidy programme has no clear targeting criteria of subsidies to poor famers which is argued to drive away international donor support. Ricker-Gilbert *et al.* (2013) found that smallholder farmers are marginalised in other SSA countries such as Ghana and Zambia. In these countries, politically connected households with more financial capital capture a larger share of national subsidy programmes tailored for poor small-scale farmers.

2.8.2 Smallholder Agricultural Development Programme

The Smallholder Agricultural Development Programme (SADP) is a six-year (2012-2018) developmental programme co-financed by the World Bank, the International Fund for Agricultural Development (IFAD), and the Lesotho government. It supports smallholder farmers by promoting innovative agri-business projects which aim to increase competitiveness, improve market access and boost provision of services (World Bank, 2016). According to World Bank (2017a), the SADP consists of four components. The first component consists of rounds of competitive grants that farmers compete for to start various agricultural development projects such as chicken farms and green houses. The second component involves collaboration with the Ministry of Trade and entails improving market linkages between smallholder farmers and traders. The third component involves agricultural investment plans where business

proposals for productive investments are funded on condition that they can impact on local livelihoods and local income generation. The last component promotes unpaid conservation work at community level and offering training programmes on how to manage agricultural projects and drawing up business proposals. Ulrichs and Mphale (2016) found that the programme has been successful but programme staff have raised doubts that the government will continue with the programme beyond the 2018 agricultural year when donor funding ceases.

2.8.3 National Block Faming Programme

The National Block Farming Programme is a sharecropping system between field owners and the government. It aims to scale-up production of poor farmers with limited production inputs (Ulrichs and Mphale, 2016). The government incurs all production costs (fertilisers, seeds, and necessary equipment), while field owners supply land and human labour. The output sharing ratio is 60 percent to the government and 40 percent to field owners. Farmers typically store their share of the harvest for household food security and while the government's share is sold to private mills at market prices and also stored for national food security purposes (WTO, 2015). The programme has faced challenges in the implementation and monitoring stages. Ulrichs and Mphale (2016) and WTO (2015) found that a minimum of 4 hectares of land is required from farmers, which becomes a problem to smallholder farmers who do not own that much land and therefore cannot benefit from the programme. Moreover, development partners have raised concerns of lack of documentation with the programme's objectives and that some farmers believe that the share going to the government is too high and would rather continue cultivating fields on their own.

2.8.4 Integrated Watershed Management Programme

According to Barron *et al.* (2008), agricultural water management is generally considered as a crucial step towards improving smallholder farming systems in SSA. This is because most of the population makes a living from subsistence rain-fed agriculture. Watershed management programmes typically aim to restore ecological systems by harnessing and conserving natural resources such as soil and rainwater. In Lesotho the Integrated Watershed Management Programme targets areas that show declining agricultural productivity because of climate and human induced land degradation (GEF, 2016).

The programme employs about 1000 people per month and targets rural unemployed labour at village level (one participant per household) to participate in reversing environmental degradation by planting trees and filling up gullies. The programme was also introduced to increase rural household income (financial capital) in response to soaring food and commodity prices and has been sustainable due to popularity and political traction. However, Ulrichs and Mphale (2016) found that there has been no evaluation of the impact of the programme on rural communities and development partners have raised concerns about poor geographical targeting criteria.

2.9 Summary

This chapter presented a review of some of the literature on smallholder farming and factors or constraints limiting production of smallholder farmers. Challenges such as limited access to information, limited farming inputs and limited financial capital are often cited as major constraints. These challenges are found to confine smallholder farmers to subsistence agriculture with limited access to formal markets. Several agricultural programs such as input subsidy and watershed management programmes have been implemented in smallholder agricultural sectors to address challenges faced by farmers. However, some programmes have not achieved expected outcomes, especially in rural and remote farming communities where farmers are too far from services and generally don't benefit from government support programmes.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the study areas, data collection, the conceptual framework used and data analytical methods. To address the research goals, this study adopted a pragmatic paradigm following a sequential explanatory approach for mixed methods (Creswell, 2014). According to Armitage (2007), a pragmatic paradigm is a mixed method approach that involves data collection and analysis simultaneously or sequentially using quantitative and qualitative data collection methods that best address the research goals. The rationale for this approach is centered on the fact that neither quantitative nor qualitative methods are independently sufficient to capture trends and details of a situation, thus data from both methods can be used to provide a richer base for analysis (Adato and Meinzen-Dick, 2003; Ivankova *et al.*, 2006).

Sequential mixed method strategies entail one form of data collection and analysis building on another (Creswell, 2009). In this study, the sequential explanatory approach is qualitative design dominant. That is, quantitative methods are used to embellish a primarily qualitative study (Creswell *et al.*, 2003). Therefore, quantitative data collection and analysis is used to partially build on qualitative data collection and analysis, then interpretation of the entire analysis can be made (Ngulube and Ngulube, 2015; Creswell, 2009). This study therefore consists of two phases of data collection and analysis.

3.2 Study Area Description

Lesotho is a small land locked country bordered by the Republic of South Africa. It is located between 28^0 S and 31^0 S latitudes and 27^0 E and 30^0 E longitudes (LMS, 2017). It is divided into ten administrative districts, namely Butha-Buthe, Mokhotlong, Thaba-Tseka, Qacha's-Nek, Quthing, Mohale's-Hoek, Mafeteng, Maseru, Berea and Leribe. These districts are divided into four agro-ecological zones, i.e the Lowlands, Foothills, Senqu River Valley and Mountains (Highlands). These agro-ecological zones occupy 17, 15, 9 and 59 percent of total land area, respectively, and have varying agricultural potential (LASR, 2011). The climate is temperate with cool to cold winters and hot, wet summers. Average precipitation is 788 mm which ranges from less than 300 mm in the western lowlands to 1600 mm in the northeastern Highlands (FAO, 2005). Temperature ranges from an average of 15^0 C in the Lowlands to 7^0 C in the Highlands (Maseatile, 2011).

The study was conducted in the Lowlands of Lesotho, in the Leribe and Mafeteng districts as shown in Figure 3.1 below. In Leribe, research was conducted in the following areas: i) Mahobong; ii) Maputsoe; iii) Linotsing; iv) Tale; and v) Khabo. According to LDS (2011), Leribe has a *de jure* population of 331, 117 and arable of land 52, 114 hectares which is about 18 percent of total arable land in Lesotho. In Mafeteng, research was conducted in: i) Ramokoatsi; ii) Kolo; iii) T'sakholo; iv) Matelile; and v) Mosala. Mafeteng has a *de jure* population of 183, 507 and arable land of 37, 156 hectares which is approximately 13 percent of total arable land in Lesotho.

Figure 3.1: Map showing the study areas (highlighted) in Lesotho

Source: LTDC (2018).

Geographical and climatic features of Lesotho determine the relevance of land for agricultural activities and suitability of various types of field crops (Maseatile, 2011). The Mafeteng and Leribe districts were therefore selected based on the agricultural potential of agro-ecological zones and levels of maize production. According to Morojele and Sekoli (2016), the Lowlands of Lesotho have the largest arable land and climate conditions which allow maize to be planted over a longer period relative to other agro-ecological zones, making the Lowlands the highest

maize producing agro-ecological zone. Furthermore, the districts selected represent two major maize producing districts in Lesotho. According to LASR (2013) and Maseatile (2011), Leribe represents the highest maize producing district in the Northern lowlands, while Mafeteng represents the highest maize producing district in the Southern lowlands of Lesotho.

Comparatively, the maize market structure in Leribe is more formal as excess maize produce is mostly sold to Lesotho's milling companies and exported to Ficksburg cooperatives in the Free State Province of South Africa (LVAC, 2016; Maseatile, 2011). In Mafeteng, farming systems are embedded in community cultural norms with little formal market structures (Sekaleli and Sebusi, 2013). Generally, there is little motivation for mass production of maize in Mafeteng and excess maize produce is typically sold to government schools and community members (Maseatile, 2011).

3.3 Data Collection

This section explains the data collection methods, sampling procedure, sample sizes and data collection instruments used in this study.

3.3.1 Data Collection Methods and Justifications

As stated is Section 3.1, this study has two phases of data collection. The first phase of data collection involves secondary quantitative data collection and analysis on the following variables: i) annual maize productivity and productivity growth (yield) rates; ii) quarterly temperature; and iii) quarterly rainfall. Data on the above-mentioned variables was sourced from the Lesotho Bureau of Statistics and the World Bank Climate Change Knowledge Portal. Trend analysis was done on the variables using fitted line graphs generated by the E-views 8 statistical software over the 36-year period 1980-2016 to graphically investigate changes over the sample period. In the second phase, primary qualitative data was collected. Focus group discussions and key stakeholder interviews were used as data collection methods. Qualitative results were presented and analysed using non-quantifying methods in the form of matrices and network diagrams to highlight main issues discussed in focus groups and stakeholder interviews.

It is worth noting that total maize production was used as a proxy for smallholder maize production in the study areas. This was done for two reasons, firstly, research found no

disaggregated data on smallholder maize production, secondly, maize is produced by all farming households in Lesotho and about 90 percent of farmers are smallholder subsistence farmers, thus making total maize production a close approximation for smallholder maize production (Maseatile, 2011). Furthermore, qualitative findings in this study were limited to the 5-year period 2012-2016. This period is motivated firstly by the fact that a longer period would likely produce biased results from focus group discussions as farmers may not accurately recall a lot of events in detail over a longer period. Secondly the period was considered because of the implementation of the ICP scheme and the SADP programme in 2012.

According to Hennink (2014) and Adato and Meinzen-Dick (2003), focus group discussion is a qualitative data collection method that involves an interactive discussion with a predetermined group of participants to obtain collective experience and opinions on specific issues or topics. Group discussions have long been used since the 1920s when social scientists began to investigate alternative interview techniques where the researcher assumes a less instructive and dominant role, therefore allowing participants to discuss the main issue(s) in detail (Krueger and Casey, 2000, cited in Colucci, 2007). Key stakeholder interviews on the other hand entail interviewing individuals who are likely to provide information, ideas and insights on a subject (Kumar, 1989). Depending on the research context and research goals, both focus group discussions and key stakeholder interviews may provide more information that is qualitatively better than face-to-face interviews and they are also regarded to be more effective when used in conjunction with multiple data collection methods for cross-checking and triangulation (Threlfall, 1999; Barrows, 2000; Boyce and Neale, 2006).

Focus group discussions and key stakeholders were therefore used as data collection methods in this study to obtain in-depth information about farmers' use of livelihood assets, constraints experienced in farming and how agricultural programmes influence their production of maize (see Appendices A and B). These data collection methods were also used taking into consideration the time boundary of this study and limited financial capital for conducting research.

3.3.2 Sampling Procedures

Farmers were selected using a combination of purposive and stratified sampling procedures. According to Etikan *et al*. (2016), purposive sampling is a sampling technique that entails a deliberate choice of a respondent based on the qualities they possess. Stratified sampling

involves the researcher dividing the population into strata or sub-groups where each sample unit belongs to a single stratum and then selections are made from those strata (Teddlie and Yu, 2007). The study therefore purposively considered smallholder maize farmers who are or have been beneficiaries of agricultural support programmes. Stratification was done according to different farming communities in each district. Individual farmers were then randomly selected from the list of beneficiaries of selected agricultural programmes in each district from the MAFS. A combination of purposive and snowball sampling techniques was used to select key stakeholders. According to Noy (2008), snowball sampling involves the researcher accessing additional informants through contacts provided by previously interviewed informants. Key stakeholders comprised of researchers that have specialised knowledge on maize production and agricultural programmes that support smallholder farmers in Lesotho. Stakeholders were from the MAFS, the Disaster Management Authority, World Vision International and the Lesotho Agricultural College (see Appendix C).

3.3.3 Sample Sizes

With respect to the size of focus groups, existing literature showed that there is no general rule. However, researchers should include enough participants to promote information diversity while being cautious not to include too many participants as that would create an environment where participants are reluctant to share their knowledge, experience and opinions (Onwuegbuzie *et al.*, 2009). Different sizes have been used by different researchers (Leitao and Vergueiro, 2000). Hennink (2014) noted a range of 6 to 8, while Prince and Davies (2001) and Baumgartner *et al.* (2002) noted that a size of 6 to 12 participants is typically enough. However, Braithwaite *et al.* (2004) found that some studies have conducted group discussions with as many as 10 to 23 participants while Breen (2006) found studies that have conducted group discussions with as few as 4 to 6 participants.

Concerning the number of focus groups, the literature also shows that this too can vary. Studies by Breen (2006), Morse (1995) and Strauss and Corbin (1990) argue that multiple focus groups should be conducted up until a point of saturation is reached as "one size does not fit all" (Fusch and Ness, 2015). According to Strauss and Corbin (1990), a point of saturation is reached when conducting additional focus groups yields no further interpretive value. In this study, a total of 10 focus group discussions were held at agricultural resource centres in the Leribe and Mafeteng districts and consisted of 6 to 12 smallholder maize farmers.

After focus group discussions, key stakeholder interviews were conducted. According to Alaska PFS (2016), the number of participants in key stakeholder interviews typically ranges from 8 to 10, while Kumar (1989) argues that a range of 15 to 35 stakeholder is sufficient for most studies. However, some studies argue that the number of stakeholder interviews to be conducted can vary. Kumar (1989) further argues that the range of 15 to 35 interviews can be reduced if the research consists of multiple data collection methods such as surveys and document content analysis. Yuksel *et al.* (1999) argue that it is a matter of opinion as to how many stakeholder interviews to conduct. Boyce and Neale (2006) on the other hand argue that the general rule of thumb is to stop conducting interviews when the same information is heard from several stakeholders. Taking the above arguments into consideration, interviews conducted in this study consisted of a total of 10 key stakeholders.

Overall, primary qualitative data was collected from a total of 85 research participants. This comprised of 75 smallholder maize farmers (38 farmers from Leribe and 37 farmers from Mafeteng) and 10 key stakeholders. With the assistance of extension officers from the MAFS, qualitative data collection took approximately four weeks from the 9th November 2017 to the 7th December 2017.

3.3.4 Data Collection Instruments

Qualitative data was collected by conducting focus group discussions and key stakeholder interviews. Accordingly, the study used focus group discussion and key stakeholder interview guides (see Appendices A and B) as data collection instruments. Discussions with maize farmers followed the SLF structure (discussed in the following section) but mainly focusing on constraints experienced in production, accessibility of livelihood assets and support from selected agricultural programmes (see Appendix A). Interviews with key stakeholders focused on how programmes can be modified to improve accessibility of limited assets and what actions farmers can take to improve production and reduce vulnerability in areas where support programmes has failed (see Appendix B).

3.4 Conceptual Framework

This section discusses the sustainable livelihood framework used in this study as a conceptual guide in data collection and analysis. According to Parkinson and Ramirez (2007), the idea of sustainable livelihoods was developed in the 1980s by Robert Chambers. The idea was that development professionals conceptualise poverty differently from poor people, that is, poor people's priorities and the perception of their environment often differ from those imputed to them by development professionals. Poor people's perception of poverty is more complex and the use of strategies to sustain their livelihoods differ in terms of activity and motivation. Sustainable livelihood approaches therefore aim to develop an accurate and dynamic picture of how poor people perceive their own environment in the context of poverty and how social, cultural, political, and institutional factors influence their livelihood activities (Adato and Meinzen-Dick, 2003).

By the late 1990s, several sustainable livelihood frameworks had been developed and/or implemented by various non-government organisations and research institutions such as UNDP, FAO and CARE (Arun *et al.*, 2004). However, all sustainable livelihood frameworks are similar in that they focus on beneficiaries of development interventions (Parkinson and Ramirez, 2007). According to Maxwell (2005), in research, a conceptual framework is a tool that "incorporates pierces that are borrowed from elsewhere, but the structure, the overall coherence, is something that you build not something that exists ready-made".

Several studies in agricultural research have used different sustainable livelihood frameworks as conceptual guides. Phakathi (2016) used a modified British Department for International Development (DFID) framework to study small-scale irrigation and its role in diversifying rural livelihood options in KwaZulu-Natal, South Africa. Adato and Meinzen-Dick (2003) also used a modified DFID framework to assess the impact of agricultural research on poverty in Bangladesh, Kenya, Zimbabwe and Mexico. Other studies used different variations of the SLF. Ndlela (2015) used a modified SLF for creating self-reliance among farmers in Noodsberg, South Africa while Jowah (2009) used the sustainable rural livelihoods framework adapted from the Institute for Developmental Studies (IDS) to study rural livelihoods and food security in Zimbabwe.

3.4.1 The DFID Sustainable Livelihood Conceptual Framework

This study uses the DFID sustainable livelihoods framework (presented in Figure 3.2 below) as a data collection and analytical guide. The DFID framework is people centered and stresses the use of livelihood or capital assets and can be used as a guide for research on how interventions can best be implemented to improve livelihoods of poor people (Adato and Meizen-Dick, 2003; Carney *et al.*, 1999). The framework is more suited for this study as it allows for an integrated, interdisciplinary approach that utilizes both quantitative and qualitative data collection and analysis (Adato and Meizen-Dick, 2003). Therefore, triangulation and crosschecks from quantitative and qualitative data can make it possible to sufficiently cover key aspects of the framework and hence provide a richer base for analysis (Ndlela, 2015).

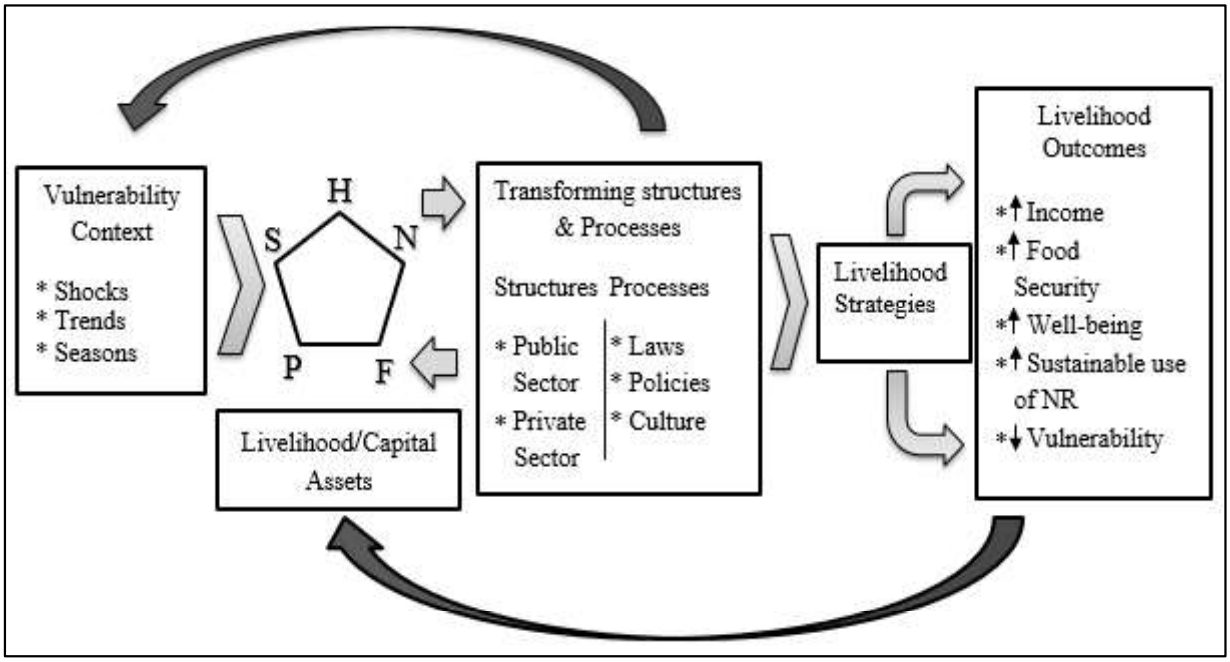

Figure 3.2: The DFID sustainable livelihood framework

Source: DFID (1999).

As shown in Figure 3.2 below, the DFID framework starts with the vulnerability context within which people operate then attention is given to assets that people draw their livelihoods from. Livelihood assets interrelate with policies, institutions and processes to influence livelihood strategies. These ultimately impact on livelihood outcomes which are often the types of impact researchers and policy makers are interested in (Adato and Meinzen-Dick, 2003 and Kollmair and Gamper, 2002).

The vulnerability context lies outside of people's control and thus little can be done to alter it directly in the short to medium term (DFID, 1999). According to Parkinson and Ramirez (2007), the vulnerability context includes shocks (i.e unpredictable events such as droughts, floods and epidemics), trends (i.e trends in population, natural resources and economic indicators) and seasonalities (i.e changes related to seasons such as seasonal variations in prices, products and employment opportunities). Makoza and Chigona (2012) argued that vulnerabilities are therefore external factors that affect people's livelihoods and can lead to hardship.

The DFID framework also presents five forms of livelihood or capital assets (human (H), natural (N), financial (F), physical (P) and social (S) assets, explained in Chapter 2, Section 2.7) which households have access to and use strategically to produce goods and services as a means of sustaining their livelihoods. No single asset category is sufficient to yield the different livelihood outcomes that household seek (Kollmair and Gamper, 2002). This is especially true for poor people who have limited access to capital assets and must find ways of combining limited assets in innovative ways to sustain their livelihoods (DFID, 1999).

The framework also presents transforming structures and processes which are institutions, organisations, policies and cultural norms that shape livelihoods (Kollmair and Gamper, 2002). According to DFID (1999), structures are both private and public organisations that set policies and legislation and perform functions that affect livelihoods. Processes determine the way structures operate and interact, this can be done through enforcing laws, policies or cultural procedures. Also, livelihood goals or outcomes are continuously influenced by actions people undertake to improve their standards of living. According to Arun *et al.* (2004), livelihood strategies are a combination of activities that people undertake to achieve their livelihood goals or outcomes. They can be strategies related to income generation, food production and other productive goals.

The last component of the DFID framework is livelihood outcomes. They include more income (e.g cash), reduced vulnerability (e.g ability to adapt to climate changes) and improved food security (e.g increased financial capital to purchase food or increased household food production). According to Kollmair and Gamper (2002), livelihood outcomes influence the portfolio of livelihhod assets people choose to acquire. Moreover, livelihood outcomes and capital assets motivate how people are likely to respond to new opportunities and which interventions are likely to be implemented to support them in sustaining their livelihoods.

3.5 Data Analytical Methods

This section presents a discussion of equations used to calculate maize productivity and productivity growth and also discusses the adoption of the cross-consistency matrix and problem tree diagram in this study.

3.5.1 Trend Analysis

In this study, maize productivity was calculated using annual maize yields as shown in Equation 1 while maize productivity growth was calculated using annual yield growth rates in Equation 2. Yield rates were used to calculate productivity and productivity growth because the yield growth rate is one of the main indicators of agricultural growth in developing countries (Oni *et al.*, 2009). Temperature and rainfall data was analysed because maize productivity is highly vulnerable to climatic shocks, particularly droughts and erratic rains which are the two major climatic constraints on maize production in Lesotho (Nxumalo, 2014; Morojele and Sekoli, 2016). Rainfall and temperature trends were based on quarterly averages with no further data manipulation. Productivity and productivity growth equations are presented below.

$$Y_t = \frac{P_t}{A_t} \text{----------} \quad (1)$$

Where

Y_t = Current maize yield

P_t = Current maize production output in metric tonnes

A_t = Current maize area harvested in hectares

Maize productivity growth was computed using yield rates and was calculated using the following equation:

$$Y_t^* = \left[\frac{Y_t - Y_{t-1}}{Y_{t-1}}\right] x(100) \text{----------} \quad (2)$$

Where

Y_t^* = Current maize yield growth rate

Y_{t-1} = Previous year's maize yield

3.5.2 The Cross-consistency Matrix and Problem Tree Diagram

Qualitative data analysis involves the use of non-quantifying methods of summarising data into cross-consistency matrices and problem tree diagrams to visualise the main issues discussed during focus group discussions and stakeholder interviews. According to Ritchey (2002), cross-consistency matrix is a tool used in general morphological analysis, which is a method for classifying and investigating possible mutual constraints in a problem space. This is achieved by pairing all parameter values or conditions in a morphological field then each pair is examined to assert whether the pair can co-exist or represent a consistent relationship. The cross-consistency matrix can be used in non-quantified studies in instances where formal mathematical methods, causal modeling and simulation cannot be employed. In this study, the cross-consistency matrix is adopted to summarise and pair the same production constraints identified in different study areas in Leribe and Mafeteng.

A problem tree on the other hand is a heuristic tool used to visualise and prioritise main causes (factors) and effects (consequences) of a central problem (Snowdon *et al.*, 2008; Vesely, 2008). Anyaegbunam *et al*. (2004) states that the starting point in constructing a problem tree is to identify the focal or central problem experienced by the community and prioritise causes and effects to ultimately come up with effective and sustainable solutions to the problem. Figure 3.3 below presents a classic problem tree structure used in this study.

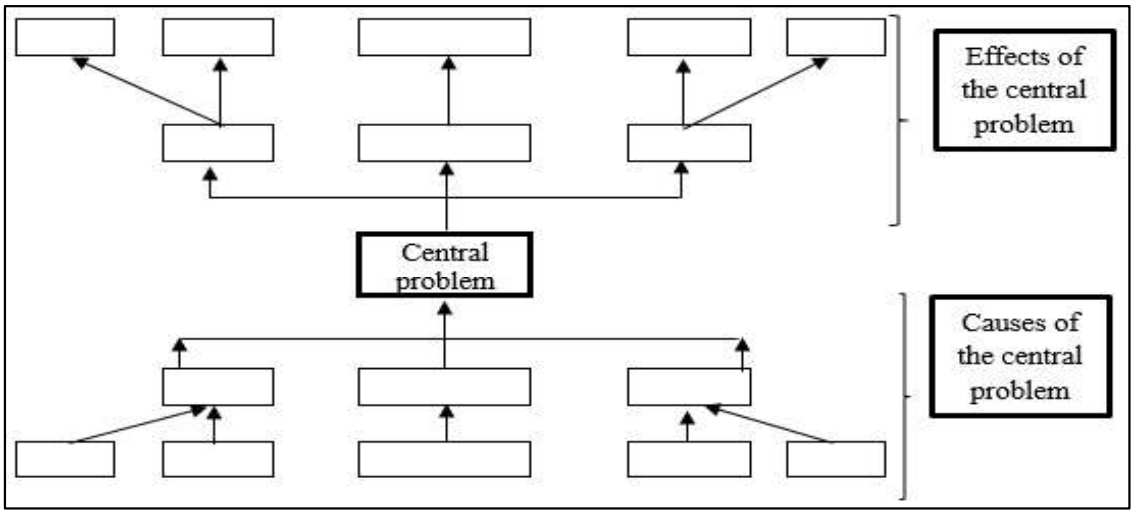

Figure 3.3: The classic problem tree diagram

Source: Snowdon *et al.* (2008).

As shown in Figure 3.3 above, the central problem is the focus (trunk) of a problem tree where the causes (roots) represent factors that lead to the problem and effects (branches) represent

consequences of the problem. According to Dearden *et al*. (2002) and Snowdon *et al.* (2008), the problem tree is then structured such that the immediate and direct causes of the central problem are placed in succession below the problem while the immediate and direct effects are placed in succession above the problem. The problem tree diagram is therefore adopted in this study to schematically visualise main production constraints identified by farmers and investigate their causes and effects on maize production.

3.6 Summary

This study was conducted in the Leribe and Mafeteng districts. The two districts represent the highest maize producing districts in Lesotho's Northern and Southern lowlands. The research entails a qualitative dominant mixed methods approach, following a sequential explanatory design. Thus, quantitative data on maize productivity, rainfall and temperature was collected and analysed in the first phase. The second phase of data collection involved focus group discussions with smallholder maize farmers and key stakeholder interviews.

The DFID sustainable livelihood framework was used as a conceptual framework to explore the use of livelihood assets and how agricultural support programmes influence smallholder production of maize. The following chapter presents results and discussions on maize production constraints, use of livelihood assets, maize productivity and farmers' perceptions on the influence of agricultural support programmes on their livelihoods.

CHAPTER 4: RESULTS AND DISCUSSIONS

4.1 Introduction

The chapter first presents main constraints on maize production identified by farmers in the study areas. The chapter then gives findings on five forms of livelihood assets of the DFID sustainable livelihood framework and how availability and use of these assets influences maize production. Results on maize productivity and productivity growth are also presented and lastly, the chapter presents findings and discussions on farmers' perceptions on the influence of support programmes on their livelihoods.

4.2 Main Production Constraints Identified by Farmers

Main constraints found in the study areas are summarised by the cross-consistency matrices in Tables 4.1 and 4.2 below. These tables are generated from focus group discussions with smallholder maize farmers in Leribe and Mafeteng. As stated in Chapter 3, Section 3.5.2, the cross-consistency matrices are adopted in this study to pair the same constraints identified in different study areas in Leribe and Mafeteng. They are also used in this chapter as references in discussions on the use of livelihood assets by farmers in the following section of this chapter.

Table 4.1 below shows a summary of production constraints identified by farmers in the Leribe district. Constraints identified in the production of maize are limited access to formal markets, late delivery of subsidised inputs, droughts, limited equipment, damaged crops, weak draft animals, limited storage facilities, pest out-breaks, limited financial capital and remoteness. The table also shows that late delivery of subsidised inputs and droughts are the most consistently identified constraints in all the study areas visited in Leribe.

Table 4.1: Cross-consistency matrix of main constraints identified by farmers in Leribe

Study areas	Cosntraints	Maputsoe				Linotsing					Tale					Khabo						
	Constraints	Droughts	Limited storage facilities	Late delivery of inputs*	Limited market access	Late delivery of inputs*	Draughts	Weak draft animals	Limited finacial capital	Pest out-breaks	Droughts	Limited storage facilities	Weak draft animals	Late delivery of inputs*	Pest out-breaks	Droughts	Pest out-breaks	Weak draft animals	Damage of crops**	Limited storage facilities	Remoteness	Late delivery of inputs*
Mahobong	Limited market access				X																	
	Late delivery of inputs*			X		X								X								X
	Droughts	X					X				X					X						
	Limited farm equipment											X										
	Damage of crops**																		X			
	Weak draft animals												X					X				
Maputsoe	Droughts						X				X					X						
	Limited storage facilities																			X		
	Late delivery of inputs*					X								X								X
	Limited marker access																					
Linotsing	Late delivery of inputs*													X								X
	Droughts										X					X						
	Weak draft animals												X					X				
	Limited financial capital																					
	Pest out-breaks														X		X					
Tale	Droughts															X						
	Limited storage facilities																			X		
	weak draft animals																	X				
	Late delivery of inputs*																					X
	Pest out-breaks																X					

Source: Own table generated from focus group discussions in November 2017 with farmers in Leribe.

Notes: *Late delivery inputs refer to late delivery of subsidised seeds and fertilisers from the National Fertiliser and Input Subsidy Programme.
**Crops damaged by livestock due to reckless herdsmen.
"X" represents the same constraint identified in different study areas.

Table 4.2: Cross-consistency matrix of main constraints identified by farmers in Mafeteng

	Study areas	Kolo					T'shakholo						Matelile						Mosala					
Study areas	Constraint / Constraints	Droughts	Pest out-breaks	Limited farm equipment	Limited financial capital	Poor road infrastructure	Late delivery of inputs*	Remoteness	Draughts	Limited finacial capital	Weak draft animals	Limited market access	Droughts	Damage of crops**	Late delivery of inputs*	Poor road infrastructure	Limited market access	Limited storage faciliies	Limited financial capital	Draughts	Pest out-breaks	Damage of crops**	Weak draft animals	Late delivery of inputs*
Ramokoatsi	Limited financial capital				X					X									X					
	Late delivery of inputs*						X								X									X
	Limited information																							
	Pest out-breaks		X																		X			
	Damage of crops**													X								X		
	Droughts	X							X				X						X	X				
Kolo	Droughts								X				X							X				
	Pest out-breaks																				X			
	Limited farm equipment																							
	Limited financial capital																		X					
	Poor road infrastructure															X								
T'sakholo	Late delivery of inputs*														X									X
	Remoteness																							
	Draughts												X							X				
	Limited finacial capital																		X					
	weak draft animals															X							X	
	Limited market access																X							
Matelile	Droughts																			X				
	Damage of crops**																					X		
	Late delivery of inputs*																							X
	Poor road infrastructure																							
	Limited market access																							
	Limited storage facilities																							

Source: Own table generated from focus group discussions in November 2017 with farmers in Mafeteng.

Notes: *Late delivery inputs refer to late delivery of subsidised seeds and fertilisers from the National Fertiliser and Input Subsidy Programme.
**Crops damaged by livestock due to reckless herdsmen.
"X" represents the same constraint identified in different study areas.

Table 4.2 above shows a summary of production constraints identified by farmers in the Mafeteng district. The table shows that farmers in Mafeteng identified the same production constraints as farmers in Leribe. However, farmers in Mafeteng also identified additional constraints such as limited information and poor road infrastructure. Late delivery of subsidised inputs and droughts are also the most consistently identified constraints in Mafeteng.

4.3 Availability and Use of Livelihood Assets

During focus group discussions (see Appendix A) farmers in both Leribe and Mafeteng stated that in the production of maize, livelihood assets (see Figure 3.2 in Chapter 3) are used to address production constraints and increase output to achieve livelihood goals of food security (for household and livestock consumption) and increases in income (generated through sale of excess produce). Below is a discussion of how availability and use of these assets influence their production of maize.

4.3.1 Financial Assets

As shown in Tables 4.1 and 4.2, farmers identified limited financial assets or capital as one of the main constraints to maize production. Focus group discussions mostly consisted of old and retired farmers that rely on agriculture for income generation[9]. Farmers indicated that pension grants play a role as they use some of the money to purchase seeds, fertilizers and pesticides. This is consistent with findings by Ranyakane (2014) who found that some rural pensioners in Lesotho designate a portion of their old age grants to purchase seeds for household food security. Some farmers indicated that they joined skovels as an informal way of saving money. Income from such savings is usually used to cover basic household needs and some of it is also used to purchase farm inputs. Other sources of financial capital such as loans from financial credit institutions are limited as banks and insurance companies usually don't offer credit to smallholder farmers because they are seen as a risky business with low returns.

Using the logistic regression model where access to credit was the dependent variable and land ownership was one to the independent variables, Motsoari *et al.* (2015) found that land ownership among smallholder farmers in Lesotho has a negative relation with access to credit from financial institutions. Motsoari *et al*. (2015) concluded that the negative relation between land ownership and access to credit from financial institutions could either be a result of farmers getting credit from informal money lenders or it could be caused by the 2009-2011 government partial guarantee scheme. According to CBL (2012), the partial guarantee scheme was a government initiative that repaid 50 percent of loans extended to farmers by financial institutions as a way of increasing credit extensions to smallholder farmers and thus addressing the constraint of limited financial capital. However, land was not considered as collateral in

[9]This is because the younger generation work in urban areas in non-farm industries.

extending credit to farmers under the scheme. The partial guarantee scheme ultimately proved to be ineffective in increasing credit to smallholder farmers as farmers continued to default on loan obligations even when their loan payments were partially guaranteed by the government. Consequently, financial institutions only considered income levels, savings, farm size and loan repayment history as factors to consider when assessing the credit worthiness of a farmer. However, smallholder farmers cannot easily meet such conditions and are therefore unlikely to receive credit from financial institutions even though land maybe available.

4.3.2 Natural Assets

Natural resource stock such as water and draft animals is limited. Land is secure and does not significantly constrain production as it can be hired or informally leased to expand production when necessary. Farmers therefore stated that challenges encountered in scaling up production are usually not due to land availability but rather due to limited financial resources and farming inputs. This finding is consistent with that of Motsoari *et al.* (2015) who found that Lesotho's land tenure is characterised by farmers who own farmlands that are inherited from previous generations, thus making it rare or unlikely that production would be halted by unavailability of land. Water on the other hand is typically difficult to access due to recurring droughts stated by farmers to be one of the main constraints on maize production (see Tables 4.1 and 4.2). Figure 4.1 below presents rainfall and temperature trends in Lesotho.

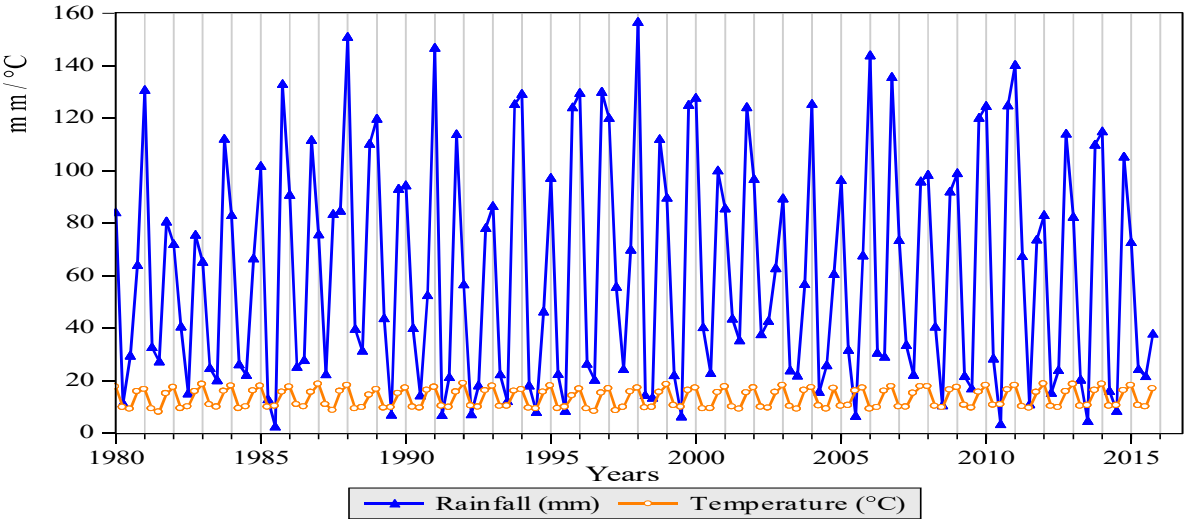

Figure 4.1: Average quarterly rainfall and temperature trends in Lesotho (1980-2015)

Source: Own calculations sourced from World Bank (2017b).

Note: 2015 was the most recent year for which data was available.

Rainfall averaged 61.4 mm and recorded the highest value of 156.0 mm in 19985q1 and recorded the lowest value of 2.4 mm in 1985q3 and averaged 13.3 ^{0}C. The highest temperature was recorded at 18.9 ^{0}C in 1992q1 and was lowest in 1981q3 at 8.0 ^{0}C. The figure shows a highly cyclical rainfall trend with varying peaks and troughs and a more uniform fluctuating temperature trend. Since maize production in Lesotho is rain-fed, such trends in rainfall and temperature can therefore contribute to fluctuating maize production trends (see Chapter 2, Section 2.6). FAO (2016) also found that rainfall in Lesotho is erratic and periods of late or below average rains can be followed by periods of heavy destructive rains that lead to farmers having to replant crops in the same planting season, thereby negatively affecting yields and food security.

During focus group discussions, farmers confirmed the above results by stating that periodic droughts caused by erratic rains and dry spells constrain maize production and results in food insecurity and loss of income. Figure 4.2 below presents a problem tree diagram where 'droughts' is the central problem. As shown in Figure 4.2, farmers sometimes start the planting season later than usual because of late rains and high temperatures which results in low yields and missed business opportunities. Farmers in Leribe said that because of hostile weather conditions (that negatively affect the quality of maize), milling companies reject their produce as it is of poor quality and therefore opt for better quality maize produce imported from South Africa. Such findings are consistent with the work of Ehui (2016) and Salami *et al.* (2010) who found that smallholder farmers are unable to consistently comply with high quality produce standards demanded by food retailers.

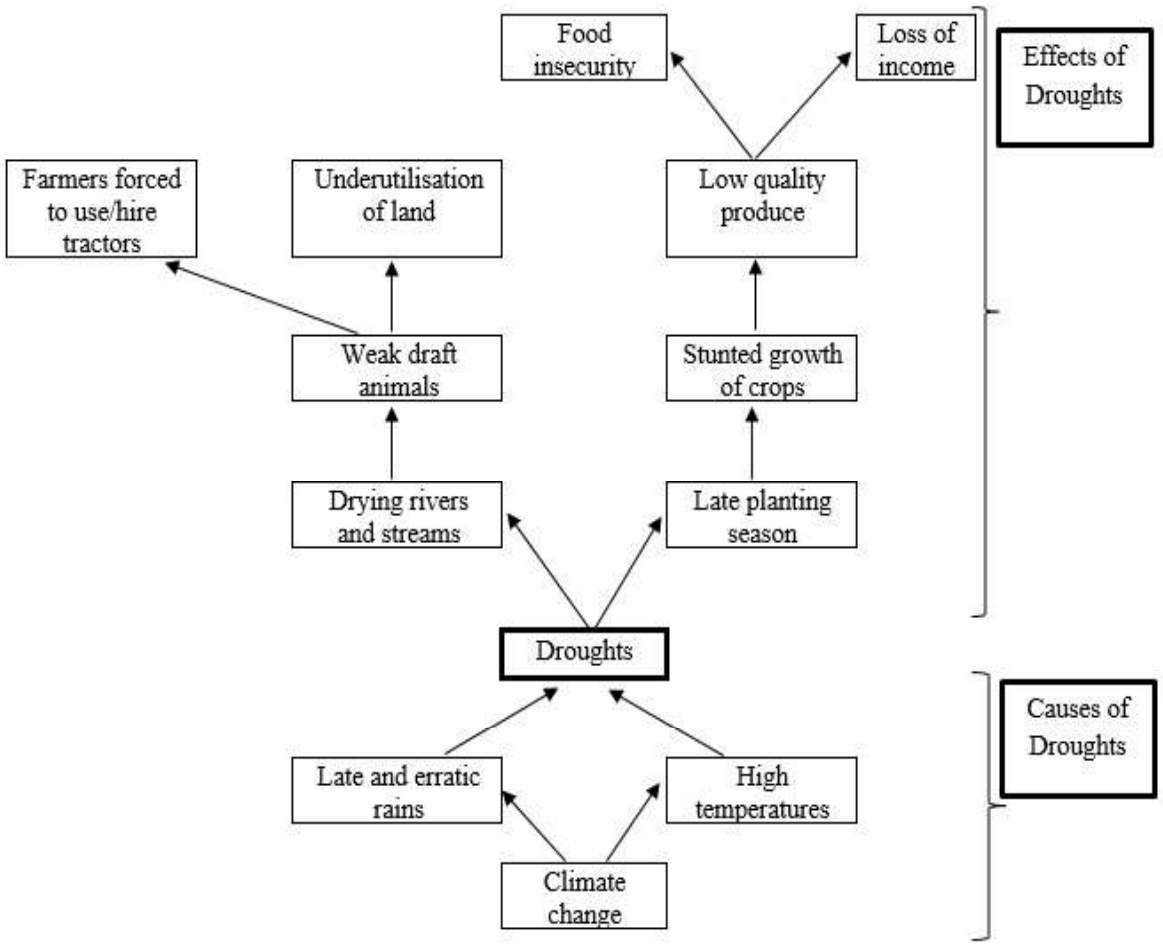

Figure 4.2: Problem tree diagram of the causes and effects of droughts in maize production

Source: Own diagram generated from focus group discussions with farmers and key stakeholder interviews in November and December 2017.

Other effects of droughts as shown in Figure 4.2 include dry rivers and streams which results in weakened draft animals. This leads to underutilisation of agricultural land as farmers are forced to use the little income they have to buy or hire tractors (physical asset) for land preparation. In studying animal traction power on agricultural productivity in Lesotho, Rampokanyo (2012) found that the use of tractors over draft animals in maize production increased total variable costs by 4.3 percent, mainly because of maintenance and fuel costs. Furthermore, during focus group discussions, farmers stated that state owned tractors are not sufficient enough to plough on all the fields as one tractor can be assigned to plough fields for an entire community.

4.3.3 Physical Assets

Due to a general lack of financial income and credit extensions (financial assets), farmers cannot easily acquire and maintain modern farm equipment such as tractors, sprayers and irrigation systems. Typical farm equipment used includes wheelbarrows, hand held hoes for weeding and ox driven planters and trailers. However, through the ICP scheme, the government offers state owned tractor services as well as seeds and fertilisers at subsidised prices to reduce the burden of limited physical assets in production.

As shown in Tables 4.1 and 4.2, limited storage facilities is also a major constraint to maize production. After harvesting, farmers typically designate a room in their houses for storage, however, produce is at a constant risk of being spoiled, which poses a risk to household food security and revenue generated from sale of excess produce. Farmers and key stakeholders interviewed stated that there used to be government silos at district levels in the 1980s and early 1990s where excess produce would be sold. However, such silos were abandoned or privatised after the 1993 elections when the Basotholand Congress Party took office. Currently, farmers have to find other ways of selling their produce which involves selling to community members, government schools and in market areas in towns and cities at lower prices to avoid produce being spoiled. This directly impacts on profitability and the ability to invest back to agricultural production for the following season.

Moreover, lack of road infrastructure (especially in areas hit by severe soil erosion) makes it difficult for farmers to get to their fields during cropping seasons. Also, because of their remoteness, they travel longer distances to get to market places for sale of excess produce and purchase of farm inputs. This finding is consistent with that of Chapagain and Raizada (2017) and (Sipoko, 2014) who found that most smallholder farmers live in remote scattered areas and incur large transaction costs to deliver their produce to markets.

During focus group discussions, famers also stated that production is highly affected by availability of subsidised seeds and fertilisers. Prior to the 1993 elections, government warehouses were placed in districts for easy and timely access of subsidised inputs for farmers. However, following agricultural reforms of the mid 1990s, the government promoted commercialisation of the agricultural sector and encouraged the private sector to participate in distribution of inputs to the entire country (ASS, 2003). Accordingly, under the new storage and delivery system of the National Fertiliser and Input Subsidy Programme, inputs are stored in only one warehouse at Ha-Foso in the Maseru district. Inputs are then transported by delivery

agents to delivery points across the country. However, farmers stated that this storage and delivery system negatively affects their production as they often receive inputs late into the planting season.

Figure 4.3 below presents a problem tree diagram where 'late delivery of inputs' is the central problem. As shown in Figure 4.3, late delivery of inputs as a constraint to smallholder maize production is caused by several factors. These include having one storage facility, long queues, lack of transport infrastructure and long travel distances. While conducting interviews, stakeholders stated that delivery agents have to wait in long queues to get ordered inputs. Furthermore, in remote rural areas, inputs arrive late because of poor transport infrastructure such as dilapidated roads and bridges and long travel distances to reach delivery points.

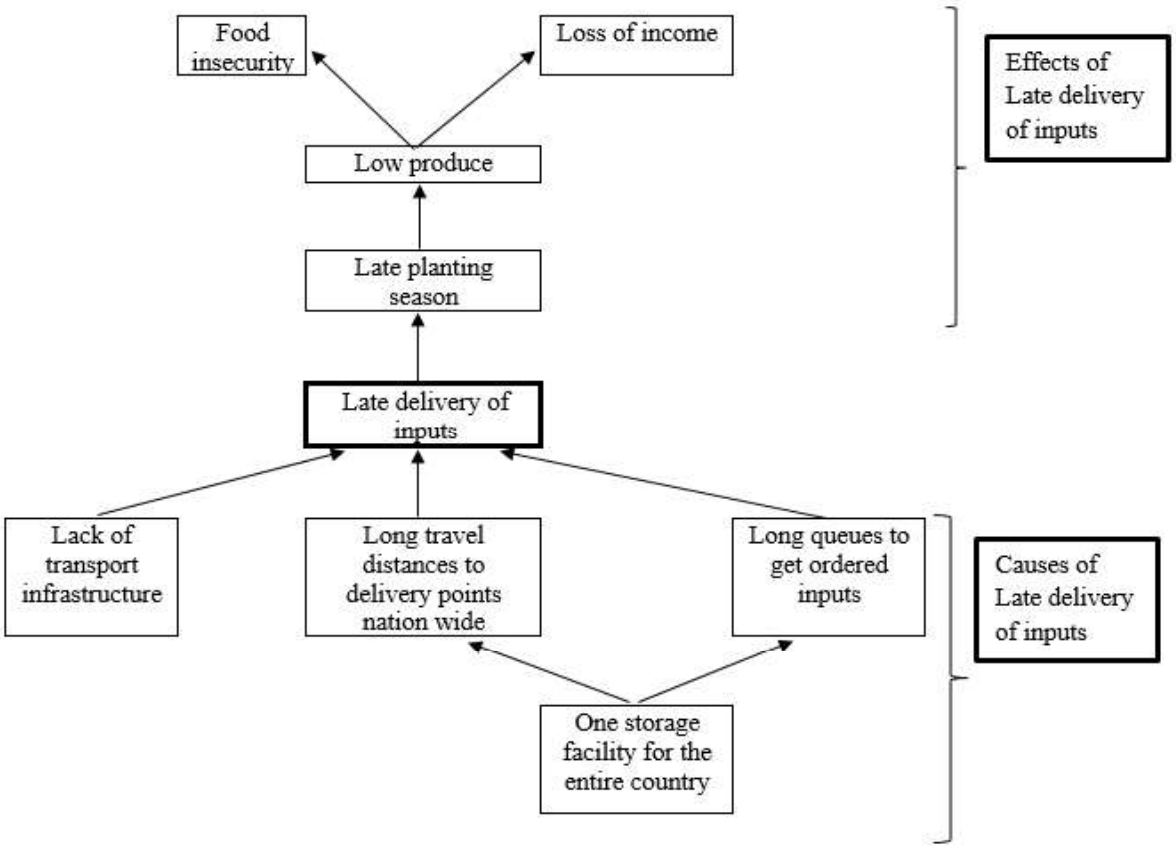

Figure 4.3: Problem tree diagram of the causes and effects of late delivery of inputs in maize production

Source: Own diagram generated from focus group discussions with farmers and key stakeholder interviews in November and December 2017.

However, FAO (2016) found that in some instances, inputs are delivered late to farmers due to complications in procuring (importing) inputs from South Africa. Nevertheless, late delivery

of seeds and fertilisers have several effects on production. Farmers said that in extreme cases, they lose the opportunity to plant in a season as inputs arrive too late into the planting season. These findings are in line with the work of Ulrichs and Mphale (2016) and Molatoli and Xiaoyun (2016) who found that in Lesotho, late delivery of subsidised inputs delays the planting season, and in some cases, farmers get ordered inputs two months into the planting season, thus resulting in low maize yields, increased household food insecurity and loss of potential income.

4.3.4 Human and Social Assets

Farmers stated that production is labour intensive and labour (human capital) is a critical input, vital for weeding, harvesting and selling of excess produce. This is a major challenge as the majority of farmers are old and may not be in good health to work long hours in the fields. Some farmers practice what is called "seahlolo" which is a form of social capital whereby inputs such as land, seeds, ploughs and draft animals are traded or borrowed as per needs of individual farmers. These social networks typically comprise of tight knit groups of farmers, neighbours, friends and relatives who co-depend on each other and therefore save costs by sharing inputs. Famers can also trade harvested produce in exchange for labour (for weeding and harvesting) supplied by community members. However, the practice of labour in exchange for harvested produce is slowly declining as farmers stated that labourers now require cash compensation for their services, but farmers cannot always meet such demands because of limited financial capital.

The existence of close social groups in farming communities does not only increase accessibility of farming tools but also reduces disputes and conflicts. Farmers stated that courts and community chiefs have little influence on maize production as disputes are often solved among themselves or by extension officers. Common disputes include disagreements over field demarcations and fair compensation of farmers whose fields have been destroyed by livestock. In such cases, extension officers intervene by re-measuring fields and mediating compensation of farmers whose crops have been destroyed. Extension officers also train and educate groups of farmers on the use of different kinds of fertilisers and hybrid seeds. Farmers stated that extension officers have equipped them with knowledge about climate change, proper spacing of crops and optimal or recommended mix of manure and fertilisers.

The practice of forming groups has benefited farmers and makes it easy for them to work with extension officers. However, groups are often informal, and information shared is not always linked to market demand and modern farming strategies. Farmers stated that they don't have proper records on market demands and prices as their yields are too erratic. This is consistent with Khapayi and Celliers (2016) and Bienabe *et al.* (2004), who found that smallholder farmers have limited market information and usually rely on other farmers and community members to obtain information that is usually not accurate or certified. Furthermore, because of limited information about prices, farmers have little bargaining power and are desperate to sell their produce because of fear of it being spoiled, especially green millies that can also be sold as a boiled snack. Kheethoa (2017) who is one of the key stakeholders interviewed from the Lesotho National Farmers Union (see Appendix C) stated that farmers should seek to join associations (particularly community-based associations that usually focus on a single product) to obtain reliable market information and training. NAPFS (2006) also found that in Lesotho, smallholder farmers operate individually in market places and have little bargaining power for fair prices. Therefore, joining producer associations or corporatives can increase their bargaining power and return on their investment. Such findings confirm the work of Lowitt *et al.* (2015) and Kumwenda *et al.* (2013) who found that forming groups or associations reduces the cost of acquiring inputs and information necessary to compete in high-value markets and ultimately increase bargaining power.

In relation to agricultural institutions, the Ministry of Agriculture and Food Security, World Vision Lesotho and Food and Agriculture Organisation were identified by farmers as key institutions contributing to maize production. Private enterprises were stated by farmers and key stakeholders to have little influence on production as farmers predominantly get inputs from the government and sell most of their excess produce in informal markets. The Ministry of Agriculture and Food Security promotes production through interventions (policies and support programmes) and extension delivery. World Vision Lesotho and Food and Agriculture Organisation occasionally offer training and input grants such as bags of maize seeds and fertilisers. However, stakeholders argue that institutions providing goods and services to farmers at below economic prices (through subsidies and/or grants) sometimes create a dependency syndrome and a disincentive to productive work. Stakeholders have therefore advised that farmers invest in mixed farming to guarantee year-round income and food security while also reducing their dependency on agricultural institutions. Mokuoane (2017) who is one of the key stakeholders interviewed (see Appendix C) stated that "smallholder maize farmers

must invest in maize and dairy cow mixed farming". In so doing, income generated from the sale of milk can be used to purchase inputs such as seeds and fertilisers for maize production, and in turn, crushed stovers can be fed to cattle during peak dry seasons.

4.4 Maize Productivity and Productivity Growth

In respect to the DFID sustainable livelihood framework, maize productivity trends represent "seasons" which form part of the vulnerability context in which farmers have little control over. Findings on maize productivity and productivity growth using data from the Lesotho Bureau of Statistics are presented.

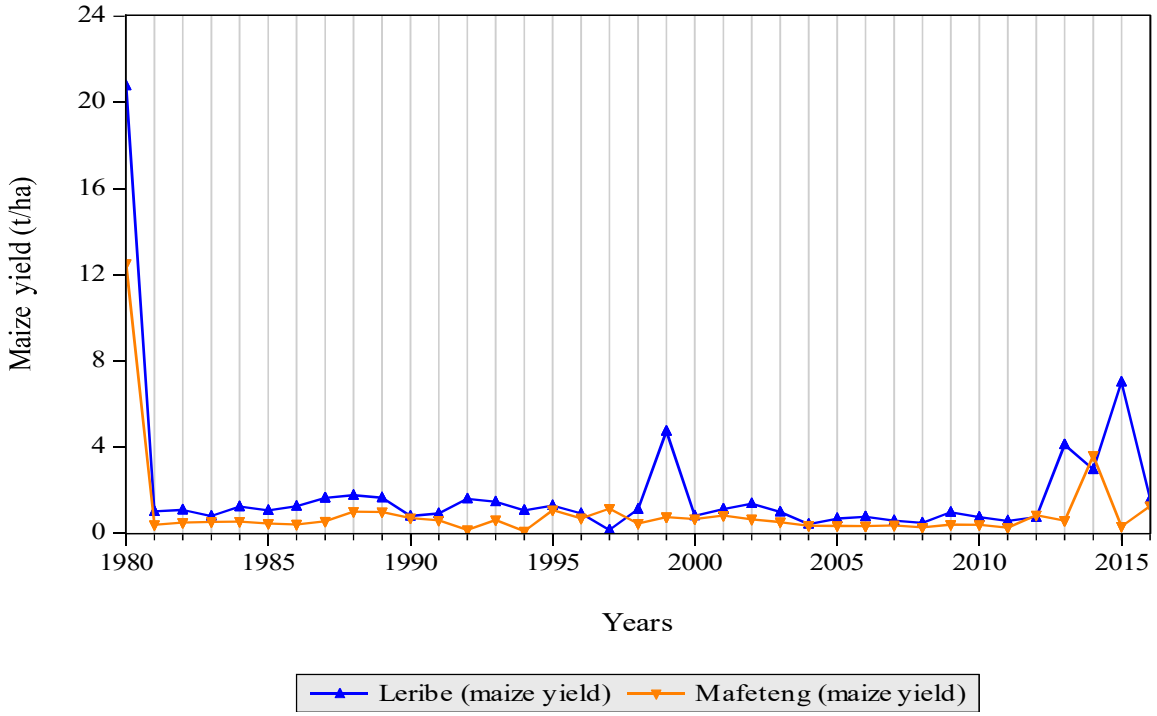

Figure 4.4: Maize productivity in Leribe and Mafeteng (1980-2016)

Source: Own calculations sourced from LBOS (2017).

Figure 4.4 shows that productivity in both districts has been low and constant, except for the periods 1994-2000 and 2011-2016 which show fluctuating productivity. Maize productivity in Leribe averaged 1.9 t/ha and was highest in 1980 at 20.8 t/ha and lowest in 1997 at 0.1 t/ha. In Mafeteng, productivity averaged 0.96 t/ha and recorded the highest productivity in 1980 at 12.5 t/ha and the lowest in 1994 at 0.1 t/ha.

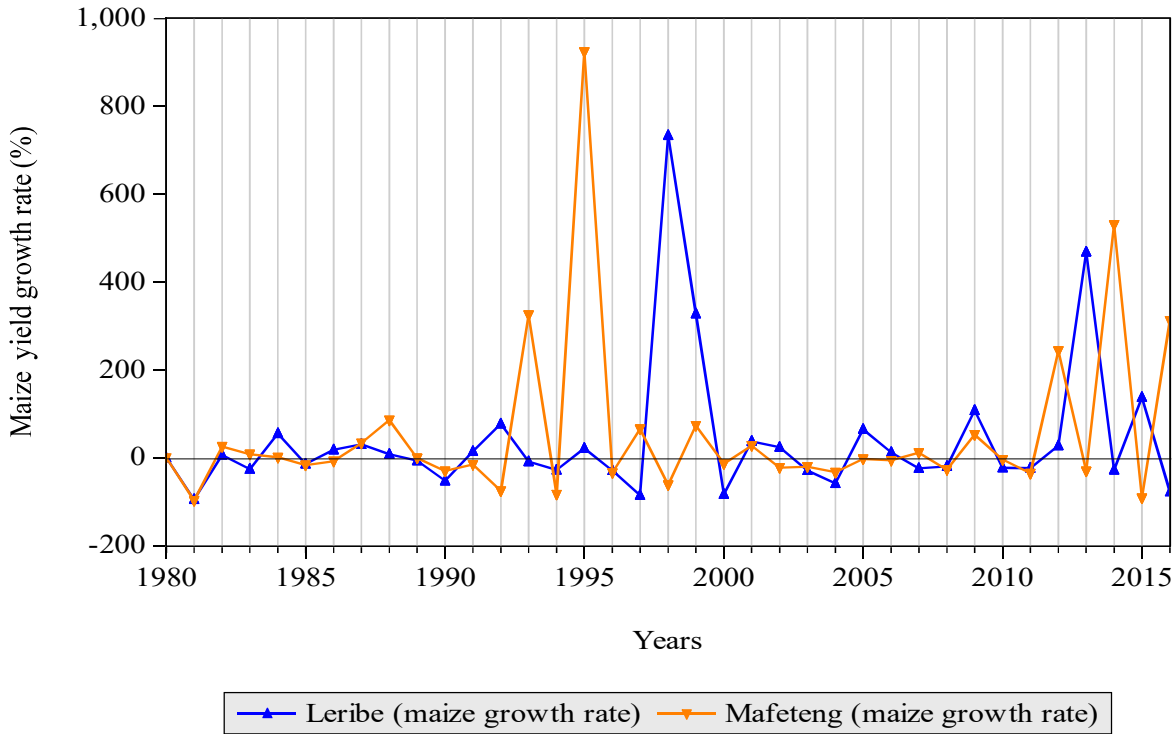

Figure 4.5: Maize productivity growth in Leribe and Mafeteng (1980-2016)

Source: Own calculations sourced from LBOS (2017).

Figure 4.5 shows that maize productivity growth also exhibited fluctuating trends in both districts, particularly during the periods 1994-2000 and 2011-2016. Leribe recorded the highest productivity growth rate in 1998 at 734 percent and the lowest in 1980 at -95.2 percent. Mafeteng on the other hand recorded the highest productivity growth rate in 1995 at 925 percent and the lowest in 1980 at -96.9 percent. Productivity growth averaged 39.57 percent and 54.43 percent in Leribe and Mafeteng, respectively.

As stated in Chapter 2, Section 2.4, the government of Lesotho embarked on agricultural policy reforms during the period 1995-1999 which included the deregulation of the grain market, revaluation of agricultural subsidies and abandoning the food self-sufficiency in major crops. Fluctuating trends shown in both productivity and productivity growth of maize during the period 1994-2000 can therefore be attributed to the 1995-1999 policy reforms as maize was one of the major crops affected by such reforms (ADF, 2006).

Fluctuations during the period 2011-2016 on the other hand were caused by the 2011 floods and 2015/2016 El Nino drought as well as the implementation of the SADP and the ICP Scheme in 2012. The 2011 floods and 2015/2016 drought contributed to decreases in productivity as the 2011 floods damaged field crops and destroyed road infrastructure while the 2015/2016

drought negatively affected rain-fed maize production and led the country to declare a state of emergency due to national food insecurity (FAO, 2016; WTO, 2015). In contrast, the SADP and the ICP Scheme increased productivity by improving market access and increasing availability of inputs to farmers (World Bank, 2017a; Ulrichs and Mphale, 2016; WTO, 2015). This shows that the government is responsive in periods of national food insecurity caused by external shocks that are outside of farmers' control. Moreover, results on the negative impact of droughts and floods in this study are consistent with those of LBOS (2015) and Mekbib *et al.* (2011) who found that erratic rains are one of the main climatic factors influencing maize productivity in Lesotho as production is closely associated with the uneven nature of rainfall. Mairiga (2014) also found that in Nigeria, droughts and floods cause fluctuating productivity and productivity growth rates of maize; while Barron *et al.* (2003) found that erratic rains and dry spells contributed to fluctuating maize yields in the Republic of Zambia.

4.5 Farmers' Perceptions on the influence of Agricultural Support Programmes on their Livelihoods

During focus group discussions, farmers expressed their perceptions on the four support programmes i.e the National Fertiliser and Input Subsidy Programme, the Smallholder Agricultural Development Programme, the National Block Farming Programme, and the Integrated Watershed Management Programme (as discussed in Chapter 2, Section 2.8) and how they influence their livelihoods by addressing production constraints and improving the use of livelihood assets. The National Fertiliser and Input Subsidy Programme and the Smallholder Agricultural Development Programme were identified by farmers as the most beneficial programmes to their livelihoods. In contrast, the National Block Farming Programme and the Integrated Watershed Management Programme were identified as least beneficial to farmers' livelihoods. Findings of how these programmes are beneficial/not beneficial to farmers are presented in the sections below.

4.5.1 National Fertiliser and Input Subsidy Programme

During focus group discussions, farmers said that the National Fertiliser and Input Subsidy Programme is very beneficial. They said that the programme improves their production of maize in two ways: i) they are able to get quality seeds and fertilisers at cheaper prices (which they cannot get anywhere else); ii) hybrid seeds included in the programme are more drought

tolerant and they can relatively get more yields from such seeds during periods of droughts. The programme therefore addresses the constraints of limited access to inputs and financial capital (see Table 4.1 and 4.2) and through the programme, they can increase their area planted and produce more maize resulting in attainment of household food security and increases in income. However, as mentioned in Section 4.3, the programme creates additional constraints on production due to late delivery of seeds and fertilisers. Wiggins *et al.* (2010) found that the retreat of state intervention to allow the private sector to take more responsibility in supplying inputs causes market failures and more problems to small farms than large farms. Livington *et al.* (2011) found that in Sub-Saharan Africa, late delivery of fertilisers to farmer's field is a common characteristic of fertiliser subsidy programmes.

This study also found that the programme saturates the maize seed market as most smallholder farmers selling seeds cannot compete with high quality hybrid seeds (imported from South Africa) sold through the subsidy programme. Thus, most smallholder farmers can only sell maize on the cob for consumption and not seeds for planting. Furthermore, local seed producers sometimes compete against their own products in the market. This occurs because the government only buys a fixed amount of seed bags (at market prices) from local seed producers and sells them through the subsidy programme at subsidised prices. Local seed producers therefore struggle to sell (at market prices) the remaining seed bags not bought by the government. FAO (2016) also found that the input subsidy programme dominates the seed sub-sector and acts as a barrier to entry in the seed market. Figure 4.6 below shows a picture taken during data collection. The picture shows the local maize seed product sold through the subsidy programme.

Figure 4.6: Local maize seed (ZM521) sold by the government through the subsidy programme

Source: Picture taken during data collection in Maputsoe, Leribe district on the 22nd November 2017.

4.5.2 Smallholder Agricultural Development Programme

Farmers stated that the Smallholder Agricultural Development Programme (SADP) is beneficial to their livelihoods because of the opportunity to engage in agri-business projects. The programme offers grants to farmers to engage in development programmes aimed at increasing market access and competitiveness of smallholder farmers. Mpholle (2017) who is one of the key stakeholders interviewed from the Smallholder Agricultural Development Project (see Appendix C) stated that the SADP has built piggeries, fowl runs and green houses for farmers and through capacity building programmes, smallholder farmers are expected to generate enough income to sustain their livelihoods and graduate to commercial farming. Dorward and Chiwa (2011) argues that apart from sales revenue, having other sources of cash resources is crucial in smallholder production as smallholder farmers can find themselves consuming most of their produce because of low yields and thus being unable to generate any income from surplus sales. Chamberlin (2008) therefore states that designing agricultural interventions aimed at creating multiple income streams through farmer-market linkages can lead to an agricultural modernisation effect on smallholder farmers.

Accordingly, farmers in both Leribe and Mafeteng stated that excess income generated through agri-business projects is invested in maize production. Therefore, maize production inputs such as seeds, fertilisers and tools can be bought using proceeds from agribusiness projects. The SADP therefore addresses the constraints of limited financial capital and limited market access (see Tables 4.1 and 4.2). However, observations during data collection as well as comments from farmers and stakeholder showed that not all projects have been successful as grants have been extended to incompetent farmers that are not familiar with running businesses. This consequently leads to a waste of government resources and missed opportunities of farmers expanding their production of maize. Figure 4.7 below shows a dilapidated greenhouse from a failed project (producing vegetables such as cabbages and tomatoes) that lasted for no longer than four years and was funded by the SADP.

Figure 4.7: Failed greenhouse project funded by the SADP in Ts'akholo, Mafeteng district

Source: Picture taken during data collection in T'sakholo, Mafeteng district on the 14th November 2017.

4.5.3 National Block Farming Programme

The National Block Farming Programme is a sharecropping system between field owners and the government. The government incurs all production costs except for land and labour which is supplied by field owners and output is shared on a ratio of 60 percent to the government and 40 percent to field owners. The programme aims to scale-up production by addressing the constraints of limited financial capital and farming inputs (see Tables 4.1 and 4.2) to resource-poor farmers that cannot afford to plant their own fields. During focus group discussions, farmers stated that implementation of the National Block Farming Programme is inconsistent and thus regard the programme as unreliable. In 4 out of the 10 sites studied (Ramokoatsi, Ts'akholo, Linotsing and Tale) farmers stated that they continually benefit from the programme. In the remaining 6 sites (Kolo, Matelile, Mosala, Mahobong, Maputsoe, Khabo), farmers stated that implementation of the programme was stopped and in some instances, the programme was implemented once. For this reason, farmers are convinced that the programme is unreliable and its geographical targeting criteria is politically motivated. Such findings support the work by Ulrichs and Mphale (2016), who found that the National Block Farming Programme is not attractive to most smallholder farmers and that farmers believe they are better off cultivating fields on their own. Farmers therefore have to rely on social networks through the practice of "seahlolo" to operate on uncultivated fields.

4.5.4 Integrated Watershed Management Programme

The programme aims to reverse environmental degradation and increase household income. However, farmers in Kolo, Matelile and Tale believe that the programme is biased towards certain areas as they have to travel to neighboring areas to be enrolled in the programme yet they experience environmental degradation in their own areas. Farmers believe that the bias of the programme is caused by politicians who favour areas where they have a large political following and neglect other areas. In respect to maize production, farmers stated that the programme has the least impact on maize production as environmental shocks such as soil erosion caused by land degradation currently has little impact on their production of maize.

4.6 Summary

The chapter has presented results and findings on factors influencing maize production in Lesotho focusing on production constraints, livelihood assets and support from agricultural

programmes. Trends analysis showed fluctuating maize productivity and productivity growth rates in the study areas. External shocks in the form of dry spells and cyclical rainfall as well as the implementation of the SADP and the ICP scheme are argued to have contributed to the recent fluctuations in maize productivity trends. Findings on the use of livelihood assets in maize production showed that farmers rely more on human and social capital and that droughts and late delivery of inputs are the chief constraints in producing maize.

The chapter also presented farmers' perceptions on how selected agricultural programmes influence their livelihoods by addressing production constraints and improving the use of livelihood assets. Farmers stated that the National Fertiliser and Input Subsidy Programme is beneficial to their livelihoods because of reduced input prices. However, group discussions and stakeholder interviews highlighted the short comings of the programme which includes late delivery of inputs and monopolisation of the formal seed market. Nevertheless, the programme directly addresses the constraints of limited access to inputs and financial capital which allows farmers to cheaply maintain production levels during periods of droughts. The SADP was also identified as beneficial by farmers. The programme addresses the constraints of limited financial capital and limited access to formal markets by providing farmers with the opportunity to engage in agri-business projects. This programme is beneficial as income generated from agri-business projects is invested in producing maize. The National Block Farming Programme and the Integrated Watershed Management Programme were found to be the least beneficial programmes to farmers' livelihoods. Interventions of these programmes were infrequent and in some cases once off. Moreover, farmers believe that the programmes are biased in their geographical targeting criteria as selection of farming communities is based on political interests.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The prime objective of this study was to investigate the role played by agricultural programmes on the livelihoods of smallholder maize farmers in Lesotho. This was achieved by addressing three sub-goals: i) investigating the availability and use of livelihood assets in maize farming; ii) analysing the trend of maize productivity and productivity growth after implementation of agricultural support programmes; and iii) investigating farmers' perceptions on the influence of agricultural support programmes on their livelihoods. The study used the DFID sustainable livelihood framework as a conceptual guide to aid the investigation of factors influencing the livelihoods of smallholder maize farmers in Lesotho.

The study is qualitative design dominant, employing a pragmatic paradigm following a sequential explanatory strategy for mixed methods. Secondary quantitative results in the form of trend analysis was done with the aid of the E-views statistical software. Primary qualitative data was collected by way of conducting focus group discussions and key stakeholder interviews, using non-quantifying methods of detextualising data into matrices and network diagrams.

5.2 Conclusions and Recommendations

Quantitative results showed highly cyclical rainfall trends which are argued to constrain maize production and contribute to fluctuating productivity and productivity growth of maize. Farmers identified several other constraints in producing maize, however, two major constraints, namely, droughts and late delivery of subsidised caused several other constraints such as weak draft animals, late planting seasons and stunned growth of crops. Findings from focus group discussions showed that farmers have more access to human and social assets. Financial, natural and physical assets were found to be less accessible to farmers and thus limiting their production of maize.

The National Fertiliser and Input Subsidy Programme and the Smallholder Agricultural Development Programme were found to be beneficial to farmers' livelihoods. These programmes are consistent with the sustainable livelihood theory as they address constraints in production and maximise the acquisition of limited livelihood assets, thereby allowing farmers

to achieve their livelihood goals in maize production. The National Block Farming Programme and the Integrated Watershed Management Programme were considered the least beneficial programmes and biased in their geographical selections. These programmes can therefore be argued to be inconsistent with the sustainable livelihood theory as non-participation of farmers and biased geographical targeting suggests that the programmes are not people-centred and thus do not place farmers' needs at the heart of intervention processes.

Furthermore, findings in this study showed that there is no government programme that primarily aims to address climate variability which has been argued to have adverse effects on rain-fed maize production. It is therefore recommended that the government invest in climate adaptation programmes such as conservation agriculture (CA) and educate smallholder maize farmers on conservation practices such as minimum/zero tillage, soil cover (by crop residue) and appropriate crop rotation to incentivise farmers to consider CA strategies in maize production.

Furthermore, it is recommended that additional warehouses or storage facilities be built in districts that produce more maize than others in Lesotho. In doing so, districts that produce more maize would then supply subsidised inputs to districts that produce less maize. In Chapter 3, Section 3.2, it was found that Leribe and Mafeteng are some of the highest maize producing districts in Lesotho. Therefore, building warehouses or storage facilities in these districts would mean farmers in neighbouring districts would travel shorter distances to get inputs. Bringing inputs closer to farmers in this way will save time and reduce transport costs and will also enable farmers to start planting in time. It is recommended that the SADP revise its screening process and offer training to farmers on how to manage funds to avoid extending grants to incompetent farmers in the future. Nevertheless, it is advised that the government of Lesotho invest more in scale-specific interventions such as the SADP that are designed to specifically target smallholder farmers. Such programmes reduce marginalisation of smallholder farmers and efficiently allocate resources to target populations. Accordingly, it is recommended the SADP programme be extended beyond the 2018 agricultural year.

It is also recommended that the National Block Farming Programme and the Integrated Watershed Management Programme revise their framework in relation to monitoring and evaluation. Strengthening current monitoring and evaluation systems by focusing on grievances of farmers affected by interventions will give feed-back on whether the programmes

are improving the livelihoods of farmers and will lead to fair and effective interventions in the future.

Farmers should be encouraged to put more effort in adapting new technologies and taking initiatives to seek ways of increasing accessibility of limited livelihood assets in areas where interventions has failed. It is advised that farmers save extra seeds as a contingent or precautionary strategy for possible late arrival of seeds from the subsidy programme in the following planting season. Furthermore, farmers should invest more in crop and livestock mixed farming to secure year-round income and food security. Lastly, it is recommended that farmers form or join community associations that are linked to formal markets to improve production of maize. In this study, it can be argued that associations reduce costs for individual farmers, promote sharing of accurate information and even increase chances to getting loans from financial institutions. With such benefits from associations, farmers can then invest in water management projects such as building irrigation systems and water reservoir infrastructures to reduce dependency on rainfall, reduce productivity fluctuations and ultimately increase their competitiveness in formal markets.

5.3 Limitations and Areas of Further Research

Time and financial resources were the chief constraints experienced in this study. Qualitative data was collected by way of conducting focus group discussions and key stakeholder interviews where sample sizes were determined by the principle of saturation, which means that data collection was stopped when additional data yielded no further interpretive value. Nevertheless, findings in this study would have been more revealing if face-to-face interviews were conducted and econometric analysis done to analyse the impact of support programmes on livelihood outcomes such as income generated from maize production (and accordingly, expenditure on purchasing farming inputs) and the amount of maize produced in farming households. Furthermore, the study would have been more robust if least maize producing districts in the highlands were also studied to assert and compare the role of agricultural programmes on the livelihoods of smallholder maize farmers in all ecological zones of Lesotho.

REFERENCES

Adato, M., and Meinzen-Dick, R. 2003. Assessing the impact of agricultural research on poverty and livelihoods. *Quarterly Journal of International Agriculture* 42 (2):149-166.

Afenyo, J.S. 2012. Making small scale farming work in Sub-Saharan Africa. Global Forum on Food Security and Nutrition Forum, FAO.

African Development Fund (ADF), 2006. Kingdom of Lesotho agricultural sector adjustment programme. Report for the Agriculture and Rural Development Department North, East and South (ONAR), June 2006.

Agricultural Sector Strategy (ASS), 2003. Ministry of Agriculture and Food Security. Government of Lesotho.

Alaska PFS, 2016. Conducting key stakeholder interviews. Alaska Partnership for Success. [Online]. Available: http://www.iser.uaa.alaska.edu/Projects/pfs/docs/Conducting%20Key%20Stakeholder%20Interviews.pdf [Accessed 02 January 2018].

Annor-Frempong, I.E. 2008. The national agricultural research system in Lesotho: Situation analysis. Implementation and Coordination of Agricultural Research and Training (ICART) in the SADC region. SADC Food and Natural Resource Directorate and the European Union Commission.

Anyaegbunam, C., Mefalopulos, P., and Moetsabi, T. 2004. Participatory rural communication appraisal. Starting with the people. FAO

Armitage, A. 2007. Mutual research designs: Redefining mixed methods research design. Paper presented at the British Educational Research Association Annual Conference, Institute of Education, University of London, 5-8 September. [Online]. Available: www.leeds.ac.uk/educol/documents/167799.doc [Accessed 21 September 2017].

Arun, S., Heeks, R., and Morgan, S. 2004. Researching ICT-based enterprise for women in developing countries: A livelihoods perspective. [Online]. Available: https://assets.publishing.service.gov.uk/media/.../R8352-LivelihoodsResearch.pdf [Accessed 17 September 2017].

Baloyi, J.K. 2010. An analysis of constraints facing smallholder farmers in the agribusiness value chain: A case study of farmers in the Limpopo Province. Unpublished MSc thesis, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria.

Barrette, C.B., Carter, M.R., and Timmer, C.P. 2010. A Century-long perspective on agricultural development. *American Journal of Agricultural Economics* 92 (2): 447-468.

Barron, J., Noel, S., Malesu, M., Oduor, A., Shoe, G., and Rockstrom, J. 2008. Agricultural water management in smallholder farming systems: The value of soft components in mesoscale interventions. Stockholm Environment Institute (SEI) project report.

Barron, J., Rockstrom, J., Gichuki, F., and Hatibu, N. 2003. Dry spell analysis and maize yields for two semi-arid locations in East Africa. *Agricultural and Forestry Meteorology* 117 (1): 23-37.

Barrows, C.W. 2000. An exploratory study of food and beverage training in private clubs. *International Journal of Contemporary Hospitality Management* 12 (3): 190-197.

Barrows, R., and Roth, M. 1990. Land tenure investment in African agriculture: Theory and evidence. Madison, WI: Land Tenure Center.

Baumgartner, T.A., Strong, C.H., and Hensley, L.D. 2002. Conducting and reading research in health and human performance (3ed.). New York: McGraw-Hill.

Belt, J., Kleijn, W., Chibvuma, P., A., Mudyazvivi, E., Gomo, M., Mfula., C., …, and Boafo, K. 2015. Market-based solutions for input supply: making inputs accessible for smallholder farmers in Africa. KIT Working Papers. [Online]. Available: http://www.snv.org/public/cms/sites/default/files/explore/download/snv-kit_wps_5-2015-web.pdf [Accessed 21 December 2017].

Bezu, S., and Holden, S. 2008. Can food-for-work encourage agricultural production? *Food Policy* 33 (6):541-549.

Bienabe, E., Coronel C., Coq, J., and Liagre, L. 2004. Linking smallholder farmers to markets: Lessons learned from literature review and analytical review of selected projects. Study Report Final draft, March 2004. CIRAD & IRAM. World Bank.

Boyce, C., and Neale, P. 2006. Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input. Pathfinder international, tool series monitoring and evaluation II.

Braithwaite, J., Hindle, D., Finnegan, T.P., Graham, E.M., Degeling, P.J., and Westbrook, M.T. 2004. How important are quality and safety for clinician managers? Evidence from triangulated studies. *Clinical Governance: An International Journal* 9 (1): 34-41.

Breen, R.L. 2006. Practical guide to focus-group research. *Journal of Geography in Higher Education* 30 (3): 463-475.

Cairns, J., Hellin, J., Sonder, K., Araus, J.L., MacRobert., J.F., Christian, T., and Prasanna, B.M. 2013. Adapting maize production to climate change in sub-Saharan Africa. *Food Security* 5(3): 345-360.

Carney, D., Neefjes, K., Wanmali, S., and Sigh, N. 1999. Livelihoods approaches compared. Department for International Development (DFID). [Online]. Available: www.start.org/Program/advanced_institute3_web/p3_documents.../Carney_etal.pdf [Accessed 17 October 2017].

Central Bank of Lesotho (CBL), 2018. Macroeconomic statistics. [Online]. Available on: https://www.centralbank.org.ls/index.php/statistics/macroeconomic-statistics [Accessed 20 February 2018].

Central Bank of Lesotho (CBL), 2012. Lesotho's 2011/2012 crop forecasting: Lesotho's food security is under threat. Economic Review. No. 139, February. [Online]. Available: http://www.centralbank.org.ls/publications/MonthlyEconomicReviews/2012/February%20economic%20review.pdf [Accessed 17 March 2017].

Chamberlin, J. 2008. It's a small world after all: Defining smallholder agriculture in Ghana. Discussion Paper 00823. Development Strategy and Governance Division.

Chambers, R., and Conway, G.R. 1991. Sustainable rural livelihoods: Practical concepts for the 21st Century. IDS Discussion Paper 296.

Chapagain, T., and Raizada, M.N. 2017. Agronomic challenges and opportunities for smallholder terrace agriculture in developing countries. Frontiers in Plant Science [Online]. Available: https://www.frontiersin.org/articles/10.3389/fpls.2017.00331/full [Accessed 17 January 2018].

Chirigo, K.C. 2014. An analysis of the economic competitiveness of green maize production in smallholder irrigation schemes: A case of Makhathini flats irrigation scheme in KwaZulu-Natal, South Africa. Unpublished Msc thesis, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal.

Colucci, E. 2007. Focus groups can be fun: The use of activity-oriented questions in focus group discussions. *Qualitative Health Research* 17 (10):1422-1433.

Crosby C.T., De Lange, M., Stimie, C.M., and Van Der Stoep, I. 2000. A review of planning and design procedures applicable to small-scale farmer irrigation projects. WRC Report No. 578/2/00. Water Research Commission, Pretoria. 241pp.

Creswell, J.W. 2014. Research design: Qualitative, quantitative and mixed methods approaches (4ed). California, USA: SEGE Publications, Inc.

Creswell, J.W. 2009. Research design: Qualitative, quantitative and mixed methods approaches (3ed). California, USA: SEGE Publications, Inc.

Creswell, J.W., Plano Clark, V.L., Gutmann, M.L., and Hanson, W.E. 2003. Advanced mixed methods research designs. In Tashakkori, A., and Teddlie, C. (Eds.), Handbook of mixed methods in social and behavioral research (pp. 209–240). Thousand Oaks, CA: Sage.

Darroch, M.A.G., and Mushayanyama, T. (2006). Improving working relationships for smallholder farmers in formal organic crop supply chains: Evidence from KwaZulu-Natal, South Africa. *Agrekon* 45(3): 339-360.

Daryanto, S., Wang L., and Jacinthe, P. 2016. Global synthesis of drought effects on maize and wheat production. PLOS one. [Online]. Available: https://doi.org/10.1371/journal.pone.0156362 [Accessed 19 December 2017].

Dearden, P., CIDT., Jones, S., and Sartorius, R. 2002. A handbook for those in development activity. Department for International Development. Tools for Development. Version 15 September 2002.

De Lange, M. 1994. Small scale irrigation in South Africa. Water Research Commission. Report 578/1/94, Pretoria.

Denning, G., Kabambe, P., Sanchez, P., Malik, A., Flor, R., Harawa, R., …, and Sachs, J. 2009. Input subsidies to improve smallholder maize productivity in Malawi: Toward an African green revolution. PLoS Biology, 7(1), e23. [Online]. Available: http://doi.org/10.1371/journal.pbio.1000023 [Accessed 08 February 2018].

Department of Agriculture, Forestry and Fisheries (DAFF), 2012. A framework for the development of smallholder farmers through cooperatives development, South Africa.

Department for International Development (DFID), 1999. Sustainable livelihood guidance Sheets. Department for International Development. [Online]. Available: http://web.archive.org/web/20070202034518/http://www.livelihoods.org:80/info/guidance_sheets_pdfs/section1.pdf [Accessed 08 October 2017].

Dorward, A., and Chirwa, E. 2011. The Malawi agricultural input subsidy programme: 2005/06 to 2008/09. *International Journal of Agricultural Sustainability* 9 (1): 232-247.

Du Plessis, F.J., Van Averbeke, W., and Van Der Stoep, I. 2002. Micro-irrigation for smallholders: Guidelines for funders, planners, designers and support staff in South Africa. WRC Report TT 164/01. Water Research Commission, Pretoria. 68pp.

Easterling, W.E., Aggarwal, P.K., Batima, P.K.M., Brander, K.M., Erda, L., Howden, S., …, and Tubiello, F.N. 2007. Food, fibre and forest products. Climate change 2007: Impacts, adaptation and vulnerability. Cambridge University Press, Cambridge, UK, 273-313.

Ehui, S. 2016. How can we help smallholder farmers seize opportunities in Africa? Africa can end poverty. The World Bank. [Online]. Available: https://nl4worldbank.org/2016/12/19/how-can-we-help-smallholder-farmers-seize-opportunities-in-africa/ [Accessed 17 December 2017].

Etikan, I., Abubakar, S., and Alkassim, R.S. 2016. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics* 5 (1): 1-4.

Feder, G., and Noronha, R. 1987. Land rights systems and agricultural development in Sub-Saharan Africa. *The World Bank Research Observer* 2 (2): 143-69.

Fenske, J. 2011. Land tenure and investment incentives: Evidence from West Africa. *Journal of Development Economics* 95 (2):137–156.

Food and Agriculture Organisation (FAO), 2016. Seed security assessment. Response to the draught related to El Nino.

Food and Agriculture Organisation (FAO), 2012. Smallholders and family farms, Sustainable Pathways. [Online]. Available: www.fao.org/fileadmin/templates/nr/sustainability.../Factsheet_SMALLHOLDERS.pdf [Accessed 15 December 2017].

Food and Agriculture Organisation (FAO), 2009. How to feed the world in 2050. Forum background document. Rome 12-13 October 2009.

Food and Agriculture Organisation (FAO), 2005. Lesotho water report 29. [Online]. Available: http://www.fao.org/nr/water/aquastat/countries_regions/LSO/ [Accessed 30 December 2017].

Fusch, P.I., and Ness, L.R. 2015. *The Qualitative Report* 20 (9): 1408-1416.

Garcia, M., and Moore, C.M.T. 2012. The cash dividend: The rise of cash transfer programs in Sub-Saharan Africa. Washington DC: The World Bank.

Global Environmental Facility (GEF), 2016. GEF small grants program – Lesotho. Country Program Strategy for OP6. Global Investment Faculty.

Gollin, D. 2014. Smallholder agriculture in Africa: An overview and implications for policy. International Institute for Environment and Development, Working paper. IFED, London.

Groupe AGECO, 2015. Is government intervention in agriculture still relevant in the 21st century? Final report presented to Union Des Producteurs Agricoles October 2015, France.

Hazell, P., Poulton, C., Wiggins, S., and Dorward, A. 2007. The Future of small farms for poverty reduction and growth. International Food Policy Research Institute (IFPRI) 2020 Discussion Paper 42, May 2007. Washington D.C.

Hennink, M.M. 2014. Focus group discussions: Understanding qualitative research. New York: Oxford University Press.

International Food Policy Research Institute (IFPRI), 2005. The future of small farms: Proceedings of a research workshop, Wye, UK, June 26-29, 2005. Washington, DC.

International Fund for Agricultural Development (IFAD), 2011. Smallholders can feed the world. Rome: IFAD.

International Fund for Agricultural Development (IFAD), 2010. New realities, new challenges: New opportunities for tomorrow's generation. Rural poverty report 2011, IFAD, Rome.

International Fund for Agricultural Development (IFAD), 2009. Smallholder farming in transforming economies of Asia and the Pacific: Challenges and opportunities. Discussion paper prepared for thirty-third session of IFAD's Government Council, February 2009.

International Institute of Tropical Africa (IITA), 2017. Maize- SARD-SC support to agricultural research for development to strategic crops in Africa. [Online]. Available: http://www.iita.org/search_gcse/?q=maize [Accessed 27 December 2017].

International Monetary Fund (IMF), 2008. Kingdom of Lesotho: Selected issues and statistical appendix. IMF country report No. 08/135.

Ivankova, N.V., Creswell, J.W., and Stick, S.L. 2006. Using mixed-methods sequential explanatory design: From theory to practice. *Field Methods* 18(1):3–20.

Jayne, T.S., and Rashid, S. 2013. Input subsidy programs in sub-Saharan Africa: A synthesis of recent evidence. *Agricultural Economics* 44(6): 545-734.

Jowah, E.V. 2009. Rural livelihoods and food security in the aftermath of the fast track land reform in Zimbabwe. Unpublished MSc thesis, Department of Sociology, Rhodes University.

Karodia, M.A. 2014. Chayanov's "development theory" and Colin Bundy's "African peasantry": Relevance to contemporary development and agricultural discourse. *International Journal of Development and Sustainability* 3 (7):1410-1437.

Kawa, I.H., and Kaitira, L.M. 2007. Enhancing smallholder's market competitiveness in Tanzania. Food policy for developing countries: The role of government in the global food system. Case study H (6-7).

Khapayi, M., and Celliers, P.R. 2016. Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the King William's Town area of the Eastern Cape Province, South Africa. *South African Journal of Agricultural Extension* 44 (1): 25-41.

Kheethoa, J.K. 2017. Project coordinator. Maseru district: Lesotho National Farmers Union. Key stakeholder interview. 30 November.

Kibirige, D. 2013. The impact of human dimensions on smallholder farming in the Eastern Cape Province of South Africa. Unpublished PhD thesis, Department of Agricultural Economics and Extension, University of Fort Hare.

Kloeppinger-Todd, R., and Sharma, M. 2010. Innovations in rural and agricultural finance. Focus 18, Brief 1-14. Washington DC.

Kollmair, M., and Gamper, S.T. 2002. The sustainable livelihood approach. Input paper for the Integrated Training Course of NCCR North-South. Development Study Group. University of Zurich.

Krueger, R.A., and Casey, M.A. 2000. Focus groups. A practical guide for applied research (3ed.). Thousand Oaks, CA: Sage.

Kumar, k. 1989. Conducting key informant interviews in developing countries. Agency for International Development. Program Design and Evaluation Methodology Report no. 13.

Kumwenda, W.W., Botha, B., and Mclean, S. 2013. Promoting empowerment and knowledge through smallholder farmers' associations in Malawi. Conference Paper, 15-16 April 2013 Dublin, Ireland.

Lahiff, E., and Cousins, B. 2005. Smallholder agriculture and land reform in South Africa. *IDS Bulletin* 36(2): 127-31.

Leitao, B.J., and Vergueiro, W. 2000. Using the focus group approach for evaluating customers' opinions: The experience of a Brazilian academic library. *New Library World 101* (2) 60-65.

Lesotho Agricultural Situation Report (LASR), 2013. 2012/13 Final draft. Government of Lesotho.

Lesotho Agricultural Situation Report (LASR), 2011. 2010/11 Final draft. Government of Lesotho.

Lesotho Bureau of Statistics (LBOS), 2017. Data and statistics. Government of Lesotho.

Lesotho Bureau of Statistics (LBOS), 2016. 2015/2016 Agricultural production survey. Statistical Report NO: 24 of 2016. Government of Lesotho.

Lesotho Bureau of Statistics (LBOS), 2015. 2014/2015 Crop forecasting report. Statistical Report NO: 19:2015. Government of Lesotho.

Lesotho Demographic Survey (LDS), 2011. Demographic survey analytical report, vol. I. March 2011. Government of Lesotho.

Lesotho Meteorological Services (LMS), 2017. Climate of Lesotho. [Online]. Available: http://www.lesmet.org.ls/cimatology/climate-lesotho [Accessed 15 December 2017].

Lesotho Tourism and Development Corporation (LTDC), 2018. The kingdom in the sky travel guide. [Online]. Available: https://visitlesotho.travel/travel-guide/about-lesotho/ [Accessed 05 March 2018].

Lesotho Vulnerability Assessment Committee (LVAC), 2016. Market Assessment Report. Government of Lesotho.

Liu, Y., and Myers, R. 2009. Model selection in stochastic frontier analysis with an application to maize production in Kenya. *Journal of Productivity Analysis* 31 (1):33-36.

Livingston, G., Schonberger, S., and Delaney, S. 2011. Sub-Saharan Africa: The state of smallholders in agriculture. IFAD Conference on New Directions for Smallholder Agriculture, January, Rome, IFAD HQ.

Louw, A., Jordaan, D., Ndanga, L., and Kirsten, J.F. 2008. Alternative marketing options for small-scale farmers in the wake of changing agri-food supply chains in South Africa. *Agrekon* 47 (3):287-308.

Lowitt, K., Hickey, G.M., Ville, A.S., Raeburn, K., Thompson-Colon, T., Laszlo, S., and Phillip, L.E. 2015. Factors affecting the innovation potential of smallholder farmers in the Caribbean community. *Regional Environmental Change* 5 (7): 1367-1377.

Mairiga, T.H. 2014. Trend analysis of productivity of some selected cereal crops in Nigeria: 1983- 2008. *Research on Humanities and Social Sciences* 4(8):110-117.

Maiyaki, A.A. 2010. Zimbabwe's agricultural industry. *African Journal of Business Management* 4(19): 4159-4166.

Makenete, A.L. 1996. Grain marketing policies and food aid in Lesotho: Implications for food security. Unpublished MSc thesis, Department of Agricultural Economics, University of Natal Pietermaritzburg.

Makoza, F., and Chigona, W. 2012. The livelihood outcomes of ICT in microenterprises: The case of South Africa. *The Electronic Journal on Information Systems in Developing Countries* 53 (1): 1-16.

Maseatile, M.S.M. 2011. Productivity of small-scale maize farmers in Lesotho. Unpublished MSc thesis, Department of Agricultural Economics, University of the Free State.

Maxwell, J.A. 2005. Qualitative research design: An interactive approach (2e). Thousand Oaks, Califonia: Sage Publications.

Mekbib, S.B., Olaleye, A.O., Mokhothu, M.N., Johane, M., Tlali, S.B., and Godeto, T.W. 2011. Assessment on the adaptive capacity of the machobane farming system to climate hange in Lesotho. African Technology Policy Studies Network working paper series no. 60.

Mohlatsane, M., Chabana, M., and Ts'iame, P. 2009. Ministry of Agriculture and Food Security. Performance Audit Report on Crop Production, Lesotho.

Mokuoane, H.R. 2017. Former head of department. Maseru district: Lesotho College of Education. Key stakeholder interview. 28 November.

Molatoli, T.J., and Xiaoyun, L. 2016. Development evaluation of Lesotho agricultural input subsidy policy based on rural households' food security and access to inputs: Evidence from Mohale's Hoek District. *African Journal of Agricultural Research* 11(16): 1411-1420.

Morojele, M.E., and Sekoli, M.S. 2016. Trend analysis of maize production in Lesotho and its distribution among the ecological zones. *European Journal of Agriculture and Forestry Research* 4 (1):1-7.

Morse, J.M. 1995. The significance of saturation. *Qualitative Health Research* 5 (2): 147-149.

Motsoari, C., Cloete, A., Philippus, C., and Schalkwyk, D.H. 2015. An analysis of factors affecting access to credit in Lesotho's smallholder agricultural sector. *Development Southern Africa* 32 (5): 592-602.

Mphahama, L.E. 2011. Institutional constraints to horticulture production and marketing in Lesotho. Unpublished MSc. Thesis, Department of Agricultural Economics. University of Fort Hare.

Mpholle, L. 2017. Agriculture investment officer. Maseru district: Smallholder Agriculture Development Project. Key stakeholder interview. 05 December.

Muchara, B., Ortmann, G., Wale, E., and Mudhara, M. 2014. Collective action and participation in irrigation water management: A case study of Mooi River irrigation scheme in KwaZulu-Natal Province, South Africa. *Water SA* 40 (4):699-708.

Nagayets, O. 2005. Small farms: Current status and key trends. Prepared for the Future of Small Farms Research Workshop, June 26-29. Wye College.

National Action Plan for Food Security (NAPFS), 2006. Ten year plan 2007-2017. Ministry of Agriculture and Food Security. Government of Lesotho.

Ndlela, S. 2015. Agricultural extension, sustainable livelihoods and self-reliance: The case of Illovo's small-scale sugarcane farmer development programme (Noodsberg, South Africa). Unpublished MSc thesis, Agricultural Extension and Rural Resource Management, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal.

Ngulube, P., and Ngulube, B. 2015. Mixed methods research in the South African Journal of Economic and Management Sciences: An investigation of trends in the literature. *South African Journal of Economic and Management Sciences* 18 (1):1-13.

Noy, C. 2008. Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. *International Journal of Social Research Methodology* 11(4): 327-344.

Ntai, P.J. 2011. Critical factors determining successful irrigation farming in Lesotho. Unpublished MSc thesis, Department of Agricultural Economics, Extension and Rural Development, University of Pretoria.

Nxumalo, B.G. 2014. The analysis of the economic impact of climate change on maize production under different farming systems: The case of smallholder farmers in Jozini Municipality, KwaZulu Natal Province, South Africa. Unpublished MSc thesis, Department of Agricultural Economics and Extension, University of Fort Hare.

Ogang, C. 2014. Access to inputs for smallholders in Africa. Uganda National Farmers Federation (UNFFE). October, Rome, Italy.

Oni, O., Nkonya, E., Pender, J., Philips, D., and Kato, E. 2009. Trends and drivers of agricultural productivity in Nigeria. (NSSP Rep. 001). IFPRI.

Onwuegbuzie, A.J., Dickinson, W.B., Leech, N.L., and Zoran, A.G. 2009. A qualitative framework for collecting and analyzing data focus group research. *International Journal of Qualitative Methods* 8 (3): 1-21.

Oseni, T.O., and Masarirambi, M.T. 2011. Effect of climate change on maize (zea mays) production and food security in Swaziland. *American-Eurasian Journal of Agricultural and Environmental Science* 11 (3): 385-391.

Parkinson, S., and Ramirez, R. 2007. Using a sustainable livelihoods approach to assess the impact of ICTs in development. *The Journal of Community Informatics* 2 (3). [Online]. Available: http://ci-journal.net/index.php/ciej/article/view/310/269 [Accessed 12 October 2017].

Phakathi, S. 2016. Small-scale irrigation water use productivity and its role in diversifying rural livelihood options: case studies from Ndumo B and Makhathini irrigation schemes, KwaZulu-Natal, South Africa. Unpublished MSc thesis in Agricultural Economic, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal.

Prince, M., and Davies, M. 2001. Moderator teams: An extension to focus group methodology. *Qualitative Market Research: An International Journal* 4 (4): 207-216.

Rampokanyo, L.K. 2012. The impact of animal traction power on agricultural productivity: case of lowlands of Mohale's Hoek district of Lesotho. Unpublished MSc thesis, Department of Agricultural Economics and Extension, University of Fort Hare.

Ranyakane, P. 2014. Old age pension as a means of poverty alleviation in Lesotho. Unpublished Msc thesis, Department of Social Work at The University of Zululand.

Ricker-Gilbert, J., Jayne, T.S., and Shively, G. 2013. Addressing the "wicked problem" of input subsidy programs in Africa. *Applied Economic Perspectives and Policy* 35 (2): 322-340.

Ritchey, T. 2002. General morphological analysis: A general method for non-quantified modelling. Adapted from a paper presented at the 16th Euro Conference on Operational Analysis, Brussels. [Online]. Available: http://www.swemorph.com/pdf/gma.pdf [Accessed 17 January 2018].

Roth, M., and Haase, D. 1998. Land tenure security and agricultural performance in Southern Africa. Land Tenure Center Research Paper 115, University of Wisconsim, Madison.

Salami, A., Kamara, A.B., and Brixiova, Z. 2010. Smallholder agriculture in East-Africa: Trends, constraints and opportunities. African Development Bank. [Online]. Available: https://www.ifad.org/topic/tags/drd/2186589 [Accessed 14 December 2017].

Sandrey, R., Matlanyane, A., Maleleka, D., and Seventer, D.E.V. 2005. Lesotho: Potential export diversification study. Tralac working paper No. 10.

Sekaleli, T.S.T., and Sebusi, K. 2013. Farmers' response and adaptation strategies to climate change in Mafeteng District, Lesotho. African Technology Policy Studies Network (ATPS). Working Paper No. 74.

Sheahan, M., and Barrett, C.B. 2017. Ten striking facts about agricultural input use in Sub-Saharan Africa. *Food Policy* 67 (1): 12-25.

Siba, E. 2015. Considering land tenure security for structural transformation of Africa agriculture. Africa in focus. Brookings. [Online]. Available: https://www.brookings.edu/blog/africa-in-focus/2015/12/30/considering-land-tenure-security-for-structural-transformation-of-african-agriculture/ [Accessed 20 December 2017].

Simbizi, M.C.D., Bennett, D.R.M., and Zevenbergen, J. 2014. Land tenure security: Revisiting and refining the concept for Sub-Saharan Africa's rural poor. *Land Use Policy* 36 (1): 231-238.

Sinyolo, S. 2015. The impact of social grants on rural households' incentives to farm, market participation and farm entrepreneurship: Evidence from KwaZulu-Natal, South Africa. Unpublished PhD thesis in Agricultural Economic, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal.

Sinyolo, S., Mudhara, M., and Wale, E. 2014. The impact of smallholder irrigation on household welfare: The case of Tugela Ferry irrigation scheme in KwaZulu-Natal, South Africa. *Water SA* 40 (1):145-156.

Sipoko, N. 2014. Effect of irrigation farming potential on commercialization of smallholder farming in the Eastern Cape Province of South Africa. Dissertation, Department of Agricultural Economics and Extension, University of Fort Hare.

Snowdon, W., Schultz, J., and Swinburn, B. 2008. Problem and solution trees: A practical approach for identifying potential interventions to improve population nutrition. *Health Promotion International* 23 (4): 345-353.

Staatz, J., Dembele, N., and Mabiso, A. 2007. Agriculture for development in Sub-Saharan Africa. Background paper for the World Development Report 2008.

Stevens, J.B., and Ntai, P.J. 2011. The role of extension support to irrigation farmers in Lesotho. *African Journal of Agricultural Extension* 39 (2): 104-112.

Stewart, R., Erasmus, Y., Zaranyika, H., Rebelo, H., Silva, D., Korth, M., …, and Thea, D.T. 2014. The size and nature of the evidence-base for smallholder farming in Africa: A systematic map. *Journal of Development Effectiveness* 6 (1): 58-68.

Strauss, A., and Corbin, J. 1998. Basics of qualitative research: Techniques and procedures for developing grounded theory (2ed). Thousand Oaks, CA: Sage.

Teddlie, C., and Yu, F. 2007. Mixed methods sampling: A typology with examples. *Journal of Mixed Methods Research* 1(1): 77-100.

Threlfall, K.D. 1999. Using focus groups as a consumer research tool. *Journal of Marketing Practice: Applied Marketing Science* 5 (4): 102-105.

Ulrichs, M., and Mphale, M. 2016. Strengthening coherence between agriculture and social protection: Lesotho country case study report. Overseas Development Institution. Food and Agriculture Organisation of the United Nations, Rome.

United Nations Conference on Trade and Development (UNCTAD), 2017. Investment and digital economy. World Investment Report. United Nations publication.

United Nations Development Programme (UNDP), 2013. Lesotho sustainable land and water management strategic investment programme 2014-2024. Programme Document.

Van Averbeke, W., and Mohamed, S.S. 2006. Smallholder irrigation schemes in South Africa: Past, present and future. Paper presented at the 2nd Symposium of the SANCID, South Africa, 15-17 November 2006.

Vesely, A. 2008. Problem tree: A problem structuring heuristic. *Central European Journal of Public Policy* 2 (2): 61-81.

Wiggins, S., Kirsten, J., and Llambi, L. 2010. The future of small farms. *World Development* 3 (10): 1341-1348.

World Bank, 2017a. Lesotho smallholder agriculture development project. Projects & operations. [Online]. Available: http://projects.worldbank.org/P119432/lesotho-smallholder-agriculture-development-program?lang=en [Accessed 09 September 2017].

World Bank, 2017b. The World Bank climate change knowledge portal for development practitioners and policy makers [Online]. Available: http://sdwebx.worldbank.org/climateportal/index.cfm?page=downscaled_data_download&menu=historical [Accessed 25 October 2017].

World Bank, 2016. Agriculture project helps Lesotho's smallholder farmers become more productive. [Online]. Available: http://www.worldbank.org/en/news/feature/2016/12/28/agriculture-project-helps-lesothos-smallholder-farmers-become-more-productive [Accessed 09 September 2017].

World Bank, 2010. World Development Indicators. Washington DC.

World Bank, 2003. Reaching the rural poor: A renewed strategy for rural development. Washington, DC.

World Trade Organisation (WTO), 2015. WT/TPR/S/324? Lesotho – 138 – ANNEX 2. [Online]. Available: https://www.wto.org/english/tratop_e/tpr_e/s324-01_e.pdf [Accessed 10 March 2017].

Yuksel, F., Bramwell, B., and Yuksel, A. 1999. Stakeholder interviews and tourism planning at Pamukkale, Turkey. *Tourism Management* 20 (1): 351-360.

Zwelendaba, V.V. 2014. An evaluation of the effects of land tenure security in on-farm investment and on-farm productivity: A case of the smallholder farmers in the Amathole District of the Eastern Cape Province of South Africa. Unpublished MSc. Thesis, Department of Agricultural Economics and Extention. University of Fort Hare.

APPENDICES

Appendix A: Focus Group Discussion Guide

THE ROLE OF AGRICULTURAL SUPPORT PROGRAMMES ON THE LIVELIHOODS OF SMALLHOLDER MAIZE FARMERS IN LESOTHO: ASSET UTILISATION, PRODUCTIVITY AND PERCEPTIONS.

Introduction

My name is Taole Mohlahatsa, a masters student at Rhodes University. This survey serves to add more knowledge and understanding on the challenges faced by smallholder maize farmers and the role of support programmes on smallholder maize production in Lesotho. Like most countries in Sub-Saharan Africa, maize is a principal staple crop in Lesotho and it is mostly produced by smallholder farmers in rural areas for household food security. However, maize production in Lesotho has not been consistent in satisfying local demand despite continuous government support through agricultural programmes. This discussion guide therefore serves to investigate the livelihoods of smallholder maize farmers in Lesotho and how agricultural support programmes influence their production of maize. The sustainable livelihood framework was used as a guide in setting up the following discussion questions.

Questions

Constraints and vulnerability context

1. What are the major constraints you face in the production of maize?

2. Do any of the below vulnerabilities affect you in your area? If so, how do they affect your production of maize?

    - **Shocks** (e.g unpredictable events such as natural disaster and epidemics)
    - **Trends** (e.g trends that affect people such as natural resources and economic indecators)
    - **Seasonalities** (e.g changes related to seasons such as seasonal variations in prices, products and employment opportunities)

Livelihood/Capital Assets

3. How do accessibility of the below mentioned assets affect your production of maize?

    - **Human Capital**: the skills, knowledge, good health and ability of labour to pursue different livelihood strategies.
    - **Natural Capital**: the natural resource stocks such as land, water, wildlife, biodiversity and environmental resources.
    - **Financial Capital**: the financial resources available to people which include salaries, wages, savings, access to credit and pensions.
    - **Physical Capital**: resources created through the economic production process such as roads, bridges, power lines and tools and equipment.
    - **Social Capital**: social resources such as networks, membership to organisations and relationships of trust.

4. Which of the above assets do you rely on the most in the production of maize and why?

5. Which assets do you want to have more access to and why?

Transforming structures and processes

6. What private and/or public organisation support your production of maize the most?

7. How do the following agricultural programmes address constraints mentioned in question 1?

    - National Fertiliser and Input Subsidy Programme
    - National Block-farming Programme
    - Small Holder Agricultural Development Programme (SADP)
    - Integrated Watershed Management Programme (Fato-Fato)

8. How do the above mentioned agricultural programmes improve accessibility of livelihood assets mentioned in question 3?

9. Do any of the above mentioned agricultural programmes create additional challenges or constraints on production?

Livelihood strategies and outcomes

10. What livelihood goals or outcomes do you aim to achieve through the production of maize?

11. What production, marketing or sales strategies do you practice in achieving your livelihood goals?

12. How do the programmes listed in question 7 influence your livelihood outcomes in maize production?

13. Is there anything you wish to discuss about maize production than can benefit this study?

Appendix B: Key Stakeholder Interview Guide

THE ROLE OF AGRICULTURAL SUPPORT PROGRAMMES ON THE LIVELIHOODS OF SMALLHOLDER MAIZE FARMERS IN LESOTHO: ASSET UTILISATION, PRODUCTIVITY AND PERCEPTIONS.

Introduction

My name is Taole Mohlahatsa, a masters student at Rhodes University. This survey serves to add more knowledge and understanding on the challenges faced by smallholder maize farmers and the role of support programmes on smallholder maize production in Lesotho. Like most countries in Sub-Saharan Africa, maize is a principal staple crop in Lesotho and it is mostly produced by smallholder farmers in rural areas for household food security. However, maize production in Lesotho has not been consistent in satisfying local demand despite continuous government support through agricultural programmes. This interview guide therefore serves to investigate the livelihoods of smallholder maize farmers in Lesotho and how agricultural support programmes influence their production of maize.

Questions

1. Farmers have identified several constraints throughout the production process, these include late delivery of subsidies inputs, limited financial capital, droughts and limited access to markets. However, farmers stated that droughts and late delivery of subsidised inputs are the main constraints they face in producing maize. How can such constraints be addressed and what kind of programmes are best suited to tackle such constraints?

2. Out of the five capital assets (human, natural, financial, physical and social assets), famers seem to rely more on human and social capital throughout the maize cropping season. What steps can the government take to increase the use of other capital assets, especially modern physical assets such as irrigation equipment, water tanks and tractors?

3. In relation to transforming structures, farmers receive support from the Ministry of Agriculture and Food Security MAFS) and NGOs such as World Vision international and Food and Agriculture Organisation (FAO). However, aid from such organisations sometimes cause a dependency syndrome to resource-scarce smallholder farmers. What are ways the MAFS and NGOs can intervene in the smallholder agricultural sector without creating a dependency syndrome?

4. Research has revealed that development partners have raised concerns about lack of strategic and explicit targeting criteria on set government programmes and thus stress the

review of some existing agricultural programmes. With a specific focus on maize production, should the government consider discontinuing or modifying the following programmes? And why?

- National Fertiliser and Input Subsidy Programme
- National Block-farming Programme
- Small Holder Agricultural Development Programme (SADP)
- Integrated Watershed Management Programme (Fato-Fato)

5. Due to their subsistence nature characterized by limited financial capital and reliance on rainfall, farmers have limited adaptive capacity to climate changes. What recommendations can you make on climate adaptive strategies to improve maize farmers' resilience to climate changes?

6. Farmers mostly aim to achieve food security through maize production, however farmers that engage in crop and livestock mixed farming can achieve additional livelihood outcomes such as increased income (that can be used to pay childrens' school fees) and increased well-being (being able to pay for medical needs). What kind of programmes can the government consider in promoting the practice of mixed farming among smallholder maize farmers?

7. Smallholder farmers that live in rural areas characterized by limited physical infrastructure (physical capital) such as bridges and roads often don't benefit from agricultural programmes, what can the government do to assists smallholder maize farmers in remote, hard to reach areas?

8. Due to climatic shocks such as dry spells and erratic rains, Lesotho experiences fluctuating maize production and productivity. How can agricultural programmes be modified to support farmers in times of low production and productivity?

9. Is there anything you wish to add on smallholder maize production that can benefit this study?

Appendix C: List of Key Stakeholders and Extension Officers

Table A: Contact details of key stakeholders

Name	Position	Institution and contact details
Mr. Hendrick R. Mokuoane	Retired	Retired Former Head of Department at the Lesotho College of Education [1976-1989] Former Project Manager of the Schools Self Reliance and Feeding Unit [1998 – 2004] Tel: +266 5884 6070
Mrs. 'Mamonaheng Monato	Advisory officer	Disaster Management Authority Tel: +266 2231 2183
Mr. Thato Pitso	Advisory officer	Disaster Management Authority Tel: +266 2231 2183
Ms. Mpho Sakoane	Lecturer	Lesotho Agricultural College Tel: +266 2232 4963
Mrs. Ntsoaki Moeketsi	Lecturer	Lesotho Agricultural College Tel: +266 2232 4963
Mr. Khauhelo J. Kheethoa	Project coordinator	Lesotho National Farmers Union (LENAFU) Tell: +266 5959 2732 E-mail: jkheethoa@yahoo.com
Mr. Lehlohonolo Mpholle	Agricultural Investment Officer	Smallholder Agricultural Development Project Tel: +266 2231 2578 E-mail: mrmpholle@yahoo.co.uk
Mr. Mafamo Pholo	TP Manager (Livelihoods)	World Vision Lesotho Tel: +266 22317371
Mr. Kakole Likotsi	Research officer	Ministry of Agriculture and Food Security (Department of Agricultural Research) Tel: +266 312395
Mr. Lereko Masopha	Chief information officer	Ministry of Agriculture and Food Security (Department of Agricultural Information) Tel: +266 22324551

Table B: Contact details of extension officers who aided in data collection

Name	Institution and contact details
Mr. Bothata Sehloho	Ministry of Agriculture and Food Security [Mafeteng District] Tel: +266 5812 7105
Mrs. Limakatso Nqosa	Ministry of Agriculture and Food Security [Leribe District] Tel: +266 6383 3352