Determinants of commercial orientation and the level of market participation by women maize farmers in Eswatini

by

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DECLARATION OF ORIGINALITY

I, Lucinda Nosizo Dlamini declare that the thesis/dissertation, which I hereby submit for the degree of MSC Agric (Agricultural Economics) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

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Date …….

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Dr. M.N. Makhura

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DEDICATION

I dedicate this thesis to my grandmother, Mrs Sellinah Hlebeya-Andrade and all women farmers in the African continent. Through all the hardships faced, unrecognised and unaccounted efforts, you have successfully prosecuted your role as homemakers as well become *de facto* farm managers.

We salute and appreciate you!

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ABSTRACT

With Sustainable Development Goal 5 focusing on the role of gender in sustainable development, developing countries like Eswatini are promoting the role of women in agriculture to drive their sustainable development agenda. This entails promoting women empowerment through agricultural commercialisation as it has the potential to improve women-led farming households' income and living standards. Eswatini's government has initiated programs such as Rural Development Areas programs to assist farmers in agricultural production, especially maize as it is the country's main staple food.

Women's contribution to the agricultural sector has been limited by several constraints. These range from limited access to credit sources to poor infrastructure and high transaction costs which make it difficult to enter the market. In addition, development polices have been biased against addressing challenges faced by women as well as integrating them into development strategies. As such, women farmers' access to agricultural markets and commercialisation of their maize operations market, is constrained and scanty. This study aims to highlight agricultural commercialisation activities of women farmers in Eswatini. The specific objective

of the study is to identify the factors influencing participation of women farmers in the maize market.

The study focused on the Highveld region where six communities, namely, Maphalaleni, Nsingweni, Endlozini, Sitseni, Kasiko and Motjane were purposively selected based on their ability to produce maize surplus. A multi-stage sampling technique was employed to select respondents which resulted in 191 farm households being surveyed. Since the study focuses more on women, the majority (131) of respondents were women farmers with the remaining being men farmers. Men participation was explored and presented as supplementary data. The Heckman two-stage procedure was used to identify the factors that influence commercialisation.

In the first stage, the Probit regression model was used to identify factors that influence farmers' decision to participate in the maize market. The factors; household size, farm size, livestock, radio, off-farm income, savings, credit, farmers' group, extension services and fertiliser increased the probability to enter the market while age, education and ownership of a mobile-phone reduced the probability of participation. The first stage also generated the Inverse Mills Ratios used to test selectivity bias in the second stage.

In the second stage, the Ordinary Least Squares model identified factors that influence the level of commercialisation. Education, household size, farm size, vehicle, off-farm income, extension services, fertiliser and commercialisation index positively influenced the level of market participation, while price had a negative influence. The negative price relationship may underscore women farmer's risk management behaviour where they could sell less in lieu reducing the cost of purchasing maize meal at higher prices.

Evidence from the study shows that women farmers in Eswatini face several market barriers when participating in commercial agriculture. This study, therefore, recommends the need for effective and efficient policies and programs to encourage and improve participation of women farmers in maize marketing. Policies should be geared towards improving rural infrastructure, prices, extension and financial services which will help overcome barriers to market participation thus improving engagement in the sector.

Keywords: women farmers, commercialisation, maize, market participation, Highveld, Eswatini, two-stage procedure.

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LIST OF ABBREVIATIONS AND ACRONYMS

AU	African Union
DFID	Department for International Development
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FAO	Food and Agriculture Organisation of the United Nations
FTC	Fixed Transaction Costs
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
MOA	Ministry of Agriculture
NAMBoard	National Agriculture Marketing Board
NMC	National Maize Corporation
OLS	Ordinary Least Squares
PTC	Proportional Transaction Costs
RDA	Rural Development Areas Program
SADC	Southern African Development Community
SDG	Sustainable Development Goals
SNL	Swazi Nation Land
SPSS	Statistical Package for Social Science
SSA	Sub-Sahara Africa
TC	Transaction Costs
TDL	Title Deed Land
VIF	Variance Inflation Factor

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

The majority of the population in sub-Saharan Africa (SSA) live in rural areas where hunger, poverty and unemployment are on the rise (Mmbando, 2014). Food aid constitutes a great proportion of donor assistance in Southern Africa, where approximately 30% of Africans are undernourished (Mabuza *et al*., 2007). About 70% of the poor in SSA economies heavily depend on agriculture for their livelihoods, either directly or indirectly as a source of food and income (IFAD, 2001). The agricultural sector is the largest employer of labour in these countries, with the potential for enhancing food security and poverty reduction (World Bank, 2008).

With agriculture as the focal point, poverty reduction strategies can directly raise farm income through an increase in output and indirectly through job creation as the sector is labour intensive (United Nations Development Programme, 2005). Agriculture is also central in achieving the first two Sustainable Development Goals of ending poverty and realising food security and nutrition (UN Women, 2018). The sector employs 62% of the population of SSA, with the majority living in rural areas, and generates 27% of Gross Domestic Product (GDP) of SSA economies (World Bank, 2008). This contributes to economic development since both national and individual income levels, as well as the standards of living, for the rural poor are improved. Furthermore, the agricultural sector is directly linked with the manufacturing and processing sectors, as well as factor markets, which contribute to marketable surplus. Moreover, the urban poor can benefit through reduced food prices, thereby increasing their purchasing power for food while farmers can re-allocate limited household incomes due to a decline in prices (Pender & Dawit, 2007). Such effects are transmitted to the poor as a result of commercialisation and can lead to poverty reduction (IFAD, 2001).

The African Union (AU, 2003) suggests that Africans must make maximum use of their resources with the help of the African Union Commission, the New Partnership for Africa's Development (NEPAD) secretariat, Regional Economic communities and the Food and Agriculture Organization (FAO) to increase agricultural production. This not only strengthens the agricultural sector, but also ensures the economic prosperity and welfare of SSA economies

(AU, 2003; 2014). Therefore, interventions and development strategies aimed at eradicating poverty through the agricultural sector are more effective at this course than other sectors. Kahari (2009) reported that the number of people living below the poverty line reduced due to a 1% growth in agriculture. Therefore, heads of state and the government of the AU, during the summit held in Maputo and Malabo in 2003 and 2014, respectively, adopted relevant and sustainable policies for agricultural and rural development, as well as pledging 10% of public expenditure towards their implementation to ensure efficiency and effectiveness (AU, 2003; 2014).

Eswatini, like most African countries, is characterised by a predominantly rural society. About 70% of the 1.25 million Eswatini population live in rural areas and are heavily dependent on agriculture for their livelihoods and employment opportunities (Ministry of Agriculture (MOA), 2016). The country has two distinctive tenure systems, namely Swazi Nation Land (SNL), which accounts for 60 % of total land that is vested in the king in trust for the Eswatini community, and the remaining 40% accounted for Title Deed Land (TDL), also known as freehold land(Dlamini & Masuku, 2011). This land is owned by corporations or individuals who have exclusive rights to sell, transfer, reallocate, use and control the land.

1.1.1 The Eswatini agricultural sector

The agricultural sector plays a key role in the Eswatini economy. It contributes about 11% to the GDP, employs about 70% of the population, and generates merchandise exports (MOA, 2016). Production takes place on land held under both tenure systems. However, production on Title Deed Land is largely market-oriented and employs a great deal of modern technology, such as irrigation systems, high yielding varieties, and mechanical power sources and equipment (Dlamini & Masuku, 2011). On the other hand, production on Swazi Nation Land is mainly subsistence-oriented, rain-fed and comprises low input use. Therefore, Title Deed Land serves as a major contributor (80% of total farm production) to the agricultural sector, while Swazi Nation Land contributes 10%, with the remainder coming from forestry (MOA, 2016). Eswatini, like most SSA countries, struggles with high levels of poverty; hence, it is working towards elevating the agriculture sector to alleviate hunger and poverty. According to Chapoto *et al.* (2011), 80% of the rural population is affected by poverty, as compared with 34% in urban areas. In Eswatini, 63% of the nation lives below the poverty line with high rates of unemployment, at 28.1% (IFAD, 2011).

Agriculture is essential when driving economic growth and poverty reduction. However, the agricultural sector in the country has not been performing at optimum. The poor performance is partly attributed to the fact that women experience daunting constraints, in accessing resources (Doss, 2001). Women play a key role in farming and the rural economy through their roles as farmers, labourers and entrepreneurs.

It is essential to analyse the gendered dimension of agricultural commercialisation, as both men and women exert different efforts and contributions in the sector. As such, government should acknowledge and build on women's efforts and contributions in the agricultural sector to ensure economic growth, food security and the achievement of agricultural development goals. This will lead to ensuring sustainable food production systems and the implementation of resilient agricultural practices that increase productivity and production. In addition, there is a need for efforts to address the constraints faced by women as well as to integrate them into development strategies.

1.1.2 The role of Eswatini women farmers in agricultural production

In Eswatini, women play an integral part in agricultural production. Although changes in Eswatini agricultural production have occurred, women farmers continue to be the backbone of subsistence farming (Doss, 2001). Women have contributed their time, labour and resources to the agricultural economy of Eswatini.

Women play a vital role in agricultural decision-making. Decisions are essential in agricultural production and are normally the responsibility of the household head (husband), made in conjunction with the woman (wife). These are critical in the planning and implementation process as they involve coordination and supervision of agricultural activities. However, women have the primary responsibility and control over household and agricultural decisions (Omondi, 2015). This has led to women maintaining significant influence not only in family decisions, but also in day-to-day agricultural decisions. These include decisions on agricultural cultivation, purchase, and application of inputs such as fertiliser, seed and labour (Oladejo and Ladipo, 2012). In addition, changes in the agricultural and industrial sectors have led to traditional responsibilities, such as agricultural activities, being altered, thus leaving women to accomplish them. This increases their work load as other agricultural activities, such as planting, weeding and harvesting, remain women's responsibility. As such, women provide the

bulk of labour in the sector, with the assistance of their children, while also providing the basic needs for their families (Sachs & Roach, 1983).

1.1.3 Constraints faced by Eswatini women farmers in agricultural production

Regardless of the significance of women farmers and their dominance in all homestead farming activities, their role in agricultural production has barely been recognised, nor have they been beneficiaries of sustainable development assistance (Oladejo & Ladipo, 2012). For instance, the lack of access to information proves to be a major constraint for women in engaging in commercial farming operations. According to Croppenstedt *et al*. (2003), women farmers had lesser access to agricultural information provided by extension officers than other cotton growers. Similarly, Doss (2001) also stated that women farmers lacked knowledge of the services that extension officers offered. Furthermore, they stated that two-thirds of female respondents in their study were eager to learn more about farming, but did not know who to turn to for farming education and advice. Hill and Vigneri (2014) reported a similar result, where women farmers had limited access to extension services and participated less in Rural Development Areas (RDA) programmes which provide farmers with training and technical assistance, and serve as a source of agricultural inputs. This was because most officers and field staff responsible for training and delivery of other services were both male-dominated and male-oriented in their approach (Sachs & Roach, 1983): about 85% of extension workers were men (Conley and Udry 2010). In addition, women received fewer visits from extension officers and field staff since it was taboo for male strangers to visit women at their homesteads in the absence of their husbands (Martey *et al.*, 2012). Female farmers had fewer visits and those visited had less contact with extension agents (USAID, 1981). As such, the lack of access to agricultural information and training leaves women with having to rely on traditional and less productive methods (Sachs & Roach, 1983). This, then, also translates into limited access to guaranteed markets and price information. Hence, women resort to marketing produce through intermediaries that offer low prices, thereby putting a constraint on the quantity of marketable surplus (Randela *et al*., 2008).

Furthermore, women's limited participation in economic development strategies can be explained by their social and economic status in society. For instance, women's social status precludes their successful engagement in agricultural development programmes, as extension agents are less keen to engage with married women (Andrehn *et al.*, 1977). This is because

they are thought of as having little or no control over farming decisions and the essential resources required to make substantial changes in production. Despite women's increasing control in agricultural decision-making, the assumption was, when such skills and knowledge were directed towards men, that men were most likely to be effective as they owned and controlled resources (Hill & Vigneri, 2014).

Moreover, women's economic conditions play a major role in their limited participation in agricultural development programmes. Women have limited access to cash resources and credit sources (Sachs & Roach, 1983). This results in their inability to purchase agricultural inputs and/or hire equipment and labour (Barnes, 1979). As such, women depend on their own, as well as their children's labour to participate in production and produce marketable surplus. Again, women do not own most assets such as land and livestock which could serve as collateral for loans from formal financial institutions. This results in the lack of necessary capital needed by women to increase production and thus produce surplus (Randela *et al*., 2008).

Agricultural development policies and programmes in Eswatini have not focused on increasing women's participation in commercial agricultural production and marketing (Sachs & Roach, 1983), as it is difficult and costly to design women inclusive programmes. However, it is evident that women possess distinct capabilities that enable them to actively participate in development strategies. For instance, women play a significant role in decision-making, as they are regularly consulted when faced with important decisions that need to be made (IFAD, 2011)). This leads to women's empowerment and their increasing control in their households. Furthermore, Nxumalo (1979) stated that the engagement of Eswatini's women in farm activities, in exchange for labour or in-kind payment, can serve as a platform for disseminating information and the provision of training services by extension personnel. Sachs and Roach (1983) reported that women farmers are at least as productive as men farmers are, if they receive adequate training and support. Moreover, women are eager to learn about modern farming methods and techniques, as well as entering the commercial farming economy. This is seen by their willingness to participate in agricultural development programmes (Andrehn *et al*., 1977).

For Eswatini to improve market participation as well as ensure equal distribution of economic growth benefits, women must have equal opportunities to participate in development strategies. The expertise, labour and commitment of female farmers must be realised if the goal of

economic development is part and parcel of increasing production (Timmer, 1997). Government needs to consider the economic contribution of women and acknowledge that the commercialisation of the sector requires improving the ability of women farmers to participate in output markets.

1.2 COMMERCIALISATION OF WOMEN AGRICULTURE IN ESWATINI

Pender *et al*. (2006) defined agricultural commercialisation as a shift from producing crops for household consumption requirements to a more market-oriented approach where profit maximisation is the end goal. Haddad and Bouis (1990) referred to commercialisation in terms of the volume of marketed surplus to total farm production. Hence, venturing into commercial farming involves a shift from production consumption to commercial orientation that involves modernised farming systems, the adoption of new technology, and farm mechanisation. This not only increases the market share of agricultural output but also leads to high productivity, quality, specialisation of labour, and higher incomes for women farmers (Boughton *et al*., 2007). Market participation may lead to lower food prices because of increased competition. According to Jayne *et al*. (1995), this results in lower costs in food marketing and processing. This would improve the overall welfare of Eswatini women farmers by increasing their purchasing power for food as well as re-allocating limited household income. As a result, women farmers could derive a greater part of their livelihoods from a market-oriented approach, as well as escape from poverty. Moreover, market participation is a strategy being promoted by the Eswatini government to promote poverty alleviation and income creation (Magagula *et al*., 2007).

Maize, the country's most important and predominant crop, is a staple food and source of livestock feed. It is one of the crops that are widely grown in the country; hence, it is promoted by the Eswatini government for commercialisation and diversification (MOA, 2016). This cereal is promoted at both national and producer levels and is the top third most important crop grown, after sugarcane and cotton. It constitutes 90% of the crop cultivated on Swazi Nation Land (Dlamini & Masuku, 2011). In addition, maize is the most important source of income in the two plateau ecological zones, namely the Middleveld and Highveld, with each producing 45 and 28% of total production, respectively (Mabuza, 2007). On average, farmers own 1.7 hectares of land on SNL, and 96% of homesteads engage in maize production, with the majority being women (FANRPAN, 2003).

As a consequence of the El Nino weather system that has affected Southern Africa, Eswatini included, the country experienced serious drought for two consecutive years, from 2014 to 2016 (MOA, 2016). There has been a gradual decline in maize yields, with only 27% of the country's maize requirements for the 2016–2017 marketing season being produced, while the remaining 73% (114, 000 tonnes) needed to be imported (MOA, 2016). Again, Eswatini has not been self-sufficient in maize and the loss is expected to persist if relevant and sustainable policies and production strategies are not developed and implemented (MOA, 2016).

However, due to the growth of local and regional consumption, maize cereal has a competitive advantage over other cereals for alleviating hunger and poverty, if markets were to be made accessible to Eswatini women (Moono, 2015). According to Barrett (2008), increased market participation has the potential to increase women farmers' farm-income and improve their standards of living through marketable surplus. Furthermore, commercialisation has been identified as both a driver and consequence of development (Omiti *et al*., 2009). This is attributed to the fact that access to markets enables households to sell surplus output, thereby generating income that can further be used to purchase additional household necessities. Moreover, increased incomes lead to the demand for other goods and services, thereby stimulating development (Boughton *et al*., 2007). Therefore, with 70 % of the Eswatini nation depending on agriculture, commercialisation is one way that could lead to the achievement of various Sustainable Development Goals (SDGs) such as gender equality and food security.

1.3 PROBLEM STATEMENT

Empowering women is essential in accelerating economic growth, promoting social development and enhancing business performance. The full incorporation of women capacities into income generating strategies will lead to social investment and development of families, communities and nations. Developing countries like Eswatini can enforce this by recognising and supporting women's efforts at farm-level.

Women play a dominant and key role in agricultural production, especially maize. Such changes in women participation in agricultural production are a result of ample opportunities, employment and education (Oladejo and Ladipo, 2012). Hence, women make up 60-80% of the agricultural labour force and produce two-thirds of the crops (Badmus *et al*., 2015). This has led to women farmers' producing mainly for household consumption and market in order

to increase their household incomes. As such, commercialising farmer's maize is an essential pathway towards economic growth and development (Omondi, 2015). However, key interventions that can boost commercialisation of maize in Eswatini have not been established.

Maize has the potential to address SDGs, including, food security, poverty eradication, wealth creation and diversification, but, few empirical studies has been done in commercialising the crop (Badmus *et al.,* 2015) in Eswatini. Although the government of Eswatini has been encouraging commercialisation among farmers, they still face challenges regarding commercialisation and participation in agricultural markets. Poor infrastructure such as roads and input shops have hindered women's successful engagement in the market (Lindsay, 2015). Women farmers find it costly to transport produce to the market. Lack of price and marketing information is another prime obstacle faced by women as they hardly have access to extension agents (Croppenstedt *et al*. 2003: Mmbando, 2014: Omondi, 2015). Further, women farmers' level of education, access to technical skills and productive resources have not been well established and understood from a market-oriented perspective (Oladejo and Ladipo, 2012). This has raised questions as to (i) what factors influence the decisions of women farmers to sell their maize in the market, and (ii) what factors influence the level of maize sales.

Therefore, for women farmers to transition from subsistence production to producing for the market or commercially, there is a need to understand the determinants of commercialisation and its extent. Overcoming market barriers can serve as a strategy in enhancing participation in commercial agriculture. This can ensure the provision of public goods such as roads, depots and markets, which are prerequisites in transitioning to a market-oriented production aimed at profit maximisation. Some research has been conducted on commercialisation and the influencing factors (Boughton *et al*., 2007; Mather *et al*., 2011; Martey *et al*., 2012; Mmbando, 2014). However, commercial orientation among smallholder producers differs, due to the different levels of infrastructure. Access to improved infrastructure enables penetration of local and international markets, and access to productive resources (Barrett, 2008). Furthermore, these studies may not be relevant and applicable to the Eswatini context due to the heterogeneity effects on factors. Other studies on commercialisation may not address the economic contributions of women in the sector within SSA and Eswatini as a whole. For instance, Hill and Vigneri (2014) found that women lack access to resources, which prohibits their participation in output markets. Similarly, Dorward *et al.* (2004) stressed the high levels of marginalisation and exclusion of women in society that lowers their share in agricultural trade. In addition, a few studies, such as Tangka *et al.* (1999), Hill and Vigneri (2014) and

Omondi (2015), have been conducted on the engagement of women farmers in the maize market, as well as empirically investigating the determinants that influence the participation of women, despite the challenges they face in accessing the market.

Gaps in literature still exist mainly, in detailed and concurrent concepts that explain the determinants of market participation by women farmers at household level across different agro-ecological zones in Eswatini. This study intends to fill these gaps by providing detailed explanations of the determinants of commercialisation agricultural operations of women farmers.

1.4 OBJECTIVES

The purpose of this study is to identify the factors that influence the market participation of women maize farmers in the Highveld region of Eswatini. The specific objectives are:

i. To identify the factors that influence Swazi women farmers' decision to commercialise their maize produce in the Highveld region.
ii. To identify the factors that influence the level of commercialisation among women maize farmers in the Highveld region.
iii. To identify factors that influence commercialisation decisions by men maize farmers in the Highveld region.

1.5 ANALYTICAL METHODS

The study employed two analytical methods. Firstly, descriptive statistics, such as frequencies and means, are applied to socio-economic characteristics of sampled households to test for differences in participation. The chow test was used to test whether it was appropriate to pool or split date into mem and women sub-groups. Secondly, the Heckman two-stage procedure is used to identify and test for significant determinants of maize-market participation among men and women farmers. The first step in the analytical analysis included running a Probit regression that identified factors affecting the probability of participating in the maize market, while the second step used ordinary least squares (OLS) to determine the intensity of market participation.

1.6 SAMPLING, DATA COLLECTION AND ANALYSIS

This study was conducted in the Highveld region, also known as the Hhohho district. It is in the north-west part of the country and has the second highest rural population of 248,791 Swazis (MAO), 2016). The district was selected because it is the second largest producer of maize in the country, with women at the forefront of production. Table 1.1 presents the maize production forecast in the four regions from 2010 to 2016.

Table 1.1: Swaziland's 2010-15 maize production and 2015-16 production forecast

Region	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16*
Highveld	36 437	31 315	31 440	38 821	32 887	17 208
Middleveld	33 127	32 056	32 738	48 097	39 548	13 602
Lowveld	12 532	9 273	12 994	19 081	6 646	1 741
Lubombo	2 589	2 774	4 762	12 872	2 542	908
National	84 685	75 418	81 934	11 8871	87 195	33 460

Source: MOA, 2016: 2015-16*- maize production forecast

As shown in the Table 1.1, the district had an average production forecast of 32 814 tonnes of maize in 5 years. The relatively high yields are a result of the large number of producers in the region. Legumes are the second most-important crop grown in the region by both male and female farmers. However, jugo beans are mostly grown by men, while groundnuts are mostly grown by women. This represents the engagement of farmers in various crop production systems; hence, the government of Eswatini could alleviate poverty through commercialising subsistence agriculture, especially that of maize producers, as maize has a comparative advantage over other crops in the country.

1.6.1 Selection of study sites

Of the 55 constituents (tinkhundla) in the country, the Highveld region comprises 14. These constituents serve as centres where community members can engage in political, social and economic roles which focus on developing these areas and the country at large. Constituents are further divided into chiefdoms. The sample was drawn from 6 communities, namely the

Nsingweni, Maphalaleni, Endlozini, Sitseni, Kasiko and Motjane communities. All the communities were selected based on their ability to produce high yields as well as supply the National Maize Corporation (NMC) and/or sell to maize deficit zones in the other regions (Middleveld, Lowveld and Lubombo Plateau). In addition to marketable surplus, these communities were purposively selected based on distinguishing features, set out as follows.

Nsingweni community: Women at Nsingweni community are largely involved in women/farmer groups. For instance, in the 1990s, women formed a group called Timeleni Bomake (women be self-reliant), with 13 members (Mlipha, 2015). Over the years, the group has grown and presently it has 30 members. The main objective of this group is achieving poverty eradication through ensuring that households are food secure, as well as participating in income-generating activities such as maize production, growing vegetables, planting fruit trees' and rearing indigenous chickens.

Endlozini community: Women in Endlozini rank maize as the most important crop, but also feel that legumes were equally important (Mlipha, 2015). This is based on the versatility of such food crops as they can be boiled and eaten as a snack. Furthermore, legume crops can be roasted or used for seasoning relish, soup and vegetables. In addition, the commercial value of the crop proves to be of critical value as they preferred crops (maize and legumes) that were high in demand and profitable.

Motjane community: The proximity of Motjane to the capital city, Mbabane, is essential since it not only serves as a direct link for maize farmers in the community to the market place, but also reduces transaction costs associated with searching for trading partners, screening potential buyers and transferring the produce.

Maphalaleni, Sitseni and Kasiko communities: The majority of women farmers in the Maphalaleni, Sitseni and Kasiko communities sell their produce at the Ntfonjeni regional depot. The other communities, however, view this depot as an unsatisfactory alternative due to the low prices and stringent requirements on maize quality and quantity.

1.6.2 Sampling procedure

191 maize farmers were purposively selected from six communities in the Highveld region. Farm households were randomly drawn from the sample frame with the help of agricultural extension officers from the NMC. Respondents who comprised household heads were

randomly picked from the list. Where the list was not available before visiting communities, farmers were assembled and randomly selected to be interviewed.

1.6.3 Data collection

Primary data details from the community and household levels were used in the study. Data was obtained through a household survey. Surveys are useful in describing the characteristics of a large population. As such, information was gathered through questionnaire interviews. The questionnaire covered a large scope of topics, from socio-economic structures to data related to maize production and marketing.

1.6.4 Ethical clearance

Ethical clearance is a requirement of the Faculty of Natural and Agricultural Sciences in the University of Pretoria. Hence, prior to any research work being undertaken, ethical clearance was sought from the faculty as the research involved human participants. This ensures good research practices and conduct in terms of respect for the human subjects involved in the process of conducting research. This involves obtaining informed consent and ensuring confidentiality of the data. Beneficence is also another ethical principle, which ensures that maximum benefits and minimum risk attach to the people involved in the research. Lastly, fairness regarding research distribution is catered for. Upon submission, the study received approval from the faculty's Ethics Committee in August 2018.

1.7 PURPOSE OF STUDY

Commercialization leads to economic development as farms shift from producing for household to producing for markets through advanced production systems. Participating in commercial agriculture, for purposes of this study, is based on the comparative advantage among women maize farmers. This study aims to shed light on key policy issues that need to be addressed by policymakers and stakeholders to ensure market participation by women maize farmers, as well as food security and improved rural incomes. These stakeholders include:

Women: Ensuring market participation by women maize farmers can play a major role in escalating economic growth, eradicating poverty and improving food security in SSA economies. Hence, investing in women leads to improved production, and improvements in

small businesses and small-scale manufacturing. This not only empowers them to invest in agriculture, but also allows them to sustainably remain in farming. Furthermore, farming traditional crops could enhance women's economic empowerment through their crops being produced locally and sold at reasonable prices in available local, national and international markets (MOA, 2016). This might result in the establishment of an agribusiness venture which could benefit women food producers. This would further serve as a source of employment and income, thus improving their living standards (Omiti et al., 2009). Participation in market-oriented output results in more income being generated, as compared with subsistence output levels, and hence greater consumption by the household. In addition, this study will place a focus on the feminisation of agriculture, as the participation of women in the sector has grown over the years. This has enabled women to become more involved in decision making, as well as acquire assets.

Increases in production would be realised if women had equal access to such resources as land, seed, fertiliser and capital (DFID, 2014). It would also lead to a new era where women are recognised as primary producers, thus eliminating the segregation between crops being classified as women's and men's crops. Women would also benefit through financial and technical support. Extension workers could assist farmers by providing information on markets, thus linking them to different outlets (Mmbando, 2014). These agents could also assist women who are illiterate and are unaware of modern and improved farming techniques.

Government: The main objective of any country is to achieve food security. Therefore, ensuring that farmers have access to productive resources and markets will aid in lowering transaction costs and market barriers, thus enhancing food security within households and thereby reduce poverty levels in the country. This also results in low mortality rates among young infants caused by malnutrition. In addition, government would rely less on food aid from the international community. According to Mabuza *et al*., (2007), during the 2002–2005 production seasons, government had to request cereal food-aid from the international community as a result of the effects of the 2001/2002 drought. Furthermore, agriculture opens job opportunities, thus ensuring that more people in the country are employed. This reduces the high employment rates in the country and ensures livelihood strategies for the rural poor. It contributes largely to foreign exchange. However, government must meet farmers half way through the development of policies which improve access to productive assets and enhance

market participation. Economic development can also be achieved as the national income and people's standard of living is improved.

Ministry of Agriculture: Policy and strategy intervention should be able to enhance the functioning of input and output markets. This institution will be able to identify ways to assist farmers to transition from subsistence to commercial farming. The ministry would also find ways to improve service delivery and development of infrastructure in order to achieve structural transformation (MOA, 2016). In addition, the findings from this study would contribute to the literature on women farmers by outlining the factors that influence both the likelihood of participating in the market and the level of agricultural commercialisation in the Highveld region. Furthermore, the study will to shed light and guide future research on agricultural commercialisation in the other regions in Eswatini.

Private sector: Market participation promotes investment in the sector through the mobilisation of local producers, farmer groups and associations, commodity organisations, and agri-businesses ventures.

Community/Family: Overall, the community will benefit through improved infrastructure such as roads, access to information, technology and the like. Access to markets encourages farmers to grow varieties of crops since markets are guaranteed and the connectedness allows for fresh, nutritious produce to become readily available to communities, thus ensuring healthy food and lowering malnutrition death rates. Furthermore, nutritious food would be made readily available at reasonable prices by eliminating transaction costs, such as those of middleman, and opportunities would be provided for community members to participate in commercial farming. Again, this generates jobs and income for families, thus improving their standards of living.

In addition, farming activities stress the importance of women in the agricultural sector and addresses gender inequalities that serve as challenges impacting upon the achievement of SDGs, worldwide. These development goals include sustainable food security, which comprises better nutrition through sustainable production, distribution and consumption systems, thus ending hunger and achieving long-term food security. Furthermore, improved lives and livelihoods serve as a major objective to be achieved through facilitating access to

employment, information and education, and through reducing inequalities, while shifting towards sustainable production, consumption and women empowerment. This consequently improves women's welfare. According to Olwande and Mathenge (2012), staple foods have the greatest potential for penetrating both local and international markets, since many farmers can grow them. Over time, this will lead to commercialisation, thus providing an opportunity to escape to above the poverty line. Therefore, policymakers need to develop sound policies that will be both efficient and effective in assisting women financially, in providing access to guaranteed markets and market information, in ensuring equal distribution of resources, and in the provision of public goods.

1.8 DELINEATION OF THE STUDY

This study is organised into seven chapters, including the introductory chapter. Chapter 2 examines the Swaziland maize industry by critically evaluating maize production, labour contribution by women, and maize storage and marketing. The following chapter (Chapter 3) presents the concepts of commercialisation and market participation. Having defined some key concepts and terminologies, it provides an overview of the factors affecting women farmers' decisions to participate in the maize market and the extent of market participation. It also provides the theoretical framework and empirical evidence on market participation. Chapter 4 outlines the research methods and procedures used in the study, while Chapter 5 presents the characteristics of maize farmers. This is followed by empirical results, which are presented and discussed in Chapter 6. Lastly, Chapter 7 concludes by summarising the findings of the study and providing recommendations for policy implications and future research.

CHAPTER 2
ESWATINI'S MAIZE INDUSTRY

2.1 INTRODUCTION

Maize cereal is the most predominant crop grown on Eswatini soil; hence, it constitutes a large portion of the nation's diet. It has become part and parcel of the Swazi way of life, as farmers have a biological connection with producing maize and overall farming. Therefore, it is imperative to understand the importance of maize as a staple food crop to the Swazi people. This chapter presents the maize cycle, from production to marketing. It also brings forth the importance and contribution of women in crop production and household food security.

2.2 MAIZE PRODUCTION IN ESWATINI

Maize is the most dominant crop grown in the country; hence, it is the staple food for the Eswatini people. According to FANRPAN (2003), maize production in the country covers 80% of total land under crop production. Of the four regions, the Middleveld produces the most (45%) maize cereal, with the Lubombo Plateau producing only 4% (Mlipha, 2015). The Lowveld, also known as the driest region in the country, contributes 23% of total production (Mlipha, 2015). However, areas such as Maphungwane comprise some of the highest producing areas as they have more favourable weather conditions in terms rainfall. On the other hand, the Highveld region is known for its climatic conditions favourable for the maize cereal, as production of the crop is highly dependent on rainfall. As such, the region contributes 28% of total production (Mlipha, 2015). Households in the Highveld spent less than 50% of their income on food parcels, compared with household in other regions (MOA, 2016). This accounted for the highest proportion of households in the country which relied on own produce. This goes to show that a considerable proportion of households in the region were engaged in farming. Production of maize cereal occurs on both tenure systems, with subsistence farming being conducted on Swazi Nation Land, while commercial farming occurs on Title Deed Land (Dlamini *et al.,* 2012). About 90% of maize is grown on Swazi Nation Land (Dlamini *et al.*, 2012).

2.2.1 Maize production on Swazi Nation Land (SNL)

In Eswatini, the agricultural sector is the backbone of the rural economy and the livelihoods of rural people, as 70% of Swazis reside on Swazi Nation Land (Mlipha, 2015). With maize being the dominant crop on Swazi Nation Land, the cereal forms an integral part of the diet, tradition and culture of rural communities. Since most production of maize takes place on Swazi Nation Land, the total arable land of which covers 1,910 km^2, this tenure system occupies an estimated total of 57.6% (West, 2000). SNL is allocated to Swazis through the kukhonta system by chiefs and their headmen (Dlamini & Masuku, 2011). Average landholdings are 3 hectares in extent, with households achieving 4.42 tonnes of yield per hectare (Dlamini & Masuku, 2011).

However, crop production on Swazi Nation Land is mainly affected by climatic conditions, as it heavily depends on rain. Extreme weather conditions over the years have led to low productivity on Swazi Nation Land, as shown in Table 2.1. Therefore, production is mainly subsistence oriented and characterised by feminisation of agriculture and low input-use, and is labour intensive and rain dependent.

Table 2.1: Maize production on Swazi Nation Land (2000-10)

Area (ha)	**Season**									
	00/01	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	**09/10**
Area ha ('000)	69	58	68	68	54	56	47	47	60	52
Yield (000 mt)	113	83	68	69	68	75	67	26	60	71
Yield/Ha	1.6	1.4	1.0	1.0	1.3	1.4	1.4	0.6	1.0	1.4

Source: Mlipha, 2015

Due to reliance on rain-fed maize production, preparation of the land begins in August and September. This is followed by the planting season in November, with farmers weeding from December until March, when the crop is young (Mlipha, 2015). This ensures optimal crop growth. Furthermore, around this time, farmers prepare on-farm storage facilities for when maize is harvested. However, harvesting seasons vary from region to region, with the Lowveld harvesting from March to April, and the bulk of maize produce being harvested around May

and July. After harvesting and household food requirements has been met, surplus produce is sold from March to November.

2.2.2 Constraints in maize production

According to FANRPAN (2003), production in the industry is affected by the following constraints:

- Fragmented Landholdings: The average size of land on SNL is 1.3ha. This area is not adequate, thus limiting the quantity that can be produced.
- Climatic Conditions: Recently, the El Niño weather system affected Southern Africa, leaving behind two consecutive years of drought in the country. This affected soil moisture, resulting in low yields.
- Soil pH: Both the Highveld and Middleveld are affected by high levels of acidity in the soil, which results in nutrient deficiencies.
- Lack of Financial Support from Formal Financial organisations: Women often lack assets that serve as collateral when borrowing from organisations such as banks.
- Costs of Production: Farmers find it difficult and expensive to produce maize due to the costs incurred in procuring production inputs, such as seeds and fertiliser. This results in low quality and quantity of maize yields.
- Inadequate Draft Power: The majority of farmers do not own tractors; hence, they must rely on hiring these from RDA programmes that serve as a source of agricultural inputs and equipment. However, due to the low supply of agricultural mechanisation within these programmes, the demands for tractors are not met, thus reducing productivity.

2.3 CONTRIBUTION OF WOMEN TO MAIZE PRODUCTION IN ESWATINI

Before women can engage in production, there is a need to satisfy the demand for farm inputs. These include seeds, fertilisers, herbicides, pesticides, implements and machinery. For instance, the NMC does not accept traditional seed varieties; hence, if women want to sell their maize produce to the corporation, they are compelled to adhere to this quality standard and purchase commercial hybrids and genetically modified seeds. This results in both increased demand and use of agricultural commodities. In addition, the demand for high-value products

leads to the increased demand for financial services such as loans. Such high-value products are expensive, and women farmers cannot afford them. Therefore, loans provide farmers with the means to purchase farm inputs (Moono, 2015). Furthermore, the demands for farm implements and machines lead to advances in agricultural technology that make it easier to produce at a larger scale and save time and resources, thereby increasing productivity. As such, once farm inputs have been procured, production begins.

Previously in Africa, it was customary that men and their sons went out into the fields and did farm work, while women stayed home and engaged in household chores and the processing of food crops. According to Omondi (2015), men were responsible for milking cattle and clearing land in preparation for cultivation using cattle draft power. However, due to industrialisation and wage employment, men have migrated from rural to urban areas to participate in the modern sectors of the economy (Oladejo and Ladipo, 2012). One report has stated that a total of 58% of Swazi males were absent from homesteads, while females accounted for only 28% of absentees (de Vletter, 1981). Sachs and Roach (1983) found a similar result where men's absenteeism was higher than that of females, at a 3-to-1 ratio with average absenteeism rates of 63% and 12% between males and females in rural Swazi homesteads, respectively.

This has led to an era of feminisation of agriculture where women are at the forefront of farm-work (Figure 2.1). They have not only become responsible for planting, weeding and harvesting crops, but have also taken up the role and responsibility of clearing the land, either by ploughing themselves or by hiring a tractor (Saunders, 1982). In the northern part of the country, women were engaged in ploughing fields (Andrehn *et al*., 1977). Furthermore, findings from Andrehn *et al*. (1977), Nxumalo (1979), de Vletter (1981) and Dlamini and Masuku (2011) showed that Swazi women were greatly engaged in planting, hoeing, weeding, harvesting, storage, food processing and preservation. This shows the contributions of women farmers to maize production in the sector. Hence, labour distribution in the production of crops has changed over the years. According to records kept on the hours worked, women ranked first, based on their labour devoted to maize production, followed by children and, lastly, men (Low,1977: FAO, 2011). The majority of the farming activities are done by women as 83% of crops were planted by them while men planted 45% (Sachs & Roach, 1983). The authors further stated that women and children weeded and harvested 95% of crops, compared with men who were involved in 31% of the farming activities. Lastly, they reported that 87% of the women and 83% of the men who were engaged in irrigation schemes produced surpluses;

hence, women are as productive as their male counterparts are when they awarded opportunities to engage in development strategies.

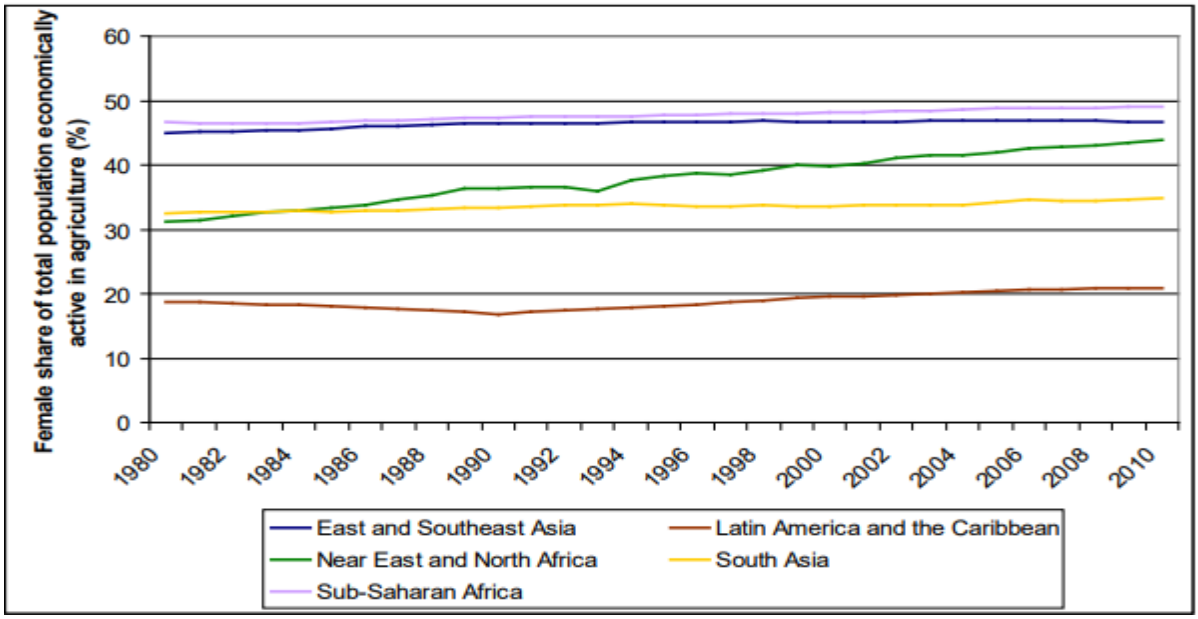

Figure 2.1: Female share of agricultural labour
Source: FAO (2011)

Women farmers contribute to the increased demand for credit, input use and labour, and also contribute significantly to the output that is produced and to food security. With average landholdings being 3 hectares, some homesteads divide their land based on subsistence and commercial production (Mlipha, 2015). Women are known as homemakers; hence, they engage in subsistence farming to ensure that consumption requirements are met, thereby achieving food security. This results in the reduction of child mortality rates caused by malnutrition. Moreover, larger farm sizes will lead to more land being cultivated and higher productivity, and thus the production of marketable surplus. This contributes to the quantity of maize traded in output markets as well as to national food security (Mabuza *et al.*, 2007).

2.4 EXTENSION SERVICES

A government division, the Ministry of Agriculture and Cooperatives, is responsible for the provision of agricultural research, extension and training. This division is tasked with promoting crop production in the country, especially smallholder maize production. According

to Mabuza *et al.* (2007), research on maize mainly focuses on identifying and screening new seed varieties to ensure suitability to the local growing conditions in the country, such as soils and climatic conditions. In addition, new and improved seed varieties are tested for drought tolerance, and pest and disease resistance. As such, seed trials are mainly conducted in the Highveld region due to its favourable climatic conditions for the maize crop, while the Lowveld is used to test drought-resistant varieties as it is the driest region in the country (Mabuza *et al.*, 2007).

Furthermore, farmers receive extension advice and training services from government field staff and extension personnel from NMC. These include workshops, field days and visits which educate farmers on when and how to plant, field preparation and layout, fertiliser application, crop rotation, minimum tillage, use of pesticides and herbicides, and post-harvest techniques. On the other hand, maize price and marketing information is usually provided by the NMC through its extension officers (NMC, 2016).

2.5 STORAGE AND MARKETING OF MAIZE

After harvesting, maize is stored for household consumption. The majority of rural households have on-farm storage facilities that comprise corrugated metal tanks (80%), followed by maize cribs (15%), concrete tanks (3%) and lastly, underground pits (2%), as reported by Mabuza *et al.*, (2007). If the household is self-sufficient, surplus grain is sold either to the NMC or through the informal sector to households in the Lowveld and Lubombo Plateau, from June to September. The NMC operates five regional depots and nine distribution centres, country-wide, as shown in Table 2.2. The storage capacity of the five silos is 23,500 metric tons (NMC, 2016). The largest storage facility (2000 metric tons), which serves as the central regional depot as it receives maize from the other silos, is in Matsapha. It is also near the Swaziland Milling Company.

Table 2.2: Regional depots

Region	Depot	Capacity (tons)
Middleveld	Matsapha	20 000
Highveld	Ntfonjeni	1 400
Lowveld	Madulini	700
Middleveld	Ngwempisis	700
Lubombo	Kalanga	700
Total		**23 500**

Source: NMC (2016)

2.5.1 The national maize corporation

The NMC is a parastatal that was established in 1985 with the sole responsibility of ensuring a competitive market for farmers and meeting the country's maize demand (MOA, 2016). According to Mabuza *et al.* (2007), the corporation has two major shareholders, namely the Ministry of Agriculture and Cooperatives (MOAC) and the National Agricultural Marketing Board (NAMBoard). Both the NMC and NAMBoard are responsible for guiding the Maize Marketing Advisory Committee, which is responsible for setting the price and volume of maize imports in the country (MOA, 2016). The NMC enjoys a monopolistic market as it is the sole importer of white maize in Eswatini. Therefore, it receives no government subventions to cover its operational costs (FANRPAN, 2003). The maize is then sold to two large-scale millers, namely Premier Foods and Swazi Milling.

2.5.2 Eswatini's marketing structure

The provisions of public goods, such as road networks and handling facilities between cities and across districts, are well developed, thereby enabling maize meal to reach local markets and end consumers (MOA, 2016). Figure 2.2 shows the local markets in the country. These markets are found in all four regions in Eswatini. They serve as trading places where farmers can meet buyers and sell their maize produce. However, the majority of these local markets are

situated in towns, as shown in Figure 2.2. This makes it difficult for farmers to access the markets, since the farmers live in the rural parts of Eswatini.

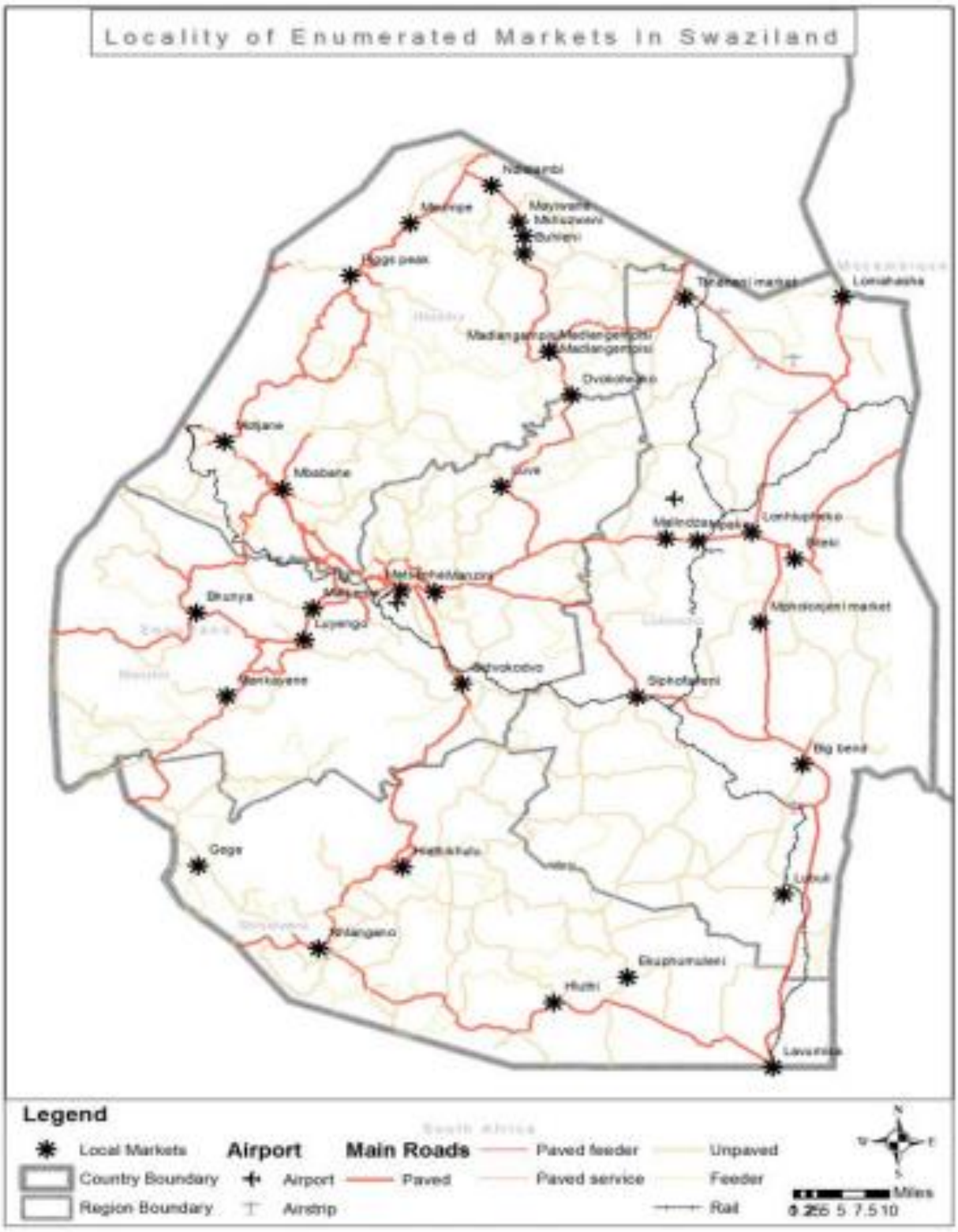

Figure 2.2: Geo-location of markets in Eswatini

Source: Swaziland market assessment (2016)

Figure 2.3 shows the various supply routes that exist in Eswatini's market structure and these include the two large-scale millers which purchase grain from NMC and process it into maize-meal that is later sold to wholesalers, supermarkets and retailers. In addition, households and traders provide another supply route. These suppliers purchase South African VAT-free maize-meal at border points into the country. However, there is a limit of 50 kg per person in one crossing (MOA, 2016). This maize-meal is either consumed directly at household level or disposed of in informal trade that takes place within households. Women are largely involved in household production and the informal trade that takes place between women farmers in the Highveld and consumers in the Lubombo, Lowveld and some parts of the Middleveld zones. In addition, both the Highveld and Middleveld zones have the highest maize production forecasts in the country. Hence, informal trades between households from the above-mentioned zones and maize deficit zones, which include the Lowveld and Lubombo plateau, take place (MOA, 2016). Further, organisations such as the World Food Programme, World Vision and the likes are responsible for food aid imports into the country (Mabuza *et al.*, 2007).

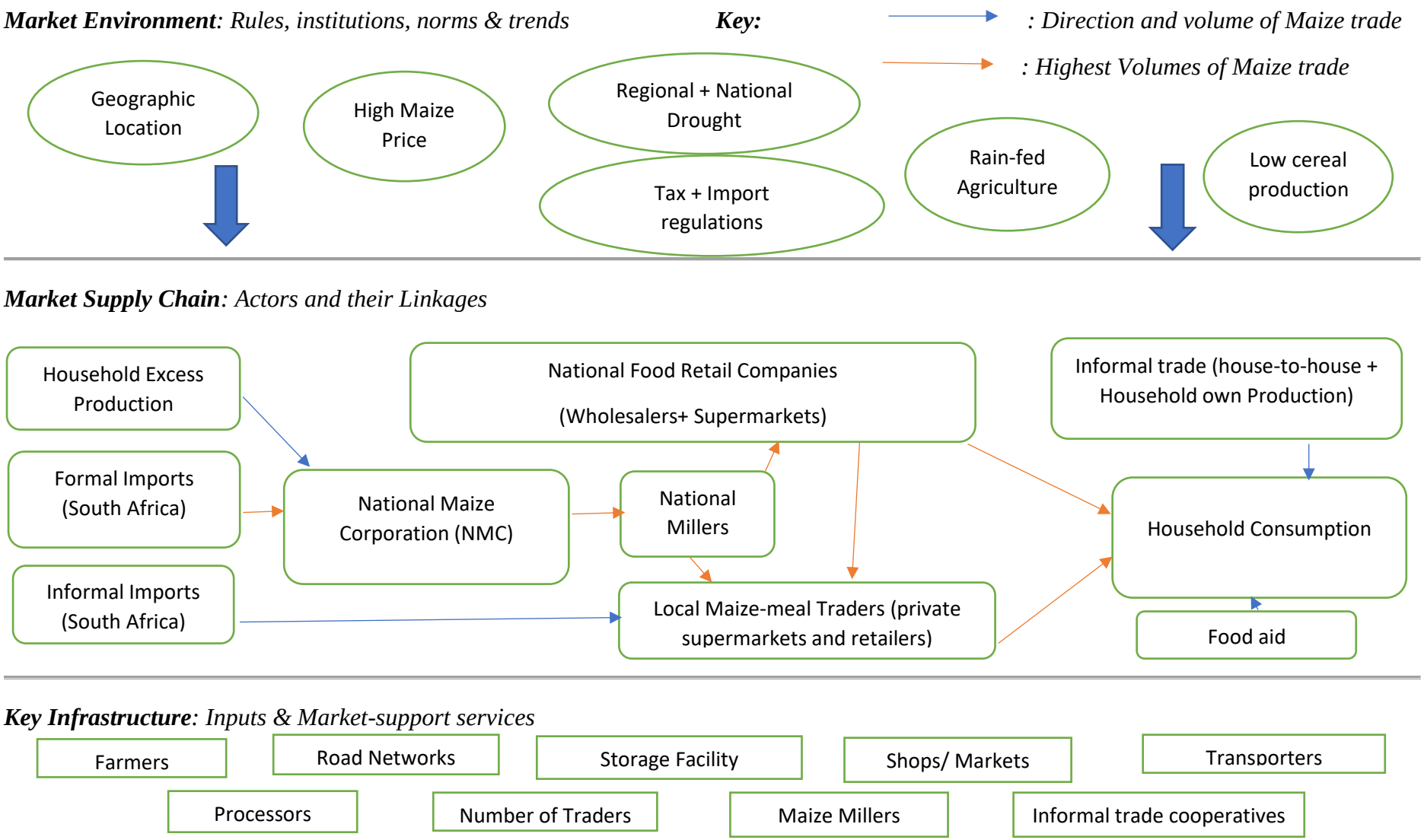

Figure 2.3: Eswatini's maize trade flow diagram

Source: Swaziland market assessment (2016)

2.5.3 Maize prices

The Maize Marketing Advisory Committee, which is guided by NMC and NAMBoard, is responsible for setting maize grain purchasing and selling prices. Due to the recent drought in Southern Africa, maize prices have escalated, thus affecting local prices. This had led to Eswatini experiencing the highest maize prices in Southern Africa, after Namibia, as shown in Table 2.3 below. According to the MOA (2016), prices in the country are 53% higher than South African prices are, with South Africa being the country's main supplier of maize imports. Currently, NMC purchases maize grain at Emalangeni (E) 238/50 kg and 4750/tonne, and sells it at E 280/50 kg and 5,000/tonne (MOA, 2016). After maize has been processed, the prices range from E8,000 per tonne, in 25–50 kg bags, and E9,000–10,000 per tonne, in 10 kg bags.

Table 2.3: Southern African maize meal prices (August–September 2016)

Country	Maize Meal Price US $/kg	Price Comparison to Southern Africa National Average
Botswana	0.53	-8
Lesotho	0.49	-14.3
Malawi	0.64	1.6
Mozambique	0.60	-4.6
Namibia	1.06	68.6
South Africa	0.46	-26.8
Swaziland	0.96	52.7
Tanzania	0.50	-20.6
Zambia	0.35	-44.3
Zimbabwe	0.58	-7.8
Average	0.36	

Source: MOA (2016)

2.6 MAIZE CONSUMPTION

Since maize forms the majority of the nation's diet, it provides about 64% of the average per capita energy intake (Mabuza *et al.,* 2007). According to Tanko and Opara (2010), maize cereal is a multipurpose crop as it can be eaten boiled, roasted or milled into flour, prepared into porridge, or served as livestock feed. Despite the nutritious value that maize plays in the lives of Swazis, it is also of economic importance as it can be used to produce a variety of food and non-food products (Badmus *et al*., 2015). In addition to the maize cereals consumed, rice and wheat provide about 1 and 10% of energy intake, respectively (Mabuza *et al.,* 2007).

2.7 SUMMARY

This chapter highlighted the importance of maize to the Swazi people. Maize is the most predominant crop grown in the country and it is the main staple food for the nation. It is grown in all four regions namely, Highveld, Middleveld, Lowveld and Lubombo Plateau. The Highveld and Middleveld are the highest producing regions thereby contributing 28% and 45% of total production, respectively. However, farmers still face constraints in maize production. These range from; lack of financial support, climatic conditions, soil pH, expensive farm inputs to fragmented landholdings. To try and curb these challenges faced by maize farmers, the government of Eswatini has designed development policies and interventions to assist farmers. These include the provision of extension services, storage and marketing facilities. The NMC was established to assist farmers in selling their maize produce. However, they still experience barriers to market entry. This implies that women farmers may be experiencing even more difficulties in taking part in agricultural commercial activities. The next chapter discusses the factors that influence market participation by maize farmers.

CHAPTER 3
WOMEN IN AGRICULTURAL COMMERCIALIZATION

3.1 INTRODUCTION

This chapter reviews theoretical and empirical literature relating to the commercial orientation and market participation of women maize farmers. It begins by defining terms of the study, namely women farmers and agricultural commercialisation. This is followed by a review of the literature on the determinants that influence women farmers' decisions to participate in the maize market, and the extent of participation. Lastly, it provides estimation models used to model agricultural commercialisation and presents the empirical framework.

3.2 CONCEPTS OF WOMEN AND COMMERCIALISATION

3.2.1 Women farmers

3.2.1.1 *Different perspectives of a woman farmer*

An important feature of the Eswatini agricultural sector is that farming is accessible to both men and women interested in farming. However, differences are portrayed between men and women farmers. According to Phillips (2005), gender should be viewed from a perspective that identifies sex differences between men and women. Such differences between men and women are a result of men and women engaging in specific activities, either on the farm or within the African rural household. One of the main activities of women is their engagement in household chores, while also caring for their young and sick relatives (Omondi, 2015). As such, women are referred to as homemakers who manage and coordinate household affairs and activities. However, in addition to their household duties, women are not excluded from agricultural activities, as they engaged in shelling, drying and processing of food crops (Oladejo & Ladipo, 2012).

Women have limited access to resources as well as to different endowments. Therefore, women farmers can be described as smallholder or small-scale, resource-poor and peasant farmers (Mmbando, 2014). This means that they have a low asset base. They hardly own land and if

they do, it is small landholdings on which they grow subsistence crops and one or two cash crops. Furthermore, female farmers usually rely on their own and their children's labour as a source of labour supply, while male farmers may mobilise all the available labour around the homestead (Barnes, 1979). Another aspect of women farmers is their limited ownership of productive assets, such as cattle, and the differences in human strength, access to education, farming technology and the like (Hill and Vigneri, 2014).

Furthermore, women farmers can be defined as *de facto* farm managers. The gender-specific nature of African farming has changed, as women are becoming more involved in the growing of cash crops, performing male tasks and making decisions on the day-to-day operations of the farm and household. This is a result of the migration of Eswatini men from homesteads due to growing industrialisation, wage employment and western education. Such has contributed to the distinguishing feature of women farmers becoming *de facto* farm managers. It has changed farming behaviour, decision-making, and the time and labour devoted by female producers. Traditionally, women have provided the bulk of agricultural labour, which involves planting, weeding and harvesting produce, while men cleared the land and prepared it for planting. However, the absence of Eswatini men has left women with the responsibility of taking over male tasks on the farm and in the household thereby accomplishing them by themselves (Sachs & Roach, 1983). These tasks include ploughing, tending livestock, milking cows and making household repairs. For instance, Low (1977) has reported that women's labour input in agricultural activities was three times that of the men's labour input.

Moreover, the type of crops grown has distinguished male from female farmers. Income-generating crops, such as export crops, are mainly male dominated ('male crops'), while subsistence crops are 'female crops' (Kumar, 1987). When it is profitable, men take over the production and marketing of crops to the extent of taking over traditional women's crops (Hill and Vigneri, 2014). The classification of crops by gender stems from women being described as homemakers as they are responsible for feeding and caring for the family, thereby growing food crops. On the other hand, men are tasked with providing household income, and to meet this requirement, they must grow cash and export crops (Doss, 2001).

3.2.1.2 *De jure and de facto female farmers*

This study further classified women farmers as either de jure or de facto females in terms of household headship. De jure female-headed households are defined as those households without a male component (Moyo, 2010). These households include women who are single,

have never been married, are divorced or widowed (Moyo, 2010). The woman inevitably becomes the head of the household and is responsible for all farm and household decisions. On the other hand, de facto female-headed households refer to households that have a male component. However, the male figure is temporary absent due to wage employment in urban areas.

3.2.2 Agricultural commercialisation

3.2.2.1 *Agricultural commercialisation framework*

Several definitions of commercialisation exist in literature. According to Pingali & Rosegrant (1995), commercialisation is a market-related activity that involves a transformation process which describes farmers' level of market orientation, progressing from subsistence to semi-commercial and finally, a fully commercialised system, as shown in Table 3.1. The framework further describes subsistence farming as being predominantly agricultural and food self-sufficiency driven, which is achieved through own production of inputs such as retained seed. The semi-commercial system focuses on generating marketable surplus through a mix of traded and non-traded inputs. On the other hand, the farmers' objective in a fully commercialised system is profit maximisation that is obtained through market produced inputs (Kibirige, 2016). As such, market participation may occur either on the input or on output side in terms of increased use of inputs or increased market surplus.

Table 3.1: Farmers' level of market orientation

Level of Market Orientation	Objective	Input source	Product Mix	Household income source
Subsistence farming	Self sufficiency	Own-produced inputs	Wide range	Agricultural
Semi-commercial farming	Marketable surplus	Traded + non-traded inputs	Moderately specialised	Agricultural + non-agricultural
Commercial farming	Profit maximisation	Market produced inputs	Highly specialised	Non-agricultural

Source: Pingali & Rosegrant (1995)

3.2.2.2 *Production for market*

Commercialisation introduces several dimensions in terms of what it means to be commercialised. The first aspect deals with whether a farm or household participates in the market in terms of whether it sells its crop output. Leavy and Poulton (2007) define it as the growing of crops for sale in output markets. Latt and Nieuwoudt (1988) referred to commercialisation as an act of market participation whereby farmers shift towards increased production with the sole objective of exchanging goods and services in output markets. Key *et al.* (2000) and Lapar *et al.* (2003), defined commercialisation as the process in which farmers produce mainly for sale. The driving factor for these authors is market-orientation. Therefore, agricultural commercialisation refers to a shift from production consumption to market-oriented production that encourages the sale of produce (Omiti *et al*., 2009). Such a shift activates the market engagement mode for farmers, thus providing opportunities for income generation (Mmbando, 2014). On the other hand, Makhura 2001) and Kibirige (2016) have defined commercialisation as any market-related activity that is oriented towards profit maximisation. Therefore, farmers stop being subsistence oriented when they produce a marketable surplus with the objective of cash incomes (Pingali, 1997).

In some studies, the probability of engaging in output markets is determined by the extent of commercialisation (Omiti *et al*., 2009; Seyoum *et al*., 2011; Olwande & Mathenge, 2012). This refers to the quantity of output sold by a farmer from total production. Seyoum *et al*. (2011) further referred to commercialisation as the degree of market engagement whereby the quantity of produce sold is a measure of market participation. Hence, the extent or intensity of market participation can be defined as the volume of goods traded in the market. As such, the quantity sold is an important aspect of commercial agriculture as it highlights other aspects.

3.2.2.3 *Additional aspects to agricultural commercialisation*

According to Pingali (1997), before farmers can realise the intensity of market participation in output markets, commercialisation of the input side is likely to occur. Therefore, as farmers become market-oriented, they use less of their own-produced inputs and more of market-supplied inputs. Focus transitions from using animal traction, manure, and traditional methods, among others, to using intensified production systems which involve high-yielding varieties and modern technologies which involve mechanised equipment for ploughing, planting and the

like. This not only improves the productivity of the farmer but also contributes to their growth and learning process. In addition, commercialisation results in the specialisation of activities at both farm and national levels as indicated in Table 3.1. However, Egbetokun and Omonona (2012) reported that this requires an efficient and responsive marketing system to ensure that farmers in remote rural areas are integrated into the national economy. Moreover, such a market-related activity links buyers and sellers together, thus meeting demand and supply as well as accelerating output.

Another component of commercialisation is hired labour. As production tends to be business-oriented, the total area cultivated becomes too great and puts a strain on family labour. As such, an increased demand for hired labour is experienced. This then serves as a form of rural employment and increases agricultural labour productivity. For instance, in Nigeria, Bangladesh and Zambia, hired labour provides employment for about 70%, 47.3% and 67% of the labour force, respectively, the majority of whom are from the rural poor (Egbetokun and Omonona, 2012; Moono, 2015; Osmani & Hossain, 2015).

Lastly, profit maximisation serves as an important dimension of commercialisation (Pingali & Rosegrant, 1995). It goes beyond the marketing of agricultural produce and highlights the point that product choice and input decisions are driven by the profit motive. Therefore, households earn returns on land and labour and can use earned cash incomes to meet other family necessities. This allows households to escape from food insecurity, hunger and poverty. According to Pingali and Rosegrant (1995), income generated through market participation positively influences the nutritional status of children in the household. Therefore, engagement in the market serves as a platform for opportunities in the form of rural development and social upliftment, as the market plays a vital role in accelerating output, consumption and economic development.

As such, literature will be reviewed from the selling perspective. That is, selling is viewed as the main indicator of commercialisation.

3.3 FACTORS AFFECTING WOMEN WHEN PRODUCING AT SCALE

Women normally stay at home and do the majority of the housework. Over the years, women have gradually engaged in several output markets that include fruit, vegetables, grains (corn, rice, sorghum, and millets), and handcrafts. This has brought about substantial progress for

rural Swazi female farmers. Firstly, market participation enhances women's economic independence and bargaining power (Randela *et al* 2008). As a result, women experience better standards of living. Secondly, market participation promotes women's empowerment, thus reducing sexism and other forms of prejudice. However, producing at scale for women farmers has proved to be a challenge because of unequal access and distribution of resources, which has led to different methods of production, levels of market engagement, and forms of marketing for both men and women (Hill and Vigneri, 2014). Therefore, the participation of women farmers in the maize market emanates from different sources.

3.3.1 Land and labour

The issue of land ownership and hectares owned plays a vital role in female-headed households, as it has an indirect bearing on both the ability to produce cash crops and the need to scale production. Fafchamps (2003) found that female-headed households have smaller farm sizes, compared with male-headed households. Doss (2001) also reported their landholdings to be less rich in nutrients and quite far from their homesteads. This inhibits production and achieving marketable surplus for women who have to gain access to markets, and who are at a disadvantage as a result of cultivating smaller plots (Vigneri & Holmes, 2009). Unlike men, tenure insecurity faced by women on SNL reduces their investment incentive. Sachs and Roach (1983) and Holden *et al.* (2001) found in their studies in Swaziland and Ethiopia that, female-headed households had low productivity due to their inability to mobilise male labour and draft power.

3.3.2 Input use and adoption of technology

Understanding the differences in input use and the adoption on new and improved technologies is critical to the ability of women farmers to produce high-value crops. Such technology includes fertilisers, insecticides/fungicides, high-yielding seed varieties, implements and farm mechanisation. Therefore, the use of new and improved technology has an impact on increased productivity and surplus production. In their pioneering study, Doss and Morris (2001) examined men's and women's reasons behind planting improved maize varieties and found that having access to inputs and technology played a vital role. Peterman *et al*. (2010) reported that the adoption rate for women farmers was low compared with men due to women's difficulties in accessing human capital, credit, extension training and membership in social networks. As such, women's difficulties in accessing human capital and credit will result in

low input use such as fertiliser application, as the women farmers will either lack the know how or the financial capacity.

3.3.3 Human capital

Intellectual capital as captured through formal schooling or literacy is important as it affects the ability to adopt new ideas as well as the ability to better understand the advantages of market participation. Therefore, the ability to synthesise market information and adopt the latest farming technology in order to access cash crop markets requires farmers to be literate. This is because the primary requirements for output markets include not only improved technology, but also the delivery of quality products. In their study in Ghana, Doss and Morris (2001) reported that female farmers in male-headed households acquired low levels of education. In addition, Croppenstedt *et al*. (2003) reported that female-headed households had less than four years of formal education.

3.3.4 Credit

Accessing loans from formal financial organisations has proven to be difficult for female farmers (Vigneri & Holmes, 2009). This has a negative impact on the procurement of farm inputs and implements, thus lowering production and market surplus. As such, the lack of collateral is one of the major constraints faced by female farmers as they lack ownership of productive assets such as land and livestock. Furthermore, the capacity to repay loans is critical as it can only be attained through a farmer's ability to produce marketable surplus (Vigneri & Holmes, 2009). This is positively associated with the quality and size of the land. Tangka *et al*. (1999) conducted a study on market-oriented dairying and found that women's productivity was affected by the lack of productive resources, such as credit and land, which are essential for market orientation. Similarly, Drafor (2014) found lack of credit to be a major barrier in achieving commercialisation status by women farmers. The author stated that farmers were attracted by the profitability and inflow of income from early maturing crops, which served to change the social and economic status of women through financial independence.

3.3.5 Extension services, networks and information

Extension officers are important sources of information on production practices, new technologies, prices, markets, and the like. They serve to educate, train and deliver services to farmers in remote areas. However, such information and service delivery are scarce in the

female community. Saito *et al*. (1994) and Doss and Morris (2001) reported that female-headed households and female farmers in general are hardly in contact with extension agents. Although women are eager to learn and access to information is on demand, extension agents often fail to reach women producers (Vigneri & Holmes, 2009). This is because, agents tend to be inContact and work better with farmers that have access to productive resources. In addition, female-headed households have had less access to price and marketing information, which has impeded their access to growing cash crops (Saito *et al.*, 1994). Furthermore, the poor and informal networks that exist among women farmers have resulted in the dissemination of impaired knowledge (Morrison *et al*., 2007).

3.4 DRIVERS OF AGRICULTURAL COMMERCIALISATION

Several factors in literature have been identified as influencing agricultural commercialisation. Studies such as those by Omiti *et al*. (2009) and Martey *et al*. (2012) have distinguished and analysed these factors from internal and external points of view. However, both these perspectives drive the commercialisation process by influencing the factors of demand and supply, output, prices and transaction costs faced by farmers (Pender & Alemu, 2007). The following section discusses the drivers of commercialisation from internal and external standpoints.

3.4.1 Internal factors

Martey *et al*. (2012) defined internal factors as those determinants that are household specific. The household structure has been identified to play an essential role in the process of commercialisation. These factors have been observed to emanate from the household, thus making them household specific. This not only makes them easier to identify and categorise, but also informs the choice and measurement of specific variables to be used in an analytical model. Such factors occur at farm level; hence market participation is mainly influenced by household and resource endowments as described below (Omiti *et al*., 2009).

3.4.1.1 *Socio-economic characteristics*

Socio-economic characteristics can be defined as representing the relationship between social and economic drivers in a community. Previous studies have reported that demographic characteristics and human capital have a significant impact on commercialisation and its degree (Matungul *et al*., 2001; Lapar *et al*., 2003; Barrett, 2008; Randela *et al*., 2008).

Studies such as Randela *et al.* (2008) and Muricho *et al*. (2015) have used the age of the household head as a proxy for farming experience. The relationship between age and market participation was found to be parabolic. This is a result of the different stages of development (Mmbando, 2014). Younger farmers are expected to be more dynamic in terms of new ideas and innovations. Moreover, they are able to realise and appreciate the benefits of engaging in output markets. According to Randela *et al.* (2008), younger farmers are expected to experience lower TCs as a result of their higher socio-economic status. On the other hand, older farmers are more able to overcome TCs, as they are more experienced and have a larger pool of trading partners (Makhura, 2001). In addition, repeated transactions among farmers and potential buyers build up trust, thus lowering costs associated with searching for trading agents, monitoring and enforcing contracts (Goetz, 1992).

Human or intellectual capital is captured by the household head's educational level. It represents the skills and expertise of a farm household. Moreover, it is a tool that households can use to escape above the poverty line. Therefore, the level of education attained reflects on the farmer's ability to process, understand and interpret market information and dynamics. According to Makhura (2001), this improves the decisions to be made on the quantity to be sold. Again, this contributes to profitable participation decisions as farmers can synthesise and effectively use information gathered, which may lower transaction costs and thereby overcome market participation barriers.

Makhura (2001) argues that household size can represent either the productive or consumption units of the household. Hence, family size may explain a household's labour supply for farm activities, especially production. The assumption is that all household members contribute to labour supply, hence households with greater numbers of family members are expected to achieve higher yields, thereby producing more marketable surplus. Contrary to this, Lapar *et al*. (2003) stated that larger households could be under greater pressure to ensure food security within the households, as consumption requirements would be high as a result of having more family members. Therefore, greater amounts of produce would be stored for household

consumption. This has a negative impact on both the probability to participate in the market and the sales volume decisions.

3.4.1.2 *Physical household assets*

Several studies show that resource endowments owned by the household are key drivers of commercialisation (Nyoro *et al*., 1999; Boughton *et al*., 2007; Asfaw *et al*., 2012). Productive assets facilitate engagement in economic activities and lead to increased agricultural productivity (Heierli & Gass, 2001). These household assets refer to a set of property items owned by households. Hence, these asset holdings play a vital role in specifying the quantity of output to be produced. Not only do they determine produce amounts, they also assist in overcoming market barriers as they act as buffers to mitigate production and market shocks, thus serving as important variables in the commercialisation process (Kirui *et al*., 2013). Furthermore, these factor endowments enable farmers to take advantage of market opportunities and escape poverty, as well as being empowered by them.

Land is the most important factor of production (Hill and Vigneri, 2014). Hence, without it, farmers would not be able to produce and participate in markets to sell their produce. Access to land enables farmers to plough and produce food for the family as well as for selling surplus. Where farmers have exclusive rights to land, it can be used as a form of collateral for loans. As such, farmers are able to overcome cash constraints, thereby using resources to purchase and hire farm inputs and mechanisation. In addition, ownership of land motivates farmers to invest in land, as they would have secure land rights. Such land rights are positively correlated with land development. Furthermore, the size of arable land a household owns has a direct bearing on the quantity produced and sold. Therefore, the greater the extent of arable land a household owns, the more likely it will produce high yields, thereby selling more produce (Moono, 2015).

Ownership of livestock is usually associated with prestige and wealth. However, ownership of livestock goes beyond this, as it provides households with draft power (Mmbando, 2014). Using livestock for traction power help households to achieve food security as they are used in production. For instance, cattle and donkeys can be used to plough larger fields, which under normal circumstances, would be impossible to plough. As such, they increase the area planted, thereby increasing the likelihood of entering the market and selling large quantities of produce. Authors Binswanger and McIntire (1987) have further reported that ownership of livestock

serves as a source of rural income as the animals can be sold to purchase improved seed varieties and fertiliser, while on the other hand, they might be put up as an insurance substitute. Moreover, cattle manure can be used as fertiliser for homesteads who cannot afford to purchase inorganic fertilisers. This can improve crop yields, thereby producing marketable surplus (Pravakar *et al*., 2010).

Ownership of transport and communication equipment plays a critical role in agricultural commercialisation. Transport assets, such as vehicles, bicycles, donkey-/ox-carts and motor cycles, aid in reducing transport costs, especially for farmers in remote rural areas. Ownership of such assets comes in handy when farmers must transport inputs from the market to the farm, and produce from the farm to the market (Muricho *et al.,* 2015). Moreover, ownership of an own transport asset serves as an advantage as households are able to market produce on time, before it loses value. Produce gets to the market when it is still in demand and prices are high.

In addition, communication devices, such as a working radio, television and mobile phone, not only allow for information flow in rural areas, but also can be used to educate farmers on modern farming production systems, new and improved technology, and marketing information (Mmbando, 2014). This may lead to the adoption of new innovations, thus resulting in higher productivity and marketable surplus. Moreover, communication equipment helps to link farmers with potential buyers through the provision of such information, thereby lowering transaction costs (Moono, 2015).

3.4.1.3 *Financial endowment*

Several theoretical studies have found that gaining access to financial assets has a positive impact on market participation (Olwande and Mathenge, 2012; Randela *et al*., 2008; Makhura, 2001; Aidoo *et al*., 2014).

Included in this category are credit, savings, and non-farm income. Purchasing power is essential in agricultural production as it enables farmers to purchase farm inputs, implements, and mechanisation such as tractors. According to Randela *et al.* (2008), credit is a major deterrent that hinders access to markets, and the participation and competitiveness of smallholder farmers in the agricultural sector. As such, microfinance may be used to procure inputs, thereby increasing production and the probability of entering output markets. Alternative income sources such as savings can serve as working capital, thus assisting in the

day-to-day operations of the farm. This aids in the general operation of the farm business, thus ensuring production and marketing of produce. Lastly, off-farm income can contribute to marketable surplus when such income is invested in improving the farm and in technology (Alene *et al*., 2008).

3.4.1.4 *Social capital*

Randela *et al*. (2008) defined social capital as a pool of social networks that provides farmers with opportunities to engage in output markets. Sharp and Smith (2003) stated that social capital is a form of collective action that involves being part of a farmer groups, cooperatives, associations and the like. Being part of these farmer organisations works to the advantage of farmers as such networks can lead to various essential outcomes, such as the development of trust that encourages cooperation and joint efforts among farmers to reduce market inefficiencies and failures. In addition, such networks enhance the dissemination of information and resources, as well as encouraging regular exchanges between farmers (Holloway *et al*., 1999).

According to Randela *et al*. (2008), being part of such groups has led to the dissemination of information among farmers regarding prices, new and improved technologies, and when to enter the market. Randela *et al.* (2008) further stated that membership in farmers' groups can strengthen the bargaining and lobbying power of farmers, thus leading to improved coordination and co-operation in lowering market inefficiencies. Stockbridge *et al*. (2003) and Stringfellow *et al.* (1997) reported that social organisations are essential, as farmers are able to build negotiation skills, power and political representation for ensuring a conducive market environment for farmers. Membership also serves to spread fixed costs as these will be distributed equally among farmers. More importantly, these groups help farmers to gain access to markets for their produce at reasonable prices. Thus, group participation encourages market penetration among farmers who find it difficult to access markets due to factors such as TCs.

3.4.1.5 *Product characteristics*

Product characteristics are attributes or features that identify a specific product. These include price, size, and colour. Characteristics, such as output price and quantity produced, play a vital

role in market participation. Komarek (2010) found output price to have a significantly positive impact in banana market participation in Uganda. As a result, output prices serve as incentives to farmers to engage in agricultural markets, as their main objective is to get the best price for their produce. Similarly, Omiti *et al.* (2009) reported output prices to be a key motivator for increased market sales in the rural and peri-urban areas of Kenya. In addition to price, the quantity produced has been identified as a factor influencing the commercialisation of subsistence agriculture. For farmers to sell surplus, they must ensure that they are food self-sufficient first. Hence, higher yields ensure marketable surplus. Martey *et al*. (2012) and Moono (2015) found that the quantity produced had an influence on cassava and rice market participation in Ghana and Zambia, respectively.

3.4.2 External factors

Another frame of reference is comprised of external factors. These factors affect producers either positively or negatively, while some of the effects are ambiguous (Martey *et al*., 2012). The difference between internal and external factors is that external factors are more complex and occur at a macro level. Hence, farmers have no control over such forces. These factors are described in the following subsections.

3.4.2.1 *Population growth and demographic change*

Population growth and demographic change go hand in hand, as an increase in the number of people who live in a particular country, state or city can be characterised by their age, income or other statistical characteristics. In Southern Africa, males have typically migrated from rural to urban areas to participate in the modern sector of the economy, thus increasing the population in cities and towns (Gordon, 1981; Safilios-Rothschild, 1982). Therefore, population growth and demographic change can be classified as demand drivers due to the urbanisation effect of economic growth (von Braun & Kennedy, 1994). For instance, costs related to family labour increase as a result of increasing non-farm employment opportunities, which bring about rightward shifts in the demand curve that are offset by urbanisation.

Such effects, as well as increased incomes, cause a rightward shift in the demand curve for marketable agricultural produce as they accelerate production and increase prices. On the other

hand, such growth and change in the state's demographics can have adverse effects on the commercialisation process, as overcrowding in urban areas can lead to fertile land being used to construct infrastructure such as buildings, roads, power stations and the like. This not only lowers productivity but also results in land degradation. In addition, reduced farm land can result in farmers reverting to subsistence farming to ensure food self-sufficiency, thus decelerating their market participation. Therefore, the effect of population growth and demographic change on commercialisation is not clear (Martey *et al*., 2012).

3.4.2.2 *Technologies*

The adoption of modern technology has played a massive role in the agricultural sector over the years. According to Fafchamps (1992), growth in agricultural production has been rapid due to technological advances which include mechanisation, infrastructure development, improved management practices, introduction of new crops, and dissemination of information. As such, modern agriculture goes beyond farms and producers as it incorporates highly sophisticated management systems that move, store and process output.

Such systems play a more central role in increasing crop yields, compared with traditional systems. For instance, a farmer can use machines to cultivate greater farm areas. This not only accelerates production, thus increasing yields, but also saves time and money as less labour is used. Furthermore, farmers are able to grow large quantities of food and fibre in a shorter period of time (Moono, 2015). Again, improved varieties for crops and livestock not only enhance yields but also give improvements in the quality, reliability and resistance of crops and livestock. In addition, modern transport technology, such as tractors, can help transport inputs and other farm products to the farms, as well as speed up the supply of agricultural produce from farms to markets (Muricho *et al.*, 2015).

3.4.2.3 *Institutions*

North (1990) defined institutions as including the rules of the game that shape human interactions. According to Groenewegen *et al.* (2010), these institutions and mechanisms not only influence behaviour when faced with uncertainty but also provide safeguards and lower risks, thus making interactions more predictable. Institutions consist of both formal and

informal institutions (North, 1990). The following subsections discuss the roles of both formal and informal institutions in the commercialisation process.

Formal institutions

Formal institutions comprise rules, laws, constitutions and the like. These institutions are legally enforced as they are public rules of behaviour that are designed and enforced by a public authority. According to Groenewegen *et al.* (2010), such laws influence the behaviour of economic actors, thus influencing commercialisation. For instance, any influence on social interactions will have an impact on economic performance, growth and development (Kharellah and Kirsten, 2001).

For instance, contract farming serves as a form of formal institution that facilitates agreements between producers, processors and marketers on the supply of products at specific prices, quantities and quality levels. Such instruments build a relationship between producers and processors, thus providing a basis for risk sharing and decision-making among others. Contracting also aids in linking farmers to markets and stimulating production. Such linkages help farmers overcome barriers to entry and in turn reduce transaction costs (TCs).

In addition, property rights play a vital role in modern agriculture and in accelerating the economic performance of actors. However, SNL lacks clear agreement and rules governing its customary land, which results in insecure tenure in terms of existing rights, the number of rights, and the cost of enforcing such rights (Dlamini and Masuku, 2011). Such weak legal arrangements result in the lack of adoption and practising of modern agricultural systems on customary land. Therefore, it deters investments, as farmers fear expropriation of land, and results in high barriers to entry and TCs that are transferred to farmers in terms of farm-gate and retail prices. Moreover, the lack of well-defined property rights can hamper farmers in gaining access to credit, as land can serve as collateral. Therefore, property rights must be clearly defined so as to assist farmers in accessing credit from financial institutions, which is essential for acquiring working capital and dealing with the risks associated with commercial crop production (Lerman, 2004).

Furthermore, government can aid in the development of support services such as research, training and extension. Such services not only link farmers to input and output markets, but

also extend to information and technology dissemination in remote rural areas. This ensures that farmers can penetrate and participate in markets.

Informal institutions

Informal institutions are private rules of behaviour as they involve customs, norms, codes of conduct and the like. Compared with rules and laws, informal institutions are socially enforced. However, these institutions are as important as formal ones are in stimulating or hampering the commercialisation process, as they influence both production and marketing decisions. For instance, chiefs are responsible for allocating land to Swazis through the kukhonta process. They govern the traditional customary tenure system (known as the SNL).

In Eswatini, about 87% of extension officers are males (Sachs and Roach, 1983). This makes it very difficult for women farmers to get assistance regarding agricultural activities, since it is taboo for male agents to visit women at their homesteads. This results in women relying on traditional and less productive methods that hinder their commercialisation process. Furthermore, extension officers tend to aid or concentrate on farmers who are slightly better-off regarding access to resources such as capital, land, and labour (Hill and Vigneri, 2014).

3.4.2.4 *Policy*

A policy is a blueprint or statement of intent that is implemented to achieve rational outcomes. It is formulated and enforced either by an individual or an organisation. This system of principles plays a key role in facilitating the transition of small-scale farmers from subsistence to commercial farming. According to Pingali and Rosegrant (1995), policymakers should develop effective and efficient policies that focus on rural development that is inclusive of rural markets, research and extension, rural infrastructure and the like. Pingali (2006) identified support services, such as market information, extension and credit services, health and nutrition, as focus areas that government must target. Furthermore, North (1990) stressed the importance of well-defined property rights as these can promote tenure security, thus encouraging land investments in rural communities. This also helps enforce contracts, thus reducing costs.

3.4.2.5 *Transaction Costs (TCs)*

Transaction costs rank among the main determinants of commercialisation, as they serve as a challenge to farmers wishing to engage in the market (Makhura, 2001). Farmers are less likely to participate in the market when costs are high. Randela *et al*. (2008) define TCs as comprising costs associated with obtaining and verifying information on trading agents, as well as on goods and services.

Hobbs (1997) identified three types of TCs in the marketing of agricultural products. These include information costs that are associated with searching for markets and trading partners. The majority of farmers are in remote rural areas that are far from towns and consumers. This leads to high search and transport costs. In addition, once the consumer has been located, negotiation and bargaining costs erupt because of information asymmetries about market prices. This will lead to farmers negotiating and bargaining for reasonable prices for their produce. Moreover, costs rise when farmers must specify the terms of exchange between parties, which increases information costs. Lastly, the author identified monitoring and enforcement costs that impose an additional cost burden that hampers commercialisation, as farmers need to ensure that parties meet the exchange requirements. These costs explain why some farmers engage in output markets, while others do not.

Similarly, Bromley (1991), identified TCs as the costs associated with bargaining, negotiating contracts, monitoring and enforcement. As such, market-related costs are the embodiment of barriers to entry often associated with market failures. These costs imply inadequate information and knowledge of market characteristics, such as trading agents, prices, and market opportunities. They hinder market participation as they impose additional costs when conducting market activities**.** Ouma *et al.* (2010) further refer to TC as hidden costs since they can be classified as either observable or non-observable costs related to the exchange of goods and services.

On the other hand, Key *et al*. (2000) classified TCs into two categories, the first of which comprises fixed transaction costs (FTC), which do not affect the supply curve as they remain constant, regardless of the quantity sold. These costs include those incurred in searching for trading agents, bargaining and negotiating, as well as contract enforcement costs. The second category comprises proportional transaction costs (PTC), which are costs associated with imperfect information and transportation costs that affect the supply curve by causing either an upward or downward shift. These costs vary with the quantity traded, and both FTCs and PTCs

influence the probability of engaging in output markets. Furthermore, Scott (1995) groups these costs as either ex-ante or ex-post costs.

Therefore, every market transaction involves TCs, either before or after it takes place. This has resulted in some farmers not participating in the market as these costs are the embodiment of access barriers to market participation through the additional financial burdens that they impose. As such, the costs incurred when farmers are searching for trading partners, screening potential individuals, transferring products and enforcing transactions, among others, should ideally accommodate smallholder farmers, as they impede their market participation (Matungul *et al*., 2001). Several studies have explored the effects that these factors have on market participation by small-scale producers (Goetz, 1992; Key *et al*., 2000; Makhura, 2001; Ouma *et al*., 2010).

Infrastructural factors are also identified as being obstacles that hinder the abilities of women farmers to integrate with the market. These obstacles faced by Swazi women farmers include poor and inadequate road channels that hinder market efficiency (Lindsay, 2015). Those remote farms who suffer from the poor state of roads have to incur high transport costs, leading to a reduction in prices paid by buyers. Moreover, poor infrastructure increases search and monitoring costs, thus limiting the integration of rural markets with international markets (Pingali *et al*., 2005).

Randela *et al.* (2008) used a logistic model within a TCs framework, whereby they evaluated the variables that enhanced market participation by small-scale cotton farmers. The results of this study showed that TCs are central and significantly influenced commercialisation, as the distance to market place had a negative impact, while access to information and guaranteed markets had a positive significant effect on commercialisation. Makhura (2001) and Key *et al.* (2000) also found that distance to markets had a negative impact both on the decision to participate in the market and on the volume of goods sold. Makhura (2001) further argues that the proximity to towns indicates the distance travelled in search of information.

In addition, the lack of access to information can hinder marketing efficiency by increasing transaction costs, such as search, screening and bargaining costs. Makhura (2001) reported that farmers in remote areas experience high TCs, as they must travel long distances to reach information sources. Furthermore, Barrett (2007) has stated that the lack of information regarding market opportunities and commodity prices makes it difficult for women farmers to engage in and join the output market. The Apind (2015) study found that group marketing,

grading, market information, output level, and access to credit and extension services had significant influences on the extent of market participation.

3.5 REVIEW OF RELATED EMPIRICAL STUDIES ON AGRICULTURAL COMMERCIALISATION

Makhura (2001) defined commercialisation as the increased participation in an output market. Data collected through a household survey of 157 randomly selected farm households revealed that, households participated in horticultural, livestock, maize and other field crops markets. Selectivity models, namely Probit and Heckit regressions also revealed that size of arable land, livestock ownership, non-farm income, pensions, proximity to markets, contact with extension officers, road conditions, household size and age were important factors of market participation in the Northern Province of South Africa.

Olwande and Mathenge (2012) employed a double hurdle regression model to identify the factors of market participation in Kenya. The authors defined agricultural commercialisation as a shift from subsistence farming to a more complex production system involving modern technology. The study used a three-year panel dataset, collected from nine agro-ecological zones in Kenya. The results indicated that membership in farmers' groups and farm size played a significant role in market engagement. Their study recommended improving access to land and land productivity, as well as promoting social capital.

Seyoum *et al.* (2011) defined commercialisation as representing a transition from subsistence farming, which is food self-sufficient oriented, to commercial farming where households produce marketable surplus with a profit motive. Their work was on "Factors Determining the Degree of Commercialization of Smallholder Agriculture: the case of Potato Growers in Kombolcha District, East Hararghe, Ethiopia". A sample of 133 farmers was randomly selected from five potato-growing peasant associations. To determine the degree of commercialisation, a robust Ordinary Least Squares (OLS) model used to analyse quantitative data. The OLS results showed that farm size, and access to irrigation and marketing information influenced the level of market participation.

Mmbando (2014) assessed market participation, channel choice and impacts on household welfare in Tanzania. The author defined market participation as the ability to participate in output markets. The study sampled 700 farm households by using a multi-stage sampling

procedure. The Heckman selection model indicated that FTCs and household characteristics influenced maize and pigeon pea markets, while product and market characteristics influenced the quantity sold. The multinomial logit results indicated that TCs, household wealth, social capital, access to extension services and credit had an impact on the choice of market channel. The propensity score matching and endogenous switching regression results revealed that engagement in maize and pigeon pea markets had a significant impact on household welfare.

Ouma *et al*. (2010) studied the transaction costs and smallholder farmers' participation in banana markets in the Great Lakes region of Burundi, Rwanda and the Democratic Republic of Congo. The study used the Heckman two-stage model to identify factors influencing a household's banana market participation in Central Africa. The results indicated FTCs to be the key factors influencing the decision to enter the market, while PTCs influenced the degree of commercialisation. Policies geared towards improving market information, rural infrastructure and collective action were critical, as they not only lowered transaction costs but also enhanced market participation.

Participation in commercial farming has a potential to improve rural incomes and farming households' standards of living. Agwu *et al*. (2012) analysed the socio-economic determinants of commercialisation among smallholder farmers in Kenya. They defined commercialisation as the process of increasing the amount of produce sold by farmers. The study focused on cassava, maize, sweet potatoes, cocoyam and water yam. A multi-stage sampling technique was used, with the first stage selecting two local government areas from three agricultural zones. Three communities were further selected. The second stage involved the random selection of 20 farmers from each community. The household commercialisation index results showed low levels of cassava commercialisation, as the ratio was 29.58%. This was followed by maize (24.02%), sweet potato (19.06), cocoyam (13.79%) and lastly, water yam (13.55%). As such, the study revealed the commercialisation in Abia State to be influenced by household and farm size, proximity to markets, income, membership of a society, farming experience and access to credit.

3.6 THEORETICAL FRAMEWORK

The theory of agricultural commercialisation has developed several aspects, including the agricultural household framework, agricultural development theory, and asset-based

approaches. Makhura (1994) study on theoretical and econometric models of commercialisation behaviour of households in developing areas of South Africa extensively explored several models, including the risk concept. The author argued that risk could be defined in terms of whether the household head was male or female. Therefore, this study adopts Makhura (1994)'s approach, which interpreted the model of von Braun et al. (1991), as presented in Figure 3.1. This model does allow some important partial hypotheses to be tested concerning the exogenous determinants of a farm's transition into the market. The model incorporates risk, which is based on the allocation of limited resources for subsistence and commercial farming. This results in the disutility of risk being balanced against the utility of market goods, thereby allowing an association to be made between commercialisation and risk, i.e. the higher the risk is, the less commercial the household will be. The conditions relating to women tend to render them vulnerable, and their commercial operations may be constrained. As such, such risk conditions need to be removed in order for women to become more commercial.

Von Braun's model presents a production function for both the subsistence and cash good. However, they both demonstrate decreasing returns to labour. Composite goods Z are made up of market and subsistence goods and provide the household with utility, since cash goods are exchanged for market goods. With constant prices for cash and market goods, the quantity of market goods consumed is proportional to the quantity of cash goods produced. As such, cash good production is measured in terms of market goods. Section I, curve a, shows the transformation between subsistence goods (Z_s) and market goods (Z_m). Subsistence production is a function of input X and can be expressed as $Z_s = Z_s\ (x)$, while market goods are obtained from the market in exchange for cash goods purchased by the household. The market goods equation is expressed as:

$$Z_m = (\frac{P_m}{P_c})Z_c \qquad (1)$$

where:

P_m : Price of market goods

P_c : Price of cash products

Z_c : Amount of cash products produced by the household.

The production function for the cash products is given by $Z_c = Z_c(x)$; hence, substituting this production function into Equation (1) yields:

$$Z_m \left(\frac{P_m}{P_c}\right) Z_c(x) \quad (2)$$

Marginal products for both subsistence and cash products are assumed to be decreasing; hence, the transformation curve can be obtained by maximising Z_m subject to Z_s, and fixed x can be expressed as $Z_m = f(Z_s/x)$, where x comprises the fixed resources used to produce either Z_m or Z_s or both. Therefore, a pure subsistence household will produce S_1 amount of subsistence goods, while a market-oriented household will produce M_1 amount of market goods. The marginal rate of commodity substitution between subsistence and market goods is decreasing due to decreasing marginal productivity. The aggregate availability of Z goods (curve f) can be considered as a proxy for households' income (I), as shown in section III. It is a function of subsistence production and can be expressed as:

$$I = Z_m + Z_S(x) \quad (3)$$

Curve c in section IV shows the combination of aggregate income and risk faced by the household. The relationship between aggregate income and risk can be expressed as:

$$I = f(r) \text{ for } I > S_1 \quad (4)$$

That is, there is no risk associated with subsistence households whose aggregate good comprises only subsistence production S_1. When S_1 is produced, aggregate income in S_1 and commercial production is zero and so there is risk. On the other hand, curve d in section IV is the indifference curve that indicates positive utility of income and disutility of risk. Utility is positively related to income and negatively related to risk. The utility function is given as follows:

$$U = U(I, r) \quad (5)$$

where:

I : aggregate income

r : market risk.

The two curves are tangent at point D. This condition determines the optimal levels of aggregate income (C) and risk (F). The level of commercialisation is determined from the market risk function and corresponds to point E on the transformation curve. The level of

subsistence production is also determined from point E on the transformation curve and corresponds to aggregate goods amounting to C. Furthermore, section IV illustrates the effect of a change in risk, such as a guaranteed minimum price. This will be reflected by a shift to the right in the market risk function in section II, resulting in an income curve shift.

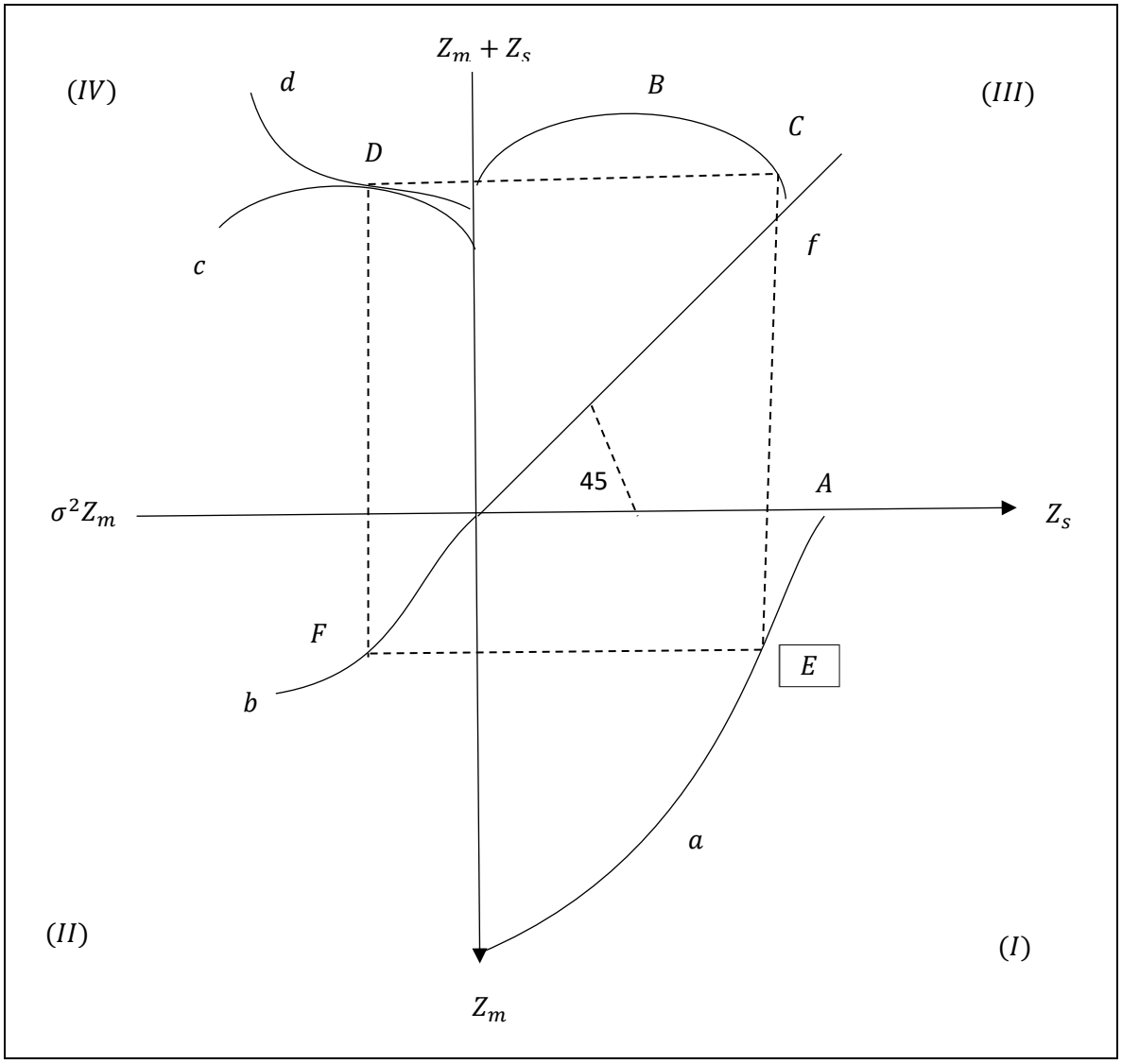

Figure 3.1: Resource allocation to market versus subsistence production under risk
Source: von Braun *et al.,* (1991)

It will be seen that risk-averse households (normally perceived as being female-headed households) keep commercial production low to avoid the risks associated with commercialisation. The more risk-averse farmer will have steeper indifference curves, whereas

those of a risk-taking farmer will be flatter. As a result, the less risk-averse farmer will be more commercially oriented (point *D*) than the more risk-averse farmer will be. Studies such as those of Brynes *et al,* (1999) and Croson and Gneezy (2009) found that women are more risk averse than their male counterparts. This implies that women avoid risk, and so are less likely to commercialise. Women are said to prefer the expected value of wealth rather than to take risk. However, Johnson and Powell (1994) reported that the women risk aversion theory is merely stereotype and stems from the discrimination against them. In addition, such claims should be accompanied by theories that qualify and explain gender differences among men and women in order to explain the conditions that promote risk aversion and those that promote risk taking. For instance, women farmers face different constraints in accessing and controlling productive resources and services than men do, as discussed in section 3.3.1. This then translates into different constraints when dealing with commercialisation risk as well as the options available to women differ (World Bank, 2017). Therefore, before women can be classified as being risk averse, they should have equal access to resources and market opportunities. Furthermore, the risk premium associated with them should be addressed by understanding the constraints they face in both production and marketing.

Importance of incorporating a gender lens

Taking risks is part and parcel of commercial behaviour. Venturing into business, such as agricultural commercialisation, is not without risk. Hence, both men and women engaging in output markets face a certain amount of risk. Risk can be defined as the possibility of losing something of value. According to Makhura (1994), the risk associated with market participation is a result of price and quantity fluctuations. The Word Bank (2017) reported that women farmers are more susceptible to agricultural and market risk than men are. Therefore, incorporating a gender lens is crucial as it enhances the understanding of gender differences while assessing risk associated with commercialisation (World Bank, 2017). Furthermore, it leads to inclusive and effective agricultural policies and interventions that are tailored for a specific gender. Therefore, understanding the primary causes of gender differences when households are faced with risk is important for mitigating and developing interventions, risk-coping mechanisms and programmes to deal with such obstacles (World Bank, 2017).

3.7 ESTIMATION METHODS USED IN COMMERCIALISATION STUDIES

Several studies, such as those by Makhura (2001), Ouma *et al*. (2010), Mmbando (2014) and Moono (2015), have considered commercialisation as a two-step decision process. Firstly, it is the decision whether to participate in the market or not, followed by the intensity of participation. The probability of market participation can be estimated using either the Probit or logit models (Martey *et al*., 2012). This study has selected the Probit model because it is easier to compute when analysing factors that influence a farmer's decision to commercialise. Furthermore, the dependent variable has a binary response, hence it is dichotomous. However, just like the logit model, the probit model fails to draw a distinction between farm households that sell a small portion of their output and households that sell a large portion. Therefore, the ordinary least squares (OLS) regression model is used to estimate the level of commercialisation.

3.7.1 The Tobit regression model

The Tobit model, also known as a censored regression model, was first proposed by Tobin (Tobin, 1958). This statistical model uses the method of maximum likelihood to determine the relationship between limited dependent variables (y) and a set of explanatory variables (Maddala, 2001). Therefore, it is observed once above or below a cut-off level. Apind (2015) explains that, due to left censoring, the regression line is pulled down at the end, resulting in under- and over-estimation of the intercepts and slopes, respectively, while truncating the sample will also lead to over-estimating the intercept and under-estimating the slope. Moreover, the model interprets households that report zero sales as corner solutions, meaning that the household is a seller with zero outcome. This increases biasness. Another drawback is the clustering of zeros (Moono, 2015). For instance, if women maize farmers did not sell due to market barriers, this will result in an assessment of a rational choice by them as not wanting to participate willingly. Again, Heckman (1979) argues that the Tobit model does not allow a vector of variables that explains (y) to differ from those explaining the value of (y) unless it is positive. Therefore, the suitability of the model is seen when the decision to participate and the intensity of market participation are taken concurrently. Studies such as Greene (2002) and Martey *et al.,* (2012) used the Tobit model. When decisions are not taken simultaneously, both the double hurdle and Heckman two-step approaches are deemed appropriate (Mather *et al*.,

2011). To determine the probability of partaking in the market, both models use the probit regression model in the first stage, and diverge in the second step when determining the variables influencing the quantity sold.

3.7.2 Double hurdle model

The double hurdle model is a form of the Heckman model that uses data that is randomly drawn from a population sample (Maddala, 2001). In the second step, when assessing the intensity of participation, the truncated model is used. Burton *et al.* (2000), Shirferaw *et al.*, (2008) and Omiti *et al.*, (2009) used the double hurdle regression to model commercialisation in their studies. This model is more appropriate than the recursive simultaneous equations of the Tobit model when dealing with factors that are expected to impact upon participation. However, incidental truncation is a major problem in this model as the outcome of another variable may result in the dependent variable not being observed. Moreover, Komarek (2010) has argued that this method does not account for selection bias and endogeneity issues, thus resulting in biased and inconsistent estimators. Therefore, to solve the selection bias problem, a two-step Heckman approach is appropriate (Greene, 2003).

3.7.3 Heckman's sample selection model

Heckman's two-step approach has been widely used in studies when dealing with the determinants of commercialisation. As mentioned above, the first step uses the probit analysis to estimate the probability of participation, while the second step uses an OLS model to determine the intensity of participation. The inverse Mills ratio, computed from the probit regression, is run with the other independent variables in the second step to help explain the non-zero dependent. This model also eliminates bias attributable to omitted variables, as well as accommodates selectivity bias due to purposive sampling. Goetz (1992), Alene *et al.*, (2008) and Moono (2015) used this model in their studies. Lastly, the Heckman model relaxes the assumptions in the Tobit model, as decisions are taken separately (Apind, 2015).

Given that the two selection models account for both the decision to participate and the intensity of commercialisation, the double hurdle model was not suitable for this study because it does not cater for selection bias. Therefore, this study adopted Heckman's method because

the selection problem was probable, as only 62.3% of farmers participated in the maize market during the 2016/2017 marketing season. As a result of some farmers not participating, selection bias is a problem; hence, the Heckman method is most suited to deal with it. Moreover, the model assumes the factors that influence the probability are different from those that influence the intensity of commercialisation.

3.8 SUMMARY

This chapter used the literature to describe the key concepts of the study, namely the women farmer and agricultural commercialisation. In this study, women farmers are defined as homemakers, resource poor farmers and *de facto* farm managers. Agricultural commercialisation involves a shit from subsistence farming to participating in commercial agriculture through the sale of produce. Market orientation is a subset of commercialisation. The empirical literature also assisted in grouping the factors that influence commercialisation from an internal and external perspective. Internal factors are were viewed as those within the farmers control. These include resource endowments such as land, labour, physical and human capital. Hence, they are household specific and occur at farm level. On the other hand, commercialisation can be influenced by external factors such as population growth and demographic change, institutions, technological change and TCs. These factors occur at a macro-level; hence, they are beyond the farmer's control. The study narrows these factors to highlight the theoretical analysis and measurement of specific variables to be used in the econometric model.

This chapter also reviewed empirical studies on agricultural commercialisation. Several studies identified TCs as the major barriers to the efficient participation of producers in markets. This study identifies several factors and groups them into categories. In addition, these studies treated farmers as a homogenous group of stakeholders. This provides insight for the present research as it isolates women farmers. The chapter also identifies different estimation methods to model commercialisation. These include the Tobit, double hurdle and the Heckman model. The study adopts Heckman's model since it caters for selectivity bias. The model assumes that the factors that influence market participation are different from those that influence the level of commercialisation. The next chapter discusses the methods and procedures used in the study.

CHAPTER 4
METHODS AND PROCEDURES

4.1 INTRODUCTION

This study focuses on the main research question of what factors influence the commercialisation of women maize farmers in the Highveld. It explores both the factors that influence their decisions to commercialise and the intensity of commercialisation. Therefore, this chapter presents the methodology used to achieve the study objectives. It begins by addressing the study area, which is followed by a description of the sampling procedure and data collection technique. The data collected is discussed in the context of how the variables are used in analysis. Lastly, this section deals with data analysis.

4.2 THE STUDY AREA

Figure 4.1 shows the four regions in Eswatini, including the Highveld. The Highveld region is situated between latitudes 26° 00’ south and longitudes 31° 30’ east in the north-western part of Eswatini, from the north and running towards the southwards and to the centre. It is bordered to the south-east by the Lubombo district and on the south-west by the Manzini district. The Highveld region covers an area of 3,569 square kilometres, with a population of about 300 000 Emaswati (MOA, 2016).

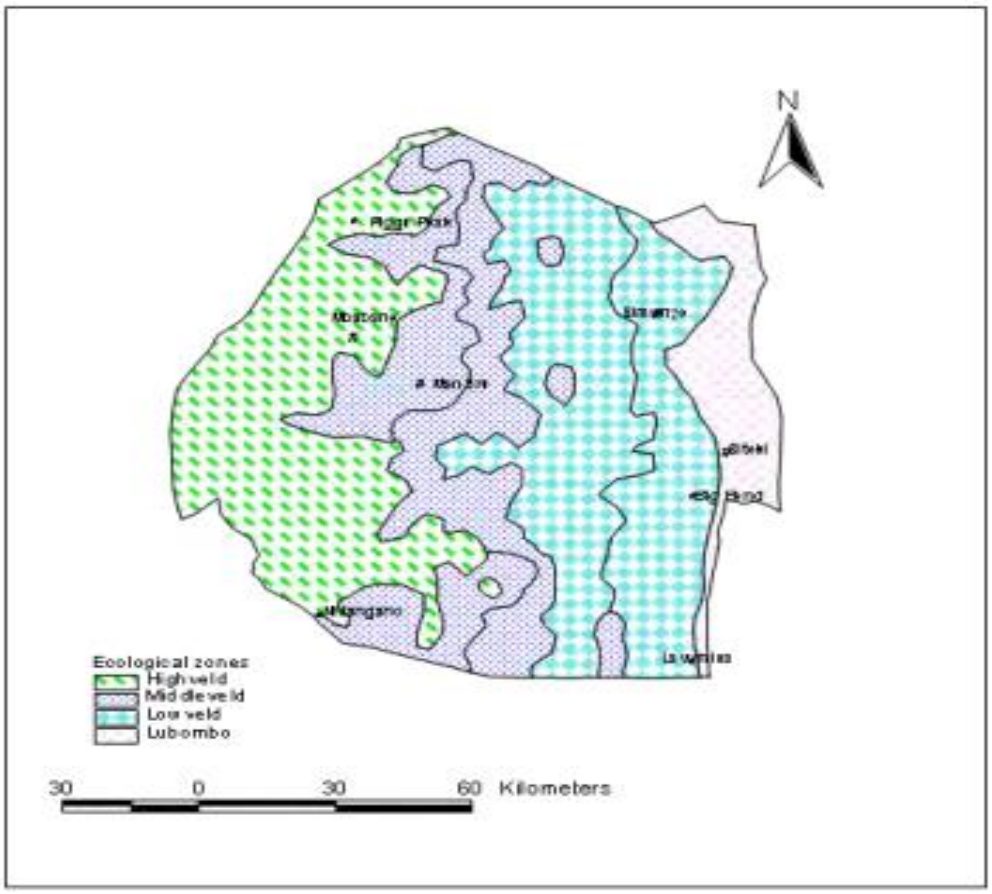

Figure 4.1: Map of Eswatini showing the four ecological zones

Source: Mlipha, 2015

Monthly, the maximum and minimum average temperatures in the district are 22 and 11 degrees Celsius, respectively, with an average rainfall estimated to be about 55 inches (1400mm). As such, climatic conditions range from wet summers, with the highest annual rainfall in the country, to dry winters. Furthermore, this agro-ecological zone is known for its man-made forests of pine and eucalyptus, which are of commercial importance as they supply timber to wood pulp and sawmills (MOA, 2016). In addition, households in the region spend less than half of their income on food stuffs, as compared with households in the other three districts (MOA, 2016). This indicates that households in this region supply most of their own food products. The Manzini, Hhohho and Shiselweni districts provide 96% of the maize produced in the Swaziland, with the Hhohho district contributing 28% of total maize production (Dlamini & Masuku, 2011).

4.3 SAMPLING PROCEDURE

This study employed a purposive multi-stage random sampling technique to arrive at the various units. The first stage involved a purposive selection of the Highveld region, based on preceding knowledge of it being one of the largest producers of maize in the country. The second stage involved the selection of six communities, namely Nsingweni, Maphalaleni, Endlozini, Sitseni, Kasiko and Motjane. These communities were purposefully selected based on their ability to produce surplus, supply NMC, and sell to households in maize-deficit regions; their proximity to the markets; the high participation of women in crop production; and women's group that aid in the eradication poverty through farming and other income-generating activities. The last stage involved the random selection of men (61) and women (131) farmers from the six communities, making a total of 191 farmers. Although this study is on women, men were sampled to correct for biasness, and their participation in the maize market was presented as supplementary data.

4.3.1 Sample size determination

An up-to-date list of 308 maize farmers, who attended the NMC meeting in June 2018, was obtained from community headmen (Table 4.1). This list formed the sample frame and controlled for sample frame error. The sample size was calculated from the target population. This made up the number of respondents interviewed from each community. The Roberts-Lombard (2006) formula was used to calculate the sample size. This formula is shown below:

$$n = \frac{N}{(1+N(e)^2)} \qquad (6)$$

where:

n = is the sample size

N = total population of maize farmers who attended the NMC meeting in June 2018

e = margin of error (0.1) for obtaining a representative sample.

Table 4.1: Households interviewed per community

Community	Target population	Sample size
Maphalaleni	67	40
Nsingweni	100	50
Motjane	20	17
Endlozini	58	37
Kasiko	24	19
Sitseni	39	28
Total	**308**	**191**

Source: Survey data (2018)

4.4 DATA COLLECTION

Primary data was collected from farmers in the six communities through using semi-structured questionnaires. Farmer's surveys and key informant interviews were used to capture farmers' information on socio-economic characteristics, household assets, social capital, and market, institutional and production factors. Household heads were interviewed. Additional data details were obtained through informal discussions and personal observations in order to support data obtained from farmers. Furthermore, literature was reviewed from secondary data sources such as journal articles, textbooks, and online material. A pilot study of 30 respondents was conducted to test whether the questions were clear, appropriate and relevant for the study. The pre-test survey was carried out in August 2018 and included farmers from the Bethany community. Three enumerators, who are fluent in the local language (Siswati) and understand the Swazi way of life, were trained and assisted in the data collection process.

4.4.1 Data management

To ensure that the information gathered from the household survey was suitable for the study, the data was edited, coded and cleaned. This also ensured that the information obtained was consistent, uniform and accurate. In addition, diagnostic tests were run to check for model

misspecification issues, as well as to see if variables could be modelled together, without concerns such as multicollinearity.

4.4.2 Diagnostics tests

4.4.2.1 *Multicollinearity*

Multicollinearity refers to high inter-associations among explanatory variables that cause the statistical power to weaken because of reduced precision (Gujarati, 2007). Therefore, one cannot trust the effect of the variables. Another problem of multicollinearity is the sensitivity of coefficient estimates towards small changes in the regression model (Gujarati, 2007). As a result, the Variance Inflation Factor (VIF) and the correlation matrix were used to test for high inter-correlations the data.

4.4.2.2 *Pearson's pair-wise correlation matrix*

This test is also used to measure the strength and direction of relationships between variables. Therefore, a pairwise correlation of more than 0.8 suggests highly correlated variables in the data (Gujarati, 2007). A correlation matrix was generated using SPSS 25, and the results were consistent with those of the VIF test, as multicollinearity was not a problem since no variables had a pairwise correlation above 0.6. (Appendix A).

4.4.2.3 *Variance inflation factor*

The Variance Inflation Factor (VIF) is a test used to identify correlations, as well as the strength, by producing inflated variances in the presence of multicollinearity. VIFs have a range of 1 to infinity; hence, a value of 1 shows no correlation, 1 to 5 indicates moderate correlations between explanatory variables, while greater than 5 suggests highly correlated variables (Gujarati and Porter, 2009). The results showed VIF values of less than 5, which suggested that multicollinearity was not a problem among the variables (Appendix B).

4.4.2.4 *Testing for outliers*

Outliers are values extreme from others which can distort statistical tests, resulting in incorrect conclusions (Gujarati and Porter, 2009). Boxplots were used to identify outliers and four variables, namely Yield (output), farm size, price and distance to market (mins), were detected for outliers.

Of the above-mentioned variables, distance to market had 8 outliers and the mean was checked to see if these influenced the data. With these values, the average market distance was 110.08 minutes, with a standard deviation of 41.51, and when these were excluded from the data, the mean was 105.48 with a standard deviation of 28.01. The difference was significant; hence, these outliers were dropped. However, outliers detected for yield, price and farm size were insignificant.

4.4.2.5 *Heteroskedasticity*

Heteroskedasticity refers to a non-constant variance which may result in biased standard errors, leading to incorrect conclusions. To determine how much variance in the dependent variable is explained by the independent variables, a Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was run in STATA 14.0. Since heteroskedasticity is a common problem in cross-sectional data, robust standard-errors were used to correct this problem (Wooldridge, 2002).

4.5 DATA ANALYSIS

Following the diagnostic tests, the data was processed using both the Statistical Package for Social Scientist (SPSS) 25 and STATA 14.0 computer programs. Descriptive statistics, the Chow test, and Probit and OLS regression models were used to analyse data. Descriptive statistics involved distribution tables, frequencies, percentages and means. These were used to present socio-economic, household, institutional and market characteristics.

4.6 ANALYTICAL FRAMEWORK

4.6.1 Chow test for non-separability of data

The Chow test is used to determine whether the relationship between the dependent variable and the explanatory variables are the same between groups and site-specific models. It leads to the conclusion on whether pooling or separating the model is ideal. Therefore, since the data was collected from both men and women farmers, it was necessary to determine if it was

appropriate to estimate a pooled sample model, or to split the data into gender-specific models. This study used Chow's seminal test to assess whether data from men and women farmers was significantly different (Chow, 1960). Therefore, gender-specific models for both male and female sub-groups were presented as follows:

$$Y_m = \beta_m X_m + \varepsilon_m \quad (7)$$

$$Y_f = \beta_f X_f + \varepsilon_f \quad (8)$$

where:

Y_m and Y_f = represent vectors of the dependent variables

β_i = the parameters to be estimated

X_i = vector of explanatory variables, where: $_{i\,=}$ m, f which account for men and women sub-groups respectively.

ε_f = error term.

The null hypothesis is that there was no structural change across the men and women sub-samples.

$$H_0 = B_f = B_m \quad (9)$$

To estimate the Chow test, the pooled sample was split into two sub-samples, namely men and women farmers, where the residual sum of squares (RSS) was obtained for both restricted (pooled sample) and unrestricted (sub-samples) models, as shown below:

$$F* = RSSp - \frac{\frac{RSSw+RSSm}{P}}{(RSSf+RSSm)/(n-2p)}$$

where:

F^* is the test statistic

RSS_p= Residual sum of squares for the pooled sample

RSSw= Residual sum of squares for the women sub-sample

RSSm= Residual sum of squares for the men sub-sample

P= number of parameters in the model

N= number of observations.

4.6.2 Model specification

Objective 1: To identify the factors that influence Eswatini women farmers' decision to participate in the maize market in the Highveld region of Eswatini.

The factors that influence the decisions of women farmers to participate in the maize market were estimated using the Probit regression model, based on farmers' information on whether or not to engage in the market. Following studies such as Makhura (2001), Randela *et al.* (2008), Omiti *et al*. (2009), and Seyoum *et al*. (2011), age, education, household size, farm size, livestock, radio, mobile phone, off-farm income, savings, credit, market information, vehicle, extension services, farmers' group, and fertiliser were used in Probit model as independent variables. Hence, the Probit regression model for identifying the factors that affect market participation decision of farmers in the Highveld region is specified in the following way (Moono, 2015:

$$\Pr(Y_i = 1|x_i, \alpha) = \boldsymbol{\Phi}\big(h(x_i, \alpha)\big) + u_i \quad (10)$$

where:

Y_i = the indicator variable equal to unity for a household that sold maize

X_i = vector of factors affecting market participation

α = coefficients to be estimated

$\boldsymbol{\Phi}$= distribution function

U_i = error term.

The variable Y_i assumes the value of 1 if marginal utility household $_i$ gets from participating in the maize market is greater than 0, and 0 otherwise, as shown below:

$$Y_i^* = \alpha x_i + v_i \quad (11)$$

where Y_i^* is the latent variable for utility the household gets from participating in the maize market and the error term is $V_i \sim(N, 1)$; hence:

$$Y_i = 1 \; if \; Y_i^* > 0 \qquad (12)$$

$$Y_i = 0 \; if \; Y_i^* \leq 0$$

Objective 2: To identify the factors that influence the level of market participation among women maize farmers in the Highveld region of Eswatini.

While other authors examine the decision to participate and the extent of participation simultaneously, this study observed them as two distinct decisions (Moono, 2015). This implies that independent variables that influenced the probability of participating in the market were different from the sets of independent variables that influenced the intensity of commercialisation. Therefore, the regression allowed for estimation by the OLS regression model, where the level of maize market participation (Y) is a linear function of regressors X. This represents the supply volume decision, which is measured in quantities. Independent variables modelled together included age, education, household size, farm size, livestock, radio, mobile phone, vehicle, non-farm income, access to credit, market information, savings, extension services, farmers' group, fertiliser, price, and the commercialisation index. As such, the extent of participation is indicated by (Mmbando, 2014):

$$Z_i = X_i\beta + \varepsilon_i \qquad (13)$$

where:

Z_i = presents the quantity of maize sold

X_i = the vector of independent variables influencing the intensity of market participation

β = the vector of coefficients

ε_i = the error term.

However, the regression model produces biased results, since error terms from both the probit and OLS models are correlated such that $corr(u_i, \varepsilon_i) = \rho$.

To correct for this bias, lambda (inverse Mill's ratio), which was calculated from the probit regression, is incorporated into the OLS model. As a result, the equation is specified as follows (Greene, 2003):

$$\lambda_i = \frac{\phi(Z_{iY}/\sigma_u)}{\Phi(Z_{iY}/\sigma_u)} \quad (14)$$

where:

X_i= the determinants of the extent of commercialisation

β is the vector of coefficients

$\sigma_s \; and \; \sigma_u$= the standard errors for regression and selection models, respectively.

λ_i = represents the inverse Mill's ratio

ϕ and **Φ** are the density and distribution functions, respectively.

4.7 DESCRIPTION OF VARIABLES

Dependent variables

The maize market represents the dependent variable in the participation equation. It is denoted by the probability of selling maize; hence, the participation model takes the value of 1 if the household sold maize during the 2016/2017 marketing season, and 0 if no sales were made. On the other hand, the dependent variable in the supply equation represents the quantity sold during the 2016/2017 marketing season.

Independent variables

Based on previous studies on commercialisation, explanatory variables have been identified and hypothesised to explain commercialisation and its intensity. For this study, explanatory variables were grouped into seven categories, namely household characteristics, household assets, social capital, financial endowment, production technology, market and institutional characteristics. These variables are discussed and summarised in Table 4.2.

Table 4.2: Description of variables used to analyse the determinants of commercialisation and intensity of participation

Variable name	Variable code	Variable description	Measurement	Expected sign	Source of hypothesised relationships
Dependent Variables					
Maize market	MAIZMKT	Probability of selling maize	1 = if household sold; 0 = otherwise		
Quantity sold	QS	Quantity of maize sold	Kilograms (kg)		
Household characteristics					
Age	AGEHH	Age of household head	Years	+/-	(Randela *et al*., 2008 ; Martey *et al*., 2012)
Education	EDUC	Education level of household head	Grade completed	+	(Boughton *et al*., 2007 ; Olwande & Mathenge, 2012 ; Lubungu *et al*., 2013)
Household size	HHSIZE	Family size		+/-	(Lapar *et al*., 2003 ; Ehui *et al*., 2009 ; Siziba *et al*., 2011)
Household assets					
Farm size	FSIZE	Average landholdings	Hectares	+/-	(Komarek 2010; Jagwe, 2011)
Transport asset	TRANS	Ownership of transport asset	1 = yes; 0 = otherwise	+	(Mather *et al*., 2011 ; Olwande & Mathenge, 2012 ; Reyes *et al*., 2012)
Communication asset	COMM	Ownership of communication asset	1 = yes; 0 = otherwise	+	(Goetz, 1992; Key *et al*., 2000)
Livestock	LIVEOWN	Ownership of livestock	1 = yes; 0 = otherwise	+	(Heierli & Gass, 2001; Boughton *et al*., 2007)
Working radio	RADIO	Ownership of working radio	1 = yes; 0 = otherwise	+	(Siziba *et al*., 2011; Olwande & Mathenge, 2012)
Social capital					

Farmers' group	FASS	Membership in farmers' group	1 = yes; 0 = otherwise	+	(Matungul *et al*., 2001; Mmbando, 2014)
Financial endowment					
Savings account	SAVACC	Access to savings	1 = yes; 0 = otherwise	+	(Aidoo *et al*., 2014)
Non-farm income	NFARM	Income earned from nonfarm activities	1 = yes; 0 = otherwise	+/-	(Makhura, 2001; Omondi, 2015)
Credit	CREDIT	Credit access	1 = yes; 0 = otherwise	+	(Olwande & Mathenge, 2012; Omondi, 2015)
Institutional factors					
Marketing information	MKTINFO	Access to marketing information	1 = yes; 0 = otherwise	+	(Komarek, 2010; Siziba *et al*., 2011)
Extension services	EXT	Access to extension services	1 = yes; 0 = otherwise	+	(Siziba *et al*., 2011)
Production technology					
Fertiliser	FERT	Used inorganic fertiliser	1 = yes; 0 = otherwise	+	(Mather *et al*., 2011; Chilundika, 2011)
Market factors					
Output price	PRICE	Per unit price of maize sold	Emalangeni	+	(Key *et al*., 2000 ; Omiti *et al*., 2009 ; Komarek, 2010)
Commercialisation index	HCI	Proportion of a households produce that is marketed	1 = household is more market-oriented; 0 = otherwise	+	(Chilundika, 2011)

4.8 SUMMARY

In this chapter, the study methods and procedures employed are presented. A multi-stage sampling technique was used. The study was conducted in the Highveld region as it is the second largest maize producer with women at the forefront of production. 191 respondents were selected from six communities namely, Nsingweni, Maphalaleni, Endlozini, Sitseni, Kasiko and Motjane. Farmer's survey and key informant interviews were used to capture farmers' information on socio-economic characteristics, household assets, social capital, and market, institutional and production factors. Diagnostic tests were conducted to ensure that information obtained was consistent, uniform and accurate. Following the tests, data was processed using SPSS 25 and STATA 14.0 computer programs. Descriptive statistics, the Chow test, and Probit and OLS regression models were used to analyse data. The following section presents sample characteristics and empirical results.

CHAPTER 5
HOUSEHOLD CHARACTERISTICS AND TENDENCY FOR MAIZE COMMERCIALISATION

5.1 INTRODUCTION

Various factors influence market engagement. These range from market factors, product characteristics, and transaction costs, to household characteristics. As such, the household tends to be the focal point as it contributes to the existence of commercialisation factors. For instance, information regarding market access and the process of engagement could stem from household characteristics such as age, education and the like.

Therefore, this chapter provides an overview of the characteristics of the sampled households in the Highveld region. It is divided into three subsections, with the first section presenting the household structure. This is followed by further descriptive statistics that include comparison of factors among male and female-headed households (*de jure* and *de facto* female-heads). Lastly, this section tests for the differences in means between participants (sellers) and non-participants (non-sellers) in the maize market with respect to their socio-economic, household, institutional factors and the like.

5.2 SOCIO-ECONOMIC CHARACTERISTICS OF THE SAMPLE

This section discusses the socio-economic characteristics of the sampled households in the Highveld region. These determinants not only influence the behavioural organisation of the household, but also its economic behaviour, as they affect the households' decision-making with regard to economic activities and livelihood strategies. In addition, socio-economic characteristics give insight to a household's susceptibility to economic, political and cultural shocks. Hence, an understanding of household characteristics is an important aspect in drafting policies that are effective and efficient for promoting development such as such as agricultural commercialisation.

5.2.1 Household structure

This involves the family structure that comprises the family support system. It is inclusive of the family size and the engagement of household members in various social and farming activities.

5.2.1.1 *Household size and composition*

The household is the prime socio-economic unit in societies and is made up of a number of persons living together. As shown in Table 5.1, the minimum and maximum household sizes ranged from two to thirteen people, with the average size being approximately seven members. Normally, the mean household size that makes up a nuclear family constitutes two adults and five children, while other households comprise either a single parent (no husband), or polygamous or extended families (in-laws, relatives and grandparents). As such, larger family sizes are typically a result of polygamous and extended family arrangements. Furthermore, the composition of female members was slightly higher than the males. This might be explained by male household heads marrying more than one wife, or their male children taking wives who would now relocate to stay at their in-laws' household, thus increasing the number of female members in the household. On the other hand, households that did not have any children were predominantly those that were headed by grandparents, whose grandchildren lived in the urban areas with their parents, and would visit during school holidays.

Table 5.1: Household size

Variable	N	Mean	Minimum	Maximum	Std. Dev
Total male members	191	3.01	0.00	7.00	1.39
Total female members	191	3.96	1.00	10.00	1.77
Number of children	191	4.96	0.00	12.00	2.16
Total family members	191	6.98	2.00	13.00	2.28

5.2.1.2 *Gender, age, and education of the household head*

Household characteristics, such as gender, age and educational level, are important determinants in understanding how decisions are made by households. These decisions are normally made by household heads, who are also responsible for the economic maintenance of households as they are the primary breadwinners. In the Swazi culture, the husband is the head

of the household and is responsible for both household and agricultural decision-making, made with regular consultations with the wife. However, in the absence of males from homesteads as a result of wage employment, women assume the role of household heads and supervise all household activities, including the farming activities. Some decisions are taken based on the instructions left by the husband.

Of the 191 respondents, 31.9% comprised male-headed households, while the majority (68.1%) were female-headed households. Of the 68.1% female-headed households, 39.3% were *de facto* (functional) female household heads and the remaining 28.8% were *de jure* (legal) female household heads (Figure 5.1). Due to the high migration trend in the country, women are left not only to run the day-to-day affairs of the household, and look after their children and sick relatives, but also to manage the farm. This puts emphasis on the increased participation of women in the agricultural sector, as they must accomplish their farming activities and still take over male chores such as preparing the land for planting.

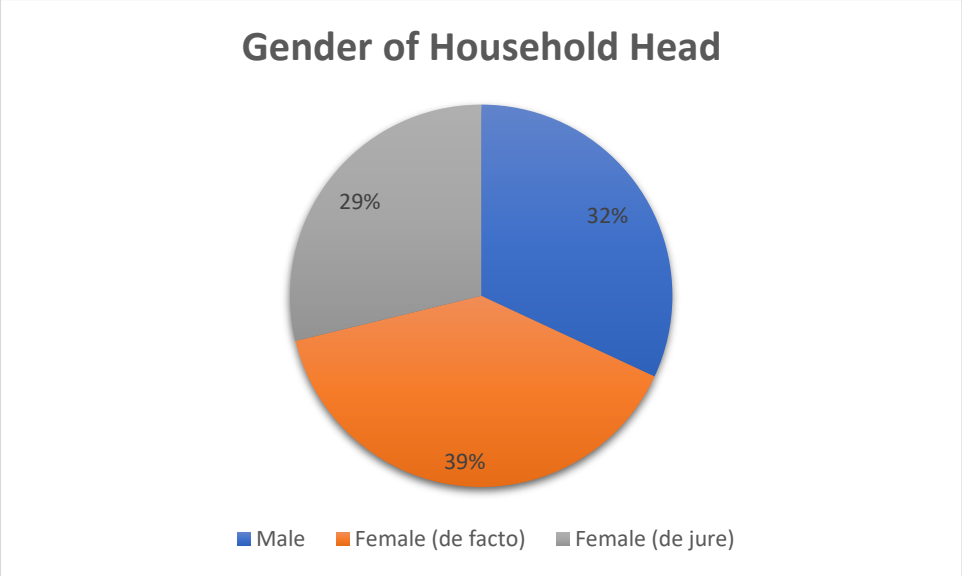

Figure 5.1: Gender of household head

Source: Survey data (2018)

The age attribute provides a description of the agricultural labour force in the study area. A 25-year-old farmer can be described as young and belonging to the economically active group (Martey *et al.*, 2012). This young farmer may be receptive to new ideas that enhance productivity and improve his or her marketing at low costs. On the other hand, an 80-year-old

senior citizen who has a biological connection to land and farming may be less active and keen in participating in the maize market, and his or her primary goal may be to achieve food security. However, older farmers may have more experience in overcoming TCs such as by having more trading partners. Typically, the household head in the sample is 51 years of age, with a nine-year age gap between male and female heads. This can be explained by females marrying earlier than males. Men in Eswatini tend to marry a bit later in life, after they have established sources of livelihood; hence, they typically marry younger women.

Table 5.2: Age of household head

Variable	N	Mean	Minimum	Maximum	Std. Dev
Age of respondents	191	51.11	25	80	11.75
Age of male head	61	56.39	33	80	12.21
Age of female head	130	48.63	25	78	10.70

Education empowers individuals to make informed decisions. It represents human capital, skills and expertise. Households with better production and managerial skills are better able to escape poverty levels, as education influences the household head's ability to process, understand and interpret information. In addition to this, education affects the adoption of new technologies and ideas, as well as informing marketing decisions. About 39% of household heads in the study area had attained a secondary level of education, while less than 10% had no formal education (Table 5.3). As such, the literacy level in the region was relatively high.

Table 5.3: Education level of household head

Variable	Number of respondents	%
No formal	15	7.9
Primary school	39	20.4
Secondary school	74	38.7
High school	43	22.5
Tertiary	20	10.5

5.2.2 Household assets

The following subsection discusses the assets owned by households in the study area. These physical endowments not only empower the rural poor, but also shield households from economic shocks and assist in overcoming market entry barriers. This then translates into market opportunities that maize producers might take advantage of. The key private assets investigated included fixed, mobile and financial assets.

5.2.2.1 *Land*

Eswatini's tenure system follows a dualistic pattern; hence, food production in the country occurs on both communal and private land. Both SNL and TDL influence the development and performance of the agricultural sector, as they affect land ownership and rights (use, control and transfer rights). Households in the study area were located on SNL which occupies 42.4% of total arable land (West, 2000). These households acquired land through the kukhonta system whereby Swazis seek residence in a chiefdom through the traditional council (chief, headmen and councillors). However, land rights are limited to building, cultivating and inheritance to descendants; hence, land cannot be used as a form of security. Households, therefore, occupied between 0.5 and 7 hectares (ha) of land, with a typical household having landholdings of 2.17 ha (Table 5.4).

Table 5.4: Farm size

Variable	N	Mean	Minimum	Maximum	Std. Dev
Farm size (ha)	191	2.17	0.5	7.0	1.20

As shown in Figure 5.2, land examined in this study was either owned by an individual (male-head or de jure female-head households), a spouse (husband) or the family (relatives or in-laws). More than 40% of the land was owned either by male or *de jure* female heads.

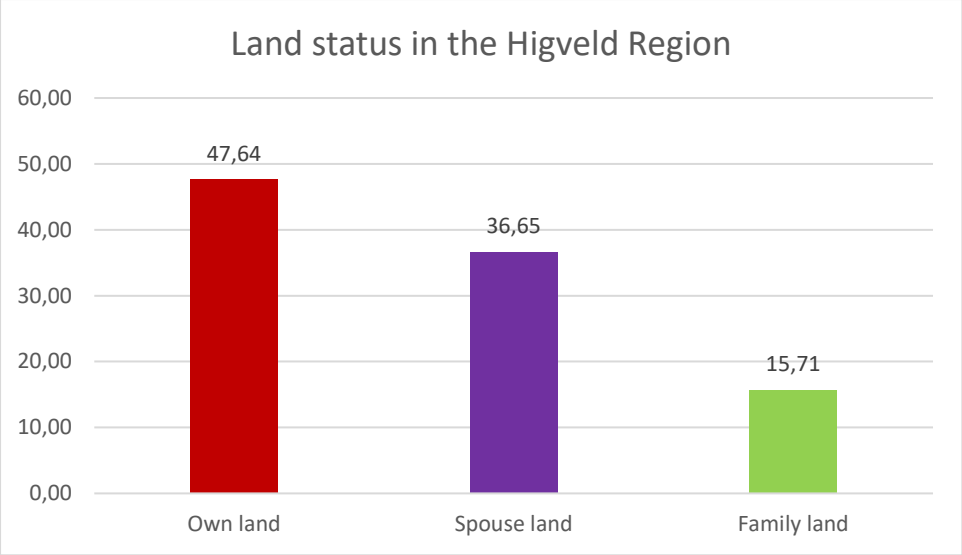

Figure 5.2: Land status

Source: Survey data (2018)

5.2.2.2 *Mobile assets*

Table 5.5 reflects the mobile assets owned by households, and these include livestock, tractors and vehicles. In the rural parts of Eswatini, livestock comprise the most predominant and significant asset. Livestock serves as a measure of asset endowment and social status. However, productive assets such as cattle are not only a measure of wealth in the country, but also enable households to engage in economic activities, such as renting them out, or serve as an insurance substitute. Hence, more than 50% of households owned cattle, while approximately 42% of households owned a vehicle or tractor. The majority of households hired tractors from the government or fellow farmers, as these are costly to purchase.

Table 5.5: Mobile assets

Asset	N	% Owning
Livestock ownership	191	59.7
Tractor ownership	191	4.7
Vehicle ownership	191	37.2

5.2.3 Financial endowment

Financial assets are intangible assets that are based on contractual agreements such as loans, bank deposits and marketable securities. Therefore, they are more liquid than physical assets. These financial assets are presented in Table 5.6.

A considerable portion of the sampled households (over 50%) in the study area had access to credit. Credit is important regarding market participation because it enables households to purchase inputs and productive assets, which increase the likelihood of producing a marketable surplus. Moreover, 41% of the sampled households had an insurance policy, while 15% had a savings account.

Table 5.6: Financial assets

Variable	N	%
Access to credit	191	50.8
Have savings account	191	15.2
Have insurance (life)	191	41.4

5.2.4 Non-farm income

Households in the study area depended on either on-farm, off-farm income or both. Farm income was earned through the operation of farms, while off-farm income was generated through off-farm activities such as non-farm wages and salaries. As such, access to non-farm income has a bearing on market engagement as it can aid in the procurement of farm technology, thereby improving the condition of the farm as well as facilitating marketing activities. However, only 27% of households in the study area obtained income from non-farm sources such as businesses, pensions, services provision, salaries and wages.

Table 5.7: Off-farm income

Variable	N	% Earning of farm income
Earns off-farm income	191	26.7

5.2.5 Farming characteristics

In this case, farming characteristics are presented by TCs faced by farmers. These factors influence both the likelihood of participating in the maize market and the quantity sold. The key farming characteristics investigated were access to farming education and market information.

5.2.5.1 *Farming education*

Access to extension services is very important in agricultural activities and related business-orientated ventures. Hence, farmers who are in contact with extension officers, through either regular communication or meetings, are better off regarding production and marketing information and technical farming skills. Therefore, such training services are likely to facilitate producer linkages with input and output markets. About 49% of the sampled households had access to farming education (Table 5.8). More than half the sampled households did not have access to farming education because they were not in contact with extension personnel. The reason for this was that some farmers were not aware of the status and availability of extension officers in the area.

5.2.5.2 *Information on prices and marketing of maize*

Getting prior information on marketing and prices is very important in understanding the dynamics of the maize market. Therefore, information on prices can improve farmers' bargaining power, reduce transaction costs faced by farmers, such search costs, and create an opportunity for farmers to choose the best options. This enables farmers to get the best price for their produce. Table 5.8 shows that, more than 50% of households in the study area had access to market and price information prior to selling.

Table 5.8: Institutional factors

Variable	N	%
Access to marketing information	191	48.7
Access to extension services	191	58.6

5.2.6 Collective action

Collective action is another important element of market participation. It refers to a group of people working together to achieve a common goal. The broad spectrum of this encompasses social organisations such as networks of interaction, which are resources that give benefit to individuals and groups. Through such networks, information and resources are passed from one person or place to another.

In the study area, collective action was mainly experienced in the form of farmer groups. Of the 50.3% of households who were members of farmer groups, 61.5% were female headed, while 38.5% were male-headed households (Table 5.9). The majority of the farmer group activities were agriculturally related; hence, they provided better access to markets, prices, technology, business skills and bargaining power.

Table 5.9: Farmer groups

Variable	N	%
Membership in farmers' association	191	50.3

Other groups joined by farmers are presented in the Table 5.10. These included savings clubs, and funeral, women's and community groups. More than 60% of the farmers acquired goods and services from women's, savings and funeral groups, while less than 10% were part of community groups.

Table 5.10: Membership in other social organisations

Variable	Number of respondents	%
Membership in credit and savings group	71	37.2
Membership in Women's group	67	35.1
Membership in a funeral group	79	41.4
Membership in community, church and other networks	13	6.8

Some 90% of the respondents in the study area were members of these social organisations, and the remaining respondents were members of the various executive committees. These

committee positions included: chairperson, deputy chairperson, treasurer and secretary. Being part of the committee ensured having greater access to information, as leaders normally receive first hand and up-to-date information.

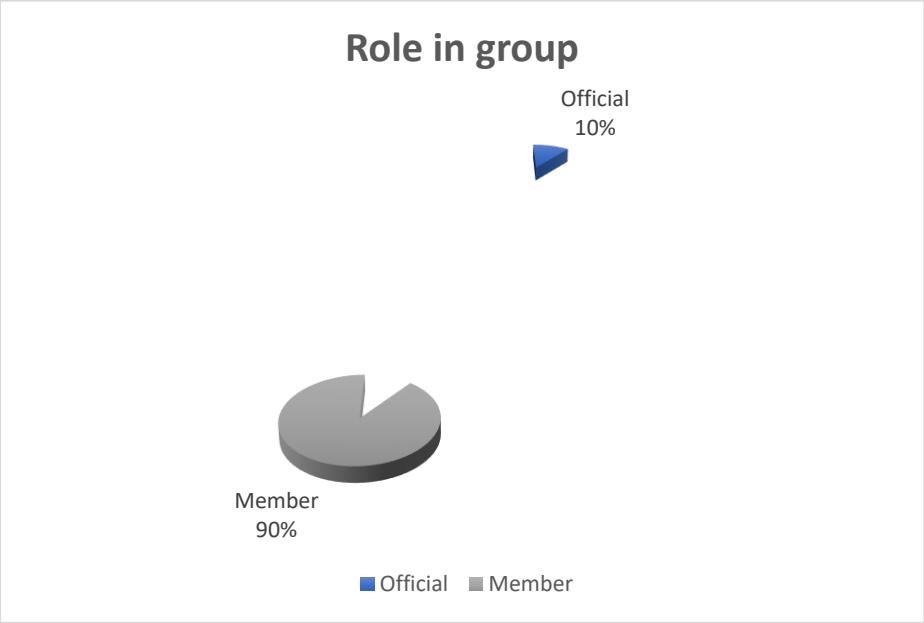

Figure 5.3: Role in social networks

Source: Survey data (2018)

5.2.7 Productive technology

Access to production technology, such as hybrid seeds and fertiliser, can aid in overcoming market barriers. For instance, the use of such technology will not only lead to increased productivity, but may also encourage crop sales. Therefore, with the Highveld region being one of the primary producers of maize, such technology was common as more than 70% of households used hybrid seeds and applied inorganic fertiliser.

Table 5.11: Productivity enhancing technology

Variable	N	%
Used hybrid seed	191	75.9
Used fertiliser	191	77.5

5.2.8 Product characteristics

Product characteristics, such as output produced and price, can act as an incentive for participating in the market. As such, the higher the yield and price are, the higher the probability of engaging in the market is. The average yield in the study area was slightly more than 2 tonnes, with the minimum and maximum yields ranging from 250 to 6000 kilograms (kg), respectively. As a maize producing region, such yields were concerning. However, farmers did mention that they were still recovering from the effects of the El Nino droughts of 2014–2015 and 2015–2016.

Price influenced the choice of market channels by producers in the study area. Surplus producers of maize have a limited number of alternatives when marketing their produce, as they may sell it either to the NMC or to their neighbours. However, selling to the NMC has proved to be unbeneficial in all aspects, including financial gain. This is a result of the unreasonably low prices and stringent standards imposed on the quality and quantity of maize purchased by the corporation (Sachs and Roach, 1983).

Farmers were able to sell 50 kg bags of maize to their neighbours at a price range of E300–500.00, while the NMC bought 1000 kg at roughly E2750.00. Moreover, the NMC did not accept traditional maize varieties/seed and did not purchase anything under a tonne. This may be a way to avoid high TCs faced by the corporation. Therefore, based on these restrictions, farmers found that selling to neighbours was a satisfactory alternative.

Table 5.12: Product characteristics

Variable	N	Mean	Minimum	Maximum	Std. Dev
Output produced (kg)	181	2367.40	250	6000	1510.56
Price (E/kg)	119	299.92	110	500	115.76

5.2.9 Market factors

The sampled households in the study area were located in rural parts of the region; hence, farmers had to travel long distances to meet buyers and conduct trade. Village markets were relatively close as they were situated within the various communities. Producers would

therefore take approximately 10 minutes (mins) from the farm to the village market to trade, whereas districts markets were quite far to travel to (104.45 mins) (Table 5.13).

Table 5.13: Market factors

Variable	N	Mean	Minimum	Maximum	Std. Dev
Time taken to market (mins)	82	104.45	10	104.45	36.97

5.3 CHARACTERISTICS OF MAIZE FARMERS BY GENDER

5.3.1 INTRODUCTION

This section presents characteristics of men and women maize farmers. These characteristics are important as they give a distinct picture of men and women farmers' sub-samples with respect to their socio-economic, household, institutional and product characteristics. This aids in understanding the farming behaviour of women in the Highveld region. Both the independent sample t-test and Pearson's chi-square test were used. The t-test was used to test for differences in means for individual variables for market participants and non-participants. On the other hand, the chi-square test was used to test for association. Furthermore, a Chow test was constructed to test whether it was appropriate to pool or split models into men and women farmers.

Table 5.14 presents the Chow test results, where the computed F* statistic of 2.40 was greater than the tabulated F statistic 1.97, at 5% significance level. This resulted in the rejection of the null hypothesis that the coefficients were equal between men and women farmers. Therefore, separate models were estimated for both men and women farmers. This also implies the need to take due care when introducing development programmes and support services. Such interventions need to take account of the differences that exist among men and women farmers in Eswatini. The observation supports the position of this study to focus on enhancing the participation of women farmers in output markets.

Table 5.14: Chow test computation

RSS_p	RSS_w	RSS_m	F^*	F (P, n-2p)	Decision
101760.27	3227.05	51706.22	2.40	1.97	Separate data

5.3.2 Socio-economic characteristics of men and women farmers

Female-headed households included both *de jure* and *de facto* female household heads, who accounted for 68.1% of the sampled households. The distinguishing feature between the two sub-groups was that the *de jure* female household heads were those without a male component (i.e. single, divorced, widowed and never married), while the *de facto* female household heads had a male component who was temporarily absent due to employment opportunities and the like in urban areas and/or neighbouring countries. This differentiated them from male-headed households in which the male components were available full-time.

Therefore, among household characteristics, age, education and marital status proved to vary significantly between mem and women farmers at 1% (age and education) and 10% (marital status) (Table 5.15). Specifically, men farmers were nine years older than their women counterparts were. Such an age gap may represent the aging agricultural labour force, which may be less active and keen on market engagement. Furthermore, they were more literate than women farmers were, as they had attained, on average, a secondary level of education, while the later, typically, had a primary education. A possible explanation for the relatively high literacy level among men farmers is that they had been accorded educational preferences over women in the past. Lastly, 28% more of the men farmers were married, as compared with the women farmers. This may suggest better accessibility to resources due to joint partnerships.

Table 5.15: Test for differences in means of socio-economic characteristics among men and women farmers

Variable	Men farmers (61)	Women farmers (130)	Pooled Sample (191)	
	Mean	**Mean**	**Mean**	**t-value**
Age	56.39	48.63	51.11	4.26***
Education	3.25	2.88	2.99	4.74***
Marital status	0.87	0.58	0.67	-1.73*
Household size	7.08	6.94	6.98	0.41

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.3.3 Ownership of household assets among men and women farmers

Ownership of household assets, namely land, mobile phone, donkey- / ox-cart, vehicle and tractor were significantly different between men and women farmers at 1% and 10% significance level (Table 5.16). Hence, differences in asset ownership explicitly raise inequality issues between men and women. Most assets owned were skewed towards the male-headed households. For instance, less than 30% of women farmers owned land in the region. This gender difference in land ownership is a mass representation of the unequal distribution of resources between men and women. Women rarely owned land, but had access to it through their husbands or male relatives. This is a result of the customary land tenure system that allows men to directly own land, while women must first acquire a male representative in order to go through the kukhonta system (process of acquiring land through the chief).

Table 5.16: Test for differences in means of household assets among men and women farmers

Variable	Men farmers (61)	Women farmers (130)	Pooled Sample (191)	
	Mean	Mean	Mean	t-value
Land	1.00	0.23	0.48	-20.74***
Livestock	0.62	0.58	0.60	-0.50
Tractor	0.016	0.062	4.7	1.69*
Radio	0.72	0.61	0.64	-1.58
Mobile phone	0.57	0.96	0.84	-5.87***
Donkey- / Ox-cart	0.52	0.32	0.39	-2.63***
Vehicle	0.62	0.25	0.37	-5.03***
Bicycle	0.34	0.25	0.28	-1.25

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

Similarly, transport assets such as vehicles and ox-carts were mainly male dominated, as males would have either the means to purchase vehicles due to salaried employment or the man-power required to build and manoeuvre donkey- and ox-carts. Furthermore, this then has an impact on a household's access to markets, as well as the quantity sold. However, female-headed households owned more tractors than male-headed households did. This can be explained by the absence of male components; hence, women found it easier, cheaper and time-saving in investing in a tractor as a farming implement, a business venture (renting to other farmers), and a transport asset. In addition, over 80% of women farmers owned mobile phones. This may be explained by the women in the younger age-group who were more receptive to new ideas and technology.

5.3.4 Access to institutional factors among men and women farmers

Membership of farmers' groups, extension services and credit accessibility varied between the two sub-groups at 1% and 5%, respectively. More than 60% of men farmers either belonged to a farmers' organisation or had access to credit facilities and extension training (Table 5.17).

Table 5.17: Test for differences in means of institutional factors among men and women farmers

Variable	Men farmers (61)	Women farmers (130)	Pooled Sample (191)	
	Mean	Mean	Mean	t-value
Membership in farmers' group	0.61	0.45	0.50	-1.99**
Accessed credit	0.67	0.43	0.51	-3.23***
Accessed marketing information	0.56	0.45	0.49	-1.33
Accessed extension services	0.71	0.53	0.59	-2.37**

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

Access to credit facilities may aid in the procurement of hybrid seeds, farming equipment, fertilisers and the like. However, most financial institutions require collateral and ownership of assets such as land and livestock, which act as collateral, thereby permitting individuals to enter into contractual arrangements such as loans. As shown in Table 5.17, due to the lack of ownership of such assets by women, collateral was the second most cited reason given by women farmers who did not have access to credit, while only less than 20% of male farmers complained of security requirements as being a deterrent in accessing loans. Access to credit varied significantly at 1%.

Table 5.18: Reasons for lack of access to credit by gender of household head

Reason	Men-led farming households	Women-led farming households	
	%	%	Chi-square
Lack of collateral	18.4	81.6	18.06***
Information asymmetry	61.5	38.5	
High interest rates	17.2	82.8	

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

In addition, access to training services by male farmers may imply that they have better access to information on production, such as field lay-out, planting, irrigation, fertiliser application and the like. As shown in Table 5.18, training on production and processing was mostly skewed towards women farmers, as more than 50% of them had received such training, while men farmers had received training on marketing services. This not only explains the feminisation of agriculture or women being the backbone of agriculture, but also highlights the disparities in accessing price marketing information between the two sub-groups.

Table 5.19: Access to extension services by gender of household head

Service	Men-led farming households	Women-led farming households	
	%	%	Chi-square
Production	20.4	79.6	15.94***
Processing	46.2	53.8	
Marketing	62.5	37.5	

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

Furthermore, although access to marketing was not significantly different between men and women farmers, 10% more men farmers had access to information on marketing and maize prices prior to selling (Table 5.17). This can be explained by the fact that more than 50% of

men farmers received market information from extension officers who normally work for the NMC, which is the sole-trader of maize in the country. Furthermore, women farmers find it difficult to access training services from extension officers, as they are usually men and it is taboo for male strangers to pay home visits to female-headed homesteads.

Lastly, social organisations and media platforms proved to be important in disseminating information on prices and market options among women farmers. As such, more than 70% of the women farmers obtained marketing information from these sources.

Table 5.20: Sources of information by gender of household head

Source of Information	Men-led farming households	Women-led farming households	
	%	%	Chi-square
Extension officer	57.9	42.1	10.000**
Media	26.1	73.9	
Farmer's group	19.2	80.8	
Fellow farmer, friend, etc…	50.0	50.0	

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels respectively.**

5.3.5 Access to market and product characteristics among men and women farmers

There was no significant difference between men and women farmers in terms of the outputs produced, prices and the time taken to get to the market. This may imply that women are as productive as their male counterparts are, and because farmers were sampled in the same region but in different communities, prices charged and the time taken to the market was more or less the same, as they sold in relatively the same district markets.

Table 5.21: Test for differences in means of market and product characteristics among men and women farmers

Variable	Men farmers (61)	Women farmers (130)	Pooled Sample (191)	
	Mean	Mean	Mean	t-value
Output produced (kg)	2512.96	2305.1	2367.40	-0.85
Price (E)	307.69	295.98	299.92	-0.52
Time to market (mins)	102.67	105.46	104.45	0.33

Source: Survey data (2018)

5.4 COMPARISON BETWEEN COMMERCIAL AND NON-COMMERCIAL WOMEN FARMERS

This section discusses the differences between market participants and non-participants with respect to their socio-economic, asset, and institutional circumstances. Both the independent sample t-test and Pearson's chi-square test were used.

5.4.1 Demographic characteristics

To determine the differences in means, the demographic characteristics investigated included age, education and household size. Of the sample of 191 respondents, 62.3% participated in the maize market as sellers, while 37.7% did not. All variables varied significantly between participants and non-participants. Education level and household size were significant at 1% while age was significant at 5% (Table 2.22). Market participants were approximately three years younger, better educated, and had larger households. This could imply that maize market participants in the region were more progressive and receptive to new ideas, and better understood market dynamics and the benefits of commercialisation. Furthermore, larger households may imply a larger labour force to produce marketable output.

Table 5.22 :Demographic characteristics of maize farmers in the Highveld

Variable	Participants (n=119)		Non-participants (n=72)		
	Mean	Std	Mean	Std	T-Value
Age (years)	49.53	10.85	53.72	12.76	2.33**
Education (level completed)	3.33	1.11	2.44	1.29	-5.03***
Household size (number)	7.70	2.23	5.81	1.82	-6.38***

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.4.2 Household and marital status of farmers

Table 5.23 reflects the household and marital status in the region. Household status was classified into two groups, male and female household heads. Of these, more than 60% were married and either living with their spouse or were temporary absent due to employment. The chi-square test was used to test if there was any relationship between categorical variables. Based on the chi-square values, there was a significant difference at 1% noticed in male- and female-headed households between participants and non-participants. The majority of men were engaged in wage employment in urban areas and neighbouring countries such as South Africa. Hence, less than 40% engaged in output markets, while more than 60% of women who were based in the rural areas participated full-time in the market, selling maize. With over 30% more women-led farming households participating in the market, it is shown that women are actively engaged in economic activities.

Table 5.23: Gender and marital status of farmers in the Highveld

Variable	Participants (n=119)	Non-participants (n=72)	
	Percentage	**Percentage**	**Chi-square**
Household Status			
Male head	33.6	29.2	7.23***
Female head	66.4	70.8	6.03***
Marital Status			
Single	33.6	31.9	
Married	66.4	68.1	

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.4.3 Institutional factors among maize farmers

A considerable proportion of the sampled households (over 60%) had access to credit, marketing information and extension services, and belonged to farmers' organisations (Table 5.24). This resulted in significant differences between participants and non-participants at 1%.

The availability of credit implies that market participants were able to purchase farm inputs, thus increasing their likelihood of market participation. Moreover, access to production and marketing information may result in better quality produce and marketing decisions. This positively influences market engagement in the region. In addition, membership of farmers' groups implies that maize sellers were at an advantage in spreading their fixed transaction costs, as well as in strengthening their bargaining power.

Table 5.24: Institutional factors among maize farmers in the Highveld

Variable	Participants (n=119)	Non-participants (n=72)	Pooled Sample (n=191)	
	%	%	%	Chi-square
Accessed Credit	74.8	11.1	50.8	72.78***
Membership to farmer group	65.5	25.0	50.3	29.50***
Accessed marketing information	73.1	8.3	48.7	75.34***
Accessed extension services	78.2	26.4	58.6	49.56***

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.4.4 Distribution of assets among maize farmers

Table 5.25 reflects the assets owned by maize farmers in the Highveld region. Ownership of transport assets, mobile phones, radios and livestock were significantly different between participants and non-participants, as shown by the chi-square values. Transport assets included vehicles, bicycles and donkey- /ox-carts. These were skewed towards market participants, as they owned more than 30%. This may imply that they enjoy reduced transport costs, as these communities are located in remote areas. In addition, more than 60% of the maize sellers owned a mobile phone, a working radio and livestock. Livestock for traction power may imply that participants cultivated greater areas of land, while ownership of a mobile phone and working radio may suggest better access to current farming and price information.

Table 5.25: Distribution of assets among maize farmers in the Highveld region

Variable	Participants (n=120)	Non-participants (n=71)	Pooled Sample (n=191)	
	%	%	%	Chi-square
Bicycle	36.1	15.3	28.3	9.62***
Vehicle	48.7	18.1	37.2	18.08***
Donkey/ Oxcart	43.7	30.6	38.7	3.26*
Cell phone	88.2	76.4	83.8	4.63**
Working radio	75.6	45.8	64.4	17.37***
Livestock	68.9	44.4	59.7	11.16***
Land	42.3	50.8	47.6	1.32

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.4.5 Use of production technology among maize farmers

Due to the Highveld region being the second largest maize producer in the country, one would expect the intensive use of production technology in the region. As such, more than 80% of market participants used inorganic fertiliser and hybrid seed; hence, showing a significant difference at 1% and 5% between the two groups, respectively (Table 5.26). Typically, maize producers incurred low production costs as a result of drought-tolerant and disease-resistant seeds, uniform appearance of produce, and high yields, as compared with non-participants.

Table 5.26: Use of production technology among maize farmers in the Highveld region

Variable	Participants (120)	Non-participants (71)	Pooled Sample (191)	
	%	%	%	Chi-square
Hybrid seed	81.5	66.7	75.9	5.41**
Inorganic Fertiliser (kg)	88.2	59.7	77.5	20.91***

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.4.6 Production and consumption of maize among maize farmers

There was a 1% significant difference in the areas cultivated, quantities produced and household consumptions between participants and non-participants (Table 5.27). Of the 428 500 kg of maize produced in the region, market participants produced 1.23 tonnes more than non-participants did. This may be explained by the differences in the availability of farm inputs. For instance, participants cultivated about a hectare more than non-participants did. This alternately had an impact on household consumption, as participants further consumed 225.45 kg more maize than the non-participants did. Moreover, since participants had larger households, this explained why they consumed more maize, as they had more household members to feed.

Table 5.27: Production and consumption of maize among maize farmers in the Highveld

Variable	Participants (120)	Non-participants (71)	Pooled Sample (191)	
	Mean	Mean	Mean	T-Value
Area cultivated (ha)	1.92	1.24	1.66	-6.60***
Yield (kg)	2 857.34	1 625.69	2 367.40	-6.46***
Consumption (kg)	715.03	489.58	630.04	-3.93***

Source: Survey data (2018)

***, **, *** indicate significance at 10%, 5% and 1% levels, respectively.**

5.5 MAIZE DISTRIBUTION IN THE HIGHVELD REGION

Figure 5.4 reflects the distribution of maize in the region. Of 428 500 kg of maize produced by sampled households, 74.86% was sold, 24.54% was consumed, and 0.61% was reserved for seed. This shows how critical the maize cereal is as a source of household income in the region, as it is mainly grown for sale and not consumption.

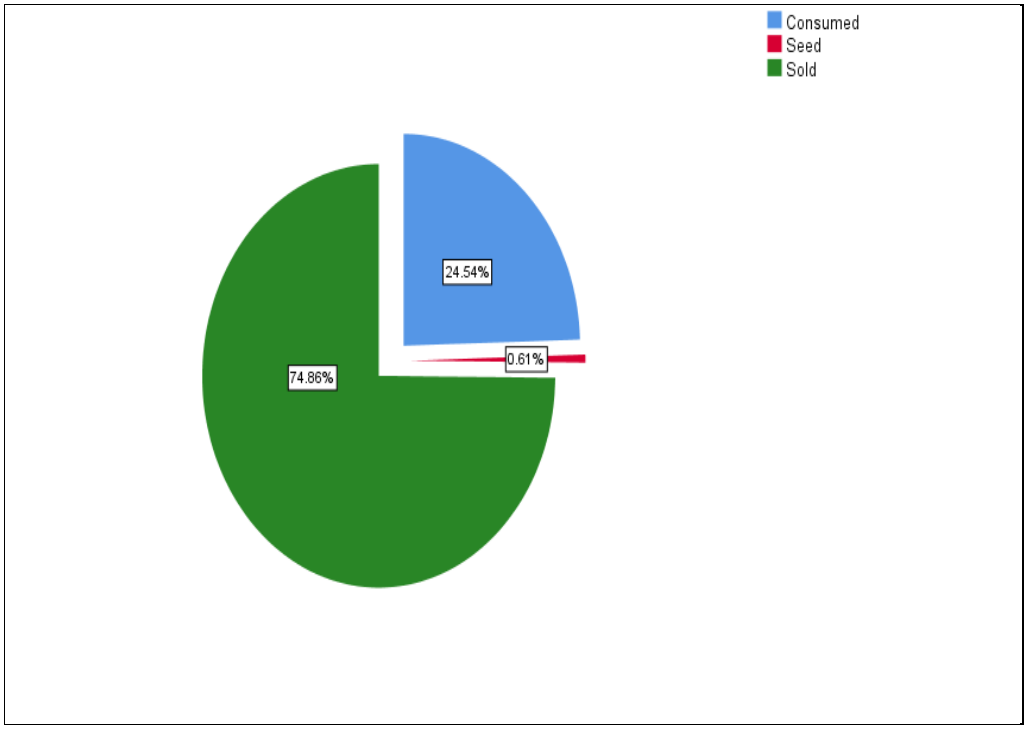

Figure 5.4: Output distribution among maize farmers

5.6 MARKET PARTICIPATION BY COMMUNITIES IN THE HIGHVELD REGION

Market participation by communities is presented in Figure 5.5, where Nsingweni and Maphalaleni were the leading communities in which farmers sold maize, whilst Kasiko and Motjane had the least market engagement by farmers. More than 15% more maize farmers in the Nsingweni community participated in the market as sellers, compared with the Motjane community. The difference in participation by communities may be explained by differences in their social and economic states, such as farming potential, resource accessibility, infrastructure and the like.

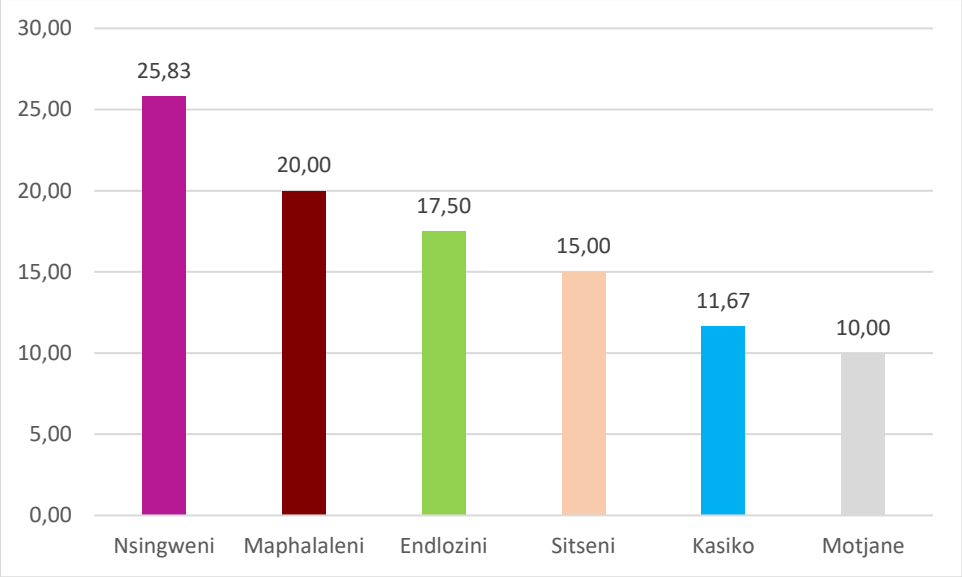

Figure 5.5: Market participation by community (%)

Figure 5.6 shows the various points of sale, which are important when designing policies to improve market engagement by women. Of the 62.3% of farmers who sold in the maize market, the majority (about 40%) sold to the depot, while less than 5% sold at the district market.

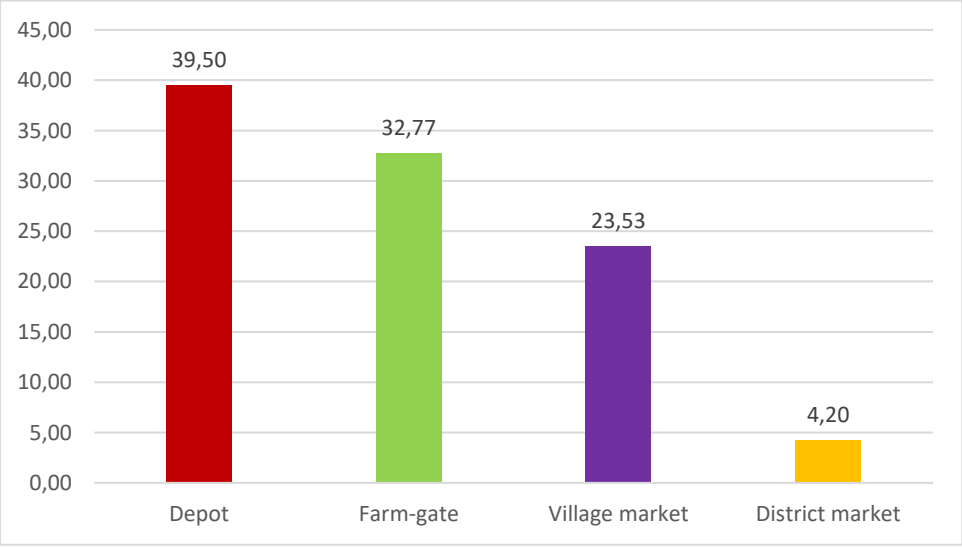

Figure 5.6: Point of sale by participants

Source: Survey data (2018)

5.7 SUMMARY

Chapter 5 is divided into three sub-sections. The first section highlights the sample characteristics in the Highveld region. Of the 191 respondents, 31.9% comprised of men-led farming households and the majority (68.1%) were women-led farming households. These households had on average seven members while the minimum and maximum household sizes ranged from two to thirteen members. Respondents in the study area had a mean age of 51 years with secondary level of schooling. This suggests that the literacy level in the region was relatively high. Physical resource endowments owned by farmers included land, livestock, vehicles and tractors. Livestock was the most owned asset as approximately 60% of the respondents owned cattle, sheep and goats. Average landholdings were 2.17 hectares. In order to plough these fields, farmers needed to have access to finances. These included credit, savings and off-farm income. A considerable proportion of the sampled households (over 60%) had access to credit hence, they were able to purchase farm inputs. However, farmers still faced challenges in accessing market information, extension services and production technology. This explains why some farmers participate in output markets and why others do not.

The second sub-section presented farmers characteristics by gender. Based on the Chow test results, men and women data was split to allow analysis of these two sub-groups. Men farmers were older and more educated. Ownership of household assets such as land, oxcarts and vehicles were skewed towards men. Women farmers owned mobile-phones and tractors. This suggests they were more receptive to technology. However, less than 50% of women farmers had access to credit and marketing information. Women farmers complained about the high interest rates and that majority (more than 50%) of the training they received was on production and processing and less on marketing.

The last section discusses the differences between market participants and non-participants. 62.3% participated in the market as maize sellers. Participants were younger, better educated and had larger households. In addition, more than 60% of participants had access to credit, information and extension services. Assets and production technology were also skewed towards market participants. This gives an overview of factors that may influence participation and supply volume decisions of farmers.

CHAPTER 6
DETERMINANTS OF COMMERCIALISATION AND MARKET PARTICIPATION

6.1 INTRODUCTION

Maize is the country's staple food, hence most of it is produced and consumed within the household. However, it is one of the most versatile crops grown in Africa. As such, it is also traded by barter or sold for cash. The latter forms the basis of this chapter, as maize sales are examined to identify the potential for maize grain to generate income for farmers, and especially women farmers. The view is that the fixed and variable transaction cost factors would explain the process of market participation in maize.

The maize market participation model was estimated using a two-step selection procedure. Firstly, the probit model was used to identify the factors that affect the decision to participate, and secondly, the OLS model was used to identify the determinants of the level of maize commercialisation.

6.2 COMMERCIAL ORIENTATION OF WOMEN MAIZE FARMERS

6.2.1 Decisions by women to commercialise maize production

The Probit model was used to distinguish market participants (sellers) from non-market participants (non-sellers). As such, the dependent variable had a binary response (yes = 1, no = 0) and was specified as follows for both sub-samples:

Pr (MAIZMKT)= f (AGE, EDUC, HHSIZE, FSIZE, LIVEOWN, RADIO, TRANS, COMM, SAVACC, CREDIT, NFARM, MKTINFO, EXT, FASS, FERT)

Before estimating the selection model, the study examined for possible multicollinearity problems by using the correlation matrix and Variance Inflation Factor (VIF). Both diagnostics tests confirmed that multicollinearity was not a problem in both male and female sub-samples. All variables had a VIF that was less than the critical value of 5 and the pairwise correlation was less than the standard 0.8 (Gujarati, 2007). This permitted the above variables to be modelled together.

Table 6.1 presents the coefficient estimates as well as the marginal effects of the Probit model for women farmers. The model correctly predicted 84% of the participation outcomes in women farmers. The Wald test of the hypothesis that the coefficients are equal to zero was rejected, at 1% significance level. This further explains the variations in the household's probability for selling maize caused by the explanatory variables included in the model. Of the 15 variables included, 13 of these had coefficients significantly different from zero. This shows that women are more prone to market participation factors; hence, they must overcome numerous market barriers in order to enter the maize market.

Larger households with greater numbers of an active labour force have an increased probability of engaging in output markets. This not only reduces production costs but also ensures that households produce surplus, thus enabling market orientation. Household size had a significantly positive effect on participation in the maize market. As a result, households with more numbers of family members would certainly enjoy a larger labour supply, and are 5% more likely to participate in the maize market. Because crop production is labour intensive, an adequate labour resource endowment of households is essential in producing marketable surplus. Boughton *et al.* (2007) found a similar result in their study in the tobacco market in Mozambique.

Farm size was significant and had a positive influence on the decision to enter the maize market. An increase in the farm size increases the production level, thereby increasing the sales volume. Therefore, an increase in a household's arable land area leads to an increase in the probability of deciding for maize commercialisation. In addition, an increase in landholdings helps households to apportion the land for food and for cash crop production, which aids in clarifying, setting and positioning the household towards producing marketed surplus, thus achieving their agricultural commercialisation goals. This suggests that larger farm sizes enable women to surpass their subsistence needs, thereby producing surplus to sell. This result conforms to the finding by Zivenge and Karavina (2012) in Zimbabwe who found land size to have a positive impact on the probability of selling produce.

Among other household assets, livestock had a significant positive effect on maize market participation. Ownership of livestock may imply the availability of draft power that can be used to increase crop production, thus leading to farmers engaging in the maize market. Moreover, cattle manure may be used as a source of fertiliser, which may enhance productivity. As a result, ownership of livestock increased the likelihood of entering the maize market by 9% for

women farmers. As expected, productive assets such as oxen can be exploited to increase the area planted, thereby enabling farmers to produce marketable surplus. This finding is consistent with Moono (2015) who found livestock ownership to increase the probability of entering the rice market in Zambia.

Ownership of a mobile phone and working radio were used as proxy variables for fixed transaction costs. Having access to price and marketing information gathered through radio programmes reduces risks of perceptions and false information being gathered through other less-reliable sources. It ensures increased information flow among farmers in remote areas. The coefficient for having a working radio had a significant and positive effect on women maize market participation. Therefore, ownership of a working radio raises the probability of maize market participation by 13%, as women farmers are likely to verify and obtain information on trading partners and the like. This finding corroborates that of Moono (2015). Moreover, ownership of a communication device such as a mobile phone had a significant influence on participating in commercial agriculture. However, the effect was negative for women farmers' market engagement. Although mobile phones are readily available devices for transmitting market information, these may result in different sources (e.g. neighbours, extension agents and farmers group) interpreting and transmitting misleading propaganda, which may reduce the likelihood of female market participation by 25%.

Social capital is essential in overcoming information and technology barriers and so achieve improved agricultural production and market access. Belonging to a farmers' group had a significantly positive impact on women's decisions to enter the market. As expected, membership in such networks reduces fixed transaction costs through enabling farmers to exchange information as well as linking them with potential buyers. As such, membership in social organisations increased women farmers' market participation by 18%. This is consistent with Matungul *et al*. (2001), who reported that collective action aided in the coordination and provision of solutions to complex market problems.

Access to marketing information by women farmers was positive and significantly influenced the decision to enter the maize market. This suggests that women-led farming households who have access to price and marketing information prior to selling are 39% more likely to the participate in the maize market. As such, the more marketing information a household has, the less transaction costs are incurred, thereby raising the probability of maize market participation.

This result is consistent with Komarek (2010), who found the availability of market information to influence the likelihood of entering the banana market in Uganda.

Furthermore, access to credit positively influenced the decision to participate in the maize market, and was significant. Access to loans enables farmers to purchase farm-inputs and/or hire farm machinery such as tractors and ploughs. This enables farmers to plough more areas of arable land; hence, these production-enhancing assets facilitate productivity, thus encouraging the decision to participate in the maize market. Non-farm income was also positive and statistically significant among women producers. This result is expected since non-farm income equips farm households with economic power that enables investment in farm technology and other improvements on the farm, leading to households participating in intensive agriculture. This results in greater production, and thus greater marketable surplus. Moreover, such income may lower risk in agricultural decision making. Masuku *et al.* (2001) found a similar result in their study in Eswatini.

The coefficient for inorganic fertiliser had a positive and statistically significant impact on market participation. The use of fertiliser contributes to increased yields and consequently increases marketable surplus, thus influencing women farmers' decisions to participate in the maize market by 25%.

The coefficient of savings had a significantly positive effect on market participation. Access to such funds may ease liquidity constraints that a farm and household might be experiencing. This not only contributes to farming but also to commercial production. Likewise, access to savings can provide farmers with the power to participate and spend in input markets, purchasing agricultural commodities such as seeds, fertilisers and other improved farming technologies that boost maize yields, thus leading to the production of marketable surplus. Aidoo *et al*. (2014) found a similar result in their study. Therefore, the marginal effect results indicate that having access to savings increases the probability of participating in the maize market by 19%.

Older farmers are more concerned about food security and are emotionally connected to land and farming (Randela *et al*., 2008). Therefore, they are less likely to gamble with their grain reserves, especially since farmers are still recovering from the recent drought effects. On the other hand, younger farmers are more dynamic in adopting new ideas, such as venturing into business, and enjoying the financial benefits that come with it. However, the coefficient of age was statistically significant and negatively related to market participation. A possible

explanation could be the aging labour force in the region. Furthermore, the farming perspective of older farmers is mainly culture oriented, i.e. towards a rural way of life, rather than being market-oriented. As such, older women farmers are 0.93% less likely to participate in the maize market. This result conforms to the findings by Moono (2015) in Zambia, where age negatively influenced the decision to enter the rice market.

The education level of a woman farmer had a significantly negative impact on the probability of maize market participation for female producers. Women, on average, had acquired a primary level of education. Such a level of education may not be adequate for being able to synthesise and effectively use market information. Moreover, this could imply that women with a higher level of education are not likely to participate in the maize market as net sellers but buyers. A possible explanation for this finding is that women farmers with a higher literacy levels partake in farming on a part-time basis, while most of their energy is directed towards the more remunerative employment opportunities that are available.

Such employment opportunities normally demand skills equipped by education. This is in contrast with the findings of Makhura (2001) and Randela *et al*. (2008) who reported that education helps farmers to effectively process and understand market information, which may lead to increased market participation. This finding implies that the level of education reduces the likelihood of women farmers' market participation by 18%. This result is consistent with Ouma *et al.* (2010) who found that education level had a significantly negative impact on participation in the banana markets in Burundi and Rwanda.

Table 6.1: Factors influencing maize market participation among women farmers

Factor	Probit model	
	Co-efficient	**Marginal Effects**
Constant	-3.590	
	(2.390)	
Household characteristics		
• **Age of HH head (years)**	-0.162 ***	-0.00930 ***
	(0.0467)	
• **Educational level of HH (dummy)**	-3.070 ***	-0.176 ***
	(1.555)	
• **Household size (number)**	0.798 ***	0.0457 ***
	(0.224)	
Household Assets		
• **Size of land owned (ha)**	0.805 ***	0.0461 ***
	(0.252)	
• **HH owns livestock (dummy)**	4.007 **	0.229 **
	(1.234)	
• **HH owns a working radio (dummy)**	2.333***	0.134 ***
	(0.843)	
• **HH owns a vehicle (dummy)**	0.649	0.0372
	(1.021)	
• **HH owns a mobile phone (dummy)**	-4.353 ***	-0.249 ***
	(1.517)	
Financial Endowment		
• **Earns off-farm income (dummy)**	3.403 ***	0.195 ***
	(0.940)	
• **HH has a savings account (dummy)**	3.362 **	0.193 **
	(1.374)	
• **Access to credit**	4.728 ***	0.271 ***
	(1.421)	
Institutional Factors		
• **Membership in farmers' association (dummy)**	3.052 ***	0.175 ***
	(0.956)	
• **Access to extension services (dummy)**	0.190	0.0109
	(0.759)	
• **Access to marketing information (dummy**	6.887 ***	0.394 ***
	(1.500)	
Production Technology		
• **Used fertiliser**	4.345 ***	0.249 ***
	(0.928)	
% Correctly predicted	84	
CHI-SQ	36.46***	
N	131	

6.2.2 The level of participation in the market by women maize farmers

The second stage of the selectivity model identifies factors influencing the level of maize sales. The model is specified as:

SALES= f (AGE, EDUC, HHSIZE, FSIZE, LIVEOWN, RADIO, TRANS, COMM, SAVACC, CREDIT, NFARM, MKTINFO, EXT, FASS, FERT, HCI, PRICE)

Before running the model, the Breusch-Pagan/Cook-Weisberg test was conducted to test for heteroskedasticity. The results showed a violation of the homoscedasticity assumption. To correct for this, robust standard errors were used. The model R-square for female farmers was 65%, with a significant overall fit. In addition, the coefficient for the inverse Mill's ratio λ, is significantly different from zero ($p < 0.1$). This indicates that sample selection bias would have resulted if women maize supply equations had been estimated without the consideration of the decision to sell. The results are presented in Table 6.2.

The education level negatively influenced the level of commercialisation for women maize farmers. A possible explanation for this could be that education empowers women to participate in the modern sector of the economy, thereby committing women to full-time jobs and only engaging in farming on a part-time basis. This may result in smaller fields being cultivated, thereby lowering the yield and subsequently lowering the quantity sold.

Traditionally women are regarded as homemakers and so are responsible for feeding and caring for the family. Therefore, before they might participate in maize markets as sellers, they need to ensure that household consumption requirements are met, especially for staple food grains like maize. As such, the coefficient of household size was significant and had a positive effect on women farmers' supply volume decision. This not only implies that women farmers obtained high yields, but also that they had a large family size that accounted for labour supply which was used to produce surplus, thereby making sure that they surpass their subsistence needs. Moreover, this results in the production of marketable surplus. Again, larger households may result in more produce being transported to the market, thereby increasing the quantity sold.

An increase in arable land area naturally implies an increase in output produced. A larger farm size enables farmers to plough larger fields. Therefore, larger landholdings allow farmers to produce beyond their household food consumption needs. The implication of this finding highlights the constraints farmers undergo when accessing the market. As a result, small farm

sizes hinder the production of marketable surplus, thereby negatively influencing the level of agricultural commercialisation. However, the coefficient of farm size was positive and significant for marketed supply. This suggests that women farmers with larger farm sizes are at an advantage for producing and selling more amounts of surplus to the market. This finding corroborates that of Martey *et al.* (2012), who found the intensity of market participation to increase as the farm size increases. Alene *et al.* (2008) reported similar results in Kenya.

To enable households to participate in maize markets as net sellers, it is essential to ensure that they have access to productivity enhancing technologies, such as improved seed varieties and inorganic fertilisers, rather than price policies that result in exorbitant producer prices. As such, the coefficient of inorganic fertiliser had a significantly positive impact on the quantity sold by women farmers. The use of fertiliser may result in high maize yields, thereby increasing the amount of maize sold in output markets. This finding suggests that, given the option to choose between price interventions and input subsidies such as subsidised maize seed and fertiliser, it would be advantageous for both producers and consumers to be provided with input subsidies rather than government price-support policies. This is because such policy interventions have a positive impact on household incomes, as well as ensuring affordable prices for consumers. Although they are difficult to maintain in the long run and less destructive than price polices are, when used effectively and within a stipulated time frame, they can enhance sustainable market supply (Muricho *et al*., 2015).

The coefficient of price was significant and negatively related to the level of maize sales. This could be a result of the low prices charged by the NMC. Such prices discourage farmers from venturing into the maize market, resulting in low quantities being sold. Therefore, the impact of maize prices on the quantity sold is in contrast to, or rather not in line with, the objectives of government price support policies that aim at encouraging farmers to be net sellers of maize, as this would improve households' incomes, thereby improving their standards of living. This finding further implies that such interventions render women maize farmers worse off as it restricts them from engaging in the market as sellers. In addition, maize consumers are at a disadvantage as they end up buying at higher prices from NMC than the selling prices of farmers. Stephens and Barrett (2011) refer to this as the 'sell low and buy high' behaviour of farmers. This may also suggest that Swazi women farmers are rational producers. When prices are high, they make rational decisions and tend to be risk averse. They may prefer to be food secure and sell less in order to avoid exorbitant maize prices in future when they purchase value added maize. Moreover, maize grain prices in the country are inelastic due to high demand as

maize is the country's staple food. As such, the sky-high prices result in deteriorating rural livelihoods. Furthermore, these price support policies result in the transferring of income from the hands of the rural poor producers to better-off grain traders (Muricho *et al*., 2015). As such, this study's finding contradicts that of Olwande and Mathenge (2012) who found price to act as an incentive for farmers to produce and supply more amounts to markets, thus increasing their participation.

Ownership of a mobile phone had a significantly positive impact on sales volume. This suggests that women farmers had better access to marketing infrastructure, thereby increasing the intensity of their market participation. Moreover, ownership of such communication equipment reduces costs spent in accessing information. In addition, mobile phones ensure increased connectivity between farmers and traders, thereby making information on markets and potential trading partners readily available. Mmbando (2014) found a similar result in their study in Tanzania.

The coefficient of extension services had a significant positive influence on the quantity of maize sold by women. This suggests that farmers in the region had a better understanding of new production practices and techniques, such as better seed varieties, which understanding increases their likelihood of producing more. Again, extension personnel help to link farmers with markets, thus increasing their market opportunities for selling more produce. Siziba *et al.* (2011) found a similar result in their study in SSA. A possible explanation for this is that extension services received by women farmers in the Highveld region were mainly focused on production and processing techniques, while the marketing services were geared towards men farmers.

Other than farming, women are engaged in various income-generating activities outside the farm. These include running spaza shops, hand-crafts and beer brewing. These alternative income sources not only contribute to rural household incomes, but also enhance large-scale production through enabling the investment of income in farm inputs and technology. Access to off-farm income had a positive and significant influence on sales volumes for women farmers. This implies that households earning higher incomes sold more produce, compared with households earning less income. This finding corroborates that of Alene *et al.* (2008).

The coefficient for the index on commercialisation had a statistically significant and positive effect on marketed supply for women producers. This result is consistent with a priori expectations, as a greater quantity produced ensures having a marketable surplus. It highlights

the importance of increased output for ensuring that women escape the vicious cycle of poverty and improve their welfare. This leads to enhanced rural livelihoods through increased incomes from sales. This suggests that women had a relatively high yield, thus allowing more output to be sold.

Table 6.2: Factors influencing the intensity of market participation among women farmers

Factor	OLS regression	
	Co-efficient	Robust Std. Error
Constant	-1784.816	1308.899
Household characteristics		
• **Age of HH head (years)**	-11.187	13.236
• **Educational level of HH (dummy)**	1436.059	728.385 **
• **Household size (number)**	30.171	46.365 **
Household Assets		
• **Size of land owned (ha)**	210.504	91.998 **
• **HH owns livestock (dummy)**	349.335	236.922
• **HH owns a working radio (dummy)**	-273.675	276.281
• **HH owns a vehicle (dummy)**	-62.720	254.280
• **HH owns a mobile phone (dummy)**	1301.699	373.949 **
Financial Endowment		
• **Earns off-farm income (dummy)**	445.262	240.622 *
• **HH has a savings account (dummy)**	-432.937	320.913
• **Access to credit**	90.628	232.018
Institutional Factors		
• **Membership in farmers' association (dummy)**	321.604	211.246
• **Access to extension services (dummy)**	622.0.34	313762 **
• **Access to marketing information (dummy**	-418.287	300.378
Production Technology		
• **Used fertiliser**	588.922	302.132 **
Product characteristics		
Price (E)	-2.658	1.054 **
Commercialisation index	5544.456	976.241 ***
Lambda (Inverse Mills Ratio)	-739.278	400.598
R-SQ	65	
F-test	18.50 ***	

6.3 COMMERCIAL ORIENTATION OF MEN MAIZE FARMERS

This subsection presents the economic analysis for the male data, as presented in Table 6.3. The Heckman two-stage model was executed to see whether there were any similarities or differences in the factors that influenced both the probability of males entering the market and the level of male market participation in the Highveld. The model correctly predicted 70% of the participation outcomes among male maize farmers. Second, the model R^2 indicates that the explanatory variables included in the regression explain 74% of the variations of the quantity sold in the maize market.

The decision to participate in the maize market was significantly influenced by age of the household head, household size, mobile phone, extension services and fertiliser.

6.3.1 Men's decisions to commercialise maize

Men farmers in the study area can be described as elderly, as the average age was 56 years, with the oldest farmer being 80 years of age. Such an age group may represent an age bracket that is productively inactive among men farmers in the Highveld. As such, the coefficient of age had a significantly negative effect on maize market participation. This may imply that an increase in age negatively influences the probability of participating in the maize market. Men farmers may be less keen on commercialising and prefer to direct their focus on improving food security within their households. Older farmers are 9% less likely to participate in commercial agriculture.

Household size represents the number of household members that make up the family and help the household head in crop production by providing labour services. The coefficient of household size was positive and significantly associated with male farmers' participation in maize markets. This implies that the larger the family size is, the greater the chances of participating in the market are. Furthermore, a higher number of people in the household may result in lower hired labour and transaction costs, as well as encourage main production for both household and commercial purposes. Therefore, households with a larger labour force had a 5% probability of engaging in the maize market. This finding is in conformity with Jaleta *et al*. (2009), but contradicts findings from Makhura (2001) and Siziba *et al*. (2011) who found that larger households had reduced likelihoods of engaging in output markets, as the majority

of produce would be used to satisfy consumption needs of their larger numbers of household members, thus leaving little or no produce for sale.

To ensure agricultural commercialisation, a market-oriented production system is required. This market-oriented production system further requires up-to-date information on relevant markets. Ownership of a mobile phone had a significantly positive impact on the probability of engaging in maize output markets. This can be explained by farmers in remote rural areas facing information asymmetries in both factor and product markets, which results in them settling for subsistence farming and not expanding into commercial agriculture. Therefore, ownership of communication equipment, such as a mobile phone, facilitates infrastructure as well as enhances information accessibility.

More than 70% of men farmers had access to extension services. The majority of these services are provided by government extension agents and field staff. These services range from training on new and improved production systems to linking farmers with potential buyers. As such, the coefficient of extension services had a significantly positive impact on the probability of participating in the market. Men farmers with access to extension services are 19% more likely to participate in the maize market. This implies that farmers who have access to technical assistance in terms of training would better understand the dynamics of farming, and that such training and assistance may aid in overcoming the deteriorating situation of agriculture in Eswatini, thus increase production. This finding is in agreement with that of Johann *et al*. (2013) who reported that agricultural support services are crucial in enhancing farmers' participation in profitable agricultural commercial markets.

The majority of farmers in the study area stressed the importance of using fertiliser in maize production. Access to such a production-enhancing asset could lead to higher crop yields, thus prompting farmers to engage in maize markets. This resulted in more than 60% of farmers using fertiliser during maize production, even though it was costly to buy and transport from the shop to the farm. The coefficient of fertiliser was significant and positively related to market participation. This finding implies that households with access to fertiliser are 13% more likely to participate in maize markets.

Table 6.3: Factors influencing maize market participation among men farmers

Factor	Probit model	
	Co-efficient	Marginal Effects
Constant	-4.181	
	(3.848)	
Household characteristics		
• **Age of HH head (years)**	-0.0799 **	
	(0.0323)	-0.00862**
• **Educational level of HH (dummy)**	2.112	0.228
	(1.550)	
• **Household size (number)**	0.426 ***	0.0459 ***
	(0.135)	
Household Assets		
• **Size of land owned (ha)**	0.401	0.0432
	(0.440)	
• **HH owns livestock (dummy)**	-0.826	-0.0891
	(1.240)	
• **HH owns a working radio (dummy)**	-0.877	-0.0946
	(0.684)	
• **HH owns a vehicle (dummy)**	1.873	0.202
	(1.590)	
• **HH owns a mobile phone (dummy)**	1.102 **	0.119 **
	(0.565)	
Financial Endowment		
• **Earns off-farm income (dummy)**	-0.709	-0.0765
	(1.051)	
• **HH has a savings account (dummy)**	0.609	0.0657
	(1.503)	
• **Access to credit**	0.696	0.0751
	(0.995)	
Institutional Factors		
• **Membership in farmers' association (dummy)**	0.138	
	(0.780)	0.0149
• **Access to extension services (dummy)**	1.737 *	0187 *
	(0.927)	
• **Access to marketing information (dummy**	1.545	0.167
	(0.980)	
Production Technology		
• **Used fertiliser**	1.185 **	0.128 **
	(0.571)	
% Correctly predicted	70	
CHI-SQ	37.66 ***	
N	61	

6.3.2 The level of participation in markets by men maize farmers

As mentioned earlier, the second stage of the Heckman model identifies significant factors that influence the sales volume, conditional on market participation (Table 6.4). The OLS regression model includes the inverse Mill's ratio, which was significant and positively related to the quantity sold. This implies that there was sample selection bias. Six variables were identified to significantly influence the level of men's market participation (Table 6.3). These include the education level of the household head, farm size, transport asset and access to market information and extension services.

Men farmers had, on average, received secondary education. Omiti *et al*. (2009) reported that household heads with at least a secondary education level were in a better position to understand the market and its dynamics, as well as to make informed decisions on the quantity sold. As such, the coefficient on male farmers' education level was positive and had a statistically significant impact on the quantity sold. This implies that the level of education is related to maize sales. The study is in conformity with that of Randela *et al*. (2008) who reported that education helped farmers to manage their production and led to better market participation. However, this finding contradicts that of Musah *et al*. (2014) who argued that an additional year of formal schooling had a negative impact on maize commercialisation, as education ensured non-farm income job opportunities. Swazi's would then rely less on farming and commercial agriculture.

The coefficient of farm size had a positive and significant influence on the level of participation. The possible explanation for such a relationship is that the larger the farm size a household owns, the greater the land area is that is likely to be allocated to crop production, especially maize, as it is the country's staple food. This may result in higher maize yields, thereby increasing the quantity of maize available for sale. Moreover, it will translate into lower per capita production costs as a result of economies of scale. This result is consistent with that of Adeoti *et al*. (2014).

With the Highveld being the second largest maize-producing area in Eswatini, soil fertility improvement is essential. Therefore, production technology such as fertiliser is crucial in order to boost plant growth, as it supplies plants with important nutrients. Fertiliser had a positive and statistically significant impact on maize market participation. Access to new and improved technology may result in higher crop yields, thereby increasing the quantity sold in the market.

The NMC is mainly responsible for providing maize market information. This information involves current prices/tonne, and the quality and quantity required by the market. Such information is mainly distributed by the corporation through its extension personnel. Notwithstanding the fact that farmers in the study area are situated in rural areas, where access to information is scarce, the access to such market information is essential, as it creates awareness of the availability of markets and ensures that farmers have adequate price information. Therefore, access to marketing information had a significantly positive effect on the maize supply volume. This information presents farmers with available options to choose from so as to get the best price for their produce, thus earning higher returns. As such, the more remunerative the price is to a farmer, the greater the chances ae that it will have a larger impact on the sales volume.

Furthermore, men farmers who had access to information were likely to have fewer preconceived perceptions of market dynamics, risks and operations. Moreover, having access to price information prior to selling helps farmers to decide whether to sell or to hold produce back and sell when prices are high. This also helps to educate farmers on the advantages of agricultural commercialisation, as well as to persuade them to enter the market. In addition, access to extension services had a significantly positive impact on the probability of market participation for men farmers. This finding implies that men producers with access to extension services were in a better position to make informed decisions on participating in the market. Contact with extension agents provided farmers not only with information, but also technical assistance. This result is consistent with that of Moono (2015).

The farmers in the study area were located in rural areas. These places are far away from towns, making it difficult and expensive for farmers to gain access to markets. Hence, ownership of a vehicle was used as a proxy variable for proportional transaction costs. As such, the coefficient of vehicle was positive and significant for marketed supply by men farmers. This finding draws on the importance of proportional transaction costs in explaining the quantity sold. Ownership of such an asset is essential as it reduces the costs of transporting produce from the farm to the market. Furthermore, households with own transport are likely to have higher levels of commercialisation, as they are able to transport larger quantities of produce as well as to ensure that it gets to the market on time, before losing value. This finding corroborates that of Reyes *et al*. (2012).

Table 6.4: Factors influencing the intensity of market participation among men farmers

Factor	OLS regression	
	Co-efficient	Robust Std. Error
Constant	-3918.953	1793.494
Household characteristics		
• **Age of HH head (years)**	-19.785	19.583
• **Educational level of HH (dummy)**	1152.516	537.995 **
• **Household size (number)**	149.925	112.713
Household Assets		
• **Size of land owned (ha)**	870.876	169.294 ***
• **HH owns livestock (dummy)**	56.679	339.904
• **HH owns a working radio (dummy)**	14.157	368.533
• **HH owns a vehicle (dummy)**	1014.300	572.344 *
• **HH owns a mobile phone (dummy)**	399.254	354.417
Financial Endowment		
• **Earns off-farm income (dummy)**	-527.534	478.949
• **HH has a savings account (dummy)**	532.094	684.111
• **Access to credit**	-598.541	547.400
Institutional Factors		
• **Membership in farmers' association (dummy)**	-61.551	411.981
• **Access to extension services (dummy)**	949.100	479.796 **
• **Access to marketing information (dummy**	986.413	484.982 **
Production Technology		
• **Used fertiliser**	672.463	349.172 *
Product characteristics		
Price (E)	-0.144	1.517
Commercialisation index	1059.914	1388.495
Lambda (Inverse Mills Ratio)	572.982	277.197 *
R-SQ	74	
F-test	7.08 ***	

6.4 SUMMARY

This chapter estimated factors that influence women farmers' commercial orientation and participation in the maize market. Age, education, household size, farm size, livestock, working radio, vehicle, mobile-phone, off-farm income, savings, credit, farmers' group, marketing information and fertilizer have a significant effect on women farmers market participation. While age, household size, mobile-phone, extension services and fertilizer have a significant effect of men farmers decision to participate in the maize market.

On the other hand, education, household and farm size, mobile-phone, off-farm income, extension services, fertilizer, price and HCI were found to have a significant impact on women farmers supply volume. The HCI, education, farm size, vehicle, extension services and market information significantly influence the level of commercialisation by men farmers.

The results suggest that both men and women face different constraints when accessing the market. The government of Eswatini should take care when developing policies and interventions to ensure that both men and women have equal access and opportunities.

CHAPTER 7
CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

This chapter is divided into 3 sections. It begins by presenting the summary of the study, which is followed by the conclusion, which draws on the key study findings. It further recommends policy implications for improving market participation for both male and female farmers. Lastly, it presents study limitations and suggests areas for future research.

Agriculture is the backbone of Eswatini's economy. It contributes significantly to the country's GDP, generates employment opportunities and merchandise exports, and enhances food security, thus lowering poverty levels. Women are seen to play an integral part in the agricultural sector. This encompasses their roles in agricultural decisions, increased demand and use of farm-inputs and credit, the production of marketable surplus, and labour contribution, as well as contributing to household and national food security. With maize cereal being the most important and predominant crop grown in Eswatini, it serves as the country's main staple food. As such, it is promoted at both producer and national levels by the Eswatini government for commercialisation and diversification.

Therefore, commercialising subsistence farmers, especially women maize farmers, involves transitioning from subsistence production to commercial farming. Agricultural commercialisation has been identified as both a driver and consequence of change, as it goes beyond marketing produce and involves product choice and input decisions that are driven by the profit maximisation motive. As such, commercialisation has the potential for increasing women farmers' rural incomes and enhancing their standards of living. However, the participation of women farmers in markets, especially in sub-Saharan African countries including Eswatini, remains low as they experience daunting constraints. These range from lack of productive and financial assets and production technology, to high transaction costs. Therefore, to overcome these constraints and market barriers, it is imperative to understand the factors that influence agricultural commercialisation, especially if participation in commercial agriculture has a potential for unlocking opportunities for Eswatini women farmers to derive sustainable livelihoods. As such, this study endeavoured to identify the factors that influence the decision and level of market participation among women maize farmers. The study

hypothesis sought out to test whether socioeconomic factors, household assets, production factors and institutional factors significantly affect the decision and level of market participation among women maize farmers in the Highveld region.

To achieve the study objectives, data was collected through questionnaire interviews. The study reviewed two theories, namely the agricultural risk management (ARM) theory and the resource allocation to market versus subsistence production under risk. The ARM framework proposed by the World Bank (2017) brings about an understanding of agricultural risk, while incorporating a gender lens. The framework sheds light on the importance of approaching agricultural commercialisation from a gendered perspective, rather than by treating farmers as a homogenous group. This is crucial as it identifies the gender differences that help to explain the challenges faced by women when participating in output markets. It was found that von Braun's theory of resource allocation to market versus subsistence production counteracts the risk attribute of farmers who are averse to participating in commercial agriculture. Therefore, both theories were used to understand the effect of risk on agricultural commercialisation and on women farmers.

Following the theoretical framework, the Heckman two-stage procedure was employed in Chapter 6 to analyse the factors that influence commercialisation. The first stage used the Probit model to address the first objective, which was to identify the factors that influence the probability of entering the maize market, while the OLS model was employed to determine the factors that influence the intensity of market participation. The models were estimated, and significant variables were identified. The preliminary results are presented and discussed in Chapter 6 in terms of household characteristics, assets, production technology, institutional and market factors.

7.2 CONCLUSION

Empirical evidence shows that women farmers are keen on participating in the maize market, as 60.8% engaged in the market as maize sellers. Women farmers in the study area are approximately 49 years old. They are relatively young; hence they can be described as belonging to the economically active group in Eswatini. Households headed by women had 7 members, which represented the availability of required labour to produce 2305.1 kgs of maize, thereby increasing their likelihood of participating in the maize market as net sellers. However,

women had attained, on average, primary education. This explains why the majority engaged in output markets, as they lacked the skills and expertise provided by education that would enable them to take up wage employment opportunities. In addition, a considerable proportion of women (over 60%) did not own assets such as land and transport equipment. This was a result of the stringent requirement under Eswatini's customary tenure system and lack of funds to purchase assets.

The lack of access to credit, market information and extension services by women farmers hindered their participation in commercial agriculture, as they lacked the means to purchase farm inputs and/or access current information based on new and improved technologies, prices, markets and potential trading partners. As such, the study revealed that women farmers must overcome various constraints and market barriers in order to participate in the market.

The first objective was to identify the factors influencing the decision to become commercial in maize. The study concludes that the factors: household size, farm size, livestock, working radio, off-farm income, savings, credit, farmers' group, marketing information and fertiliser had a significant positive effect on women farmers' decisions to participate in the maize market. Age, education and mobile phone negatively influenced the decision to enter the market. The second objective was to determine the factors influencing the level of commercialisation. The study revealed that the level of market participation is positively influenced by education, household size, farm size, mobile phone, off-farm income, extension services, fertilisers, and HCI while price negatively influences the quantity of maize sold by women farmers.

The study identified the following ways to enhance women farmers' participation in maize markets. These include educating women on the benefits of agricultural commercialisation. This involves homestead and field visits by extension personnel. Furthermore, field staff should ensure that women receive relevant training and up-to-date information on prices, markets and potential buyers. In addition, the government should establish support services such as input subsidies and also ensure that women farmers are integrated into development strategies. Financial institutions should consider providing financial services that are tailored to meet and address the needs of women farmers. Lastly, government should consider reducing the transaction costs faced by farmers when entering the market. This involves developing and improving rural infrastructure such as roads, local markets and depots.

7.3 POLICY RECOMMENDATIONS

To increase participation and the quantity of maize sold in the market, agricultural development policies need to be geared towards addressing the needs, assets and constraints of Swazi farmers, especially women, in order for them to be effective and efficient. Areas for attention that have been identified by this study include the following:

Policy implications directed at assisting women farmers:

- Promoting knowledge through training can improve agricultural productivity, thus accelerating economic growth and rural development. Since women account for 70% of agricultural labour, ensuring that they have the same access to farm inputs, education, training and marketing information may result in high productivity and sales volumes, thus reducing poverty indices and improving household welfare.

- Moreover, the development of new and improved agricultural technologies should take into account the large female share of agricultural labour. As such, if possible, less intensive and time-consuming technologies should be developed and introduced to aid in production. In addition, clearly stated directions on how to use farm chemicals, such as pesticides and herbicides, should be instituted, as women work the fields with their young children.

- The development of financial product lines, like microfinance, saving schemes, crop insurance and credit associations that are targeted at women agriculturalists, should be instituted. Such services can ensure access to inputs and markets as women will have the financial muscle.

- Training programmes, education modules and learning material for field staff and extension agents should be properly designed to stress the importance and valuable contribution of women farmers in the agricultural sector.

- Furthermore, agricultural workshops, reports and materials should provide extension officers with an in-depth understanding of the significance of, and the relationship between, educating, training, and assisting women farmers towards the achievement of sector goals such as high productivity and food-secure homesteads. This also translates into the achievement of national development and Sustainable Development Goals.

- Extension services have proven to be crucial for farmers' participating in commercial agriculture. Therefore, increasing the number of female extension field staff would ensure that the delivery of programmes, workshops and training services are differentiated by gender. This may increase women's access and contact with extension services. Furthermore, retraining of male extension workers on women farmer behaviour and issues should be implemented.

- Lastly, women in Eswatini do not own land, but have access to it through their husbands or male relatives. As such, they do not have direct access or ownership without their male counterparts acting as middle-men. Hence, the revision of land policies is critical to enable women to own land rights, thus incentivising land investments that can lead to the exploitation of market opportunities.

Recommendations for women maize farmers:

- Farmers who are not members of farmers' groups should consider joining such platforms as they play a significant role in lowering transaction costs and overcoming market barriers. Workshops and seminars can be held to educate farmers on the benefits of joining such groups.

- To ensure high yields, farmers should make use of productivity enhancing technologies such as improved seed varieties and fertilisers. It is of critical importance to ensure that farmers use the correct amount and rates of seeds and fertiliser per hectare, respectively. They should stop under- or over-utilising farm inputs, and apply the recommended rates. Farmers should be educated on the cons of such farming activities.

- Farmers who have access to extension personnel should make use of their services. This could help to solve the majority of farm problems, as well as aid in keeping them up-to-date in terms of new and improved production techniques, marketing information and linking them with potentials buyers.

Policy recommendations:

- Government should ensure that extension agents are supported regarding improving their skills and expertise in order to ensure the effective delivery of information and

training services. Moreover, encouraging and motivating field staff could result in regular homestead visits and monitoring of field progress.

- There is a need to develop wealth-creation and asset-accumulation policies and interventions, as these help in increasing productivity, thus producing marketable surplus. This involves the ownership of property rights which would enable farmers to own, control and transfer assets.

- Price normally acts as an incentive to engage in the market. However, it has negatively influenced the quantity sold by farmers. Therefore, the impact of output price as experienced on sales volumes is in contrast with the end goal of government price support policies, which normally strive to ensure that farmers become net sellers of maize. As such, the revision of price policies is essential in order to encourage maize sales. There is a need to train women farmers on the price mechanisms and also to support them in risk management.

- Again, input subsidies are essential to ensure and encourage local production. Such policy interventions have a positive impact on household incomes, as well as ensuring affordable prices for consumers

- The provision and improvement of existing rural infrastructure should be examined. These topics include the construction and maintenance of roads which connect rural areas to market places. These not only make market places readily available and accessible, but also lower transaction costs. Moreover, because of the complaints made by maize farmers about the low prices charged by the NMC, the development of retail outlets in both communities and districts would ensure reasonable and competitive prices for their produce, thus avoiding the monopolistic prices charged by the corporation.

- Community shops that purchase farm inputs should be established. Currently, producers must travel long distances to district town markets to purchase inputs. This increases transport and search costs. Moreover, it limits their adoption of productivity enhancing inputs, such as improved seeds and fertilisers, which may have a negative impact on the production of marketable surplus.

- Government should promote the awareness of, and support the establishment of, farmers' groups, as these allow for information flow regarding prices, reduce transport

costs, and aid in strengthening the lobbying and bargaining power of farmers. They can also ensure access to extension services, as it much easier and time saving to administer services to a group. Again, access to farm implements and mechanisation can be attained easily when structured as a group.

7.4 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH

Upon conducting this study, a few limitations became apparent. Firstly, the study focused on the commercial orientation and the level of market participation among women maize farmers. As such, the focus was solely on maize farmers, as maize cereal is the country's staple food crop. In addition, due to limited time and funds, the study did not include all maize farmers in the region, but only a sample of surplus maize producers. Furthermore, the sample was collected from one district in Eswatini out of four. Therefore, due to differences in topography, climatic conditions and poverty levels, some study inferences may only apply to the Highveld region, and not to the whole of Eswatini. Moreover, the use of cross-sectional data does not properly determine the drivers of agricultural commercialisation.

As such, future research can focus on using time series data, where available, in order to capture how changes in the farm household would influence agricultural commercialisation. Another suggestion would be to assess the factors that influence input market participation, as this is the first stepping stone to producing output. Research could also investigate the challenges faced in participating both in input and output markets.

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APPENDICES

Appendix A: Pearson's correlation matrix

	Age	Education	HS	Assoc	Land size	Livestock	Vehicle
Age	1						
Education	-0.3195	1					
HS	0.0806	0.0923	1				
Assoc	-0.072	0.2156	0.1822	1			
Land size	-0.0183	0.0165	0.1339	0.0955	1		
Livestock	0.1161	-0.0415	0.0366	0.1431	0.1373	1	
Vehicle	0.0806	0.0635	0.1103	0.2235	0.0236	0.2125	1
Credit	-0.0355	0.1019	0.293	0.3193	0.0634	0.2371	0.3888
Marketing	-0.0842	0.0897	0.265	0.2358	0.1481	0.1386	0.2261
Extension	-0.1836	0.15	0.2283	0.1639	0.0998	0.22	0.294
Radio	-0.1554	0.1894	0.12	0.1132	0.0173	-0.0092	0.1647
Phone	-0.2467	0.1354	0.0595	-0.0971	0.0913	-0.0144	-0.1903
Off-farm	-0.2683	0.1762	-0.0427	0.056	0.0045	-0.0106	0.1235
Savings	0.0222	0.0693	0.0286	0.0124	0.081	0.1098	0.1878
Fertilizer	-0.1073	0.029	0.1343	0.0655	0.1488	0.0681	0.0515

	Credit	Marketing	Extension	Radio	Mobile	Off-farm	Savings
Credit	1						
Marketing	0.6028	1					
Extension	0.4491	0.5629	1				
Radio	0.1867	0.1993	0.2414	1			
Phone	-0.0073	0.0879	0.0051	0.1175	1		
Off-farm	0.0497	0.004	0.0503	0.0286	0.0089	1	
Savings	0.2122	0.1424	0.148	0.1013	0.1071	0.1404	1
Fertilizer	0.1464	0.2241	0.1836	0.1752	0.1027	-0.0714	0.0883

	Fertilizer
Fertilizer	1

Appendix B: VIF values

Variable	VIF	1/VIF
Age	1.44	0.70
Education	1.25	0.80
Household size	1.22	0.82
Land size	1.21	0.82
Livestock	1.29	0.78
Vehicle	1.38	0.73
Radio	1.19	0.84
Mobile phone	1.23	0.81
Credit	2.06	0.49
Savings	1.16	0.87
Off-farm	1.16	0.86
Farmer's group	1.26	0.79
Marketing information	2.25	0.44
Extension	1.73	0.59
HCI	1.71	0.58
Price	2.98	0.34
Fertilizer	1.26	0.80

Appendix C: Determinants of market participation decision for the pooled sample

Factor	Probit Model	
	Co-efficient	**Robust Std. Error**
Constant	-5.042	1.380 ***
Household characteristics		
• **Age of HH head (years)**	-0.0255	0.0143 ***
• **Educational level of HH (dummy)**	- 0.320	0.533
• **Household size (number)**	0.321	0.0757 ***
Household Assets		
• **Size of land owned (ha)**	0.263	0.119 **
• **HH owns livestock (dummy)**	0.516	0.318
• **HH owns a working radio (dummy)**	0.298	0.307
• **HH owns a vehicle (dummy)**	0.527	0.390
• **HH owns a mobile-phone (dummy)**	1.016	0.770
Financial Endowment		
• **Earns off-farm income (dummy)**	0.855	0.350 ***
• **HH has a savings account (dummy)**	- 0.517	0.506
• **Access to credit**	1.219	0.340 ***
Institutional Factors		
• **Membership in farmers' association (dummy)**	1.186	0.329 ***
• **Access to extension services (dummy)**	0.367	0.329
• **Access to marketing information (dummy**	1.511	0.422 ***
Production Technology		
• **Used fertilizer**	1.194	0.395***
% Correctly predicted	68	
CHI-SQ	78.45***	
N	191	

Appendix D: Determinants of the level of market participation for the pooled sample

Factor	OLS Model	
	Co-efficient	**Robust Std. Error**
Constant	- 4104.967	1120.501 ***
Household characteristics		
• **Age of HH head (years)**	-4.857	6.837
• **Educational level of HH (dummy)**	117.782	281.058
• **Household size (number)**	97.509	47.455 **
Household Assets		
• **Size of land owned (ha)**	506.694	122.064 ***
• **HH owns livestock (dummy)**	491.241	157.689 ***
• **HH owns a working radio (dummy)**	155.620	158.071
• **HH owns a vehicle (dummy)**	29.439	179.490
• **HH owns a mobile-phone (dummy)**	386.974	278.836
Financial Endowment		
• **Earns off-farm income (dummy)**	270.909	210.584
• **HH has a savings account (dummy)**	18.465	279.974
• **Access to credit**	567.923	263.561 **
Institutional Factors		
• **Membership in farmers' association (dummy)**	357.327	218.964
• **Access to extension services (dummy)**	398.200	191.058 **
• **Access to marketing information (dummy**	602.949	244.706 **
Production Technology		
• **Used fertilizer**	773.480	178.924 ***
Product characteristics		
Price (E)	0..713	0.820
Commercialisation index	1780.348	909.107 **
Lambda (Inverse Mills Ratio)	696.754	169.930***
R-SQ	54	
F-test	7.30***	
N	119	

QUESTIONNAIRE

AN ANALYSIS OF FACTORS INFLUENCING COMMERCIALISATION OF WOMEN MAIZE FARMERS IN THE HIGHVELD, SWAZILAND

(Interviewer, introduce yourself by showing the university ID or other ID. Please make sure to put the interviewee at ease before talking to him/her).

Hello, my name is …….. I am conducting a study on factors that influence commercialisation of women maize farmers in Swaziland as part of a student degree studies at the university of Pretoria in South Africa.

read out: Your participation in the study is very important in achieving the study goals and it is entirely voluntary. All information you provide will be treated **confidential** and will not be made available to anyone else inside or outside of the research team.

To fieldworker:

If Yes	Continue	
If No	Ask to speak to the person who does	

RESPONSE DETAILS

Attempt No	**Date (actual)**									**Response**		**Next Attempt (planned)**							
	D	**D**	**M**	**M**	**Y**	**Y**	**Y**	**Y**	**Code**		**D**	**D**	**M**	**M**	**Y**	**Y**	**Y**	**Y**
1.																			
2.																			
3.																			
4. FINAL RESULT																			

Response Codes

01 Complete questionnaire

02 Partially completed questionnaire

03 Revisit

04 Refusal

INTERVIEWER COMMENTS: Give full details for result codes 02 – 04 in space below

SECTION 1: GENERAL HOUSEHOLD INFORMATION

1.1. IDENTIFICATION OF HOUSEHOLD

LOCATION (village)	
ROLE OF HOUSEHOLD HEAD IN THE VILLAGE (Codes A)	
PERIOD POSITION HELD (Codes B)	
DATE OF INTERVIEW	
TIME OF INTERVIEW (start and end time)	
NAME OF INTERVIEWER	

Codes A		**Codes B**
1= Chief	5= Farmers' group Leader	1= <12 months.
2= Headmen	6= School Committee	2= 1 to 3yrs.
3= Councillor	7= Other (specify)	3= 3 to 5yrs.
4= Church leader	8= None of the above	4= > 5yrs.

1.2 HOUSEHOLD DEMOGRAPHIC CHARACTERISTICS

Family Code	Household members- Relation to Respondent (Codes A) (start with respondent)	Sex (Codes B)	Marital Status (Codes C)	Age (years)	Educational Level (Codes D)	Occupation (Codes E)	Do you assist with farm-work? (Codes F)
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1							
2							
3							
4							
5							
6							
7							
8							
10							
11							
12							

Codes A	**Codes B**	**Codes C**	**Codes D**	**Codes E**	**Codes F**
1= HH head 2= Spouse 3= Parent 4= Son/ Daughter 5= Son/ Daughter in-law 6= Grand- child 7= Other relative 8= Hired worker	0= Female 1= Male	1= Single/Never Married 2= Married living with spouse 3= Married but spouse away 4= Divorced/separated 5= Widow	0= None/illiterate 1= Informal education 2= Primary 3= Secondary 4= High School 5= Tertiary Education	1= Farming 2= Salaried employment 3= Self- employed 4= School/ College child 5= Non-school child 6= Herding 7= Household chores 8= Other	0= No 1= Yes

SECTION 2: SOCIAL CAPITAL AND NETWORKING

Membership in formal/informal institutions (*primary respondent and spouse only*)

Family Code	Type of group	Group functions			Role in the group	Relationship with group members	How often do you meet?	In your view, is the institute working in the community
		1st	2nd	3rd				
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

Codes A	**Codes B**	**Codes C**	**Codes D**	**Codes E**	**Codes F**
1= Input supply/farmer coops 2= Crop/ seed producer& marketing group 3=Farmers association 4= Women's association 5= Church/mosque/ traditional congregation 6= Community administration (Chief, headmen etc…) 7= Savings and credit group 8= Funeral association 9= Water user association 10= Other (specify)	1= Marketing produce 2= Input access/ marketing 3= Seed production 4= Farmer research group 5= Saving and credit 6= Funeral group 7= nursery 8= input credit 9= Church group/ traditional ceremonies 10= Other (specify)	1= official 2= member	1= Good 2= Bad 3= No relationship	1= when there's a need 2= Weekly 3= Monthly 4= Quarterly 5= Annually 6= Never 7= Other (specify)	0= No 1= Yes 2= don't know

SECTION 3: HOUSEHOLD ASSETS

3.1. Natural Resources *(Tick where appropriate)*

1. Does your household have access to the following natural resources?

Resources	**Yes**	**No**
Land		
Water		

2. Land Ownership

Who owns the land	Select what is applicable
Own land (Respondent)	1
Spouse	2
Family land	3
Rented land	4
Other (specify)	5

3. What is the size of the land? ……..ha

4. What is the tenure system of your farm?

Title Deed land	1	Swazi Nation Land	2

5. What was the main use of land during the last growing season?

Use	Select what is applicable
Crop production	1
Grazing of livestock	2
Agricultural purposes	3
Other (Specify)	4

6. Soil description

Characteristics	Response Codes
1. What is your soil type? (Codes A)	
2. Have extension agents told you about the conditions of your soil? (Codes B)	
3. If yes, what is your soil Ph? (Codes C)	
4. In your view, is the soil good for farming? (Codes A)	
5. What do other farmers say about your soil? (Codes D)	

Codes A	**Codes B**	**Codes C**	**Codes D**
1= Sandy loam soil 2= Clay loam 3= Other (specify)	0= No 1= Yes	1= Acid 2= Neutral 3= Base	1= Good 2=Bad

7. Do you have access to water?

Yes	1	No	0

8. What is the household's main source of water? *(Tick all that apply in each column)*

Piped (tap) water in dwelling/house	1
Piped (tap) water in yard	2
Borehole in yard	3
Rain-water tank in yard	4
Neighbour's tap	5
Public/communal tap	6
Water-carrier/tanker	7
Borehole outside yard	8
Flowing water/stream/river	9
Stagnant water/dam/pool	10
Well (spring)	11
Other (specify)	13

9. What is the distance you or your household members need to travel to fetch water from a communal water point?

Do not travel, have water in-house	1
Don't travel, access water outside the house, but inside my yard	2
Less than 200 metres	3
201 - 500 metres	4
501 metres - 1 kilometre	5
More than 1 kilometre	6
Water is within 2.5 km	7
Water is more than 2,5 km radius	8
Others, please specify: _____	9

3.2. Financial Resources- *Household savings*

1. Do you have the following?

Financial Resources	1= Yes 0= No	Amount saved during 2016/17	Type of policy? 1=life 2=Car/ house 3=Agricultural (i.e. crops, livestock etc….) 4=other (specify)	Monthly Premium (E)
Savings Account				
Insurance policy				

3.3. Human Resource

Labour	Rate/day	No. of labourers	Days employed	Total wages
1	**2**	**3**	**4**	**5**
1. Permanent hired labour				
2. Casual labour				
3. Use only household labour				

3.4. Productive Resources- *Livestock Ownership*

Livestock type	Number	Purpose during 2016/17 (1= Consumption, 2= Sale, 3= Both)	If sold, how many?	To whom? 1= Farmer 2=Butcher 3= Auction 4= meat corporation (SME)	If you would sell one of the […], how much would you receive from the sale?
1	**2**	**3**			**4**
Cattle					
1. Bull					
2. Cow					
3. Calves					
Goats					
1. Mature male goat					
2. Mature female goat					
3. Kids					
Sheep					
1. Mature male sheep					
2. Mature female Sheep					
3. Lamb					
Other livestock					
1. Poultry					
2. Pigs					

3.5. Physical Resources

3.5.1. Production Asset

Asset	How long have you had the asset? (yrs)	Number in good condition	Value of asset (E)
1	**2**	**3**	**4**
1. Hoe			
2. Plough			
3. Cultivators			
4. Rippers			
5. Tractor			
6. Sprayers			
7. Trailer			
8. Axe			
9. Water pump			
10. Tv			
11. Radio			
12. Mobile phone			
13. Vehicle			
14. Other (specify)			

3.5.2. Transport asset

Type	Ownership 1= Yes 0= No	Year of acquisition	Number	Use (1= Household errands, 2= Business purposes)	Value of asset if sold (E)
1	**2**	**3**	**4**	**5**	**6**
1. Donkey/ Ox cart					
2. Vehicle					
3. Bicycle					
4. Motorbike					

SECTION 4: PRODUCTION AND MARKETING

4.1. Maize Production

1. What was the amount of land planted during 2016/17 marketing season? ……ha
2. Which month did you prepare the field for planting? .....
3. Method of field preparation?

Method	Select all that apply
Ox- drawn plough	1
Hand	2
Tractor	3

What was the quantity of hybrid seed used?.....kgs

4. Price per kg?.....
5. Quantity of fertilizer (Basal+ Top) used?.....kg
6. Cost of fertilizer per bag? E…….
7. What was the source of input?

Agro-agent within community	1	Agro-agent in town	2

4.2. Marketing of Crops

Questions in this sub-section apply to the 2016/17 marketing season?

Crop	Area planted (ha)	Yield? (kgs)	Reason for Production? *(Codes A)*	Quantity consumed? (kg)	Quantity reserved for seed (Kg)	Did the household sell? *(Codes E)*	Quantity sold? (Kgs)	To whom did you sell? *(Codes B)*	Price/ kg	Point of sale? *(Codes C)*
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1. Maize										
2. Beans										
3. Sorghum										
4. Other (specify)										
5.										
6.										

Codes A	**Codes B**	**Codes C**	**Codes D**	**Codes E**	**Codes F**
1= Consumption 2= Sale 3= Both	1= Depot 2= Trader 3= Farmer cooperative 4= Miller 5= Another farmer/ consumer 6= Other (specify)……	1= Farm-gate 2= Depot 3= Village market 4= District market	1= Bicycle 2= Hired truck 3= Motorbike 4= Donkey 5= Back/ head load 6= Other(specify)…… 7= Horse/ Ox- cart	1= Yes 0= No	1= Loss to spoilage 2= Sold at low price 3= Sold later 4=Consumed

Crop	Distance to market? (minutes)	Mode of Transport? *(Codes D)*	Transport costs	Do you always find a ready market? *(Codes E)*	What happens to unsold produce? *(Codes F)*
10	**11**	**12**	**13**	**14**	**15**
7. Maize					
8. Beans					
9. Sorghum					
10. Other (specify)					
11.					
12.					

Non-sellers (if did not sell):

1. Why didn't the household sell?
    a) ……..
    b) ……..
    c) ……..
2. Does the household have produce in store?

Yes	1	No	0

3. If yes, what quantity? …… kg

SECTION 5: HOUSEHOLD INCOME

1. Where do you get household income? Rank your income sources in order of importance *(complete table below).*

***1**= livestock, **2**=field crops, **3**=vegetables, **4**= remittances **5**=beer brewing, **6**=craft, **7**= casual labor sales, **8**=formal employment, **9**=Other (SPECIFY)*

Rank	Source of income
1	**2**
1	
2	
3	
4	
5	

SECTION 6: ACCESS TO FINANCIAL CAPITAL, INFORMATION AND INSTITUTIONS

6.1. Access to Credit

1. Do you have access to credit?

Yes	1	No	0

(If no, please go to question 4)

2. Who provided it?

Bank	**1**
Farmers 'group/ cooperative	**2**
Informal sources (ROSCAs, ASCAs, money-lenders, family/friend, etc…)	**3**
Other (specify)……	**4**

3. What was the purpose of credit?

Input acquisition	**1**
Marketing	**2**
Processing	**3**
Consumption	**4**
Renting farm	**5**
Other (specify)……	**6**

4. Why don't you have access to credit?

Lack of collateral	**1**
Information asymmetry	**2**
High interest rates	**3**
Had enough capital to start up and run business	**4**
Other (specify)	**5**

6.2. Marketing Information

1. Do you have access to market information?

Yes	1	No	0

(If no, please go to question 4)

2. What are your sources of information?

Extension officer	**1**
Media	**2**
Famer's group/cooperative	**3**
Buyer	**4**
Fellow farmer/friend	**5**
Other (specify)……	**6**

3. How often do you receive information?

Daily	**1**
Weekly	**2**
Monthly	**3**
Annually	**4**

4. In your view, why don't you have access to information?

Information asymmetry	**1**
Lack of media devices/ extension officers	**2**
Other (specify)	**3**

6.3. Extension Services

1. Do you have contact with extension agents?

Yes	1	No	0

2. What services are provided by agents?

Production	**1**
Processing	**2**
Marketing	**3**
Other (specify)……	**4**

3. Are agents always available when you need them?

Never available	1	Sometimes available	2	Always available	3

6.4. Infrastructure

1. What type of road do you use to the market?

Tarmac	1	Gravel	2	Both	3

2. In your opinion, how do you rate the road?

Fine	1	Good	2	Bad	3

3. What is the state of the Ntfonjeni Storage house?

Fine	1	Good	2	Bad	3

SECTION 7: HOUSEHOLD EXPENDITURE

7.1. Food consumption

Item	Own produced	Bought	Cost of buying	Frequency of buying (e.g. 3 times a month)
1	**2**	**3**	**4**	**5**
1. Staple foods				
2. Vegetables				
3. Fruits				
4. Meat & other animal products				
5. Beverages and drinks				
6. Fats, oils, sweeteners, snacks & others				

7.2. Expenditure on non-food items

Item	Costs per month
1	2
1. Clothing	
2. Health	
3. Education	
4. Amenities	
5. Rentals	
6. Other (specify)	
7.	

SECTION 8. EXPECTATIONS

8.1 What do you think government can do to improve your farming?

_____

_____

8.2 What help/support do you need to sell your maize with ease?

_____

_____

8.3 Where will you like to see your farming operation in 10 years?

_____

_____

This interview has ended. Do you have any question or comment?

_____

_____

Thank you!!!!