

University of Venda

An Analysis of Agricultural Commercialisation amongst Smallholder Farmers in
Munyati Resettlement Area, Chikomba District, Zimbabwe

By

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(11576147)

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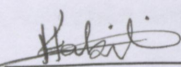
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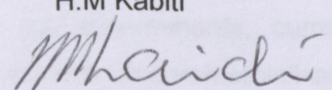
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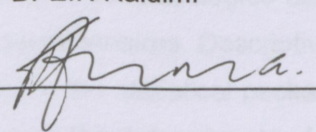
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Declaration

I, **Kabiti Hlekani Muchazotida** hereby declare that this dissertation for Masters of Science in Agricultural Economics at University of Venda hereby submitted by me, is my original work, and has not been submitted in partial or entirety for degree purposes to any other university or institution. All the work that was written by other authors and used in the dissertation is fully acknowledged.

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Abstract

Smallholder farmer commercialisation has been identified as a way of increasing agricultural production, food availability, and farmers' incomes. Smallholder commercialisation can occur as a result of an increase in the production levels of "traditional" food crops or as a result of a shift in production towards cash crops. Commercialisation occurs both on the input side and output side. Zimbabwe has been coming up with strategies to increase smallholder farmer commercialisation and participation in agricultural markets. Smallholder farmers in Munyati resettlement area in Zimbabwe are still facing challenges in commercialisation. The study analysed smallholder farmer input and output commercialisation in the study area, paying attention to the determinants, current levels, challenges and the perceptions of the smallholder farmers on commercialisation. The study was limited to crop commercialisation. The study respondents were smallholder farmers and the extension officer working in the study area. Research methodologies used include transect walk, key informant interviews, and structured questionnaires. Descriptive statistics and econometric methods were used to analyse the data on the statistical package Stata version 10.0. The Tobit Regression Model was used to analyse the determinants of input and output commercialisation.

The study revealed that the farmers have an average input commercialisation index of 0.42 and an average output commercialisation index of 0.41. Level of input commercialisation was found to be determined by method of cultivation, years of schooling of household head, irrigation availability, distance to input market, road access and household gross production value in the study area. Level of output commercialisation at household level was found to be determined by household labour size, irrigation availability, household gross production value, farming experience and off farm income. The farmers had positive perceptions and attitudes towards agricultural commercialisation. Various challenges were indicated as hindrances to commercialisation. Most of the indicated challenges were market related. Lack of farmer organisations was another challenge indicated. The study ends by recommending that different strategies be used to enhance input and output commercialisation as they are determined by different factors. Further studies are recommended on commodity specific levels of commercialisation so as to better understand the agricultural commodities which can be promoted for the purpose commercialisation in the study area

Key words: Agricultural commercialisation, input commercialisation, output commercialisation, perceptions, smallholder farmer

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PTLSP:	Fast-track Land Reform Programme	
GMB:	Grain Marketing Board	
GOZ:	Government of Zimbabwe	
HCIC:	Household Crop Input Commercialisation index	
HCOC:	Household Crop Output Commercialisation index	
IFPRI:	International Food Policy Research Institute	
km:	Kilometres	
UNDP:	United Nations Development Programme	

List of acronyms

AREX:	Agricultural Research and Extension
EU:	European Union
FAO:	Food and Agriculture Organisation
FTLRP:	Fast-track Land Reform Programme
GMB:	Grain Marketing Board
GOZ:	Government of Zimbabwe
HCiCi:	Household Crop Input Commercialisation index
HCOCi:	Household Crop Output Commercialisation index
IFPRI:	International Food Policy Research Institute
Mm:	Millimetres
UNDP:	United Nations Development Programme

CHAPTER 1: INTRODUCTION

This chapter gives the introduction to the study. It encompasses the background and setting, the problem statement, explanation of the concepts relevant to the study, significance of the study, objectives, research questions and the structure of the study.

1.1 Background

Many of the developing countries have an agro-based economy whereby a sizable amount of agricultural production is carried out by smallholder farmers. Zimbabwe is also one such country which recognises the importance of smallholder farmers in the economic development of the country. This is evident in the Medium term plan (2011-2015) policy on agriculture, which indicates sustainable agricultural productivity and competitiveness as one of its priority areas (Government of Zimbabwe (GOZ), 2011). This priority area covers the increased agricultural commercialisation within the smallholder sector as its outcome. In a bid to increase the participation of smallholder farmers in the economic development of the country, the Government of Zimbabwe has embarked on a series of farmer support programmes (GOZ & FAO, 2011).

The intensification of the farmers support programmes started after the fast-track land reform programme (FTLRP) which occurred in the year 2000. The fast-track land reform programme was initiated with a vision of creating an economically competitive farming community with an ability to lead agricultural development towards economically-oriented production, and also to ensure food security and sustainability (Mujeyi, 2010). This, however, did not go as planned. Racial distribution of ownership to land was, however, greatly reduced (Njaya & Mazuru, 2010). The programme ensured a more equitable distribution of land with new smallholders acquiring land. However, it was then followed by a series of economic down turn, which caused instability in all sectors of the economy, including agriculture (Njaya & Mazuru, 2010; Mujeyi, 2010).

A new agricultural market set-up arose as a result of the dynamics which were occurring within the economy of Zimbabwe. As a result of the high economic activity by entrepreneurs, the new markets were characterised by a wide variety of players, operating according to a different set of supply and demand rules (Mavedzenge *et al.*, 2008). These distortions had an impact on both input and output agricultural markets. According to Mujeyi (2010), the distortions in the input and output markets were not moving together. This had serious repercussions on the farmers' income.

The new smallholder farmers who emerged as a result of the land reform embarked on farming in the backdrop of an unstable agricultural market. These farmers had to find survival skills so as to try and fit into the market. Considering that the smallholder farmers are more prone to risk, the setup of the markets discouraged the participation of smallholder farmers in the formal markets and gave birth to informal and localized marketing channels (Mujeyi, 2010).

Smallholder commercialisation is when there is participation in agricultural markets by the farmers. This can be achieved when a portion of the agricultural produce from the farmers is marketed and/or when part of the inputs are acquired from the agricultural markets (Pingali, 1997). Commercialisation by smallholder farmers, especially in developing countries, has a positive impact on the performance of the agricultural sector in the country, and on the livelihoods of the farmers involved. Smallholder market participation also avails great opportunities for growth and poverty reduction in rural communities.

Commercialisation of smallholder agriculture has been identified as one of the important ways that can be adopted to ensure economic growth and development for any agro-based economy (World Bank, 2008). In Zimbabwe, the Minister of Agriculture, in 2008, agreed that smallholder farmers are vital for economic growth and employment creation if they actively participate in markets (Made, 2008).

According to Kunze (2003), there has been an intensification of commercialisation among smallholder farmers over the past 20 years as a result of increased globalisation, demographic transition, trade liberalisation and increased technological innovation. However, more still needs to be done to incentivise commercialisation by smallholder farmers in poor regions.

1.2 Problem Statement

The Government of Zimbabwe initiated the Fast-track Land Reform Programme in the year 2000 so as to ensure agricultural development, food security and sustainable economic growth. This programme however did not achieve what it had targeted in the face of the economic instability which followed thereafter. Prior to the onset of the fast-track land reform program, Zimbabwe was known as the bread basket of the Southern African region because of the high production of food crops. Smallholder farmers were also contributing to that status by means of participating well in the output markets with the surplus from their household consumption (Sukume & Guveya, 2009).

The FTLRP gave rise to new smallholder farmers who were expected to boost agricultural production in the country. Agricultural commercialisation can be used as a way of increasing agricultural production in a country. The Government of Zimbabwe (GOZ) has been encouraging commercialisation among smallholder farmers. Even though it has been almost twelve years since the smallholder farmers in the study area received land, challenges are still faced with regard to commercialisation and participation in agricultural markets.

To encourage commercialisation, there is need to first make available the necessary economic, market, social, physical and political environment (determinants). Studies carried out in different parts of the world have revealed some of the determinants of commercialisation (Kunze, 2003; Barrett, 2007; Gabre-Madhin *et al.*, 2007; Davidova *et al.*, 2009; Goitom, 2009; Berhanu & Moti, 2010). However, these determinants differ within and across countries due to the heterogeneous conditions faced by the smallholder farmers. This necessitates a location based analysis of commercialisation in order to recognise the best way to capacitate the smallholder farmers for commercialisation. With the above knowledge in mind, this study sought to add location specific knowledge to the already existing knowledge on smallholder farmer commercialisation.

1.3 Significance of the Study

Following the land reform programme, the GOZ came up with different strategies to improve the productivity and market participation of the land reform beneficiaries. Commercialisation and market participation of smallholder farmers is vital as it can result in agricultural and economic development. The study, therefore, sought to provide location specific information on the determinants of commercialisation and the current commercialisation levels of the farmers in the study area. The information generated from this study will be shared with the interested parties on policy and strategy formulation with respect to commercialisation of smallholder farmers.

The study generated knowledge on the perceptions of the farmers in the study area on commercialisation. The study also added to the knowledge base on agricultural commercialisation amongst smallholder farmers, particularly the extent of commercialisation, challenges and determinants of commercialisation.

1.4 Objectives of the Study

1.4.1 General objective

The general objective of this study is to analyse smallholder farmer commercialisation in the study area by paying attention to the determinants, current levels, challenges and the perceptions of the smallholder farmers on commercialisation.

1.4.2 Specific objectives

The specific objectives of this study are to:

- i. measure the degree of agricultural commercialisation at household level among smallholder farmers in the study area;
- ii. identify the factors that determine the level of input and output commercialisation by smallholder farmers in the study area;
- iii. determine the perceptions and attitudes of smallholder farmers on commercialisation; and
- iv. identify the challenges faced by smallholder farmers in the commercialisation process

1.4.3 Research hypothesis

The research hypotheses for this study are that:

- i. There are low levels of agricultural commercialisation at household level among the smallholder farmers in the study area;
- ii. Institutional factors, household resource endowments, household head characteristics and market related factors determine the level of input and output commercialisation in the study area;
- iii. Farmers have negative perceptions and attitudes towards commercialisation. and that
- iv. Farmers are faced with challenges in commercialisation process.

1.4.4 Research questions

The research questions for this study are:

- i. What is the degree of agricultural commercialisation at household level among farmers in the study area?
- ii. What factors determine the level of input and output commercialisation of the smallholder farmers in the study area?

- iii. What are the perceptions and attitudes of smallholder farmers on commercialisation?
- iv. What are the challenges faced by smallholder farmers in commercialisation?

1.5 Explaining the Concepts

1.5.1 Input and output commercialisation

Input commercialisation is when a farm household utilises agricultural inputs obtained from markets (von Broun *et al.*, 1994; Gabre-Madhin *et al.*, 2007). Output commercialisation is when a farm household sells a considerable proportion of its agricultural output to the markets (Pingali, 1997; Gabre-Madhin *et al.*, 2007). Commercialised households target markets in their production.

1.5.2 Smallholder farmer

Defining smallholder farmers and small farms is a problem as different authors have different definitions for the terms. According to Hazel *et al.* (2007) and Chamberlin (2008), a smallholder farmer can be defined conventionally as one who carries out farming under very limited availability of land. However, this does not spell out the level of limitedness or what limited entails. It is clear that the definition of a smallholder goes beyond the land available to the farmer. There are other characteristics which may be used to spell out a smallholder farmer. These include “resource endowments, subsistence orientation, high vulnerability to risk and limited land availability” (Goitom, 2009). The resources include land, capital, skills and labour.

Some authors also try to spell out the degree or limited land availability by defining smallholder farmers as farmers with less than 2 hectares of cropland (Hazel *et al.*, 2007). Smallholder farmers can also be defined by low technology usage, heavy dependence on household labour and subsistence orientation. It is important to note that smallholders may exhibit some and not the entire characteristics described above. According to Hazel *et al.*, (2007), the context in which the definition of a smallholder farmer is being used is important. Hazel made use of an example of some parts of Latin America whereby 10 hectares of land is considered less than average for smallholders, whereas in Bengal a farmer in possession of such land size would be considered a medium to large scale farmer and would make use of hired labour and produce surplus to allow market participation.

Brooks, Cervantes-Godoy and Jonasson (2009) defined smallholder farmer as an agricultural producer which struggle to be competitive, either because their endowments of assets compare unfavourably to those of other producers who are more efficient in the economy; or because they are faced with missing or under-developed markets. They identified the major limiting factors as insufficient farm size, but also argue that other assets, such as farm management skills may also be lacking.

Likewise, the definition of a smallholder farmer in Zimbabwe is also not very clear. However, according to the then Minister of Agriculture, Made (2008), smallholder farmers in Zimbabwe are made up of communal farmers and resettlement farmers. Another guideline which can be used to define smallholder farmers in Zimbabwe relates to the fast-track land reform resettlement schemes, which were used. Farmers were given land under the A1 and A2 schemes. The A1 covered the small-scale farmers and the A2 covered the commercial farmers (Njaya & Mazuru, 2010).

In this study, smallholder farmers were considered to be the beneficiaries of land under the A1 FTLRP. The farmers are also subsistence oriented, with poor resource endowments (financial, skills and labour), low technology use and high exposure to risk. In Zimbabwe, the smallholder sector is characterized by the diversified farming of crops and livestock. Specialization of commodities is minimal. Usually the general food crops are produced by the smallholder farmers.

1.5.3 Commercialisation of smallholder agriculture

Commercialisation of smallholder agriculture implies the increased agricultural-related market transactions by the farmer. These transactions can be both on the input and output sides. According to Jaleta *et al.* (2009), smallholder commercialisation can be viewed as the strength of the linkages between a farm household and the agricultural markets. The farm household-to-market linkages can be both on the input and /or output sides by means of either buying or selling or both.

Agricultural commercialisation can be defined as the portion of agricultural production that is marketed (Govere *et al.*, 1999). Smallholder farmer participation in the agricultural markets is as a result of commercialisation. Hazel *et al.* (2007), define agricultural commercialisation as, "the degree of participation in the output markets with the focus very much on cash incomes." This definition highlights that the reason for smallholder commercialisation is to

provide a source of income to the farmer. Profit generation has also been identified as a major driving force to agricultural commercialisation.

Von Braun *et al.* (1994) states that commercialisation of agriculture is not restricted to cash crops only. The traditional food crops can be produced and marketed whilst some remains for home consumption. When the farmers participate in the input market in the acquisition of production inputs for the traditional food crops and when they enhance their production technology and labour use, this can also be referred to as commercialisation. According to (Kunze, 2003), agricultural commercialisation by smallholder farmers can take place in four main ways:

- i. By means of marketing the surplus from the traditional crops and livestock;
- ii. By means of value addition to the traditional crops and livestock before marketing;
- iii. By producing market oriented crops and livestock; and
- iv. By taking part in income generating farming enterprises such as mushroom production and bee keeping.

Agricultural commercialisation by smallholder farmers occurs in stages from subsistence to semi commercialised and then to fully commercialised (Pingali *et al.*, 1995).

1.5.4 Household

There are many ways of defining a household. However, there are some keywords which appear in most of the definitions. These include residency sharing, common food consumption, production decisions and income sources (Beaman, 2009). In this study, a household is considered to be an individual/s living in the same housing and sharing the same food, sharing a common household head who is a beneficiary of the land reform programme.

1.5.5 Input and output agricultural market

A market is a place, organisation, institution or person involved in the trading of agricultural commodities. According to Jacobs (2008), an agricultural market can be defined broadly as any place where the exchange of agricultural commodities (both inputs and outputs), with clearly defined rules of exchange, occurs between the buyer and the seller. The rules encompass agreement on price, quality, quantity, delivery time and place.

1.5.6 Fast-track land reform programme (FTLRP)

FTLRP is a land reform and resettlement program launched in Zimbabwe in the year 2000. It sought to address the racially skewed land distribution pattern inherited at independence in 1980 (Zikhali, 2008). The programme was launched by the government as part of the on-going land reform and redistribution process. It was designed to accelerate land acquisition and redistribution.

Under the FTLRP, two models of resettlement were implemented. Model A1 (smallholder farms) aimed at decongesting the communal areas and improving productivity of smallholder farmers. Model A2 (commercial farms) aimed at establishing black owned commercial farms (Njaya & Mazuru, 2010). About 7.7 million hectares of land were redistributed, with 334 000 families benefiting under A1 model whilst 54 000 families benefited under the A2 model (GOZ, 2003). Under model A1, there were two schemes; villagised and the self-contained farms. For the villagised scheme, the settlers were given an average of 3 hectares of arable land and a communal grazing (UNDP, 2002). The self-contained farms consisted of one contiguous area which could be used for crop and livestock. The self-contained A1 beneficiaries received an average of 33 hectares of land consisting of at least 3 hectares of arable land depending on the agro ecological zone, and a much larger grazing land (GOZ, 2003; Njaya & Mazuru, 2010).

Model A2 beneficiaries received an average of 1600 hectares of land depending on the agro ecological zone. Beneficiaries were individuals with experience in agriculture especially those with training. These individuals also needed to prove that have access to capital to develop the farms into productive units and the ability to repay the cost of the farm as determined by government. Beneficiaries received a 99 year lease with an option to purchase (UNDP, 2002).

The FTLR started without an institutional and legal framework of implementation (Njaya and Mazuru, 2010). These were developed when the process was underway. The land owners of the farms which were listed for distribution were notified to stop farming within 45 days and were given a further 45 days to vacate the farm. The government compensated the owners for the development made on the farm and not for the land. The payment was staggered over a period of 5 years with an option for the government to convert the payment into land bonds (Njaya and Mazuru, 2010).

Land reform is known to be driven by various motives which range from economic to political. The economic rationale of land reform is rooted within the inverse farm productivity relationship (Deininger *et al.*, 2002). The relationship argues that for a given technology

level, smallholder farmers are more efficient resource allocators than large farmers. This is mainly attributed to the fewer problems associated with supervision within a small farm.

Land reform programs can also lead to distributional welfare gains because the utility gains realised by the poor are larger than the corresponding losses by the rich land owners (Zikhali, 2008). Countries faced by a significant proportion which relies on agriculture for subsistence justify land reform as a means of achieving equity.

In Zimbabwe, equity and political motives were the major driving forces for land reform (Zikhali, 2008). This was done to address the racially skewed land ownership pattern and duality in the agricultural sector. The duality of agriculture was shaped by the modernised commercial large scale farmers and the non mechanised small scale sector.

1.5.7 Determinants of commercialisation

These are factors that enhance or reduce agricultural commercialisation by smallholder farmers. According to (Jaleta *et al.*, 2009), these factors can either be internal or external. External factors are those beyond the farmers control and include population growth, technological change and new products, infrastructure development, market institutions, development of the broader economy, rising labour opportunity costs, macroeconomic, trade and sectorial policies affecting prices (von Braun & Kennedy, 1994; Pingali, 1997). Internal factors are those that are household specific such as smallholder resource endowments including land and other natural capital, labour, physical capital, and human capital.

1.5.8 Transect walk

A transect walk is a qualitative data collection technique used to gather data on the study area by means of walking with an individual familiar to the area and discussing different aspects of land use and agro ecological zones (Murkherjee, 1993).

1.5.9 Key informant interviews

A key informant interview is the collection of perceptions, opinions and facts from people with special knowledge and expertise on the subject matter by means of semi structured discussions (Wholey *et al.*, 2003).

1.6 Delimitation of the Study

The study is restricted to the smallholder farmers in Munyati resettlement area in Zimbabwe because it is accessible to the researcher. The analysis of smallholder commercialisation

was limited to the determinants, current levels, challenges and the perceptions of the farmers in the study area. Smallholder commercialisation in this study is restricted to crop producers. The livestock commercialisation aspect is not considered in this study.

1.7 Structure of the Study

This study is divided into six chapters. Chapter 1, as seen above, introduces the study. This chapter outlines the background and setting of the study, the problem statement, the significance of the study, objectives, research questions and the structure of the study. Chapter 2 contains the theoretical framework and literature review in relation to the study. Literature reviewed focus on the global, regional and local evidence supporting the study. Chapter 3 discusses the methodology adopted for the study. It outlines the research methods, information sources, sampling procedure and data analysis used for the study. Chapter 4 covers the results and discussion of the study. Chapter 5 comprises of the summary and conclusion. This chapter also discusses the limitations of the study, policy implications and future research opportunities.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of literature and the conceptual framework that gives genesis to this study. It starts with the general perspective on agricultural commercialisation. The chapter focuses on the global, regional and local evidence on commercialisation supporting the study, gathered from previous studies.

2.2 General Perspective on Agricultural Commercialisation among Smallholder Farmers

Smallholder farmers are known to be small but effective. Arguments to support commercialisation of smallholder farmers are based on the observations that these farmers have continued to exist and produce in different regions of the world regardless of the harsh and unfavourable conditions they operate in (Makhura, 2001). This spells a comparative advantage in resource use by the smallholder farmers which can be tapped into more by encouraging commercialisation. Smallholder commercialisation can also benefit from the flexibility in household labour resources.

Commercialisation of smallholder farmers is necessary because in the long run, subsistence agriculture may not be able to ensure both household food security and welfare. However, smallholder commercialisation is a process which involves an increase in market participation in levels. According to Pingali and Rosegrant (1995), these levels are subsistence oriented, then semi commercial level then commercialised agriculture. In subsistence oriented, the producer's objective will be food self-sufficiency with a wide product mix. The household income source will be mainly agriculture. On the semi commercial level, the farmer's objective will not only be food self-sufficiency but will broaden to include surplus generation. Product mix will be moderately specialised and a mixture of traded and untraded input will be utilised. The household income sources will be both agriculture and non-agriculture. The final level is commercial oriented which has farmers with the objective of profit maximisation. The inputs are mainly traded and the product mix is highly specialised. Household income is predominantly non-agricultural.

Agricultural commercialisation is often viewed as specialisation (Wiggins, 2012). On the contrary, commercialisation may well be associated with diversification. Most small farmers want to produce a large part of staples for home consumption, owing to fears about

availability and cost of food in markets. They are also often reluctant to take the risk of relying on one or two crops for their income.

Achieving the process of smallholder commercialisation needs policies and strategy interventions to improve the functioning of agricultural markets, development of infrastructure and improvement in service provisions. There is also a need to understand markets and agricultural commodities to be promoted for commercialisation.

Smallholder commercialisation can occur in two ways; either by increasing productivity and marketed surplus of the food crops or by focusing on cash crops (Kunze, 2003; Jaleta *et al.*, 2009). Focusing on cash crop production has given rise to arguments on the impacts of such a move on food security. This is because the smallholder farmers would have to buy food for household consumption rather than producing for themselves. However, this results in higher incomes for the farmers, because cash crops usually have higher economic benefits than the food crops.

Using the surplus production route ensures household food security at the same time earning income for the producer. However the income may not be as much as with the cash crop production (Govere, Jayne & Nyoro, 1999). The advantage of such a route is that the farmers will take advantage of the experience they have and will continue to produce the same kind of product they have been producing. If the farmer is to produce the cash crop, they have to start to learn how to do it and this may take time before they really master how to do it.

According to (Jaleta *et al.*, 2009), smallholder commercialisation requires more than just well functioning output markets, but also efficient and low cost factor markets that truly reflect opportunity cost of farm inputs. Such conditions are usually a problem in the poor regions especially in Africa, whereby smallholders may not be able to purchase inputs due to shortages of liquidity or higher transaction costs. These farmers may not be able to access output markets due to the same problem. Given such a scenario, institutional arrangements need to be devised to solve the problem. An example of such an arrangement is the use of interlinked markets.

Interlinked markets are meant to reduce transaction cost and hedge the price risk. This occurs by the formation of linkages between the input and credit supply, and the delivery of product after harvest (Jaleta *et al.*, 2009). The input and credit supplier will provide production inputs to the smallholder farmer, who will provide product after harvest as

payment. Linkages such as these makes it easier for smallholder farmers to commercialise as they will be sure that their product has a ready market available.

More literature review on smallholder commercialisation in different regions is given below.

2.3 Smallholder Commercialisation: Global Context

2.3.1 Importance of smallholder agriculture

Smallholder agriculture plays a vital role globally, especially in relation to food security and the livelihood source of the producers. In European countries such as Poland and Romania, smallholder agriculture has been identified as an important survival strategy, especially for poor and under resourced households (Davidova *et al.*, 2009). Smallholder agriculture is important for households surviving under difficult financial and risky markets, as well as risky environmental condition. A case study of Bulgaria, Hungary, Poland, Romania and Slovenia carried out by Davidova *et al.* (2009), shows that smallholder agriculture contributes significantly to household incomes. The case study also shows that smallholder farming can be used as a way of coping with high transaction costs. Majumdar (2011) indicates that in India, commercialisation of smallholder farmers is vital for agricultural development as it fosters mechanisation. Increased mechanisation enhances agricultural yield, reduces production cost and eventually increases profit.

2.3.2 The state of agricultural commercialisation amongst smallholder farmers

Globally, there are varying levels of agricultural commercialisation. However, there are countries which have seen remarkable success in the commercialisation of smallholder farmers, for example, Ethiopia and India. Different models of commercialisation are adopted in the different regions of the globe (Kunze, 2003). The first model which is often adopted by more developed countries often supports commercialisation by means of encouraging the production of high value crops. The other model, usually adopted by less developed regions such as sub-Saharan Africa, is often linked to limited resources, involves increasing production of food crops or subsistence crops as a first step to commercialisation (Govere *et al.*, 1999).

India is an example of a country that has achieved increased levels of smallholder commercialisation (Satyasai & Viswanathan, 1997). India adopted both the models of commercialisation. However, the increase in smallholder commercialisation has resulted in shift from traditional food crops to cash crops. The product mix has also improved among the

commercialised farmers and this is referred to as a risk hedging strategy (Satyasai & Viswanathan, 1997).

2.3.3 Agricultural markets and smallholder farmers

Market structures make it difficult for the smallholder producers to participate in agricultural markets because markets are poorly organised. The problem is more prominent in countries with poorly functioning markets. Smallholder farmers usually have low bargaining power due to the smaller quantities of agricultural inputs they purchase from the suppliers. Issues to do with economies of scale often affect the smallholder farmers in market participation. In India, the problem was solved by encouraging co-operative formation (Satyasai and Viswanathan, 1997). In the European Union countries, market support policies are laid to support smallholder farmer commercialisation (Davidova *et al.*, 2009).

2.3.4 Challenges faced by smallholder farmers in agricultural commercialisation

Challenges faced by smallholder farmers in commercialisation are mainly related to economies of scale. One of the challenges is the high transaction cost which deters farmers from commercialisation. Poor market access, as a result of not meeting market standards, is another challenge identified by Davidova *et al.* (2009), in the study carried out in five EU member states namely Bulgaria, Hungary, Poland, Romania and Slovenia. Limited funds for acquiring inputs and technologies are another challenge faced by smallholder farmers globally.

2.3.5 Factors that influence smallholder input and output commercialisation

A study carried out in the above mentioned EU member states revealed that market prices, policy support, insufficient capital, lack of skills, lack of information, old age and poor health are some of the factors which influence output commercialisation (Davidova *et al.*, 2009). The respondents revealed that due to the low market prices, there are no incentives for subsistence farmers to increase their integration into the market. As a result, the farmers continue making use of low cost inputs which result in low production which in turn can be directed to home consumption.

2.4 Smallholder Commercialisation: Regional Context

2.4.1 Importance of smallholder agriculture

In developing countries and most of the agro-based economy countries, smallholder agriculture is viewed as a significant contributor to the national gross agricultural production.

In sub-Saharan Africa, smallholder agriculture is deemed as one of the major food and livelihood source for rural households (Baiphethi, 2009). Governments in such countries have since started to recognise smallholder agriculture as the key to agricultural development and have directed their attention to these farmers. Strategies such as public policies, investment in agriculture research, investment in agricultural development, and the setting up of public infrastructure (such as roads and communication networks) are used by governments of such countries to support smallholder agriculture as it contributes immensely to national development (Persley, 2000).

According to the World Bank (2007), smallholder agriculture plays a role in economic activity as a means to achieve food security, economic growth and a livelihood source, especially in rural areas. The World Development Report (World Bank, 2008) also indicates that the greatest portion of farmers in developing countries is smallholders.

Smallholder agriculture as indicated by World Bank (2007), plays an important role in economic growth considering the fact that about 1.5 billion farm households live in rural areas of the developing world and produce on less than 2 hectares of land (World Bank, 2007). In Ghana, smallholder farms constitute about 90% of the total farm holding (Martey *et al.*, 2012). These smallholder farmers in Ghana own less than 2 hectares of land. Over the years, Ghana has been giving particular attention to increasing agricultural productivity and promoting sustainable intensification of major food crops production by smallholder farmers, through research and development projects (Diao & Hazel, 2004). Significant progress has been made and now evidence is showing that sustainable productivity based agricultural growth is dependent on the market opportunities (Diao & Hazel, 2004).

Kaplinsky (2000) argues that agricultural growth among smallholders should move beyond increased productivity focus to include profitability and competitiveness. Traditionally, smallholder farmers' production objectives were to ensure household food security, but growing evidence shows the increasing need for market access and income earned from produce. In sub-Saharan Africa, the smallholder farmers have extremely variable domestic production and limited tradability of staples, which impacts on the income earned (World Bank, 2007). Governments and non-governmental organisations are now striving to improve the smallholders' participation in the markets and market access opportunities (IFPRI, 2002).

2.4.2 The state of agricultural commercialisation amongst smallholder farmers

Most African states have since realised the importance of agricultural commercialisation by smallholder farmers. These include countries like Kenya (Govereh *et al.*, 1999), Zambia

(Agrifood Consulting, 2005), and Uganda (Komarek, 2010; Nivievskyi, 2011). These countries have been coming up with strategies to increase the participation of smallholder farmers in agricultural markets.

Some success has been realised with regards to the commercialisation of smallholder farmers in countries such as Kenya. A case study on Kenya revealed that smallholder commercialisation resulted in growth of horticultural, dairy, tea and rice production (Thorpe *et al.*, 2000; Gitu 2006). The Kenyan government has been involved in setting up institutional support services that aided the smallholder farmers with commercialisation. In the year 2000, Kenya was the second largest producer of tea in the world. This was attributed to the increased market participation of the smallholder farmers (Gitu, 2006). Tea production increases by the small farmers was attributed to the provision of institutional support through the Kenyan tea Development Authority. In the same year, again, the smallholder farmers contributed 60% of the horticultural exports in the country. This went a long way in the provision of income and employment in the rural areas. Commercialisation of smallholder farmers in the Kenyan dairy sectors saw an 80% contribution from the smallholder out of the total annual output of 3 million tonnes (Gitu 2006). This production level was twice as much as for the other countries in Africa. Commercialisation of sugarcane production has seen an increase in the farmers' income and nutrition in Kenya.

Martey *et al.* (2012) outlined the efforts made by the Ghanaian government to try and increase smallholder commercialisation through some favourable policies. Ethiopia has also recorded significant success in the commercialisation of smallholder farming (Gabre-Madhin *et al.*, 2007; Goitom, 2009; Berhanu *et al.*, 2010).

2.4.3 Agricultural markets and smallholder farmers

Smallholder farmers, if linked to the markets, are seen as significant role players in alleviating poverty in poor rural communities of Africa. According to Njuki *et al.* (2011), pressure is now on the governments and agricultural development organisations to put more emphasis on viewing smallholder production as a farming business and to "understand how the rural communities in diverse situations can best achieve their income and livelihoods aspirations through better links with markets" (Njuki *et al.*, 2011). There is, however, a gap in the knowledge on how small scale farming can be more market-oriented and how markets can work for the people.

In South Africa, market development for smallholder farmers is believed to have large scale positive impacts on their productive capacity, incomes and local employment (Jacobs, 2008).

South African smallholder farmers, especially the emerging ones need assistance to gain access to agricultural markets. The access will be gained through breaking entry barriers such as high input costs and transaction costs (Jacobs, 2008). The opening up of new local and export markets will go a long way towards solving the challenges. Participation of smallholder farmers in agricultural markets can be enhanced if a combined factor approach is adopted. The approach will need to look at all the factors that impact on the farmers' participation and try to solve them. This combination of factors includes market policies, market infrastructure, and the practical functioning of the markets.

2.4.4 Challenges faced by smallholder farmers in agricultural commercialisation

In a case study carried out among smallholder farmers in Kenya, it was found that barriers to both input and output commercialisation include bad market access, high transaction costs and lack of reliable information (Omiti *et al.*, 2007). The study revealed that smallholder farmers lack adequate information on how best they can access the markets and how they can take part in them. They are not sure how to make markets work for them (Omiti *et al.*, 2007). High transportation costs of the inputs and produce, to and from the market forced some of the farmers to opt out of participating in agricultural output markets.

2.4.5 Factors that influence smallholder input and output commercialisation

In South Africa, policy makers have a challenge of understanding the necessary conditions that need to be put in place so as to motivate and enable smallholder farmers to shift from being subsistence to commercial producers (van Averbek & Mohammed, 2006). Socio-economic factors that affect commercialisation of smallholder farmers include age and years of experience in marketing, availability of irrigation facilities, farm labour availability, access to credit, contact with agricultural extension officers, a good road network and access to market information (Matere *et al.*, (undated)).

Omiti *et al.* (2007), identified production challenges as another factor that affects farmers' participation in market. Farmers who produce less, which is not even sufficient for household consumption throughout the year, are unable to participate in agricultural output markets. This is mainly because smallholder farmers engage in production to ensure household food availability. This means they will channel the little they produce towards the household consumption and very little, if any, will be directed towards markets.

Berhanu and Moti (2010) identified household size as another socio-economic factor that affects market participation in a study carried out in Ethiopia. A large family will mean that a greater portion of the output has to be used for household consumption and thus reduces

market participation. In their study, they however, revealed that if the large household size translates into household labour supply, it can impact positively on commercialisation.

Commercialisation of smallholder farmers can be enhanced if critical conditions are put in place. The conditions, according to Leavy and Poulton (2007), are market access, access to staple foods and asset accumulation. If such conditions are in place, smallholder farmers can move towards commercialisation by means of producing high value crops.

Access to staple foods of smallholder farmers is ensured mainly by food production. Arguments have often risen about whether small farmers should venture into cash crop production or stick to the production of staple foods and enter into the output markets with the surplus (von Braun & Kennedy, 1994). However, according to the definition of a smallholder, these are resource poor farmers who venture into production mainly for the purpose of household consumption. Literature on smallholder commercialisation in Africa indicates that commercialisation occurs in a staggered manner (Barrett, 2007; Jaleta *et al.*, 2009). When conditions in the market are inviting (appropriate incentives and market access), the small farmers' decisions on production and consumption are not immediately parted. Rather, their first step would be to diversify their crop portfolios and later shift to a more commercial specialisation.

2.5 Smallholder Commercialisation: Local Context

2.5.1 Importance of smallholder agriculture

According to the publication by Government of Zimbabwe (GOZ), the country is estimated to have 1 524 396 smallholder farmers (GOZ, 2011). A greater proportion of farmers in Zimbabwe are smallholder farmers. This makes smallholder farming important to the economy of the country. Products from smallholder production contribute to the gross national agricultural production in the country.

Smallholder agriculture also contributes largely to the provision of employment to the rural youth and the unemployed (Zivenge *et al.*, 2012). It therefore acts as a source of livelihood for the households taking part in production. Smallholder agriculture in Zimbabwe is important in increasing cash income for rural areas (Zivenge *et al.*, 2012). Considering that a greater proportion of the population in rural areas is unemployed and does not have any source of funds, agriculture plays a significant role in the provision of income.

2.5.2 The state of agricultural commercialisation amongst smallholder farmers

Agricultural commercialisation is still low amongst smallholder farmers in Zimbabwe (Mujeyi, 2010). A large number still rely on government input hand out (Mujeyi, 2010; Zivenge *et al.*, 2012). The Government of Zimbabwe is coming up with strategies to integrate the smallholder farmers into the markets and to increase their levels of commercialisation (Mujeyi, 2010). Smallholder commercialisation is highly underfunded and discriminated against, within the financial sector due to limited security or other forms of collateral in Zimbabwe (GOZ & FAO, 2011). Smallholder commercialisation is characterised by lack of adequate and timely information which compromise decision-making and coordination at all levels, in the process increasing the risks of production and marketing.

2.5.3 Agricultural markets and smallholder farmers

Zimbabwe has a history of trying different marketing strategies which range from government regulated to free market systems with the aim of developing new markets which work better and improve farmers' livelihoods (Mujeyi, 2010). There has been government intervention in both the input and output agricultural markets lately in efforts to support emerging smallholder farmers. Evidence shows that resettled farmers have better access to inputs and government services (Deininger *et al.*, 2002; Jowah, 2005), which functions for their productive advantage. This has, however, resulted in commodity shortages on the formal market (Mujeyi, 2010). Imperfect functioning agricultural markets and unavailability of inputs on the formal market makes commercialisation difficult for smallholders.

2.5.4 The importance of agricultural commercialisation by smallholder farmers

In Zimbabwe, commercialisation of smallholders has been identified as the key to increased agricultural growth and development. Agricultural commercialisation has the potential to bring about some benefits. According to the study carried out among the smallholder horticultural products producers in Chinamora district, it revealed that commercialisation can bring about improved farmers access to cash incomes, which can be spent on various needs (Zivenge *et al.*, 2012). The study identified the promotion of agricultural production, food security, employment opportunities, and an increase in rural incomes as some of the benefits of commercialisation. Increase in rural incomes can also translate into the overall development of the rural areas and poverty reduction. Smallholder commercialisation has contributed to the growth of the vegetable (horticultural) production.

2.5.5 Challenges faced by smallholder farmers in agricultural commercialisation

Zivenge *et al.* (2012) identified issues related to market access as major problems faced by the smallholder farmers in the process of commercialisation in Zimbabwe. Market access problems are as a result of the farmers' inability to meet the market standards due to poor skills, inputs and support services. High transportation costs of the produce to the market force some of the farmers to opt out of participating in agricultural output markets. Low volumes of produce also affect the level of commercialisation. This is because the farmers are faced with low capital to invest into their agricultural production hence production will be low. Lack of adequate market information is another market related challenge faced by smallholder farmers in efforts to commercialise. Other challenges faced in commercialisation in Zimbabwean include high cost of inputs, inefficient production systems, high post-harvest losses, lack of proper marketing infrastructure and ineffective marketing policies (GOZ & FAO, 2011). The high cost of inputs forces most of the farmers to opt for recycling seed which results in low productivity.

2.5.6 Factors that influence smallholder input and output commercialisation

In a study carried out in five districts of Zimbabwe, the following market related issues were perceived by the A1 farmers as factors that impact on output commercialisation: flexibility of the marketing channel; transaction costs involved; payment arrangements; accessibility; dependability; and produce prices (Mujeyi, 2010). Payment arrangements impacted on the decision to participate in output markets due to the fact that the farmers incurred instant costs, whilst some of the payment arrangements meant that the farmer only got paid after a considerable number of months.

2.6 Conceptual Framework of the Study

The overall concept in Figure 1 below is based on the literature of the determinants of commercialisation. Crop input commercialisation is hypothesised to be determined by household and head characteristics, production and market related factors, household resource endowment, and institutional and support services available. Crop output commercialisation is hypothesised to be determined by the level of crop production, household and head characteristics, and market related factors and institutional services. Farmers' perceptions influence the decision of the producer to commercialise either input wise or output wise or both.

Crop output commercialisation is considered to be the degree of participation in the output market. Crop input market participation is considered to be the degree of participation in input markets. These will be measured on a continuum zero to one scale.

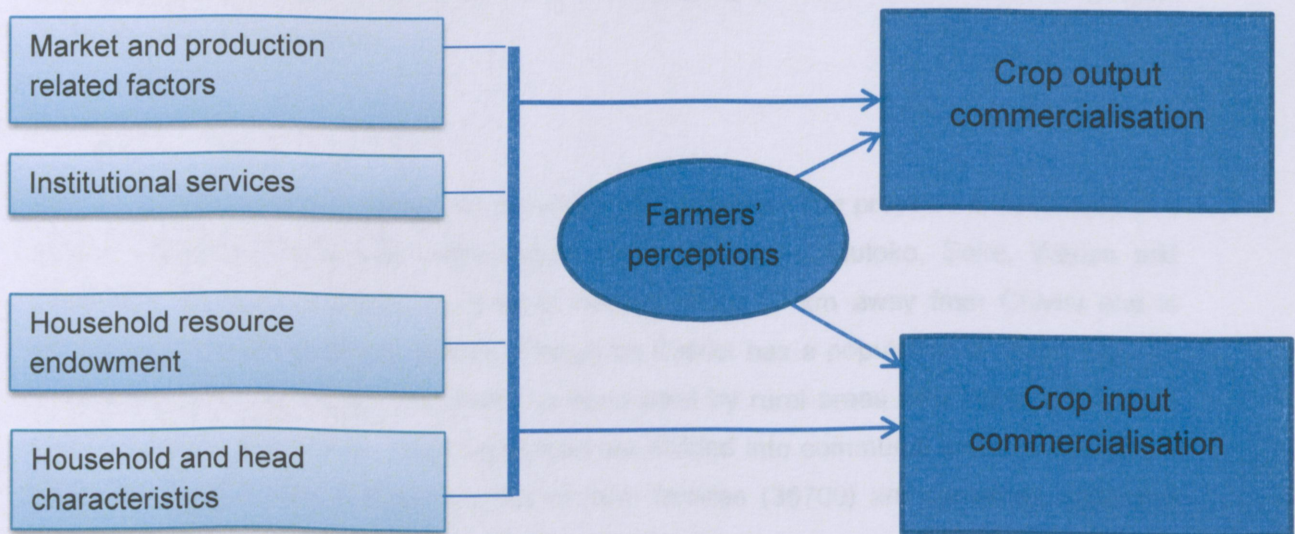


Figure 1: Conceptual framework

2.7 Chapter Summary

This chapter reviewed literature on agricultural commercialisation among smallholder farmers in the world. The chapter outlined the general perspective on smallholder commercialisation. The importance of smallholder farmers and their state of commercialisation is highlighted in the chapter. The chapter went on to outline agricultural markets and their linkages to smallholder farmers and the challenges that are faced in commercialisation throughout the world. This chapter also reviewed literature on the importance of agricultural commercialisation among smallholder farmers.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter spells out the methodology adopted for the study. Both quantitative and qualitative research methods were used for the purpose of data collection. This chapter discusses the following: Information sources, sampling procedure, and the data analysis methods used for the study.

3.2 Study Area

Mashonaland East is one of the ten provinces of Zimbabwe. The province is comprised of 8 districts namely; Goromonzi, Marondera, Mudzi, Murehwa, Mutoko, Seke, Wedza and Chikomba. Munyati resettlement area is located about 17 km away from Chivhu and is inhabited by Shona speaking people. Chikomba District has a population of about 120 747 (Population Census, 2002). The district is dominated by rural areas with the small town of Chivhu as the district town. The rural areas are divided into communal areas, resettlement area and large farms. A large number of farm families (36700) are contained within the communal areas with an average land size of 0.4 hectares.

The resettlement areas are divided into the old resettlements and the new resettlements. The new resettlements are further classified as the A1 scheme and the A2 scheme. The A1 scheme houses about 3390 farm families who own an average of 30 hectares. The A1 scheme is for the smallholder farmers with 5 hectares of arable land and the rest for livestock feeds. Chikomba district has recorded significant agricultural production in new resettlement areas post fast-track land reform programme. According to a report by Elich (2011) a greater proportion of the marketed maize in recent years in Chikomba District originates from the newly resettled areas.

Chikomba District lies within Natural region III of Zimbabwe. This is a semi-intensive farming region which receives moderate amount of rainfall, which around 650- 800mm per year. Severe mid-season dry spells are experienced within this region and make it marginal for maize and tobacco, or for enterprises based on crop production alone. The farming systems are, therefore, based on both livestock and crop (food crop and cash crops) production. Small scale farmers in the district produce cash crops such as soybeans, tobacco, paprika, sugar beans, sunflower, groundnuts and Irish potatoes. They produce food crops such as maize, sorghum, rapoko and peanuts.

3.3 Research Strategy, Method and Design

In this study, a mixed research strategy was used. The quantitative strategy was employed to gather and analyse the quantitative data collected from the sample of household heads within the study area. This data was collected through use of questionnaires. The qualitative research strategy was employed to gather and analyse data from key informants, namely the extension officers. Transect walks were also carried out. The data collected from transect walk was analysed by using the qualitative techniques. The transect walk was carried out to get baseline data on the socio-economic status of the area and the respondents. A cross sectional survey research design was employed.

3.4 Data Collection

3.4.1 Sampling techniques

The study area comprises of 250 smallholder farmers who received land during the FTLRP. In this study, a sample of 102 households was selected using the simple random sampling. The study respondents comprised of 30 female household heads and 72 male household heads. The plot number of all the farmers was used to carry out the simple random sampling. According to Leedy and Ormrod (2001), simple random sampling has the advantage of being easy to use when the population is small and all the members are known. The selected household heads responded to the questionnaires. For the key informant, the purposive sampling technique was used to select the respondents.

3.4.2 Information and data sources

For the purpose of this study, both primary and secondary information and data sources were utilised. The secondary data sources comprised of journal articles, books, previous research work, government publications, documents from the AREX offices (Agricultural, Research and Extension) and Internet sources.

The primary data sources comprised of smallholder farmers and extension officers working in the study area. The primary data was gathered by means of methodological triangulation. The specific methodologies used are transect walk, key informant interviews, and structured questionnaires.

3.4.3 Questionnaire design and construction

A pretested questionnaire was administered through face to face interviews with the respondents who comprised of sampled smallholder farmers in the study area. A five point

Likert type scale questions was included to cater for the objective on challenges, attitudes and perceptions of farmers towards commercialisation. Respondents were household heads and in the absence of the head, the second most senior individual person was contacted. The questionnaire (appendix A) was designed to collect data on:

- Demographic data (age, sex, highest educational level attained, family size and income); factors of production (land, labour, irrigation, fertilisers, seed, pesticides human and natural resources);
- Infrastructure development (roads, communication links and transport availability);
- Market information (crop sold at the market, market proximity, market prices of inputs and outputs);
- Institutional support services (credit, extension education and famer support groups);
- Perceptions and attitude of farmers on commercialisation.

3.4.4 Transect walk

Transect walk was carried out by the researcher to gather elementary data on the study area. The researcher carried out the transect walk with the aid of a research assistant from the study area. Information on the infrastructure and the available markets was gathered. Data on the socio economic status of the study area was gathered through use of this method.

3.4.5 Key informant interviews

Key informant interviews were used to gather data from extension officers since they have an in-depth knowledge of the activities of the smallholder farmers in the study area. The semi-structured face to face interviews were carried out with the key informants, in order to supplement, crosscheck the consistency of responses, and cement the information that was gathered from the farmers. The interview guide (appendix B and C) was used during the key informant interviews as the data collection tool. This was designed before the interview.

3.5 Data Analysis

Data capturing was done using MS Excel. The statistical data analyses package Stata Version 10.0 was used to analyse data collected from questionnaires. To measure the degree of agricultural commercialisation among smallholder farmers, the household crop input and output commercialisation indices were used. The indices were computed as follows:

a. Household crop input commercialisation index (HCICi)

Crop input commercialisation was computed by using the formula applied by von Braun *et al.*, (1994) in their study. This is computed as follows:

$$HCICi = \frac{a}{b}$$

where HCICi = Household crop input commercialisation index

a = gross value of crop inputs acquired from markets (in US\$)

b = gross value of crop production (in US\$)

The index takes the continuum values ranging from 0 to 1 with the extremes representing the subsistent and highly commercialised respectively.

b. Household crop output commercialisation index (HCOCi)

Von Braun *et al.*, (1994); Govereh *et al.*, (1999); and Strasberg *et al.* (1999) computed the crop output commercialisation as:

$$HCOCi = \frac{a}{b}$$

Where: HCOCi = Household crop output commercialisation index

a = gross value of crop sale (in US\$)

b = gross crop production value (in US\$)

The index measures the extent to which household crop production is oriented towards the markets. The index takes the values ranging from 0 (totally subsistence-oriented household) to 1 (highly commercialised household). The same formula was used for this study as it treats commercialisation as a continuum, and in the process avoiding the crude distinction between commercialised and non-commercialised household.

3.6 Justification for Using Tobit Model

The study used the Tobit /censored normal regression model to identify the factors that determine the level of input and output commercialisation by smallholder farmers. The

nature of the dependent variable determines the econometric model used (Vasisht, n.d). The Tobit model is used because the dependent variables (input and output commercialisation index) are truncated as latent variables (Greene, 2003). In this study, the input and output commercialisation index are the dependent variables and are lower censored at zero and upper censored at 1. Farmers who do not sell any of their output or buy any of their inputs had a 0 value of dependent variable. Tobit model is the most common censored regression model appropriate for analysing dependent variables with upper or lower limits (Tobin, 1958; Rockneck, 1992). Tobit model answers both the question on factors influencing a decision and the factors that determine such a decision. The Tobit model was used to quantify the magnitude and direction of determinants of input and output commercialisation. In this study, agricultural commercialisation was modelled as a two-step analytic approach which involves the observable degree or extent of commercialisation and the unobservable decision to commercialise.

The Tobit model assumes that the observed dependent variable y for n observations satisfies:

$y = \max(y^*, 0)$ where y^* are latent variables generated by the linear regression model:

$$y^* = \beta_0 + x\beta_1 + \mu$$

where $y = y^*$

when $y^* \geq 0$

and $y = 0$

when $y^* \leq 0$

where $y^* =$ latent variable of the dependent variable

$\beta =$ estimable parameter And $\mu =$ error term

$x =$ explanatory variables

Tobit model parameters do not directly correspond to changes in the dependent variable brought about by changes in independent variables. The marginal effect on the intensity of commercialisation due to changes in the explanatory variable is given as follows:

$$\frac{\partial E \left[\frac{y_i}{x_i} \right]}{(\partial x_i)} = \beta \phi \left[\frac{\beta x_i}{\sigma} \right]$$

The marginal effects as well as Maximum Likelihood Estimates were estimated from the Tobit model using STATA computer software. The marginal effects/ coefficients indicate the commercialisation index resulting from a unit change in the independent variables. The marginal effects also account for the probability of being commercialised. A Tobit model provides a single coefficient for each independent variable despite two distinct types of dependent variables (censored and uncensored). Hence, the interpretation of coefficients in Tobit model differs substantially from the interpretation of an OLS regression. A coefficient represents the effect of an independent variable on the dependent variable in an OLS analysis, because the coefficient is the first order partial derivative of the independent variable. The OLS interpretation is not valid for Tobit coefficients because the Tobit coefficients represent the effects of the independent variables on the latent variables of the Tobit model.

The variable factors for the model with output commercialisation as the dependent variable are listed in Table 3.1

Table 3.1 Variable factors for model with output commercialisation as the dependent variable

Variable	Specification	Expected sign
Age of household head (AGEHH)	Age at the time of interview	+
Marital status (MAST)	1 if married and 0 if otherwise	+
Gender of household head (GEND)	1 if male and 0 if female	+
Education (EDUHH)	Number of years of formal education	+
Household labour size(LSHH)	Adults in household involved in farming	+
Value of total crop output(VTCO)	Value in US\$ of total output	+
Farming experience (FMEXP)	Number of years in farming	+
Farm size (FMSIZE)	Size of farm in hectares	+
Irrigation (IRAV)	1 if applied and 0 if otherwise	+
Extension services access (EXTACS)	1 if has access and 0 if otherwise	+
Credit access (CRDAV)	1 if has access and 0 if otherwise	+
Market information access (INFO)	1 if has access and 0 if otherwise	+
Transport access (TRA)	1 if has and 0 if otherwise	+
Distance to nearest market (DISMKT)	Distance in Kilometres	-
Off farm Income (INC)	Income in US\$	+

The variable factors for the model with input commercialisation as the dependent variable are listed in Table 3.2 below

Table 3.2 Variable factors for the model with input commercialisation as the dependent variable

Variable	Specification	Expected sign
Age of household head (AGEHH)	Age at the time of interview	+
Marital status (MAST)	1 if married and 0 if otherwise	+
Gender of household head (GEND)	1 if male and 0 if female	+
Education (EDUHH)	Years of formal education	+
Method of cultivation(MOCU)	1 if tractor and 0 if otherwise	+
Value of total crop output (VTCO)	Value in US\$ of total output	+
Total area under production (TAUP)	Size of area in hectares	+
Farming experience (FMEXP)	Number of years in farming	+
Farm size (FMSIZE)	Size of farm in hectares	+
Irrigation (IRAV)	1 if applied and 0 if otherwise	+
Extension services access (EXTACS)	1 if has access and 0 if otherwise	+
Credit access (CRDAV)	1 if has access and 0 if otherwise	+
Market information access (INFO)	1 if has access and 0 if otherwise	+
Transport access (TRA)	1 if has and 0 if otherwise	+
Access to road (RDA)	1 if has access and 0 if otherwise	+
Distance to nearest market (DISMKT)	Distance in Kilometres	-
Off farm Income (INC)	Income in US\$	+
Household input commercialisation index (HCICI)	Input commercialisation index	+

For the third objective (to investigate the perceptions and attitudes of farmers on commercialisation), the data was analysed by making use of descriptive statistics.

To identify the challenges faced by the farmers in commercialisation, descriptive statistics were used to analyse the data collected.

3.7 Summary of the Objectives, Research Questions and Methodologies used

A summary of the research objectives and questions is given in Table 3.3 below:

Table 3.3 Summary of Research Objectives, Research Questions, Data requirements and Analytic tools

Research objectives	Hypothesis	Research Questions	Data requirements	Analytic tools
To measure the degree of agricultural commercialisation at household level among farmers in the study area.	There are low levels of agricultural commercialisation at household level among smallholder farmers in the study area.	What is the degree of agricultural commercialisation at household level among farmers in the study area?	<ul style="list-style-type: none"> • Production data • Input use data 	<ul style="list-style-type: none"> -Descriptive statistics -Input commercialisation index -Output commercialisation index
To identify the factors that determines the level of input and output commercialisation by smallholder farmers in the study area.	Institutional factors, household resource endowments, household head characteristics, market related factors determine the level of input and output commercialisation in the study area.	What factors determine the level of input and output commercialisation of smallholder farmers in the study area?	<ul style="list-style-type: none"> • Production data • Demographic data • Institutional service data • Market related data 	<ul style="list-style-type: none"> -Descriptive statistics -Tobit regression model
To determine the perceptions and attitude of smallholder farmers on commercialisation.	Farmers have negative perceptions and attitudes towards commercialisation.	What are the perceptions and attitudes of smallholder farmers on commercialisation?	<ul style="list-style-type: none"> • Perceptions and attitudes on commercialisation 	<ul style="list-style-type: none"> -Descriptive statistics
To identify the challenges faced by smallholder farmers in commercialisation process.	Smallholder farmers are faced with challenges in the commercialisation process	What are the challenges faced by the smallholder farmers in commercialisation?	<ul style="list-style-type: none"> • Kinds of challenges faced by smallholder farmers 	<ul style="list-style-type: none"> -Descriptive statistics

3.8 Ethical Considerations

Ethics are guidelines to individuals on how they should conduct themselves in a given situation. The following research ethics issues were addressed when the study was carried out:

Voluntary participation

The researcher gave the respondents consent forms prior to engaging them in the study. The respondents were advised that they were not obligated to participate and that they could pull out if they feel so.

No harm to the participant

The researcher made sure that the questions asked in the study were not in a position to cause any form of emotional, psychological or physical harm. Information that had the potential to embarrass the respondents was avoided.

Anonymity and confidentiality

The research was conducted in manners that do not associate the participant to the responses. The respondents were informed that they can choose not to respond to questions if they feel that it exposes them.

Deceiving subjects

The respondents were informed that the information which they were giving was used for the purpose of the study only and not for other purposes. An accompanying document was produced to verify the purpose of the study and how the findings will be used.

3.9 Chapter Summary

The chapter reviewed the data collection and analysis methods used in the study. Data was collected from 102 smallholder farmers from Munyati resettlement area who were randomly selected from a population of 250. A questionnaire was administered by means of face to face interviews. The collected data was analysed using Tobit Regression model on STATA software. The chapter ends by giving a summary of the study objectives and their relationship to the analytical tools used.

CHAPTER 4: RESULTS AND DISCUSSION

4.1 Introduction

This chapter discusses the results of the study. The data used in this Chapter has been obtained from the sampled household heads in Munyati resettlement area through transect walk, key informant interviews and individual questionnaires. The Chapter outlines the descriptive results of the survey data. This is then followed by presentation and discussion of econometric results of the factors that determine the level of household commercialisation, the perceptions and attitudes of the farmers towards commercialisation and the challenges faced in commercialisation.

4.2 Descriptive Results of Survey Data

In this section, a brief description of the sampled household characteristics is outlined. The main focus of the description is on socio-economic aspects, production and marketing of household agricultural produce. It is important to understand the environment in which the smallholder farmers are operating in, so as to get a clear picture of the context from which they are coming from. The descriptive results are grouped into the following four groups:

4.2.1 Demographic data

The demographic data of the sampled households comprised of age, sex, highest educational level attained by the household head, household size, and farming experience. The results are summarised in Table 4.1 below. The results in Figure 2 below indicate that the proportion of male headed households (70.6%) is higher than that of female household (29.4%). The statistical summary in Table 4.1 below indicates that the mean age of a typical household head in Munyati resettlement area is 49 with an age range of 25 to 85 years. A typical household head in the study area has gone for at least two years of schooling and at most 17 years with an average of 10 schooling years. This result indicates that the least educated household head has at least reading and writing basic skills which are important factors in commercialisation process.

Table 4.1 Demographic background of household heads in Munyati

Household attributes	N	Mean	Std. Deviation	Min	Max
Age (in years)	102	48.88235	11.96223	25	85
Education (years of schooling)	102	10.17647	2.8989999	2	17
Household size	102	5.568627	2.507453	1	15
Farming experience	102	9.813725	2.749367	2	12

Source: Survey 2012 (N=102)

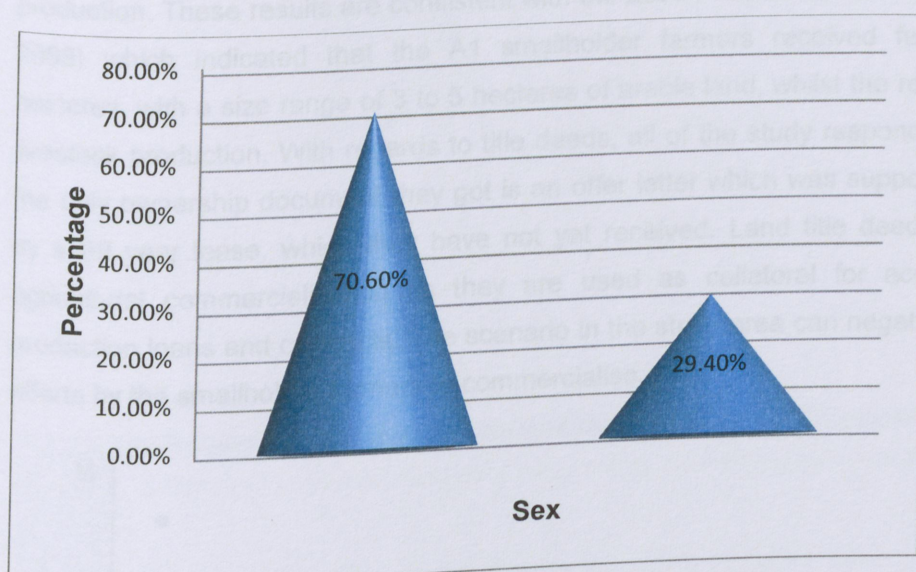


Figure 2: Distribution of household heads according to sex in Munyati, 2012 (N=102)

The average family size in the study area was found to be 6 with a maximum of 15 and other household heads staying alone on the farm. Household size can impact on commercialisation with regards to labour availability and quantities of produce allocated for household consumption (Makhura, 2001; Lapar, Holloway, & Ehui, 2003). The average household size in the study area indicates a fair size which strikes a balance between the issues of labour availability and allocation for household consumption. A household size of 6 is big enough to make meaningful contribution to agricultural production labour force while maintaining the proportion of produce allocated for household consumption at a rational size. The results also indicate that the typical household head in Munyati resettlement area has a mean farming experience of approximately 10 years. This is consistent with the fact that the

farmers in the study area benefited from the land reform program which took place from the year 2000 to 2002.

4.2.2 Factors of production

Land is an imperative resource in agricultural production enterprises. Study results shown in Figure 3 below indicate that the farmers in the study area have an average of 40 hectares farm size which they received from the land reform programme. Smallholder farmers are known to have limited land available to them for agricultural purposes; however this is not the case with the farmers in Munyati resettlement area as all of the farmers have a mean of 40 hectares of the land at their disposal. The study respondents indicated that out of the mean 40 hectares of land at their disposal, an average of 5.5 hectares is utilised for crop production. These results are consistent with the 2003 Presidential land reform report (GOZ, 2003) which indicated that the A1 smallholder farmers received farms averaging 33 hectares, with a size range of 3 to 5 hectares of arable land, whilst the rest of the land is for livestock production. With regards to title deeds, all of the study respondents indicated that the only ownership document they got is an offer letter which was supposed to be followed by a 99 year lease, which they have not yet received. Land title deeds are important in agricultural commercialisation as they are used as collateral for acquiring agricultural production loans and contracts. The scenario in the study area can negatively impact on the efforts by the smallholder farmers to commercialise.

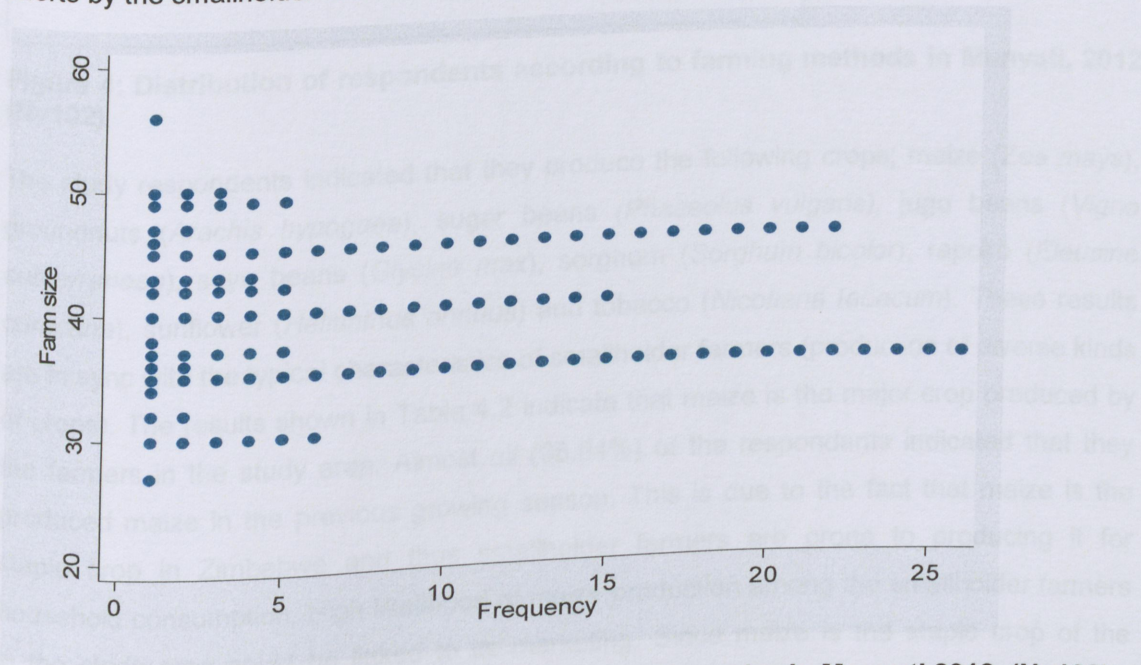


Figure 3: Distribution of respondents according to farm size in Munyati 2012, (N=102)

Figure 4 below indicates that most of the farmers (77.7%) in Munyati resettlement area practise mixed farming method. Mixed farming method entails the production of crops and the rearing of livestock. Such a farming method helps to spread the smallholder farmers risk between livestock production and crop production. This is important especially when sustainability issues are factored in; whereby the farmer is almost assured of a harvest either from crop or livestock production. This method is considered to be beneficial especially in the climate change era where agricultural production is prone to climatic risk.

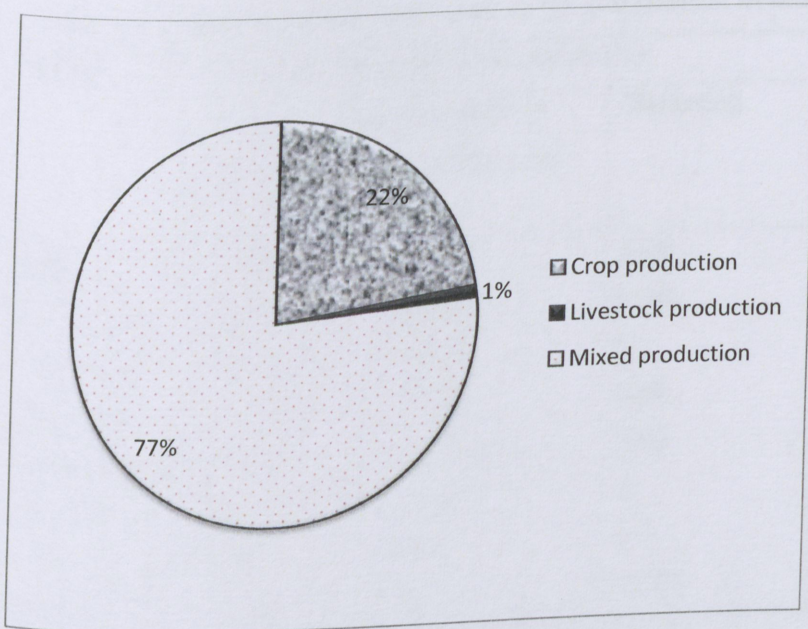


Figure 4: Distribution of respondents according to farming methods in Munyati, 2012 (N=102)

The study respondents indicated that they produce the following crops; maize (*Zea mays*), groundnuts (*Arachis hypogaea*), sugar beans (*Phaseolus vulgaris*), jugo beans (*Vigna subterranean*), soya beans (*Glycine max*), sorghum (*Sorghum bicolor*), rapoko (*Eleusine coracana*), sunflower (*Helianthus annuus*) and tobacco (*Nicotiana tabacum*). These results are in sync with the typical characteristics of smallholder farmers (production of diverse kinds of crops). The results shown in Table 4.2 indicate that maize is the major crop produced by the farmers in the study area. Almost all (98.04%) of the respondents indicated that they produced maize in the previous growing season. This is due to the fact that maize is the staple crop in Zimbabwe and thus smallholder farmers are prone to producing it for household consumption. High likelihood of maize production among the smallholder farmers in the study area could be linked to its marketing. Since maize is the staple crop of the country, it would be relatively easy to find a buyer of maize than any other food crop. This alludes to the 57.84% maize producers who produce the crop with partial marketing and

consumption as the main reason behind its production. The second most common crop is groundnut (68.63%) which is also an important food crop used for production of peanut butter. Tobacco producers (11.74%) in the study area indicated that their sole reason for production was to sell the crop. It is however not a very common crop among the farmers in the study area. It is interesting to note that for all the food crops produced, at least some of the producers consider them for marketing.

Table 4.2 Crops produced and reason for production in Munyati

Crop	Reason for crop production (%)				
	Did not produce	Household consumption	Marketing	Partial consumption and marketing	Livestock feeding
Maize	1.96	24.51	4.90	57.84	10.78
Groundnut	31.37	38.24	0.98	28.43	0.98
Jugo beans	82.35	7.84	0	0.98	0
Soy beans	88.24	0.98	0.98	2.94	6.86
Sugar Beans	72.55	11.76	2.94	12.75	0
Rapoko	96.08	1.96	0	1.96	0
Sunflower	99.02	0	0	0	0.98
Tobacco	88.24	0	11.76	0	0

Source: Survey 2012 (N=102)

Labour is an important resource in agriculture. Household labour size in the study area averaged 5 people. Considering that the farmers in the study area have an average of 40 hectares of land, 5 people cannot provide enough labour for agricultural activities on such a land. The household heads indicated that on average they have gross monthly income of US\$ 250. Most of the respondents indicated that they did not irrigate their crops implying that they rely on the rainfall. Irrigation ensures continual agricultural production throughout the year regardless of the season. This is important for commercialisation as the farmer will be in a position to get income throughout the whole year.

4.2.3 Infrastructure development and market information

Almost all study respondents (93%) indicated that they have access to a road which links with the output market. A typical farm household in the study area stays 36.5 km away from the input and output market. They also indicated that they use various modes of transport to get to the market ranging from commuter transport to animal drawn carts. All the farmers

who marketed part of their produce indicated that they sold it at, or part of it, to the Grain Marketing Board (GMB). This is interesting because by design, the GMB is supposed to be the last resort buyer of grain but in this case it is being placed as the first resort buyer. This is an indication of lack of market options. The respondents (62%) also indicated informal market as an important option for selling produce. They market a considerable amount of their produce at the farm gate.

4.2.4 Institutional support services

With regards to credit, 87% of the smallholder farmers indicated that they did not have access due to collateral requirements. A greater proportion (79%) of the study respondents agreed to have accessed extension service within the previous production season. Services accessed through extension agents include technical advice, market information, credit and farming equipment use. This result is consistent with what the extension officers indicated during the key informant interviews with regards to the services they offer to the farmers. All the study respondents highlighted that there is lack of farmer organisations within the study area.

4.3 The Degree of Agricultural Commercialisation at Household Level among Smallholder Farmers in the Study Area

The statistical summary given in Table 4.3 below indicates that a typical household in the study area has a total agricultural crop production value of US\$ 3 405.89. There is a notable difference between the household with the maximum (US\$ 24 069.25) gross production value and the household with the minimum (US\$ 114). An average of US\$ 2 143.75 worth of sales are made out of the gross household production and this constitutes the gross value of output sold. There are some households which did not sell anything from their gross output, as indicated by the minimum value of 0. With regards to inputs, the mean household value of inputs obtained from the markets is US\$ 756.57 with a maximum value of US\$ 5 020. The Table 4.3 below also shows that all of the sampled households used at least some inputs acquired from the market with a minimum value of US\$ 60.

Table 4.3 Statistical summary of input, crop output commercialisation (in US\$) and commercialisation index in Munyati

Variable	Obs	Mean	Std. Dev	Min	Max
Gross production value	102	3405.887	4711.202	114	24069.25
Gross value of output sold	102	2143.753	4390.215	0	23400
Gross value of inputs obtained from the markets	102	756.5686	749.367	60	5020
Household output commercialisation index	102	.4078881	.3303885	0	.9762203
Household input commercialisation index	102	.4262028	.506707	.0227259	3.522807

Source: Survey 2012 (N=102)

Household output commercialisation indicates the degree of participation of a household in output markets as a seller. Results in Table 4.3 displays that the mean degree of household output commercialisation in Munyati resettlement area is 40.8%. This is a generally moderate commercialisation level. The most commercialised household sold 97.6% of the gross production value. The mean output commercialisation of 40.8% is 10% higher than the figure reported for smallholder farmers in Zambia for the 2010/2011 season (Hichaambwa and Jayne, 2012). A study carried out in Nigeria, Abia state indicates that the commercialisation index of the smallholder farmers is below 30% (Agwu, Anyanwu & Mendie, 2012). This shows that the farmers in the study area are doing well in comparison to other farmers in the region and thus can be considered to be output commercialised.

Household input commercialisation indicates the extent to which a household participate in input markets as a buyer. Table 4.3 above shows that the mean degree of household input commercialisation in Munyati is 42.6%. The least output commercialised household had a degree of 2.2%. This indicates that all of the sampled households used at least some inputs from the markets. This points out that the farmers are participating in agricultural input markets as buyers. The study results indicate that there is moderate degree of input commercialisation in the study area. This results interestingly illustrates that regardless of the economic challenges which the farmers are faced with, the still acquire a significant amount of inputs from the market.

Study results indicate that the farmers in the study area can be described as semi commercialised. This is because they fall under that category as described by Pingali and

Rosegrant (1995) in their study. They described semi commercialised farmers as those with an objective of surplus generation, mix traded and untraded inputs, and rely on both on farm and off farm income. All these characteristics were observed within the study participants. However, these farmers can be viewed differently if the World Development Report (2008) is to be considered. The report stipulates that a producer who sells more than 50 per cent of their agricultural production on the market is market-oriented; otherwise is considered as subsistence farmer (World Bank, 2007).

4.4 Factors that determine the level of household commercialisation:

4.4.1 Input commercialisation

The results show that household input commercialisation, in the study area, is influenced by means of land cultivation, years of formal education of the household head, irrigation availability, distance to input market, road access and gross production value. All the other significant variables have the expected sign except distance to input markets which has a positive influence on the level of commercialisation.

Method of land cultivation had significant influence ($p < 0.05$) on the level of input commercialisation of a household in the study area. The marginal effect was found to be negative indicating that shifting from tractor cultivation to animal cultivation will result in decrease in input commercialisation. Farmers who cultivate their land by tractor are more likely to use inputs from the formal markets. The fact that a farmer would opt to use a tractor for cultivation could be an indicator that the farmer is not poor and has capital to finance input acquisition. Farmers who afford to use tractor are also likely to acquire inputs from the market.

Number of observations	102
LR chi2(17)	49.05
Prob > chi2	0.0001
Pseudo R2	0.3138
Log likelihood	-6.3015034

Source: Survey 2012 (N=102)

*.05 **p<.01 ***p<.001
 2 left-censored observations
 34 uncensored observations
 4 right-censored observations at time=1

Table 4.4 Tobit estimates of the determinants of level of input commercialisation in Munyati

Explanatory variable	Marginal effect.	t- Value
Farm size	-.0014792	-0.33
Method of Land cultivation	-.1313992*	-2.49
Gender(sex)	.0427672	0.73
Age of household head	.0012709	0.55
Household head years of schooling	.0236298*	2.37
Marital status	.0017731	0.04
Off farm income	.0217864	0.77
Farming experience	.0042012	0.43
Irrigation availability	.3394227*	2.17
Access to credit in previous season	-.0188356	-0.19
Distance to input market	.0015977*	2.27
Access to road	.2562112*	2.51
Access to transport	-.059965	-0.96
Access to market information	-.0475563	-0.91
Access to extension services	.0666279	0.99
Total area under crop production	-.0009408	-0.10
Household gross production value	-.0000462***	-4.99
Constant	.137701	0.49
Number of observations	102	
LR chi2(17)	49.05	
Prob > chi2	0.0001	
Pseudo R2	0.8198	
Log likelihood	-5.3909034	

Source: Survey 2012 (N=102)

Note: *.05, ** p<.01, *** p<.001
0 left-censored observations
94 uncensored observations
8 right-censored observations at hcici>=1

Years of formal education of the household head was found to have significant positive influence ($p < 0.05$) on the level of input commercialisation of a household in the study area. The marginal effect from Table 4.4 above indicates that a year increase in formal education acquired by the household head will result in 0.024 unit increase in the level of commercialisation. Education is theorised to have a positive impact on the farmers' understanding of production and market dynamics and hence influence farmers' level of input commercialisation (Makhura, Kirsten, & Delgado, 2001; Martey, Al-Hassan, & Kuwornu, 2012). Educational attainment enhances the farmers' ability to appreciate the essence of credit, new techniques and information disseminated from extension agents which impacts positively on commercialisation (Olagunju & Ajiboye, 2010). The study carried out by Randela, Alemu, & Groenewald, (2008) highlights that farmers with higher educational levels are more likely to understand and interpret information better than others and thus experience reduced search, screening and information costs.

Irrigation availability was found to significantly ($p < 0.05$) influence the level of household input commercialisation in Munyati. From Table 4.4 above, when a household shifts from non-irrigation to irrigation, the level of input commercialisation increases. This could be attributed to reduced rainfall risk faced by irrigators. Farmers who irrigate their crops can control the amount and frequency of water available to their fields. Reduced rainfall risk means that farmers can be more willing to invest more in agricultural activities (in the form of inputs), as there will be confidence of getting a good harvest. The results from the key informant interviews with the extension officers are in agreement with this result. The extension officers indicated that irrigation availability would contribute a lot towards commercialisation.

Another variable which was found to be significant ($p < 0.05$) is distance of the farm from the input market. The marginal effect indicates that 1 km increase in the distance will result in 0.002 unit increase in the level of input commercialisation in the study area. This indicates that households which are located closer to the markets are more likely to have a lower level of input commercialisation than those which are further away. This is however a deviation from expected result and findings from previous studies. The expectation would be that the closer the farmer is to the input markets the higher their input commercialisation level due to reduced transportation and other transaction costs. This could be attributed to the fact that farmers who stay far from the town (where markets are located) are more likely to go there less than those who stay closer. The farmers who stay distant from the input market are prone to buy their inputs earlier than those who are in the proximity of the market. This protects the farmers who stay far away from the town from the last minute input rush, which is usually characterised by unavailability of inputs on the market. Also, the farmers who buy

early are more likely to get cheaper prices and thus, they acquire more inputs from the market at a given amount of money.

Access to road is another variable which was found to be significant ($p < 0.05$) in this study. Households with access to a road are more likely to have a higher level of input commercialisation. A road serves as a linkage between the farm and the input market. Therefore, this means that farms with access to roads can also easily access input markets and thus have a higher input commercialisation. Access to road also enables input marketers to easily get to the farm.

The study results also indicate that household gross production value is a significant variable ($p < 0.001$). An increase in gross production value is expected to reduce the level of input commercialisation. This is in line with the computation of the input commercialisation whereby gross production value is a divisor in the equation and thus increasing the production value results in decrease in input commercialisation.

The study however, indicates that off-farm household income is an insignificant variable. This is inconsistent with what the extension officers indicated during the key informant interviews. They highlighted that the level of commercialisation is determined by the amount of money earned by a household. This is also surprising as input commercialisation is dependent upon the amount of capital available for input acquisition. Households with higher off farm income are expected to have a higher input commercialisation index.

4.4.2 Output commercialisation

Household output commercialisation index is influenced by household labour size, irrigation availability, gross agricultural production value, farming experience of the household head and the non-farm income (Table 4.5) in this study. All the significant variables have the expected sign except for irrigation availability which impacts negatively on output commercialisation.

From the results, increase in household labour size by 1 person will cause a 0.046 unit increase in output commercialisation. This positive relationship was expected as an increased household labour size means that more human resource is available for agricultural activities ranging from production to marketing. A large household labour size in the study area also means that fewer funds are directed towards hiring labour. The saved funds can thus be used for increasing crop area planted, increasing the inputs acquired from the market or any other agricultural activity which can result in increased household

commercialisation index. This result is in line with the findings by Zikhali (2008) which alludes to the fact that increasing household labour size results in increase in productivity. This in turn results in increased output commercialisation.

Table 4.5 Tobit estimates of the determinants of level of output commercialisation in

Munyati

Explanatory Variable	Marginal effect	t -Value
Age of household head	-.0025556	-0.80
Gender(sex)	-.0580642	-0.71
Marital status	.0305217	0.46
Household head years of schooling	-.0141536	-1.01
Farm size	-.0019323	-0.30
Household labour size	.0456365**	2.89
Irrigation availability	-.8842449**	-3.31
Household gross production value	.0000341*	2.44
Access to extension services	.1171282	1.18
Farming experience	.0296723*	2.04
Access to credit in previous season	.0380626	0.26
Access to market information	-.0538615	-0.78
Distance to nearest output market	.00201	1.64
Household off farm income	.0815422*	2.02
Access to transport	.1103205	1.28
Household input commercialisation index	-.1050506	-1.32
Constant	-.2853493	-0.79
	57.99	
LRchi2(16)	102	
Number of observations	0.0000	
Prob > chi2	0.4085	
Pseudo R2	-41.980327	
Log likelihood		

Source: Survey 2012 (N=102)

Note: * p<.05; ** p<.01; *** p<.001
 28 left-censored observations at hcoci<=0
 74 uncensored observations
 0 right-censored observations at hcoci>=1

Irrigation availability is statistically significant at 1% but has a negative effect. When a household moves from being a non-irrigator to an irrigator, the output commercialisation level is expected to decrease by 0.884 units. This is a diversion from the findings from a number of studies which realised a positive relationship between irrigation availability and

level of commercialisation. This could be as a result of high installation and maintenance costs of the irrigation facilities which use up some of the production capital which would otherwise be used for increased crop production. In other words, setting up an irrigation facility would mean that the households' investment in fixed assets would have increased, in the process reducing the amount of investment in current assets.

Such a relationship can also be due to the erratic rainfall patterns which are sometimes faced in the area. Irrigation water is supplied by the rainfall. If there is a drought, benefits from ownership of irrigation facilities may not be achieved in the process creating an extra expense for facility maintenance. Wiggins (2012) indicates that technology on its own does not lead to increase production level and commercialisation. It should be coupled with market opportunities which lure farmers into adoption.

The study results show that gross production value is significant at 5% significance level. As expected, an increase in household gross production value will result in an increase in the household output commercialisation level. An increase in household gross production value necessitates the producer to market the excess after taking away the portion for household consumption. The marginal effect is relatively low (0.0000341) than expected. This could be due to the fact that a number of the farmers in the study area indicated that they keep livestock (mainly pigs, poultry and cattle) which they feed from the crop production output. This means that an increase in gross production value may result in increase in gross farm output commercialisation index but not crop output commercialisation index.

Household head farming experience is a significant at 5% level with a positive sign. A unit increase in farming experience of the household head results in 0.0297 unit increase in output commercialisation. Previous researches indicate that increase in experience also increases perfection. This resultantly manifest as increased knowledge of farming techniques which results in increased household output commercialisation. This result is consistent with the finding of Martey, Al-Hassan and Kuwornu (2012) who argue that the more farming experience the household head has, the more trading partners they can get in contact with at relatively lower costs. This enhances output commercialisation as the produce markets will be more available for the experienced farmers than the less experienced ones. The extension officers in the study area also alluded to the fact farming experience enhances output commercialisation.

Household off farm income was significant at 5% level of significance with a positive sign. This implies that an increase in household off farm income would result in an increase in the

level of output commercialisation in the study area. This could be due to the fact that household income can impact on the size (land size cultivated) and operations (type of cultivation, inputs, access to transport) of the agricultural enterprise which thus impact on commercialisation. Household income also has the potential of reducing the dependency on agricultural produce as food and income sources; and hence increased commercialisation (Agwu & Ibeabuchi, 2011).

The results also indicate that household level of input commercialisation, distance to formal output market and access to market information are insignificant variables. Level of input commercialisation can be an indicator of the amount of investment placed by the farmer for agricultural production over a particular year. Higher investments are expected to have higher returns. However the study results show that the level of input commercialisation does not determine the level of output commercialisation. This result is inconsistent with the findings from other studies which reflect that output commercialisation should move along with input commercialisation (Pingali & Rosegrant (1995), Manda, 2003). This could be due to inefficiencies in production and erratic weather conditions which reduces the output.

Access to market information is an important factor in commercialisation because it presents the farmers with all the options which are available for them to choose from so as to get higher returns. However this study reveals that access to market information is an insignificant factor in the study area. This was attributed to the fact that the farmers were participating in agricultural markets as maize traders and there is almost a sole market of the produce, in the study area, which is the GMB. Distance to output market is an indicator of the transportation cost and thus farmers who stay far from the market are more likely to have low levels of output commercialisation. The study however indicates that this is not the case in Munyati resettlement area as distance to output market was found to be an insignificant factor. This can be due to irregularities in the pricing system within the transport industry operating in the area.

4.5 Perceptions and Attitudes of Smallholder Farmers on Commercialisation

Perceptions influence ones actions. If a change is desired, there is need to understand the perceptions of the people involved. To enable necessary agricultural transformation policy formulation, there is need to understand the smallholder farmers' perceptions and attitude. Likewise, the perceptions of the smallholder farmers in Munyati district were sought with regards to the statements in Table 4.6. These perceptions sought to capture the study respondents' understanding and attitudes towards commercialisation.

Table 4.6 Perceptions and attitudes of farmers on commercialisation in Munyati

Perceptions and attitudes N=102	Strongly agree(%)	Agree (%)	Somewhat (%)	Disagree (%)	Strongly disagree(%)
Commercialisation is for large scale farmers	8.82	2.94	5.88	10.78	71.57
Commercialisation can only occur if lots of production capital is available	72.55	18.63	2.94	2.94	2.94
Smallholder commercialisation can only occur if government aid is availed	69.58	16.67	8.82	0.98	3.92
Commercialisation is when cash crops are produced and marketed	34.31	20.59	28.43	6.86	9.80
You can commercialise even by growing food crops only	68.63	12.75	10.78	1.96	5.88
Commercialisation results in household food insecurity	10.78	5.88	10.78	12.75	59.80
Commercialisation results in reduced food crop production	16.67	11.76	20.59	11.76	39.22
Beneficiaries of land reform cannot commercialise	9.80	0.98	2.94	9.80	76.47
Commercialisation increases household income	79.41	11.76	2.94	0.98	4.90
You regard yourself as a smallholder commercial farmer	76.47	6.68	5.88	2.94	7.84

Source: Survey 2012 (N=102)

The majority of the study respondents (73%) strongly agreed with the perception that commercialisation can only occur if a lot of production capital is available. Such a view is derived from the knowledge that successful commercialisation is accompanied by acquisition of new machinery for agricultural activities. To acquire such machinery, there is need for capital to finance that. The farmers perceive that they can only think of commercialisation when they have enough production capital. Similar results were also obtained in the study carried out by Fredriksson, Davidova, and Bailey (2010) in five EU member states. Such perception can be related to the perception that one can commercialise even by growing food crops, which 70% of the respondents strongly agreed to. If food crops are being considered for commercialisation, usually the household requirements would have been

satisfied first. This means that more of the crop needs to be produced and this requires a lot of production capital.

This explains why the smallholder farmers consider lots of production capital a necessity for commercialisation. Such a perception can however discourage those farmers with limited production capitals from considering commercialisation. It is however interesting to note that the farmers understand what commercialisation is because it is usually narrowly viewed as the production of non-food crop solely for marketing purpose.

Majority of the study respondents (70%) also strongly agreed to the perception that smallholder commercialisation can only occur if government aid is available. Studies carried out in Zambia have shown that government aid plays a huge role in developing the smallholder farmers (Hichaambwa and Jayne, 2012). It has reported that the household maize commercialisation index of smallholder farmers in Zambia has been increasing as a result of government input and output market subsidy programs. Such programs make maize production and marketing more attractive to the smallholders (Hichaambwa and Jayne, 2012). Even though government support is vital, it is also equally important for the farmers to rely on the resources they have to develop their agricultural enterprises. Government aid should be considered as a bonus.

Majority of the respondents (79%) also agreed that commercialisation increases household income. It was interesting to note that the farmers are fully aware of the benefits of commercialisation. This shows that given that all the production resources are available, the smallholder farmers will be willing to commercialise.

It was very interesting to observe that the 76% of the study respondents strongly agreed that they regard themselves as smallholder commercial farmers. This implies that they perceive themselves as commercial farmers. This can be an indicator of their willingness to commercialise and thus, if conditions are made favourable these farmers can participate more in agricultural input and output markets. From the key informant interview, the extension officer also agrees with the farmers to the fact that they can be regarded as smallholder commercial farmers.

Results in Table 4.6 above also indicate that the smallholder farmers (76%) strongly disagreed with the perception that beneficiaries of land reform cannot commercialise. This statement sought to seek the views of the farmers as it is usually stated many times when looking at land reform and commercialisation in Zimbabwe. Quite a number of people and organisations are sceptical about the ability of the land reform beneficiaries, to participate in

agricultural markets effectively. Strongly disagreeing to the statement is an indicator that the farmers have confidence in themselves and their ability to commercialise. This shows that these farmers view themselves with different lenses from the ones used by those who do not believe in land reform beneficiaries.

The same results also show that 60% of the study respondents strongly disagreed with the perception that commercialisation results in household food insecurity. This has been a great debate among the commercialisation authorities whereby some view commercialisation as having negative impacts on household food security while others do not agree. The fact that the farmers in the study area strongly disagreed to the statement could be an indicator that they are willing to commercialise or increase their levels as they do not view it as having negative impacts on household food security. Wiggins (2012) argues that commercialisation does not result in household food security because a farmer who is able to produce cash crops is also in a position to produce enough food crops for consumption.

The majority of smallholder farmers in the study (72%) area strongly disagreed to the perception that commercialisation is for large scale farmers. This perception also indicates their level of understanding of commercialisation. This shows that the smallholder farmers themselves can also commercialise.

4.6 Challenges Faced by Smallholder Farmers in the Commercialisation Process

Despite a fair level of commercialisation, the smallholder farmers in Munyati resettlement area indicate that they are faced with some challenges. All the farmers strongly agreed that lack of market alternative and delayed payment for sales were challenges they were facing in commercialisation (Table 4.7). They indicated that the only available market for their grain produce was the GMB, which delay paying farmers for their produce. Such a scenario can discourage farmers from marketing their produce because they will face problems in trying to get payment for their sales. This situation exhibit the monopolistic economy in that GMB is the sole buyer of farm produce and thus they can charge any price they want for grains. Farmers are not in the position of setting or negotiating prices but are simply price takers. This alludes to the fact that 83% of the farmers strongly agreed that low commodity prices is a challenge they are facing. This is consistent with the results found by Fredriksson, Davidova and Bailey (2010) in their study, that higher market prices encourage commercialisation. According to Randela, *et al.* (2008) low commodity prices is a huge disincentive to agricultural commercialisation.

Table 4.7 Challenges faced by farmers in commercialisation in Munyati

Challenge N=102	Strongly agree(%)	Agree (%)	Somewhat (%)	Disagree (%)	Strongly disagree(%)
Lack of knowledge on how to commercialise	11.76	4.90	12.75	12.75	57.84
Lack of funds to buy inputs	93.14	5.88	0	0	0.98
Poor production technology (farming implements)	57.84	14.71	13.73	3.92	9.80
High cost of inputs	79.41	12.75	3.92	1.96	1.96
High transportation cost	47.06	7.84	9.80	6.86	28.43
Poor road network	10.78	7.84	14.71	16.67	50.00
Poor market structure	75.49	7.84	4.90	0.98	10.78
Lack of irrigation facilities and water	78.43	6.86	6.86	0	7.84
Lack of knowledge on the benefits of commercialisation	20.59	8.82	6.86	10.78	52.94
Not enough land for farming	5.88	3.92	2.94	13.73	73.53
Lack of technical skills	48.04	4.90	8.82	13.73	24.51
Poor quality products	25.49	9.80	14.71	13.73	36.27
Lack of farmer organisations to support farmers	80.39	10.39	1.96	1.96	4.90
Unavailability of input markets	73.53	6.86	9.80	2.94	6.86
Unavailability of output markets	75.49	9.80	5.88	0	8.82
Low commodity prices	83.33	6.86	4.90	.98	3.92
Lack of market alternatives	100	0	0	0	0
Delayed payment of farmers	100	0	0	0	0

Source: Survey 2012 (N=102)

The farmers indicated poor market structure as another problem which they were faced with. Dysfunctional markets have the potential of hurting some of the players and this is not good for smallholder farmers who are still trying to get onto their feet in terms of agricultural commercialisation. The farmers also agreed strongly to unavailability of input and output markets as another challenge they are faced with in efforts to commercialise. Unavailability of input markets may force farmers to opt for previous season produce for use as seed. This has a direct impact on the quality and quantity of produce and thus also impact on output

commercialisation. Unavailability of input markets can also cause delays in planting fields also impacting on output. Unavailability of output markets results in farmers giving away their produce at a lower price on informal markets.

Results in Table 4.7 above indicates that the majority (83%) of the study respondents agreed that lack of farmer organisations is a challenge hindering commercialisation in the study area. Farmer organisations are important in coordinating the activities of farmers. They are important for acquisition of farming implements, resource pooling and access to credit and markets. They also enable sharing of ideas among farmers. Lack of support organisations negatively impacts on commercialisation levels of the smallholder farmers. Farmers who belong to a group have more lobbying and bargaining power which enhances their participation in both input and output markets (Matungul, Lyne, & Ortmann, 2001).

Lack of irrigation facilities and was another challenge which the farmers strongly agreed to having. This means that the farmers have to rely on rain fed production. This presents challenges of timing especially in the face of climate change. Availability of irrigation facilities enable farmers to carry out agricultural production thorough out the whole year. This in turn enables participation in output markets as sellers and input markets as buyers.

The majority of the farmers in the study area (79.41%) indicated that in the high cost of inputs is another challenge they are faced with. This can be attributed to the problem of poor market structure. High cost of inputs discourages the smallholder farmers from using inputs from the markets. This means that it discourages farmers from being input commercialised. This high cost of inputs challenge is aggravated by the lack of funds on the part of the farmers to finance to the acquisition of the inputs. This is a major challenge which is faced by most smallholder farmers in the region. The same results are indicated in the study carried out by Odurukwe, Asiabaka, and Ejiogu-Okereke (2003) whereby the farmers indicated lack of capital as a major constraint to commercialisation.

The study respondents also agreed that poor production technology is another challenge hindering them from commercialising. Out dated farming implements reduce production level per given land area and requires higher investments in labour. Ownership and use of production technology is associated with high production levels which translate from timely planting. The high production level in turn enables output commercialisation.

The majority of the study respondents (73.53%) however strongly disagreed that not having enough land is a challenge hindering them from agricultural commercialisation. This shows that the farmers acknowledge that they have adequate production land. They also indicated

that they strongly disagreed to facing the following challenges: lack of knowledge on the benefits of commercialisation; lack of knowledge on how to commercialise and poor road network. This means that these farmers are well acquainted with how and the benefits of commercialisation.

4.7 Chapter Summary

This chapter presented the results from the survey carried out and a discussion of the presented results. The results indicate that the average input commercialisation is 0.41 and output commercialisation is 0.43. Input commercialisation was found to be influenced by means of land cultivation, years of formal education of the household head, irrigation availability, distance to input market, road access and gross production value. Output commercialisation is influenced by household labour size, irrigation availability, gross agricultural production value, farming experience of the household head and total monthly income in the study area. The challenges faced by the smallholder farmers in commercialisation were also highlighted. The Chapter ends by outlining the perceptions of the farmers on agricultural commercialisation.

CHAPTER 5: SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

This chapter comprises of the summaries, conclusions and policy recommendations. It summarises, and discusses the results of the study with respect to objectives and hypothesis presented in the first chapter. The second part relates to limitations of the study. This is followed by a consideration of the broader implications of the research results for policy development and practise. Finally, the Chapter ends with a list of suggestions for future research.

5.2 Summary and Discussions

5.2.1 The degree of household agricultural commercialisation

The study sought to outline the degree of agricultural commercialisation among the smallholder farmers in the study area. The degree of agricultural commercialisation was viewed from the input side and output side at household level. The two commercialisations were measured by indices. The degree of input commercialisation indicated the proportion of market acquired agricultural input used per given output of a household. Degree of output commercialisation indicated the proportion of sales made out of the total agricultural produce in a household. There were 102 smallholder farmers from Munyati resettlement area who took part in the study.

Study results indicated a mean household input commercialisation index of 0.43 with a standard deviation of 0.51. The degree of household output commercialisation was found to be 0.40 with a standard deviation of 0.33. The least input commercialised household was found to have an index of 0.02 indicating at least some input use though little. However there were some households which were found to be non-output commercialised (with an index value of 0). Results showed that the farmers in the study area have almost the same level of input and output commercialisation. The study therefore concluded that the smallholder farmers in the study area are semi commercialised both on the input and output side at household level. There is enough evidence to reject the hypothesis that there are low levels of agricultural commercialisation at household level among smallholder farmers in the study area.

5.2.2 The factors that determine the degree of household input and output commercialisation

Understanding the determinants of the degree of agricultural commercialisation is important for decision making on the appropriate action to take, so as to improve the level of commercialisation. The determinants can either be internal or external. Internal determinants are those which the farmer has control over while with external factors, the farmer does not have power over them. The Tobit econometric analysis was used to deduce the determinants. This was run on the Stata Version 10.0 statistical package. Two models were run, for the determinants of the degree of household input commercialisation and for household output commercialisation.

Study results showed that method of cultivation ($p < 0.05$), years of schooling of household head ($p < 0.05$), irrigation availability ($p < 0.05$), distance to input market ($p < 0.05$), road access ($p < 0.05$) and household gross production value ($p < 0.001$) were found to be significant determinants of household input commercialisation. The relationship between the degree of commercialisation and distance to input market was unexpectedly found to be positive. This was, however, attributed to the fact that farmers who stay far from the markets are more likely to start buying agricultural inputs early and often avoid last minute rush. The last minute rush for inputs is also accompanied by unavailability of some of the inputs on the market. This in turn forces the last minute input buyers to opt for recycling seed and not using other inputs such as fertilisers and other chemicals.

The degree of household output commercialisation in the study area is determined by household labour size ($p < 0.01$), irrigation availability ($p < 0.01$), household gross production value ($p < 0.05$), farming experience ($p < 0.05$) and off farm income ($p < 0.05$). However, irrigation availability influenced commercialisation negatively. This is a deviation from the expected as irrigation is known to enhance the degree of output commercialisation. This was attributed to the high maintenance cost associated with irrigation facilities. High maintenance cost is an indicator of high running cost and, this results in reduced investment in agricultural production activities. This in turn reduces the quantity of produce which a farmer enters into the agricultural market with and thus low degree of commercialisation. The study surprisingly revealed that the degree of household input commercialisation was an insignificant factor in determining the degree of output commercialisation. It was expected that the farmers who acquire more inputs from the markets would be have more produce than those who do not, and thus, are expected to participate more in agricultural output markets as sellers. This, however, is an indicator of a problem that occurs between the process of planting and harvesting which results in low output. Access to market information was also found to be

insignificant. This was attributed to the fact that the farmers were participating in agricultural markets as maize traders and there is almost a sole market of the produce, in the study area, which is the Grain Marketing Board (GMB).

5.2.3 The perceptions and attitudes of smallholder farmers on commercialisation

Understanding the perceptions and attitudes of the farmers with regards to commercialisation is important in shaping the appropriate intervention to put in place. Many times interventions are put in place based on assumptions on what the farmers' perceptions and attitudes are. This however usually leads to failure as the farmers tend to ignore the intervention. In this study, farmers' perceptions and attitude towards commercialisation were sought after. The study participants were given 10 statements which related to their perceptions and attitudes towards commercialisation. Using a 5 Likert point scale, the farmers indicated their level of agreement to the given statement. Results indicate that the farmers understand what commercialisation entails and how it can be achieved. This is supported by the fact that the farmers agreed strongly to the perception which indicated to the need of production capital for commercialisation and the need for government aid. They also perceived that commercialisation increases household income. With this knowledge, the farmers can be expected to commercialise provided that they have the production inputs and markets. The study participants also strongly disagreed (60%) to the statement that commercialisation can result in household food security. This indicates that the farmers in the study area view agricultural commercialisation as an avenue to achieving food security. The study participants also highlighted the understanding that commercialisation is not only for large scale farmers but, even themselves as smallholder farmers, can commercialise. The study revealed that 76% of the participants strongly perceived themselves as smallholder commercial farmers.

5.2.4 The challenges faced by smallholder farmers in the commercialisation process

Smallholder farmers in Africa are known to be faced with a lot of challenges in agricultural commercialisation. These challenges are often presented in a way that give one no confidence in smallholder farming. This study also sought to understand the various challenges which the farmers in the study area were faced with. Even though the farmers in the study area recorded significant commercialisation levels, they indicated that they are faced with some challenges in commercialisation. The participants indicated lack of market alternatives and delayed payment of farmers after trading in their produce as the greatest challenges they are faced with. This indicates a problem within the agricultural markets. The farmers indicated that the only formal grain market which is available to them is the GMB.

However this institution was designed to be the last resort market and not the first option. A number of challenges were raised which related to the markets. These include low commodity prices, poor market structure, unavailability of input and output markets; and high cost of input. These market related challenges are a huge disincentive to commercialisation. The farmers also highlighted the lack of farmer organisations as another challenge they are faced with. Farmer organisations are important for lobbying and bargaining power; pooling of resources and ideas. The study participants also agreed that they are faced with a challenge of poor production technology and lack of irrigation facilities. Production technology and irrigation facilities are important in the commercialisation process because they support agricultural production. The study revealed that the participants did not have the problem of land availability for agricultural activities. This is quite a diversion from the norm whereby smallholder farmers are often known for having limited availability of land.

5.3 Conclusions

The study concluded the following:

5.3.1 The degree of household agricultural commercialisation

From the discussion above, it can be concluded that the farmers in the study are fairly commercialised. However, there is still more room for improvement. Study results indicate that the level of both input and output commercialisation in the study area is not low. The study results therefore provided enough evidence to reject the hypothesis that there are low levels of agricultural commercialisation at household level among the smallholder farmers in the study area. The study also revealed that maize is an important commercialisation crop of the smallholder farmers in the study area.

5.3.2 The factors that determine the level of household input and output commercialisation

It can be concluded that household level of input commercialisation is determined by method of cultivation, years of schooling of household head, irrigation availability, distance to input market, road access and household gross production value in the study area. It can also be concluded that output commercialisation at household level in Munyati resettlement area is determined by household labour size, irrigation availability, household gross production value, farming experience and off farm income. The study revealed that the determinants of the level of commercialisations cannot be generalised for different countries and regions. This is because some of the determinants found in other studies were found to be

insignificant in the study area. The study results indicated a number of divergences from other previous studies on commercialisation.

5.3.3 The perceptions and attitudes of smallholder farmers on commercialisation

From the results discussion, it can be concluded that the farmers in the study area have positive perceptions and attitudes towards agricultural commercialisation. Their perceptions indicate that they have an understanding of what agricultural commercialisation entails. The farmers know that despite the fact that they are smallholders, they can still commercialise. The study therefore, provides sufficient evidence to reject the hypothesis that the farmers have negative perceptions and attitudes towards commercialisation.

5.3.4 The challenges faced by smallholder farmers in the commercialisation process

It can be concluded that although the farmers in the study area fairly commercialising, they are still faced with some challenges. The challenges are mainly to do with markets. It can be concluded that the smallholder farmers in the study area are in the same predicament as a number of Sub Saharan regions with regards to agricultural markets (Berhanu & Moti, 2010; Barrett, 2007). Commodity price is another challenge faced in the study area. The farmers do not have organisations which provide a platform for the farmers to share knowledge and have bargaining power. The challenges faced by the farmers in the study area are therefore, hindrances to higher levels of commercialisation.

5.4 Limitations of the Study

5.4.1 Time

Due to the limited time which this study had to be carried out within, the study focused only on the smallholder farmers in one area of the district. Given more time, the study could be stretched to other parts of the district so that the results give a better picture of commercialisation in the district.

5.4.2 Resources

The study was carried out under a limited budget. This presented an obstacle to accessing other resources which were necessary for carrying out the study. The major resource constraint was transport to get to the various farms where the farmers are located. This is because there is limited transport operating within the area.

5.5 Policy Implications

- There is need to formulate an agricultural policy which speaks directly to the small holder farmers and address the challenges they are faced with.
- Considering that the farmers in the study area indicated trading in traditional food crops, agricultural commercialisation intervention programmes should not only focus on cash crops but should be all inclusive. The agricultural commercialisation intervention program should also consider subsidising setting up of irrigation facilities and maintenance.
- Different strategies (such as intervention programmes) should be used for encouraging input and output commercialisation as the study showed that the two types of commercialisation are determined by dissimilar factors.
- There is need to encourage entrance of players into both the input and output market so as to avail market options to the farmers. This can go a long way in controlling the prices of the agricultural commodities.
- There is need to infuse the development of farmer organisation in the duties of agricultural extension workers so as to enable bargaining for lower input prices and higher output prices. Setting up co-operatives can be considered as a means of organising farmer. This can be really helpful in solving some of the challenges and irregularities outlined by the study.

5.6 Future research opportunities

There is need for more research to investigate:

- the alternative market options which the farmers in the study area can take advantage of. This will go a long way in stabilising the agricultural market since study results indicated that the main market available for the farmers was the GMB which is now operating as a monopoly.
- the commodity specific levels of commercialisation so as to better understand the agricultural commodities which can be promoted for the purpose commercialisation in the study area.
- commercialisation among large-scale farmers in the same region so as to have a full picture on commercialisation within the study area.
- the production related challenges which hinder the translation of higher investment into inputs from converting to higher output.

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BACKGROUND INFORMATION

Date of interview

Interviewer

Name of the area

Name of respondent (Optional)

Demographic DATA

Household number	Sex (Male/Female)	Age (in years)	Education (years of schooling)	Marital Status				Household size (in number)
				Single	Married	Widowed	Divorced	

APPENDICES

Appendix A : Household Survey Questionnaire

Analysis of smallholder agricultural commercialisation among smallholder farmers in Munyati resettlement area, Chikomba District, Zimbabwe

This questionnaire is prepared for the purpose of gathering data for research on smallholder agricultural commercialisation. This research is meant to identify the determinants, current levels, challenges and perceptions on commercialisation. The research is being carried out on purely academic purposes. As such the respondent is kindly requested to provide genuine responses to the questions. I have selected you to participate in this study. Although there are no direct benefits to you, this study will be helpful in that the results can be shared with government, agencies and other interested parties and thus the public may benefit from it. Participation is voluntary and you may decide to discontinue completing the questionnaire at any time. Respondents are firmly assured of confidentiality of the response. Thank you in advance.

BACKGROUND INFORMATION

Date of Interview.....

Interviewer.....

Name of the area

Name of respondent (Optional)

DEMOGRAPHIC DATA

1.

Household member	Sex (0=Male, 1=Female)	Age (in years)	Education (years of schooling)	Marital Status				Household size (in number)
				Single	Married	Widowed	Divorced	
Household head								

2. What is your employment status?

Employment status	Income range in US\$ per Month						
	<100	100-299	300-499	500-699	700-899	900-1099	1100+
Fulltime farmer							
Part-time Farmer							
Formally employed							
Pensioner							
Unemployed							
Others (specify)							

3. How many years have you been producing?.....

FARMING AND PRODUCTION

4. Which kind of farming are you involved in?(tick)

Type of farming	Tick
Crop production	
Livestock production	
Mixed farming	
Other(Specify):	

5. Indicate the amount of land in your disposal, land tenure system on the land in use and how you acquired it?

Land holding size(Ha)	Land tenure system			How you acquired the land			
	Communal	Rent/Lease	Privately owned	Bought	Inherited	Resettled	Other (specify)

6. Do you have land use title document from government?

Yes	No
-----	----

3. Which of the following production inputs did you use but did not purchase from markets?
 7. Which of the following crops did you cultivate in the previous growing season?

Type of crops produced	*Reason for production	Land used(in hectares)	Quantities produced(in tonnes or kgs)	Quantities sold (in tonnes or kgs)	Selling price (in \$ per kg or tonne)
Maize					
Peanuts					
Groundnuts					
Soybeans					
Sugar beans					
Other:					

*Key: Reason for production

1= Own consumption

2= Selling to the market

3= Partial for consumption and partially for market

8. Which of the following production inputs did you purchase and use in the previous production season?

Input		Market price of input per unit	Number of units bought
Treated Seeds	Maize		
	Peanuts		
	Groundnuts		
	Soybeans		
	Sugar beans		
	Other		
Fertilizer	Ammonium nitrate (AN)		
	Compound D		
	Gypsum		
	Other(Specify)		
Pesticides			
Herbicides			
Other (Specify)			

9. Which of the following production inputs did you use but did not purchase from markets?

Input		Units used	*Source
Seeds	Maize		
	Peanuts		
	Groundnuts		
	Soybeans		
	Sugar beans		
	Other		
Fertilizer	Ammonium nitrate (AN)		
	Compound D		
	Gypsum		
	Other(Specify)		
Pesticides			
Herbicides			
Other (Specify)			

*Key: Source

1. Recycled

2. Donation from relatives and friends

3. Government farmer support programme

10. How did you cultivate your land in the previous season? (Indicate by ticking)

	Own	Borrowed	Hired	Cost/Ha
Tractor				
Animal drawn				
Hand				
Other (specify)				

11. Have you been irrigating your crops?

Yes	No
-----	----

12. Did you take out any credit/loan?

Yes	No
-----	----

13. If "No", what was the main reason?(tick)

Reason	Tick
1. Lack of access	
2. Collateral requirement	
3. High interest	
4. Availability of alternatives	
5. Other (specify)	

14. If you answered "Yes" to question 12, how much did you borrow? _____.

15. If you answered "Yes" to question 12, what was your major source?

Source	Tick
Savings and credit institutions	
Informal creditors	
Commercial banks	
Other(Specify)	

16. What did you use the borrowed money for?

Use	Yes/No
Purchased Inputs such as fertilizer, improved seeds, etc.	
Purchased Livestock	
Rented-in land	
Hired farm labourer	
Other (please specify)	

17. What did the labour composition of your farm look like in the last production year?

Participation in Farm activity	Number of persons
Household head	
Spouse	
Adult women (Age >=17)	
Adult men (Age >=17)	
Young girls (10-13)	
Young girls (14-16)	
Young boys (10-13)	
Young boys (14-16)	

18. Did you hire any labour?

Yes	No
-----	----

19. If yes how much did you pay for the labour?

MARKET AND INFRASTRUCTURE RELATED FACTORS

20. Which market do you usually sell your produce

Market	Tick
Formal	
Informal	
I do not sell	

21. Where do you sell your farm outputs?

Place	Tick
Farm gate	
Grain marketing board	
Near town	
Export	
Other(Specify)	

22. What is the nearest market where you mainly buy the inputs and sale your products?

	Nearest market	Distance to market(km)
Inputs		
Outputs		

23. Do you have road access to the nearest town/city?

Yes	No
-----	----

24. If "yes", what is the nearest town/city where you buy your inputs and sale your products?

_____.

25. Do you have transport access to the nearest town/city if you intend to sell products or buy inputs there?

Yes	No
-----	----

26. How do you get to the nearest input or output markets most often?

Market	*Mode of Transport	Cost of one trip
Input		
Output		

Key*: mode of transport

1= on foot 2= by animals

3= by own car 4= by commuter transport

27. Do you have access to market information?

28. How do you acquire market information pertaining to output prices most often?

Yes	No
-----	----

Means of Accessing Information	Have been using as a means		*Degree of dependence as a source of information	*Reliability of the source	*Rank as 1st, 2nd, 3rd, etc. according to frequency of use
	Yes	No			
Radio					
Mobile Television					
Government/Extension agents					
Traders/Middlemen					
Neighbours					
Other (specify)					

Key:

1. Degree of dependence

1= High

2= Medium

3= Low

2. Reliability

1=High

2= Medium

3= Low

3. Rank

1st, 2nd, 3rd...n

29. Did you receive agricultural extension service in the previous growing season?

Yes	No
-----	----

30. If yes which of the following services did you receive?

Type of goods or service	Yes/ No
Technical advice	
Market Information (input or/and output)	
Credit	
Farm equipment	
Improved seeds	
Fertilizer	
Capacity building training	
Weather related/Metrological	

To what extent do you agree with the following statements? Use a scale of 1 (strongly agree) to 5 (strongly disagree). The higher the score you give the less the extent which you agree with the statement.

31. What challenges do you face in trying to commercialise?

Challenges faced in commercialisation	Level of agreement
a. Lack of knowledge on how to commercialise	
b. Lack of funds to buy inputs	
c. Poor production technology (farming implements)	
d. High cost of inputs	
e. High transportation cost	
f. Poor road network	
g. Poor market structure	
h. Lack of irrigation facilities and water	
i. Lack of knowledge on the benefits of commercialisation	
j. Not enough land for farming	
k. Lack of technical skills (fertilisation, pest control ploughing)	
l. Poor quality products	
m. Lack of farmer organisations to support farmers	
n. Unavailability of input markets	
o. Unavailability of output markets	
p. Low commodity prices	
q. Others (specify)	

PERCEPTIONS AND ATTITUDES ON COMMERCIALISATION

To what extent do you agree with the following statements? Use a scale of 1 (strongly agree) to 5 (strongly disagree). The higher the score you give the less the extent which you agree with the statement.

32. What are your perceptions and attitudes towards commercialisation?

Perception/ Attitude towards commercialisation	Level of agreement
Commercialisation is for large scale farmers	
Commercialisation can only occur if a lot of production capital is available	
Smallholder commercialisation can only occur if government aid is availed	
Commercialisation is when cash crops are produced and marketed	
You can commercialise even by growing food crops only	
Commercialisation results in household food insecurity	
Commercialisation results in reduced food crop production	
Beneficiaries of land reform cannot commercialise	
Commercialisation increases household income	
You regard yourself as a smallholder commercial farmer	
Others (specify)	

7. What factors determine the level of input and output commercialisation of the smallholder farmers in the study area?
8. What are the perceptions and attitudes of the smallholder farmers on commercialisation?
9. What do you think should be done to increase the level of commercialisation by the smallholder farmers in Mnyati commercial area?

Appendix B: Key Informant Interview Guide1

Key informant interview with the extension officer responsible for Munyati resettlement area.

Name of Key Informant	
Name of the Community	
Date of Interview	
Time of Interview	
Place of Meeting	
Name of Facilitator	
Name of Recorder	

1. What is your job responsibility?
2. What are the main crops grown by the farmers in Munyati resettlement area and why?
3. What services or assistance does your office provide to farmers?
4. What does smallholder agricultural commercialisation mean to you?
5. What efforts are being done to increase the smallholder farmers' commercialisation levels?
6. What are the challenges and opportunities at their disposal with regards to commercialisation?
7. What factors determine the level of input and output commercialisation of the smallholder farmers in the study area?
8. What are the perceptions and attitudes of the smallholder farmers on commercialisation?
9. What do you think should be done to increase the level of commercialisation the smallholder farmers in Munyati resettlement area?

Appendix C: Key Informant Interview Guide 2

Key informant interview with the extension officer supervisor responsible for Munyati resettlement area.

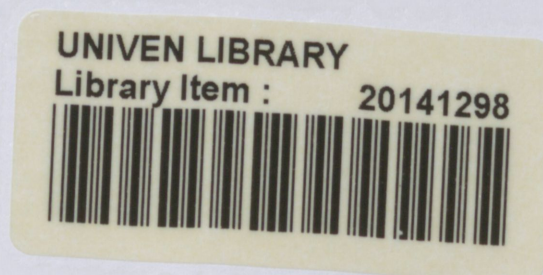
Name of Key Informant	
Name of the Community	
Date of Interview	
Time of Interview	
Place of Meeting	
Name of Facilitator	
Name of Recorder	

1. What is your job responsibility?
2. What does smallholder agricultural commercialisation mean to you?
3. What efforts are being done to increase the smallholder farmers' commercialisation levels?
4. What are the opportunities at their disposal with regards to commercialisation?
5. What factors determine the level of input and output commercialisation of the smallholder farmers in the study area?
6. What are the perceptions and attitudes of the smallholder farmers on commercialisation?
7. What are the challenges faced by the smallholder farmers in commercialisation?
8. What do you think should be done to increase the level of commercialisation the smallholder farmers in Munyati resettlement area?

Appendix D: A Letter of Introduction for the Key Informant Interviews to the Interviewee.

My name is Hlekani Muchazotida Kabiti. I am conducting research about the smallholder farmer agricultural commercialisation to (1) determine the current level of agricultural commercialisation, (2) outline the determinants of commercialisation, (3) the perceptions of the farmers on commercialisation and (4) the challenges faced by the farmers in commercialisation. My colleagues are here to assist me with the recording. You have been selected to participate in this key informant interview because of your valuable knowledge on the issue of smallholder commercialisation.

I will be asking you questions related to smallholder agricultural commercialisation. The information you provide will be used for the purpose of study only. Participation is voluntary. You can choose not to take part. All the information you give will be confidential. Thank you in advance.



Appendix E: Tobit Regression Results for Input commercialisation

```
. tobit hcici fmsize lndcult gend agehh eduhh mast incm fmexp irav tkcrd dis
> imkt rdacs tra mrkinfa extacs totalareaunderproduction grossproductionval
> ue, ll(0) ul(1)
```

```
Tobit regression                               Number of obs   =       102
                                                LR chi2(17)    =       49.05
                                                Prob > chi2    =       0.0003
                                                Pseudo R2     =       0.8198

Log likelihood = -5.3909034
```

hcici	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
fmsize	-.0014792	.0044726	-0.33	0.742	-.0103719 .0074134
lndcult	-.1313992	.0526775	-2.49	0.015	-.2361362 -.0266622
gend	.0427672	.0587657	0.73	0.469	-.0740747 .1596092
agehh	.0012709	.0023032	0.55	0.583	-.0033085 .0058503
eduhh	.0236298	.0099531	2.37	0.020	.0038404 .0434192
mast	.0017731	.0479202	0.04	0.971	-.0935051 .0970513
incm	.0217864	.0282321	0.77	0.442	-.0343467 .0779194
fmexp	.0042012	.0098569	0.43	0.671	-.0153971 .0237994
irav	.3394227	.1561818	2.17	0.033	.0288914 .6499544
tkcrd	-.0188356	.0968515	-0.19	0.846	-.2114023 .1737311
disimkt	.0015977	.0007044	2.27	0.026	.0001972 .0029983
rdacs	.2562112	.1018742	2.51	0.014	.0536579 .4587645
tra	-.059965	.0627865	-0.96	0.342	-.1848015 .0648714
mrkinfa	-.0475563	.0522488	-0.91	0.365	-.1514409 .0563282
extacs	.0666279	.067181	0.99	0.324	-.0669459 .2002017
totalareaun	-.0009408	.0091686	-0.10	0.919	-.0191705 .0172885
grossprodu	-.0000462	9.25e-06	-4.99	0.000	-.0000646 -.0000278
_cons	.137701	.2801466	0.49	0.624	-.4193055 .6947076
/sigma	.2273598	.0170483			.1934632 .2612564

```
obs. summary:      0 left-censored observations
                   94 uncensored observations
                   8 right-censored observations at hcici>=1
```

```
. estimates table, stats(chi2 df N aic bic rank) star(.05 .01 .001) style(one)
> ine)
```

Variable	active
model	
fmsize	-.00147924
lndcult	-.13139919*
gend	.04276723
agehh	.00127092
eduhh	.02362981*
mast	.00177308
incm	.02178635
fmexp	.00420117
irav	.33942268*
tkcrd	-.0188356
disimkt	.00159773*
rdacs	.2562112*
tra	-.05996505
mrkinfa	-.04755634
extacs	.06662793
totalareaun	-.00094079
grossprodu	-.00004616***
_cons	.13770104
sigma	
_cons	.2273598***
Statistics	
chi2	49.046759
df	
N	102
aic	48.781807
bic	98.65629
rank	19

Legend: * p<.05; ** p<.01; *** p<.001

```
. test (gend agehh eduhh mast incm fmexp fmsize irav tkcrd disimkt tra mrkir
> fa rdacs extacs grossproductionvalue totalareaunderproduction lndcult)
```

```
( 1) [model] gend = 0
( 2) [model] agehh = 0
( 3) [model] eduhh = 0
( 4) [model] mast = 0
( 5) [model] incm = 0
( 6) [model] fmexp = 0
( 7) [model] fmsize = 0
( 8) [model] irav = 0
( 9) [model] tkcrd = 0
(10) [model] disimkt = 0
(11) [model] tra = 0
(12) [model] mrkinfa = 0
(13) [model] rdacs = 0
(14) [model] extacs = 0
(15) [model] grossproductionvalue = 0
(16) [model] totalareaunderproduction = 0
(17) [model] lndcult = 0
```

```
F( 17, 85) = 3.70
Prob > F = 0.0000
```

```
. estf compute, data(xtrain)
. estimates stats, n(102)
```

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	102	-29.91428	-5.390903	19	48.78181	98.65629

Note: N=102 used in calculating BIC

```
. estat summarize, equation labels
```

Estimation sample tobit Number of obs = 102

Variable	Mean	Std. Dev.	Min	Max	Label
depvar					
hcici	.4262028	.506707	.022726	3.52281	HCICI
model					
fmsize	39.93137	5.771661	27	56	Farm size
lndcult	1.666667	.4941907	1	3	Method of land cultivation
gend	.2941176	.4578952	0	1	Gender of household head
agehh	48.88235	11.96223	25	85	Age of household head in years
eduhh	10.17647	2.898999	2	17	Years in school of household head
mast	1.264706	.5615832	1	4	Marital status
incm	1.970588	.9276381	1	4	Income range
fmexp	9.813725	2.749367	2	12	Farming experience
irav	.0392157	.1950663	0	1	Irrigation availability
tkcrd	.127451	.3351243	0	1	Take credit in the previous season
disimkt	36.83333	49.05121	5	195	Distance to the nearest input market
rdacs	.9313725	.254068	0	1	Road access
tra	.8921569	.3956912	0	3	Transport access
mrkinfa	.754902	.4962488	0	3	Access to market information
extacs	.7941176	.4063417	0	1	Accessed extension services in the previous season
totalareau~n	5.530882	2.994599	1	16.5	Total area under production
grossprodu~e	3405.887	4711.202	114	24069.3	gross production value

. mfx compute, dydx at(mean)

Marginal effects after tobit
y = Fitted values (predict)
= .37067659

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
fmsize	-.0014792	.00447	-0.33	0.741	-.010245 .007287	39.9314
lndcult	-.1313992	.05268	-2.49	0.013	-.234645 -.028153	1.66667
gend*	.0427672	.05877	0.73	0.467	-.072411 .157946	.294118
agehh	.0012709	.0023	0.55	0.581	-.003243 .005785	48.8824
eduhh	.0236298	.00995	2.37	0.018	.004122 .043137	10.1765
mast	.0017731	.04792	0.04	0.970	-.092149 .095695	1.26471
incm	.0217864	.02823	0.77	0.440	-.033548 .07712	1.97059
fmexp	.0042012	.00986	0.43	0.670	-.015118 .02352	9.81373
irav*	.3394227	.15618	2.17	0.030	.033312 .645533	.039216
tkcrd*	-.0188356	.09685	-0.19	0.846	-.208661 .17099	.127451
disimkt	.0015977	.0007	2.27	0.023	.000217 .002978	36.8333
rdacs*	.2562112	.10187	2.51	0.012	.056541 .455881	.931373
tra	-.059965	.06279	-0.96	0.340	-.183024 .063094	.892157
mrkinfa	-.0475563	.05225	-0.91	0.363	-.149962 .054849	.754902
extacs*	.0666279	.06718	0.99	0.321	-.065044 .1983	.794118
totala~n	-.0009408	.00917	-0.10	0.918	-.018911 .017029	5.53088
grossp~e	-.0000462	.00001	-4.99	0.000	-.000064 -.000028	3405.89

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. mfx

Marginal effects after tobit
y = Fitted values (predict)
= .37067659

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
fmsize	-.0014792	.00447	-0.33	0.741	-.010245 .007287	39.9314
lndcult	-.1313992	.05268	-2.49	0.013	-.234645 -.028153	1.66667
gend*	.0427672	.05877	0.73	0.467	-.072411 .157946	.294118
agehh	.0012709	.0023	0.55	0.581	-.003243 .005785	48.8824
eduhh	.0236298	.00995	2.37	0.018	.004122 .043137	10.1765
mast	.0017731	.04792	0.04	0.970	-.092149 .095695	1.26471
incm	.0217864	.02823	0.77	0.440	-.033548 .07712	1.97059
fmexp	.0042012	.00986	0.43	0.670	-.015118 .02352	9.81373
irav*	.3394227	.15618	2.17	0.030	.033312 .645533	.039216
tkcrd*	-.0188356	.09685	-0.19	0.846	-.208661 .17099	.127451
disimkt	.0015977	.0007	2.27	0.023	.000217 .002978	36.8333
rdacs*	.2562112	.10187	2.51	0.012	.056541 .455881	.931373
tra	-.059965	.06279	-0.96	0.340	-.183024 .063094	.892157
mrkinfa	-.0475563	.05225	-0.91	0.363	-.149962 .054849	.754902
extacs*	.0666279	.06718	0.99	0.321	-.065044 .1983	.794118
totala~n	-.0009408	.00917	-0.10	0.918	-.018911 .017029	5.53088
grossp~e	-.0000462	.00001	-4.99	0.000	-.000064 -.000028	3405.89

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. mfx, pred(pr(0,1.))

Marginal effects after tobit
y = Pr(0<hcici<1.) (predict, pr(0,1.))
= .94566608

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
fmsize	-.0006308	.00191	-0.33	0.742	-.00438 .003118	39.9314
lndcult	-.0560367	.02559	-2.19	0.029	-.106184 -.00589	1.66667
gend*	.016858	.02169	0.78	0.437	-.025652 .059368	.294118
agehh	.000542	.00099	0.55	0.584	-.001397 .002481	48.8824
eduhh	.0100772	.00478	2.11	0.035	.000707 .019448	10.1765
mast	.0007562	.02044	0.04	0.970	-.039299 .040811	1.26471
incm	.009291	.01221	0.76	0.447	-.014632 .033214	1.97059
fmexp	.0017916	.00422	0.42	0.671	-.006484 .010067	9.81373
irav*	-.0319033	.10645	-0.30	0.764	-.240549 .176742	.039216
tkcrd*	-.0085416	.04661	-0.18	0.855	-.099899 .082815	.127451
disimkt	.0006814	.00034	2.03	0.042	.000024 .001339	36.8333
rdacs*	.2333451	.14517	1.61	0.108	-.051187 .517877	9.931373
tra	-.0255728	.02735	-0.93	0.350	-.079181 .028035	.892157
mrkinfa	-.020281	.02273	-0.89	0.372	-.064837 .024275	.754902
extacs*	.0336215	.03993	0.84	0.400	-.044632 .111875	.794118
totala~n	-.0004012	.00391	-0.10	0.918	-.008067 .007264	5.53088
grossp~e	-.0000197	.00001	-3.37	0.001	-.000031 -8.2e-06	3405.89

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. mfx, pred(e(0,1.))

Marginal effects after tobit
y = E(hcici|0<hcici<1.) (predict, e(0,1.))
= .39398805

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
fmsize	-.0011569	.0035	-0.33	0.741	-.008012 .005699	39.9314
lndcult	-.1027642	.04154	-2.47	0.013	-.184184 -.021344	1.66667
gend*	.0337363	.04674	0.72	0.470	-.057878 .125351	.294118
agehh	.000994	.0018	0.55	0.581	-.002539 .004527	48.8824
eduhh	.0184803	.00786	2.35	0.019	.003082 .033878	10.1765
mast	.0013867	.03748	0.04	0.970	-.072068 .074841	1.26471
incm	.0170386	.02211	0.77	0.441	-.026293 .06037	1.97059
fmexp	.0032856	.00771	0.43	0.670	-.011825 .018396	9.81373
irav*	.2729834	.11297	2.42	0.016	.051573 .494394	.039216
tkcrd*	-.0146166	.07455	-0.20	0.845	-.160733 .1315	.127451
disimkt	.0012495	.00055	2.25	0.024	.000163 .002336	36.8333
rdacs*	.1693646	.05448	3.11	0.002	.062581 .276148	9.931373
tra	-.0468972	.04917	-0.95	0.340	-.143261 .049466	.892157
mrkinfa	-.0371927	.04088	-0.91	0.363	-.117312 .042926	.754902
extacs*	.0508982	.05008	1.02	0.309	-.047259 .149056	.794118
totala~n	-.0007358	.00717	-0.10	0.918	-.01479 .013319	5.53088
grossp~e	-.0000361	.00001	-4.81	0.000	-.000051 -.000021	3405.89

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Appendix F: Tobit Regression Results for Output commercialisation

```
. tobit hcoci agehh gend mast eduhh fmsize lshh irav grossproductionvalue ex
> tacs fmexp tkcrd mrkinfa disomkt incm tra hcici, ll(0) ul(1)

Tobit regression                               Number of obs   =       102
LR chi2(16)                                   =       57.95
Prob > chi2                                    =       0.0000
Pseudo R2                                     =       0.4082

Log likelihood = -41.980327
```

hcoci	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
agehh	-.0025556	.0032097	-0.80	0.428	-.0089364 .0038252
gend	-.0580642	.0823471	-0.71	0.483	-.2217648 .1056365
mast	.0305217	.0666414	0.46	0.648	-.101957 .1630004
eduhh	-.0141536	.014083	-1.01	0.318	-.0421496 .0138425
fmsize	-.0019323	.0065388	-0.30	0.768	-.014931 .0110664
lshh	.0456365	.0157921	2.89	0.005	.0142429 .0770302
irav	-.8842449	.2670052	-3.31	0.001	-1.415034 -.3534561
grossprodu~e	.0000341	.000014	2.44	0.017	6.33e-06 .0000615
extacs	.1171282	.0993071	1.18	0.241	-.0802877 .3145442
fmexp	.0296723	.0145443	2.04	0.044	.0007592 .0585854
tkcrd	.0380626	.1467588	0.26	0.796	-.2536842 .3298094
mrkinfa	-.0538615	.0688877	-0.78	0.436	-.1908058 .0830828
disomkt	.00201	.0012285	1.64	0.105	-.0004322 .0044521
incm	.0815422	.0403322	2.02	0.046	.0013645 .1617195
tra	.1103205	.0860897	1.28	0.203	-.0608201 .281461
hcici	-.1050506	.0794067	-1.32	0.189	-.2629059 .0528047
_cons	-.2853493	.3606868	-0.79	0.431	-1.002371 .4316723
/sigma	.3123351	.0274331			.2578 .3668703

```
Obs. summary:      28 left-censored observations at hcoci<=0
                   74 uncensored observations
                   0 right-censored observations
```

```
. estimates stats, n(102)
```

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	102	-70.97328	-41.98033	18	119.9607	167.2102

Note: N=102 used in calculating BIC

```
. estimates table, stats(chi2 df N aic bic rank) star(.05 .01 .001) style(one)
> ine)
```

variable	active
model	
agehh	-.00255561
gend	-.05806417
mast	.03052168
eduhh	-.01415359
fmsize	-.00193227
lshh	.04563654**
irav	-.88424493**
grossprodu~e	.00003412*
extacs	.11712825
fmexp	.02967231*
tkcrd	.03806261
mrkinfa	-.05386154
disomkt	.00200997
incm	.08154219*
tra	.11032045
hcici	-.10505059
_cons	-.28534927
sigma	
_cons	.31233513***
Statistics	
chi2	57.985908
df	
N	102
aic	119.96065
bic	167.21016
rank	18

Legend: * p<.05; ** p<.01; *** p<.001

. estat summarize, equation labels

Estimation sample tobit
> 2

Number of obs = 10

Variable	Mean	Std. Dev.	Min	Max	Label
depvar					
hcoci	.4078881	.3303885	0	.97622	HCOCI
model					
agehh	48.88235	11.96223	25	85	Age of household head in years
gend	.2941176	.4578952	0	1	Gender of household head
mast	1.264706	.5615832	1	4	Marital status
eduhh	10.17647	2.898999	2	17	Years in school of household head
fmsize	39.93137	5.771661	27	56	Farm size
lshh	5.147059	2.159011	1	12	Labour composition
irav	.0392157	.1950663	0	1	Irrigation availability
grossprod~e	3405.887	4711.202	114	24069.3	gross production value
extacs	.7941176	.4063417	0	1	Accessed extension services in the previous season
fmexp	9.813725	2.749367	2	12	Farming experience
tkcrd	.127451	.3351243	0	1	Take credit in the previous season
mrkinfa	.754902	.4962488	0	3	Access to market information
disomkt	36.5	48.18503	5	195	Distance to the nearest output market
incm	1.970588	.9276381	1	4	Income range
tra	.8921569	.3956912	0	3	Transport access
hcici	.4262028	.506707	.022726	3.52281	HCICI

> -

. mfx compute, dydx at(mean)

Marginal effects after tobit
y = Fitted values (predict)
= .34259356

variable	dy/dx	std. Err.	z	P> z	[95% C.I.]	x
agehh	-.0025556	.00321	-0.80	0.426	-.008847 .003735	48.8824
gend*	-.0580642	.08235	-0.71	0.481	-.219462 .103333	.294118
mast	.0305217	.06664	0.46	0.647	-.100093 .161136	1.26471
eduhh	-.0141536	.01408	-1.01	0.315	-.041756 .013449	10.1765
fmsize	-.0019323	.00654	-0.30	0.768	-.014748 .010884	39.9314
lshh	.0456365	.01579	2.89	0.004	.014685 .076588	5.14706
irav*	-.8842449	.26701	-3.31	0.001	-1.40757 -.360924	.039216
grossprod~e	.0000341	.00001	2.44	0.015	6.7e-06 .000062	3405.89
extacs*	.1171282	.09931	1.18	0.238	-.07751 .311767	.794118
fmexp	.0296723	.01454	2.04	0.041	.001166 .058179	9.81373
tkcrd*	.0380626	.14676	0.26	0.795	-.249579 .325705	.127451
mrkinfa	-.0538615	.06889	-0.78	0.434	-.188879 .081156	.754902
disomkt	.00201	.00123	1.64	0.102	-.000398 .004418	36.5
incm	.0815422	.04033	2.02	0.043	.002493 .160592	1.97059
tra	.1103205	.08609	1.28	0.200	-.058412 .279053	.892157
hcici	-.1050506	.07941	-1.32	0.186	-.260685 .050584	.426203

(*) dy/dx is for discrete change of dummy variable from 0 to 1

```
. mfx
Marginal effects after tobit
y = Fitted values (predict)
= .34259356
```

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
agehh	-.0025556	.00321	-0.80	0.426	-.008847 .003735	48.8824
gend*	-.0580642	.08235	-0.71	0.481	-.219462 .103333	.294118
mast	.0305217	.06664	0.46	0.647	-.100093 .161136	1.26471
eduhh	-.0141536	.01408	-1.01	0.315	-.041756 .013449	10.1765
fmsize	-.0019323	.00654	-0.30	0.768	-.014748 .010884	39.9314
lshh	.0456365	.01579	2.89	0.004	.014685 .076588	5.14706
irav*	-.8842449	.26701	-3.31	0.001	-1.40757 -.360924	.039216
grossp~e	.0000341	.00001	2.44	0.015	6.7e-06 .000062	3405.85
extacs*	.1171282	.09931	1.18	0.238	-.07751 .311767	.794118
fmexp	.0296723	.01454	2.04	0.041	.001166 .058179	9.81373
tkcrd*	.0380626	.14676	0.26	0.795	-.249579 .325705	.127451
mrkinfa	-.0538615	.06889	-0.78	0.434	-.188879 .081156	.754902
disomkt	.00201	.00123	1.64	0.102	-.000398 .004418	36.5
incm	.0815422	.04033	2.02	0.043	.002493 .160592	1.97055
tra	.1103205	.08609	1.28	0.200	-.058412 .279053	.892157
hcici	-.1050506	.07941	-1.32	0.186	-.260685 .050584	.426203

(*) dy/dx is for discrete change of dummy variable from 0 to 1

```
. mfx, pred(pr(0,1.))
Marginal effects after tobit
y = Pr(0<hcoci<1.) (predict, pr(0,1.))
= .84599878
```

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
agehh	-.0014324	.00182	-0.79	0.432	-.005008 .002144	48.8824
gend*	-.0348562	.05313	-0.66	0.512	-.138994 .069282	.294118
mast	.0171107	.03755	0.46	0.649	-.056494 .090708	1.26471
eduhh	-.0079329	.00809	-0.98	0.327	-.02379 .007924	10.1765
fmsize	-.001083	.00367	-0.29	0.768	-.008282 .006116	39.9314
lshh	.0255787	.01045	2.45	0.014	.005099 .046059	5.14706
irav*	-.8110946	.09974	-8.13	0.000	-1.00657 -.615618	.039216
grossp~e	.0000191	.00001	2.15	0.031	1.7e-06 .000037	3405.85
extacs*	.0787813	.07888	1.00	0.318	-.075816 .233378	.794118
fmexp	.0166309	.00891	1.87	0.062	-.000827 .034089	9.81373
tkcrd*	.0194804	.06788	0.29	0.774	-.113569 .152529	.127451
mrkinfa	-.0301887	.03912	-0.77	0.440	-.106855 .046478	.754902
disomkt	.0011266	.00073	1.55	0.122	-.0003 .002553	36.5
incm	.0457033	.02479	1.84	0.065	-.002886 .094293	1.97055
tra	.0618331	.0499	1.24	0.215	-.035968 .159635	.892157
hcici	-.0588794	.0465	-1.27	0.205	-.15002 .032261	.426203

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. mfx, pred(e(0,1.))

Marginal effects after tobit
y = E(hcoci|0<hcoci<1.) (predict, e(0,1.))
= .40722398

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	x
agehh	-.001445	.00182	-0.79	0.427	-.005013 .002123	48.8824
gend*	-.0325009	.04555	-0.71	0.476	-.121786 .056785	.294118
mast	.0172578	.03767	0.46	0.647	-.056569 .091084	1.26471
eduhh	-.0080028	.00799	-1.00	0.317	-.023667 .007662	10.1765
fmsize	-.0010926	.0037	-0.30	0.768	-.008337 .006151	39.9314
lshh	.0258041	.00908	2.84	0.004	.008005 .043603	5.14706
irav*	-.2956383	.0439	-6.73	0.000	-.381673 -.209604	.039216
grossp~e	.0000193	.00001	2.39	0.017	3.5e-06 .000035	3405.85
extacs*	.0641899	.0525	1.22	0.221	-.0387 .16708	.794118
fmexp	.0167775	.00825	2.03	0.042	.000605 .03295	9.81373
tkcrd*	.0217441	.08467	0.26	0.797	-.144202 .187691	.127451
mrkinfa	-.0304548	.03902	-0.78	0.435	-.106928 .046019	.754902
disomkt	.0011365	.0007	1.61	0.107	-.000244 .002517	36.5
incm	.0461062	.02305	2.00	0.045	.000931 .091281	1.97055
tra	.0623782	.04895	1.27	0.203	-.033557 .158313	.892157
hcici	-.0593985	.04485	-1.32	0.185	-.147298 .028501	.426203

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. estimates table, stats(chi2 df N aic bic rank) star(.05 .01 .001) style(one) > ine)

Variable	active
model	
agehh	-.00255561
gend	-.05806417
mast	.03052168
eduhh	-.01415359
fmsize	-.00193227
lshh	.04563654**
irav	-.88424493**
grossprodu~e	.00003412*
extacs	.11712825
fmexp	.02967231*
tkcrd	.03806261
mrkinfa	-.05386154
disomkt	.00200997
incm	.08154219*
tra	.11032045
hcici	-.10505059
_cons	-.28534927
sigma	
_cons	.31233513***
Statistics	
chi2	57.985908
df	
N	102
aic	119.96065
bic	167.21016
rank	18

Legend: * p<.05; ** p<.01; *** p<.001

. estimates describe

Estimation results produced by

. tobit hcoci agehh gend mast eduhh fmsize lshh irav
grossproductionvalue extacs fmexp tkcrd mrkinfa disomkt incm tra
hcici, ll(0) ul(1)

. estat ic, n(102)

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	102	-70.97328	-41.98033	18	119.9607	167.2102

Note: N=102 used in calculating BIC