LAND TENURE SECURITY AND SMALL SCALE COMMERCIAL AGRICULTURE PERFOMANCE IN ZIMBABWE

A Dissertation submitted by

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CERTIFICATION OF DISSERTATION

I certify that the ideas, experimental work, results, analyses, software and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

5 August, 2009

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DEDICATION

This dissertation is dedicated to my sons, Loyal, Harmony and Courage. This has been a fulfilling experience that I would encourage you to pursue should opportunity avail itself.

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I would like to thank God for seeing me throughout the course of my entire study.

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ABSTRACT

The major objective of this study is to identify the effects of land tenure security on Small Scale Commercial agricultural productivity and development in Zimbabwe. Using a probit model, the study draws the following conclusions:

i. Under a more secure tenure system, farmers are likely to have some long-term investments, in this case in plantation crops.
ii. The type of tenure system may not necessarily influence an investment in non-fixed assets like livestock.
iii. Secure tenure is likely to influence investment in property improvement fixed assets such as fencing and woodlots.
iv. Secure tenure is likely to positively influence an investment in permanent housing facilities but does not seem to influence an investment in associated infrastructure such as garages, workshops or shades.
v. Secure tenure seems to be associated with a higher propensity to invest in improving existing farm infrastructure.
vi. Freehold tenure system is associated with a higher propensity to access to credit.
vii. Tenure security appears not to significantly affect medium term soil improvements. Medium-term and long-term investments on the farm do not seem to have any significant impact on the level of input use.
viii. However, contrary to expectations, the results of this study indicate that tenure security may not necessarily result in higher productivity.

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ACRONYMS AND ABBREVIATIONS

CA	Communal area
CSO	Central Statistical Office
HA	Hectare
ICA	Intensive Conservation Area
LSC	Large Scale Commercial
MOA	Ministry of Agriculture
RA	Resettlement area
SADC	Southern African Development Community
SSC	Small Scale Commercial

CHAPTER ONE – INTRODUCTION

1.1 Background and Significance of Research

The debate on appropriate land tenure systems for smallholder agriculture has been going on for quite some time now in the Southern African Development Community (SADC) region. Smallholder farmers within SADC often attribute the poor performance of smallholder agriculture to existing land tenure systems. Most smallholder farmer organizations in SADC argue that freehold tenure and adequate land are the most important pre-conditions for smallholder agriculture commercialization. Development specialists on the other hand argue that land tenure security is a pre-requisite to increased smallholder agricultural productivity and development. Past arguments in favour of statutory, individualized land tenure systems (titling) claim that tenure security (1) increases credit use through greater incentives for investment, improved creditworthiness of projects, and enhanced collateral value of land; (2) increases land transactions, facilitating land transfers from less efficient to more efficient users by increasing the certainty of contracts and lowering enforcement costs; (3) reduces the incidence of land disputes through clearer definition and protection of rights; and (4) raises productivity through increased agricultural investment (Feder and Noronha 1987, Barrows and Roth 1990).

Many development thinkers have attributed the weakened incentives to invest in smallholder agriculture to the absence of security of tenure to land ownership (for example Rukuni, 2000; Bruce and Migot-Adholla, 1994; Feder and Noronha 1987). Rukuni (2000) argues that the inability of smallholder farmers to use “their” land as collateral to borrow the much needed short and long term credit for investment in agriculture denies most of them access to technology (hybrid seed, fertilizer, equipment etc). This in turn can lead to low productivity and unsustainable practices. Tenure security is considered an important precondition for increasing land-based economic development and environmentally sustainable natural resource use (Bruce and Migot-Adholla, 1994). According to Rukuni (2000) tenure security in

as far as an exclusive land right of groups and individuals is concerned, is the very basis of economic, political and social power and status.

1.2 Research Question and Objective

Zimbabwe has about 10 000 small-scale commercial (SSC) farmers farming a total of 1.2 million hectares. Farm sizes range from 70 to 500 hectares depending on the agro-ecological region. High potential agro-ecological regions will tend to have smaller farms practicing intensive agriculture whilst low potential agro-ecological regions have relatively larger farms practicing extensive agriculture. The average farm size is about 162 hectares of which 10 – 40 hectares are arable. Fifty-two percent of the SSC farms are under leasehold and the balance is under freehold title.

The freehold tenure system is characterized by individual land ownership. The registered farm owner has exclusive property rights and full control and responsibility over the land and everything attached to it except to the extent that ownership and exclusive control over the land and some natural resources may be limited by statutory provisions. Such limitations relate to changes in land use, control over public water courses, felling of indigenous timber resources and controls on wildlife. In Zimbabwe, this is the most secure tenure system and it is often argued that it provides land owners with the incentives to conserve and improve the natural resource base. The leasehold tenure (permit or resettlement) system is an agreement between the state, through the Ministry of Lands, Land Reform and Resettlement and the Lessee. Land use under leasehold is limited by the purpose of the lease and land legislation. Lease conditions for example may limit stocking limits, or land use options. The system imposes high levels of care on the leaseholder and any lease transfers may require State approval. There are no rights to subdivide or aggregate land. The state retains the power to acquire leases or withhold lease when the leasing period expires (Murombedzi and Gomera, 2004).

In the Zimbabwean context, the freehold tenure system is considered the most secure tenure system when compared to the leasehold tenure system. Following Place and Hazell (1993), tenure security in this study is measured based on whether

a farmer has freehold tenure or leasehold tenure to their farm. With freehold tenure (title deeds) the farmer has complete transfer rights (the right to sell the land), whereas with the leasehold tenure, the farmer only has use rights.

SSC agriculture in Zimbabwe continues to suffer from low and declining productivity. Productivity of SSC agriculture is much lower than its potential. In the 1960's productivity levels were nearly as high as the large-scale commercial (LSC) sub-sector in comparable areas[1]. Since then, there has been a gradual decline in productivity levels. Productivity accounts for as little as 3 percent of the annual area planted to principal crops. SSC agriculture is also not diversified and commercialized. On average, these farmers crop about fifty-five percent of their total cropped area to maize.

The major objective of this study is to identify the effects of land tenure security on SSC agricultural productivity and development in Zimbabwe. The research question for this study is:

Does land tenure security affect farming systems, organization and performance among Zimbabwean small scale commercial farmers, and if so, how?

The specific objectives of the study are to:

- analyze the current state and performance of SSC agriculture;
- compare farm infrastructure development between freehold tenure and leasehold tenure SSC agriculture;
- assess if there are any differences to credit access for freehold tenure and leasehold tenure SSC agriculture; and
- analyze any productivity differences between freehold tenure and leasehold tenure SSC agriculture.

Based on the above objectives, the hypotheses of the study are:

[1] The LSC sub-sector average farm size is 2 223 hectares for private farms and 7 644 hectares for state farms and the arable land varies considerably from agro-ecological region to agro-ecological region.

- Farm infrastructure development is higher for freehold tenure than leasehold tenure SSC agriculture. This is because farmers with more secure land rights may have a higher probability of recouping the benefits from land improvements and thus will be more inclined to make medium- or long-term land improvements and to use complementary yield-increasing inputs
- Farmers under freehold tenure have better access to credit than those under leasehold tenure. Land ownership security is presumed to enhance capital formation by providing better incentives and improved access to credit. Because it implies a greater likelihood of repayment, improved tenure security may also increase lender willingness to offer credit, leading to easier financing of farm investments and inputs.
- Farms under freehold tenure have higher productivity than those under leasehold tenure. Tenure security may enhance long-term investments, which in turn enhance yields. Tenure security provides farmers with adequate incentives or means to make land improvements or adopt new technologies that could enhance production efficiency (Parsons, 1971).

The above hypothesis will be measured by exploring the following key research issues or questions:

- Does land tenure security affect farm infrastructure development and investment amongst SSC farmers in Zimbabwe?
- Does land tenure security affect SSC farmer's access to credit?
- Does land tenure security affect farm productivity amongst SSC farms in Zimbabwe?

1.3 Justification for the Research

There is a continuing debate about whether land tenure security is a constraint on small scale agricultural productivity in Zimbabwe. This debate has been carried out without benefit of rigorous empirical tests of the relationship between different tenure systems and agricultural productivity. The present study uses data from farm

surveys to test the relationships through formal econometric modeling. This section reviews gaps in literature; highlights the importance of smallholder agriculture in the Zimbabwean economy and the potential implications for future land tenure policy in Zimbabwe.

Gaps in literature

Although economists argue that full-fledged private property rights enhance investment incentives [Demsetz, 1967; Ault and Rutman, 1979; De Alessi, 1980; Feder, 1987, 1993; Feder et al., 1988; Feder and Feeny, 1991; Barzel, 1989; Lebecap, 1989; Binswanger et al., 1995; Zimmerman and Carter, 1997; Feder and Nishio, 1997], in African agriculture, the logic associating higher land tenure security and higher incentives to invest has recently been called into question. Results obtained in Burkina Faso cast doubt on the existence of a systematic influence of land tenure security on investment (Brasselle, Gaspart and Platteau, 2001). Brasselle et al. (2001) concluded that the village order, where it exists, provides the basic land rights required to stimulate small-scale investment.

Broadly speaking, landowners are expected to be both more willing and more able to undertake investment where private property rights prevail. They are more willing to invest for essentially two reasons. First, when farmers feel more secure in their right or ability to maintain long-term use over their land, the return to long-term land improvements and conservation measures is higher, and they have therefore a greater incentive to undertake investments. This is the 'assurance effect'. Second, when land can be more easily converted to liquid assets, superior transfer rights have the effect of lowering the costs of exchange if the land is either rented or sold and improvements made through investment can be better realized, thereby increasing its expected return. Investment incentives are again enhanced because of the 'realizability effect'. On the other hand, farmers are more able to invest because, when freehold titles are established, land acquires collateral value and access to credit is easier. This 'collateralisation effect' is especially important

regarding formal lending sources which often have imperfect information on the borrower [Feder and Nishio, 1997:5]

Verifying empirically the impact of land tenure security on investment behaviour is a more difficult task than what it may appear at first sight. There is a problem in inferring from the existence of a significant relationship between tenure security and agricultural investment that causality actually runs from the former to the latter. In Sub-Saharan Africa, some land improvements, particularly the planting of trees, is a well-recognized method of enhancing tenure security for holders of temporary or fragile claims [see, e.g., Bruce, 1988; Noronha, 1985; Robertson, 1987; Atwood, 1990; Place and Hazel, 1993; Sjaastad and Bronley, 1997; De Zeeuw, 1997]. Again, there exists a two-way relationship between land rights and investment.

So far, only a few studies have actually dealt with the problem of endogenous land rights while estimating the effect of tenure security on agricultural investment. Besley (1995) re-worked the data collected by the World Bank on Ghana to assess the sensitivity of the results to the estimation methodology used. The conclusion is that such sensitivity is considerable since the results have been simply inverted. More precisely, while the original World Bank's study (Migot-Adholla et. al., 1994) concluded that tenure security has a clearly positive impact on investment in the region of Anloga but less noticeable impact in Wassa (and no impact at all in Ejura), Besley's study reached the opposite conclusion that better land rights facilitate investment in Wassa but not in Anloga. A recent study on 36 villages in central Uganda concludes that investment enhances tenure security, yet the converse relationship is not true (Baland et al., 1999).

Moor (1996) concluded that tenure security in the form of land titling and registration has a significant and positive effect on long-term on-farm investments. Feder (1987) concluded that titling of land has a decisive influence on investment behaviour in Thailand. Hayes, Roth and Zepeda (1997) conclude that secure tenure tends to stimulate long-term land improvements and tree planting in Gambia. All these

authors failed to control for the endogeneity[2] of land rights and so the few studies done on African agriculture have given mixed results. This study will contribute to existing empirical evidence by specifically looking at the Zimbabwean experience. It will also take into account the problem of endogenous land rights while estimating the effect of tenure security on agricultural investment.

The importance of smallholder agriculture in the Zimbabwean economy

Smallholder agriculture plays a pivotal role in most African economies, particularly those of the SADC region. In most parts of rural Africa, most households derive their livelihood from agriculture. Hence, the emphasis most governments are placing on smallholder agricultural development and commercialization. Despite its importance, smallholder agriculture faces a number of constraints. It continues to suffer from low and declining productivity. Productivity still remains far below that of the large-scale commercial farming sector and the majority of the farmers still produce traditional food crops. In Zimbabwe, crop yields for most crops are less than 30 percent of those of the large-scale commercial farming sector. Productivity accounts for as little as 3 percent of the annual area planted to principal crops. In most SADC countries, smallholder agriculture is highly undercapitalized and is also not diversified and commercialized. If the current land tenure constraints are resolved, small scale agriculture productivity increase is likely to boost gross domestic product, reduce rural unemployment, and reduce poverty through increased farm incomes.

This study will contribute to establishing whether increased tenure security is a necessary condition for increased investment and productivity in small-scale commercial agriculture in Zimbabwe.

Potential Implications for Land Tenure Policy

The arguments for freehold tenure for the smallholder sector in Zimbabwe are often based on economic theories and a few studies done in other countries. No studies

[2] The 'problem of endogeneity' arises when the factors that are supposed to affect a particular outcome, depend themselves on that outcome. In an economic model, an endogenous change is one that comes from inside the model and is explained by the model itself.

have been done in Zimbabwe to establish the extent to which increased tenure security influences smallholder agriculture performance. The results of this study will provide a useful guide to policy analysts and practitioners in reforming the existing land tenure arrangements that currently exist amongst smallholder farmers in Zimbabwe today.

1.4 Structure of the Dissertation

This study is organized into five chapters. This chapter presented the study background, the research question, the rationale for the study, a summary of the research methodology and the delimitation of the scope of the study.

Chapter 2 presents a detailed literature review on the small-scale commercial agriculture sector in Zimbabwe and also on the effects of increased land tenure security on farm investment and agricultural productivity. Chapter 3 presents the detailed methodology employed in this study including an econometric model for assessing the link between tenure security, farm investment, and productivity. Chapter 4 presents a descriptive analysis whilst Chapter 5 presents the econometric results and discussion of the study. Chapter 6 presents the summary, conclusions and implications of the study.

1.5 Summary

This chapter laid the foundation for the study. It presented the research question and the key research issues to be explored during the study. Using an econometric approach, this study will explore whether different land tenure conditions affect farming systems, organization and performance among Zimbabwean small scale commercial farmers. In addition, it presented a justification for the study, and the overall structure of the study.

CHAPTER TWO – LITERATURE REVIEW

2.1 Introduction

The main objective of this study is to identify the effects of land tenure security on small-scale commercial (SSC) agricultural productivity and development in Zimbabwe. In this chapter, a brief review of SSC agriculture in Zimbabwe is given. This will be followed by a definition of the key concepts of the study that is land tenure and land tenure security. The chapter then goes on to explore the theory linking land tenure security with agricultural productivity and development. Finally, the chapter reviews a number of empirical studies that have been done to test the conceptual model linking tenure security with agricultural productivity and development.

2.2 The Agricultural Sector in Zimbabwe

Zimbabwe's agricultural sector comprises four major sub-sectors. These are the large-scale commercial sub-sector (LSC), the small-scale commercial sub-sector (SSC), the resettlement area sub-sector (RA) and the communal area sub-sector (CA). The SSC, RA and CA together form the smallholder sub-sector. Of Zimbabwe's 39 million hectares, 33.3 million hectares are designated agricultural. The remaining 6 million hectares have been reserved for national parks and wild life and for urban settlements. Before the current land resettlement program, the agricultural land was distributed as shown in Table 1.

Table 1: Land ownership by category of farmers

Land category	Total land area (million ha)	Total number of farmers
Large Scale Commercial	11.2	4,400
Small Scale Commercial	1.2	10,000
Communal	16.3	1,000,000
Resettlement	3.3	60,000
State	0.5	

Under the current land resettlement program, the government has designated close to 98 percent of the 11.2 million hectares of large-scale commercial farmland for

resettlement. The new land distribution pattern will only be available after the land resettlement programme, and will result in a significant increase in the small scale commercial farming sector. The current average farm size in the CA sub-sector is 18 hectares and of this, 3 – 5 hectares is arable. In the RA sub-sector, the average farm size is 58 hectares and about 3 – 5 hectares is arable. For the SSC sub-sector, the average farm size is about 162 hectares of which 10 – 40 hectares are arable. The LSC sub-sector average farm size is 2 223 hectares for private farms and 7 644 hectares for state farms and the arable land varies considerably from region to region.

Fifty-two percent of the SSC farms are under leasehold and the balance is under freehold title. The farm sizes range from 70 hectares to 500 hectares. Despite an apparently favourable land tenure system, SSC farmers continue to suffer from low and declining productivity. Productivity still remains far below that of the large-scale commercial farming sector. Yields for most crops are less than 30 percent those of the large-scale commercial farming sector.

2.2.1 Political Economy of Land and the Evolution of Small Scale Commercial Agriculture in Zimbabwe

The current land distribution came into existence through a number of government legislations dating back to as early as 1889 when the white colonialists began acquiring all the high potential land, leaving the marginal areas for black settlement. Land and land reform has been the centre of debate for Zimbabwe since pre-independence times. Land redistribution did not start with the advent of independence in 1980. Prior to the colonization of the country by the British, the people of Zimbabwe lived in communities where the traditional chiefs were the recognized land authorities. In 1888, the colonialists identified land suitable for commercial agriculture and large-scale ranching and displaced the local people whom they resettled together with their chiefs in what are now known as communal lands. Communal lands are therefore a creation of the very early land redistribution program carried out by the colonialists.

The colonialists strengthened their land reform and redistribution program by enacting, in 1931, the Land Apportionment Act. This act designated land in terms of who lived and farmed therein. In 1951, the Land Husbandry Act was introduced to reinforce agricultural practices in the areas designated by the previous acts. This legislative program was not achieved through universal suffrage as Africans were not allowed to vote. Prior to independence, Africans were prohibited from owning urban land, prohibited from developing in certain areas as well as being pushed into subtle separate development, and they had no rights to any land, even land in communal areas where the majority of them lived. Instead land rights were held on their behalf by the administrative machinery set up by the colonial governments such as the system of District Commissioners.

At independence in 1980, around 40 percent of the total land area was occupied by the minority white commercial farmers, while the majority black peasants remained in less arable communal areas. The agricultural sector consisted of three distinct sub-sectors as follows

(a) A large scale commercial sub-sector with about 6000 white farmers. The sector comprised more than 45% of prime agricultural land, mainly in the high potential natural regions I, II and III (Table 2).

(b) A small scale commercial farming sub-sector with about 8500 black farmers taking up 5% of agricultural land. More than 50% of this land lies in the drier natural regions IV and V. A distinct feature of the small scale commercial farming areas was that in the majority of cases, these were created as buffer zones between communal and commercial areas. This was a deliberate move by the settler authority to prohibit blacks from purchasing land in the white areas. Thus, this policy was not meant to empower blacks to venture into successful commercial agriculture.

(c) A communal sub-sector with approximately 800000 peasant farmers comprising less than 50% of agricultural land. 75% of this land lay in low potential natural regions IV and V.

Table 2: Percent Distribution of Land by Sector and Natural Regions

Natural Regions[3]	All Land	Large-Scale Commercial	Small-Scale Commercial	Communal Areas
I	1.8	3.0	0.5	0.7
II	14.8	28.6	17.8	8.7
III	17.8	17.5	37.9	17.1
IV	36.3	25.2	36.9	47.6
V	26.1	25.7	6.9	25.9

During the first decade of independence, land redistribution was done on a 'willing buyer, willing seller' basis with the government having the first refusal option.[4] The target for land redistribution is shown in Table 2a below. The government's first refusal option was intended to ensure the continued consolidation of commercial agricultural land and avoid fragmentation.

Table 2a: Initial targets for Land Redistribution

Ownership category	Area (m.ha) 1980	Target area (m.ha)
Large scale commercial farming sector	15.5	5.0
Small scale commercial farming sector	1.4	1.4
Resettlement	-	8.3
Communal areas	16.4	16.4
State farms	0.3	2.5
National parks and urban settlements	6.0	6.0
Total	39.6	39.6

Source: Ministry of Lands, Agriculture and Rural Resettlement

Of the 10.5 million hectares to be acquired from the commercial farming sector 8.3 million hectares was to be redistributed to landless people while 2.2 million hectares was to constitute state farms. By the end of the first decade after independence, the government managed to acquire 40 percent of the targeted 8.3 million hectares meant for resettlement of the landless people, and 71,000 families out of a target of 162,000 were resettled.

[3] Land distribution in Zimbabwe is categorized by five Natural Regions (NR) in descending order of productivity. NR1 is in the Eastern Highlands and is most suited for plantation crops and livestock production. NR II is good for maize, tobacco, cotton, wheat, as well as cattle. NR III is prone to drought so crop production is riskier, and NRs IV and V are generally only used for cattle and drought-resistant crops.

[4] Under the first refusal option, all land was to be offered to Government first. Only after government had refused to acquire such land for whatever reason was it to be offered to other interested parties.

In 1992, the government enacted the Land Acquisition Act which was meant to speed up the land reform process by removing the 'willing seller, willing buyer' clause, limiting the size of farms and introducing a land tax, though the tax was never implemented. The Act empowered the government to buy land compulsorily for redistribution, and a fair compensation was to be paid for land acquired. During the 1990s, less than 1 million hectares were acquired, and fewer than 20,000 families were resettled.

From July 2000, the Government embarked on a Fast track land reform program with the aim of acquiring about 12 million hectares for distribution. Available statistics show that by end of 2002, the government had acquired about 10.5 million hectares of which 7.3 million hectares had been distributed under the A1 farm model[5] benefiting about 160,340 households, 1.7 million had been distributed under the A2 farm model[6] benefiting about 27,854 households and the remainder was still to be planned and allocated. To date, the fast track land reform program is still to be concluded and it is only when this is done that a true distribution of the land by farming category can be established.

All land that has been resettled by the Government since independence is occupied under leasehold tenure, while some other land remains freehold. The land holding rights and obligations in Zimbabwe find their expression in the country's four main systems of land tenure, namely the freehold (private), state land, communal and leasehold (resettlement) systems. The tenure systems impact and shape the property rights and natural resource access regimes that exist in the country.

The freehold tenure system is prevalent in both the commercial farming sectors which consists of large scale and small scale commercial farmers who occupy about 32% of the country's land area of 39 million hectares. The registered farm owner has exclusive property rights and full control and responsibility over the land and everything attached to it except to the extent that ownership and exclusive control over the land and some natural resources may be limited by statutory provisions.

[5] It is villagized, self contained and has three-tier land use plans

Such limitations relate to changes in land use, control over public water courses, felling of indigenous timber resources and controls on wildlife. In Zimbabwe, this is the most secure tenure system and it is often argued that it provides land owners with the incentives to conserve and improve the natural resource base.

The communal land tenure system is governed by the Communal Lands Act and is applicable to 42% of Zimbabwe's land area. According to the Communal Lands Act, all communal land is vested in the State President who has powers to permit its occupation and utilization in accordance with the Act. Communal Area inhabitants thus have usufructuary rights over communal land. It is often argued that the communal land tenure system is a disincentive to long term investment in agriculture and other key natural resources such as forests.

The State set aside 15% of the country as gazetted/protected forests (2%) and national parks (13%). These offer good examples of *in situ* conservation and sustainable use of Zimbabwe's biological heritage. The remainder of the land is under leasehold tenure (permit or resettlement) systems. The lease is an agreement between the state, through the Ministry of Lands, Land Reform and Resettlement and the Lessee. Land use under leasehold is limited by the purpose of the lease and land legislation. Lease conditions for example may limit stocking limits, or land use options. The system imposes high levels of care on the leaseholder and any lease transfers may require State approval. There are no rights to subdivide or aggregate land. The state retains the power to acquire or withhold leases when the leasing period expires (Murombedzi and Gomera, 2004).

Literature on the economics of SSC farming in Zimbabwe is not readily available. However, raw data on production statistics and crop forecasts can be obtained especially for the post independent era. Prior to independence in 1980, SSC farming data was often reported aggregated with that of the LSC on the assumption that both sectors were commercial. However, the two are completely different in performance,

[6] Meant to replace the commercial sector but with a focus to increase the number of farmers by demarcating land holdings larger than the A1 but not as large as the existing commercial farm holdings.

and that aggregation made it very difficult to effectively appraise the performance of the SSC sub-sector.

2.3 Land Tenure Security and Agricultural Development

This section explores the effects of land tenure security on agricultural development. It first presents a definition of the core concepts of the study, that is, land tenure and land tenure security. This is then followed by a detailed discussion of the conceptual framework of land ownership security and farm productivity.

2.3.1 Definition of Core Concepts

One of the most important current land problems associated with agricultural productivity and the modernization of agriculture is the land tenure question. The land tenure system embodies '… those legal and contractual or customary arrangements whereby people in farming gain access to productive opportunities on the land. It constitutes the rules and procedures governing the rights, duties, liberties and exposures of individuals and groups in the use and control over the basic resources of land and water' (Dorner, 1972). It includes public and private rights and written and unwritten sets of laws.

In the broad sense, land tenure is also seen as the equivalent to land tenure systems; this way of viewing land tenure concentrates on the relationships between people and land. Land tenure systems include the entire scope of land tenure relationships and are part of the more comprehensive property rights system. Land tenure systems are composed of a static and a dynamic component. The *static* component subsumes instruments for land administration while the *dynamic* component comprises instruments for land development and reform processes. Thus, land tenure comprises the habitual and/or legal rights that individuals or groups have to land, and the resulting social relationships between the members of the society.

The scholarly literature on tenure emphasizes the need for tenure security. The various types of tenure, including the registered title, can be secure or insecure

depending on social, legal and administrative institutions in a given society. Most smallholder farmer organizations in the SADC region often make the implicit assumption that title ownership and ownership security are synonymous. However, ownership is not necessarily synonymous with ownership security. Tenure insecurity, narrowly defined, is the landholder's perception of the probability of losing land within some future time period. It can also be defined more broadly as the landholder's perception of the likelihood of losing a specific right in land such as the right to cultivate, graze, fallow, transfer, or mortgage. Thus, one cannot assume that landholder tenure security can be captured by a simple dichotomy of "titled" and "untitled" owners. In Africa, customary land allocation provides individuals with tenure security to such rights as grazing and cultivation, without any legal title definition, registration, or government enforcement. However, traditional tenure systems may weaken with rising population densities and declining land-labor ratios. Conversely, high levels of tenure insecurity may exist even with legal title, for example when the formal legal code is ambiguous in its definition of rights or when the government lacks the will or the means to enforce those rights. Legal title to land increases security only to the extent that the government's definition and enforcement of property rights provides a more secure set of ownership rights and enforcement than that provided by existing tenure systems.

Security of tenure is thus associated with four sets of rights. The basket of rights, therefore, indicates the relative security of a tenure system depending on secured rights from the four sets as follows (Dorner, 1972):

- Use rights are rights to grow crops, trees, make permanent improvement, harvest trees and fruits, and so on;
- Transfer rights are rights to transfer land or use rights, i.e., rights to sell, give, mortgage, lease, rent or bequeath;
- Exclusion and inclusion rights are rights by an individual, group or community to exclude others from the rights discussed above; and
- Enforcement rights refer to the legal, institutional and administrative provisions to guarantee rights.

Institutional arrangements include instruments for defining and enforcing property rights, be they formal procedures, or social customs, beliefs, and attitudes determining legitimacy and recognition of these rights (Taylor, 1988). Enforcement often requires a buttress of instruments such as courts, police, financial institutions, the legal profession, land surveys, cadastral and record keeping systems, and land titling agencies.

Tenure systems can be categorized on the basis of the degree of exclusivity of rights. On this basis all tenure systems fall into four broad categories: open access, communal, private and state (Table 3). As a general observation, some land may appear or behave as open access but such land is usually state land or communal land. When the state or community lacks adequate legal and enforcement capacity, or such capacity comes under pressure, the resultant insecurity of tenure is evidenced through land use patterns that mimic open access systems.

Table 3: Categories of land tenure systems

CATEGORY	OWNERSHIP OF EXCLUSIVE RIGHTS
Open access	None
Communal	Defined group
Private	Individual legal entity
State	Public sector

Exclusivity (to individual or group) therefore defines the degree of tenure security. Under communal tenure, exclusive rights are assigned to a group. Individual or family rights are also assigned under most traditional tenure systems for arable land (Migot-Adholla et. al., 1991).

Private property rights are the most prevalent form of tenure in industrialized western countries. Private land rights are not God-given or sacred rights, but rather that private property is a creation of the state. After all, private property is not and cannot be an absolute right (Dorner, 1992). Where private property rights are not viewed as legitimate, or not generally viewed as working in public interest, or where they are simply not enforced adequately, *de jure* private property becomes *de facto* open

access. Institutions, or rules of the game and how the rules are applied, are most important in determining how secure rights are, and this goes for all tenure systems. Ultimately, and in the abstract, there is no tenure system that is good or bad, right or wrong, but rather that any tenure system has to be secure, appropriate, and able to facilitate the needs of a community or society.

Thus, tenure systems have two important dimensions: property rights definition (security of land rights associated with tenure possession) and property rights distribution (to whom these land rights are distributed) (Carter, Roth and Feder 1995). Land tenure security is thus the individual's perception of his/her rights to a piece of land on a continual basis, free from imposition or interference from outside sources, as well as the ability to reap the benefits of labor or capital invested in land, either in use or upon alienation. This definition contains three components – breadth, duration and assurance – with legal and economic dimensions (Place, Roth and Hazell 1994).

- Breadth refers to the quantity or bundle of rights held, or possession of key rights if certain ones are more important than others.
- Duration is the length of time that a given right is legally valid. The economic dimension requires, in addition, that the time horizon be sufficiently long to enable the holder to recoup with confidence the full income stream generated by the investment. As land rights are generally secure for the season, tenure insecurity tends to be less important for short-term inputs or innovations (fertilizer, new seed varieties) than for capital long-term improvements with benefit streams stretching far into the future (tree crops, buildings).
- Assurance implies that right(s) and duration are known and held with certainty.

The legal dimension defines the composition (breadth) and duration of rights in the bundle, and implies that one holds with complete assurance all rights embodied in his or her tenure, even if that tenure is of short duration and confers meager rights. The economic dimension defines the value of economic benefits derived from de facto tenure in the land resource. Economic actions may diverge from legal

provisions due to weak or costly enforcement, high transaction costs, and corrupt or illicit behavior.

Tenure insecurity from an economic perspective is thus some function of three factors: (1) inadequate number of rights or lack of key rights (use rights, transfer rights, exclusion and inclusion rights and enforcement rights); (2) inadequate duration; and/or (3) lack of assurance. These factors must furthermore be applied in ways that address questions of tenure security for whom and to what piece of land – i.e., property rights distribution.

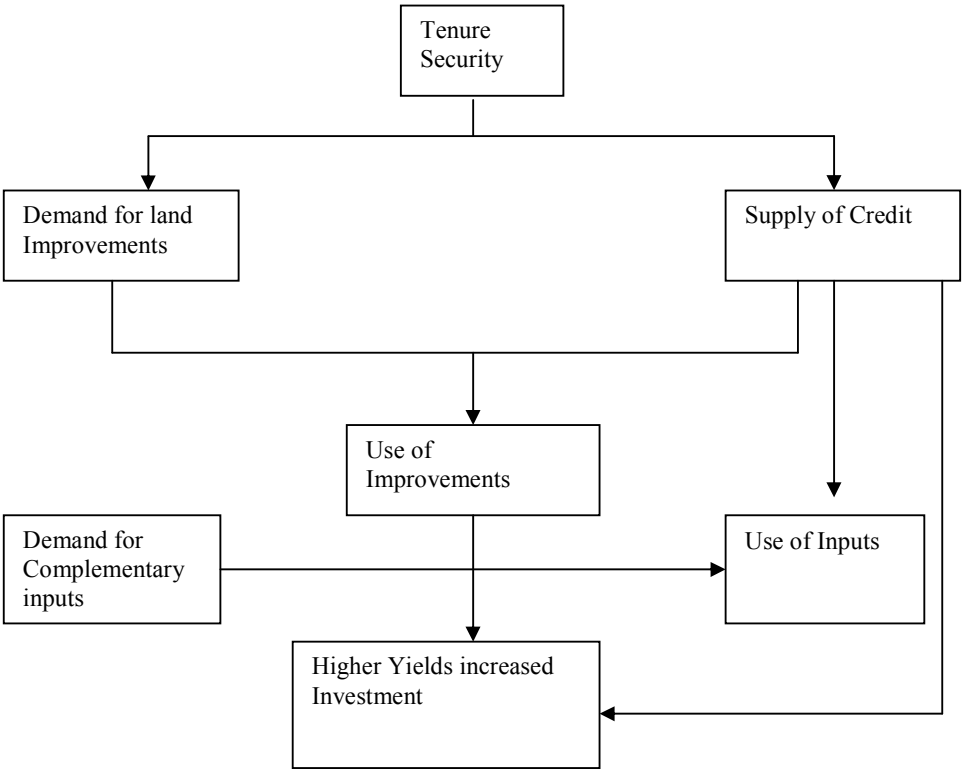
2.3.2 A Conceptual Framework of Land Ownership Security and Farm Productivity

Feder et al. (1988) argues that security of tenure and social stability conferred by a tenure system are the most impelling forces which encourage the rapid adoption of agricultural innovations among many farming communities. There is a widespread belief among development specialists that land tenure security is a necessary but not sufficient condition for economic development. Compared with weak or insufficient property rights, tenure security (1) increases credit use through greater incentives for investment, improved creditworthness of projects, and enhanced collateral value of land; (2) increases land transactions, facilitating land transfers from less efficient to more efficient users by increasing the certainty of contracts and lowering enforcement costs; (3) reduces the incidence of land disputes through clearer definition and protection of rights; and raises productivity through increased agricultural investment (Feder and Noronha 1987, Barrows and Roth 1990).

The theoretical model relating tenure security to agricultural performance (Figure 1) is drawn from Feder et al. (1988). The land ownership security and farm productivity conceptual framework, developed by Feder et al. (1988), is built around two key linkages that connect land titles to economic performance: the positive effects of land titles on land tenure security and investment incentives; and the role of land titles in collateral arrangements for institutional credit.

On the other hand, agricultural performance can be also conceptualized in two dimensions: (1) productivity and investment impacts; and (2) labor absorption, income distribution and stability. The former emphasizes efficiency objectives although not entirely. The later emphasizes the importance of equity objectives, although labor absorption and stability may also constitute efficient outcomes.

Figure 1: Conceptual Model linking Tenure Security with Agricultural Sustainability and Productivity



Source: Feder et al. (1988)

The model suggests both demand-side (incentives to farmers) and supply-side (incentives to lenders) effects. On the demand side, an enhancement in tenure security would increase farmer demand for medium to long-term land improvements, and to a lesser extent, for mobile farm equipment. This increase in demand is derived from two sources. First, greater tenure security would increase the likelihood that the operator will capture the returns from investments. According to Feder et al. (1988) land tenure security that accrues from land registration, removes uncertainty on whether or not landowners can reap the benefits from any long term investments they make such as on-farm tertiary irrigation systems, drainage, soil and water conservation, and construction of a rental house. With positive expectations about

exclusive enjoyment of any returns earned from investment, landowners develop interest in investing in land improvements as well as making land-based investments in agriculture and non-agricultural activities. This boosts demand for investment, which in turn increases demand for complementary inputs including labor, and agricultural inputs (including credit).

Second, increased tenure security would reduce the incidence of disputes, freeing up resources, which would otherwise have been used for litigation. Demand for complementary inputs (farm chemicals, labor) will also increase because the enhanced tenure security will encourage land improvements (e.g., higher water retention from construction of ridges increases fertilizer profitability). Assuming the existence of viable technologies, access to inputs and extension advice, and the availability of household labor and financial resources, enhanced tenure security will lead to higher investment and hence higher yields.

Because of potential supply-side effects, higher yields are possible even if households lack sufficient financial resources of their own. Individualized tenure accompanied by transferable title may improve the creditworthiness of the landholder, especially for long-term credit, and may enhance the land's collateral value, thereby raising lenders' expected returns. Land titles are associated with collateral arrangements in the following way. When borrowers apply for loans, land titles are often pledged as collateral. The pledging of land titles, accompanied by registration of mortgage transactions, helps to overcome the problems of asymmetrical information and the related incentive problems of moral hazard and adverse selection. These collateral arrangements are crucial to lending institutions and the credit markets because they partly or fully shift the risk of loan loss from the lenders to the borrowers since a default on the loan would trigger the loss of collateral to the borrower. The prospect of losing property rights to the collateral works as an incentive for the borrower to repay the loan; at least, it works as an incentive for borrowers to avoid intentional default (moral hazard). In addition, collateral mitigates the problem of adverse selection as it enables the lender to screen out borrowers most likely to default (Feder et. al., 1988).

In the event of default, property rights to collateral are transferred to the lender, if there are adequate legal and regulatory arrangements for foreclosure. The lender can then sell the collateral (land) to recover the loan if there is an active land market, free of sale restrictions. Land is regarded as a highly suitable collateral asset, with desirable characteristics being sedentary, difficult to permanently damage and with generally low maintenance requirements (Binswanger and Rosenzweig 1986). For a given interest rate, the amount of credit is expected to increase as the collateral increases, up to a point when credit rationing is triggered (Stiglitz and Weiss, 1981). In addition, for a given amount of credit, the interest rate will be substantially lower when collateral is used.

Improved security of tenure can raise the expected returns from investment and ease credit constraints. This in turn can raise investment levels and thenceforth productivity. Secure tenure to land helps assure investors that the returns to their investment will not be expropriated by government or private agents. If land tenure is secure, a functioning land market that allows transfer of property from one owner (or possessor of user rights) to another can help raise productivity by transferring land from less efficient cultivators to more efficient ones. This overall productivity gain, of course, is greater if there are functioning credit markets – otherwise the more efficient farmers would not be able to raise the capital needed for the purchase. Productivity increases also depend on sellers being able to engage in other income-generating activity.

According to Gavian and Fafchamps (1996), land tenure is thought to influence agricultural productivity through the security (or investment demand) effect. According to this hypothesis, the uncertainty of a user's claim to land lessens expected future returns to current investments. Afraid of not recouping the investment made, the user hesitates to spend resources on land improving inputs. The study hypothesizes that land title can stimulate investment by means of the collateral effect (or credit supply). By turning land into a mortgageable, transferable commodity, farmers can use it as collateral to access the credit needed for productivity-enhancing investments. For this reason, land title is thought to raise the

supply of investment capital available to farmers (see for example Feder et al.; Bruce and Migot-Adholla; Atwood; Barrows and Roth; Green; Kille and Lyne).

Broadly speaking, landowners are expected to be both more willing and more able to undertake investment where private property rights prevail. They are more willing to invest for essentially two reasons. First, when farmers feel more secure in their right or ability to maintain long-term use over their land, the return to long-term land improvements and conservation measures is higher, and they have therefore a greater incentive to undertake investments. This is the 'assurance effect'. Second, when land can be more easily converted to liquid assets through sale-that is, when superior transfer rights have the effect of lowering the costs of exchange if the land is either rented or sold-, improvements made through investment can be better realized, thereby increasing its expected return. Investment incentives are again enhanced. This is the 'realizability effect'. On the other hand, farmers are more able to invest because, when freehold titles are established, land acquires collateral value and access to credit is easier. This 'collateralisation effect' is especially important regarding formal lending sources which often have imperfect information on the borrower [Feder and Nishio, 1997:5].

Land rights typically are not necessarily predetermined. Under sporadic land registration systems, the landholder chooses whether or not to register land and may have some choice in the type of tenure. An individual can enhance long term claims to land by investing in improvements. High yields due to good farmer practices may improve eligibility for long-term tenure in government sponsored resettlement or farm development schemes. Land rights normally adapt to agricultural commercialization, and to broader economic and political factors (Feder and Noronha 1987). These dynamics and interdependence are very complex and greatly complicate the analysis of land tenure and performance.

Usually such factors are assumed to be exogenous to the individual or household within reasonable time parameters, enabling analyses that conclude "this tenure system produced that result". But there are risks that complicate easy interpretation and synthesis of empirical studies. First, there is risk of spurious causality, in effect

concluding that tenure security particular to a system produced or failed to produce a desired outcome when other important or leading factors are discounted or ignored. Second, there is the dynamic risk that the land tenure system observed at one point in time changes states of security in response to population pressure, market access, technological innovation, growing land scarcity and political uncertainty.

2.4 Review of Empirical Studies

Having looked at the conceptual framework of land ownership security and farm productivity in the preceding section, this section discusses some of the studies that have formally tested the relationship between tenure security and agricultural performance. A number of studies outside of southern Africa have formally tested the nature and strength of the linkages between tenure security and agricultural performance using the conceptual framework in figure 1 (Feder and Onchan, 1987, in Thailand; Hayes, Roth and Zepeda, 1997, in the Gambia; and Place and Hazell, 1993, in Ghana, Kenya and Rwanda).

Many scholars have outlined the beneficial economic effects, which accompany proper recording of private property rights (secure tenure to land ownership). There is allocative efficiency and dynamic benefits from land conservation and improvement (Demstz, 1967; Johnson, 1972; Ault and Rutman, 1979; Feder, 1987; Feder et al, 1988; Feder and Feeney, 1991; Barzel, 1989; Binswanger et al, 1995 in Plateau, undated). First more efficient crop choices are possible through the removal of bias towards short term cycle crops (arising from insecurity of tenure) and second land can be transferred from less to more dynamic farmers with consolidation into larger holdings. This eliminates excessive fragmentation and subdivision encouraged by traditional systems. The dynamic impact of land titling, put simply can be explained by the fact that legally protected land owners can be expected to be more willing and able to undertake investments.

Feder and Onchan (1987) were among the first to emprically test the increased investment argument in a rigorous way. Feder et al. (1987) investigated the impact of land ownership security on farm investment and land improvements in Thailand. Data from three provinces in Thailand were used to support theoretical propositions

and estimate the impact of ownership security. Econometric analysis showed that in two provinces, ownership security induced significantly higher capital/land ratios. In a third province, with a well-developed, informal credit market, ownership security was less important and the impact on capital formation was less significant. The study showed that land-improving investments were significantly affected by ownership security. Also, ownership security enhances capital formation by providing better incentives and improved access to credit.

Hayes and Roth (1997) investigated the determinants of investment, input use, and productivity under customary tenure in peri-urban areas of Gambia. The conceptual model employed by Hayes and Roth draws from Feder. Key differences were that three types of investments were considered, and that the supply-side link between credit access, tenure security, and investments/inputs was omitted. A study of 120 households in three villages in the peri-urban area of Gambia was done. The study measured the impacts of different levels of tenure security on farm investment, input use, and yield in order to examine the role of tenure security in increasing agricultural production. Tenure security was measured based on whether the plot manager believed he or she has complete transfer rights (the right to sell the land). Tenure insecurity is represented by the probability of being evicted from one's land. The study found positive relationships between tenure security, the propensity to make long term land improvements, and the presence of trees on a plot. Also long term land improvements were found to enhance yield.

The study also found that credit access in rural Gambia rarely depended on the use of land as collateral and loans were infrequently (less than 3%) used for agricultural purposes. Thus, tenure security affects investment mainly through the demand side – that is, through the assurance that the returns of investments will accrue to those who make investments. The farmer chooses between investments in capital equipment, which is not lost in the event of eviction; land improvements, which are completely lost in an eviction; and nonagricultural activities and assets, which are unaffected by eviction. The farmer invests in the first period or season and produces in the second season, with the objective of maximizing expected terminal wealth at the end of the second period. Terminal wealth consists of production value, land

value, and returns to nonagricultural activities, less any debts incurred through credit use. Tenure security indirectly affects productivity through investment. In their study, Deininger and Chamorro (2002) also found that the propensity to undertake largely labor-intensive investments in Nicaragua is increased significantly by the receipt of land title.

Much of the land tenure literature on sub-Saharan Africa concerns the hypothesis that tenure insecurity has a negative impact upon the propensity to invest in land improvements. Indigenous land tenure systems, under which farmers often do not hold title to land they cultivate, have been charged with failing to provide farmers with adequate incentives or means to make land improvements or adopt new technologies that could enhance production efficiency (Parsons, 1971). However, some authors such as Place and Hazell (1993) argue that lack of credit access, insufficient human capital and labor shortages adversely affect investment decisions more often than tenure insecurity. Roth, Cochrane, and Kisamba-Mugerwa (1993, 1994), in their study of Rukungiri District, Uganda, consider the role of title in promoting farm investments. The authors conclude that farmers value land registration and suggest that the process be simplified to allow more farmers to register their land.

Using survey data from the Niger, Gavian and Fafcjamps (1996) tested whether traditional land tenure systems allocate land efficiently and whether tenure insecurity affects households' manure allocation. They found robust evidence that tenure insecurity incites farmers to divert scarce manure resources to more secure fields whenever they can. On the other hand, they found no evidence linking tenure security to short-term investment decisions. They also concluded that in an environment of multiple market imperfections where customary forms of land tenure do not pose tenure security constraints, land titling and other measures to encourage land markets are not likely to induce increased investment, productivity, or efficiency.

Although studies from Thailand offer evidence for the collateral and security effects of land title (e.g., Feder 1987; Feder et al. 1988; Feder and Onchan, 1987), similar research in Africa, however, has been far less conclusive. A collection of World

Bank studies from Ghana, Rwanda, and Kenya found little relation between land rights and credit, in part because both formal and informal capital markets are very thin. Even in Kenya, where landowners could show formal documents, title was unrelated to formal credit, the term of loan maturity, or the size of loans (e.g., Migot-Adholla et al. 1994a; Migot-Adholla, Hazell, and Place, 1991; Carter, Wiebe, and Blarel, 1989). Only one study in South Africa succeeded at empirically linking tenure security to input use (Kille and Lyne, 1993). On the whole, therefore, existing empirical studies have failed to establish strong links between land rights, investments, and agricultural productivity on African crop lands.

Recent results obtained in Burkina Faso also cast doubt on the existence of a systematic influence of land tenure security on investment (Anne-Sophie Brasselle, Frederic Gaspart and Jean-Philippe Platteau, 2002). In fact, in Burkina Faso, land-related investment appears to be undertaken primarily to increase tenure security rather than as a consequence of more secure rights (Brasselle et al., 2002). Brasselle et al. (2002) concluded that the village order, where it exists, provides the basic land rights required to stimulate small-scale investment.

Verifying empirically the impact of land tenure security on investment behaviour is a more difficult task than what it may appear at first sight. The reason is that there is a problem in inferring from the existence of a significant relationship between tenure security and agricultural investment that causality actually runs from the former to the latter. In Sub-Saharan Africa, some land improvements, particularly the planting of trees, is a well-recognized method of enhancing tenure security for holders of temporary or fragile claims [see, e.g., Bruce, 1988; Noronha, 1985; Robertson, 1987; Atwood, 1990; Place and Hazel, 1993; Sjaastad and Bronley, 1997; De Zeeuw, 1997]. Again, there exists a two-way relationship between land rights and investment.

So far, only a few studies have actually dealt with the problem of endogenous land rights while estimating the effect of tenure security on agricultural investment. Notable studies by Moor (1996); Feder (1987); and Hayes, Roth and Zepeda (1997) failed to control for the endogeneity of land rights. Besley (1995) re-worked the data

collected by the World Bank on Ghana to assess the sensitivity of the results to the estimation methodology used. The conclusion is that such sensitivity is considerable since the results have been simply inverted. More precisely, while the original World Bank study (Migot-Adholla et. al., 1994a) concluded that tenure security has a clearly positive impact on investment in the region of Anloga but less noticeable impact in Wassa (and no impact at all in Ejura), Besley's study reached the opposite conclusion that better land rights facilitate investment in Wassa but not in Anloga. A recent study of 36 villages in central Uganda concludes that investment enhances tenure security, yet the converse relationship is not true (Baland et al., 1999).

2.5 Summary

From a theoretical perspective, secure property rights are generally considered to be a precondition for economic growth and development, for three reasons, namely (i) they provide the incentives necessary for owners to undertake land-related investments thus helping to maintain and increase sustainability of resource use and agricultural productivity; (ii) they decrease the cost of transacting land in the market, thus helping to increase allocative efficiency in the economy; and (iii) availability of formal land title increases credit supply by providing a basis for institutional lenders to actually foreclose on a property in case of default (Besley 1995; Binswanger et al. 1995; Deininger and Feder 1999).

The notion that the greater tenure security accorded by possession of registered land title will be associated with higher levels of investment is a key element in the literature (e.g. Feder et al. 1988). The relationship between possession of title and higher levels of land-attached investments has repeatedly been confirmed in cross-sectional equations (Binswanger, Deininger, and Feder 1995). Numerous studies have demonstrated that land tenure has an investment-enhancing effect (Besley 1985, Rozelle et al. 1998; Gavian and Fafchamphs 1996). However, the overall productivity gain, is greater if there are functioning credit markets – otherwise the more efficient farmers would not be able to raise the capital needed for the purchase. If land tenure is secure, a functioning land market that allows transfer of property from one owner (or possessor of user rights) to another can help raise productivity by transferring land from less efficient cultivators to more efficient ones. Productivity

increases also depend on sellers being able to engage in other income-generating activity.

CHAPTER THREE – RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the detailed research methodology used to collect data for addressing the research question and research issues identified in section 1.2 of chapter one of this study. The chapter briefly reviews the relevance of the positivist research paradigm to the study before discussing in detail the research design. The study used a descriptive research design and two methods of data collection were used for the study. These are secondary data collection and primary data collection methods.

3.2 Research Paradigm

There are four conceptual frameworks within which a researcher may work under scientific research (Guba and Lincoln, 1994). These are positivism, critical realism or post positivism, critical theory and constructivism. This study is predominantly based on the positivism paradigm. Positivism assumes that reality exists and is driven by natural mechanisms and that there is truth that the research can discover (Gephart, 1999; Guba and Lincoln, 1994). It also assumes an objective world hence it often involves searches for facts conceived in terms of specified correlations and associations among variables. In positivism the goal is to uncover the truth and facts as quantitatively specified relations among variables. The research is based on collecting empirical quantitative data to address the research question and also to test the relationship between security of tenure and farm performance as discussed in the theoretical framework presented in chapter 2 of this study. Positivism is most appropriate for this study because:

- In positivism, the purpose of the inquiry is explanation, ultimately enabling the prediction and control of phenomena, whether physical or human (Guba and Lincoln, 1994). In this research the main objective is to find out if security of land tenure influences small-scale commercial agriculture performance in Zimbabwe.
- In positivism, knowledge consists of verified hypotheses that can be accepted as facts or laws (Gephart, 1999). Through the literature review that has been

conducted for this research, a number of hypotheses have been formulated for the study and these were tested using the empirical data to be collected during the research.

- In positivism, ethics is an important consideration (Guba and Lincoln, 1994). Throughout this study, ethical behaviour on the part of the researcher was taken seriously during the inquiry process. Section 3.6 of this chapter discusses the various ethical considerations of this study.

3.3 Research Design

A research design is a framework for action that serves as a bridge between research questions and the execution or implementation of the research (Babbie and Mouton, 2001). It is used to structure the research, to show how all of the major parts of the research project work together to try to address the central research question. Research designs may be classified into three broad categories namely, exploratory, descriptive or causal (Zikmund, 2000; Guba and Lincolm, 1994 and Babbie and Mouton, 2001). The various types of designs have different strengths and weaknesses and some are better for answering some types of questions than others. Feasibility and costs are also important determinants in choosing the appropriate design. An exploratory design is appropriate for developing an initial, rough understanding of a phenomenon and the data collection methods normally used are literature reviews, interviews, case studies and key informants interviews. The descriptive design is most appropriate for precise measurement and reporting of the characteristics of the population or phenomenon and the data collection methods are usually census, surveys and qualitative studies. The causal design is most appropriate for studying cause-and-effect relationships among variables and the data collection is normally done through experiments.

A descriptive research design is chosen for this study. The descriptive design is used because (1) It helps understand the characteristics of a group; (2) It aids in thinking systematically about aspects in a given situation; (3) It offers ideas for further probing; and (4) It helps make certain decisions (Zikmund, 2000). The descriptive design is closely associated with the positivism paradigm and is also

most appropriate for studying the nature of relationships amongst variables. In this study, the primary purpose is to find out the relationships between land tenure security and small-scale commercial agriculture performance.

3.3.1 Data Collection Methods

Both secondary and primary data were used for the study. The main source of secondary data was the production data available from the Central Statistical Office (CSO), various commodity associations and the Ministry of Agriculture (MoA). Secondary data was used for the study because of the following advantages:

- It is considerably cheaper and faster than doing original studies. Thus time and resources were saved, as the data is easily accessible and relatively inexpensive.
- The study can benefit from the research from some of the top scholars in the field, which for the most part ensures quality data. Thus, the study can compare data obtained through in-depth interviews in order to assess the generalisability of findings.
- The quality of secondary data maybe higher because it is obtained from larger and often national samples. It is also gathered in a consistent way over time. As a result, through re-analyzing, unforeseen or unexpected new discoveries can be made.
- Time series data is also available from the national statistical records. This makes it possible for studying the performance of the small-scale commercial farming sector over time.

However, despite having the above advantages, the study also takes note of some major limitations of secondary data that need to be addressed to reduce their potential impact on the findings.

- One disadvantage noted in using available secondary data was that the data was used for a purpose other than that for which it was original collected for. Therefore, specific items or factors of interest may have not been assessed, may have been collected in a different manner, or collected with less depth than the study would prefer.

- Although timeliness is an advantage of secondary analysis, there is a variable lag period (almost three years) between data collection and data availability in Zimbabwe.

- Since many available secondary data deal with national populations, and the study is interested in studying small-scale commercial farmers as a well-defined minority subgroup it was difficult finding relevant data. The majority of available secondary data aggregates small-scale commercial farming statistics with that of large-scale commercial agriculture.

- Most of available secondary data are available in statistical packages that are not compatible with modern packages like SPSS and this makes it difficult to access and use it.

- Although surveys often allow analyses for specific population subgroups, there may be insufficient sample size to study a particular group or condition of interest.

- Non-response to the surveys or individual items may introduce bias.
- Although longitudinal data sets can support development of predictive models, creating the analytic files to support these analyses is challenging in most surveys, and limitations such as sample attrition are common.

- Investigations using survey data are subject to all of the inherent limitations of observational studies. However, observational studies may be the only feasible way to answer the study question, and statistical methods are available to account for and minimize potential bias in these analyses.

- Differences in survey methods such as sampling frame, item wording, and timing of data collection may result in different estimates for a similar question derived from different data sources. Therefore, the study must pay attention to the specifics of survey methodology and understand how this may influence results.

Primary data for the study was collected mainly through a questionnaire (Appendix 1) that was administered through personal interviews with selected farmers. The personal interview approach is a direct, personal interaction in which respondents are probed to uncover underlying motivations, beliefs, attitudes, and feelings on a topic. The personal interview approach has been chosen amongst other typical surveys because of the following advantages:

- It will allow the researcher to obtain complete and precise information.
- It will provide the opportunity for feedback during the data collection exercise and allows the interviewer to answer questions from the respondent (Zikmund, 2000).
- It will provide the opportunity for probing (Zikmund, 2000).
- The possibility for respondent misunderstanding is also lowest. If the participant, for example, does not understand a question or needs further explanation on a particular issue, it is possible to converse with the participant.
- It produces the lowest non-response items. Although obtaining a certain number of respondents who are willing to take time to do an interview is difficult, the researcher has more control over the response rate in the personal interview approach than with other types of survey research. As opposed to mail surveys where the researcher must wait to see how many respondents actually answer and send back the survey, a researcher using the personal interview approach can, if the time and money are available, interview respondents until the required sample has been achieved.
- It can allow for a lengthy interview (Zikmund, 2000).

Thus, in summary, interviewing offers the flexibility to react to the respondent's situation, probe for more detail, seek more reflective replies and ask questions which are complex or personally intrusive. Despite having the above advantages, the personal interview approach is costly and may also introduce bias from either the interviewer or the interviewee.

The study used key informant interviews to augment the data that was collected from secondary sources and the in-depth interviews with the selected sample farmers. Key informant interviews were done with local farmer leadership and extension staff. Collecting data from multiple sources facilitated triangulation of the data sources and

enhanced validity of the data analysis (Nachmias and Nachmias, 1996). Also before designing the final questionnaire to be used for primary data collection, the draft questionnaire presented in appendix 1 was pilot-tested in two stages to improve on validity and reliability, with suggested modifications from the first stage being incorporated for the second stage.

Survey investigations attempt to describe what is happening or learn the reasons of a particular business activity (Zikmund, 2000). The survey methodology was used because:

- It is a quick, inexpensive, efficient and an accurate means of assessing information about the population (Nachmias and Nachmias, 1996). Instead of interviewing the 10 000 small-scale commercial farmers for the study, a representative sample of these farmers was interviewed during the research.
- The survey methodology is useful for describing the characteristics of a large population. No other method of observation can provide this general capability.
- The survey methodology also allows for flexibility during the course of the study if needed (Zikmund, 2000). For example, if the sampled farmer is not available during the period of the interview, then the farmer can easily be replaced by sampling another farmer from the study population.
- Many questions can be asked about a given topic giving considerable flexibility to the analysis.
- Standardized questions make measurement more precise by enforcing uniform definitions upon the participants. Also, standardization ensures that similar data can be collected from groups then interpreted comparatively (between-group study).
- Usually, high reliability is easy to obtain—by presenting all subjects with a standardized stimulus, observer subjectivity is greatly eliminated.

However, despite having the above advantages, the survey methodology may suffer from both random sampling errors and systematic errors if not properly designed and executed. Throughout the research process, measures were put in place to try and minimize these two major sources of error. One way of checking on the

accuracy of the primary data was to compare it to the few available secondary data. Other weaknesses of the survey methodology are:

- A methodology relying on standardization forces the researcher to develop questions general enough to be minimally appropriate for all respondents, possibly missing what is most appropriate to many respondents.
- Surveys are inflexible in that they require the initial study design (the tool and administration of the tool) to remain unchanged throughout the data collection.
- The researcher must ensure that a large number of the selected sample will reply.
- It may be hard for participants to recall information or to tell the truth about a controversial question.

3.3.2 Sampling Strategy

A multi-stage sampling strategy was adopted for the study. Small-scale commercial farms are scattered around the country in clusters. These clusters are known locally as Intensive Conservation Areas (ICAs). The study selected two ICAs (see figure 2 below) - one under freehold tenure and another under leasehold / permit tenure which are adjacent to each other. Thus, travel costs between SSC areas were also greatly reduced. Furthermore, these sites were in the same agro-ecological zone and therefore there are no obvious differences in soil types and climates. Within each selected ICA, the study selected a 58 percent random sample (57 farm units) of the total farm units with permit tenure and 34% (59 farm units) for farm units with freehold tenure. Thus, the farm unit within each ICA was the secondary sampling unit.

However, one possible limitation of the cluster sampling approach is that the characteristics and attitudes of farmers within each cluster or ICA may be too similar. Ideally, a cluster should be as heterogeneous as the population itself to allow for statistical inference.

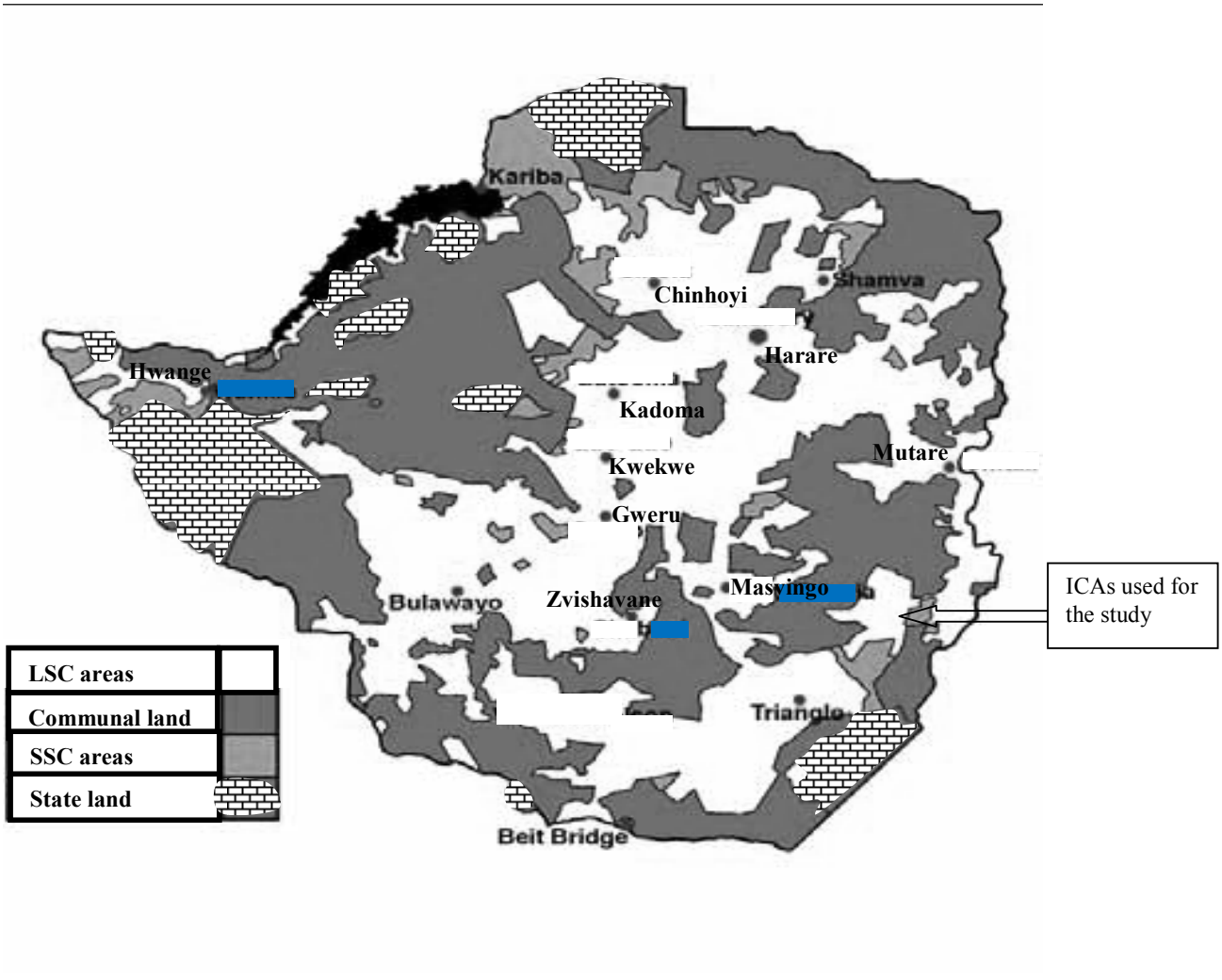


Figure 2: Distribution of land by farming sector before land reform

3.3.3 Data Needs and Questionnaire Design

Primary data was collected to address the specific issues identified from the literature review. From the literature review, the following issues have been identified for the study:

- Does land tenure security affect farm infrastructure development and investment amongst SSC farmers in Zimbabwe? In their study on the impact of land ownership security on farm investment and land improvements in Thailand, Feder and Onchan (1987) found that land-improving investments are significantly

affected by ownership security. In two of the three provinces they studied, ownership security induces significantly higher capital/land ratios.

- How does land tenure security affect farmers' access to credit? Some studies have shown that land ownership security enhances capital formation by providing better incentives and improved access to credit. Because they imply a greater likelihood of repayment, improved tenure security may also increase lender willingness to offer credit, leading to easier financing of farm investments and inputs.
- Does land tenure security affect farm productivity amongst SSC farms in Zimbabwe? Tenure security enhances long-term investments, which in turn enhance yields. Tenure security provides farmers with adequate incentives or means to make land improvements or adopt new technologies that could enhance production efficiency (Parsons, 1971).

The questionnaire (appendix 1) collected data from the following main areas:

- Demographic questions for the head of household, spouse, and other household members. The section contains questions that will capture data on the family size and composition, age of family members, nature of the household, education status of family members, and other related issues.
- Information on land holding. It contains questions that capture data on the total farm size, total arable area, total grazing area, type and quality of natural resource endowment, and other related issues.
- Information on farm structure and land use. The questions will try and collect data on the different cropping enterprises and level of input use.
- Marketing information. Questions in this section aim at collecting data on the various marketing arrangements used by the farmer for both inputs and farm output.
- Information on livestock and other capital holdings. Questions in this section was aimed at collected data on the farm's major livestock enterprises, their size and production levels.
- Information on farm planning. This section will look at how the farming activities are financed, and in particular, if the farmer uses credit.

- Problems and constraints. This section will contain questions that will seek to establish the problems that the farmers are experiencing. It will also look at whether the farmer is leasing part of his farm to other users and also look at the conditions under which other users are allowed to cultivate.

3.3.4 Data Analysis Procedures: A Model of Tenure Security, Investment, and Productivity

After collecting the data, it was coded first before being loaded into SPSS. Cleaning of the data was done first by running frequencies and secondly by a random check of ten percent of the entered questionnaires. The study used an adapted version of a regression model developed by Feder, Onchan, Chalamwong, and Hongladaron (1988) to measure the effect of land tenure security on farm investment and productivity.

Feder and Onchan (1987) formally developed Feder's framework of investment and tenure security as an optimization problem. Tenure insecurity is represented by the probability of being evicted from one's land. The farmer chooses between investments in capital equipment, which is not lost in the event of eviction; land improvements, which are completely lost in an eviction; and nonagricultural activities and assets, which are unaffected by eviction. The farmer invests in the first period and produces in the second with the objective of maximizing expected terminal wealth at the end of the second period. Terminal wealth consists of production value, land value, and returns to non-agricultural activities, less any debts incurred through credit use. The first conditions for maximum terminal wealth yield the following structural form equations used by Place and Hazell (1993):

$C = f(X, TS)$ [1]
$L = f(X, TS, C)$ [2]
$I = f(X, L, C)$ [3]
$Y = f(X, L, I)$ [4]

Where the endogenous variables are:
C is credit,
L is land improvements
I is variable inputs, and
Y is yield (Y).

Tenure security (TS) is exogenous, and X represents exogenous characteristics of the farm and its cultivator(s). This system of equations is recursive in the sense of the model structure, not necessarily temporally. That is, tenure security indirectly affects productivity through investment.

Feder (1987) used this framework to examine the relationship between land title, yield, and inputs in three provinces in Thailand. Migot-Adholla, et. al. (1994), and Place and Hazell (1993) adopted a variation of Feder's system for their econometric work in Kenya, Ghana, and Rwanda. Their studies were innovative in their attempt to control for parcel, household, and village characteristics and for their use of lexicographic transfer rights bundles to create tenure categories. Roth, Cochrane, and Kisamba-Mugerwa (1993, 1994), in their study of Rukungiri District, Uganda, consider the role of title in promoting farm investments.

Following Place and Hazell (1993), tenure security is measured based on whether a farmer has title deeds or a permit to their farm. With freehold tenure (title deeds) the farmer has complete transfer rights (the right to sell the land), whereas with the permit system, the farmer only has use rights. The investments considered are grouped into three types: long-term or fixed improvements, (wells and fences), plantation crops, and medium-term soil improvements (soil and water conservation and fallowing). Long-and medium-term improvements are thought to be complementary, and both of these are considered to affect the use of variable inputs. The structural model employed here takes its inspiration from that of Place and Hazell (1993) and Migot-Adholla et. al. (1994), and can be written as the following system:

L=f(X[sub 1], TS) [5]
T = f(X[sub 2], TS) [6]
M = f(X[sub 3], TS, L) [7]
I = f(X[sub 4], L, M) [8]
Y = f(X[sub 5], L, T, M, I) [9]

where long-term improvements (L), the presence of trees (T), and medium-term soil improvements (M) are binary endogenous variables; commercial inputs (I) and yield (Y) are continuous endogenous variables; tenure security (TS) is exogenous; and the X's are exogenous explanatory variables included in each respective equation.

Data from the survey is used to construct variables to estimate equations [10] to [14]:

$$PLANT = \alpha_0 + \alpha_1 HHEDUC + \alpha_2 TRAINING + \alpha_3 EXPERIENCE + \alpha_4 FARMSIZE + \alpha_5 TENURE + \alpha_6 EXTENSION + \mu_0 \quad [10]$$

$$LONGT = \beta_0 + \beta_1 HHEDUC + \beta_2 TRAINING + \beta_3 EXPERIENCE + \beta_4 FARMSIZE + \beta_5 TENURE + \beta_6 EXTENSION + \beta_7 CREDIT + \beta_8 NFINCOM + \beta_9 RIVER + \beta_{10} OUTVALUE + \beta_{11} IRRIGAREA + \beta_{12} MIDTERM + \mu_1 \quad [11]$$

$$MIDTERM = \delta_0 + \delta_1 HHEDUC + \delta_2 TRAINING + \delta_3 EXPERIENCE + \delta_4 FARMSIZE + \delta_5 TENURE + \delta_6 EXTENSION + \delta_7 CREDIT + \delta_8 NFINCOM + \delta_9 OUTVALUE + \delta_{10} DRAFT + \mu_2 \quad [12]$$

$$TVCHA = \partial_0 + \partial_1 HHEDUC + \partial_2 MIDTERM + \partial_3 SEXFARM + \partial_4 EXTENSION + \partial_5 LONGT + \partial_6 TRAINING + \partial_7 NFINCOM + \partial_8 ARABLE + \partial_9 RELATIVE + \mu_3 \quad [13]$$

$$YIELDHA = \sigma_0 + \sigma_1 HHEDUC + \sigma_2 MIDTERM + \sigma_3 TVCHA + \sigma_5 SEXFARM + \sigma_6 PLANT + \sigma_7 EXTENSION + \sigma_8 LONGT + \sigma_9 FARMSIZE + \mu_4 \quad [14]$$

$$CREDIT = \delta_0 + \delta_1 HHEDUC + \delta_2 AGEHHH + \delta_3 LONGT + \delta_4 FARMSIZE + \delta_5 TENURE + \delta_6 EXTENSION + \delta_7 PLANT + \mu_5 \quad [15]$$

Where the variable definitions are presented in Table 4 below:

Table 4: Land Tenure Econometric Model Variable Description

Variable	Variable Description
PLANT	farmer has at least a plantation crop (1 = yes, 0 = otherwise);
HHHEDUC	education level of farm owner;
AGEHHH	Age of household head (years)
TRAINING	farmer received formal agricultural training (1 = yes, 0 = otherwise);
EXPERIENCE	number of years farming;
FARMSIZE	total farm size (ha);
TENURE	tenure type (1 = freehold, 0 = leasehold);
EXTENSION	farmer receive agricultural extension services (1 = yes, 0 = otherwise);
CREDIT	farmer has access to credit (1 = yes, 0 = otherwise);
NFINCOM	non-farm income (Z$);
RIVER	farmer has access to a river for irrigation (1 = yes, 0 = otherwise);
OUTVALUE	value of annual total farm production/output (Z$);
IRRIGAREA	current area under irrigation (ha);
MIDTERM	farmer has mid-term investments, i.e. soil and soil water conservation, manuring, (1 = yes, 0 = otherwise);
LONGT	farmer has long-term investments, i.e. irrigation infrastructure, buildings, paddocks, fencing, (1 = yes, 0 = otherwise);
DRAFT	farmer has access to draft power (1 = yes, 0 = otherwise);
YIELDHA	value of annual total farm production/output per hectare (Z$/ha);
TVCHA	annual total variable costs per hectare (Z$/ha),
SEXFARM	sex of farm owner;
ARABLE	total farm arable land (ha);
RELATIVE	farmer receive money from relatives who live away from the farm (1 = yes, 0 = otherwise).

Equations [10] to [12], specifying the relationships between tenure security, investment, input use, and yield, were estimated using LIMDEP. Probit analysis was used to estimate the equations coefficients. Equations [13] and [14] were estimated using multiple regression analysis technique – ordinary least squares (OLS).

From equation [10], it is expected that *a priori*, the probability that a farmer grows at least one plantation crop increases with farm size and when a household has freehold tenure. As farm size increases, there is enough land to produce both plantation and other crops. With freehold tenure, the rights to access to land are secure, hence a farmer is likely to make long-term investments in “fixed” assets like plantation crops. The effect on investing in plantation crops of the education level of

household head, formal training in agriculture, experience and access to extension services can not be determined *a priori*.

From equation [11], the probability of making long-term investments in buildings, irrigation infrastructure, and paddocks is expected to increase with an increase in the education level of household head, agricultural training, farming experience, access to credit, non-farm income, output value, the area under irrigation, and mid-term investments. It is assumed that those with experience and education are more likely to know the value of infrastructure investment and would also be considered a lower credit risk. *A priori*, the probability of making long-term investments (especially in irrigation facilities) is likely to decrease if a farmer has direct access to irrigation water from the river. Furthermore, it is assumed that a farmer with freehold tenure is likely to make greater long-term investments than a farmer with a permit.

From equation [12], investments in soil conservation are likely to increase with an increase in the level of farmer education, formal training in agriculture, farming experience, access to extension services, access to credit, non-farm income, value of agriculture output and access to draft power. The probability of making medium term investments is like to be higher under freehold tenure than under the permit system. The effect of farm size on the probability of making medium-term investments cannot be determined *a priori*.

From equation [13], the total variable costs per hectare are expected to increase with an increase non-farm income, and income from relatives. The effect of the other variables in the equation on TVCHA cannot be determined *a priori*. From equation [14], the value of output per hectare is expected to increase with an increase in the level of education of owner farmer, mid-term investments, TVCHA, production of plantation crops, access to extension services, and long-term investments. Ceteris paribus, YIELDHA is expected to decrease with an increase in farm size. As farm size increases, the efficiency in the use of land decreases, hence a decrease in YIELDHA.

From equation [15], the probability of accessing credit is expected to be higher with security of tenure, i.e. under freehold tenure, than under leasehold tenure. The probability of accessing credit is expected *a priori* to increase with an increase in the level of education and age of the owner farmer, long-term investments, access to extension services, ownership of plantation crops, and an increase in farm size.

3.4 Survey Administration

During the survey stage, assistance was sought from a team of two enumerators who were responsible for administering the questionnaire to the sample farmers. These enumerators were trained before being assigned to the field and were also participants in pilot testing the draft questionnaire. Table 5 shows the time schedule of the various activities that were carried out during the data collection stage.

Table 5: Schedule of Activities for Data Collection

Activity	**Date of completion**
Sampling – selection of two ICAs and study sample	Mid June 2006
Training of two enumerators	Third week, July 2007
Finalization of the questionnaire and pilot testing	End July 2007
Introduction of study to local authorities	Mid August 2007
Field data collection	End November 2007
Data assembly, capturing, and analysis	January 2008

3.5 Limitations of the Study

In carrying out this study, it is acknowledged that there are other factors that affect productivity that this study may not have been captured within the available time. Another possible limitation of the study could result from the sampling strategy. A problem may arise with cluster sampling if the characteristics and attitudes of the farmers within the cluster are too similar. Increasing the number of clusters for the study and reducing the number of farms selected within a cluster may mitigate this problem.

Farmers may also have problems in recalling past production data. They may also not be willing to share their farm production data and they may under report on the

various activities. This problem was addressed by fully explaining to the sample farmers the purpose of the study, by ensuring maximum confidentiality and also by respecting the respondent's right to privacy.

3.6 Ethical Considerations

There are a number of ethical issues that were considered during the research study such as:

- The respondent's right to be informed about the purpose of research. Before collecting information and data from the sample farmers, each farmer was thoroughly briefed on the purpose of the research and the study sought the farmer's agreement to participate in the study. The study did not deceive farmers into participating in the study by promising them rewards. Thus, the study explained to the farmers the exact purpose of the study and requested them to decide on whether to participate or not.
- The respondent's right to privacy. Farmer's right to privacy was respected by interviewing each of the sample farmers in their homesteads and by maintaining confidentiality throughout the process.
- Confidentiality was achieved by assigning a code to every questionnaire. Thus, farmers' names and farm names were not referred to during the analysis and reporting phases of the study. Only questionnaire codes were used. Also, information from any farmer was not to be shared with any other person.
- Throughout the study, honesty and objectivity in both data collection and data reporting were strictly adhered to.

3.7 Summary

This chapter presented the main research methodology that was used for this research data. The chapter first discussed the research paradigm that was used for the study. It then went on to discuss the detailed research procedures covering such issues like research design, sampling strategy, data collection methods, data needs, data analysis procedures and survey administration. This is followed by a discussion of the limitations of the study and the main ethical considerations for the study.

The study used an adapted version of a regression model developed by Feder, Onchan, Chalamwong, and Hongladaron (1988) to measure the effect of land tenure security on farm investment and productivity. Feder and Onchan (1987) formally developed Feder's framework of investment and tenure security as an optimization problem. Feder (1987) used this framework to examine the relationship between land title, yield, and inputs in three provinces in Thailand. Migot-Adholla, et. al. (1994), and Place and Hazell (1993) adopted a variation of Feder's system for their econometric work in Kenya, Ghana, and Rwanda.

CHAPTER FOUR – DESCRIPTIVE ANALYSIS

4.1 Introduction

This Chapter presents the descriptive analysis of the study findings. The descriptive analysis aims at assessing if there are any differences in the level and type of investment on the farm by tenure system. Chi Square statistical tests are used to identify significant correlations

4.2 General Farm Owner Characteristics

For both forms of tenure, about 85% are male owned whilst about 15% are female owned. The majority of farm owners with leasehold tenure are resident farm owners (59.6%), whilst the majority of farm owners with freehold tenure are non-resident (61%). This result is contrary to a priori expectations. The expectation is farmers with freehold tenure will be more committed to managing their own farms and more likely to invest in permanent fixtures and hence would have a higher residence percentage.

An analysis by gender of farm owner shows that:

i. male owned farms under leasehold tenure are mostly with resident owners (about 61%) whilst the majority of male owned farms under title deed tenure are mostly with non-resident owners (Table 6).

ii. About 50% of female owned farms under permit tenure are with resident owners whilst about 56% of farms under freehold tenure are with non-resident owners.

Table 6: Residence of Farm Owner by Sex by tenure system, Percent (n = 116)

Sex of registered farm owner	**Residence**	**Type of tenure**	
		Leasehold	Freehold
Male	Resident	61.2	38.0
	Non-resident	38.8	62.0
Female	Resident	50.0	44.4
	Non-resident	50.0	55.6

Source: Survey, 2007

Farm owners were asked about their management arrangements for their farms. The results are presented in Table 7. At least 74% of the farms under the two (freehold and Leasehold) tenure types are the sole farm managers. About 15% of the farmers under freehold co-manage the farms with their relatives. A priori it is expected that the level of investment on a farm is higher with sole management compared to other forms of management.

Table 7: Farm Management Arrangement by tenure system, Percent (n= 116)

Farm Management Arrangement	**Type of tenure**		**Significance Tests**	
	Leasehold	Freehold	Pearson Chi-Square	Asymp. Sig. (2 sided)
Sole manager	89.5	74.6	4.340	0.037*
Co-manager with family	7.0	8.5	0.086	0.769
Co-manager with relatives (brothers)	3.5	15.3	4.660	0.031*
Employ farm manager		1.7	0.975	0.324

Source: Survey, 2007

Table 8 shows that at least 73 percent of the farm owners under both types of tenure did not receive any formal agricultural training. The percentage of farmers without any formal training is significantly higher for those under leasehold tenure. The percentage of farmers with a certificate or with vocational training is significantly higher for those under freehold tenure.

Table 8: Level of formal agricultural training by tenure system, Percent (n=116)

Level of formal agricultural training	**Type of tenure**		**Significance Tests**	
	Leasehold	Freehold	Pearson Chi-Square	Asymp. Sig. (2 sided)
No training	87.7	72.9	4.015.	0.045*
Master farmer	5.3	1.7	1.109	0.292
Certificate		6.9	4.002	0.045*
Diploma	3.5	3.4	0.001	0.972
Degree	1.8	3.4	0.308	0.579
vocational training	1.8	10.3	3.621	0.057

Source: Survey, 2007

4.3 Land Holding and Land Cultivation

On average, the mean area under freehold tenure is about three times that under leasehold tenure (Table 9). A priori it is expected that as farm size increases, farmers are able to invest into rotational grazing, woodlots, and fallow land.

Table 9: Mean landholding by land use by tenure system (ha)

Type of tenure	total arable	total grazing area	Idle land	Total land
Leasehold	8.518	5.333	5.825	12.509
Freehold	24.127	10.069	9.759	36.092
Total	16.457	8.490	8.153	24.503
t-value	-5.419	-3.798	-1.969	-6.334
Sig.	0.000	0.000	0.000	0.000

Source: Survey, 2007

All farmers with freehold tenure bought their land (for cash) whilst all farmers with leasehold tenure were allocated their land by the government. None of the farmers inherited their land nor were given land as a gift by other family members. None of the farmers under both leasehold and freehold tenure have sold or permanently transferred any of their holdings to other farmers in the past 10 years. Thus there is no farm fragmentation. None of the farmers under either tenure types have leased outland to other farmers in 2005.

About 32% and 39% of farmers under leasehold and freehold tenure respectively cultivated all their arable land in 2005. The main reasons for not cultivating all the arable land include (Table 10) (a) lack of labour (82%); (b) lack of inputs to cultivate all the land (82%); and lack of draft power (47%). The percentage of farmers indicating that old age is the main reason for not cultivating all the arable land in 2005 is significantly higher for farmers under freehold tenure.

Table 10: Reasons for not cultivating the total arable land area by tenure system

Reason for not cultivating	Type of tenure (% of respondents) (n=116)		Total	Significance Tests	
	leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Lack of labour	77.5	86.1	81.6	0.935	0.334
Old age	2.5	38.9	19.7	15.838	0.000**
Lack of inputs to plant total area	77.5	86.1	81.6	0.935	0.334
Lack of draft power	45.0	50.0	47.4	0.190	0.663
Sickness	17.5	19.4	18.4	0.048	0.827
Fallow land as part of crop rotation	7.5	11.1	9.2	0.295	0.587

Source: Survey, 2007

Under both tenure systems, the main cropping season for all farmers is summer. This is an indicator that none of the farmers have invested in irrigation facilities for dry season cropping.

4.4 Level of Farm Mechanization

Table 11 shows that the percentage farmers under freehold tenure using their own draft power (either tractor or draft animals) is significantly higher than that of farmers under leasehold tenure. However, the high percentage of hand hoe use by both categories of farmers shows the low level of farm mechanization under both tenure types.

Table 11: Land Preparation Methods by tenure system

Land Preparation Method	Type of tenure(% of respondents) (n=116)		Total	Significance Tests	
	leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
hired tractor	12.3	16.9	14.7	0.505	0.477
Own tractor	5.4	15.3	10.4	3.011	0.083
hired draft animals	28.1	23.7	25.9	0.285	0.593
Hoes	82.5	84.7	83.6	0.111	0.739
Own draft animals	29.8	55.9	43.1	8.058	0.005**

Source: Survey, 2007

4.5 Crop Production

An analysis of the crop enterprises by tenure type shows that the percentage of farmers growing annual food crops (maize, sweet potato, sorghum, rapoko) is higher under the leasehold tenure system (Table 12). The percentage of farmers with plantation crops (tea, gum tree, macadamia nuts, banana, coffee, citrus fruits, and avocado) are significantly higher under freehold tenure. The percentage of farmers growing cash crops (beans, sunflower, groundnut, vegetables, tomato, Irish potato, pop corn, soya bean) is similar under both tenure systems. This result seems to show that under secure tenure system, farmers are likely to have long-term investments, in this case in plantation crops.

Table 12: Percent of Farmers Indicating Crop Enterprises by tenure system (n=116)

Crops	**Type of tenure**		**Total**	**Significance Test**	
	Leasehold	freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Annual food crops	96.5	79.7	87.9	7.738	0.005**
Annual cash crops	22.8	25.4	24.1	0.108	0.742
Plantation crops	3.5	42.4	23.3	24.520	0.000**

Source: Survey, 2007

4.6 Livestock Ownership

The mostly held types of livestock, in order of decreasing importance, are poultry, goats, and cattle (Table 13). The percentage of farmers owning all livestock types except poultry is significantly higher under freehold tenure than under leasehold tenure. This result seems to suggest that investment in livestock is associated with secure tenure systems. However, Table 14 shows that on average, a farmer under the leasehold tenure systems holds more poultry than a farmer under the freehold tenure whilst a farmer under freehold tenure holds more goats than a farmer under leasehold tenure. For the rest of the livestock, the mean holdings are not statistically different under both tenure types. Table 15 shows that the number of livestock owned has been mainly decreasing over the past five years for farmers under the freehold whilst it has been mainly increasing for farmers under the leasehold tenure system. In light of these results, it may be concluded that the type of tenure system may not necessarily influence an investment in non-fixed assets like livestock.

Table 13: Percent of Farmers owning Livestock by tenure system (n=116)

Establishment Period	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Cattle	42.1	59.3	50.9	3.438	0.064
Sheep	1.8	10.2	6.0	3.621	0.057
Goats	50.9	66.1	58.6	2.770	0.096
Pigs	1.8	30.5	16.4	17.501	0.000**
Poultry	75.4	88.1	81.9	3.152	0.76
Donkeys	1.8	10.2	6.0	3.621	0.057

Source: Survey, 2007

Table 14: Mean Livestock Holding by tenure system

Variable	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		T-value	Sig.
Total number of cattle	4.79	5.86	5.42	-1.029	0.308
Total number of sheep	2.50	4.66	4.12	-1.748	0.131
Total number of goats	6.31	10.53	8.73	-2.525	0.014*
Total number of pigs	6.00	3.67	3.79	0.415	0.683
Total number of poultry	24.12	17.73	20.62	2.140	0.035*
Total number of donkeys	5.00	2.17	2.57	1.782	0.135

Source: Survey, 2007

Table 15: Percent indicating stock variation over the last 5 years by tenure system

Nature of stock variation	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
stock numbers reduced	25.0	56.4	41.7	12.23	0.000**
stock numbers increased	64.6	30.9	46.6	7.816	0.005**
stock numbers stayed the same	10.4	12.7	11.7	0.299	0.585

Source: Survey, 2007

4.7 Asset Ownership

Table 16 shows the percentage farmers owning agricultural equipment by type of tenure system. The percentage of farmers owning agricultural equipment is significantly higher under the freehold tenure system for ploughs, cultivators, harrows, tractors, cars, and wheelbarrows. However, the mean agricultural equipment asset ownership is similar under both tenure systems (Table 17) but the mean numbers of major cultivation items are significantly higher under the freehold tenure system.

Table 16: Percent Farmers Owning Assets by tenure system (n=116)

Type of asset	**Type of tenure**		**Total**	**Significance Test**	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Plough	31.6	72.9	52.6	19.835	0.000**
Cultivator	7.0	40.7	24.1	17.938	0.000**
Planter	1.8	1.7	1.7	0.001	0.980
Harrow	3.5	37.3	20.7	20.160	0.000**
Maize Sheller	1.8	5.1	3.4	0.966	0.326
Maize Grinder		3.4	1.7	1.966	0.161
Hoes	93.0	93.2	93.1	0.003	0.960
Tractor	3.5	18.6	11.2	6.674	0.010*
Cart	14.0	42.4	28.4	11.437	0.001**
Bicycle	36.8	35.6	36.2	0.020	0.889
Car	7.0	13.6	10.3	1.338	0.247
Truck	3.5	11.9	7.8	2.828	0.093
Lorry	1.8	3.4	2.6	0.308	0.579
Motorbike		1.7	.9	0.975	0.324
Wheelbarrow	5.3	23.7	14.7	7.904	0.005*
Machette	1.8	1.7	1.7	0.001	0.980
Slasher	1.8	1.7	1.7	0.001	0.980

Source: Survey, 2007

Table 17: Mean assets owned by farmers by tenure system

Type of asset	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		T value	Sig.
Cultivator	1.00	1.42	1.30	0.389	0.70
Harrow	1.00	1.00	1.00	-0.428	0.673
Hoes		1.50	1.50	-1.636	0.105
Tractor	7.09	8.76	7.94	-0.607	0.556
Cart	1.00	2.45	2.23	1.691	0.101
Bicycle	1.38	1.08	1.15	-2.340	0.024*
Car	1.24	1.81	1.52	-0.690	0.506
Truck	1.00	1.13	1.08	-0.789	0.456
Wheelbarrow		1.00	1.00	-1.685	0.119
Plough	1.00	3.00	2.00	-2.665	0.010*

Source: Survey, 2007

Besides an investment in plantation crops, an analysis was made of the extent to which farmers make fixed investments like fencing[7], piped water and woodlots under different tenure systems. Under the freehold tenure system the chances of investing in fencing and woodlots is higher than under the leasehold tenure system (Table 18). Thus secure tenure is likely to influence investment in fixed assets.

Table 18: Percent Farmers Indicating Presence of Infrastructure by tenure system

Variable	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Fencing	29.8	45.8	37.9	3.128	0.077
Piped water	3.5	8.5	6.0	1.261	0.262
Woodlot	7.0	88.1	48.3	76.398	0.000**

Source: Survey, 2007

The percentage of farmers investing in animal handling facilities like kraals, fowl runs, and paddocks, is similar under both tenure systems (Table 19). However, the percentage farmers investing in pig sty is higher for farmers under the freehold tenure system.

[7] Fencing is mostly for boundary fencing (77.3% of the farmers), then boundary fencing and paddocks (15.9%) and for paddocks only (6.8%).

Table 19: Percent farmers indicating animal handling facilities developed by tenure system

Type of animal handling facility	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Kraal	33.3	44.1	38.8	1.407	0.236
Fowl run	15.8	15.3	15.5	0.006	0.937
Paddocks	3.5	6.8	5.2	0.632	0.426
Pig Sty		11.9	6.0	7.197	0.007*

Source: Survey, 2007

Table 20 shows that the percentage of farmers investing in pole and dagga housing facilities is significantly higher for farmers under the leasehold tenure whilst the percentage farmers investing in brick houses is significantly higher under the freehold tenure system. Thus, the results seem to indicate that secure tenure is likely to positively influence an investment in permanent housing facilities. Similarly security of tenure does seem to influence an investment in infrastructure like granaries and toilets (Table 21).

Table 20: Percent owning type of housing by tenure system (n=116)

Type of housing	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Pole and dagga	93.0	39.0	65.5	37.419	0.000**
Brick house	8.8	91.5	50.9	79.438	0.000**

Source: Survey, 2007

Table 21: Percent farmers owning other housing structures by tenure system

Other Housing Structures	Type of tenure		Total	Significance Test	
	Leasehold	Freehold		Pearson Chi-Square	Asymp. Sig. (2 sided)
Granary	82.5	98.3	90.5	8.484	0.004*
Garage	1.8	8.5	5.2	2.669	0.102
Toilets		5.1	2.6	2.975	0.085
Shade	1.8	3.4	2.6	0.308	0.579
Workshop	3.5	1.7	2.6	0.379	0.538

Source: Survey, 2007

4.8 Farm Infrastructure Improvements

Under both freehold and leasehold tenure systems, farmers made improvements to existing infrastructure upon acquisition of the farms. About 90 percent of the farmers under both tenure systems made some improvements to existing infrastructure upon acquisition (Table 22). Overall, the percentage of farmers making improvements to existing farm infrastructure is higher under the freehold tenure system than the leasehold tenure system. The percentage farmers making investments in infrastructure improvement is significantly higher under the freehold system for ridges and trees. Thus secure tenure seems to be associated with a higher propensity to invest in improving existing farm infrastructure.

The sources of finance for farm infrastructure improvements is mainly from own savings (Table 23). However, the investments from own savings is significantly higher under the leasehold tenure system.

Table 22: Percent farmers indicating farm infrastructure improvements by tenure system (n=116)

Farm Infrastructure Improvement	**Type of tenure**			**Significance Test**	
	Leasehold	Freehold	Overall	Pearson Chi-Square	Asymp. Sig. (2 sided)
Irrigation	1.8	5.1	3.4	0.966	0.326
Drainage	15.8	23.7	19.8	1.150	0.284
Borders	22.8	23.7	23.3	0.014	0.907
Ridges	37.5	59.3	48.7	5.476	0.019
Trees	54.4	84.7	69.8	12.683	0.000**
Building	68.4	78.0	73.3	1.349	0.245
Fences	22.8	33.9	28.4	1.752	0.186
None	10.5	10.2	10.3	0.004	0.950

Source: Survey, 2007

Table 23: Source of improvements financing by tenure system

Source of financing	Type of tenure			Significance Test	
	Leasehold	Freehold	Overall	Pearson Chi-Square	Asymp. Sig. (2 sided)
Credit	5.7	34.6	20.0	12.462	0.000
Savings	94.3	65.4	80.0	13.142	0.000

Source: Survey, 2007

That farmers mostly rely on their own savings to make farm investments is confirmed with only 14 percent and 3.4 percent of the farmers under leasehold tenure and freehold tenure respectively borrowed money during the last five seasons to finance any of their farm operations – i.e. purchasing inputs. Some of the reasons for not using credit for farm operations include: (i) a lack of knowledge on the sources of credit (42%), (ii) No collateral security (15%), (iii) use of own money/savings (12%), and (iv) being afraid of risk (9%).

4.9 Remittances

About 58 percent of the farmers under the freehold tenure system and 33 percent of the farmers under the leasehold tenure system receive money from relatives who live away from the farm (within and outside Zimbabwe). About 16 percent of the farmers under leasehold tenure and about 64 percent of the farmers under freehold tenure receive the remittances during the farming season (Table 24). Thus, the remittances from relatives are an important source of short term farm input financing, especially under the freehold tenure system.

Table 24: Frequency with which remittances are received by tenure system (Percent farmers) (n=116)

Frequency	Type of tenure			Significance Test	
	Leasehold	Freehold	Overrall	Pearson Chi-Square	Asymp. Sig. (2 sided)
During farming season	15.8	63.6	46.2	16.253	0.000**
Upon request	42.1	27.3	32.7	0.034	0.853
Monthly	26.3	6.1	13.5	1.481	0.224
After every two months	15.8	3.0	7.7	1.109	0.292

Source: Survey, 2007

4.10 Access to Extension Services

About 75 percent of the farmers under the leasehold tenure system and about 86 percent of the farmers under the freehold tenure system have access to agricultural extension services. The most important source of extension support is AREX followed by input suppliers (Table 25). The percentage of farmers getting extension services through farmer associations is significantly higher under freehold tenure system whilst the percentage of farmers getting extension services through input suppliers is significantly higher under the leasehold tenure system. The major type of extension support is in production planning (85 percent of the farmers), and then agricultural policy (19 percent of the farmers).

Table 25: Percent farmers indicating major sources of extension support by tenure system (n=116)

Source of Extension Support	Type of tenure			Significance Test	
	Leasehold	Freehold	Overall	Pearson Chi-Square	Asymp. Sig. (2 sided)
AREX	100.0	98.0	98.9	0.852	0.356
Private	2.3	2.0	2.1	0.015	0.903
Farmer Associations	2.3	13.7	8.5	3.894	0.048
Input Suppliers	20.9		9.6	11.805	0.001

Source: Survey, 2007

4.11 Summary

The majority of farm owners with leasehold tenure are resident farm owners (59.6%), whilst the majority of farm owners with freehold tenure are non-resident (61%). At least 74% of the farms under both tenure types are the sole farm managers. About 16% of the farmers under freehold co-manage the farms with their relatives. At least 74 percent of the farm owners under both types of tenure did not receive any formal agricultural training. The percentage of farmers without any formal training is higher for those under leasehold tenure.

Under both tenure systems, the main cropping season for all farmers is summer. This is an indicator that none of the farmers have invested in irrigation facilities for dry season cropping. The results also show that under both tenure systems the level of farm mechanization is very low as evidenced by the high use of hand hoes, although the freeholders tend to have more cultivation equipment.

Focusing on the effect of tenure security on farm investment, the following conclusions are drawn from the results:

(a) Under secure tenure system, farmers are likely to have long-term investments, in this case in plantation crops

(b) The type of tenure system may not necessarily influence an investment in non-fixed assets like livestock.

(c) Secure tenure is likely to influence investment in fixed assets like fencing and woodlots.

(d) Secure tenure is likely to positively influence an investment in permanent housing facilities. Security of tenure does not seem to influence an investment in infrastructure like garages, workshops or shades.

(e) Secure tenure seems to be associated with a higher propensity to invest in improving existing farm infrastructure. The sources of finance for farm infrastructure improvements is mainly from own savings.

(f) Remittances from relatives are an important source of short term farm input financing and long term farm investments.

The results of this chapter indicate that leasehold and freehold properties are structurally different, in terms of scale of operation, farm management arrangements, crop production practices, animal types, level of mechanization and asset ownership. The following chapter looks at whether there is also a difference in investment, use of commercial variable inputs and farm productivity.

CHAPTER 5 – AN ECONOMETRIC ANALYSIS OF THE INFLUENCE OF TENURE SECURITY ON FARM INVESTMENT AND PRODUCTIVITY

5.1 Introduction

This chapter presents the results of the linkages between tenure security and productivity obtained by estimating probit models which allows explicit testing of the impact of tenure security on productivity through its role on investment. These tests are based on consistent and the most asymptotically efficient coefficient estimates. Data include household, plot manager, and plot-level characteristics, and explicit account is taken of the relationships between tenure security and the choice variables measuring land investments, variable input use, and yield. Some of the hypothesized positive relationships between tenure security, investment, and yields are corroborated by the analysis. In particular, positive relationships are observed between tenure, the propensity to make long-term land improvements, and the presence of plantation crops on the farm. Long-term land improvements are found to enhance yield.

5.2 Investment and Land Tenure Security

One of the major hypotheses of this study is that farmers with a more secure tenure are likely to have higher levels of investment compared to farmers with less secure tenure. This is because farmers with more secure land rights may have a higher probability of recouping the benefits from land improvements and thus will be more inclined to make medium- or long-term land improvements and to use complementary yield-increasing inputs. To test this hypothesis, the study looked at whether tenure security influences investment in plantation crops, long-term farm investments and medium-term farm investments.

5.2.1 Land tenure security and investment in plantation crops

To assess the relationship between land tenure security and investment in plantation crops, the following econometric model was estimated.

$$PLANT = \alpha_0 + \alpha_1 HHEDUC + \alpha_2 TRAINING + \alpha_3 EXPERIENCE + \alpha_4 FARMSIZE + \alpha_5 TENURE + \alpha_6 EXTENSION + \mu_0$$

Where:

PLANT is farmer has at least a plantation crop (1 = yes, 0 = otherwise);

HHHEDUC is education level of farm owner ();

TRAINING is farmer received formal agricultural training (1 = yes, 0 = otherwise);

EXPERIENCE is number of years farming;

FARMSIZE is total farm size (ha);

TENURE is tenure type (1 = freehold, 0 = leasehold);

EXTENSION is farmer receive agricultural extension services (1 = yes, 0 = otherwise)

The model correctly predicts the presence of plantation crops 76.7% of the time, with a majority in each category correct (Table 26). Freehold tenure, representing secure tenure, is positively and significantly associated with finding plantation crops on a given farm.

As expected *a priori*, the presence of plantation crops on a farm is positively and significantly affected by farm size. The larger the farm, the more farmers can afford to put some of the land under plantation crops. Conversely, farmers with small farms cannot afford to grow plantation crops. Thus, farmers with more land can afford to hold some of it in plantation crops rather than in higher-density crops or they may opt to hold more of it in plantation crops, which require less intensive labor application than most other crops.

Table 26: Probit Model Results for Investment in Plantation Crops

Variable	Coefficient	Standard Error	b/St.Er.|	P[|Z|>z]
Constant	-0.06211064481	0.44437886	-0.140	0.8888
HHHEDUC	-0.06821360485	0.10619887	-0.642	0.5207
TRAINING	-0.09592900050	0.38825284	-0.247	0.8048
EXPERIENCE	0.01552383072	0.015142763	1.025	0.3053
FARMSIZE	0.01982292026	0.010532733	1.882	0.0598
TENURE	0.9955232030	0.40475149	2.460*	0.0139
EXTENSION	-0.4364111704	0.34139847	-1.278	0.2011

*significant at 0.05 and ** significant at 0.01

Frequencies of actual & predicted outcomes

	Predicted		
Actual	0	1	Total
0	32	10	42
1	17	57	74
Total	49	67	116

The education level of owner farmer, agricultural training, and access to extension services all has negative coefficients. However, these are statistically insignificant. Farming experience, *ceteris paribus*, does not significantly affect the probability of whether a farmer produces plantation crops or not.

5.2.2 Long-Term Investments

The following econometric model was estimated to assess the relationship between tenure security and long-term farm investments.

$$LONGT = \beta_0 + \beta_1 HHEDUC + \beta_2 TRAINING + \beta_3 EXPERIENCE + \beta_4 FARMSIZE + \beta_5 TENURE + \beta_6 EXTENSION + \beta_7 CREDIT + \beta_8 NFINCOM + \beta_9 RIVER + \beta_{10} OUTVALUE + \beta_{11} IRRIGAREA + \beta_{12} MIDTERM + \mu_1$$

Where:

LONGT is farmer has long-term investments, i.e. irrigation infrastructure, buildings, paddocks, fencing, (1 = yes, 0 = otherwise);

HHHEDUC is education level of farm owner ();

TRAINING is farmer received formal agricultural training (1 = yes, 0 = otherwise);

EXPERIENCE is number of years farming;
FARMSIZE is total farm size (ha);
TENURE is tenure type (1 = freehold, 0 = leasehold);
EXTENSION is farmer receive agricultural extension services (1 = yes, 0 = otherwise);
CREDIT is farmer has access to credit (1 = yes, 0 = otherwise);
NFINCOM is non-farm income (Z$??);
RIVER is farmer has access to a river for irrigation (1 = yes, 0 = otherwise);
OUTVALUE is value of annual total farm production/output (Z$);
IRRIGAREA is current area under irrigation (ha);
MIDTERM is farmer has mid-term investments, i.e. soil and soil water conservation, manuring, (1 = yes, 0 = otherwise);

The long-term improvements equation shows a very good fit, as measured by prediction accuracy. The model correctly predicts 91.1% of the dependent variable, with a majority in each category correctly predicted (as shown by the frequencies of actual and predicted outcomes below Table 27). The model's parameter estimates are presented in Table 27.

Table 27: Probit Model Results for Long-Term Farm Investments

Variable	Coefficient	Standard Error	b/St.Er.|	P[|Z|>z]
Constant	0.3059205411	1.0003933	0.306	0.7598
HHHEDUC	-0.1200342576	0.17082774	-0.703	0.4823
TRAINING	8.189472028	172379.45	0.000	1.0000
EXPERIENCE	0.1133002165E-01	0.064003152	0.177	0.8595
FARMSIZE	-.4849180701E-01	0.026625347	-1.821	0.0686
TENURE	2.509895244	1.1835623	2.121*	0.0340
EXTENSION	-0.4930298418	0.65310316	-0.755	0.4503
CREDIT	0.8007417133	0.73134172	1.095	0.2736
NFINCOM	-0.4284850748	0.51461524	-0.833	0.4051
RIVER	1.066164537	0.76525136	1.393	0.1636
OUTVALUE	0.1359121725E-04	0.000053345835	2.548*	0.0108
IRRIGATION	0.2613208045E-01	0.042749524	0.611	0.5410
MIDTERM	0.3139229558	0.68727137	0.457	0.6478

*significant at 0.05 and **significant at 0.01

Frequencies of actual & predicted outcomes

	Predicted		
Actual	0	1	Total
0	7	7	14
1	3	96	99
Total	10	103	113

Secure tenure, represented by freehold tenure, positively and significantly affects the propensity to make long-term investments – buildings, irrigation infrastructure, and paddocks. The coefficient for experience in farming, which can be used to represent a farmer's age, is not statistically significant.

The positive coefficient for agricultural output value (OUTVALUE) appears to support the argument that greater agricultural output enables greater access to materials for long-term land improvements. Farm size is negatively and significantly associated with long-term land improvements. This result is not as expected *a priori*. A larger farm would be expected to generate a greater marketed surplus, which could be reinvested on the farm.

The coefficients for the presence of a river or irrigation facilities on the farm prior to acquisition are positive, indicating that these influence further long-term investments on the farm. However, the coefficients are not significant, thus the presence of a river or irrigation facilities prior to acquisition does not seem to have any influence on subsequent long-term improvements.

The coefficients for the education level of the owner farmer, formal agricultural training, access to extension services and credit, access to non-farm income, and medium-term investments (i.e. soil conservation) are not significant. Thus, these variables seem not to affect the propensity to make long-term farm investments.

5.2.3 Medium-Term Improvements

To assess the relationship between land tenure security and investment in medium-term farm improvements, the following econometric model was estimated.

$$MIDTERM = \delta_0 + \delta_1 HHEDUC + \delta_2 TRAINING + \delta_3 EXPERIENCE + \delta_4 FARMSIZE + \delta_5 TENURE + \delta_6 EXTENSION + \delta_7 CREDIT + \delta_8 NFINCOM + \delta_9 OUTVALUE + \delta_{10} DRAFT + \mu_2 \quad [12]$$

Where:

MIDTERM is farmer has mid-term investments, i.e. soil and soil water conservation, manuring, (1 = yes, 0 = otherwise);
HHHEDUC is education level of farm owner ();
TRAINING is farmer received formal agricultural training (1 = yes, 0 = otherwise);
EXPERIENCE is number of years farming;
FARMSIZE is total farm size (ha);
TENURE is tenure type (1 = freehold, 0 = leasehold);
EXTENSION is farmer receive agricultural extension services (1 = yes, 0 = otherwise);
CREDIT is farmer has access to credit (1 = yes, 0 = otherwise);
NFINCOM is non-farm income (Z$??);
OUTVALUE is value of annual total farm production/output (Z$);
DRAFT is farmer has access to draft power (1 = yes, 0 = otherwise);

The model for medium-term investments in soil improvement has a very good predictive record. The model correctly predicts 94.6% of the dependent variable's values on medium-term investments. The model's parameter estimates are presented in Table 28.

Contrary to expectations, secure tenure, as in freehold tenure, have an insignificant coefficient for this equation. Thus security of tenure does not seem to affect medium-term investments in soil improvements.

Medium-term investments in soil improvement are positively and significantly affected by experience in farming and agricultural output. As experience in farming increases, farmers tend to invest in soil improvements. Similarly, higher agricultural output propels an investment in soil improvements.

Table 28: Probit Model Results for Medium-Term Farm Investments

Variable	Coefficient	Standard Error	b/St.Er.|	P[|Z|>z]
Constant	-0.3898632672	1.5448926	-0.252	0.8008
HHEDUC	-0.1891470400	0.30095814	-0.628	0.5297
TRAINING	-3.602291114	1.7173869	-2.098*	0.0359
EXPERIENCE	0.2423682919	0.12628654	1.919	0.0550
FARMSIZE	-0.01265721365	.34684666E-01	-0.365	0.7152
TENURE	0.7458434306	0.81562461	0.914	0.3605
EXTENSION	0.3364876759	1.0036987	0.335	0.7374
CREDIT	9.823720495	165752.88	0.000	1.0000
NFINCOM	0.8086335624	0.92471803	0.874	0.3819
OUTVALUE	0.00003850908266	0.16149534E-04	2.385*	0.0171
DRAFT	-1.253898189	0.82251327	-1.524	0.1274

*significant at 0.05 and ** significant at 0.01

Frequencies of actual & predicted outcomes

	Predicted		
Actual	0	1	Total
0	2	5	7
1	1	105	106
Total	3	110	113

Contrary to a priori expectations, medium-term investments are negatively and significantly affected by formal agricultural training. The result seems to indicate that ceteris paribus, farmers with formal agricultural training have a lower probability of investing in soil improvements than farmers who did not receive formal agricultural training.

The probability of making medium-term investments in soil improvement is not significantly affected by the education level of the owner farmer, farm size, and access to extension services, access to credit, access to non-farm income, and access to draft power for land preparation. This is indicated by the insignificant coefficients for these variables.

5.2.4 Variable Farm Inputs

To assess the relationship between land tenure security and the use of commercial farm inputs, the study estimated the following ordinary least squares model:

$$TVCHA = \partial_0 + \partial_1 HHEDUC + \partial_2 MIDTERM + \partial_3 SEXFARM + \partial_4 EXTENSION + \partial_5 LONGT + \partial_6 TRAINING + \partial_7 NFINCOM + \partial_8 ARABLE + \partial_9 RELATIVE + \mu_3 \quad [13]$$

Where:

TVCHA is annual total variable costs per hectare (Z$/ha),
HHHEDUC is education level of farm owner ();
MIDTERM is farmer has mid-term investments, i.e. soil and soil water conservation, manuring, (1 = yes, 0 = otherwise);
SEXFARM is sex of farm owner;
EXTENSION is farmer receive agricultural extension services (1 = yes, 0 = otherwise);
LONGT is farmer has long-term investments, i.e. irrigation infrastructure, buildings, paddocks, fencing, (1 = yes, 0 = otherwise);
TRAINING is farmer received formal agricultural training (1 = yes, 0 = otherwise);
NFINCOM is non-farm income (Z$);
ARABLE is total farm arable land (ha); and

RELATIVE is farmer receive money from relatives who live away from the farm (1 = yes, 0 = otherwise).

The model estimation for investment in variable inputs show that the included explanatory variables account for only 1.5% of the variation in the dependent variable (Table 29). All the included explanatory variables for the level of input use per hectare are statistically insignificant. The only variable with a positive coefficient is non-farm income. As the level of non-farm income increases the farmer is likely to have higher input applications per hectare. The variable for obtaining income from relatives is approaching significance and is negative. Thus farmers who mostly rely on relatives for remittances have lower input applications per hectare than farmers who are self reliant.

The model results seem to indicate that the level of input use is not significantly affected by the level of long-term and medium-term farm investments, the education level of owner farmer, sex of owner farmer, access to extension services, access to formal agricultural training, and arable land acreage.

Table 29: OLS Model Results for Total Variable Costs per Hectare

Variable	**Coefficient**	**T**	**Sig.**
Constant	-229442.407	-0.527	0.600
HHEDUC	-21011.179	-0.422	0.674
MIDTERM	98130.742	0.265	0.792
SEXFARM	94113.497	0.467	0.642
EXTENSION	147902.336	0.825	0.412
LONGT	25001.467	0.082	0.935
TRAINING	200915.930	1.147	0.255
NFINCOM	222671.844	1.533	0.129
ARABLE	2775.922	0.686	0.495
RELATIVE	-207422.738	-1.412	0.162
Adj. R^2	1.5%		
F	0.852		
Sig. F	0.571		

*significant at 0.05 and **significant at 0.01

5.3 Farm Output and Land Tenure Security

The second major hypothesis of the study is that farms under freehold tenure have higher productivity than those under leasehold tenure. Tenure security may enhance long-term investments, which in turn enhance yields. Tenure security provides farmers with adequate incentives or means to make land improvements or adopt new technologies that could enhance production efficiency (Parsons, 1971).

To test this hypothesis, the study estimated the following ordinary least squares model:

$$YIELDHA = \sigma_0 + \sigma_1 HHEDUC + \sigma_2 MIDTERM + \sigma_3 TVCHA + \sigma_5 SEXFARM + \sigma_6 PLANT + \sigma_7 EXTENSION + \sigma_8 LONGT + \sigma_9 FARMSIZE + \mu_4 \quad [14]$$

Where:
YIELDHA is value of annual total farm production/output per hectare (Z$/ha);
HHHEDUC is education level of farm owner ();
MIDTERM is farmer has mid-term investments, i.e. soil and soil water conservation, manuring, (1 = yes, 0 = otherwise);
TVCHA is annual total variable costs per hectare (Z$/ha),
SEXFARM is sex of farm owner;
PLANT is farmer has at least a plantation crop (1 = yes, 0 = otherwise);
EXTENSION is farmer receive agricultural extension services (1 = yes, 0 = otherwise);
LONGT is farmer has long-term investments, i.e. irrigation infrastructure, buildings, paddocks, fencing, (1 = yes, 0 = otherwise);
FARMSIZE is total farm size (ha);

Estimation of the equation for the value of agricultural output per hectare (YIELDHA) accounts for 14.3% of the variation in yield (Table 30). The variables for medium and long-term farm investment have insignificant coefficients. Thus, medium-term and long-term investments do not seem to affect farm productivity. This result is not as expected. A priori, both medium-term and long-term investments are expected to

positively impact on farm productivity. Contrary to expectations, the coefficient for the level of input use is also statistically insignificant.

Table 30: OLS Model Results for Value of Agricultural Output per Ha (YIELDHA)

Variable	Coefficient	T	Sig.
Constant	-19191.402	-0.497	0.620
HHEDUC	7825.869	1.717	0.090
MIDTERM	12590.820	0.373	0.710
TVCHA	0.155	0.916	0.362
SEXFARM	17413.417	0.954	0.343
PLANT	-9612.811	-0.661	0.510
EXTENSION	-33652.846	-2.080	0.041*
LONGT	10872.322	0.397	0.692
FARMSIZE	990.587	3.382	0.001**
Adj. R^2	14.3%		
F	2.833		
Sig. F	0.008		

*significant at 0.05 and ** significant at 0.01

YIELD is positively and significantly affected by the level of education of owner farmer and farm size. As the level of education of the owner farmer increases, farm productivity increases. A one-year increase in the level of education of the owner farmer results in a Z$7825 increase in productivity.

Contrary to expectations, as the farm size increases, farm productivity increases. A priori, as farm size increases, yield is expected to decrease indicating that inefficiencies arise in production on larger farms. The results show that a one-hectare increase in farm size results in a Z$990 increase in the value output per hectare. This might be attributed to the ability of large farm holders to fallow their land and they can continually cultivate on land previously under fallow – resulting in higher yields. This might also be attributed to the ability of large land holders to grow a diversity of crops – food crops, cash crops, and plantation crops. This diversity in the crops grown results in increased productivity. However, the presence of plantation crops on a farm seems to result in lower productivity as indicated by the negative coefficient for the variable PLANT. However, the coefficient is insignificant.

Contrary to expectations, the coefficient for access to extension services in negative and significant. The result indicates that farmers with access to extension services,

ceteris paribus, have a lower productivity of Z$33652 than farmers who do not have access to extension services.

5.4 Access to Credit and Land Tenure Security

To assess the relationship between land tenure security and access to seasonal credit, the following econometric model was estimated.

$$CREDIT = \delta_0 + \delta_1 HHEDUC + \delta_2 AGEHHH + \delta_3 LONGT + \delta_4 FARMSIZE + \delta_5 TENURE + \delta_6 EXTENSION + \delta_7 PLANT + \mu_5 \quad [15]$$

Where:

CREDIT is farmer has access to credit (1 = yes, 0 = otherwise);
HHHEDUC is education level of farm owner;
TRAINING is farmer received formal agricultural training (1 = yes, 0 = otherwise);
AGEHHH is age of farm owner;
LONGT is farmer has long-term investments, i.e. irrigation infrastructure, buildings, paddocks, fencing, (1 = yes, 0 = otherwise);
FARMSIZE is total farm size (ha);
TENURE is tenure type (1 = freehold, 0 = leasehold);
EXTENSION is farmer receive agricultural extension services (1 = yes, 0 = otherwise);
PLANT is farmer has at least a plantation crop (1 = yes, 0 = otherwise);

The model for access to credit has a good predictive record for those without access to credit. The model correctly predicts 81.8% of the dependent variable's values on access to credit. The model's parameter estimates are presented in Table 31.

As expected *a priori*, secure tenure, as in freehold tenure, positively and significantly affects access to credit. Thus security of tenure seems to affect access to seasonal credit for farm inputs.

Table 31: Probit Model Results for Access to Credit

Variable	Coefficient	Standard Error	b/St.Er.	P[|Z|>z]
Constant	-3.661	.495	-7.394***	.000
TENURE	0.355	.195	1.820*	.069
LONGT	.364	.312	1.169	.243
EXTENSION	.262	.245	1.069	.285
AGEHHH	.009	.006	1.618	.106
FARMSIZE	-.007	.006	-1.056	.291
HHHEDUC	-.011	.059	-.192	.848
PLANT	-.155	.179	-.866	.387

*significant at 0.05 and ** significant at 0.01

Frequencies of actual & predicted outcomes

	Predicted		
Actual	0	1	Total
0	95	0	95
1	21	0	21
Total	116	0	116

The probability of accessing credit is not significantly affected by the education level of the owner farmer, farm size, access to extension services, on-farm long-term investments, and whether the farmer has plantation crops or not. This is indicated by the insignificant coefficients for these variables.

5.5 Discussion

This study has shown that the freehold tenure system is associated with a higher propensity to (i) make long-term investments in land improvement, (ii) invest in plantation crops, and (iii) access credit. The results for long-term investment and plantation crops suggest that land tenure may influence the long view taken by farm managers. It should however, be noted that the freehold farms tend to be larger, allowing more flexibility with crop choice. In addition, the freeholders are significantly different in that age is a barrier to crop production. Plantation crops do reduce the problem of peak labour for cropping, this is despite the freeholders generally having more broad-scale cultivation equipment. In addition, freeholders are also more likely to have woodlots.

There is also greater investment in permanent housing, even though fewer freeholders live on the farm, and some farm improvements such as fencing. That is, there is some evidence that greater tenure security is associated with greater levels of long-term investment. While fencing and sheds do contribute to productivity, all these investments could also be considered as contributions to the value of the asset. Some of this investment might be explained as contributions to capital gain. The increase in long-term investment is not obviously explained by the freehold farms being larger, since this investment is negatively correlated with farm size. On the other hand there is some correlation between the long-term investments and farm output.

On the other hand and contrary to expectations, the results of this study indicate that tenure security may not necessarily result in higher productivity. In particular, tenure security appears not to significantly affect medium term soil improvements. The higher output farms tend to have higher investment in such improvements. Against expectations, those with formal training in agriculture are less likely to be investing in medium-term improvements. One possible explanation is that those trained in agriculture have a strong production focus with an emphasis on the short-term. Against that, there appears to be no correlation between training and level of investment in variables for production. Instead, yields correlate only with farm size. The influence of scale might be explained by the scope that those landholders have to rotate production and to select the most suitable areas for crops.

The results of this study are similar to those obtained by Feder and Onchan (1987) and Hayes and Roth (1997). Feder and Onchan (1987) investigated the impact of land ownership security on farm investment and land improvements in Thailand. They found that land-improving investments were significantly affected by ownership security, and also that ownership security enhances capital formation by providing better incentives and improved access to credit. Hayes and Roth (1997) on the other hand investigated the impacts of different levels of tenure security on farm investment, input use, and yield in order to examine the role of tenure security in increasing agricultural production. In their study they found positive relationships

between tenure security, the propensity to make long term land improvements, and the presence of trees on a plot. Also long term land improvements were found to enhance yield. These results are similar to the ones obtained by this study as well.

5.6 Conclusions

This chapter examined the determinants of investment, input use, and productivity in agriculture under freehold and permit tenure systems in the small-scale farming areas of Zimbabwe. The analyses were based on a set of models, developed from the survey data, described in previous chapters. The purpose of this analysis is to investigate the effects of tenure security upon farm investments and input use, and thereby upon yield. The results of this study help us to identify some important non-tenure-related determinants of investment, input use, and yields.

The important variable to investing in plantation crop is farm size. Higher agricultural output seems to be associated with a higher propensity to make long-term investments in farm buildings, irrigation infrastructure, and paddocks as well as medium term investments in soil improvement. Experience in farming is also an important determinant in making investments in medium-term soil improvements. Contrary to *a priori* expectations, (i) formal agricultural training is negatively associated with medium-term soil investments; and (ii) access to extension services is negatively associated with farm productivity.

In relation to the main hypotheses, more secure tenure does seem to correlate with some forms of long-term investment, including plantation crops, woodlots and some farm structures. There is no obvious connection between more tenure security and the medium and short-term investments. Most importantly from the national point of view, increasing security of tenure will not necessarily lead to an increase in output.

CHAPTER 6 – CONCLUSION

6.1 Summary of the Study

This chapter presents the conclusion of this study. It starts by briefly reviewing the research question, the key research issues and the research hypotheses that were addressed by this study. It also gives a brief of the research methodology and gives a summary of the main findings of this study.

6.1.1 Research Question

In literature it is often argued that freehold tenure and adequate land are the most important pre-conditions for smallholder agriculture development. Development specialists often argue that land tenure security is a pre-requisite to increased smallholder agricultural productivity and development. Arguments in favour of statutory, individualized land tenure systems (titling) claim that tenure security (1) increases credit use through greater incentives for investment, improved creditworthiness of projects, and enhanced collateral value of land; (2) increases land transactions, facilitating land transfers from less efficient to more efficient users by increasing the certainty of contracts and lowering enforcement costs; (3) reduces the incidence of land disputes through clearer definition and protection of rights; and (4) raises productivity through increased agricultural investment (Feder and Noronha 1987, Barrows and Roth 1990). The major objective of this study is to identify the effects of land tenure security on Small Scale Commercial agricultural productivity and development in Zimbabwe. The research question for this study is:

Does land tenure security affect farming systems, organization and performance among Zimbabwean small scale commercial farmers, and if so, how?

The key research issues or questions for the study are:

- Does land tenure security affect farm infrastructure development and investment amongst SSC farmers in Zimbabwe?
- Does land tenure security affect SSC farmers' access to credit?
- Does land tenure security affect farm productivity amongst SSC farms in Zimbabwe?

6.1.2 Research Hypotheses

Based on the key research issues outlined above, the hypotheses of the study are:

- Farm infrastructure development is higher for freehold tenure than leasehold tenure SSC agriculture. Thus, farmers with more secure land rights may have a higher probability of recouping the benefits from land improvements and thus will be more inclined to make medium- or long-term land improvements and to use complementary yield-increasing inputs. In their study on the impact of land ownership security on farm investment and land improvements in Thailand, Feder and Onchan (1987) found that land-improving investments are significantly affected by ownership security. In two of the three provinces they studied, ownership security induces significantly higher capital/land ratios.

- Farmers under freehold tenure have better access to credit than those under leasehold tenure. Land ownership security enhances capital formation by providing better incentives and improved access to credit. Because they imply a greater likelihood of repayment, improved tenure security may also increase lender willingness to offer credit, leading to easier financing of farm investments and inputs.

- Farms under freehold tenure have higher productivity than those under leasehold tenure. Tenure security enhances long-term investments, which in turn enhance yields. Tenure security provide farmers with adequate incentives or means to make land improvements or adopt new technologies that could enhance production efficiency (Parsons, 1971)

6.1.3 Research Design and Methodology

A descriptive research design was chosen for this study. The descriptive design is used because (1) It helps understand the characteristics of a group; (2) It aids in thinking systematically about aspects in a given situation; (3) It offers ideas for further probing; and (4) It helps make certain decisions (Zikmund, 2000). The descriptive design is closely associated with the positivist paradigm and is also most

appropriate for studying the nature of relationships amongst variables. In this study, the primary purpose is to find out the relationship between land tenure security and small-scale commercial agriculture performance.

Both secondary and primary data was used for the study. The main source of secondary data was the production data available from the Central Statistical Office (CSO), various commodity associations and the Ministry of Agriculture (MoA). Primary data for the study was collected mainly through a questionnaire (Appendix 1) that was administered through personal interviews with selected sample farmers. A multi-stage sampling strategy was adopted for the study. The study purposively selected, two ICAs which are adjacent thus reducing travel costs. Within each selected ICA, the study selected a 58 percent random sample (57 farm units) of the total farm units with permit tenure and 34% (59 farm units) for farm units with freehold tenure.

6.1.4 Research Findings and Conclusions

The results of this study indicate that leasehold and freehold properties are structurally different, in terms of scale of operation, farm management arrangements, crop production practices, animal types, level of mechanization and asset ownership. The following chapter looks at whether there is also a difference in investment, use of commercial variable inputs and farm productivity.

The majority of farm owners with leasehold tenure are resident farm owners (59.6%), whilst the majority of farm owners with freehold tenure are non-resident (61%). At least 74% of the farms under both tenure types are the sole farm managers. About 15% of the farmers under freehold co-manage the farms with their relatives. At least 74 percent of the farm owners under both types of tenure did not receive any formal agricultural training. The percentage of farmers without any formal training is significantly higher for those under leasehold tenure.

Under both tenure systems, the main cropping season for all farmers is summer. This is an indicator that none of the farmers have invested in irrigation facilities for

dry season cropping. The results also show that under both tenure systems the level of farm mechanization is very low as evidenced by the high use of hand hoes.

Focusing on the effect of tenure security on farm investment, access to credit and farm productivity, the following conclusions are drawn from the results:

- Under secure tenure system farmers are likely to have long-term investments, in this case in plantation crops and woodlots.
- The type of tenure system may not necessarily influence an investment in non-fixed assets like livestock.
- Secure tenure is likely to influence investment in fixed assets like fencing.
- Secure tenure is likely to positively influence an investment in permanent housing facilities but not investment in infrastructure like garages, workshops or shades.
- Secure tenure seems to be associated with a higher propensity to invest in improving existing farm infrastructure. The sources of finance for farm infrastructure improvements is mainly from own savings.
- Access to credit seems to be associated with secure tenure.
- Remittances from relatives are an important source of short term farm input financing and long term farm investments.

Within the small-scale commercial farming sector there exist differing incentives for investing in land. This study has shown that the freehold tenure system is associated with a higher propensity to (i) make long-term investments in land improvement, and (ii) invest in plantation crops. However, contrary to expectations, the results of this study indicate that tenure security may not necessarily result in higher productivity. Tenure security appears not to significantly affect medium term soil improvements. Medium-term and long-term investments on the farm do not seem to have any significant impact on the level of input use.

The results of this study help us to identify some important non-tenure-related determinants of investment, input use, and yields. The important variable to investing in plantation crop is farm size. Larger farm sizes are conducive to establishing plantation crops. Higher agricultural output seems to be associated with

a higher propensity to make long-term investments in farm buildings, irrigation infrastructure, and paddocks as well as medium term investments in soil improvement. Experience in farming is also an important determinant in making investments in medium-term soil improvements. Contrary to *a priori* expectations, (i) formal agricultural training is negatively associated with medium-term soil investments; and (ii) access to extension services is negatively associated with farm productivity.

6.2 Contribution of Research to Theory and Practice

The result on the effect of land tenure on long term farm investment in small scale commercial agriculture confirm the central argument often put forward by many economists in defence of full-fledged private property rights. Economists argue that farmers are more willing to invest when they feel more secure in their right or ability to maintain long-term use over their land. Broadly speaking, landowners are expected to be both more willing and more able to undertake investment where private property rights prevail. They are more willing to invest for essentially two reasons. First, when farmers feel more secure in their right or ability to maintain long-term use over their land, the return to long-term land improvements and conservation measures is higher, and they have therefore a greater incentive to undertake investments. Second, when land can be more easily converted to liquid assets through sale-that is, when superior transfer rights have the effect of lowering the costs of exchange if the land is either rented or sold-, improvements made through investment can be better realized, thereby increasing its expected return. Investment incentives are again enhanced. On the other hand, farmers are more able to invest because, when freehold titles are established, land acquires collateral value and access to credit is easier.

Smallholder agriculture plays a pivotal role in Zimbabwe. Most households derive their livelihood from agriculture. Hence, the emphasis most governments are placing on smallholder agricultural development and commercialization. Despite its importance, smallholder agriculture faces a number of constraints. Smallholder agriculture continues to suffer from low investment and declining productivity. Productivity account for as low as 3 percent of the annual area planted to principal

crops. Smallholder agriculture is highly undercapitalized and is also not diversified and commercialized. All this is often blamed on insecure land tenure systems that exist amongst the smallholder sector.

Past arguments for freehold tenure for the smallholder sector in Zimbabwe were often based on economic theory and a few studies done in other countries. The results of this study provide a useful guide to policy makers and practitioners in reforming the existing land tenure arrangements that currently exist amongst smallholder farmers in Zimbabwe today. The results are important as they also offer a guide to the establishment of an appropriate land tenure system for newly resettled farmers in Zimbabwe who are currently farming under a very insecure leasehold tenure system.

6.3 Limitations of the Study

In carrying out this study, it is acknowledged that there are other factors that affect productivity that this study may not have captured within the available time. Another possible limitation of the study could result from the sampling strategy. A problem may arise with cluster sampling if the characteristics and attitudes of the farmers within the cluster are too similar. Increasing the number of clusters for the study and reducing the number of farms selected within a cluster may mitigate this problem.

Farmers may also have problems in recalling past production data. They may also not be willing to share their farm production data and they may under report on the various activities. This problem was addressed by fully explaining to the sample farmers the purpose of the study, by ensuring maximum confidentiality and also by respecting the respondent's right to privacy.

6.4 Directions for Future Research

Future research based on the focus of this study could focus on the following research areas:

a) Further work on the determinants of farm productivity including the effect of tenure security;

b) The effect of tenure security on farm fragmentation; and

c) The relationship between tenure security, farm diversification, and the extent of small scale farm commercialization.

6.5 Conclusion

Results of this study show that under secure tenure system farmers are likely to have long-term production investments and some fixed assets like fencing and woodlots. Secure tenure is likely to positively influence access to credit and investment in permanent housing facilities. These results are quite important as they may guide agricultural practitioners in the Southern African region in finding appropriate land tenure systems for newly resettled farmers under the various agrarian reform programmes being implemented in the region.

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APPENDIX 1: SURVEY QUESTIONNAIRE

HOUSEHOLD LEVEL SURVEY INSTRUMENT

Project for the Analysis of Land Tenure Security and Small Scale Commercial Agriculture Performance in the Republic of Zimbabwe

Small Scale Commercial Farm Sector Survey

INTRODUCTION

Good morning/afternoon. My name is Lighton Dube, and I am currently studying for a Doctorate degree in Business Administration with the University of Southern Queensland, in Australia. As part of my study, I am currently carrying out a study on **Land Tenure Security and Small Scale Commercial Agriculture Performance in Zimbabwe.** The purpose of this study is to investigate whether and how different land tenure conditions affect farming systems, organisation and performance among Zimbabwean small scale commercial farmers. Four small scale commercial farming areas, namely XXXXXX have been selected for this study. From these four small scale commercial farming areas, a ten percent random sample of farms have been selected and I am now in the process of **discussing with farmers** like you to get information on the operations of the farm and on the constraints that you have encountered so far as farmers. This information is **confidential** and will only be used by myself to produce my dissertation which will not make reference by name to any one farm or farmer. Our discussion will be guided by a questionnaire. I will be grateful if you could assist me in filling out this questionnaire in as **honest** a manner as possible.

Questionnaire No. _____ District:_____

Enumerator Name:_____ ICA:_____

Date of Interview:_____ Farm:_____

ICA Natural Region:_____

SECTION A: **Demographic questions for head of household, spouse, and other household members**

1) Are you the registered farm owner?
    1. Yes
    2. No

2) Sex of registered farm owner
    1. Male
    2. Female

3) Are you the sole manager of the farm, or do you co-manage the farm?
    1. Sole manager
    2. Co-manager with _____ (relation)

4) In what year did you begin to manage (or co-manage) the farm?_____

5) Please complete this table for all family members (including children) currently residing in your household.

No	Relationship to head of household	Sex 1=M 2=F	Age	Education level	Occupation	Full (1) or Part-time (2) on farm? No work on farm = 0
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

6) Does farm owner have any formal agricultural training?
    1. Yes, please specify_____
    2. No

SECTION B **Information on land holding**

7) How many hectares comprise your farm? _____ ha

Total arable _____ ha

Total grazing _____ ha

Others, please _____ ha

8) Please complete the following table on your land holding.

Year acquired	Size (ha)	Topography 1=flat 2=hilly 3=mtnous	Form of acquisition 1=purchase 2=inherit 3=gift 4=lease 5=Others	Price (ZWD)	Method of financing 1=credit 2=cash 3=kind 4=remit	Type of document 1=Informal lease 2= Permit 3=Formal lease 4=Title deed

9) Have you sold or permanently transferred any of your holdings to other farmers in the past 10 years?
   1. Yes
   2. No

10) If 'Yes', please complete this table for all land that you have sold or permanently transferred to other users.

Land in ha	Form of acq'tion 1=purchase 2=inherit 3=gift 4=lease 5=Others	Year of transfer	Form of transfer 1=sale 2=inherit 3=gift 4=lease 5=Others	Document used 1=Informal lease 2= Permit 3=Formal lease	Price (ZWD)	Transaction Cost (ZWD)	Reason

11If you inherited your farm, did you inherit the entire farm from your parents?

1. Yes
2. No

12If 'No', how was your parent's original farm divided?

Relation	Size of holding inherited
Self	_____ ha
_____	_____ ha
_____	_____ ha

13)Have you leased out land in 2005?

14)If 'Yes',

a) How much? _____ ha

b) At what price? _____ ZWD/ha

c) How long have you rented out this land? _____

15)To whom have you leased the land?

a) From the State. _____ ha

b) From a private farmer. _____ ha

c) Other. _____ ha

SECTION C **Information on farm structure and land use**

16)Did you cultivate the total area of overall arable area in 2005?

1. Yes
2. No

17)If 'No', what are the reasons for not cultivating this land? *(circle all that apply)*

a) Lack of labour
b) Old age
c) Lack of inputs to plant the total area.
d) Lack of draft power
e) Sickness
f) Fallow land as part of crop rotations
g) Others *(Specify)*

18)How do you prepare your land? *(Circle all that apply)*

a) Hire tractor
b) Use own tractor
c) Hire draft power
d) Use hoes
e) Use own cattle/donkeys
f) Others (Specify)

19)Which is you main cropping season?

1. Summer
2. Winter
3. Both summer and winter

20)What is/are the principal enterprises?

_____
_____

21)Which summer crops did you grow in the 2005/2006 season?

Crop	Area Planted (ha)	Basal fert. applied (kg=s)	Top dressing fert. applied (kg=s)	Manure used (scotch-carts)	Chemicals used to control folia diseases (mls)	Chemicals used to control pests (mls)	Quantity of crops harvested (kg=s)	Quantity of crops sold (kg=s)	Total value of sales (Z$)	Quantity of crop lost post harvest (kg=s)
Maize grain										
Green maize										
Cotton										
Sugar beans										
Groundnuts										
Tomatoes										
Peas										
Soyabeans										
Others										
Others										
Others										

22)Which winter crops did you grow in the 2005/2006 season?

Crop	Area Planted (ha)	Basal fert. applied (kg=s)	Top dressing fert. applied (kg=s)	Manure used (scotch-carts)	Chemicals used to control folia diseases (mls)	Chemicals used to control pests (mls)	Quantity of crops harvested (kg=s)	Quantity of crops sold (kg=s)	Total value of sales (Z$)	Quantity of crop lost post harvest (kg=s)
Maize grain										
Green maize										
Wheat										
Sugar beans										
Others										
Others										
Others										

23)What were your production costs for the summer crops during the 2005/2006 season?

Crop	Maize grain	Green maize	Wheat	Tomatoes	Other	Other	Other	Other	Others	Others
Land prep.										
Seed										
Fertilizers										
Chemicals										
Planting labour										
Weeding labour										
Harvesting labour										
Soyabeans										
Others										
Others										
Others										

24)What were your production costs for the winter crops during the 2005/2006 season?

Crop	Maize grain	Green maize	Cotton	Sugar beans	Groundnuts	Tomatoes	Peas	Soyabeans	Others	Others
Land prep.										
Seed										
Fertilizers										
Chemicals										
Planting labour										
Weeding labour										
Harvesting labour										
Soyabeans										
Others										
Others										
Others										

SECTION D **Plantation Crops and Other Tress**

25)Do you grow any plantation crops?

1. Yes
2. No

26)If 'Yes', give details for the year 2005.

Crop	Area planted	Who established it	When established?	Establishment costs	Maintenance costs	Annual production

SECTION E **Information on livestock and other capital holdings**

27)What were your livestock holdings for the year 2005?

A. Number of oxen and cattle
1) Calves _____
2) Oxen _____
3) Steers _____
4) Heifers _____
5 Cows _____
TOTAL _____

B. Number of pigs
1) Sucklings _____
2) pigs _____
TOTAL _____

C. Number of sheep and goats
1) lambs _____
2) Sheep _____
3) baby goat _____
4) goats _____
TOTAL _____

D. Donkeys and horses _____

E. Poultry _____

F. Milk production in litres _____

G. Egg production _____

28)How has this stock varied over the last 5 years?

1. Stock has been reduced.
2. Stock has been increased.
3. Stock has stayed the same.

29)Do you use livestock for farm work? *(circle all that apply)*

1. Traction.
2. Transportation.
3. No livestock used for farm work.

30)What are the major livestock enterprises for the farm?

Enterprise	Size	Annual off take	Annual sales	Annual costs of production

31)Which types of mechanization do you own, and how many pieces?

Name of Asset	Number owned	Estimate total value at present
Plough		
Cultivator		
Planter		
Harrows		
Maize sheller		
Maize grinder		
Hoe		
Tractor		
Cart		
Bicycle		
Vehicle (Specify)		
Others		

32)Do you rent or borrow equipment?

1. Yes
2. No

33)If 'Yes',

a) What type _____
b) From whom _____
c) At what price _____

34)Is the farm fenced?

1. Yes
2. No

35)If 'Yes', what is the type of fencing?

1. Boundary fencing only
2. Boundary and paddocks
3. Paddocks only

36)What animal handling facilities has the farm developed? _____

37)Type of main farm homestead.

Type	Size/Rooms	Estimated value
Pole and dagga		
Brick under asbestos		
Brick under grass		
Brick under tiles		
Others		

38)What are the other housing structures that have been developed by the farmer?
_____

39)Of the total arable area, what hectarage is potentially irrigable? _____

40)What area has been developed for irrigation? _____

41)Which of the following water sources are found on the farm?

1. River
2. Dam
3. Stream
4. Boreholes
5. Well

42)Does the farm has piped water?

1. Yes
2. No

43)If yes, what is the source of the piped water? _____

44)Does the farm has a woodlot?

1. Yes
2. No

45)If yes, what is the size of the woodlot? _____

SECTION F **Information on farm planning**

46) Have you made any improvements and/or changes to your land? *(circle all that apply)*
   a) Improved irrigation.
   b) Improved drainage.
   c) Improved borders
   d) Contour ridges
   e) Planted trees
   f) Buildings
   g) Fences
   h) No improvements

47) How did you finance these improvements?
   a) Credit
   b) Savings
   c) Other _____

48) Do you currently have access to credit?
   1. Yes
   2. No

49) If 'Yes', from whom do you borrow? _____

50) If 'Yes', at what interest rate? _____

51) Have you borrowed money during the last five seasons to finance any of your farm operations?
   1. Yes
   2. No

52) If 'Yes', state how much has been borrowed and for what use?

Season	Amount borrowed	Use	Interest rate	Repayment period
2005/2006				
2004/2005				
2003/2004				
2002/2003				
2001/2002				

53) If farmer has not used credit during the last five seasons, what are the reasons?___

54) What were the requirements for applying for the credit? _____

55) Is credit readily available when needed?

1. Yes
2. No

56) Do you receive money from relatives who live away from the farm?
    1. Yes
    2. Yes

57) If any relatives send or bring back money, how often do they send it back to the farm? _____

58) Do you have access to extension services?
    1. Yes
    2. No

59) If 'Yes', from whom? *(circle all that apply)*
    1. AREX
    2. Private
    3. Farmer Association/Organisation
    4. Input suppliers
    5. Other _____

60) If 'Yes', what type? *(circle all that apply)*
    1. Seed inputs
    2. Breeding
    3. Marketing information
    4. Crop planning information
    5. Government agricultural policy information
    6. Other _____

61) Are there other agricultural services that you receive from the public sector? _____

62) Where do you get the information that enables you to plan your crop pattern? (circle all that apply)
    a) Agricultural cooperative
    b) Extension service
    c) Private traders
    d) Fellow farmers
    e) Family tradition
    f) Own marketing experience
    g) Mass media
    h) Other _____

63) How many members of your household earn money from wage employment or from running a business (including handicrafts and brewing)? _____

64) What are your main sources of labour?
   a) Permanent labour _____
   b) Casual (seasonal) labour _____

65) How does the farmer acquire his inputs?
   1. Cash
   2. Credit
   3. Other _____

66) If farmer acquires inputs on credit, what are the credit requirements? _____

SECTION G CONSTRAINTS

67) What are the major constraints you face in your farming activities? _____

68) Would you prefer a different land tenure to what you now have?
   1. Yes
   2. No

69) If 'Yes', what tenure? _____

70) If 'Yes', explain why? _____

71) Is there anything else that you would like to add?

Finishing Time in Hours _____

Once again, thank you for taking your time to assisting me in filling in this questionnaire