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**VALUE AND PREMIUM FOR TITLED  
AGRICULTURAL LAND IN UGANDA**

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AWARD OF MASTERS OF SCIENCE IN AGRICULTURAL AND  
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**APRIL 2009**

## **DECLARATION**

TO THE BEST OF MY KNOWLEDGE, I DECLARE THAT THE CONTENTS OF THIS THESIS ARE ORIGINAL UNLESS IF STATED OTHERWISE AND THE THESIS HAS NEVER BEEN SUBMITTED ANYWHERE FOR ANY AWARD.

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## **DEDICATION**

I dedicate this work to my parents, Mr. & Mrs. Obura, and to my sisters for their love and support in my educational career.

## **ACKNOWLEDGEMENT**

I wish to convey my sincere thanks and gratitude to my supervisors, Dr. J. Mugisha and Assoc. Prof. B. Bashaasha for giving me guidance and direction, and for the continuous support I received from them during the study. Many thanks go to Assoc. Prof. B. Bashaasha for developing the concept that led to this study. Thanks also go to Mr. G. Diiro for the guidance he offered me in the course of the study.

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## TABLE OF CONTENTS

DECLARATION.....	i
DEDICATION.....	ii
ACKNOWLEDGEMENT.....	iii
TABLE OF CONTENTS.....	iv
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
ABSTRACT.....	viii
<b>CHAPTER ONE: INTRODUCTION.....</b>	<b>1</b>
1.1 Land value and tenure reform.....	1
1.2 Overview of land tenure systems in Uganda.....	3
1.3 Problem statement.....	5
1.4 Objectives of the study.....	7
1.5 Hypothesis.....	7
1.6 Justification of the study.....	8
<b>CHAPTER TWO: LITERATURE REVIEW.....</b>	<b>9</b>
2.1 A historical perspective of land reform and land markets in Uganda.....	9
2.2 Previous studies on the characterisation of land.....	12
2.3 Previous studies on the value of land.....	14
2.4 Theoretical framework.....	16

<b>CHAPTER THREE: METHODOLOGY.....</b>	<b>20</b>
3.1 Theoretical model.....	20
3.2 Empirical model.....	21
3.2.1 A priori expectations.....	24
3.3 Data and sources.....	25
3.4 Data analysis.....	26
<b>CHAPTER FOUR: RESULTS AND DISCUSSION.....</b>	<b>28</b>
4.1 Characterisation of agricultural parcels in Uganda.....	28
4.2 Determinants of the value of agricultural land in Uganda.....	34
4.2.1 Location, region and the value of agricultural land in Uganda.....	35
4.2.2 Land titles, certificates and the value of agricultural land in Uganda.....	40
4.2.3 Other determinants of the value of agricultural land in Uganda.....	43
<b>CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>45</b>
5.1 Summary and conclusion.....	45
5.2 Recommendations.....	48
<b>References.....</b>	<b>50</b>

## **LIST OF TABLES**

Table 4.1: Key parcel level characteristics by region.....	29
Table 4.2: Land-related characteristics by region.....	32
Table 4.3: Regression results of the determinants of the value of agricultural land in Uganda....	39



## LIST OF FIGURES

Figure 4.1: Land ownership under different tenure systems in Uganda.....	30
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## **ABSTRACT**

It is argued that land is perhaps the most essential resource and an important pillar of national development. In Uganda, the management of land is regulated by the 1995 constitution and the Land Act of 1998, which recognise four tenure systems, namely; Customary, Mailo, Freehold and Leasehold tenure systems, each of which possess unique features and associated ownership rights. This study analysed important dimensions largely of a locational and regional nature, on tenure system and the value of agricultural land. The general objective was to investigate the determinants of the value of agricultural land in Uganda. The study hypothesized that institutional factors such as land titles were important determinants of agricultural land prices in Uganda; that there was a significant premium for agricultural land with title/certificate relative to that without, and that the premium for agricultural land with a freehold title was significantly higher than that for other titles/certificates. Data was obtained from the third round of the Uganda National Household Survey (UNHS) conducted by Uganda Bureau of Statistics (UBOS) during the 2004/2005 crop year. Descriptive analysis and multiple linear regression techniques using 9,045 parcel level observations were used to answer the study objectives.

Results showed that region, location in the peri-urban and institutional factors such as leasehold title were the major determinants of the value of agricultural land in Uganda. Compared to the Central region, agricultural land in the Eastern and Northern regions had significantly lower prices suggesting a high demand for land in the urbanising Central. Results from the characterisation of agricultural land ownership systems revealed that mailo tenure was dominant in the Central region, whereas customary tenure was dominant in the other regions of Uganda. However, current agricultural use, soil quality, trees/perennials, as well as proximity of agricultural land which were associated with higher land values in developed countries were not generally capitalised into the price of agricultural land.

The study recommended that the current land policy should promote the leasehold system in upcoming cities/ or urbanising areas, since it opens land to a wide range of users and use-options to encourage allocation of land to the best alternative uses. The land policy should also address the double ownership structure under mailo tenure which constrains its marketability and transferability, and probably services to discount its price. This can be done possibly by facilitating arrangements for single ownership of land such that either the landlord willingly sells off his ownership rights to the tenant; or the tenant accepts compensation to leave the land; or alternatively the two parties could agree to share the land. Further research was recommended to explore the benefits of freehold title since it is viewed as the tenure system of the future. More research is also needed on the impact of converting one form of land tenure to another, for instance, on the conversion of customary land to freehold, since it is the dominant tenure system in Uganda.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Land value and tenure reform**

Land is a resource in terms of the space it provides, the environment, the resources it contains and supports, and the capital it represents and generates. It is a commercial asset that can be used and traded, and a critical factor of production. It is a key factor in shaping individual and collective identities by virtue of its history, the cultural expressions and idioms with which it is associated (Busingye, 2007). It also has influence on the spirituality and aesthetic values in all our societies. Land is an important consumption good, a popular vehicle for wealth holding, and highly acceptable collateral for securing loans (Randall, 1987).

In many developed economies, the value of land is a measure of wealth in the agricultural sector and is considered a major determinant of net worth. Real estate is often used as collateral to buy additional land and equipment, so its value determines how much the farmer may borrow. Therefore, a shift in land value affects a farmer's net worth and credit-worthiness (Tsoodle *et al.*, 2003). An accurate assessment of the value of agricultural land is essential because many individuals and institutions rely on its estimates for guidance in making investment, tax, and other decisions. Land is also the primary source of property tax revenues. This makes both private and public parties interested in its value. Agricultural programs and policies which affect the value of agricultural commodities in turn influence land values. Also, viable agricultural land is finite and heterogeneous, making pricing competitive and involving many potential buyers other than agricultural producers.

However, these patterns that are seen in developed economies with regards to agricultural land are not really seen in Uganda. Property tax issues are not so salient and land is not generally used as collateral for loans. This is mainly due to absence of a well-functioning rural financial system, weaknesses in agricultural credit systems and the dominance of customary forms of tenure which do not give land users titles. Also, most of the registered mailo land in the central region is not acceptable to banks as collateral because it is encumbered by tenants. In which case neither landlords nor tenants can sell or mortgage the land without the consent of the other party.

Nevertheless, land is the most important asset held by the poor in developing nations; and therefore, policies affecting land have a direct impact on poverty reduction and development. Land policies have in recent decades taken a vital place in development discourse, as indicated by the World Bank research report entitled *Land Policies for Growth and Poverty Reduction* in 2003. This study shows that land policies can be used as strategies for poverty reduction and economic growth (Galeana, 2004). Land reform processes have been ongoing in several sub-Saharan African Countries with many having the agenda to transform traditional, largely communal, land holding systems to modern individualized systems that are easier to market. In Uganda, the 1995 Constitution and the 1998 Land Act were developed with one of the major objectives being to create a land market to move land to those that have the capacity to put it to economic usage. However, Uganda Land Alliance (2002) noted that the most successful land reform programs in Africa would be those that can recognize and protect control and access to and use of land by the masses, recognize how traditional land tenure had evolved over time, guide the tenure evolution by encouraging those changes that are beneficial, and prevent those changes that are harmful.

Land has enormous socio-economic significance as a key productive asset and source of livelihood in Uganda (Deininger *et al.*, 2006). As such, the government has widely recognised the centrality of land in sustainable development, and tenure security is now increasingly stressed as a prerequisite for better natural resource management and sustainable development. In line with this objective, in 2007 the government tabled a bill of proposed amendments to the 1998 Land Act, with the underlying objective of increasing security of land tenure. This new strand of land policy is oriented towards the establishment of a uniform system of land tenure based on freehold tenure. According to the bill, the government is to facilitate leasehold enfranchisement and phase out customary tenure. The proposal is that freehold titles whether under the form of certificates of ownership or of duly registered titles replace occupation under customary law. However, the solution to the landlord/tenant relations on mailo land is left to market forces (Bazaara, 1992).

These proposed amendments have spurred active debates on many land issues in Uganda until the tabling of the land bill in parliament in February 2008. Key issues of the bill as earlier indicated centre on changing some land tenure arrangements, and considering land titling as national priorities. This study contributes to the literature, the land debate, and guides policy by providing empirical evidence on land titles/certificates and other factors determining the value of agricultural land in Uganda.

## **1.2 Overview of land tenure systems in Uganda**

Land tenure is the system of rights and institutions that govern access to and use of land (Adams *et al.*, 2003). The bundle of rights are relative in terms of the degree of their enjoyment, and they translate into the manner of use of land, the duration of use or

occupancy, as well as relocation of the rights (transfer, lease, sublease, licensing, bequeath, etc.) (Tukahirwa, 2002). In Uganda, the management and control of land is regulated by the Land Act of 1998 which recognises four tenure systems, namely; *Customary*, *Mailo*, *Freehold* and *Leasehold* tenure systems. The Act recognises different titles to land, namely; certificate of title for land owned in freehold, leasehold and mailo; certificate of occupancy for bonafide occupants on mailo land; and customary certificates for customary land owners.

*Customary* land tenure system is governed by unwritten traditional rules and administered by traditional leaders. Active occupation or usage of a piece of land is the main evidence of ownership or an existing interest on the land and land is not alienable from the community trust. A customary tenant can be issued a customary certificate of ownership to recognise and guarantee his/her interest in the land. The Land Act permits holders of land in customary tenure to convert it to freehold, with or without the certificate of customary ownership.

*Mailo land tenure*, largely found in Buganda, is where registered land is held in perpetuity but restricted to allotments of the 1900 Buganda agreement for the Kabaka and the notables. The Land Act provides for tenants on *mailo* land to obtain a certificate of occupancy from a registered *mailo* owner which recognises and protects their interest in the land. The tenant's rights are also guaranteed by the 1995 constitution which recognizes a bonafide tenant as anyone who has occupied a piece of land for twelve or more years without having been evicted by the land owner. Although only mailo owners may acquire titles to the land, many tenants have very strong rights over land they occupy, including the right to bequeath. Today, some mailo owners occupy and farm their land; however, in many areas, occupation of land is overwhelmingly by bonafide occupants, also referred to as "kibanja tenants" (Place and Otsuka, 2002).

*Freehold land tenure* is where registered land is held in perpetuity subject to statutory and common law qualifications. The grantee of land in freehold is entitled to a certificate of title which offers exclusive rights to the owner, and hence guarantees land tenure security. The tenure system derives its legality from the constitution and is the prescribed system for registered interests outside *mailo* land.

*Leasehold land tenure* is a system of owning land on contract. A grant of land is made by an owner of freehold or *mailo* or by Uganda Land Commission to another person for a specified period of time and on certain conditions, including payment of rent. The grantee of a lease for a period of 3 years or more is entitled to a certificate of title. Leaseholds of land have been created by contract or by operation of law. An agreement is reached between a lessor and lessee, that the lessee will enjoy exclusive possession of the land of the lessor for a specified and certain period and on specific terms.

### **1.3 Problem statement**

There is evidence in the literature (e.g. Macgee, 2006; Jacoby and Minten, 2005; Deininger, 2003; Deininger and Feder, 2001; Matlon, 1994) that there is substantial difference in the relative price of titled versus untitled land, and that the premium for titled land is within the range of 15 to 81 percent. The literature is also abound with evidence that obtaining legal title to land lowers the threat of expropriation, augments land values, reduces the level and likelihood of conflict, and spurs economic participation. It is further argued in literature that well-defined, publicly enforceable and tradeable property rights provide better incentives for land related-investment and labour supply. This allows the allocation of resources to their most productive uses. If agents face binding borrowing constraints for unsecured credit, the

ability to use land assets as collateral for borrowing may significantly relax the borrowing constraints and facilitate both investment and intertemporal smoothing of consumption. Based on these views policy-makers all over the world have spent a lot of resources on formalising land rights as a way to encourage agricultural investment and stimulate land markets.

However, many of the studies relating to land tenure and land rights formalisation have mostly been undertaken in developed countries and in Asia where there are different land tenure and ownership systems. Similar studies in sub-Saharan Africa and Uganda are limited. Uganda presents a unique case of overlapping land ownership rights for mailo land where two people have claims to the same piece of land – the *mailo* title holder and the *kibanja* tenant. Also, most part of the land in the countryside is still held under customary tenure. This renders Uganda a good case study to analyse how institutional factors, including land titles, manifest themselves in a sub-Saharan Africa situation with a unique set of land tenure systems and land use rights.

The present study builds on but analyses important dimensions not examined by Bashaasha *et al.* (2008) on tenure system and the value of agricultural land in Uganda. The dimensions are largely of a locational (rural/peri-urban) and regional nature. The present study quantifies the effect of different titles and other land ownership arrangements on agricultural land values. It reviews and interprets the body of literature and empirical evidence on the major determinants of agricultural land values in Uganda. This study is therefore timely as it contributes to the recent policy debate on the proposed amendment of the 1998 Land Act to guide this policy formulation and stimulate further research on land issues in Uganda.



#### **1.4 Objectives of the study**

The general objective of the study was to investigate the determinants of the value of agricultural land in Uganda. The specific objectives were:

1. To characterise agricultural land under different ownership systems in Uganda.
2. To establish the major determinants of agricultural land prices in Uganda.
3. To estimate and compare the premium for titled agricultural land versus other land ownership arrangements.

#### **1.5 Hypotheses**

1. Institutional factors such as land titles are important determinants of agricultural land prices in Uganda.
2. There is a significant premium for agricultural land with title/certificate relative to that without.
3. The premium for agricultural land with a freehold title is significantly higher than that for other titles/certificates.

## **1.6 Justification of the study**

The knowledge from this study will enable policy makers develop better land policies to increase access to land for agriculture and investment to reduce poverty. This study will also provide information to land owners on the potential benefits of land registration and titling in Uganda, as steps towards better natural resource management and sustainable development. The multi-faceted importance of land policies for growth and equity also makes analysis of the impact of legal changes relating to land tenure in Uganda of great interest. It is also clear that land tenure and titling in Uganda are contentious and complicated issues, and increasing the body of knowledge in this area is highly desirable. This is important for policy makers and other stakeholders to understand the extent to which well-defined land rights influence land use and investment, to guide in the design of better policies and programs for economic development.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 A historical perspective of land reform and land markets in Uganda

The following subsection gives a historical overview of the land tenure reforms and the emergence of land markets in Uganda to provide insight into the characterization of land ownership systems and the regional dimensions of the value of agricultural land in Uganda.

Prior to 1900, all rural land in Uganda was governed by traditional, customary tenure systems (Baland *et al.*, 2007). Land was historically divided among clans which would allocate land to households based upon their needs such as consumption requirements and labour resources. Once allocated, land could be used indefinitely by families and was transferred through inheritance. Other clan members generally retained some rights to household land, such as grazing, firewood collection, and approval of certain land transactions (Place *et al.*, 2001).

Towards the turn of the 19<sup>th</sup> century, Uganda was declared a British protectorate (Tukahirwa, 2002). Around 1900, the British, in an attempt to co-opt the assistance of traditional rulers, demarcated large areas of land and gave legal title over these lands to the Buganda royal family and private individuals mainly chiefs, notables, the church and the colonial state (crown land) (Baland *et al.*, 2007). In the Buganda kingdom where most of this occurred, the mile was used as a unit of measure, and the resulting private tenure system became known as *mailo* tenure. The recipients of large land parcels quickly partitioned their estates to rent out tiny parcels to tenants against the payment of a fee. This led to long-term tenancies, known as *kibanjas*, which have since been transferred through inheritance or sale to other tenants (West,

1972; Noronha, 1985). Moreover, in Buganda, some public lands (formerly called crown lands) had been reserved by colonial authorities and were de facto administered by local chiefs until 1966 and occupied by settlers and squatters.

In 1975, the Land Reform Decree declared all land, whether *mailo* or customary, to be state land, leased to occupants for a maximum of 99 years. The decree turned all land into private land in Uganda into leasehold property in order to spur the capitalist use of land (Green, 2005). However, since the decree was never fully implemented, its practical impact was rather limited. Customary tenure “remained in its usual state of limbo” (McAuslan, 2000). The newly leased lands were often cultivated by squatter families, with no legal protection against arbitrary eviction, while an increasing number of leaseholders asserted their individual rights on the land, typically by fencing off their properties (Barrows and Kisamba-Mugerwa, 1989; Place *et al.*, 2001). In *mailo* lands, insecurity of rights was increased rather than reduced as rents were declared illegal and further settlement of tenants was discouraged. Tenants’ rights became varied and uncertain, particularly in the case of absentee landlordism. At the same time, ambiguity of the government’s plans to settle the overlapping tenure created uncertainty among *mailo* owners as well (Barrows and Kisamba-Mugerwa, 1989; Muhereza, 1992; Bikaako, 1994).

Beginning 1987 when the National Resistance Movement took over power, new efforts at clarifying the legal structure of land rights in the country were pursued. The 1995 constitution was promulgated bringing with it very significant changes. The radical title to land was vested in the citizens of Uganda, the Land Reform Decree was abolished and the systems of land tenure that were in existence before the 1962 independence re-instated (Uganda Land

Alliance, 2002). These were stated as customary tenure, mailo tenure, freehold tenure and leasehold tenure. It guaranteed security of occupancy of bonafide occupants of mailo, freehold or leasehold land, and the protection of individual property (Tukahirwa, 2002). According to the constitution, bonafide occupants are considered to own land and may acquire certificates of title in form of registrable interest certificates. Land which is unclaimed in customary terms or unalienated in other forms of tenure will be vested in the District Land Boards, which will hold them in trust for the citizens of Uganda (Republic of Uganda 1995, 1998). In 1998, the Land Act which aimed at reforming land tenure relations in Uganda was enacted. The legislation aimed at supporting agricultural development through enhancing the land market where it did not exist, establishing security of tenure and ensuring sustainable utilisation of land in order to bring about development. Both the 1995 constitution and the Land Act 1998 under which governance in Uganda is currently conducted attempt to streamline and free the land market in Uganda (Republic of Uganda 1995, 1998).

In 2007, the government tabled a Land Amendment Bill which attempts to address three issues. First, the 1995 Constitution and the Land Act 1998 created permanent occupancy interests on registered land for the *kibanja* holders, hence a land use deadlock between the statutory tenants (lawful occupants and bonafide occupants i.e. *bibanja* holders) and the registered land owner (mailo, native freehold, leasehold owner). Second, the existing landlord-tenant relationship as enacted in the Land Act Cap 227 served to escalate land conflicts and evictions by personifying overlapping and conflicting land rights on one and the same piece of land. The definition and rights accorded to bonafide occupants in the same Act are unpopular and lack legitimacy on the part of most landlords. Thirdly, the other controversy surrounds nominal ground rent as provided for in the Land Act Cap 227. This not

only served to devalue the title-holder's property but sent their minds thinking creatively on how to re-inject the values in their properties. In order not to lose consumer value, desperate landlords have sold to those individuals with the political-backing, appropriate legal muscle and the economic ability to massively evict tenants (Rugadya, 2008). However, it is worthwhile to note that the current market-driven reforms aim at making individual forms of tenure (freehold and leasehold) the predominant forms of land ownership, the ambiguity around both customary and *mailo* tenure notwithstanding (Okuku, 2006). Obol-Ochola (1970) defines individualisation of land as a process whereby a person or a group or family is able to register or record freehold title to the land held customarily by the person or the group.

## **2.2 Previous studies on the characterisation of land**

This subsection provides a review of some existing literature on methods of characterization of land to give insight into the characterization of land ownership systems in Uganda.

Diwani and Becker (2005) characterised agricultural land in Kakamega in Kenya by developing a typology of agricultural land and resource use systems. The typology was based on information about demography, climate, soils, crops, productivity and resource management practices as well as the changes in these parameters along biophysical and socioeconomic gradients (agroecological zone, forest proximity, population density). Their characterisation found that Kakamega was surrounded by diverse agricultural land use systems, ranging from small-scale subsistence over mixed subsistence and cash cropping, to industrial monocropping systems.

Verberg and Chen (2000) in a multi-scale characterization of land-use patterns in China used correlation and regression analyses to identify the most important explanatory variables in predicting the distribution of land use. Their study found that the spatial distribution of all land-use types in China was best described by an integrated set of biophysical and socioeconomic factors. Their study demonstrated the relevance of the systematic and quantitative characterization of the land-use patterns.

Scott and Udouj (1999) carried out a spatial and temporal characterization of the land-use and land cover of the Buffalo River Watershed. They did a quantitative description of the watershed and a summary of the digitization of the primary natural attributes, such as elevation, soils and geology of the watershed. They characterised land as forest, agricultural, urban/barren, watershed, among others. Regression coefficients and coefficients of determination were used to study the temporal relationships between forest and agricultural lands in the watershed. Nicholas and Hughes (1963) in a study on characterisation of range type vegetation in Britain used chi-square tests to examine the associations between selected vegetative species.

Other studies (e.g. Deininger and Ayalew, 2007; Baland *et al.*, 2007; Deininger and Mpuga, 2003) used descriptive statistics such as percentages, means and frequencies to study characteristics of land. For instance, Deininger and Ayalew, 2007 characterised land parcels based on aspects such as acreage, quality, topography, distance, land-related investments and tenure status. Baland *et al.* (2007) characterised land in terms of size, inheritance, rental and purchase, and used gini coefficients to study their distribution. While, Deininger and Mpuga (2003) characterised land based on ownership and market participation.

### 2.3 Previous studies on the value of land

In line with the general objective of this study, this sub-section was not to provide an exhaustive review of the existing literature but rather to extract from this literature the main relevant features and insights as regards the modelling of land value and its determinants.

Many studies on agricultural land values have been done in developed countries. They hypothesize agricultural land values to be determined by institutional, spatial and productivity factors such as soil quality, climate, water quality, location, land developments and so on. Some studies (e.g., Elad *et al.*, 1994; Vitaliano and Hill, 1994) treated land as a differentiated factor of production and implicit prices of constituent characteristics are identified using the Hedonic method of Rosen (1974). Land values are the observed prices for traded parcels and explanatory variables include characteristics such as size, buyer and seller characteristics. Hedonic studies, however, require detailed data on individual land parcels which is not readily available (Freeman, 1979).

Bashaasha *et al.* (2008) in a study on tenure system and the value of agricultural land in Uganda, reveal that farm size, rent and freehold land tenure are the key determinants of agricultural land values in rural Uganda. However, this study did not establish the extent a land title influences the price of agricultural land, and whether there exists a premium for titled land compared to untitled land in Uganda. Terry *et al.* (1982) in a study on the determinants of farmland values in Kansas used a multiple linear regression model in which the sale price per acre for 57 sales were regressed on both soil and non-soil components of sale tracts. The study showed that bordering roads, year sold, soil capability class, grain yield and percent cropland had the greatest influence on sale price.



Some previous studies examining determinants of land values have looked at the influences of production characteristics that affect farm values such as farm income, government payments, capital gains (e.g., Shi *et al.*, 1997), and to a lesser extent on factors unrelated to production or income capitalization, as land moves from farmland to other uses (Plantinga *et al.*, 2002; Folland and Hough, 1991). Production and nonproduction factors affecting land values generally exhibit spatial and temporal variation. For instance, income and capital gains vary substantially across geographical locations and through time. Thus, to explain variations in farmland values, it is important to include variables that capture all these influences.

Other studies mostly on climate change (e.g., Folland and Hough, 1991; Mendelsohn *et al.*, 1994; Shi *et al.*, 1997; Polsky, 2004), used principal factors determining land values to study the effect of climate change on agricultural land values. They used more readily available aggregate data on agricultural land values from the Census of Agriculture and other sources. While others (e.g., Mendelsohn *et al.*, 1994; Mendelsohn and Dinar, 2003) used cross sectional data using the Ricardian method to measure the effects of climate and other variables on average farm values. These studies found that climate variables such as temperature, precipitation, and soil related variables such as soil quality and slope length were important in determining farm land values.

Empirical studies on agricultural land values have found measures of development pressures to be important determinants of land values. For instance the distance of parcels to roads and metropolitan areas (e.g., Elad *et al.*, 1994; Vitaliano and Hill, 1994), population density (e.g., Mendelsohn *et al.*, 1994; Boisvert *et al.*, 1997), changes in population (Plantinga and Miller, 2001), also served as proxies for future development rents.

Reinsborough (2003) included socio-economic variables such as income per capita, and population density as explanatory variables. The socio-economic variables were meant to reflect the potential of the land for alternate uses. Income per capita was included as a proxy for the wealth of an area, while population density (and its square term) was introduced to capture urban/rural characteristics. Income per capita was found not significant, while population density was found significant with a very large positive effect. Its squared term was negative, implying that there is an optimal level of population density beyond and below which farm values decrease.

## **2.4 Theoretical framework**

The section provides a theoretical basis for the explanatory variables that were used in the analysis by extracting from literature the determinants of the value of agricultural land.

The theory of land rents is well articulated by the Ricardian and Thünen approaches. Ricardo (1815) was the first to observe that land rents reflect the net revenue value of farmland. Ricardo's approach attempts to explain land rents and land use patterns as resulting from differential land productivity. Under this theory, farmers are assumed, holding all else equal, to maximize their profits by using land in declining order of fertility, that is, climate and soil quality (Currie, 1981). The surplus of production on more fertile land is absorbed by rent. Land rents are determined by market processes in which the landlords need not do anything, rather let the farmers compete among themselves to rent the best land. Farm value consequently reflects the present value of future net productivity. The Ricardian approach requires that prices of farmland are determined on the free market (Fleischer *et al.*, 2007).

Von Thünen's approach on the other hand emphasizes land rents based on the organising principle of distance from some crucial location, a central market, in his particular case. Locational rent, a term used by von Thünen in his argument, is to be understood as the equivalent to land value. It corresponds to the maximum amount a farmer could pay for using the land, without making losses. Since locational rent falls with increasing distance from the market, the amount each farmer is willing to pay for agricultural land will shrink and the price of land will eventually decline.

According to Scharlach and Schuh (1962), the determinants of cross-sectional variations in land values may be drawn from three bodies of economic thought: Firstly, location theory has historically been assumed to play a major role in explaining variations in land values at a point in time (Dunn, 1954). Secondly, economic development theory, in combination with location theory, has been used by Schultz (1951) to explain geographical variations in labour returns. This body of thought has implications for the pattern of land values, both from a locational standpoint and in terms of non-farm demands for land. Thirdly, the theory of the firm provides insights into the determinants of the demand for land as a factor of production.

Land quality has historically played a major role in cross-sectional models of the land market. Soil conservation techniques, expenditures on farm inputs, farm wage rate and farm size evolve out of the theory of the firm as determinants of agricultural land values. They represent shifters of demand for land, and are important to the extent that land values are endogenously determined within the firm (Scharlach and Schuh, 1962). The distance from the main road reflects both transportation costs, and the influence of a major metropolitan area as a focal point for industrial-urban development. Population density reflects nonfarm impact on land values. It reflects increasing nonfarm demand for land, which results in a bid up of land

values (Scofield, 1957; Sargent, 1959). The value of land is determined by the production possibilities from the land, which are negatively related to spatial factors such as distance/location and positively related productivity factors such as the inherent soil quality, water availability and land-specific investments (Alston *et al.*, 1996). Land value is a function of supply factors, primarily the amount of available land, and demand factors that include population density, agricultural productivity and the nature of property rights to land. Productivity is determined by inherent land productivity, past investment in improvements, and other characteristics such as land contours, access to water or irrigation, and the degree to which land has been cleared of forest, which is a precondition for most agricultural activity (Alston *et al.*, 1996). The effect of clearing depends on whether forests are considered valuable or an impediment to farming.

According to William *et al.* (2000), land prices are driven by a host of demand, supply and institutional factors, which include competing uses for land, agricultural productivity, hedging against inflation or amenity values. Supply factors play a role by determining the quantity of land put up for sale. Land prices are especially sensitive to spatial factors since access to market is as important for farmers as access to urban goods and services for non-farmers. The ready access of urban public services to farmland located adjacent to incorporated communities is capitalized into higher values for favorably situated land (Chicoine, 1981).

Institutional factors such as property rights to land are important determinants of the value of any piece of land. Property rights relating to land are important in order to ensure efficient utilization since land is scarce and heterogeneous in terms of quality. According to Barrows and Roth (1990), land tenure influences agricultural land values and productivity through the security (or investment demand) effect. According to this hypothesis, the uncertainty of the

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 demand for investment declines and productivity suffers.

It is also hypothesized that a land title can stimulate investment by means of the collateral (or credit supply) effect. By turning land into a mortgageable, transferable commodity, farmers can use it as collateral to access credit needed for productivity-enhancing investments, thereby raising the value of the land (Barrows and Roth, 1990). For this reason, a land title is also thought to raise the supply of investment capital available to farmers. However, the usage of land and real estate as collateral for borrowing requires a set of enforced rules that allow potential lenders to determine not only who has existing title to a property, but also the value of any outstanding claims. Additionally, lenders must have the legal right to take possession of these assets in the event of default (Macgee, 2006). Jacoby and Minten (2005) argue that a title is the ultimate proof to the buyer that the land truly belongs to the seller and that no one will later challenge the original owner's right to sell. However, the existence of informal modes of property rights enforcement can also modify the value of a formal title. If titled land is more valuable because titles reduce transactions uncertainty, then the possession of a certificate issued by local authorities could mitigate the advantage of title.

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Theoretical Model

The study draws on the Ricardian theoretical model of land rents to guide the selection of proxy measures for the value of agricultural land. The study uses the cross-sectional Ricardian approach to estimate the importance of land titles and other variables in determining farmland value. The Ricardian method is a regression of land values against climate, soil and other exogenous characteristics. According to Ricardo (1815), land values are the expected present value of future rents. The value of agricultural land (Y) consequently reflects the present value of future net productivity. This principle is captured in equations 1 and 2 as follows:

$$Y = \int_0^{\infty} Ae^{-rt} dt \dots\dots\dots(1)$$

$$Y = \sum_i P_i Q_i (W, X, F, Z) - \sum R X \int_0^{\infty} e^{-rt} dt \dots\dots\dots(2)$$

Where A is the net revenue per hectare,  $P_i$  is the market price of crop i,  $Q_i$  is the output of crop i, W is water availability, X is a vector of purchased inputs other than land, F is a vector of land tenure and institutional variables including land titling, Z is a vector of soil variables that capture the physical characteristics of the land such as the soil quality. R is a vector of purchased input prices, t is time, and r is the discount rate (see Mendelsohn *et al.*, 1994).

Equation 1 states that the value of agricultural land equals the summation of discounted agricultural rents. Agricultural rents, A, are the annual net returns to crop, forage, and other farm-related activities on a parcel of land. The farmer is assumed to choose X to maximise net

revenues given the characteristics of the farm, market prices, in addition to other economic variables. The observed land value function is therefore the locus of maximum profits given the set of exogenous factors, and economic conditions. The Ricardian model is a reduced form hedonic price model of that locus of profits.

Equation 2 is a reduced form model that examines how a set of exogenous variables such as land tenure, land titling and others affect agricultural land value, and it gives the reduced-form expression for the price of agricultural land presented in equation 3.

$$Y = b_0 + b_1W + b_2F + b_3Z + e \dots\dots\dots(3)$$

Equation 3 is the basis for the econometric model that was estimated in this study with all variables as earlier defined and e as the error term. Based on land value theory and results from previous studies on agricultural land values, the study selected the variables to include in the empirical model.

### 3.2 Empirical Model

Based on equation 3, the study estimated an empirical model, which included several other explanatory variables hypothesized to influence the value of agricultural land. The empirical model was specified as shown in equation 4.

$$y = \alpha + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + \beta_7x_7 + \beta_8x_8 + \beta_9x_9 + \beta_{10}x_{10} + \beta_{11}x_{11} + \beta_{12}x_{12} + \beta_{13}x_{13} + \mu \dots\dots\dots(4)$$

Where;

$y$  = Land value (Value of agricultural land per hectare in Uganda Shillings)

$x_1$  = Dummy variable for Eastern region (1 = Eastern, 0 = Otherwise)

$x_2$  = Dummy variable for Northern region (1 = Northern, 0 = Otherwise)

$x_3$  = Dummy variable for Western region (1 = Western, 0 = Otherwise)

$x_4$  = Dummy variable for location of parcel (1 = peri-urban, 0 = rural)

$x_5$  = Dummy variable for freehold title (1 = freehold title and 0 = Otherwise)

$x_6$  = Dummy variable for leasehold title (1 = leasehold title and 0 = Otherwise)

$x_7$  = Dummy variable for mailo title (1 = mailo title and 0 = Otherwise)

$x_8$  = Dummy variable for customary certificate (1 = customary certificate and 0 = Otherwise)

$x_9$  = Distance of parcel from homestead in km

$x_{10}$  = Dummy variable for primary use of parcel during first and second cropping seasons of

2004/05 crop year (1 = own crops/livestock production, 0 = otherwise)

$x_{11}$  = Dummy variable for possession of title/certificate for the parcel [certificate of title,

certificate of customary ownership or of occupancy] (1 = title/certificate, 0 = otherwise)

$x_{12}$  = Dummy variable for whether parcel has tree plantation/perennial crops

(1 = tree plantation/perennial crops, 0 = otherwise)



$x_{13}$  = Dummy variable for soil / land quality of the parcel (1 = good, 0 = otherwise)

$\mu$  is the Random error term, and  $\beta_1$  to  $\beta_{13}$  are the coefficients that were estimated.

In the empirical estimation of equation 4, all the explanatory variables were constructed using the data collected by Uganda Bureau of Statistics (UBOS) during the Agricultural Module of the 2005/2006 Uganda National Household Survey (UNHS III). For instance, on soil/land quality, respondents interviewed by UBOS were asked to rate the soil type or soil quality of their parcels.

The per-hectare value of an agricultural parcel of land in Uganda Shillings was used as the dependent variable. Land owners interviewed by UBOS were asked to report on how much they would sell their parcel of land (with investments) at the time of the interview. Therefore owner perceptions of the worth of their land, rather than net revenue or actual sale values were used. This is what was used in the analysis as a proxy variable for the current market price of agricultural land. The market price was therefore the value agricultural land would sell for under the prevailing market conditions.

Although early studies in developed countries also used such data to explore the value of agricultural land, there are issues related to whether perceptions provide an accurate measure of market value. Farmers' suspicion about the interviewers' motives may have caused them to withhold or deliberately distort their responses. Measurement errors on the dependent variable are therefore likely. However, they are not necessarily a cause for concern as the study uses a large data set and econometrics handles them well. While there is no way of confirming the validity of the data, the study noted that Roka and Palmquist (1997) found some evidence that self-reported agricultural land values closely approximate market data.

### 3.2.1 A priori expectations

As earlier indicated a title is hypothesized to augment land values. Therefore, the dummy variable for possession of title/certificate for the parcel is expected to be positive to show that there is a premium price for agricultural land with title as opposed to that without (e.g. Bashaasha *et al.*, 2008).

The dummy variables for freehold, leasehold and mailo titles are expected to be positive in comparison with certificate of occupancy. It is hypothesized that titled land would have a higher value than untitled land, and that freehold system where land is held in perpetuity offers greater tenure security as compared to leasehold and mailo (e.g. Macgee, 2006; Jacoby and Minten, 2005; Deininger, 2003; Deininger and Feder, 2001; Matlon, 1994). The dummy for customary certificate is also expected to be positive because it is hypothesized that it offers greater tenure security compared to a certificate of occupancy. This is because holders of customary certificates are actual owners of the land while holders of certificate of occupancy are tenants on the land.

The dummy for location is expected to be positive because peri-urban location is hypothesized to bid up agricultural land values. Several studies (e.g. Archer and Lonsdale, 1997; Vining *et al.*, 1977; Shonkwiler and Reynolds, 1986; Scharlach and Schuh, 1962) have shown that agricultural land located in the peri-urban area as opposed to the rural area has a higher value.

The dummy variables for the eastern, northern and western regional locations are expected to be negative. It is hypothesized that the central region has higher land values compared to the other regions. This is because the central region is more urbanised compared to the other

regions (Uganda Human Development Report, 2007). The central region is also hypothesized to have higher land values compared to the other regions because of historical and cultural differences in land ownership systems between the regions brought about by the British colonial government in the 19<sup>th</sup> century.

The variable “distance from the parcel to homestead” is expected to be negative. This is because proximity of parcel to homestead is hypothesized to increase the value of land (e.g., Elad *et al.*, 1994; Vitaliano and Hill, 1994; Arden, 1985). The dummy variable for primary use of parcel during first and second cropping seasons of 2004/05 crop year is expected to be positive. This is because it is hypothesized that current land use for agriculture should bid up its value (e.g. Bashaasha *et al.*, 2008).

The dummy variable for whether parcel has tree plantation/perennial crops is expected to be positive because it is hypothesized that trees/perennials strengthen land rights and raise land values (e.g. Place and Otsuka, 2002). The dummy variable for soil / land quality of the parcel is expected to be positive because good soil quality should render land more valuable for agricultural use. (e.g. Terry *et al.*, 1982; Polsky, 2004).

### **3.3 Data and Sources**

The data used for this study come from the Agricultural Module of the 2005/2006 Uganda National Household Survey (UNHS III) which was conducted by the Uganda Bureau of Statistics (UBOS). The Bureau covered a total of 7,417 households, of which 5,877 were agricultural households across all the districts, in the Central, Eastern, Northern and Western regions of Uganda. It collected data at household and land parcel levels for over two seasons beginning with the second season of 2004 (July – December 2004) and the first season of

2005 (January – June 2005). UBOS used a two – stage sampling design and drew the household sample using Probability Proportional to Size (PPS) sampling techniques. The 2002 population Census was used as the sampling frame. For each household, parcel level data were obtained for every parcel of land owned by the household resulting in a total of 9,232 parcel level observations (Uganda Bureau of Statistics, 2007).

The present study used the above mentioned data from UBOS to achieve its objectives. However, owing to the presence of outliers and invalid observations; 9,230 parcel level observations were used to describe the characteristics of agricultural parcels under different ownership systems by region. To estimate the determinants of agricultural land values, 9,045 parcel observations were used in the regression analysis.

### **3.4 Data Analysis**

To characterize agricultural land parcels, descriptive analysis was carried out in Statistical Package for Social Scientists (SPSS). The descriptive statistics generated included percentages, means and standard errors. F-Statistics and Chi-square tests were used to test for differences in means and proportions respectively; of the characteristics of agricultural parcels across regions. Multiple Linear Regression techniques using STATA version 9 were used to estimate the land price equation to investigate the determinants of agricultural land values in Uganda. Parameter estimates from the regression model were used to establish the major determinants of agricultural land prices, and to assess whether there is a premium price for titled agricultural land as compared to other land ownership arrangements.

The model specified in equation 4 was estimated by the Ordinary Least Squares (OLS). OLS was preferred for the analysis because it is one of the most commonly used methods in estimating econometric relationships and it gives fairly satisfactory results about a wide range of relationships (Koutsoyiannis, 1977). OLS estimators satisfy several desirable statistical properties, such as unbiasedness and minimum variance. Additionally, they are point estimators and are expressed solely in terms of the observable quantities (Gujarati, 1995). Assumptions of no autocorrelation and normality of the error term were made in the analysis. The error term introduced in the model (equation 4) was to account for omitted variables, misspecification of the equation, and errors in measuring variables in accordance with Intriligator (1978). Being a cross sectional study, the model was tested for multicollinearity using the Variance Inflation Factor (VIF) test. All values of VIF for the explanatory variables were less than 3 and the mean VIF was 1.29, indicating absence of multicollinearity. The explanatory power of the regression model,  $R^2$  was 16% probably because of the diversity of the data set collected by UBOS. The cross-sectional data was obtained from a wide range of social, economic, cultural, physical and geographical conditions across the four regions of Uganda. However, this may be acceptable since the data set is very large.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.1 Characterisation of agricultural parcels in Uganda**

Descriptive statistics pertaining to sampled parcels held by agricultural households across all the regions of Uganda in 2004/2005 crop year are presented in tables 4.1 and 4.2. The statistics are presented first for the pooled sample (National), followed by the Central, Eastern, Northern and Western regions, respectively. Results are presented only for the agricultural parcels which had the respective characteristics. Chi-square tests and F – statistics were used to compare the differences between proportions and means respectively, of agricultural parcels with and without the respective characteristics across the four regions.

Results of the chi-square test (table 4.1) showed a highly significant difference at 1% level in the proportions of agricultural parcels which were held under different tenure systems across the four regions. About 80% of the agricultural land parcels were held under customary tenure. Customary form of tenure was more prevalent across all regions with exception of the central region where mailo tenure was more dominant. Mailo tenure was non-existent in the northern region, and other forms of tenure such as freehold and leasehold seemed less prevalent across all regions. Mailo tenure is mostly peculiar to Central Uganda. The dominance of mailo in the central region is the driving factor behind the significant chi-square statistics in comparing the tenure systems across the four regions, with freehold tenure in the western region contributing in a secondary fashion. The reasons for the differences in tenure across regions can be traced back to the 1900

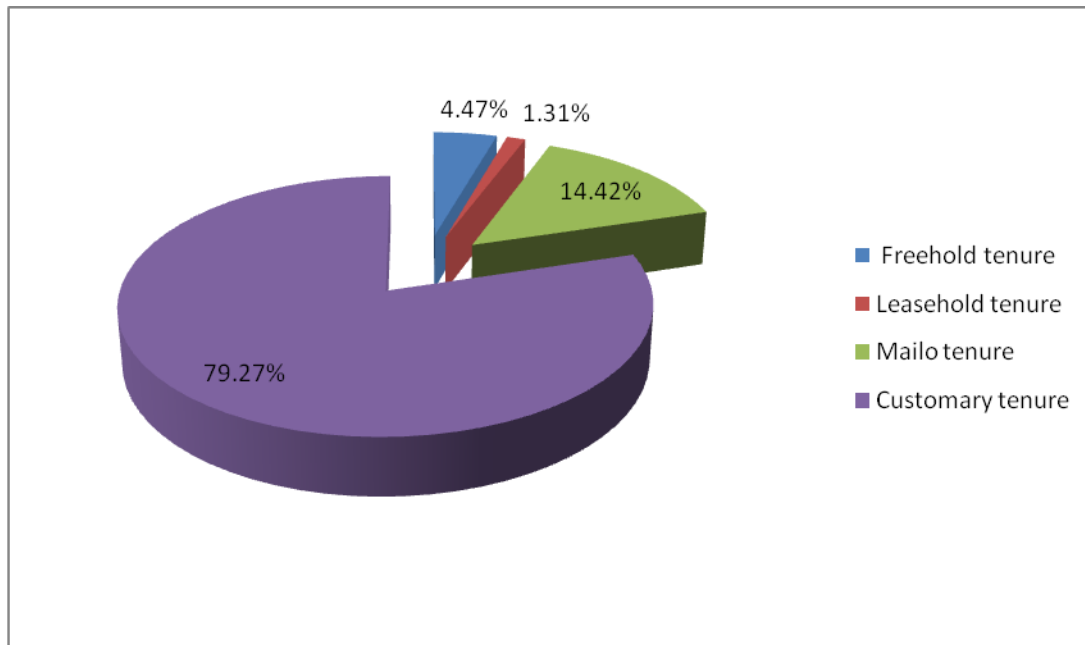
Buganda Agreement between Her Majesty's Government of Great Britain and the Kingdom of Buganda. By this agreement, chunks of land were given to some individuals to own in perpetuity, while the British awarded large tracts of “*mailo*” land, together with any smallholders occupying them, to the Buganda king and his notables (Brett, 1973). Lands not covered under this agreement were declared crown land, allowing the government to alienate such land and their occupants under freehold or leasehold grants. Therefore apart from Buganda in the central, and a few areas of Toro, Ankole and Bunyoro in the west, the colonial changes in land tenure system left many rural areas in Uganda untouched (Tukahirwa, 2002). This explains why customary tenure is dominant across other regions of Uganda except the central region.

**Table 4.1: Key parcel level characteristics by region**

Characteristic	National	Central	Eastern	Northern	Western	$\chi^2$
<b>Location</b>						
% parcels in rural areas	90.1	94.2	93.2	85.8	88.1	115.6***
<b>Tenure system</b>						
% parcels under freehold	4.5	1.8	4.1	1.2	8.7	197.7***
% parcels under leasehold	1.3	3.6	0.6	0.6	1.4	77.3***
% parcels under mailo	14.4	86.7	0.4	0.0	0.8	7500.0***
% parcels under customary	79.3	5.1	94.8	98.2	89.1	6000.0***
<b>Formal documentation</b>						
% parcels with title/certificate	5.3	4.5	5.2	5.7	5.6	3.2
<b>Use of parcels</b>						
% parcels with tree/perennials	58.8	62.4	57.6	59.0	57.9	10.8**
% parcels for crops/livestock	88.7	94.7	92.5	73.5	93.3	637.6***
<b>Soil type / land quality</b>						
% parcels with good soils	89.8	90.9	88.3	90.3	90.4	10.4**
<b>Number of observations</b>						
(parcels)	9,230	1,497	2,766	2,129	2,838	

Source: Own analysis from 2005/06 Uganda National Household Survey (UNHS) III

**Figure 4.1: Land Ownership under different tenure systems in Uganda**



**Source: Data from 2005/06 Uganda National Household Survey (UNHS) III**

Figure 4.1 above shows the proportion of land ownership under different tenure systems. It indicates that from the pooled sample of agricultural parcels surveyed by UBOS in the 2004/2005 crop year, customary ownership of land was the most prevalent system of land ownership. This was followed by mailo, freehold and lastly leasehold ownership systems.

Only 5.3% of agricultural parcels in the pooled sample collected by UBOS had formal documentation such as formal certificate of title, customary certificate or certificate of occupancy as proof of registration and ownership of land. Chi-square values showed no significant difference in proportions of registered versus unregistered agricultural parcels across the four regions. This result probably means that there is a small percentage of farmland that is actually registered nationally. This was attributed to the fact that the registration process requires investment in cash and time, and so most agricultural land



owners do not acquire title/certificate unless the expected benefits are unusually large. According to Place and Otsuka (2002), in many African countries formal land registration and titling was never undertaken at a large scale by the government, but the machinery was put in place for farmers to register their parcels at their cost.

Tree plantations and/ or perennials were found on 58.8% of the agricultural parcels. Chi-square values showed a significant difference at 5% level in the proportions of agricultural parcels which had trees/perennials as opposed to those which did not have, across the four regions. On average more tree plantations and/ or perennials were found on agricultural parcels in the central region compared to the other regions. This was attributed to the prevalence of the overlapping land ownership rights pertaining to the mailo tenure system in the central region. The tenants on mailo land tend to invest on the land by planting trees or perennial crops to enhance their land rights and reduce the possibility of eviction by landlords. According to Pender *et al.* (2003), there is a tendency of mailo land to be planted to perennial rather than annual crops. Place and Otsuka (2002) argue that tree planting is generally perceived to strengthen land rights and ownership, and to raise land values.

Over 80% of agricultural parcels were used for own crops/livestock production during the two cropping seasons in 2004/2005 crop year. Chi-square values showed a highly significant difference at 1% level in the proportions of agricultural parcels that were used for own crops/livestock production versus those which were used for other purposes across the four regions. Compared to the other regions, the northern region had fewer parcels that were used for own crops/livestock production. This is probably because the northern region has been relatively unstable over the past few decades due to rebel activity, which led to a reduction in

agricultural production in the region. These results confirm findings by the International Food Policy Research Institute (2008) that a vast amount of farmland in the northern region has been left uncultivated for nearly two decades because insecurity.

Of the agricultural parcels surveyed nationally by UBOS, over 85% had good quality soils. However, chi-square values in table 4.1 showed a significant difference at 5% level in the proportions of agricultural parcels that had good quality soils versus those which did not across the four regions. The eastern region had a lower proportion of agricultural parcels with good quality soils compared to the other regions. This suggests that probably there is more land degradation in the eastern region resulting in poorer soils compared to other regions. The Uganda Human Development Report (2007) confirmed that Eastern Uganda had the highest environmental degradation in the country, where three quarters of all forests and wetlands had been degraded.

**Table 4.2: Land - related characteristics by region**

Characteristic	National	Central	Eastern	Northern	Western	F-value
Parcel size (hectares)	0.90 (0.05)	1.06 (0.07)	0.83 (0.05)	1.29 (0.21)	0.60 (0.03)	7.88***
Distance of parcel from homestead (km)	1.60 (0.06)	1.38 (0.12)	1.61 (0.11)	1.60 (0.12)	1.71 (0.11)	1.19
Land value per hectare (Million Ushs)	1.19 (0.06)	1.67 (0.18)	1.00 (0.09)	0.72 (0.07)	1.49 (0.11)	13.76***
Annual rent per hectare (Million Ushs)	0.09 (0.01)	0.16 (0.03)	0.06 (0.01)	0.06 (0.01)	0.09 (0.01)	6.34***

**Source: Own analysis from 2005/06 Uganda National Household Survey (UNHS) III**

**Note: Figures in parentheses are standard errors, while \*\*\* denotes significance at 1% level**

Results in table 4.2 show that the national average parcel size was 0.9 hectares. F-values showed that there was a highly significant difference at 1% level in parcel sizes across regions. Mean parcel size was highest in the northern and central regions compared to the eastern and western regions. In the central where mailo tenure is dominant, large parcel sizes are probably a result of historical reasons, in which the colonial government gave away large chunks of mailo land to the king, his notables and other private individuals. Evidence from a study by Place and Otsuka (2000) in eastern and central Uganda suggests that many farms under the mailo system are large relative to those in customary areas. On the other hand, large mean parcel size in the northern region was probably because of the insecurity problem in the region which prevents people from using land productively. The Uganda Human Development Report (2007) noted that continued armed conflicts in the northern region have kept the region in continuous deprivation by preventing people from engaging in agriculture and other income generating activities.

Mean land value and annual rent per hectare from the pooled sample collected by UBOS were Ushs 1.19 million and Ushs 0.09 million, respectively. F-values (table 4.2) showed significant differences at 1% level in the mean land values and annual rents per hectare across the four regions. Mean land values and annual rents per hectare were highest in the central region, followed by the western and eastern, and were lowest in the northern region. This result was probably due to urbanization and historical factors. The central is more urbanized (see Uganda Human Development Report, 2007), and historically, individualization of land in the region by the colonial government changed the land tenure leading to emergence of land markets. This individualization did not stretch to the northern region, therefore majority of land is still customarily owned. The north is probably less urbanized and the land market may

have been disrupted by the continued armed conflict in the region. These results support findings of Deininger and Ayalew (2007) that self-assessed land values and rental rates were lowest in the Northern region when compared to the north, east and western regions. Deininger and Mpuga (2003) found that per acre land prices and cost of renting land were highest in central and western Uganda, as compared to northern and eastern Uganda between 1992 and 1999. Their study found that self-reported land values were about 3 times annual profits in the North, about 12 times annual profits in the East, and were more than 20 times the annual profits in the central and the western.

#### **4.2 Determinants of the value of agricultural land in Uganda**

This section is subdivided into three sub-sections. The first sub-section describes the effect of locational (peri-urban versus rural) and regional (central, east, north, west) determinants on the value of agricultural land in Uganda. The second sub-section presents an analysis of whether or not there exist premiums for different titles/certificates to agricultural land in Uganda. Other determinants of the value of agricultural land in Uganda are presented in the third sub-section. The price of an agricultural land parcel per hectare in Uganda Shillings (Ushs) was used as the dependent variable. Results from the regression analysis, assuming a homoskedastic error, are presented in table 4.3.

#### **4.2.1 Location, region and the value of agricultural land**

The differences in agricultural land values across the four regions of Uganda were investigated by including three dummy variables in the regression model. This was done to avoid a dummy variable trap or perfect multicollinearity (Gujarati, 2006). The central region was used as the base/reference category. Results in table 4.3 show that the dummy variables for Eastern and Northern regions were both negative and significant at 1% level, while the dummy for the Western region was not significant. This implies that the mean per hectare price of agricultural land in the Eastern and Northern regions were significantly lower as compared to that in the Central region. Compared to the Central region, the mean per hectare price of agricultural land was lower by about Ushs 686 thousand in the Eastern region and Ushs 1.07 million in the Northern region. However, there was no mean difference in the per hectare price of agricultural land in the Western region compared to the Central region. The differences in agricultural land prices between the Central and, the Eastern and Northern regions were attributed to urbanization, and differences in land tenure that were historically introduced by the British colonial government in the 19<sup>th</sup> century.

The higher price for agricultural land in the Central region compared to the Eastern and Northern regions suggests a high demand for land in this region probably because of a high urban population. Agricultural land owners in the urbanized Central also probably have better access to market information to access land through the purchase market unlike those in the Eastern and Northern regions. The Uganda Human Development Report (2007) showed that the Central region had more than half of the urban population in Uganda (56.6%). It was followed by the Northern and Western (14.5%), and Eastern (14.2%) regions.

The Central region as opposed to the Eastern and Northern regions has a high prevalence of registered/individualized land ownership systems which were introduced by the British colonial government in the 19<sup>th</sup> century as earlier mentioned in the literature reviewed. This individualization of land, possibly spurred the development of a land market in the Central region explaining the higher agricultural land values. Tukahirwa (2002) confirms that the colonial state intervention produced conditions and legal mechanisms for the emergence of land markets in the Central region. For these reasons, the economic and cultural pillars in Central Uganda are fundamentally built and hinge on land as an economic factor and as a cultural embodiment. However, outside Buganda, the colonial state assumed control over unappropriated land by declaring it crown lands, thus leaving the tenure system in many rural areas in the Eastern, Northern and some parts of the Western regions untouched.

Results (table 4.1) showed that mailo land tenure was dominant in the Central region while customary land tenure was dominant in the Eastern and Northern regions. The prevalence of customary tenure mostly in the Eastern and Northern regions could have contributed to the lower agricultural land values in these regions compared to the Central by hindering the development of land markets. This is because a land sale is quite complicated for owners of customary land because they need the family and clan approval. According to Pender *et al.* (2003), although owners of customary land generally have secure rights to use, lease and bequeath land, the sales are subject to approval of clan leaders and family members. More generally, a piece of land may be sold but only with the explicit approval of the village elders (or the lineage heads) who see to it that no member of the local community (the lineage) wants to acquire the land before authorizing the sale (Platteau 2005, 266–67). While on the other hand, mailo land which is dominant in the Central region is easier to sell. Even mailo

tenants only need approval of the actual land owners (mailo title holders) to sell the land. And, according to Baland *et al.* (2007), the possibility of mailo tenants selling their occupancy rights is subject to very limited rights of refusal by the landlord. These results support findings of studies earlier mentioned (e.g. Deininger and Ayalew, 2007; Deininger and Mpuga, 2003) which found that land values were higher in Central Uganda compared to the other three regions. Baland *et al.* (2007) in a study on land markets in Uganda concluded that land-sale markets in the Central region have been active for a long time, since the average date of acquisition of purchased parcels was 1975 (more than 20 years before the time of their survey). Moreover, farmers in their study tended to purchase land at an early age, as the mean age at the time of acquisition was only 27 years.

Results in table 4.3 show that location of agricultural land in the peri-urban area as opposed to the rural area positively and significantly (at 1% level) increased its value. The per hectare price of agricultural land in the peri-urban was significantly higher than that in the rural area by about Ushs 1.7 million. This difference was probably because agricultural lands in peri-urban areas face very high competition from other urban uses. There is high competition in peri-urban areas to convert agricultural land to more profitable alternative uses such as settlement, industry and other non agricultural uses, thereby bidding up the price of agricultural land. These results probably indicate that there is some pressure on agricultural land in the urbanising areas. For instance the Uganda Human Development Report (2007) showed that Uganda's urban population had risen from 6.7% in 1989 to 15.4% in 2006. The same report revealed that population density per square km was 2,095 in the urban areas as opposed to 118 in the rural areas of Uganda. This high population puts pressure on available land in peri-urban areas thereby bidding up even the price of agricultural land. The results

corroborate findings by other researchers in the United States and Europe. Vining *et al.* (1977) found that urban expansion was predominantly on land that was ideal for agriculture. Scharlach and Schuh (1962) found that increasing non-farm demand for farmland near larger urban areas led to bidding up of land values in such areas. Shonkwiler and Reynolds (1986) found that conversion from agriculture use to urban commercial use explained most (71%) of the variation in land sale price. Broomhall (1995) found that farmland prices near urban areas were sensitive to macro economic factors such as population probably because land is sometimes used as a “store of value” by potential investors and when ordinary instruments indicate an unstable economy, land is a haven for many investors seeking high, stable rates of return. Blank *et al.* (2004) asserts that no commodity can generate enough revenue to adequately compete with expanding urban development.



**Table 4.3: Regression results of the determinants of the value of agricultural land in Uganda**

<b>Explanatory variables</b>	<b>Coefficients</b>	<b>Std. Error</b>	<b>t-value</b>	<b>p-value</b>
Parcel in Eastern region (1=Eastern, 0=Otherwise)	-686 173	173 824	-3.950	0.000
Parcel in Northern region (1=Eastern, 0= Otherwise)	-1 074 821	186 921	-5.750	0.000
Parcel in Western region (1=Eastern, 0= Otherwise)	-253 671	173 377	-1.460	0.143
Location (1=peri-urban, 0=rural)	1 690 901	184 907	9.140	0.000
Parcel has freehold title (1=freehold title, 0= Otherwise)	176 217	1 170 569	0.150	0.880
Parcel has leasehold title (1=leasehold title, 0= Otherwise)	13 800 000	3 749 711	3.670	0.000
Parcel has mailo title (1=mailo title, 0= Otherwise)	1 381	822 076	0.002	0.999
Parcel has customary certificate (1=customary certificate, 0= Otherwise)	-477 522	553 826	-0.860	0.389
Parcel has title/certificate	-370 259	315 774	-1.170	0.241
Primary use of parcel	-29 000	182 967	-0.160	0.874
Soil quality (1=good, 0=otherwise)	-5 208	92 237	-0.060	0.955
Distance of parcel from homestead	-13 385	9 924	-1.350	0.177
Parcel has trees/perennials	169 145	113 082	1.500	0.135
Intercept	1 530 198	258 648	5.920	0.000
<b>N = 9,045   R<sup>2</sup> = 16%   Adjusted R<sup>2</sup> = 15%   F- Statistic 11.31   Sign 0.000</b>				

#### **4.2.2 Land titles, certificates and the value of agricultural land**

Differences in premiums for freehold titles, leasehold titles, mailo titles, certificate of occupancy and customary certificates were investigated by including four dummy variables in the regression model to avoid a dummy variable trap or perfect multicollinearity (Gujarati, 2006). Certificate of occupancy was treated as the base category. Results in table 4.3 indicate that leasehold title positively and significantly (at 1% level) influenced the price of agricultural land as compared to certificate of occupancy. This is shown by the dummy for leasehold title which is positive and significant at 1%. Therefore the mean price of agricultural land with leasehold title was significantly higher than that with a certificate of occupancy by about Ushs 13.8 million. This result suggests that leasehold titles offer greater tenure security to agricultural land owners as compared to certificate of occupancy. Based on this result we confirm the hypothesis that institutional factors (such as leasehold title) are important determinants of the value of agricultural land in Uganda.

Agricultural land with leasehold title is public land that is acquired from the state (usually under long-term leases) allowing the holders to make long-term investments on the land. During the lease, landholders are allowed to sublet, bequeath, mortgage or use land as collateral for loan applications. Holding land in leasehold also opens land to a wide range of users and use options. Therefore because of these attributes leasehold land was probably more preferred by the market compared to mailo. According to Pender *et al.* (2003), leasehold land is easier to market and transfer and the holders generally have long-term leases from the state. On the other hand, the overlapping ownership structure under mailo tenure seems to place constraints on the marketability and transfer of agricultural land with a certificate of occupancy which services to discount its market value. Although mailo tenure is a special

type of freehold where land can be held in perpetuity as an intergenerational asset, the double layered ownership structure where two people have claims to the land – the *mailo* title holder, and the *Kibanja* tenant ensures that neither party can sell or mortgage the land without the consent of the other party.

Results indicate that freehold title positively influenced the value of agricultural land as compared to a certificate of occupancy. However, although the impact was positive, it was not significant, as shown by the dummy for freehold (table 4.3). The mean price of agricultural land with freehold title was significantly higher than that with a certificate of occupancy by about Ushs 176 thousand. These results indicate a premium for freehold title, however it is not significant. Based on this result, the hypothesis that the premium for freehold title is significantly larger than that of other land titles/certificates is rejected. This result was unexpected because agricultural land held in freehold is owned in perpetuity as an intergenerational asset. Freehold tenure provides landholders with complete rights, including rights to use, sell, lease, transfer, sub-divide, mortgage or bequeath as the owner sees fit (Republic of Uganda, 1998). It is therefore supposed to confer the most rights and security. However, this result has contradicted those findings. This attribute was probably not significant because the pooled sample of agricultural land parcels collected by UBOS which were used for the regression analysis did not have sufficient observations with freehold titles. Pender *et al.* (2003) also noted that not all freehold owners have an actual title to their freehold parcels. More investigation is therefore recommended on this attribute.

Mailo title positively influenced the value of agricultural land as compared to certificate of occupancy (table 4.3). This is shown by the dummy on mailo which was positive; however the effect was not significant. The mean price of agricultural land with mailo title was significantly higher than that with a certificate of occupancy by about only Ushs 1400. These results indicated a very small premium for mailo title, which was however not significant. This was attributed to the overlapping ownership rights under the mailo system where both the tenant and landlord have claims to the land. The Land Act 1998 also provides that mailo tenants on agricultural land cannot be evicted by the mailo title holders unless they fail to pay the nominal ground rent. This double layered ownership for the same piece of land probably services to discount the price of mailo land. It is not possible to tell from the results whether the mailo title holder is better off than the kibanja tenant. However, Austin (2005) argues that the land tenants in reality have the more valuable right to occupy and develop the land. However this attribute also needs further investigation.

Results in table 4.3 show that a customary certificate negatively influenced the value of agricultural land as compared to certificate of occupancy. This is shown by the dummy on customary certificate which was negative; however the effect was not significant. There was no mean statistical difference in price between agricultural land with customary certificate or that with certificate of occupancy. Results indicated no premium for customary certificate. This is probably because as earlier mentioned approval of a land sale is more complicated for owners of customary land because they need the family and clan approval, whereas mailo tenants only need approval of the actual land owners to sell.

#### **4.2.3 Other determinants of the value of agricultural land**

Results showed that having a title/certificate was not important in determining the price of agricultural land (table 4.3). This was shown by the dummy variable for possession of a title/certificate for the parcel that was negative; however, the effect was not significant. Based on these results, the hypothesis that there is a premium price for agricultural land with title/certificate relative to that without is therefore rejected. This finding suggests that possession of formal documentation such as certificate of title; customary certificate or certificate of occupancy on average are probably not yet capitalised into the value of agricultural land in Uganda. Possibly because of lack of information, land owners have not yet realised the benefit of having formal documents to land and therefore do not capitalise it into its value. This attribute was probably not significant because the pooled sample of agricultural land parcels collected by UBOS which were used for the regression analysis did not have sufficient observations with titles/certificates. Table 4.1 showed that only 5.3% of agricultural parcels in the pooled sample collected by UBOS were registered. More investigation is therefore recommended on this attribute. However, De soto (2000) estimated that only about 15% of urban dwellings were formally held (registered) throughout the developing world, while 85% of them were informally held.

Productivity characteristics such as good soil quality and primary use of parcels for crop or livestock production were not significant in determining the value of agricultural land in Uganda (table 4.3). Bashaasha *et al.* (2008) also found that soil quality and primary use of parcel for own crops/livestock production were not important in determining agricultural land values in rural Uganda. However, this contrasts findings in developed countries where soil

quality was found to be important in determining farmland values (e.g. Terry *et al.*, 1982). Distance of parcel to homestead is a measure of accessibility to farmland. It was hypothesized that distance of parcel to homestead would have a negative impact on the value of agricultural land (table 4.3). This is the result that was obtained. However the variable “distance of parcel to homestead” was not significant, implying that it was not an important determinant of agricultural land values in Uganda. Results are consistent with findings of Bashaasha *et al.* (2008) that distance of parcels from the homestead had a negative, though not significant impact on agricultural land values in rural Uganda. The results indicated that trees/perennials positively influenced the value of agricultural land. The mean price of agricultural parcels with trees/perennials was higher by about Ushs 169 thousand compared to those without, however this effect was not statistically significant. Therefore, trees/perennials were not important in determining the value of agricultural land in Uganda.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION & RECOMMENDATIONS**

#### **5.1 Summary and Conclusion**

The general objective of this study was to investigate the determinants of the value of agricultural land in Uganda. Specifically, to characterise agricultural land parcels under different ownership systems in Uganda; to establish the major determinants of agricultural land prices in Uganda; and to estimate and compare the premium for titled agricultural land versus other land ownership arrangements. The study hypothesized that institutional factors such as land titles were important determinants of agricultural land prices in Uganda; that there was a significant premium for agricultural land with title/certificate relative to that without, and that the premium for agricultural land with a freehold title was significantly higher than that for other titles/certificates.

Data were obtained from the Agricultural Module of the 2005/2006 Uganda National Household Survey (UNHS III) conducted by Uganda Bureau of Statistics (UBOS) in which 7,417 households were covered, of which 5,877 were Agricultural households across all the districts of Uganda. Records of data at household and land parcel levels for over two seasons in 2004/2005 crop year across all the districts of Uganda were available from UBOS. Data analysis was undertaken in SPSS and STATA computer programs. Statistical and analytical tools such as descriptive statistics, Chi-square tests and F-tests, and multiple linear regression techniques were used to answer the study objectives.

Results showed that region, location in the peri-urban, and institutional factors such as leasehold title were the major determinants of the value of agricultural land in Uganda. Location in the peri-urban and leasehold title positively and significantly influenced the value of agricultural land. Compared to the Central region, agricultural land in the Eastern and Northern regions had significantly lower prices. Higher agricultural land prices in the Central region suggested a high demand for land in the urbanising Central. However, the price of agricultural land in the Western region was not significantly different from that in the Central region. Results from the characterisation of agricultural land ownership systems revealed that mailo tenure was dominant in the Central region, whereas customary tenure was dominant in the Northern, Eastern and Western regions of Uganda.

Results suggested that there was a high demand for land in the peri-urban areas probably because other investment alternatives are available to agricultural producers and this leads to a bid up of agricultural land prices in these areas. Institutional factors such as leasehold title were found to be significant in determining the value of agricultural land, as opposed to freehold and mailo titles, customary certificates and certificates of occupancy which were not significant. However, from the results generally having a land title; whether leasehold, freehold or mailo, positively influenced the value of agricultural land compared to having a certificate of occupancy. This suggested that probably registered agricultural land owners generally have more secure tenure than lawful or bonafide occupants on registered land which is reflected by the land prices. However, the double ownership structure under mailo tenure where both the registered mailo owner and the statutory tenant have claims over the same piece of land probably services to discount the value of mailo land.



Current agricultural use, soil quality, trees/perennials, as well as proximity of agricultural land to the homestead were not important in determining the value of agricultural land. This implied that these factors which are associated with higher land values in developed countries are probably not yet appreciated, and therefore not yet generally capitalised into the current price of agricultural land.

The hypothesis that institutional factors such as land titles are important determinants of the value of agricultural land in Uganda was confirmed. However, the hypotheses that there is a significant premium for agricultural land with title/certificate relative to that without, and that the premium for freehold title is significantly larger than that of other land titles/certificates were rejected. Results indicated a significant premium for leasehold title as opposed to freehold and mailo titles, certificate of occupancy and customary certificate. Suggesting that there is a higher market value for leasehold title compared to other titles/certificates.

## 5.2 Recommendations

This study contributes to the current policy debate on land tenure reform in Uganda by suggesting some policy alternatives based on the empirical findings of the study. Results from this study indicated a significant premium for agricultural land with leasehold title reflecting its economic value. Results also suggest a high demand for land in the peri-urban areas and in the urbanising Central region. This study recommends that the current land policy should promote the leasehold system in up-coming cities /or urbanising areas since it opens land to a wide range of users and use-options. This would encourage allocation of land in those areas to the best alternative uses to stimulate economic development.

Findings of this study suggest that registered land owners in leasehold, freehold or mailo generally have more secure tenure than lawful or bonafide occupants on registered land as reflected by the land prices. However, the double ownership structure under mailo tenure (where both the landlord and tenant have claims to the same piece of land) constrains the marketability and transferability of mailo land, and probably services to discount its price. Therefore the current land policy should address this constraint on mailo land by facilitating arrangements for single ownership of land. These arrangements could be such that either the landlord willingly sells off his ownership rights to the tenant; or the tenant accepts compensation to leave the land; or alternatively the two parties could agree to share the land. In all these cases however, the single owner should then retain the title to the land. However, in line with these single owner arrangements, it would be useful to conduct another study after the policy has been implemented for a reasonable length of time to investigate its impact.

This study recommends further research on the benefits of freehold title since this is an important institutional attribute which is viewed as the tenure system of the future because it is hypothesized to confer the most secure tenure rights to land owners. Further research is also recommended to investigate the impact of converting one form of land tenure to another, for instance, on the conversion of customary land to freehold, since it is the dominant tenure system in Uganda.

## References

- Adams, M., F. Kalabamu, and R. White. 2003. Land Tenure Policy and Practice in Botswana: Governance Lessons for Southern Africa. *Austrian Journal of Development Studies* 19(1):55-74.
- Alston, L. J., G.D. Libecap, and R. Schneider. (1996). The determinants and impact of property rights: Land titles on the Brazilian frontier. National Bureau of Economic Research. Working paper No. 5405.
- Archer, C., and R. Lonsdale. (1997). Geographical Aspects of US Farmland Values and Changes During the 1978 – 1992 Period. *Journal of Rural Studies* 13(4): 399 – 413.
- Arden, P. C. III. (1985). Agricultural Productive and Consumptive Use Components of Rural Land Values in Texas. *American Journal of Agricultural Economics* 67(1): 81-86.
- Austin, J. (2005). Land Tenure System reduces value of land. The New Vision Newspaper, 12<sup>th</sup> December 2005 (<http://www.newvision.co.ug/D/8/459/470570>)
- Baland, J.-M., F. Gaspart, J. P. Platteau and F. Place. (2007). The distributive impact of land markets in Uganda. *Economic Development and Cultural Change* 55 (2): 283-311.
- Barrows, R., and M. Roth. (1990). Land Tenure and Investment in African Agriculture: Theory and Evidence. *Journal of Modern African Studies* 28(2): 265-297.
- Barrows, R., and W. Kisamba-Mugerwa. (1989). Land Tenure, Access to Land, and Agricultural Development in Uganda. Working paper, Land Tenure Center, University of Wisconsin–Madison.
- Bashaasha, B., S. M. Kasozi, and G. Diiro. (2008). Tenure system and the value of agricultural land in Uganda. *Journal of Food, Agriculture and Environment* 6(1): 158-162.
- Bazaara, N. (1992). Land Policy and the Evolving Forms of Land Tenure in Masindi District, Uganda. Working Paper No. 28, Centre for Basic Research, Kampala, Uganda.
- Bazaara, N. (2002). Politics, Legal Land Reform and Resource Rights in Uganda. Paper presented at a Panel on “The Changing Political Economy of Land in Africa” of the Conference on the Theme Africa in the New Millennium held at the Nile International Conference, Kampala, Uganda, December 9-12, 2002.

- Bazaara, N., and Nyangabyaki. (1994). Land Policy and the Evolving Forms of Tenure in Masindi District, in Mahmood Mamdani and Joe Oloka Onyango (eds). Uganda: Studies in Living Conditions, Popular Movements and Constitutionalism. Kampala Centre for Basic Research.
- Belshaw, D., P. Lawrence, and M. Hubbard. (1999). Agricultural Tradables and Economic Recovery in Uganda: The Limitations of Structural Adjustment in Practice. *World Development* 27(4):673-690.
- Besley, T. (1995). Property Rights and Investment Incentives: Theory and Evidence from Ghana. *Journal of Political Economy* 103 (5): 903-937.
- Bikaako, W. (1994). Land to Tillers or Tillers to Land: The Existing Forms of Land Tenure Systems in Mpigi District. Working Paper no. 44, Centre for Basic Research, Kampala, Uganda.
- Binswanger, H. P., and J. McIntire. (1987). Behavioral and material determinants of production relations in land abundant tropical agriculture. *Economic Development and Cultural Change* 36(1): 73-99.
- Blake, A., A. McKay, and O. Morrissey. (2002). The Impact on Uganda of Agricultural Trade Liberalisation. *Journal of Agricultural Economics* 53 (2): 365-381.
- Blank, C. S., K. W. Erickson, R. Nehring, and C. Hallahan. (2004). Farm household wealth: Where does it come from? Giannini foundation of Agricultural Economics. U.S. Department of Agriculture's Economic Research Service, Washington, D.C.
- Boisvert, R. N., T. M. Schmit and A. Regmi. (1997). Spatial, Productivity, and Environmental Determinants of Farmland Values. *American Journal of Agricultural Economics* 79(5):1657-1664.
- Brett, E. A. (1973). Colonialism and Underdevelopment in East Africa: The Politics of Economic Change, pp 1919-1939. London: Heineman.
- Broomhall, D. (1995). Urban Encroachment, Economic Growth, and Land Values in the Urban Fringe. *Growth and Change* 26: 191 – 203.

- Busingye, G. (2007). Uganda's difficult path towards an agreeable National Land Policy: The challenges of turning our land into a real development tool. Published: March 30, 2007. [www.UGPulse.com](http://www.UGPulse.com)
- Christensen, L., D. Jorgenson, and L. Lau. (1973). Transcendental Logarithmic Production Frontiers. *Review of Economics and Statistics* 55(1): 28-45.
- Chicoine, D. (1981). Farmland Value at the Urban Fringe: An Analysis of Sales Price. *Land Economics* 57: 353-362.
- Colwell, P. F., and H. J. Munneke. (1997). "The structure of urban land prices." *Journal of Urban Economics* 41(3): 321-336.
- Currie, J. (1981). The Economic theory of Agricultural land tenure. Cambridge: Cambridge University Press.
- Deininger, K., and D. A. Ayalew (2007). Do Overlapping Land Rights Reduce Agricultural Investment? Evidence from Uganda. Development Research Group, Sustainable Rural and Urban Development Team, Policy Research Working Paper 4310, August 2007.
- Deininger, K., D. Ayalew, and T. Yamano. (2006). Legal knowledge and economic development: The case of land rights in Uganda. World Bank Policy Research Working Paper 3868. Washington DC: World Bank.
- Deininger, K., and G. Feder. (2001). Land Institutions and Land Markets, in B.L. Gardner and G.C. Rausser (eds), *Handbook of Agricultural Economics*, Elsevier: Amsterdam.
- Deininger, K., and P. Mpuga. (2003). Land markets in Uganda: Incidence, Impact and Evolution over time. Proceedings of the 25th International Conference of Agricultural Economists (IAAE), 16<sup>th</sup>- 22<sup>nd</sup> August 2003, ISBN Number: 0-958-46098-1 Durban, South Africa.
- Deininger, K., and S. Jin. (2006). Tenure Security and Land-Related Investment: Evidence from Ethiopia. *European Economic Review* 50 (5): 1245-1277.
- De Soto, H. (2000). The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else. New York: Basic Books, 2000.

- Diwani, T., and Becker .M. (2005). Characterisation and Classification of Agricultural Land Use Systems in Kakamega, Kenya: Implications on Soil Fertility, Productivity and Biodiversity. University of Bonn, Plant Nutrition in the Tropics and Subtropics. November 2005.
- Dubin, R. A., and C-H. Sung. (1987). Spatial variation in the price of housing: Rent gradients in non-monotonic cities. *Urban Studies* 24(3): 193-204.
- Dunn, E. S. (1954). The location of Agricultural Production, pp. 6-24. Gainsville, University of Florida press.
- Elad, R. L., I. D. Clifton, and J. E. Epperson. (1994). “ Hedonic estimation applied to the farmland market in Georgia.” *Journal of Agricultural and Applied Economics* 26(2): 351-366.
- Feder, G., and T. Onchan. (1987). Land Ownership, Security and Farm Investment in Thailand. *American Journal of Agricultural Economics* 69: 311-320.
- Feder, G., T. Onchan, Y. Chlamwong, and C. Hongladorom. (1988). Land Policies and Farm Productivity in Thailand. John Hopkins University Press, Baltimore, 1988.
- Fleischer, A., I. Lichtman, and R. Mendelsohn. (2007). Climate Change, Irrigation, and Israeli Agriculture: Will Warming Be Harmful? World Bank Policy Research Working Paper 4135.
- Folland, S. T., and R. R. Hough. (1991). Nuclear power plants and the value of agricultural land. *Land Economics* 67: 30-36.
- Freeman, A. (1979). Hedonic prices, Property values and Measuring environmental Benefits: A Survey of the issues. *Scandinavian Journal of Economics* 154-173.
- Galeana, F. (2004). Explaining the Demand for Land Titling in Mexico: Credit and Urbanization in the Ejido Sector. Stanford University Centre for Latin American Studies.
- Gavian, S., and M. Fafchamps. (1996). Land tenure and Allocative efficiency in Niger. *American Journal of Agricultural Economics* 78:460-471.
- Green, E. D. (2005). Ethnicity and the politics of land tenure reform in Central Uganda. Development Studies Institute, London School of Economics and Political Science, Working paper series No. 05-58.
- Gujarati, N. D. (2006). Basic Econometrics. Fourth Edition. TATA McGraw-Hill, Inc. New York.

- Gujarati, N. D. (1995). Basic Econometrics. Third Edition. TATA McGraw-Hill, Inc. New York.
- Hennessy, T., and M. O' Brien. (2007). Is off-farm income driving on-farm investment? Rural Economy Research Centre, Working Paper Series 07-WP-RE-04. Athenry, Co. Galway, Ireland.
- Hite, J. C. (1998). Farming in the Shadow of the City: Urbanization and the Changing Geography of Southern Agriculture. Paper presented to the Southern Regional Science Association, Savannah, Georgia, April 2, 1998.
- International Fund for Agricultural Development. (2002). Annual report 2002.
- International Food Policy Research Institute. (2008). Change in Household level Consumption and Poverty in Uganda in 1992/93-1999/00. Development Strategy and Governance Division, Discussion paper No. 27, January 2008.
- Intrilligator, M. D. (1978). Econometric models, techniques, and applications. Prentice – Hall, Inc. Englewood cliffs. London.
- Jacoby, H., and B. Minten. (2005). Is land titling in sub-Saharan Africa cost-effective? Evidence from Madagascar. The World Bank (DECRG) and Cornell University. November 2005.
- Kappel, R., J. Lay, and S. Steiner. (2005). Uganda: No More Pro-poor Growth? *Development Policy Review* 23(1): 27-53.
- Koutsoyiannis, A. (1977). Theory of Econometrics. An introductory Exposition of Econometrics, 2<sup>nd</sup> Edition. Macmillan Press Ltd, London.
- Macgee, J. C. (2006). Land Titles, Credit Markets and Wealth Distributions. United Nations University – World Institute for Development Economics Research, Research Paper No. 2006/150, December 2006.
- Matlon, P. (1994). Indigenous land use systems and investments in soil fertility in Burkina Faso, searching for land tenure security in Africa, in J.W. Bruce and S.E. Migot-Adhola (eds). Dubuque, IA: Kendal-Hunt Publishing Company.
- McAuslan, P. (2000). As Good as It Gets: Politics and Markets in the Making of Uganda's Land Act, 1998. Photocopy, Department of Law, Birkbeck College, London.



- McDonald, J. F., and D. P. McMillen. (1998). Land Values, Land Use, and the First Chicago Zoning Ordinance. *Journal of Real Estate Finance and Economics* 16(2): 135-150.
- Mendelsohn, R., and A. Dinar. (2003). Climate, water and Agriculture. *Land Economics* 79(3):328-341.
- Mendelsohn, R., D. W. Nordhaus, and D. Shaw. (1994). The Impact of Global Warming on Agriculture: A Ricardian Analysis. *American Economic Review* 84 (4): 753-771.
- Migot-Adholla, S., P. Hazell, and F. Place. (1991). Land Rights and Agricultural Productivity in Ghana, Kenya and Rwanda: A Synthesis of Findings. Agricultural and Rural Development Department, World Bank, Washington, D.C., 1991. (Unpublished manuscript).
- Migot-Adholla, S., P. Hazell, B. Blarel and F. Place. (1991). Indigenous Land Rights Systems in Sub-Saharan Africa: A Constraint of productivity? *World Bank Economic Review* 5: 155-175.
- Muhereza, F. (1994). Land Tenure and Peasant Adaptations: Some reflection on Agricultural Production in Luweero district, in Mahmood Mamdani and Joe Oloka Onyango (eds.) Uganda: Studies in Living Conditions, Popular Movements and Constitutionalism, Kampala Centre for Basic Research.
- Muhereza, F. E. (1992). Land Tenure and Peasant Adaptations: Some Reflections on Agricultural Production in Luwero District. Working Paper no. 27, Centre for Basic Research, Kampala, Uganda.
- Noronha, R. (1985). A Review of the Literature on Land Tenure Systems in Sub-Saharan Africa. Report no. ARU 43, Research Unit of the Agriculture and Rural Development Department, World Bank, Washington, DC.
- Nicholson, I. A. and R. Hughes. (1963). A Method for the Characterisation of Range-Type Vegetation. *Journal of Range Management* 16(6): 293-299.
- Obol-Ochola (1970). Customary Law and Development in Uganda, LMM Dissertation, University of Dar es Salaam.
- Okuku, J. M. (2006). The Land Act 1998 and Land Tenure Reform in Uganda. *Africa Development*. 31(1): 1-26.

- Pender, J., E. Nkonya, P. Jagger, D. Sserunkuuma and H. Ssali. (2003). Strategies to Increase Agricultural Productivity and Reduce Land Degradation: Evidence from Uganda. A paper selected for presentation at the 25th International Conference of Agricultural Economists, August 16-22, 2003, Durban, South Africa.
- Polsky, C. (2004). Putting Space and Time in Ricardian Climate Change Impact Studies: Agriculture in the U.S. Great Plains, 1969–1992. *Annals of the Association of American Geographers* 94(3): 549-564.
- Place, F., and S. E. Migot-Adholla. (1998). The Economic Effects of Land Registration on Smallholder Farms in Kenya: Evidence from Nyeri and Kakamega Districts. *Land Economics* 74 (3): 360-373.
- Place, F., M. Roth, and P. Hazell. (1994). Land tenure security and Agricultural performance in Africa. Overview of research methodology. In *Searching for land tenure security in Africa*, J.W. Bruce and S.E. Migot Adholla (eds). World Bank, Washington, D.C.
- Place, F., and P. Hazell. (1993). Productivity Effects of Indigenous Land Tenure Systems in Sub-Saharan Africa. *American Journal of Agricultural Economics* 75: 10-19.
- Place, F., and K. Otsuka. (2002). Land Tenure Systems and Their Impacts on Agricultural Investments and Productivity in Uganda. *Journal of Development Studies* 38(6): 105-128.
- Place, F., and K. Otsuka. (2000). Population pressure, Land Tenure and Tree Resource Management in Uganda. *Land Economics* 76: 233-251.
- Place, F., J. Ssentenza, and K. Otsuka. 2001. "Customary and Private Land Management in Uganda." In *Land Tenure and Natural Resource Management: A Comparative Study of Agrarian Communities in Asia and Africa*, ed. Keijiro Otsuka and Frank Place, 195–233. Baltimore: Johns Hopkins University Press.
- Plantinga, A. J., R. N. Lubowski, and R. N. Stavins. (2002). The Effects of Potential Land Development on Agricultural Land Prices. Discussion Paper 02–11. Resources for the future. March 2002. Washington, D.C.
- Plantinga, A. J., and D. J. Miller. (2001). Agricultural Land Values and the Value of Rights to Future Land Development. *Land Economics* 77(1):56 - 67.

- Platteau, J. P. (2005). The Gradual Erosion of the Social Security Function of Customary Land Tenure Arrangements: The Case of Tribal Societies in Sub-Saharan Africa. In *Insurance against Poverty*, ed. Stefan Dercon, 247–77. Oxford: Oxford University Press.
- Randall, A. (1987). *Resource Economics: An Approach to Natural Resources and Environmental Policy*, 2<sup>nd</sup> Edition. New York: John Wiley and Sons.
- Reinsborough, J. M. (2003). A Ricardian Model of Climate Change in Canada. *The Canadian Journal of Economics* 36(1): 21- 40.
- Republic of Uganda, 1998, “The Land Act, 1998.” Entebbe: Uganda Government Printing and Publishing Corporation.
- Republic of Uganda, 1995, “The Constitution of the Republic of Uganda.” Entebbe: Uganda Government Printing and Publishing Corporation.
- Ricardo, D. (1815). Letter to T. R. Malthus, 27 March 1815.
- Roka, F. M., and R.B. Palmquist. (1997). Examining the Use of National Databases in a hedonic Analysis of Regional Farmland Values. *American Journal of Agricultural Economics* 79(5): 1651-1656.
- Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Perfect Competition. *Journal of Political Economy* 82(1): 34-55.
- Rosenthal, S. S., and R. W. Helsley. (1994). Redevelopment and the Urban Land Price Gradient. *Journal of Urban Economics* 35(2): 182-200.
- Rugadya, M. (2008) Uganda: Why Mengo, Govt Are Fighting Over Land Law, The New Vision Newspaper. 7 January 2008
- Sargent, F. O. (1959). Land Market and Price Analysis in an Agro-Industrial Economy. *The Appraisal Journal* pp. 359-363.
- Scharlach, W. C., and G. E. Schuh. (1962). The Land Market as a Link between the Rural and Urban Sectors of the Economy. *Journal of Farm Economics* 44(5):1406-1411.
- Schultz, T. W. (1951). A framework of Land Economics – The Long view. *Journal of Farm Economics* 33:204-215.

- Scofield, W. H. (1957). Prevailing Land Market Forces. *Journal of Farm Economics* 39(5):1500.
- Scott, H. D. and T.H. Udouj. (1995). Spatial and temporal characterization of land-use in the Buffalo National River Watershed. *Environmental Conservation* 26 (2): 94–101
- Shi, Y. J., T. Phipps, and D. Colyer. (1997). Agricultural land values under urbanising influences. *Land Economics* 73: 90-100.
- Shonkwiler, J. and J. Reynolds. (1986). A Note on the Use of Hedonic Price Models in the Analysis of Land Prices at the Urban Fringe. *Land Economics* 62(1): 58 – 63.
- Terry, D.D., W. H. Pine and O. W. Bidwell. (1982). Determinants of Farmland Values. *Transactions of the Kansas Academy of Science* 85(3):152-154.
- Tsoodile, L., B. Golden, and A. Featherstone. (2003). Determinants of Kansas Agricultural Land Values. Selected Paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting, Mobile, Alabama, February 1-5, 2003
- Tukahirwa, J. M. B. (2002). Policies, People and Land Use Change in Uganda: A Case study in Ntungamo, Lake Mburo and Sango Bay sites. Land Use Change Impacts and Dynamics Project. Working paper series No. 17, September 2002.
- Uganda Bureau of Statistics (2008). The 2008 Statistical Abstract. June 2008.
- Uganda Bureau of Statistics (2007). The Uganda National Household Survey 2005/2006: Report on the Agricultural Module. April 2007.
- Uganda Bureau of Statistics (2005). The 2002 Uganda Population and Housing Census.
- Uganda Human Development Report (2007). Rediscovering Agriculture for Human Development. United Nations Development Programme.
- Uganda Land Alliance (2002). Customary Land Tenure Reform in Uganda: Lessons for South Africa. International Symposium on Communal Tenure Reform, Programme for Land and Agrarian Studies, Johannesburg, August 12-13, 2002.
- Verberg, P. H. and Chen. Y. (2000). Multi-scale characterization of land-use patterns in China. Institute of Natural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, China.

- Vining, J.D., T. Plaut, and K. Bieri. (1977). Urban Encroachment on Prime Agricultural Land in the United States. *International Regional Science Review* 2(2):143-156.
- Vitaliano, D. F., and C. Hill. (1994). Agricultural districts and farmland prices. *Journal of Real Estate Finance and Economics* 8(3):213-223.
- West, H. W. (1972). Land Policy in Buganda. London: Cambridge University Press.
- William, P., M. Rendleman and R. Beck. (2000). Using Farmland Real Estate Value Transitions in Illinois to define Regions of the State. Rural Development Opportunities Council on Food and Agricultural Research, Rural Community Development Strategic Research Initiative, Working paper No. 3.
- Williamson, I. (1985). Cadastres and Land Information Systems in Common Law Jurisdictions. *Survey Review* 28: 114-129.