

THE IMPACT OF LAND TITLING ON LAND TRANSACTION ACTIVITY AND
REGISTRATION SYSTEM SUSTAINABILITY: A CASE STUDY OF ST. LUCIA

By

CHARISSE GRIFFITH-CHARLES

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by

Charisse Griffith-Charles

To Ainsley, Aidan and Tristan.

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By

Charisse Griffith-Charles

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Various theories link land titling, the existence of the cadastre, and formalization of tenure, to tenure security and information availability and thence to formal land transaction activity. To test this link, this research questioned whether land titling projects lead to the establishment or the invigoration of the formal land market in the medium term (10-20 years). This research also explored the factors that affect sustainability of the formal land registration system over the medium term since currency of the system is required to support formal land market activity. Data acquired from St. Lucia, which was the subject of a land-titling project sufficiently long ago for assessment of impact and sustainability, informed the research.

Previous empirical research on the impact of land titling and land registration on land transactions over the medium term, particularly in the Caribbean, is limited. This research focused on formal land transactions over the medium term after a systematic and compulsory land titling and land registration program in St. Lucia.

This research finds that land titling programs have limited impact over the medium term on formal land transaction activity. In this research, family land tenure was found to significantly affect the volume of land market transactions. Despite the posited benefits, no significant movement from family land tenure toward individualization was found. Failure to register inheritances and leases was found to be the primary manifestation of the lack of sustainability of civil participation in the land title registration system.

These findings can be used to determine what are the outcomes to be anticipated from embarking on programs to perform comprehensive establishment or re-engineering of cadastral and registration systems, particularly in the presence of community tenure forms in developing countries. This empirical research adds to the body of information that tests the validity of the theories under different conditions and contributes to the design of more effective and comprehensive land administration programs.

CHAPTER 1 INTRODUCTION

Background

Property and tenure theories posit that security of land tenure is required for reducing risks in land transactions (Demsetz 1967; Palmer 1996). Reducing these risks facilitates the formal transaction process for sale or mortgage, leading to an increase in the volume of these transactions. Security of tenure also increases the confidence the landholder has of a) being able to claim the return on any investments made on the land, b) being able to convert the land into cash, and c) being able to use the land as collateral for accessing credit (Alchian and Demsetz 1973; Demsetz 1967; Feder and Nishio 1999). Thus, increasing security of tenure should encourage increased investment, improved productivity and enhanced ability to access credit. According to this body of theory, land titling, privatization of land, land registration and establishment of cadastres all contribute to an increase in tenure security on the part of land occupants. Projects to perform these processes have therefore been promoted as being able to achieve the security of tenure required for invigoration of land markets (Feder and Nishio 1999; Deininger et al. 2003; World Bank 2000; World Bank 1997; Agency for International Development 1974; Agency for International Development 1985). Systems to acquire and store data on the tenure status of land must remain current and accurate to maintain the security of tenure and to facilitate land transactions (Dale and McLaughlin 1988, 1999; Groot and McLaughlin 2000).

Definitions in Land Titling and Land Registration

For the purposes of this research, land titling is the initial process of formally recognizing rights to land. Land registration is the process of initially recording legally valid rights to land. Title registration carries the additional guarantee of not only those rights, but also the guarantee of the transactions regarding those rights being legally valid by virtue of the recordation process. In practice, though, depending on the efficiency and security of the land registration system, there may be little difference between the confidence held in the documents recorded in title registration systems and that held in the documents recorded in other land registration systems, such as deeds registration systems. Titling often (but not necessarily) occurs concurrently with the initial registration in the land registration system. Subsequent transactions in land must be recorded in the registration system at the time of transaction to be legally valid or to have legal priority over unregistered transactions. Individualization is the evolution toward increasing control by the individual landholder over land use decisions.

The cadastral system is that combination of tenure records and the related description of the smallest individually definable land units over which rights can be held in a jurisdiction. Cadastral reform denotes the process of making the cadastral system better able to acquire, store, manage or disseminate the relevant information. Security of tenure is the confidence landholders have that their rights over land will be upheld by the society, by local communities or by the state. The projects that this research discusses are therefore those that are introduced as part of a planned and implemented program with technical, social, and economic development goals in mind.

Spatial data infrastructure comprises the networked systems, standards, institutions, personnel and databases that allow the integration of spatial data and thus provides for the

access and use of that data (Groot and McLaughlin 2000). Groot and McLaughlin (2000) define spatial data or geospatial data as spatially referenced data.

Justification for the Research

The land market activity resulting from the implementation of land titling/land registration projects should lead to economic and social development both by promoting access to credit to be used in development and by facilitating the reallocation of land to those who are more productive (Feder and Nishio 1999). Yet the nexus between land titling projects and equity in land access, credit access, poverty alleviation and productivity has been questioned, since other market and cultural factors affect whether and how titled land can be used to foster economic growth. Equity concerns arise because economic growth flowing out of land market activity may not accrue evenly to all members of society (Platteau 1996; Dujon 1997; Place and Migot-Adholla 1998).

Cadastral information system frameworks focus on the availability of current land information to facilitate land markets, to manage the use and distribution of land resources and to improve the spatial data infrastructure in a jurisdiction (Dale and McLaughlin 1988, 1999; Palmer 1996). Land titling, land registration and cadastral programs acquire, formalize and record tenure information and establish mechanisms for maintaining the information in a current state.

Land titling projects, therefore, are not always applicable for promoting sustainable development in developing countries since the positive effect on security of tenure is not always attained (Roth and Haase 1998) and the efficacy of the project for sustainable land management is doubtful in some circumstances where the culture is accustomed to alternative property systems (Platteau 1996; Kombe and Kreibich 2000; Agarwal 2001; Jansen and Roquas 1998). The technology introduced for storing and maintaining the

data may also not be consistent with the level of technology with which the society is comfortable.

The theorized impact of land titling and land registration is shown in Figure 1-1. Land titling increases security of tenure and this increased security leads to assurance, realizability and collateralization effects, which are respectively described by Brasselle et al. (2002) to be the assurance that the landowner will obtain long term benefits from the land, the ability to realize immediate fungibility from the land and the ability to use the land as collateral for credit. These effects create incentives for the landowner to invest in the land and thus result in optimization of productivity and developmental activity. In the second impact track, land registration leads to the establishment of information systems that can be used to support transactions in land or land management activities. The theoretical result is again optimized productivity and development. Both of these impact tracks must take place within an environment of system maintenance to continue to function.

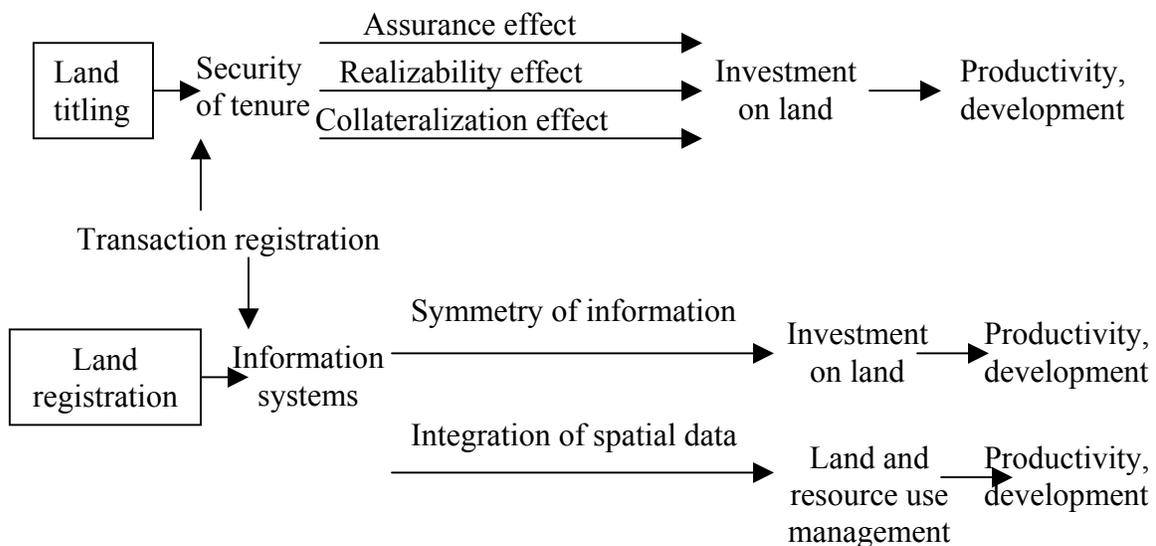


Figure 1-1. Impact of land titling and land registration

Significant investments are being made across the developing world in the establishment of cadastral and registration systems, as part of land administration programs, by governments hoping to achieve economic and social benefits. As an illustration of the scale of these projects, a search on land titling projects on the World Bank Group website (World Bank Group 2003) returns a list of land titling project costs ranging from \$US 5 million for a land titling and related services project in Sri Lanka to \$US 195 million for a rural land titling and cadastre development project in the Ukraine. A USAID/OAS website (USAID/OAS 2003) also lists projects in land titling and cadastral development. Some of these projects are listed in Table 1-1.

Internationally funded land administration programs are in various stages of planning and implementation in many countries with varied economic and social challenges such as Croatia, Nicaragua, Cambodia, Bolivia, Panama, Phillipines, Honduras, and Bulgaria amongst others (World Bank Group 2003; Inter American Development Bank [IDB] 2003; U. S. Agency for International Development/Organization of American States [USAID/OAS] 2003). A search on the World Bank website (World Bank Group 2003), for titling, registration and cadastral projects returns 66 projects. A search on the Inter-American Development Bank (IDB) website (IDB 2003) returns some 56 documents on land administration programs.

As an indication of the land administration activity in the Caribbean and South American region, a USAID/OAS website (USAID/OAS 2003) lists 20 programs in 9 Caribbean countries, 61 programs in 8 Central American countries and 42 programs in 7 South American countries that deal broadly with land administration. An example of some of these projects in South America and the Caribbean is also shown in Table 1-1.

Table 1-1. Selection of land titling projects and cadastral development projects

Project Name	Budget \$USM	Country/Area
International		
Community-Based Rural Land Development Project	27	Malawi
Land Administration Project	20.51	Ghana
Rural Land Titling And Cadastre Development Project	195.13	Ukraine
Second Land Titling Project	14.82	Lao People's Democratic Republic
Land Titling and Related Services	5	Sri Lanka
Land Titling Project	20.73	Lao People's Democratic Republic
Latin America and the Caribbean		
Cadastral and Registry Modernization		Argentina
Infrastructure for registry and property transfer	106	Bolivia
Land regularization and titling land admin. and policy reforms, accurate land ownership information, land studies and improve land transaction registration demarcation of indigenous people's lands		
feasibility study for land administration		Bahamas
Low income housing, land tenure, land reg., land use planning		Barbados
Modernize real property registration system land titling/registry	140	Dominican Republic
property rights, land tenure		
Strengthening System for Property Rights land markets	1.5	Guyana

Source: World Bank Group website 2003-

<http://web.worldbank.org/external/projects/main?query=land%20titling&menuPK=224076&pagePK=218616&piPK=217470&theSitePK=40941>

Source: USAID/OAS website- <http://www.property-registration.org/Project-list.htm>

Much of Latin America has had land administration programs or such programs are proposed for implementation (Barnes 2003). The Caribbean also has projects in various stages of implementation in Jamaica, Belize, and Trinidad and Tobago amongst others (USAID/OAS 2003). Most of the land administration programs have a land titling, land registration, or cadastral reform component although it would be difficult to identify exactly what proportion of the expenditure is allotted to each particular component.

Documented empirical evidence is needed to test whether investments in the improvement of land administration systems are socially and economically viable. Country governments must be aware that the cost incurred by the implementation of the project must include the succeeding recurrent expenditure required for maintaining the systems. Empirical research tests the theories that relate the implementation of these projects to the development of land markets and therefore allows for more effective project design that incorporates supportive activities within a holistic program to effect development.

Empirical research on the benefits achieved by land administration programs provides a better understanding of the actual benefits of the programs and also provides information for improving future programs. Platteau (1996) contends that anticipated benefits have been overestimated and are not justified by the cost of the programs. Brasselle et al. (2002) present evidence for questioning the link between security of tenure and agricultural investment in sub-Saharan Africa.

Freyfogle (2002) and Agarwal (2001) question, not the programs themselves, but the structure of the individualized land tenure regime that is normally instituted and its efficacy for land use sustainability. More specifically, Barnes (1990b; 2003), van der

Molen (2002) and the World Bank (2001) call for more research on the sustainability of land information systems to ensure that longer-term benefits derive from these programs. Maintenance of civil participation is a key area of the overall sustainability of the land registration system. While there has been research in different jurisdictions concerning the link between land registration and access to credit, land values, investments in land and output and income from land, there have been relatively fewer studies dealing with the link between titling and land registration projects and land transactions. Feder and Nishio (1999) identify further research needs in this area, including more empirical research on the actual impact of registration systems on transactions in the land market and state:

... the reduction of uncertainty regarding ownership is expected to enhance the level of activity in the land market, affording increase in the overall efficiency of land allocation. However, there has been a paucity of empirical research on the veracity of this proposition, and on the actual extent of land transactions under different levels of formality of the property rights system. (Feder and Nishio 1999, p40)

Feder and Nishio (1999) also speak of the importance of analyzing the justification for such systems in the local or regional context of various countries, particularly where tenure systems with distinct characteristics exist. This research is therefore particularly useful in the Caribbean where the “family land” type of communal tenure coexists with the more conventional private, individual tenure. Data on medium term impacts of completed programs would close this gap in the knowledge of the impact of the programs on land transactions and of the sustainability of the installed information systems. For the purpose of this research, medium term is defined to be 10 to 20 years after the completion of the land titling or land registration project.

Research Problems

There is therefore a dearth of evidence to support the assertion that land titling and land registration projects lead directly to increases in land transactions over the medium term, particularly within the economic, social, and tenorial context of the Caribbean region. There is also a paucity of medium term data on the sustainability of the land registration information systems established by land titling projects. There are, in addition, conflicting reports from various studies in different regions on the impacts of land titling and land registration projects. This empirical research is therefore required to assist in filling these gaps.

Research Questions

This research investigates the following research questions:

- Do land titling/land registration projects lead to the establishment or the invigoration of the formal land market, as measured by the registration of sales and mortgages?
- Are formal land registration systems sustainable over the medium term?

Research Methodology

The approach was firstly to locate this research within the context of the various disciplinary and theoretical themes that frame it. Figure 1-2 indicates that the boundaries of the major development theories determine the structure of the development processes that are proposed and implemented. Land-based development solutions form a large part of the development framework, supported by tenure and property theories that link tenure on land to development.

Many of these land-based development solutions require the support of the cadastre, including the land registration system, the form and function of which is founded on cadastral information system concepts and affected by diffusion theories. It

was therefore necessary to take a multidisciplinary approach to investigate the impact of land titling, land registration and cadastral programs on land transactions and on the sustainability of the land registration system, as the impact may be affected by economic, social or technological factors.

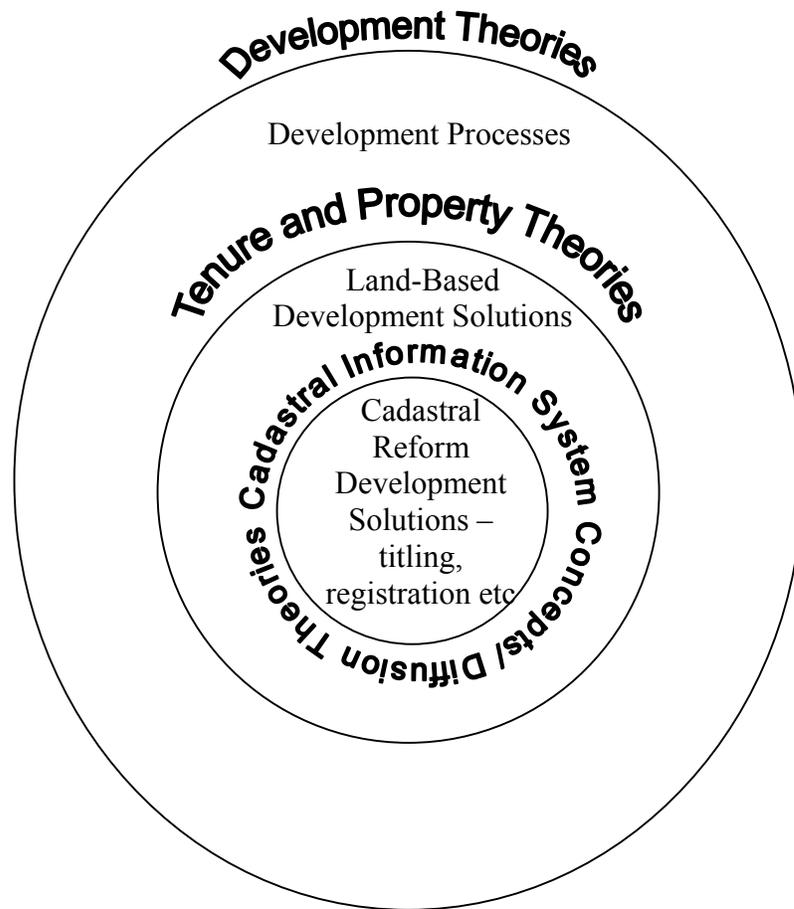


Figure 1-2. Placing land registration, land titling, cadastral programs within a comprehensive theoretical framework

Secondly, this research investigates the impact of land titling on land markets in the literature in previous empirical research. This investigation identified a list of factors that affect the ability of land titling/land registration programs to effect changes in volume of land transactions and a second list of factors that affect the sustainability of land

registration systems. From the theory and the literature, an approach was suggested to investigate the case study.

Thirdly, the empirical part of the research was based on the case study of St. Lucia. Data were collected, both from the Land Registry records and from administering questionnaires to land occupants, to address the research questions. Additional information on the economic, social and technological environment in St. Lucia was derived from interviews with land-based professionals such as lawyers, land surveyors, and valuation surveyors. The first research question was addressed by observing the extent to which landholders formally registered their land transactions in the formal land market after the titling project. The second research question was addressed by observing the congruence between the formal data acquired in the Land Registry with the data acquired in the field.

It is acknowledged that there are a myriad of confounding exogenous economic and social factors that complicate the relationship between land titling and formal land markets (Binswanger and Deininger 1993; Deininger et al. 2003). The quantification of the relative impact of all the possible contributing factors is beyond the scope of this research, which is focused on empirically testing the impact of land titling and land registration programs on land transactions and on land registration system sustainability. The scope of the practical aspect of this research was therefore limited to investigating and testing empirically the correlation between land titling/land registration and land markets, and between land titling/land registration and the sustainability of the land title registration system in the case study area. Comparing land transactions across different

tenure types within St. Lucia also helped to control for major economic and social conditions that affect the country as a whole.

The sustainability of the information system introduced via the land-titling project was examined. Societal perceptions regarding the system were also documented to determine whether they affected the sustainability of the system. Data on volume and type of land transactions since completion of the property formalization program were collected to illustrate the impact of the program on the formal land market and the progress of the impact over time. The data on volume and type of land transactions, collated into sales, gifts and bequests illustrated the activity in the formal market. The data on volume and type of informal land transactions illustrated the activity in the informal land market.

Organization of Dissertation

Chapter 1 introduced the research problem, and presented the research questions and structure of the research. Chapter 2 investigates the structure of land administration programs and how tenure and property theories fit within these programs. The chapter also develops cadastral and land registration system frameworks and diffusion theory to describe how culture has been determined to impact on geographic and land information system adoption in general.

Chapter 3 reviews existing empirical research in the literature to develop a list of factors drawn from this research that impact on the ability of land titling and land registration programs to lead to increased land transactions and to sustainable land registration systems.

Chapter 4 describes the case study characteristics relevant to the research and identifies the data acquisition methodology used in the case study country and in the analysis of the data.

Chapter 5 analyzes the data captured in the case study related to formal land transactions, compares the findings to the baseline study findings and describes the relevance of the outcomes of the analyses.

Chapter 6 analyzes the data captured in the case study related to sustainability of the land registration system, compares the findings to the baseline study findings and describes the relevance of the outcomes of the analyses.

Chapter 7 discusses the generalizability of the findings by comparing the indicators derived in Chapter 5 and Chapter 6 to indicators from other international jurisdictions gleaned from published work. Chapter 8 summarizes and concludes the research and recommends approaches to instituting land titling and land registration projects and further investigation on factors that impact sales and mortgages, and the adoption of land title and land registration system technology.

CHAPTER 2 THEORETICAL FRAMEWORK OF LAND TITLING PROGRAMS AND LAND REGISTRATION SYSTEMS

The following sections describe the theories that have impacted on and have shaped the form and structure of land administration programs. Cadastral reform draws on theories in land tenure, property systems, and information systems to develop frameworks for the optimal form and function of the cadastral system (Dale 1976; Dale and McLaughlin 1999; Larsson 1991; Williamson and Ting 2001). While development theories are presented here to briefly describe the general economic foundations that motivate the overall development process, land tenure and property theories are detailed to more closely describe the concepts that position land and cadastral systems within, and as important components of, development processes. Cadastral reform and technology diffusion concepts are detailed here to even more precisely describe the way the cadastral and land administration systems, as information systems, are structured and how they relate to societies as they attempt, as comprehensively as possible, to describe and record the complex human-land relationship.

Development Theories

Many development theories have evolved over the last 6 decades and their implementation has been pursued globally. Modernization theory, which is one of the more fundamental theories in development, became established after World War II. Modernization, summarized, states that nations are poor because they lack capital, technology and modern social values. Despite being criticized in later years for failing to

extricate poor nations from the grasp of poverty, these modernization theories retain their proponents and the concepts are still used as the basis for many current development programs (Roberts and Hite 2000). Development programs structured around land, based on this modernization theme, introduce the technology and capacities required to install or elevate land administration institutions into modern entities and attempt to establish a land market, whereby capital can be generated from land, to fund growth and development.

Globalization, as an emerging major development theory, states that power derives from a hold on information, technology and world banking institutions (Roberts and Hite 2000). Land administration development programs of this type aim to improve the accessibility and transparency of land markets so that land can be traded as a commodity on international markets and used as securitization for international investors seeking investment opportunities.

Development theories continue to evolve as the very definition of development is questioned by postmodernists who champion the validity of alternative perspectives to development (Roberts and Hite 2000). Such debates are fueled by some of the harmful social, economic and environmental consequences of conventional ideas of development. Imperatives for preserving economic and social equity and environmental sustainability now underlie proposals for development. However, solutions proposed in these debates still focus on the more judicious management and use of land.

Development theories are linked to the concept of ownership of landed property by the fact that land is one of the primary ingredients of the development theories. Land can provide the capital required for modernization efforts to occur. Access to land can

correct the inequities decried by Marxism and dependency theorists. Global corporations require land to make use of the resources in targeted nations. Land is still a major factor of production. So that whichever theory is espoused, land remains central to its implementation. Many development programs are therefore focused around the redistribution, restitution, privatization, individualization, titling, registration or recordation of land.

Supporting programs deal with the introduction of legislation and legislation changes required to facilitate these processes and the institutional structuring and restructuring required to implement and manage these processes and the data that emanate from their implementation. The World Bank policy on development via land reform has evolved to where acknowledgement is made of the value of supporting the creation of more owner-occupied family farms, securing property rights for increasing investment in land and increasing the volume of transactions in the land market, improving policy and legislation to support land migration to more productive users and uses, supporting land rental markets together with land sale markets and encouraging equity in land distribution (Deininger and Binswanger 1999). Whereas in 1975, the World Bank land reform policy was specific in its recommendation to convert communal tenure systems to individualized tenure systems, the policy has shifted to recommending that governments facilitate communal systems, where they exist, in their management while still guiding the evolution to individualization (Deininger and Binswanger 1999). However, some researchers still deplore the economic land market emphasis as put forward by international development agencies (Dujon 1997).

Land related development is therefore a key focus of national development funded by international agencies and adopted by governments.

Property and Tenure Theories

Individualization of Tenure—Economic Aspects of Property Rights

History of individualization

Property theories also support the importance of land and security of land tenure to growth and development of the individual and ultimately the society. While societies have historically used various tenure mechanisms to manage coexistence on land, the economic view of landed property has significantly shaped the western world's attitude to land ownership. By so doing, this economic view has affected the implementation of development projects related to land as proposed by western development funding institutions. The economic view is that land is simply a factor of production and therefore conforms to factor market characteristics.

Few have been as instrumental in initially defining this economic view as John Locke whose analyses of property are viewed as being foundational to market theories (McMurtry 1997). Statements by philosophers such as John Locke (1690) and, later, Jacques Rousseau (1754) supporting individualization of property within ethical limits preceded theories on the natural inevitability of individualization and those on the economic advisability of individualization as opposed to common property and later, the imperative to encourage individualization as a catalyst for development.

John Locke philosophized that “as much land as a man tills, plants, improves, cultivates, and can use the product of, so much is his property” (Locke 1690, Section 32). He modified this radical statement by declaring that an individual's ability to amass property by dint of his labor should be tempered by the “rule of propriety”, which

requires that each person only take what was required for sustenance, leaving the rest for the other members of the society to extract their own sustenance. Labor, he claimed was the only way to give land any economic value. Even though Locke is thought of as supporting individualization of landed property, which is part of neoclassical economic theory, the difference is that the neoclassicist is not constrained by morality but must obey the laws of economic self interest in order to support the economic system whereas Locke held the overriding morality of the “rule of propriety” as being paramount in preventing inequity in the world (Henry 1999). Theorists such as Hardin (1968) deride the ability of ethics to provide a workable solution to problems of finite resource use since, in an open access system, ethical behavior would doom the highly moral individual to a disadvantaged position and then to exploitation and ultimately to elimination from the user community. This view is evidence of the need for some rule-based structure to land and resource management. Since it was not the intention of his argument, Hardin did not discuss the fact that many communal groups had social rules and sanctions that provided the rule based structures that would allow the communal resource use system to function. Judge (2002) posits that the self-regulating ethical rule structure of Locke’s perspective on property is analogous to the community sanctions provided by a functional communal land use system.

The history of the thinking on individualization is still fundamental to the way ideal property structures are conceived by economists and recommended in development (Deininger and Binswanger 1999).

Description of individualization

Individualization is conceived of as being gradual when it occurs naturally in response to market forces of increasing population, external market demands or other

increases in demand for scarce land or land-based resources. Theoretically, land tenure systems, given these typical scenarios, must move inexorably towards individualized land holding since this type of system most effectively maximizes economic benefits from the land resource (Demsetz 1967; Binswanger and Deininger 1993). In the agricultural economics context, Binswanger and Deininger (1993, p1250) state that “under simple technology there are no scale economies in farming and independent family farms are economically the most efficient mode of production, except for a very limited set of plantation crops.”

The individualization process begins to occur in many countries or jurisdictions when the population increases and land space decreases, resulting in an increase in value of land and land resources. Where land was once open access, smaller more homogeneous communal ownership groups such as families or tribes develop (Larsson 1991). Demsetz (1967) described this process in economic terms as internalizing of externalities. While the value of the land is low in situations where land is freely available and the population is small, the cost of acquiring and policing ownership on an individual parcel of land to the casual user of the parcel is an externality. The definition of externality is not precisely defined in economic terms but Demsetz (1967) specifies the term to mean costs that do not impact on economic decision-making because such costs are too high to be feasible to consider. When the value of the land, or the gains to be achieved from internalization, increases to exceed the cost to the ownership group of having the open ownership system and the cost of internalization, then these costs of acquiring and policing are internalized and are therefore reflected in the increased cost of acquiring exclusive use of a parcel of land. The economically ideal situation is where all

externalities, whether positive or negative, become part of the negotiations into the transfer of land between individually rational parties (Demsetz 1967).

The ETLR: individualization to titling to land markets

The individualization process may take years, decades or even centuries depending on the relative impact of the external factors that cause the value of the land to increase. These factors may include the rate of growth of the population depending on the land or land resource for survival, the area of suitable land, the availability of land resources, and the rate of growth of the external markets for the land resource.

The economic view of individualization and its link to land markets and attendant benefits first began to be empirically tested in the 1980's in the context of a World Bank funded project in Thailand. Gershon Feder, a researcher in the World Bank, was instrumental in this advancement of the theory, developing conceptual models of the process and testing the models with data from Thailand (Feder and Onchan 1987; Feder et al. 1988). The land titling project in Thailand, begun in 1984, was the largest project of this kind in the world and was therefore a natural case study for the theory.

Evidence of the individualization process, called the evolutionary theory of land rights (ETLR) by Platteau (1996) and gleaned by him from previous descriptions of the theory by economists such as Feder et al. (1988), Demsetz (1967) and Feeny (1988), was also researched in the African context. Platteau graphically illustrated the concept as shown in Figure 2-1. This model follows the individualization process from increasing population and land scarcity through the conflicts that result from the competition for agricultural land. Two alternate views exist on the direction the land tenure takes from this point. One view is that the land tenure does not automatically evolve towards individualization but that individualization must be forcibly introduced to the

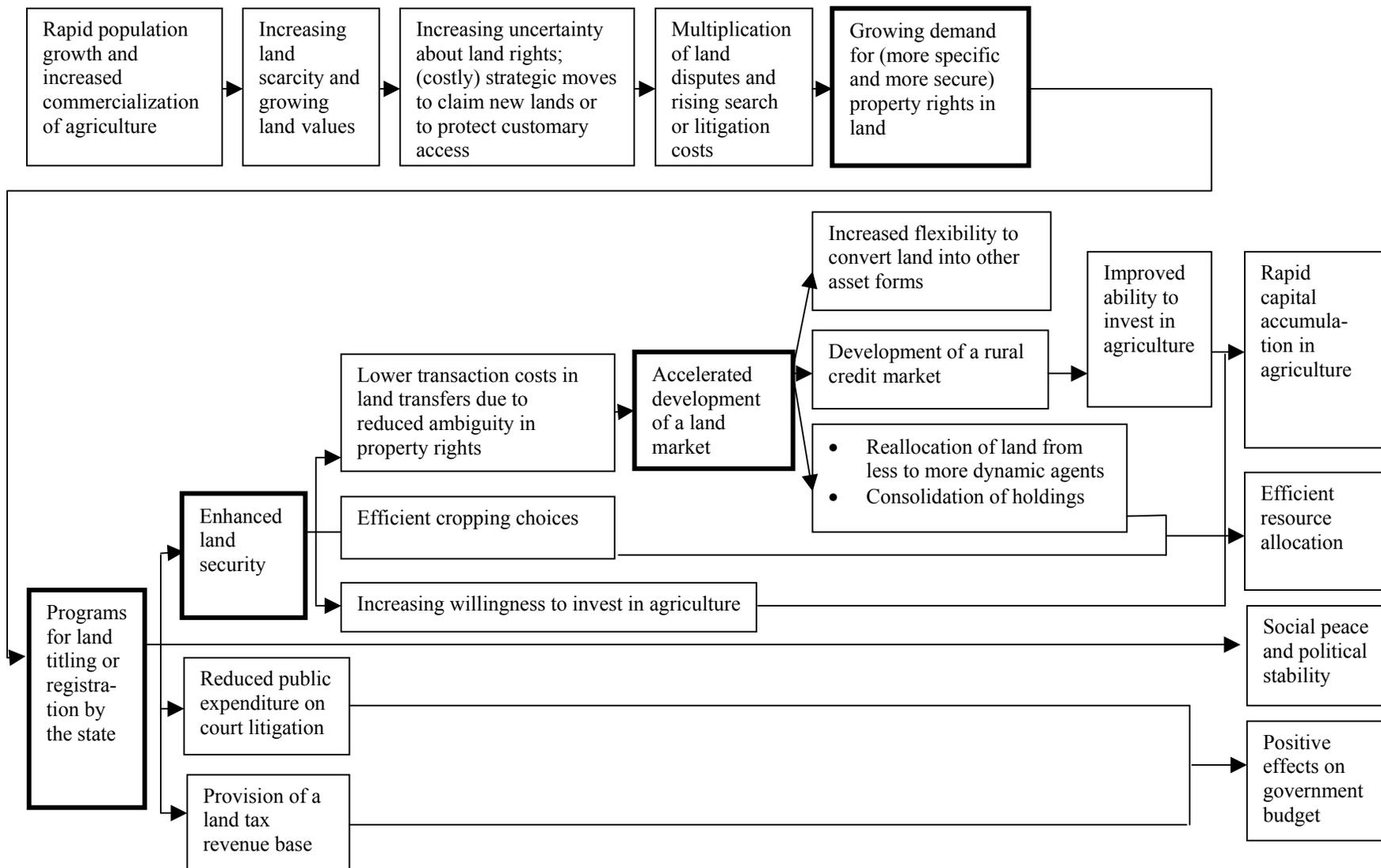


Figure 2-1. The Evolutionary Theory of Land Rights (Platteau 1996)

tenure system. The second view, shown in Figure 2-1, is that the society in conflict naturally, at some point, exerts pressure on the state to individualize land through titling mechanisms. This necessity for the state to intervene is the ETLR view. Three different economic and social benefit streams are then identified.

Firstly, the increase in tenure security, introduced by the land titling process, would lead: a) to a greater volume of transactions in land at lower costs due to the available information, b) to more economically advantageous agricultural decision making and c) to increased investment in agriculture since there would be less necessity for investment in protection of property rights.

Secondly, the decrease in land conflicts would lead to a more stable and peaceful society. Thirdly, the state benefits from the taxation that is possible with the available information and from the reduction in court litigation costs.

Platteau (1996) acknowledges the negative impacts to this scenario as a result of inequity in land distribution arising from land being lost through foreclosure on mortgages and acquired by entrepreneurs as investment opportunities. He disregards the impact of this side effect as merely “ a natural accompaniment to specialization and growth from which everybody will benefit” (Platteau 1996, 37).

The ETLR theory was supported by empirical research from Kenya that indicated a shift from sales that were redeemable to the original seller to increasingly irredeemable sales (Barrows and Roth 1989). The number of sales occurring was also positively related to the population density in Rwanda and Ghana (Migot-Adholla et al. 1991). Sales occurring only within communal groups gradually evolved to sales occurring to persons outside the group first only with group approval and then requiring no approval

(Bruce 1986). Although Platteau (1996) agreed with the ETLR view that what was occurring in sub-Saharan Africa was a natural evolution towards increased individualization and heightened transferability in land he disagreed with the inevitability of the society-induced demand for titling in all situations.

Restrictions to individualization

Empirical evidence, in the situation of sub-Saharan Africa, suggested to Platteau that the ETLR process did not naturally occur without technological change and economic alternatives to land holding accompanying the other market drivers. He therefore concluded that land tenure arrangements did evolve under increasing land scarcity but that state imposed land titling was not necessarily the result. Other informal and communal land tenure arrangements (as opposed to formal, individualized land titling, and registration instituted by the state) could evolve to respond in a more socially positive way to land scarcity. While he noted that empirical evidence was scarce, as only Uganda, Zimbabwe, and Kenya had performed large-scale land registration and formal individualization programs, he cited evidence from these countries, and from other areas, where informal individualization had occurred to support his stance. He suggested that formal, individualized land titling might only be appropriate in situations where other socially cohesive institutions, such as communal tenure, did not exist. This view therefore acknowledges the importance of culture to the determination of whether land titling is an appropriate intervention. He also suggested that formal, individualized land titling should only be performed at the appropriate time in the ETLR sequence. There must be pressure from the society due to land scarcity and rising population before land titling is warranted. Empirical evidence from case studies that Platteau cited in Africa found that, contrary to the ETLR, land registration could lead to reduced security of

tenure and more land conflict (Atwood 1990). This occurred where supportive, overlapping, customary and residual rights of women, uneducated, nomadic and other marginalized groups were not acknowledged and recorded in the formal individualization and titling process.

Binswanger and Deininger (1993) opined that market imperfections prevent the evolutionary theory from achieving the benefits. These imperfections can be:

- Political inequalities
- Policy distortions,
- Absent or imperfect land markets,
- Asymmetric information,
- Historical inequities in distribution and access to land
- Absence of insurance.

Perfect land markets with perfectly symmetrical information allowing voluntary transactions would therefore result in the stated benefits in a relatively short space of time. However, perfect land markets do not exist in reality, since land, unlike some other market products, is a variable product the price of which is affected by perceptions, and emotions of the buyer and seller (Stringer 1988). Additionally, risks in transactions are increased because of differences between transfer rights and physical possession and use rights.

Land administration programs accelerate the gradual individualization process by instituting individualized property systems via titling and registration, together with the supporting surveys and cadastre development. Whereas, under the evolutionary process, individualization would have been gradual, allowing the supporting institutions, legislation, and cultural acceptance of the technology to grow and develop, the imposed

development program model faces problems related to inadequate capacity and resistance to adoption.

Formalization of Tenure—Legal Aspects of Property Rights

In keeping with the thinking of Alchian and Demsetz (1973), the legal view of individualization is that formalized, private rights are easier to administer because they provide for the self-regulation of individuals and benefit society. In 1968 Garrett Hardin (1968) had been instrumental in publicizing this perspective of the efficacy of formal individualization for management of land as a resource even though other researchers had held this view prior to Hardin's publication of "the tragedy of the commons" (Freyfogle 2002). Even though land management was not the focus of his arguments, his goal being to apply game theory to the problem of world overpopulation, and even though he erroneously termed as common property a situation that could better be described as open access resource use, the examples he used were believed to speak to the inadequacy of common property for resource management. In Judge's (2002) perception, however, there is no such thing as open access property as all resources belong to some entity, including the state or all of humankind, who may or may not demand compensation for the effect of use by individuals. The legal view of individualization, therefore, focuses on the gradual change in formal rights to use and transfer land that occurs as societies evolve.

Hernando de Soto (2000) is another key proponent of the benefits of formalization as put forward by Demsetz and illustrated diagrammatically by Platteau (see Figure 2-1). He suggests links between formal land titling and economic development at the level of the individual that are more ambitious than those put forward by Platteau, and operate beyond the agricultural sphere to include the urban environment. Firstly, he cites

instances where the lack of a formal property system can lead to lack of development since occupiers of land who are members of the informal system in a country would not be able to count on the support of the property system for securing their land or for financing their entrepreneurial activities. This would leave them at an economic disadvantage in comparison to those who have these supports. There is also a cost attached to being informal that they must pay from their already meager resources, since most of those who remain informal are poor, as they cannot buy their way out of informality. Secondly, he postulates that a cadastral system can be used to positively foster development by allowing the owner access to capital to fund enterprises. De Soto's ideas, while attractive to many, have also been discredited by many others such as Gilbert (2002), Fernandes (2002), Unruh (2002), and Payne (2002) for lack of transparency in the empirical evidence collected in various countries and for exaggeration of positive outcomes. Unruh (2002) states that formal systems are usually more easily imposed on migrant societies such as those of early North America, which is often cited as an example of a functional property system. Imposing formal systems on traditionally communal or established alternative tenure systems with functional rules meets resistance, again citing the example of the impact of formal tenure systems on the indigenous populations of North America.

Feder and Nishio (1999) also relate formal land registration to increased access to formal credit opportunities, higher land values, greater investment in land based enterprises, and increased output to income ratios for land based investment, by analyzing empirical evidence from several countries, primarily Thailand.

Informal Tenure

Gilbert (2002) cites empirical evidence obtained from Latin America to show that, contrary to de Soto's statements, illegality and informality did not prevent development. He also found evidence that land titling did not necessarily either encourage the accessing of credit or improve the ability to access credit and did not increase the mobility of homeowners in the manner required for a vibrant land market. Instead he found land occupiers who, despite being informal, achieved perceived security of tenure based on political tolerance, service provision and the duration of time in undisturbed possession. He also found vibrant, informal land markets unhindered by lack of formal titles.

Brasselle et al. (2002) also state that security of tenure is indeed present in tests for investments but this is because performing investment related activities increases security of tenure for agriculturists and not vice versa as advanced by the ETLR. Brasselle et al. (2002), speaking for the rural agricultural environment (as opposed to Gilbert (2002), who presents evidence from primarily the urban environment), and speaking, also, for the link between security of tenure and farm-based investment solely in the African context, found conflicting evidence. They found empirical research from Green (1987), Migot-Adholla et al. (1991), Pinckney and Kimuyu (1994) where systematic titling had no impact on investment on agricultural land. They also found research from Harrison (1992) that indicated that the promise of more secure tenure was not an incentive for farmers to voluntarily register land nor did it affect their productivity. They found research (Gavian and Fafchamps 1996; Saul 1993; de Zeeuw 1997) that stated that in informal areas, investments were not affected (although in informal areas security of tenure is expected to be tenuous). However, Brasselle et al. (2002) systematically list other research (Migot-Adholla et al. 1994b; Place and Hazell 1993; Migot-Adholla et al.

1991) where security of tenure was related to investments in some communities while in other communities the relationship was not found.

These empirical studies conflict with the ETLR view by indicating instances where informal occupation does not restrict security of tenure or investments on land and that land markets can exist, albeit informal, without titling.

Communal Tenure—Social Aspects of Property Rights

A developing literature on resource management and communal land tenure questions the governance structures in individualized land tenure systems for achieving sustainable development and for maintaining sustainable information systems (Baland and Platteau 1996; Ostrum 1990; Wade 1988; Freyfogle 2002; Oestereich 2000). These perspectives follow a different track to the largely economic view of land tenure that the ETLR espouses. This alternate perspective views land tenure and property rights as a dynamic social relationship that must be constantly negotiated and renegotiated as cultures and societies change (Williamson and Ting 2001). Furubotn and Pejovich (1972, 1139) stated that “Property rights do not refer to relations between men and things but rather, to the sanctioned behavioral relations among men that arise from the existence of things and pertain to their use”.

This flexibility in the relationship demands flexibility in the structures required to manage the smooth functioning of the system and the inevitable conflicts that would arise as it shifts and changes with time and conditions. Management of this type of structure is performed at a group or community level. This social construct may be reflected in or be in conflict with the formal laws of the society. While it can be argued that the economic view provides flexibility in land tenure arrangements, since this view is founded on the ability of the land market to adapt spontaneously to the economic forces of demand and

supply, the sociological view provides for a more controlled response to the social situation so that equity can be preserved.

Williamson and Ting (2001) tracked this changing social relationship between mankind and land historically, describing the global catalysts that have progressively accelerated this changing relationship. These global catalysts are described as being;

- Imperatives for sustainable development,
- Globalization,
- Economic reform and
- The realities of urbanization and advances in technology.

While economists argue that individualized land holding is optimal for economic purposes for the individual, legal and land management minds such as Freyfogle (2002) and Oestereich (2000) take the view that land management is best performed at larger scales. This latter view therefore supports the existence of communal tenure arrangements. Communal tenure systems even allow for greater internalization of externalities since the positive externalities of conservation are better captured while the negative externalities of degradation are better allocated. Individual ownership allows individuals to focus on effects that would be felt over one lifetime while environmental effects have long-term impact and require management structures that would base decisions on longer time frames (Oestereich 2000).

Agarwal (2001) presented an expository analysis of current research methodologies used in the area of communal tenure and their governance structures by Baland and Platteau (1996), Ostrum (1990) and Wade (1988) and suggested more rigidly structured comparative analyses that would derive models for sustainable governance that look beyond the institutions to incorporate the many factors that apparently impact the sustainability, equity and efficiency of the communal resource system. These factors

relate to the several characteristics of the resource system, the communal group, the relationship between the resource system and the group, the institutional rules, the relationship between the resource system and the institutional rules, and the external environment. Cadastral and land registration systems analyses, since they deal with the land as being composed of individually definable and registrable units, would benefit from the resource and common pool literature as this suggests mechanisms for cooperative maintenance of the information systems and also mechanisms for legislating and defining land management units and authorities. The common pool research also suggests alternatives to the land titling of individualized parcels such as modifying existing communal governance structures, to bring them in line with what is posited as being the ideal, in order for these communal governance structures to be better able to manage land rights.

Much of the research on communal tenure describes the social benefits attributable to the communal tenure regime. While the economic view of individualization assumes a strictly linear process leading to complete individualization, the social view accepts a need for communal tenure to continue to exist alongside growing individualization as support and insurance for those in the society. Thus, Besson (1987) describes the symbolic nature of communal tenure systems in the Caribbean and their necessity for providing status, prestige, solidarity and economic insurance to their members. Family land tenure exists in Jamaica, Antigua, Nevis, Montserrat, Dominica, St. Lucia, St. Vincent, Grenada, Bequia, the British Virgin Islands, St. John in the American Virgin Islands, Barbados, Providencia, and Trinidad and Tobago (Besson 2003). Also, Ezigbalike et al. (1996) speak of the religious significance of land in communal tenure

systems in Africa and McLaughlin et al. (1994) compare the indigenous North Americans' tenure systems with those of the colonizers.

Security of Tenure

The various concepts of land and property pivot on the notion that security of tenure is required for increasing productivity, supporting development and providing peace of mind for individuals in the society. Just as tenure has been described here to exist on different levels; individual and communal, formal and informal, and the permutations and gradations of these categories, the security of tenure that each level provides also differs.

Security of tenure exists on three dimensions, each one having different importance to different professionals (Bruce 1998). The depth of the security of tenure, or assurance as it is termed by Place et al. (1994), relates to the degree of confidence that landholders have that their rights to hold and use the land would be supported by the local community, the society as a whole, and the state. This dimension is important to the legal profession and can be indicated by the strength and the degree of enforcement of the legislation and regulations that exist governing land rights in the jurisdiction. The breadth of the security of tenure relates to the range of supported uses to which the land can be put. This dimension is important to land use and land resource managers and can be indicated by a list of possible uses to which the land can be put ranging from rights to use, occupy, or develop, to rights to mortgage, sell, or bequeath. The duration of the security of tenure relates to the length of time for which the rights may be held. This dimension is important from an economic perspective and can be indicated by the value of the investments and the production output that can be achieved within the time allotted for the rights. These time periods can range from month-to-month to leasehold for fixed

periods to freehold in perpetuity. These three dimensions may be illustrated as in Figure 2-2.

It is difficult to measure the security of tenure held by an individual (Roth and Haase 1998) since it is a perception held by the individual based on a combination of the value of the dimensions as they exist in a particular jurisdiction for the particular parcel of land together with the expectations of that individual. Bloch (2003) differentiates between objective security — the tangible evidence of security of tenure, including the documents and the legislation that supports the documentation — and subjective security — the perceptions of tenure security experienced by the landholder.

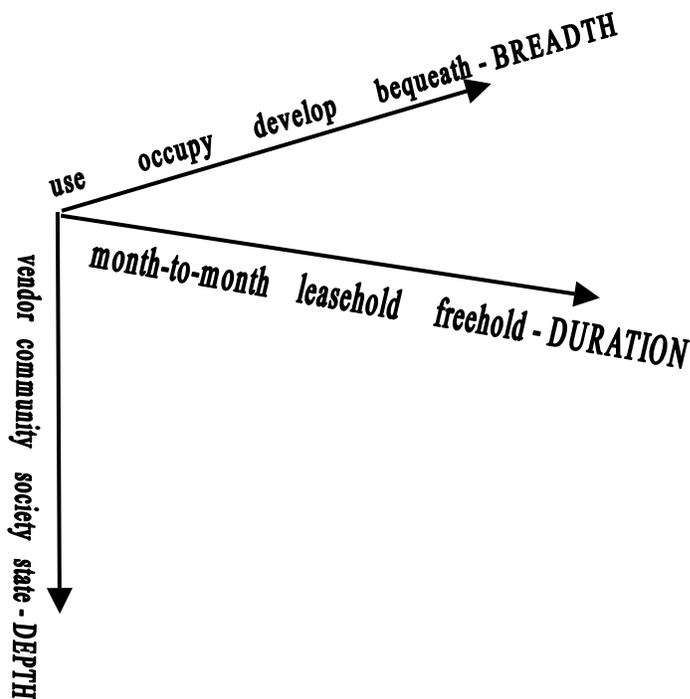


Figure 2-2. Three dimensions of security of tenure

Cadastral Reform Frameworks

Cadastral System Sustainability—Technical

Dale and McLaughlin (1988), and before them Simpson (1976) and Ruoff (1957), developed frameworks for the construction of cadastral and registration systems based on

observation and comparison of the efficiencies and benefits of then existing and historical systems and technologies. They also adapted technical, legal and sociological principles to determine what structure the cadastral and registration system should take. Some of these observations of then extant and historical systems are detailed in Dale (1976) and Dowson and Sheppard (1968). The cadastral system describes the land tenure in a country and must be able to keep pace with and support land-based development. A cadastre is defined in the Fédération Internationale des Géomètres (FIG) statement on the cadastre as:

... normally a parcel based and up-to-date land information system containing a record of interests in land (e.g. rights, restrictions and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, and ownership or control of those interests, and often the value of the parcel and its improvements. It may be established for fiscal purposes (e.g. valuation and equitable taxation), legal purposes (conveyancing), to assist in the management of land and land use (e.g. for planning and other administrative purposes), and enables sustainable development and environmental protection. (FIG 1995)

The use of the terms “normally” and “may” makes concessions for the fact that many jurisdictions contain only some of the characteristics listed but use the term cadastre for the system that they possess. Cadastral reform is therefore prescribed to either establish or reengineer these systems, including laws, institutions and technology, for recording the ownership, value and use of land. Maseyk (1993) defined cadastral reform as “... the processes of bringing about change in the cadastral systems, which will improve the efficiency, the operation of or the value of those systems.” (Maseyk 1993, p376)

The role of the cadastre through the years has evolved from strictly the recording of ownership information, value and use in the early history, through supporting land markets in the post industrialization era to management and planning of land use, to

current foci on environmental, social equity and sustainable development issues (Barnes 1990a; Williamson and Ting 2001). Frameworks for developing the cadastral system have always stressed precision in the definition of land parcels on the spatial side as well as precision in the determination of ownership on the legal side in order to ensure the efficiency of the system. With the change in the role of the cadastre, the requirements for recording ownership, value and use have expanded to where the systems must now support a myriad of other uses. To do so, they must form part of a spatial data infrastructure (Groot and McLaughlin 2000). Finley et al. (2000) cite examples of infrastructures of this type that incorporate cadastral information in their form. These examples include infrastructures developed and managed by Service New Brunswick of Canada, the US state of North Carolina, the Public Sector Mapping Agencies of Australia and the Dutch clearinghouse for geospatial information.

As technology advances to provide opportunities for increased precision in measurement, acceleration in speed of computations and improved clarity and flexibility of geospatial visualization, it has become difficult to determine, for a particular jurisdiction, exactly what level of the technology is necessary for supporting the social functions of the cadastre, of providing peaceful occupation of land and evidence for protection from contestation of claim, and at what point the use of technology results in greater conflict and contestation of land rights. This implementation problem, as it affects the global spatial data infrastructure has been highlighted by Lummaux (1997), as quoted in Groot and McLaughlin (2000, p23):

If it merely serves to emphasize the chasm between those who have and those who don't, if it would be another model for the former to profit at the expense of the latter, and if it would just aggravate the technological and economic dependencies

which already exist, this infrastructure would indeed become a terrible instrument of oppression and retreat.

This problem is more marked in the establishment or reengineering of cadastral systems in developing countries where technology can serve as a disincentive to the registration of transactions by landowners. This can occur because, inasmuch as the technology provides new options for efficiency and speed of operations and increasingly more complex representations, technology itself also has limitations and therefore restricts the system to being able to record and recognize only rights that can be clearly and verbally described and boundaries that can be numerically and graphically depicted. Where technology and legislation are, by nature, precise, standardized and generally inflexible, tenure rules can be flexible and negotiable. For example, innovations such as 3-D cadastres are in the experimental stage of more accurately describing the spatial extent of vertically layered rights (Stoter and Salzmann 2003) and video was used experimentally in Algeria to visually and orally document rights (Roux and Barry 2001). On the other hand, Ankersen and Barnes (in press) discuss the difficulties of recording and maintaining information on the spatially, temporally and hierarchically differentiated use rights within community concessions, extractive reserves and forest ejidos in Latin America since the use rights are so intricately interwoven.

Cadastral System Sustainability—Data

The technical structures of the cadastre must be able to move beyond the establishment of the cadastral land information systems to not only system scalability requirements but also to the capacity building and institutional strengthening required to maintain the systems over time. Dale and McLaughlin (1988, 1999), developed models for the structure of the land administration system, and checklists for the establishment of

the multi-purpose cadastre including the institutions, technology, spatial infrastructure and mapping required based on observation of existing systems and previous research by National Research Council (1980), Holstein et al. (1985) and others. They envision the ideal structure of the land administration system to be based on land information integrated from the institutions that traditionally acquire and manage data on the ownership, use, and value of land, that is, the land registry, the planning department and the tax department respectively. A model of the integrated system is as shown in Figure 2-3.

Dale and McLaughlin (1988, 1999) indicate the need for detailed, accurate and current land information to meet the requirements of land managers and ultimately the interests of equity, the environment and economic development, but they also stress the importance of maintenance of the information:

Maintenance is more important than initial system creation for without it, the system will become an historical monument and a folly at that. Not only must external changes be recorded within the system but also the system must itself be capable of change as the levels of sophistication both of the hardware and software and of the people operating them grow. (Dale and McLaughlin 1999, 161)

Groot and McLaughlin (2000) describe the necessity for the cadastral system to be part of an information infrastructure that would allow the sustainability of the available land information and also maintain its reliability, increase its utility and provide lowered costs to the users. They define the Geospatial Data Infrastructure (GDI) as encompassing:

... the networked geospatial databases and data handling facilities, the complex of institutional, organizational, technological, human, and economic resources which interact with one another and underpin the design, implementation, and maintenance of mechanisms facilitating the sharing, access to, and responsible use of geospatial data at an affordable cost for a specific application domain or enterprise. (Groot and McLaughlin 2000, 5)

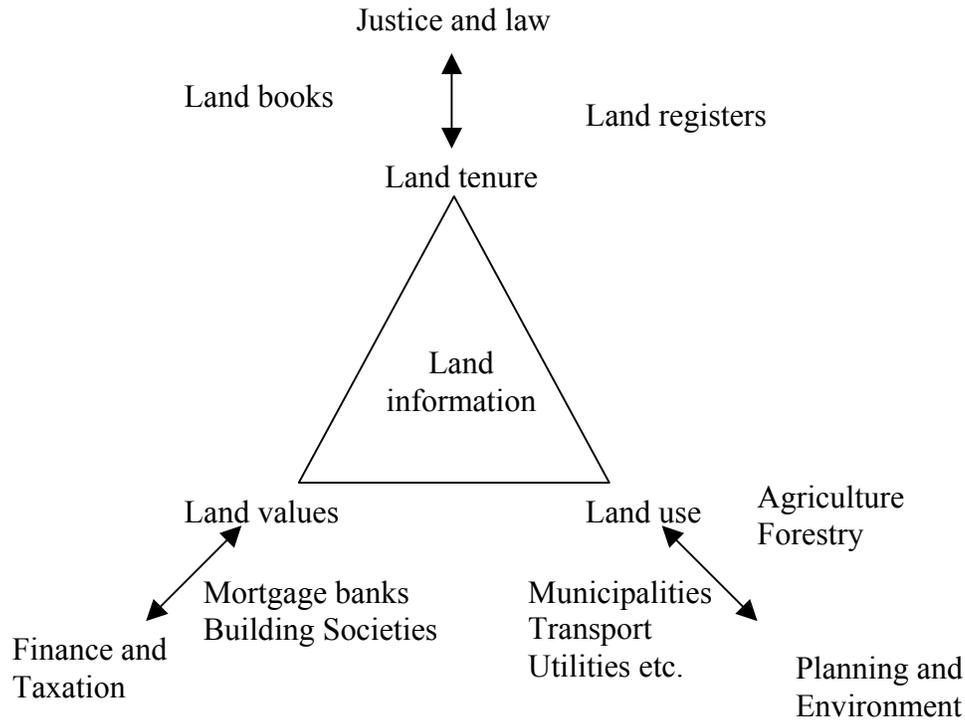


Figure 2-3. The central role of land information (Dale and McLaughlin 1999)

The position of cadastral data as one of the key foundational framework datasets is shown in Figure 2-4. The requirements for integration and comprehensiveness of data, as detailed in the information system framework definitions, run counter to trends towards decentralization of data and institutions being advanced by development, sustainability and governance literature (Baland and Platteau 1998; 1996, Grafton 2000). While centralization of technical operations in land information management leads to economy of scale, enhanced integration and better standardization of process, decentralization of system location allows easier access to communities to participate in recording of transactions and thus maintaining the currency of the database.

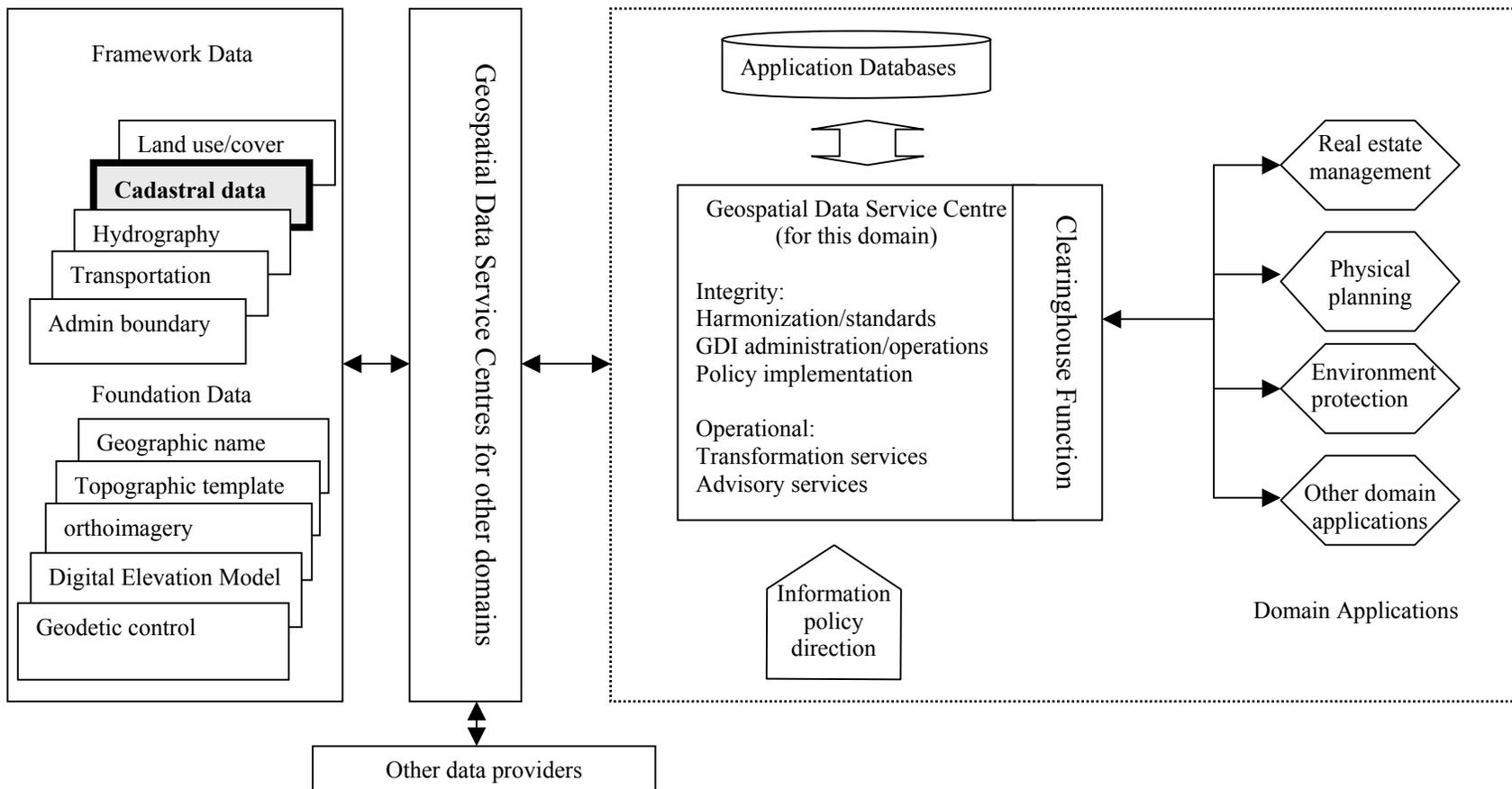


Figure 2-4. Cadastral data within the Geospatial Data Infrastructure (GDI) (Groot and McLaughlin 2000)

The decentralized institutions are more readily accepted by the local communities and can adapt to suit the communities' needs.

Van der Molen (2002) differentiates between the static components and the dynamic components of administration systems, positing that the recording of the facts at the point in time of the creation of the system is static whilst those components that are dynamic over time such as the relationship of people to land in the jurisdiction, the acceptance of this relationship by the statutory authorities, and the normal transactions that occur in a market environment require consideration prior to construction of the system to allow the system to remain sustainable. This sustainability requires flexibility in the initial conceptual design of the system since the system structure cannot be frequently changed, as this would create instability and lack of confidence in the system.

Maintenance of the information within a cadastral system is also a function of the legislation, which is part of the model of the system. Bittner and Frank (2002) develop a model for the registration of information in the cadastre. They define the correctness of the cadastre as the degree of equivalence between the information held in the cadastre and the legal situation on the ground. The information represented in the cadastre is an abstraction of the legal situation on the ground, but the legal system also is an abstraction of the actual tenure situation on the ground as it does not completely reflect reality. For example, a cadastre that does not accommodate strata titles is inadequate in its abstraction if the legislation allows strata titles. Legislation that makes no provision for dealing with strata titles is inadequate in its abstraction if strata ownership exists and is not proscribed by law. Informality occurs when occupation or use is in direct contravention of the law.

This model of the sequential abstraction from the reality to the information in the cadastre is shown in Figure 2-5.

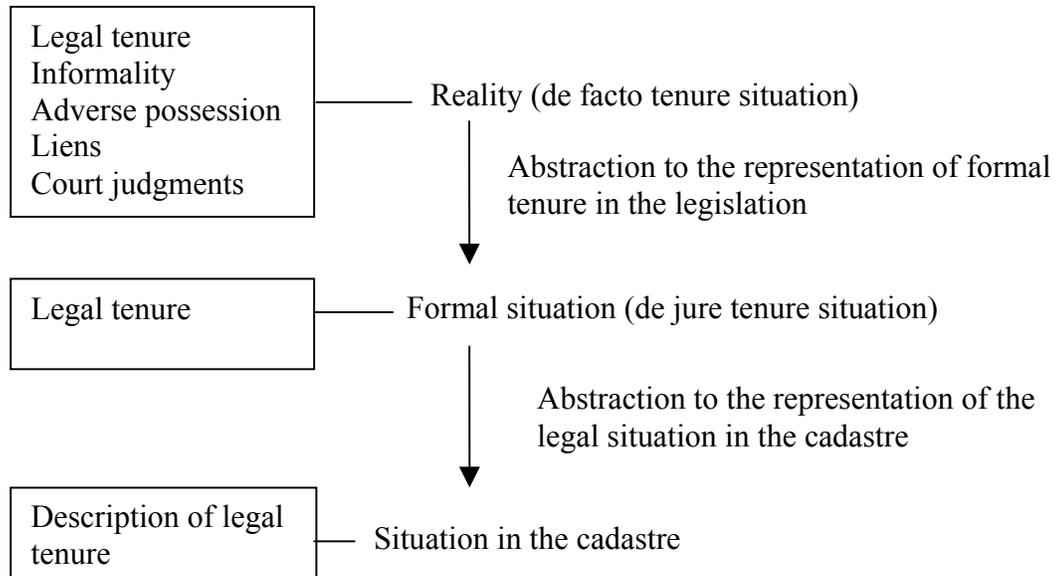


Figure 2-5. Abstraction from the tenure to the cadastre adapted from Bittner and Frank (2002)

What Bittner and Frank define as incorrectness therefore would be a subset of the actual difference between what is in the cadastre and what is found on the ground since the situation on the ground would include informality in addition to what is not adequately abstracted. This indicates that if the correctness of the cadastre in a specific jurisdiction is to be measured, then the correspondence between the situation in the cadastre and the formal situation can be measured, as in the model by Bittner and Frank.

Another measure of correspondence can be obtained by noting the difference between the tenure on the ground and the situation in the cadastre. In this latter instance, incorrectness includes the difference that can arise because the legislation is inadequate or inequitable or being flouted. In both instances, incorrectness in the recorded data can theoretically arise, because of sale, gift, donation, lease, bequest and intestate inheritance.

Then the recorded rights holder would not be the same as the actual rights holder. While legislation can prescribe for transfers of sale, gift, donation and lease to be invalid unless recorded and so preserve correctness of the registration system, this is impractical in instances of bequest or intestate inheritance since the property cannot continue to belong to the deceased until registered in the heir. The record therefore becomes incorrect immediately upon the death of the registered owner.

Bittner and Frank recommend linking the land registry to the other registries or institutions where real world changes impacting land rights are recorded. They develop an automated system for marking the land registry records as being incorrect when digital information about changes is received from other sources. The level of incorrectness of the land registry data would thus be known until the requisite legal and administrative procedures are completed to formally register the change. A level of correctness in the registration system of 100% cannot be attained as information on deaths, adverse possession, liens and personal court judgments for example would not be attainable immediately. A level of acceptable correctness that would not affect the confidence in and the functioning of the system is required to be specified. This level of acceptable correctness must be set by the institution responsible for the cadastre after consideration of the institutional capacities, the measured or anticipated impact on the users of incorrectness, and the user requirements. This level can be amended as capacities and technologies improve. The Ordnance Survey of Great Britain, for example, sets benchmark targets for the currency of its topographic maps, which are used as cadastral maps (Ordnance Survey 2004). These targets have progressed to higher and more stringent specifications as capacities and technologies have improved.

Cadastral System Sustainability—Participation

The state institutions responsible for the data are required to maintain the information system but the responsibility also falls on civil society to maintain the data. Larsson (1991) determined that certain conditions encouraged society to maintain the registers. These conditions he noted to be:

- The advantages of registration communicated to the landowners,
- The ease of registration provided by centralization of operations and simplification of process,
- Linkages between state processes that would automatically trigger updating,
- Lowered costs of registration.

Palmer (1996) suggested that government sanctions, or credit-centered incentives, such as facilitating access to credit for registered owners or assigning a credit risk rating to parcels, could be utilized to encourage the support of the land registration information system and ensure its currency. However, the model of correctness illustrated in Figure 2-4 shows that if the legislation causes low correspondence between the reality and the abstraction to the formal situation, then the system information would appear to be more incorrect when compared with the de facto situation and would also be less acceptable to the society.

This need for participation and interaction between the technology and the society has required the cadastral reform process to be more flexible and to take into consideration more of the endogenous social issues of the jurisdiction in which it is to be implemented. Suggested methodologies to marry the technological requirements of the reform with the social requirements to form one proposal have come from Bittner et al. (2000), Fourie and van Gysen (1995), Williamson and Fourie (1998), and Zevenbergen

(1998) amongst others. There have, however, been few attempts to test these methodologies, and the technology-based structure of the cadastral reform process remains largely unchanged. Williamson and Fourie (1998) suggested case study methodologies for assessing the situation in the jurisdiction in which the cadastral reform process is to be implemented prior to proposal of a solution.

Literature on the technological advances in information systems acknowledges that there is a significant cultural effect on the adoption and diffusion of land information systems from country to country and culture to culture. Even though the initial expenditure may be high, establishing high technology cadastral information systems as part of a land administration development program can tend to be more cost effective than more labor-intensive methods. Compare the cost and efficiencies of data acquisition and maintenance using a high technology land registration process including GPS, digital photogrammetry and GIS software with that based on surveying individual parcels using conventional methods and manual drafting and updating. Barnes et al. (1998) for example, found that in the study area of Albania, conventional methods surveyed 10 hectares per day while GPS techniques surveyed 37 hectares per day. However, if the receiving culture does not accept and adopt the technology, there would be difficulties in maintaining the efficiency over time. Al-Gahtani (2003) posits that even though provision of IT occurs in 90% of development banks' lending, evidence shows that the lack of adoption of the technology by institutions and individuals can prevent benefits accruing from the expenditure. This is particularly important in developing countries where other factors such as infrastructure, politics and costs already encumber the effectiveness of the technology.

There has been much research on diffusion of innovations to identify the particular characteristics of technology that determine the rate at which the technology would be adopted by the receiving society. Acceptance and adoption by civil society would encourage participation in the maintenance of the data. Rogers (1983) listed these characteristics as being:

- Relative advantage,
- Compatibility,
- Complexity,
- Trialability and
- Observability.

The relative advantage is defined as the benefit perceived by the user to accrue on adoption of the innovation. This can be a value benefit or it can be prestige attached to being seen as adopting. Compatibility defines how closely the innovation corresponds to the preceding technology and therefore how easy it is to adopt the new technology. Complexity defines how difficult it is to adopt the new technology as well as the steepness of the learning curve to adoption. Trialability defines whether the innovation can be tested without negative repercussions if it were to be abandoned. Observability denotes whether the adoption by others can be viewed so that any benefits accruing to other adopters can be observed. Researchers in the area of GIS adoption have largely upheld these general characteristics that are applicable for all technology adoption (Chan and Williamson 1999). In GIS the adoption is stated to be determined by the characteristics of the system and the characteristics of the organization within which the GIS is established (Chan and Williamson 1999). In LIS, and registration systems in particular that are established for the entire society, the adoption can be determined by the characteristics of the registration system and the culture of the society. Al-Gahtani

(2003) in a study on computer adoption in Saudi Arabia found that up to 87% of computer usage was explained by the perceived diffusion characteristics. Nedovik and Godschalk (1996) found, in a study of the adoption of GIS technology in four agencies in North Carolina, USA, that perceived relative advantage and compatibility of the new system with previous computer experience of the adopters were major determinants of the adoption of the technology.

Diffusion is defined as “the process of communicating an innovation to and among the population of potential users who might choose to adopt or reject it” (Onsrud and Pinto 1991, 447) or as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers 1995, 5). An innovation is defined as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers 1995, 11). The information system established as a result of the land titling/registration program may be considered to be the innovation to be adopted, but the concept of individualized land tenure, insofar as it may be a new process particularly for societies where communal or other traditional forms of tenure were previously prevalent, can be regarded as the innovation required to be adopted and diffused.

Maitland (1998) posits that even prior to introducing new technology, the culture of the society can be assessed to determine the potential for successful introduction and rate of diffusion. However, in researching the diffusion of interactive networks, Maitland indicates the difficulties of operationalizing the variables defining culture and presents tentative propositions relating the variables to the adoption. While there are many theories defining methods of categorizing national cultures in order to scientifically

measure the impact of culture on diffusion, Hofstede (1980; 1991) defined five categories that may be used to determine the impact on the adoption of land information technology.

These categories define the ways in which the society engages:

- Power hierarchies within its structure
- Uncertainties and problems it encounters
- Gender differences
- Individuality as opposed to group action
- Long as opposed to short term orientation

Van den Toorn and de Man (2001), speaking from the perspective of GIS in general and not necessarily registration information systems, posit that societies with vertical power hierarchies would utilize GIS for management functions and downplay any inherent sharing and social benefits. Societies with more horizontal power hierarchies would do the opposite. Societies that value direct management of problems and uncertainties would be quick to use all the novel functionalities of the GIS. Societies that are regarded as masculine or which differentiate between treatment of males and females would again use GIS for management and control, while more feminine cultures would adopt the relationship building and networking aspects of GIS. They regard individualism as being strongly and inversely correlated with power hierarchy so no additional information is attained by adding information on the status of the individualism in the society.

While there may be cultural differences even within a country relating to urban and rural cultures, or amongst different organizations within the country, general categorizations can be made about the country as a whole where the heterogeneity within the country is less marked than that across countries. The way these categories affect diffusion in land information systems has been investigated by van den Toorn and de

Man (2001) who admit that adequate systematic knowledge is lacking about the factors that determine adoption of land information systems. The impact of these cultural variables on the diffusion of interactive networks was also investigated by Maitland (1998) but since the variables are confounding, no clear consensus on a model could be derived using all the variables derived from the categories. Applying the variables to land registration systems, a hypothesis can be stated where masculine societies would adopt the system for management of the data and the use of land. Conversely a feminine society would adopt the system for supporting equitable distribution of land. This inconsistency in determining the direction of causality of the relationship between the variable and the outcome arises for all the variables leading to van den Toorn and de Man (2001) stating that the relationship is multidimensional. Maitland's (1998) proposed hypotheses would need to be empirically tested.

To address the conflict between the technology and the society into which the information system is being injected, van den Toorn and de Man (2001) suggest hybrid methods that can be revised over time since culture is dynamic. However, these hybrid approaches can prove to be expensive and less efficient.

Summary

Chapter 2 presents the background theory that drives the move to institute land titling programs internationally and also shapes the structure of such programs.

Arguments that support the need for formal individualized tenure systems conflict with research that suggests that other less formal and more communal tenure forms are just as beneficial to investment, productivity and security of tenure.

Sustainability of the cadastral system, of which the registration system is a part, has technical, data, and social participation components. The social participation component

is impacted by culture and can be modeled using diffusion concepts of perceived system characteristics and also using cultural categorization.

Chapter 3 that follows details the empirical findings of current research on the impact of land titling on land markets and sustainability of land registration systems in various jurisdictions.

CHAPTER 3
FACTORS CONTRIBUTING TO PROGRAM IMPACT AND SYSTEM
SUSTAINABILITY

Empirical Data on Land Titling Impacts

The following sections trace the major empirical studies that have been done on the impact of land titling/land registration programs on land market transactions of sale, mortgage and lease. The eventual sustainability of the land registration systems in these studies is also examined where noted. Studies that investigate the impact of land titling and land registration on change in security of tenure are also described since security of tenure is theoretically an intermediate requirement to transacting in the market. The factors that contribute to the programs achieving the outcomes are identified.

Existing Studies and Methodologies in Land Titling

There have been empirical impact assessments of land titling and land registration performed in various regions of the world using different methodologies. Few of these have measured the sustainability of the land title registration system or the impact of land titling programs on the formal land market over the medium term. There is very little empirical data on these issues to be found on the Caribbean region. The applicability of the findings in the impact studies to other cultures and regions is also questionable due to the wide ranges of exogenous factors that affect the land registration system and the land market. Some of the studies presented here are not based on the installation of a focused land titling program but are comparisons between documented tenure and undocumented tenure in a jurisdiction.

Other measures of assigning land rights that stop short of individualized title, such as Community Land Trusts (CLTs) and Temporary Occupation Licences (TOLs) in Kenya, Certificates of Comfort (COCs) in Trinidad and Tobago, Transitional Certificates in Romania and Concession of the Real Right to Use (CRRU) in Brazil, have been attempted particularly in the urban environment, but these are not considered here. The focus here is on addressing both of the research questions, the first relating to formal land transactions in the land market and the second relating to land registration systems sustainability over the medium term.

There have also been studies on the impact of land titling or secure tenure on land values (Thailand, Philippines, Indonesia, Peru), investments (Costa Rica, Ghana (Besley 1995) Thailand (Feder and Onchan 1987), India (Pender and Kerr 1994)), incomes (Ecuador, Paraguay, Costa Rica) and productivity (Zimbabwe (Moor 1996)). These outcomes, while they may be mentioned, are not the primary focus of this research.

Empirical data from Africa

Kenya and Tanzania. Pinckney and Kimuyu (1994) compared titled areas in Kenya with untitled areas in Tanzania to determine the difference in the volume of transactions between the locations. While Kenya had been the subject of land titling, the Government of Tanzania had been concerned that titling would result in loss of equity in landholding and had nationalized and leased land instead to occupants. The study found that there was no difference in the number of transactions, formal or informal, between the two locations. The study also found an insignificant number of land secured loans in the Kenyan sample and no land-secured loans in the Tanzanian sample. The researchers therefore concluded that land titling in Kenya had not led to an increase in transactions, both formal and informal, and that the tenacity of the customary tenure had negated the

impact. They suggested that the resources of the country that were being invested in land titling be otherwise deployed.

Kenya. Platteau (1996) questioned the applicability of the evolutionary theory of land rights in the Sub-Saharan African context despite the fact that other researchers such as Feder and Nishio (1999) presented empirical evidence from several other countries in other regions, of titled farmers receiving more credit and investing more on their land than untitled farmers. Platteau (1996) based his critique on empirical research done by Land Tenure Center (LTC) (1990), Roth et al. (1994a; 1994b), Migot-Adholla et al. (1994a; 1994b) and others in the Sub Saharan African context. These studies were focused on access to credit and the corresponding impact on agricultural productivity and not necessarily on the growth of the land market in terms of the changes in the number of transactions performed on land. Platteau found that, in Kenya, whereas land sales had increased in the short term following land reform, that is, when land registration had not yet been completed, this growth in the formal land market was not sustained over time. The registered parcels also soon reverted to customary transacting processes causing loss of sustainability of the land registration system. A significant cultural effect therefore mitigated any direct impact of land titling on the land market and on the sustainability of the land title registration system.

Place and Migot-Adholla (1998), re-examining data from a study performed in 1988 in Kenya, found insufficient evidence to support any significant effect of registration and land titling on the perception of security of tenure, on the use of credit by landowners, on agricultural productivity and on land sales and the reallocation of land.

They also suggested a redirection of resources towards other measures if an increase in agricultural productivity were the goal.

Security of tenure was measured, in the Kenyan study, by the incidence of land titles, by the incidence of current registration, and by enumerating the use rights perceived to be held and the number of land related disputes, including boundary and legitimacy disputes, that had occurred. The number of sales and leases that had occurred were also measured to determine the impact of land titling on the land market and on land concentration. The study found 34.6% of titles were held under the current household head and 57.7% of parcels were correctly recorded in the registry, pointing to problems in the sustainability of the registration system and also leading to conclusions that the landholders perceived security of tenure even without current registration (Place and Migot-Adholla 1998).

Place and Migot-Adholla suggested lack of demand by the farmers, costs of registration, lack of awareness, and corrupt or bureaucratic institutional processes as reasons for the lack of sustainability. These issues correspond to the relative advantage, observability and complexity of diffusion frameworks. These factors along with the proximity to urban centers, difference in land values, and history of commercialization in the area, they determined, explained the disparity in the frequency of land titles across the four study areas. The lack of transactions of sale they attributed to the indigenous tenure system restricting the demand for and the social approval to perform transactions on land.

The titling project they analyzed had begun in 1954 based on 1908 land titling legislation. While the project systematically adjudicated and surveyed in rural areas, new settlers were required to pay for land before they could obtain title. This was therefore a

significant factor that would have impacted on the sustainability of the land title registration system and the perceptions of tenure security experienced by the occupants. Although many occupants of land did not pay and thus were not eventually titled, the government's policy was not to remove the occupants, so few parcels had been repossessed. While this policy would have negatively affected incentives to register, it would have positively impacted on perceived security of tenure but not on documentary security of tenure.

Burkina Faso. More recently, Brasselle et al. (2002) point to flaws in the design and concept of empirical tests that both support and question the positive link between individualized tenure and security of tenure and then to investment on land. They opine that there is always some form of endogenous tenure underlying the titling and this must be accounted for and controlled before statements about the correlation between security of tenure and investments can be made. The researchers attempt to control for this effect by choosing for analysis newly settled communities where no endogenous tenure and therefore no tenure security would have existed prior to the titling. They then examined investment after a short period of 5 years to determine if investments increased with increasing security of tenure. Instead they found that investments increased security of tenure and not the other way around. The study was performed in a community of Burkina Faso in Africa where there was no land market so that the impact on transactions could not be investigated.

Empirical data from Asia

India. Pender and Kerr (1994) found, in India, that any differences in credit use between titled land and assigned state land were due to the difference in quality of the land and not to increased security of tenure as a result of the land titling.

Thailand. The Thailand land titling project began in 1984 and presented an opportunity for empirical testing of the benefits of instituting land titling and land registration. It was determined in an empirical study (Feder et al. 1988) on rural Thailand that farmers who were in possession of titled land accessed 52-521% more formal credit than those farmers who had no title. Feder and Nishio (1999) also cited a study done 3 to 4 years after the Land Titling Project in one area of rural Thailand that indicated that activity in the land market had grown over the short term from 35% to 205% households engaged in transactions in the titled area as opposed to the yet untitled area.

These studies attributed the difference partially to the fact that the economic environment supported the ability of the farmers to access credit and receive returns on their investments in agriculture. Pinckney and Kimuyu (1994) also attributed the impact to the fact that no previous customary tenure existed in the areas surveyed in Thailand, that would have caused resistance to the new system and reluctance to mortgage. Pinckney and Kimuyu also pointed to the supply of credit advanced by the government of Thailand as contributing to the impact of the land titling on credit access. Though focused more on the success of project output than the project outcomes, Rattanabirabongse et al. (1998) determined that the success of the Thailand titling project was due to the thriving agricultural sector, the focus of the project solely on land titling, the capacities and efficiencies of the implementing institutions, the supportive legislative environment, the absence of customary tenure, and the existence of continued political support.

More recent studies, however, question the success of socially equitable longer term project outcomes in Thailand, citing corruption in land distribution which has led to

land concentration, marginalization of the poor who have occupied land categorized as forest land for decades, and eventual landlessness caused by rising prices that became out of the reach of the poor (Leonard and Narintarakul Na Ayutthaya 2003).

Empirical data from the Caribbean

Jamaica. An IDB study (1986), performed in Jamaica, found that farmers on titled land had planted almost twice as many permanent and semi-permanent crops as those on untitled land in a voluntary sporadic titling process.

Empirical data from Latin America

Peru. De Soto (1989) presented the case of Peru and the difference between the tenure security offered by untitled and titled land. Tenure security was deduced from the fact that 13% of the lots on informal untitled land were involved in litigation. The titled land was also valued nine times higher than the untitled land.

Brazil. Alston et al. (1996) performed research in Brazil on the impact of titling on land values, demand for title and magnitude of investment. While this study did not directly focus on security of tenure or on the volume of land transactions of sale and mortgage, information on documentary security of tenure may be deduced from the observed incidence of title. The distance from the market center and the duration of occupation were determined to be related to the incidence of title. Title was required to provide security in the contested regions close to the market center.

Paraguay. In Paraguay, Carter and Olinto (1996) found that land titling increased the incidence of credit but that this credit access was affected by the size of the farm because the transaction costs were a larger percentage of the value of the land for small farmers.

Honduras. The impact of land titling on credit was researched in Honduras by López (1996). Based on a survey of 450 households, the study found that 8% more titled farmers than the untitled ones received credit and the titled farmers received almost 4 times what the untitled farmers received in credit.

Jansen and Roquas (1998) also assessed the Honduran land titling project that was initiated in 1982. The project was intended, as is usually proposed in order to derive the benefits posited by the ETLR, to improve security of tenure and by so doing to facilitate credit access and agricultural productivity. From their assessment of the outcomes in one village the researchers determined that the project was unsuccessful in its aims because of the political environment in which the land titling had occurred. The project had a social aim of empowering the poor, yet payments were required for obtaining titles on the land the poor occupied. The payments were out of the reach of most of the landholders. Political conflict and mistrust led to a decrease in security of tenure as a result of the project. The alternate land market arrangements involving private sale contracts were supported by the landholders, leading to non-adoption of the formal registration process and lack of sustainability of the land registration system. The process was not systematic, so participation was not comprehensive. The outcome was that perceived security of tenure was not improved but was reduced in some instances, formal credit access did not improve, and agricultural productivity did not increase. The study explored the impact of the titling project by interviewing villagers in the study area and documenting their perceptions of the process and outcomes of the titling project.

Nicaragua. Deininger et al. (2003) examined the land rental and land sales markets during the implementation of land policy reforms in Nicaragua between 1995

and 1998. Between 1995 and 2001, 30,000 titles were awarded to occupants of land in a selective systematic process. The comparison over the short interval pointed to only modest improvement in equity in land holding and an inverse relationship between productivity and farm size. However, while the land reform had involved titling and registration of land to occupants, the program was still ongoing at the time of the assessment.

The focus of the land reform program was on rural agricultural land markets. The methodology used was the sampling of 2000 agricultural households. Information was acquired on several socio-economic indicators including size of land holdings, area of land purchased within the 5 years preceding the study, access to credit and type of land tenure possessed. The size of holdings per household was normalized to size of holdings per adult and plotted against the net purchases of land area in 1995 and 1998. This visualization of the impact of the land reform on the land market indicated no significant difference between the sizes holdings purchased in the two years. It was determined that 2% of the sample had purchased land during the 5-year study period. The rental markets, however, increased for large landowners.

Other more rigorous statistical regression analyses were also performed to determine the relative impact of several other factors on land sales and rentals beyond the presence or absence of title, such as age of head of household, years of education of the head of household and other variables. The researchers attributed the lack of growth in the land market to credit market imperfections, which restricted demand for land, and suggested that accompanying legislation and policy measures were necessary to foster land market growth.

Empirical data from Transitional Economies

Projects in transitional economies in Europe and Central Asia are focused on individualizing land for creating land markets (Williamson 2001). However, it is too soon to determine the medium term impact of these projects, as the projects are still ongoing. Market activity is flourishing in some cases, such as in Armenia, where transactions have doubled over one year (Burns et al. 2003), but may not continue over the medium term. Bloch (2000) reported very few sale transactions occurring in Albania between the transfer of land to citizens in 1991 and the study period in 1995.

Factors Impacting Land Titling Outcomes

The findings from the selection of empirical studies can be collated to derive the key recurring factors that appear to affect the ability of the land titling and land registration programs to lead to the anticipated benefits. Table 3-1 and Table 3-2 condense the findings in the studies. These factors are contextual but they represent a broad view of the factors that have been determined to be relevant in different jurisdictions. From this assessment a list of recurring factors can be compiled.

A list of factors that impact on the ability of land titling and land registration programs to lead to enhanced security of tenure, improved credit use, and increased sale transactions can be gleaned from the empirical data to comprise:

- Culture in the form of tenure type, perceptions and practices
- Credit market status – availability of credit, opportunities, and insurance
- Appropriateness of land related legislation
- Appropriateness of land related policy
- Cost of titling/registration
- The nature of political relationships
- Presence of alternative transacting arrangements including informal arrangements
- Whether land titling was systematic or sporadic, voluntary or compulsory

Table 3-1. Existing empirical data on impact of land titling/land registration

Where	When published	Time slice	Finding	Contributing factors
Africa				
Kenya, Tanzania	1994	40 years after the beginning of sporadic titling	No difference in sales No difference in credit access Some reduced security	Culture (communal tenure)
Kenya, Uganda, others	1996	During titling in Kenya, Uganda, Zimbabwe	No increase in land sales Also: Short term growth not sustained	Culture (communal tenure)
Kenya	1998	40 years after the beginning of sporadic titling	No increase in sales Also: No change in perception of security of tenure No change in use of credit No change in agricultural productivity No change in land allocation	Lack of demand for titling Culture (communal tenure)
Burkina Faso	2002	5 years after the beginning of voluntary sporadic titling	No impact of security of tenure on investments	No link
Asia				
Thailand	1999	During systematic titling	Increase in transactions	Market and credit availability
Caribbean				
Jamaica	1986	During voluntary, sporadic titling	Increase in permanent crops	
Latin America				
Paraguay	1996	30 years after beginning voluntary titling	Increase in credit access	Size of farm (relative transaction cost impact)
Brazil	1996	During voluntary, sporadic titling	Increase in land value Increase in investment	Distance from market Gov't policy
Honduras	1998	16 years after beginning sporadic, voluntary titling	No formal credit access Also: Decrease in security of tenure No improvement in agricultural productivity	Cost Political conflict Alternate arrangements
Nicaragua	2003	During the first 3 years of sporadic titling	Rental market increase Modest improvement in equity and land holding Inverse relationship between productivity and farm size	Not systematic Credit market imperfections restricted demand for land Absence of legislation and policy

- Pre-existing land distribution – gender, ethnic, political, religious variability
- Characteristics of land – distance from market, size, value

Although there are fewer studies that focus on the sustainability of the land registration system, factors noted in the literature to impact on the ability of land registration systems to remain sustainable in participation include:

- Culture in the form of tenure type, perceptions and practices
- Society driven demand for registration
- Cost of registration
- Awareness of the system (education)
- The nature of the institutional processes – corruption, bureaucracy
- Latitude of political policies

The myriad of factors prevents relating them all and assessing them as independent variables in a single equation in a single context. Instead, case study methodology and comparisons of indicators were used in this research, as have been used in previous research, to examine whether land titling/land registration projects lead to growth in land markets and whether the land registration systems thus installed are sustainable in terms of participation over the medium term.

Table 3-2. Existing empirical data on sustainability of land registration systems

Researcher	Where	When	Time scale	Finding	Reason
Platteau	Kenya, Uganda, others	1996	various	Reversion to customary transactions	Culture (communal tenure)
Place and Migot-Adholla	Kenya	1998	44 years after the beginning of sporadic titling	Loss in sustainability	Lack of demand Cost of registration Lack of awareness Corrupt or bureaucratic institutional processes Political tolerance

Summary

Chapter 3 presented a series of empirical studies that have investigated the impact of land titling/land registration on the security of tenure, credit use, and agricultural productivity and the sustainability of the systems. From an examination of the

conclusions of these studies, a list of contributing factors that impact on the ability of land titling/land registration to achieve results is derived. The studies do not test for medium term impact after systematic titling.

Chapter 4 presents the methodology for testing for medium term impact after systematic titling in the case study jurisdiction of St. Lucia within the context of the jurisdiction.

CHAPTER 4 METHODOLOGY

Background of the Case Study

Overview of St. Lucia

The island nation of St. Lucia, in the Caribbean, shares the topography and geomorphology of several of its also volcanically formed island neighbors such as Grenada, Montserrat, and St. Vincent. The topography is therefore steep, rising to 950m above sea level within a total area of 616 sq. km. The country had a population of 158,000 persons in 2001 (Central Statistical Office [CSO] 2003), all of whom value land highly and especially prize the limited quantity of available flat or gently sloping areas.

St. Lucia is particularly well suited for a study of this type at this time since the systematic titling program that was performed there between 1984 and 1987 was one of the few land titling programs that completed an entire country over a short time span. All parcels were therefore recorded and issued with titles, even if the titles were provisional in some instances, making the project an extremely successful one in terms of the project output. This gives a starting point from which to assess the current status and the impact of land titling and land registration programs on project outcomes. The 16 years that have elapsed since the program also allow the initial impact to have been felt and absorbed, so that the current transaction activity would not be affected by any unnatural initial activity resulting from the institution of the program and the land title registration system. The stable political and peaceful social environment owing in part to a society that is relatively ethnically and culturally homogeneous removes some of the exogenous

factors that impact on the success of land titling and land registration projects and land markets. The population is predominantly African and 90% Roman Catholic.

While St. Lucia's unique status is an asset to its selection for this research, the country also has similarities with other jurisdictions that would make generalization of the findings possible. The economic environment is similar to other small island Caribbean countries in the dependence on agriculture and tourism. The "family land" system of multiple owner tenure is also common to several other islands in the Caribbean and has its parallel in the communal ownership systems of many developing countries such as the indigenous tenure systems of Latin America and the customary tenure systems of Africa.

Justification and Aims of the LRTP

The Government of St. Lucia established a land reform commission in 1979 (Stanfield 1988a) that reported on the land tenure in the country and its effect on agricultural productivity and therefore the economy. The early history and settlement patterns of the country were believed to have led to an inequitable landholding situation where most of the agricultural producers were small scale farmers on poor and marginal lands while a few land holders commanded large highly fertile areas. The "family-land" form of communal tenure that exists in the country and in other countries of the Caribbean was also singled out as being responsible for the inability of landholders to access working capital and effect efficient management and production decisions on the land. The systems for recording rights to land were also inadequate and difficult to negotiate, being based on transaction recording.

The family-land tenure type, which was believed to be the bane of the land tenure system and of productive agriculture, is defined as one in which the holders of the land

have inherited undivided shares in the land, usually after a series of intestate devolutions with no documentary identification of the size of individual shareholding nor the names of persons entitled. Using a strictly legal interpretation of inheritance legislation, the number and size of shareholding usually can be determined with some difficulty.

However, the actual practice for deciding membership in the entitled group deviates somewhat from this formal determination, as extended family members may be accepted.

The effect of this type of communal tenure is similar to that of communal groupings in traditional settings in Africa, Latin America and elsewhere (Bruce 1983). Conflicts can occur over use and physical limits of occupation, transactions and some development decisions require the approval of a large number of individuals and so are difficult to effect, and credit institutions are reluctant to extend credit to individual group members for fear of the difficulty of negotiating transaction decisions with the entire group (Stanfield 1988a). More recent research submits that the family land form of tenure is to be commended for being a resilient entity in St. Lucia that provides economic support for farmers in the uncertain market environment (Dujon 1995).

The result of the reports on the identified problems was that the Government decided to focus on specific areas to improve the agricultural productivity. These areas included (Stanfield 1988a):

- Diversification away from the dependence on banana growing
- Introduction of agricultural technology
- Promotion of agriculture as an attractive profession to youths
- Rationalization of the land tenure situation

The Land Registration and Titling Program (LRTP) was proposed to address the last point of focus, the rationalization of the land tenure situation, by improving security of tenure on individually owned land through titling and recording titles, by reducing the

incidence of family land and putting legislation and institutions in place to encourage and facilitate individualization of land and by installing a land title registration system to replace the deeds registration system and thereby to promote investment in the land market from credit institutions and potential buyers.

The LRTP Process

The LRTP began with the introduction of appropriate legislation to give authority to the process. The Saint Lucia Land Registration Act No. 12 of 1984, the Land Adjudication Act No. 11 of 1984 and the Land Surveyors' Act No. 13 of 1984 were the primary laws that, at the time of the LRTP, superseded the provisions of the St. Lucia Civil Code Chapter 242 on matters of land rights and interests in land (Deterville 1988). The LRTP proceeded to systematically and compulsorily adjudicate, demarcate, survey, and record, rights to land over all rural areas in St. Lucia and finally over the urban area of Castries, resulting in a complete graphic and textual record of rights to over 33,000 parcels over all of St. Lucia (United Aerial Mapping Inc. 1988).

Absolute, provisional and leasehold titles were given depending on a) whether the parcel holder could prove ownership by documentary evidence or had been in occupation for over thirty years, b) whether the parcel holder had been in occupation for less than thirty years even with documentary evidence and c) whether the parcel holder was party to an agreement for lease of the parcel for a period of two years or greater. The Land Registration Act, Section 29 (3) provides for the upgrading of provisional title to absolute title upon the expiration of 12 years from first registration. Conversion from provisional title to absolute title based on this regulation, however, requires application by the proprietor of the land and assessment by the Registrar to ascertain whether the conversion should be granted.

It was originally intended that the vexed problem of family lands be dealt with during the LRTP by subdividing and registering individual parcels based on the undivided interests held in the land and with the consent of the family members involved (Stanfield 1988b). However, the project personnel were required to keep within the time and budget constraints for completing the project, so their focus was not on persuading family members to subdivide, and therefore many of the family land parcels remained in multiple ownership. Dealing with the complex issue of determining who was entitled and the size of their entitlement, and obtaining agreement, would have required additional resources of staffing, money and time. Since the LRTP provided an opportunity for the family land parcels to be subdivided and the subdivided portions individually registered free of charge to the owners, the fact that many of these parcels remained in multiple ownership was felt to be an indication that the owners were not interested in individualization. In addition, the lengthy and strictly regulated planning approval process required prior to subdivision, was also thought to affect the willingness of the family land owners to subdivide during the LRTP. The result was the distribution of tenure types indicated in Table 4-1 and displayed in Figure 4-1.

Table 4-1. Incidence of family land in 1987 from baseline data

Type of Ownership	Babonneau	Micoud	Choiseul	Millet	Total
Individual	41	9	9	11	70
	57.7%	22.0%	20.9%	37.9%	38.0%
In common (husband and wife)	14	18	10	11	53
	19.7%	43.9%	23.3%	37.9%	28.8%
Family land	16	14	24	7	61
	22.5%	34.1%	55.8%	24.1%	33.2%
Totals	71	41	43	29	184

Source: Stanfield 1988b

The table and the figure indicate that the incidence of family land was greatest in Choiseul and least in Babonneau at the time of the baseline study in 1987 after the

completion of the LRTP. However, individualized parcels, including parcels held in community¹ were greater in number in all the communities except Choiseul.

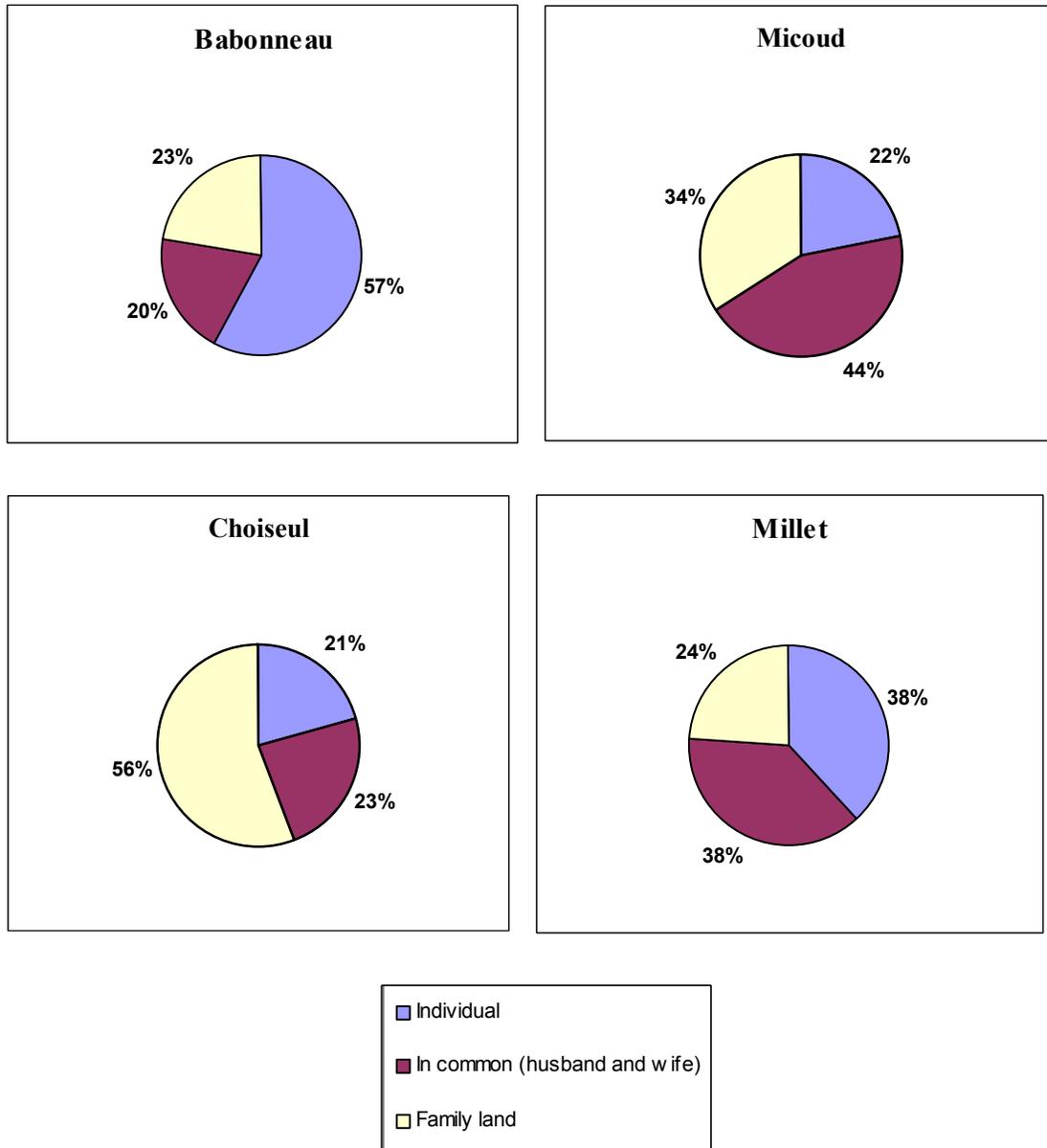


Figure 4-1. Distribution of tenure types in field sample of 1987 Baseline Study

¹ Whereas the LRTP recorded husband and wife ownership as “in common” ownership according to the Land Registration Act, a subsequent amendment restored the ability of the Civil Code to recognize this type of husband and wife ownership as “in community”. The application of succession rules differs between the two types of registration (Deterville 1988, Stanfield 1988b).

The Baseline Study

The baseline study was carried out between July and December 1987 by the Land Tenure Center of the University of Wisconsin at Madison, funded by the USAID, which also funded the LRTP. The reports on the data acquisition and data analysis were published in 1988. At the time of the baseline study the LRTP had not yet concluded but the areas surveyed during the study had already been adjudicated, titled and registered. The baseline study was proposed to be the first phase of diachronic research on the long-term effects of the LRTP. The research intended to show the impact of the LRTP via the indicators of number of transactions on agricultural land, value of agricultural land, and productivity of agricultural land (Stanfield 1988a).

Community case studies were carried out in the communities of Babonneau, Micoud, Choiseul and Millet, which fall substantially but not wholly within the administrative quarters of Rural Castries, Micoud, Choiseul and Anse La Raye (Gomes 1988; Thornburg 1988a; Crichlow 1988; Barrow 1988). Initial analyses were also done on the status of the sectors where impacts of the LRTP were likely to be experienced (Stringer 1988; Barnes 1988; Thornburg 1988b; Dickerman 1988). These areas were the land market, the cadastral information system, agricultural credit access, and land tenure.

These data provide useful comparisons to determine the change in St. Lucia after the LRTP. Barnes (1990b) also assessed the effectiveness of the cadastral system shortly after completion of the program. His assessment therefore covered not only the registry information but also the graphical aspects of the cadastre. The system was assessed using the criteria of efficiency, complexity, maintainability, cost, quality and utility. Barnes alluded to the future potential problems in maintainability of the registers including professional acceptance and informal activity especially on inheritance. He referred to

recommendations by Liverpool (1986) to have the Land Registrar acquire continued information from the Registrar of Births and Deaths. It was further suggested by Liverpool that the Land Registrar be authorized to confiscate to a trust, lands not registered after inheritance after a sufficient period of publication of notice.

Current Functioning of the Land Registry

The Saint Lucia Land Registration Act 1984 provided legal authority for the registration of different categories of rights to distinguish prescriptions or restrictions in the use or transmission of those rights. While the Act originally superseded previous law governing land, an amendment subsequently reinstated the ability of the Civil Code to override specific prescriptions in the Act. The Land Registry, registers the following categories of rights by qualifying the type of rights possessed on registration based on the 1984 legislation and the Civil Code:

1. Individual ownership—unqualified sole proprietorship
2. Ownership in community—Ownership by the community of marriage
3. Ownership in shares—the situation where more than one but less than four persons hold undivided shares
4. Executor or administrator of the estate of the deceased
5. Trusts for sale—registration of four or more owners of undivided shares
6. Heirs of ‘X’ deceased—the mechanism for recording family land tenure
7. Rights of survivorship
8. Crown land²
9. Crown and private

² Though independent, St. Lucia is under the British monarchy and the titular head of state is Queen Elizabeth II. Crown land is equivalent to state land.

The majority of “ownership in shares” was found to be in the names of two owners, apparently husband and wife.

The registration of the “executor or administrator of the estate of the deceased”, “trusts for sale”, “heirs of ‘X’ deceased” and “rights of survivorship” were all mechanisms used in an attempt to ameliorate the problems of the communal tenure system being experienced in St. Lucia prior to the LRTP.

In the instances where a list of the persons accepted to be owners by the communal group could be provided, the list was attached to the adjudication records and the first four persons named were declared to be the trustees for sale. These four then had legal authority to perform any actions requiring the authorization and signature of the owners of the land. There have been queries about the legality of the actual process of determining the four names to be registered as trustees for sale (Deterville 1988) and anecdotal evidence of some of the trustees acting in their own interests and not in the interests of the communal group.

In instances where no clear indication of actual membership in the communal group could be provided, the land was registered in the name of “heirs of ‘X’, deceased”. Registration with “rights of survivorship” allows the number of owners in the communal group to decrease by attrition.

The registration of the “administrator or executor of the estate of the deceased” sometimes indicates a reversion to unregistered status since, on viewing the land registry data, it can be observed that these registrations are many years old. This suggests that the parties involved have been delayed in assenting or transmitting the interests by conflict or cost or are not interested in so doing.

An understanding of the way the society treated these various categories was important for determining the level of acceptance of the land registration system.

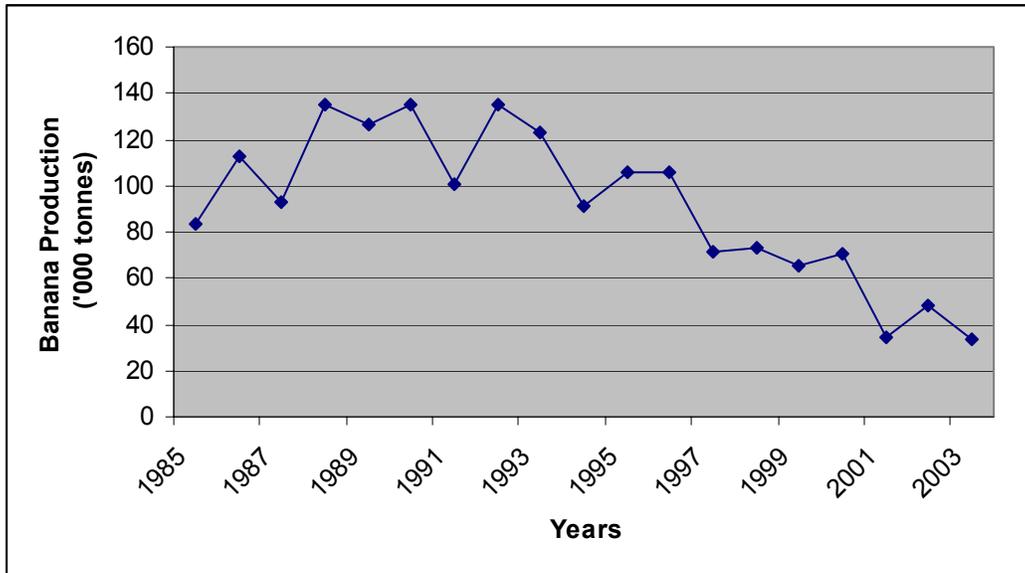
Current Land Market Environment

Parallel with the promise offered by the LRTP to improve the functioning of the land market came the negative effect on the land market of the gradual loss of preferential trading with the United Kingdom. The formation of the European Union resulted in a managed cessation of preferential prices on banana export to the United Kingdom between 1992 and 2000 (Dujon 1997). More stringent production and product quality standards are required to be met in order to remain in the market. In addition, weather and pest conditions also affected banana production. Banana production has been declining over the years with a corresponding drop in revenue as shown in Figure 4-2 and Figure 4-3 while tourism has been increasing over recent years to alleviate the shortfall in the economy (International Monetary Fund [IMF] 1999) as illustrated by the increase in tourists in Figure 4-4.

The last 5 years have seen an increase in defaulters on mortgages because of the effects of the problems in the banana industry. Foreclosures, however, are difficult to accomplish and, when they are accomplished, sometimes result in a loss to the credit institutions. Financial institutions have therefore tended to be rather conservative in how much credit is approved in relation to the value of the collateral. Only an amount equivalent to $66 \frac{2}{3}$ % of the value of the land is loaned. Secondary sources of income are also required beyond any income that may be derived from the project for which the loan is being requested.

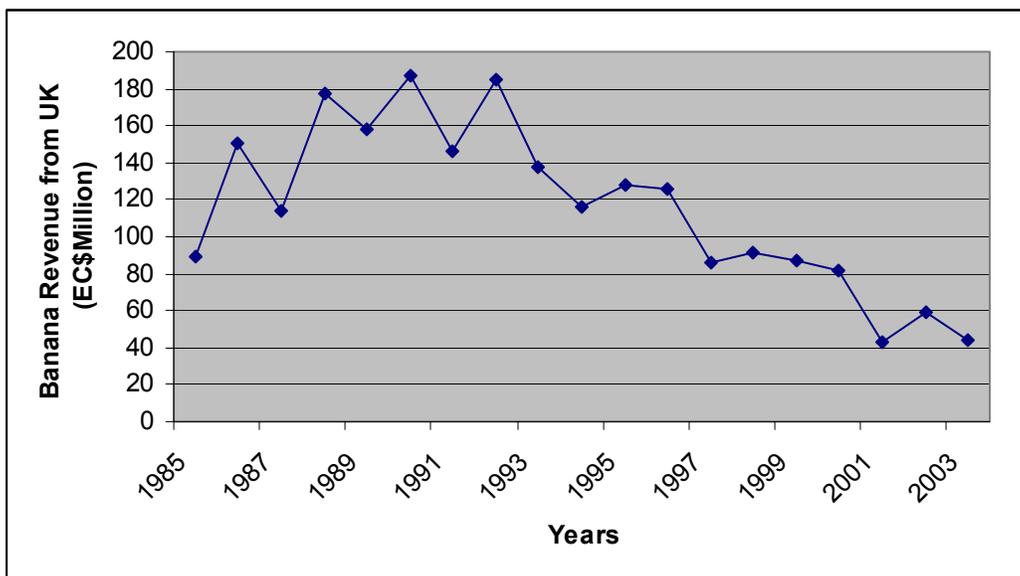
The foreclosure mechanism is governed by the Civil Code. Mortgages do not carry a power of sale clause so in the instance of default the credit institution must sue the

defaulter personally. In the overburdened St. Lucian court system, the suit may take as long as 3 years.



Source for data: St. Lucia Government Statistics Department 2004a.
<http://www.stats.gov.lc/agri2.htm>

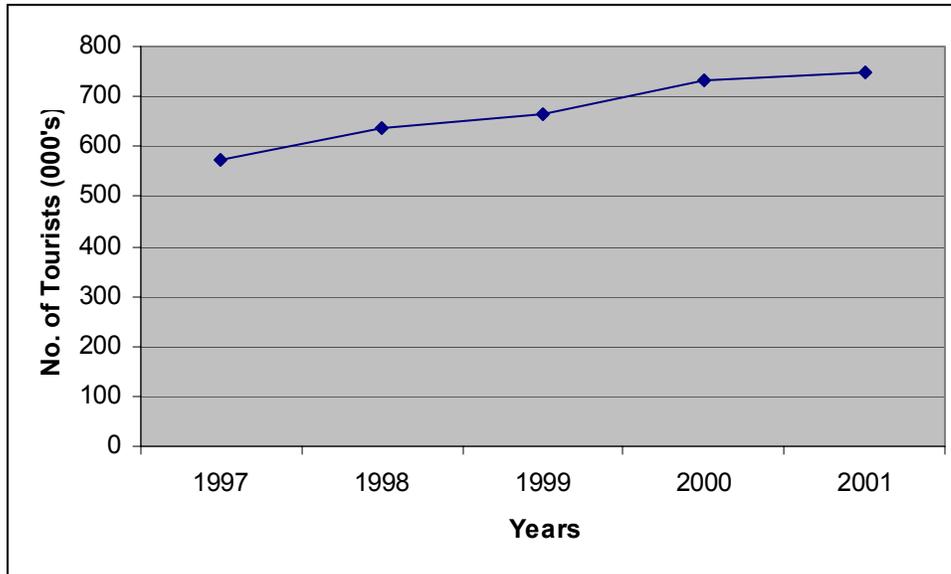
Figure 4-2. Declining banana production (1986-2003)



Source for data: St. Lucia Government Statistics Department 2004a.
<http://www.stats.gov.lc/agri2.htm>

Figure 4-3. Declining revenue from bananas (1986-2003)

If judgment is in favor of the credit institution then the court is responsible for conducting a public auction to recover the outstanding loan amount. If fewer than 3 bids are received for the sale then the sale cannot be completed, the auction is voided and the process repeated. There is anecdotal evidence that some defaulters send an agent to place an unrealistically high bid, thus ensuring that no bids would follow³.



Source for data: St. Lucia Government Statistics Department 2004b.
<http://www.stats.gov.lc/main4.htm>

Figure 4-4. Increase in tourist visitors over recent years (1997-2001)

During the long period required to resolve the issue the defaulter remains in possession of the property at no cost. This legal process is socially beneficial as it delays or prevents loss of land, but it does not encourage credit institutions to extend credit easily. There is little or no secondary mortgage market to provide additional capital for entrepreneurial activities.

³ Personal interviews with lawyers (incl. Clarence Rambally, Norman Francis and Andre Arthur) and bankers (incl. Andrew Baptiste) in St. Lucia

Current Transaction Processes

The current transaction process for sale involves, in most cases, the survey of the parcel to be sold if no previous cadastral survey exists. The approximate demarcation done during the LRTP is considered inadequate for transaction purposes. A cadastral survey performed to legal specifications as prescribed in relevant legislation and performed by authorized professionals is required. Survey fees are based on the area to be surveyed⁴ and could be EC\$ 2500⁵ (US\$ 926) for a typical residential lot. If mutation (subdivision) is required, approval from the planning authority is necessary. This process attracts a fee ranging from EC\$20 (US\$7) for parcels under 3000 sq. ft. to EC\$30 (US\$ 11) for parcels over 7000 sq. ft. Infrastructure may be required to be installed prior to obtaining approval for the subdivision.

A lawyer is required by law (Land Registration Act 1984, Part VI, Section 67) to prepare any instrument that deals with the transfer of land. The lawyer's fee is usually on a sliding scale based on a percentage of the value of the property beginning at 7% for a vacant lot. The financial institution also charges a fee for processing of a mortgage if one is to accompany the purchase of the land.

Government taxes are payable on all transfers of sale or donation based on the value stated in the transfer document. Purchasers must pay 2% of the value of the land. For parcels valued over EC\$ 50,000 (US\$ 18,500) (the vendor must also pay a tax based on a sliding scale. Non-nationals must pay a flat rate of 10% of the value of the property as a purchase tax.

⁴ From personal interviews with land surveyors (incl. Rufinus Baptiste, Fosh Modeste and Peter Felix).

⁵ The St. Lucia currency is pegged at EC\$2.70 = US\$ 1.00

Registration fees are required at the final stage of the transaction process. This is the smallest fee of the entire process, being only EC\$ 20 (US\$7). The entire process itself can be quite costly for the average landowner or potential purchaser. Typical fees for the sale transaction of a vacant parcel of land of 465 m², without mortgage, would be as shown in Table 4- and would amount to 20% of the value of the land.

Table 4-2. Typical transaction fees for parcel of land

INPUTS	COST EC\$
Valuation	450
Land survey	2,500
Planning appl.	Not required
Engineering plan	Not required
Infrastructure	Not required
Purchase price	30,000
Legal fees	2,500
Stamp duty	600
Vendor's tax	exempt
Bank fee	Not required
Total fees	6,050

Source: Interviews with St. Lucian professionals and institutions

Methodology

Comparative Analysis Data Requirements

The baseline study was performed at the completion of the program in 1987 to determine the impact of the program on the land market and agricultural productivity (Land Tenure Center 1988). Data were collected at that time via questionnaires on both quantitative and qualitative characteristics of the land parcels and the landholders as well as the outputs of the land-titling program.

This research is based on a longitudinal study that compares current 2004 data with the 1987 baseline data. Results have applicability within and outside of the region in areas of similar economic and cultural composition.

To determine the impact of the land titling and registration program through a longitudinal comparison of current and baseline land market data, comparable data needed to be acquired. The questionnaire and the data gathered for this research therefore had to be the same or a subset of the data gathered in the baseline study, so therefore this requirement constrained the selection of sample data. Additional data describing the economic and social and land related environment was derived from interviews with professionals in the land market including land surveyors, valuation surveyors, bankers and lawyers.

Sampling Methods

Community sample design

Some statements on how representative the samples selected are of the population of parcels and landholders under study are provided in this section.

At the time of the baseline study in 1987, the population of communities in the country was grouped into blocks on the basis of observed land-driven socio-economic variability amongst communities for purposes of a community case study (Stanfield 1988). Four communities—Babonneau, Micoud, Choiseul and Tete Chemin—were selected at that time to represent this variability.

Babonneau is peri-urban to Castries and represented then and continues to represent more of the urban consciousness that impacts perceptions about land and land tenure. This community has a large number of individualized land holdings of relatively high land values, and growing areas of residential and commercial land use. Micoud is rural and agricultural, deriving income from bananas, still an important mainstay in the St. Lucian economy. Choiseul and Tete Chemin are also rural and primarily agricultural, and are more isolated farming communities. In 1987, Choiseul was a community with an

agricultural base in vegetables while Tete Chemin had just begun agricultural production. Subsequently, much of the land at Tete Chemin was acquired by the state for the construction of a dam. Some small areas, unutilized in the dam construction, were returned to the original owners or resold to private individuals. Much of the land, however, remains state land, which would distort any current analyses of land markets and landowner perceptions even should the state parcels be removed from the analysis.

These four communities represent the major land-based factors and perceptions that impact on the functioning of both the Land Registry and the land market in the St. Lucian environment. The four communities are also geographically well distributed over the island as seen in Figure 4-5. The differences among the communities and the growth and urbanization of rural Castries in which Babonneau lies can be illustrated by the population statistics published by the St. Lucia Government Statistics Department (2004c) and reproduced here in Table 4-3. The figures given are for the districts in which the sample communities fall. Rural Castries displays the largest population and the largest growth between 1990 and 2001 of all the districts. Registry map sheets that covered these communities were then stratified, in the 1987 survey, on the basis of tenurial variability within the communities.

Tenurial variability was represented by the incidence of family land, which is the type of tenure more common in rural areas. Therefore the map sheets for each community were separated into two groups: one containing greater percentages of family land parcels, and the other group containing smaller percentages of family land parcels and therefore larger percentages of individualized parcels. Fifteen registry sheets were chosen at random at that time from sheets with higher and lower incidences of family

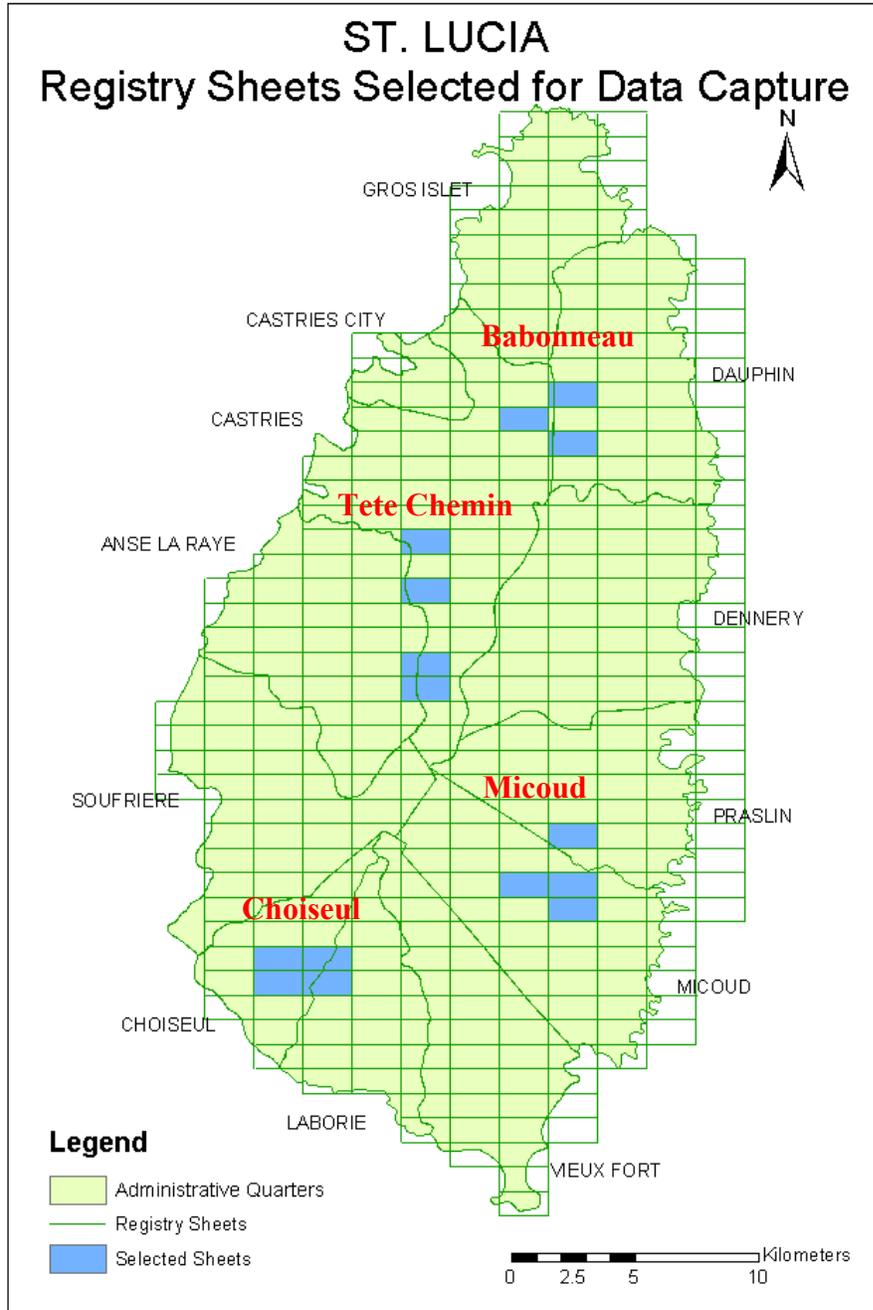


Figure 4-5. Index of registry sheets showing communities selected for survey

land within each community, giving 3 or 4 sheets per community. Sheet boundaries do not coincide exactly with community boundaries but neither do perceptions and use of land change abruptly at boundaries. The non-conformity of boundaries therefore does not affect the validity of the use of the sheets to represent the communities. The current research used the same sampled parcel sheets as the original baseline survey so that comparisons with the original baseline data could be made.

Table 4-3. Populations of districts containing sampled communities

District	1990	1995	2000	2001
Castries City	2003	2,156	2,362	1,814
Rural Castries	39,090	42,430	45,164	51,213
Micoud	15,178	16,460	17,708	16,051
Anse-La-Raye	5,065	5,492	6,356	6,071
Choiseul	6,443	6,988	7,323	6,139

Source: St. Lucia Government Statistics Department 2004

(<http://www.stats.gov.lc/pop22.htm>)

For the purposes of this current research, data on all parcels within these 15 sheets were extracted from the registry as part of a cluster sampling approach on the general functioning of the land registry and land market. For the field visits, 30 parcels were randomly sampled from the communities of Babonneau and Micoud, distributing the sampled amount evenly over the sheets within each area. Figure 4-6 shows the map sheets from which the parcels for field interview were sampled.

The communities of Babonneau and Micoud were selected from the four areas for the field survey since they sufficiently describe both the more urbanizing and individualized tenure and the more rural and multiple-owner, family land tenure types of land parcels and landholders. Babonneau, as can be observed from the map, is approximately 5 kilometers from the center of Castries at the closest point and can be reached by a short 10-minute drive on well-paved roadways. Micoud is less easily

accessible from the capital, Castries, but can be reached by an hour's drive on well-paved roadways.

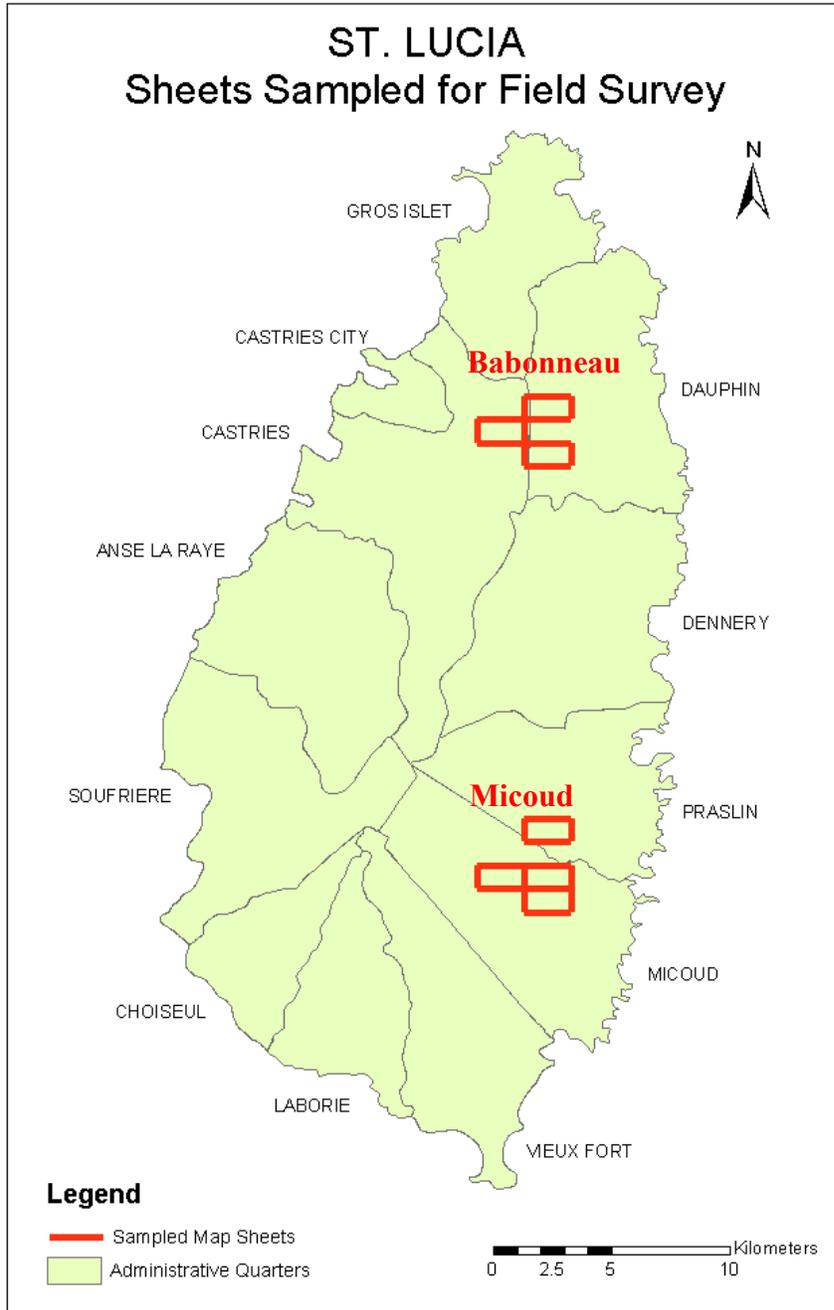


Figure 4-6. Location of map sheets from which field interview parcels were sampled

Field sample design

A sample size of 30 was chosen for the field sample in each of the 2 communities of Babonneau and Micoud. This sample size allows standard statistical tests about population means to be performed when the data on the variable being tested are normally or near normally distributed. A sample size of 30 also allows comparison of binomial type responses, of maximal variability, that is, 50% success and 50% failure, between the two areas to within $\pm 17.5\%$ at the 95% confidence level. A total sample size of 60 in the two communities allows comparison of binomial type responses, of maximal variability, between the current study and the previous baseline study to $\pm 12.5\%$ at the 95% confidence level. This means that for instances where the probability of the event occurring is equal to the probability of the event not occurring, these precisions apply. Otherwise, precisions will be greater. Since many of the questions were binomial in type, for example whether there had been a sale or not, these precision statements are valid for most of the derived statistics.

A simple sample size equation was used to determine the precision of the surveys given the sample sizes (see equation 1).

$$n = \frac{Z^2 p(1-p)}{e^2} \dots\dots\dots(1)$$

where n is the sample size,

Z is the abscissa of the normal curve which bounds, on either side of the mean, the area $1-\alpha$ or the desired confidence level.

p is the estimated proportion of a favorable (or unfavorable) response.

e is the desired level of precision.

Figure 4-7 shows the distribution of the field sampled parcels for one of the sheets in Micoud.

Figure 4-8 shows the distribution of the field sampled parcels for one of the sheets in Babonneau. These figures indicate the randomness of the distribution of the parcels that were field surveyed. The maps also indicate the difference in parcel density between the rural area of Micoud and the urbanized area of Babonneau. All 7 land registry sheets displaying the distribution of the field sampled parcels are presented in Appendix A.

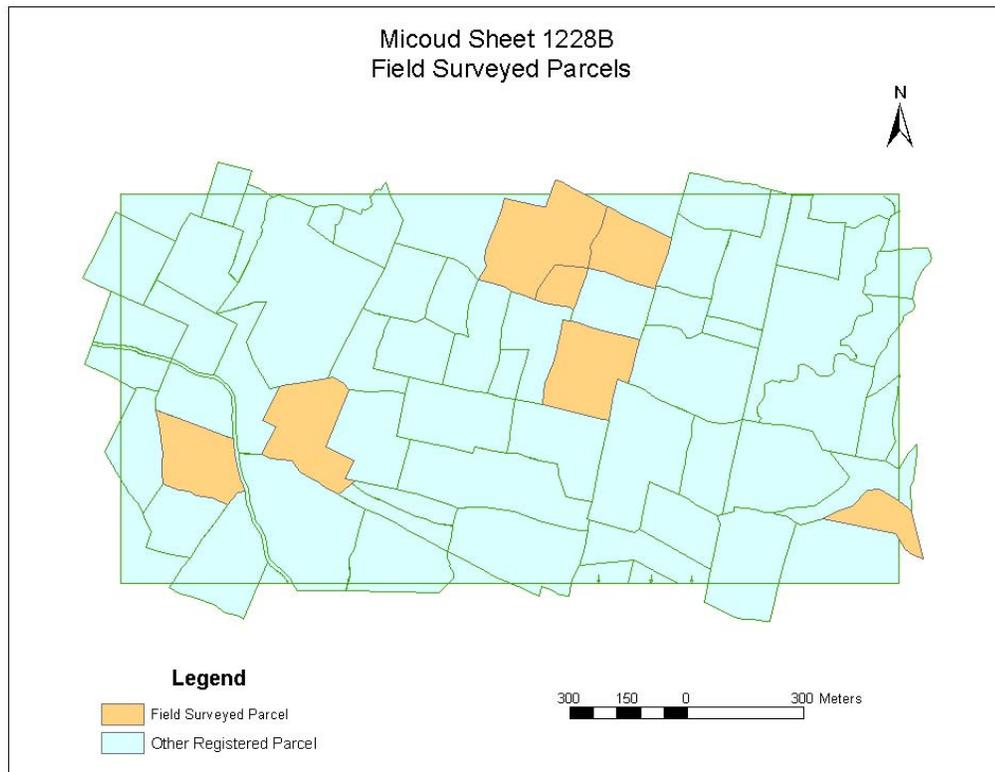


Figure 4-7. Distribution of field surveyed parcels on one sheet in Micoud

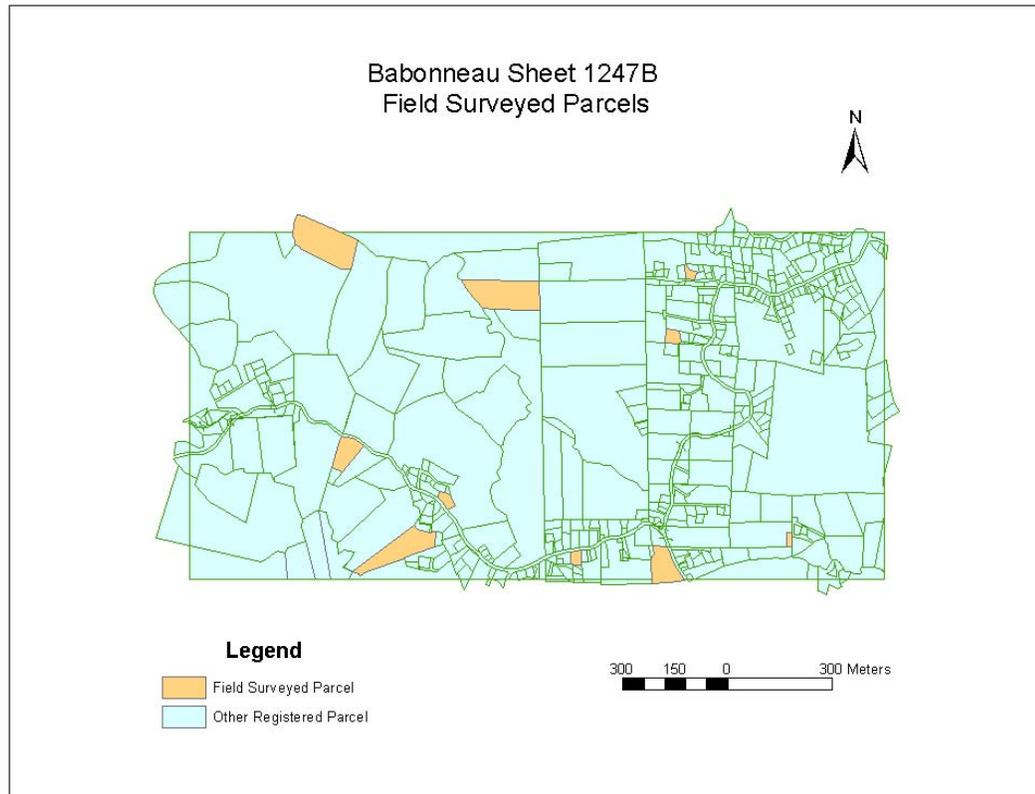


Figure 4-8. Distribution of field surveyed parcels on one sheet in Babonneau

Registry sample design

The total areas and number of parcels in the individual registry index sheets selected for study are given in Table 4-4. The LRTP originally registered some 33,287 parcels. The current number of parcels is stated by Land Registry personnel to be 56,000. The number of parcels sampled therefore represents 4% of the number of registered parcels. The total area represented by the sampled parcels is 2495 ha out of the 61,660 ha covered by the whole country or 4% of the total area of the country. The sheet areas were computed from the individual areas of the registered parcels on each sheet and do not reflect the area of each sheet, which is consistent. The computed sheet areas may therefore be greater than the actual sheet areas since parcels may overlap into other

sheets. Greater parcel density is indicated in the Babonneau community in comparison to the Micoud, Choiseul and Tete Chemin communities and this is indicative of the urbanization of Babonneau.

Table 4-4. Number of parcels and area of land sampled in the Land Registry

Community Name	Map Sheet Name	Number of Parcels	Total Area (ha)
Babonneau	1446B	144	166.93
	1448B	353	199.27
	1247B	453	193.48
Sub total		950	559.68
Micoud	1228B	56	189.79
	1427B	137	232.34
	1428B	55	178.57
	1430B	37	179.67
Sub total		285	780.37
Choiseul	0224B	120	219.35
	0225B	76	206.82
	0424B	83	166.82
	0425B	115	190.44
Sub total		393	573.93
Tete Chemin	0836B	55	71.09
	0837B	83	95.72
	0840B	141	253.23
	0842B	133	161.56
Sub total		412	581.60
Totals		2040	2495.58

The large numbers of parcels in these cluster samples allow, for binomial variables, the determination of differences between the communities to 3 to 5% within a 95% confidence. Statistics derived from the registry sheet data demonstrate variability in land market transaction activity amongst communities and within communities since the registry sheets were randomly sampled from the four communities. These statistics also demonstrate variability in land market transaction activity between tenure types and within tenure types within the communities selected. Statistics derived from the field sample compared with the randomly selected field sample from the previous survey show

variability in land market transaction activity over time between the communities sampled and within the communities sampled.

Analysis Methods

Specific indicators of the volume of the land market transactions were required to be derived to be able to draw conclusions about the case study and to be able to make comparisons with other jurisdictions. The indicators chosen are as shown in Table 4-5. The indicators of impact on the land market were the number and value of sales per parcel since initial registration and the number and value of mortgages per parcel since initial registration.

The indicators of sustainability of the land title registration system were the difference between the currently registered tenure status and the current actual tenure status on the ground, as well as the difference between provisional and absolute tenure.

Table 4-5. Indicators chosen for comparison with baseline data

Research question	Indicator	Unit of analysis
Land market	Difference in number of sales	parcel
	Difference in value of sales	parcel
	Difference in number of mortgages	parcel
	Difference in value of mortgages	parcel
	Difference in tenure security	parcel
Sustainability of the system	Difference in number of registrations	parcel
	Difference in title type	parcel

The unit of analysis for each of these indicator variables was the parcel, even though the observations were aggregated to the level of the land registry sheet and to the level of the area for some of the analyses. Factors that were expected to govern the status of the impacts were measured as shown in Table 4-6. The factors that were measured that were expected to affect the impact on the land market included security of tenure and

tenure type. The factors that were measured in relation to sustainability were those used in diffusion theory; relative advantage, compatibility, complexity, and observability.

Table 4-6. Factors impacting the indicators

Research question	Measure	Unit of analysis
Land market	Tenure security -	
	• Level of cultivation	• Parcel
	• Tenure type	• Parcel
	• Documentation	• Parcel
	• Direct responses	• Landholder
Sustainability	Relative advantage (perceptions)	Landholder
	Compatibility	Landholder
	Complexity (perceptions)	Landholder
	Trialability	Not assessed
	Observability (perceptions)	Landholder

Since these factors have proven to be difficult to operationalize, the measures were generally treated qualitatively by drawing on the perceptions of the landholder for the factors of relative advantage, complexity and observability. The compatibility measure was determined from an assessment of the land transaction process and how it compared to the previous process, and also indirectly from the perceptions of the landholders. Trialability was found not to be applicable in this instance since the initial land titling and land registration process was not a voluntary one so that participation at that time could not have been based on whether the landholders believed that they could try the system and then withdraw with no adverse repercussions.

Tenure security is difficult to measure directly so indirect measures have been used in other studies (Place and Migot-Adholla 1998; Brasselle et al. 2002). Palmer (1996) noted that quantity of property-related litigation, property values, and the manner in which financial institutions treated the property could all be used to indicate the level of security of tenure. In his research he measured market activity as a surrogate for tenure security after land titling and registration in Peru. Formal security can be denoted by the

existence of legal documentation and formal registration. Tenure security was measured in the baseline study in 1987 by incidence and type of documentation. Informal tenure security can be denoted by perceptions of security experienced by the land holders (Jansen and Roquas 1998).

For the purposes of this research, the indirect measures of security of tenure used were, in addition to the market activity and tenure type, level of cultivation on the parcel and the incidence of documentation of ownership. These measures were the same as those used in the baseline survey, for comparison purposes. Responses to direct queries on perceptions of security of tenure put to the land users were also used as measures of tenure security. Formal security is linked to the performance of formal land markets but perceptions of security are linked to societal peace and well being and equity.

Questionnaires and statistical methods have been used previously in information system research, especially in the area of determining perceptions about technology and diffusion (Newsted et al. 1998; Al-Gahtani 2003). The questionnaires were administered directly to the respondents so that the probability of response would be greater than self-administered questionnaires, and clarifications could be immediately made to questions if the need arose (Ott and Longnecker 2001).

Data Acquisition Procedure

To investigate the impact of land registration and titling on the land market, data on sales and mortgages were extracted from the registry records. The registry records comprised title register books for each registry index map sheet. Each parcel on the map sheet had its status documented on one page of the register that represented the sheet. When there are a long series of transactions on one parcel, the information registered may exceed one page and then more pages are inserted to accommodate the information. In

instances of subdivision the page representing the original parent parcel is removed from the register and placed in one of the parcel folders that contain supporting information for each parcel. These parcel folders are filed separately. The information for each new parcel is then put on a new, separate page and all the subdivided parcel pages are then appended to the end of the book and numbered sequentially. Transfers of rights appear on the front of the register page while encumbrances such as mortgages appear on the back of the page.

Since the title register did not detail whether the transfers documented were donation, sale, gift or inheritance, further investigations were performed by searching the parcel files, which contained supporting contract documents for sale, mortgage or assent for the particular parcel. Individual pages are removed from the book for updating and photocopying on a regular basis and some misfiled pages were found during the course of the data extraction exercise. Aggregated data for transfers and mortgages registered per month were maintained by the Land Registry but were only current to 2002.

To determine the currency of the registry data, the randomly sampled subset of parcels were visited in the field in order to interview the registered owner or the de facto owner. Issues that could potentially affect the reliability of the data include the difficulty experienced in locating the specific parcel owners on the randomly generated parcel list, and the language barrier in some of the interviews. The name or names of the registered parcel owners, administrators of the estate or trustees for sale and the address noted in the registry records to locate the persons were used to locate the owner or rights holder of the parcel. St. Lucia has no household mail delivery service so the listed address was usually that of the post office where the landholder collected mail. There was therefore some

difficulty in locating landholders. In addition, St. Lucians tend to have several different names so many of their acquaintances, friends, neighbors and even relatives were sometimes not helpful in locating the landholder as they were unfamiliar with the name given. Many of the more elderly landholders spoke primarily a local “french patois” called “kweyol” (Creole). The questions therefore had to be translated into “kweyol” and their responses translated back into English. It is hoped that the nuances of their perceptions about land and tenure security were not distorted by translation.

Analysis Procedures

Statistical procedures were used to draw conclusions and support the findings. Chi-square measures of relationships between variables were used to determine the factors that mitigated the anticipated impact of the LRTP on the land market in the case study area. Logistic regression was used to determine relative impacts of the various factors on the incidence of land transactions.

A land information system (LIS) was created to visualize the distribution of the variables in the research. The graphic data for the LIS were input by scanning and digitizing the analog maps and appending attribute files containing data extracted from the registry and the field. This graphic view allowed comparisons between the areas that were field sampled to be observed, and suggested spatial patterns in the distribution of the variables.

Summary

Chapter 4 provided background data on the land situation in St. Lucia, on the LRTP program conducted in St. Lucia, and on the baseline study performed in 1987, as a precursor to analyzing the data acquired in the research. The case study selected possessed attributes that benefited the research—a land titling and registration project had

been performed sufficiently long ago for assessment of medium term impact, the project had titled and registered in a complete, systematic fashion, and there was available baseline data for comparison. The methodologies used were framed in part by the baseline methodology for the baseline survey that was performed in 1987 but additional research methods were also used to acquire data on sampled sheets in the Land Registry and in the field for assessing the sustainability of the registration system.

Chapter 5 presents the data acquired in the research and the analyses performed on the data, with comparisons to the data acquired in 1987.

CHAPTER 5
ANALYSIS OF IMPACT OF LAND TITLING AND LAND REGISTRATION ON
LAND TRANSACTIONS IN ST. LUCIA

This chapter presents the registration system and land market data on St. Lucia acquired both at the Land Registry, from registry books and parcel files, and in the field, from questionnaires administered to landholders. The analyses performed and results obtained are also detailed.

The Impact of the LRTP on the Land Market

Data were acquired on the land market as it has operated in St. Lucia since the end of the LRTP in 1987. Impacts on the land market of the land titling and registration were determined by measuring:

- Change in market activity, and
- Change in security of tenure

The indicators measured to assess the impacts were:

- The number and value of sales and mortgages, and
- The documentation possessed and the perceptions of landowners about security of tenure

Land Market Activity

Sales and mortgages

Information on formal land market activity was derived from analyzing registry data aggregated for the whole country and also from statistical analysis of the registry data from the 15 cluster sampled registry sheets. Additional data on credit use was

derived from the field interviews and compared with data from the 1987 baseline sample survey.

Figure 5-1 illustrates the total number of sales and mortgages registered for all of St. Lucia in the Land Registry for selected years. The years selected are at 5 year intervals beginning with 1989. All parcels were not in the Land Registry until the beginning of 1988 so figures taken earlier would have been distorted. Since figures for the year 2004 were not available, figures for the year 2002 were included instead.

Figure 5-2 illustrates the mean number of sales and mortgages per parcel registered formally in the Land Registry for all of St. Lucia for the selected years. The number of parcels for intermediate years between 1989 and 2002 was interpolated from Land Registry index figures of 33,300 registered parcels after the LRTP in 1987 and 56,000 registered parcels currently in 2004.

The data indicate that activity increased and then peaked for sales around the year 1995 while for mortgages, after an initial increase, the peak occurred around the year 1999. There is a downward trend after the peak in both measures of activity. These figures indicate an initial increase in formal land market activity that suggest an association with the land titling and registration process and the ease of transacting in land that the process facilitated. No corresponding figures for registered transactions for all of St. Lucia prior to the institution of the Land Registry were obtained. While such figures would have lent support to the suggestion that the volume of transactions increased after the LRTP, obtaining such figures is problematic.

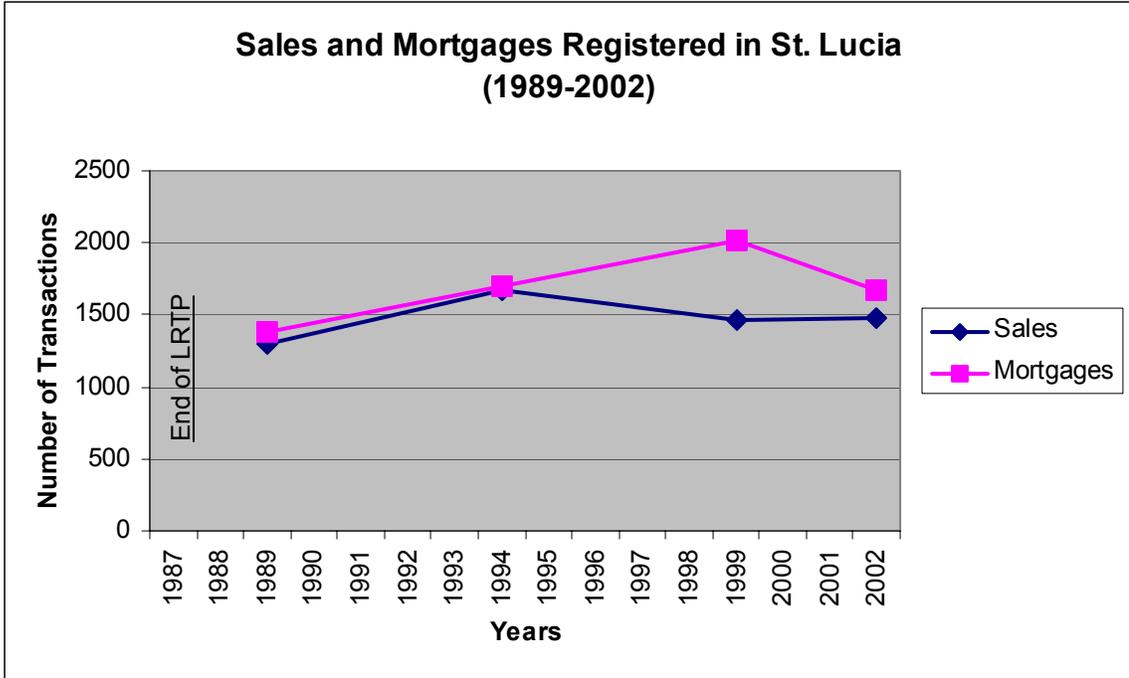


Figure 5-1. Total number of land sales and mortgages registered per year for selected years—All St. Lucia

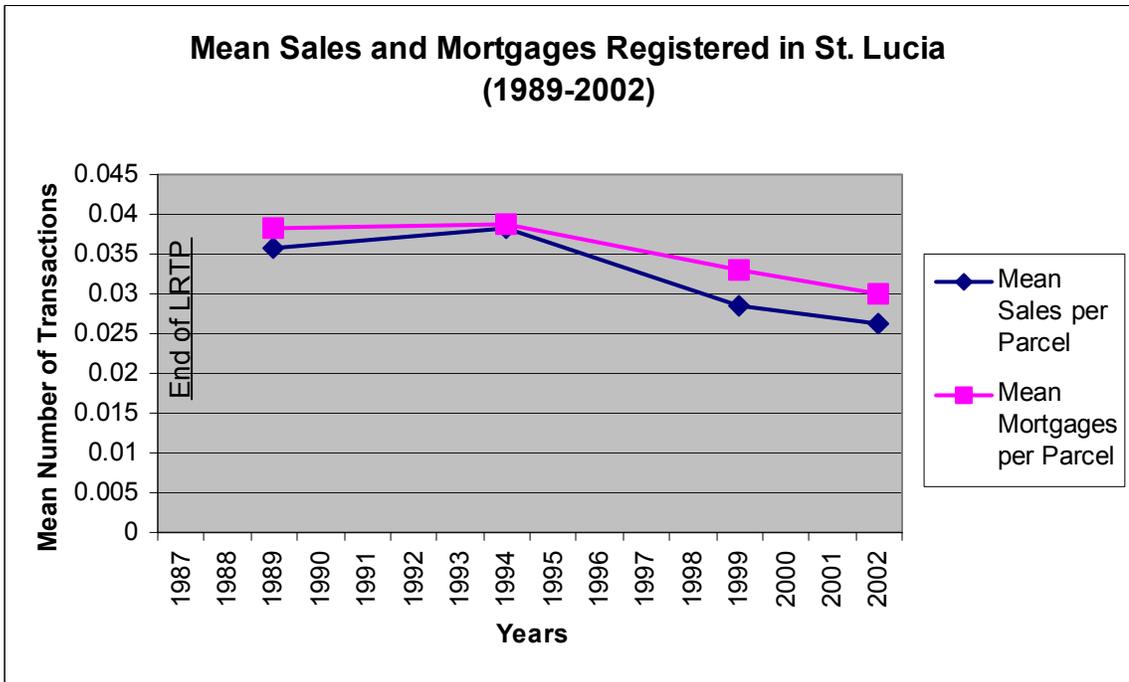


Figure 5-2. Mean number of land sales and mortgages per parcel registered for selected years—All St. Lucia

The inefficiencies of the previous deed registration system prevent accurate determination of the numbers and types of different transactions and the legality of such transactions (Stanfield 1988a). There are also cases of parcels having been sold multiple times under the previous system of deed recordation.

While the absolute numbers of both sales and mortgages initially increased, this increase is mitigated by the increase in the number of parcels so that there is an actual decrease in mortgages relative to the number of parcels and a decrease in sales relative to the number of parcels, as indicated in the graphs.

The LRTP was intended to make transactions in land more efficient and less costly in order to attract potential investors. Yet, to have a sustained economic impact on the country the initial land market activity must be sustained over the medium term. This has not happened in this case. Factors that have also impacted the land market include the reduction in profitability of the banana industry, caused by lowered prices and rejection of fruit as a result of disease or low quality.

The average lending interest rates at one bank in St. Lucia are given in Figure 5-3. This figure shows a downward trend, which should be attractive to investors in land and thus should have increased the volume of mortgages and, by extension, purchases of land. The rates are only given for one bank but these rates do not vary by more than 1% amongst banks in the banking sector in St. Lucia.

The real GDP for St. Lucia together with the share of the GDP derived from the real estate and agricultural sectors is illustrated in Figure 5-4. The trend of the GDP line is similar to that of the mortgages, indicating, as expected, a correlation between mortgage interest rates and GDP. Exogenous factors impacting on the GDP also impact

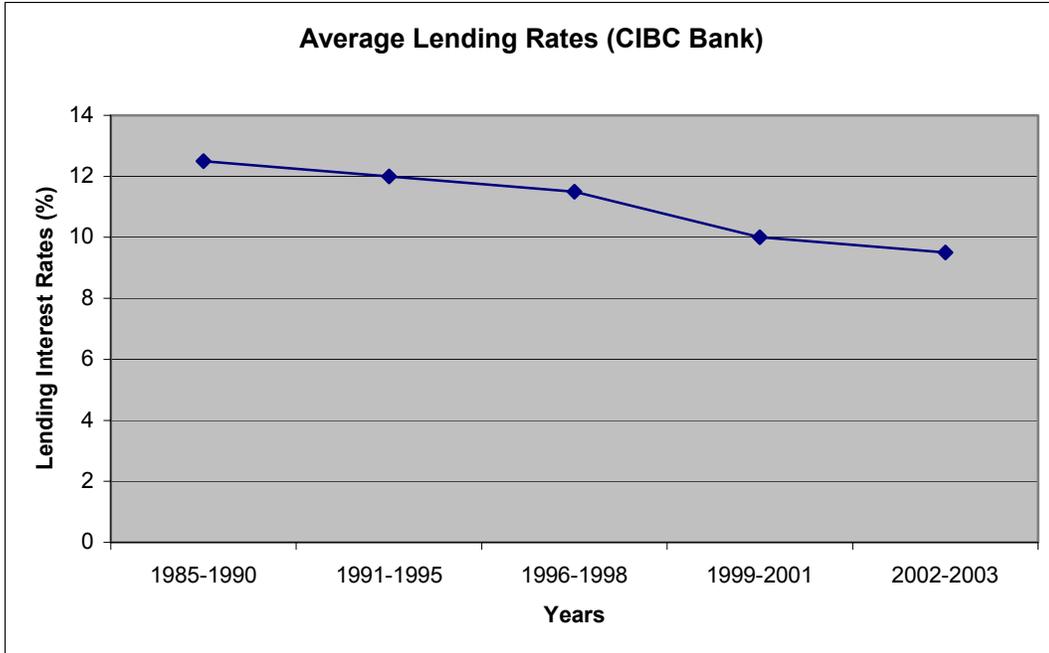
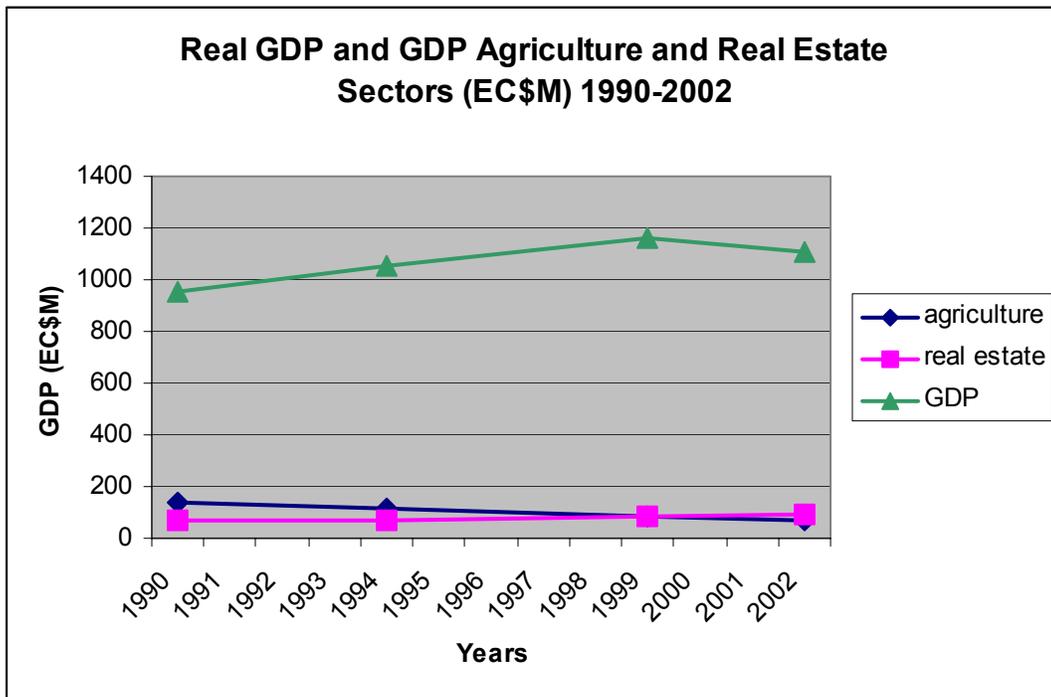


Figure 5-3. Average lending rates for CIBC¹ since the LRTP



base year – 1990

Figure 5-4. Total real GDP compared with selected sectors 1990-2002 in EC\$

¹ Figures obtained from personal communication with banker in CIBC Bank but may also be obtained from the bank's website at <http://www.firstcaribbeanbank.com/financials.html>

on the real estate sector. The real estate sector also forms an input to the GDP so that changes in the real estate sector also are reflected to a lesser extent in the GDP.

The total number of sales registered per year in the four survey communities of Babonneau, Micoud, Choiseul and Tete Chemin shown in Figure 5-5 indicates the same trend as the graph for the country overall for years 1989 through 1999, showing that the sample is representative of the country's level of land market activity. However, the sales during 2002 for the sample communities show an upward trend as opposed to the downward trend in the overall sales for the country. This upward trend is primarily due to a larger volume of sales in the peri-urban community of Babonneau. Because of the overall low level of sales, one large, uncharacteristic subdivision and sale of 12 parcels from one mutation of a large estate can be seen as a spike in the graph for sales in Micoud for the year 1989.

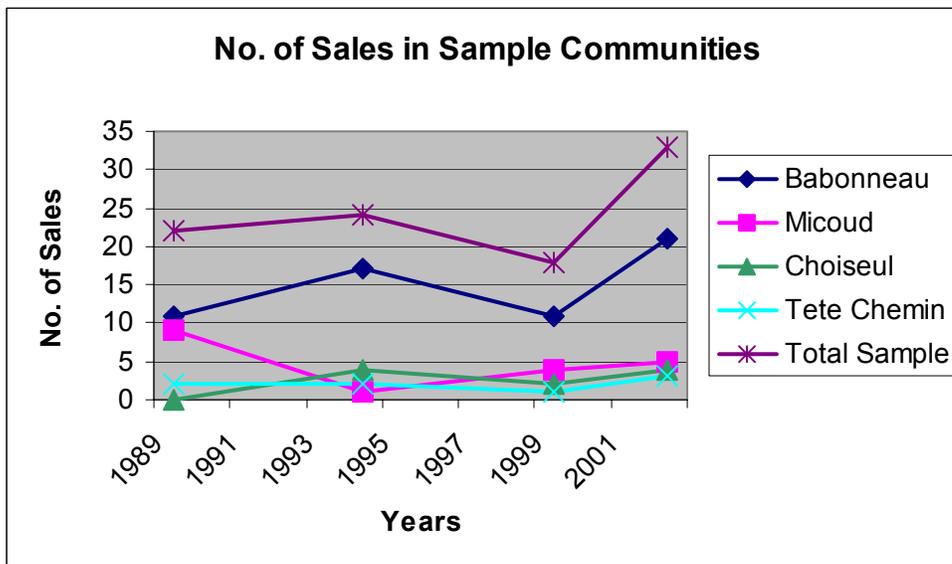


Figure 5-5. Total number of sales registered per year for selected years in the 4 survey communities

Figure 5-6 shows the mean sales per parcel for the four survey communities compared with the mean sales per parcel for the country. Again, similar trends can be

observed. Figure 5-7 shows the value of sales in EC\$ while Figure 5-8 shows these values adjusted to constant EC\$.

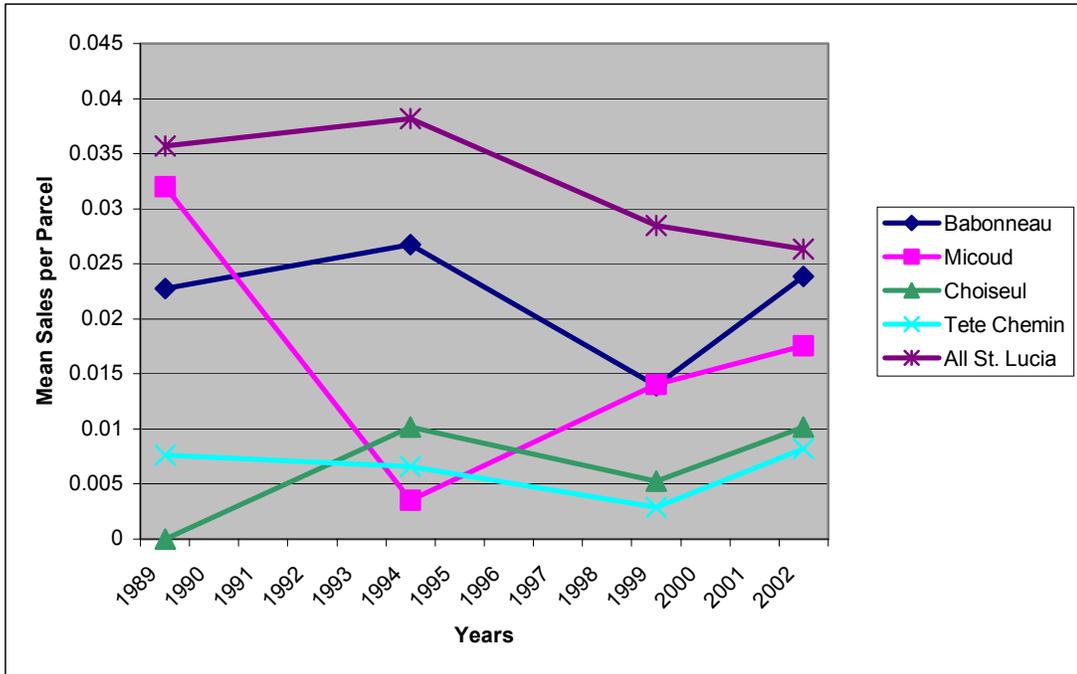


Figure 5-6. Mean sales per parcel for the 4 survey communities compared with total

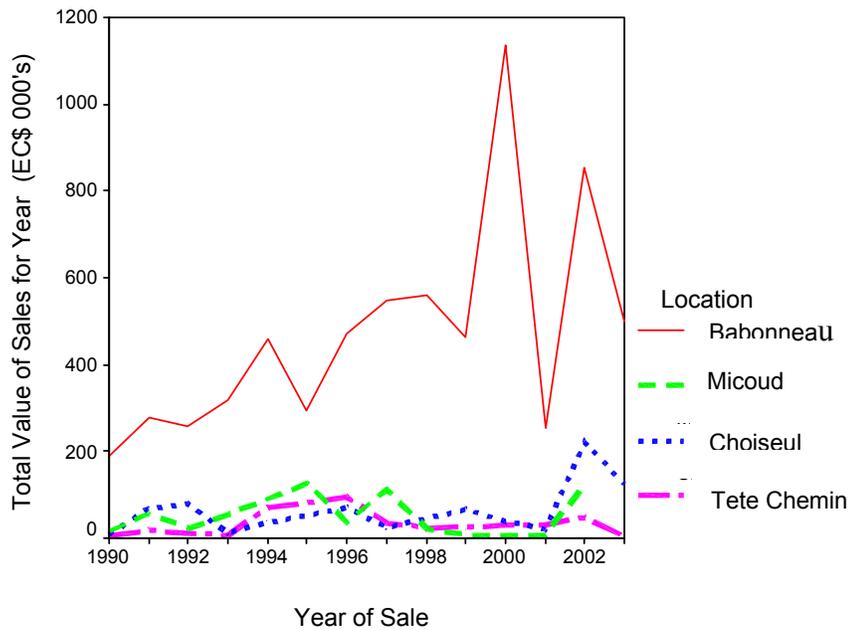


Figure 5-7. Total value of sales per year for 4 survey communities in EC\$

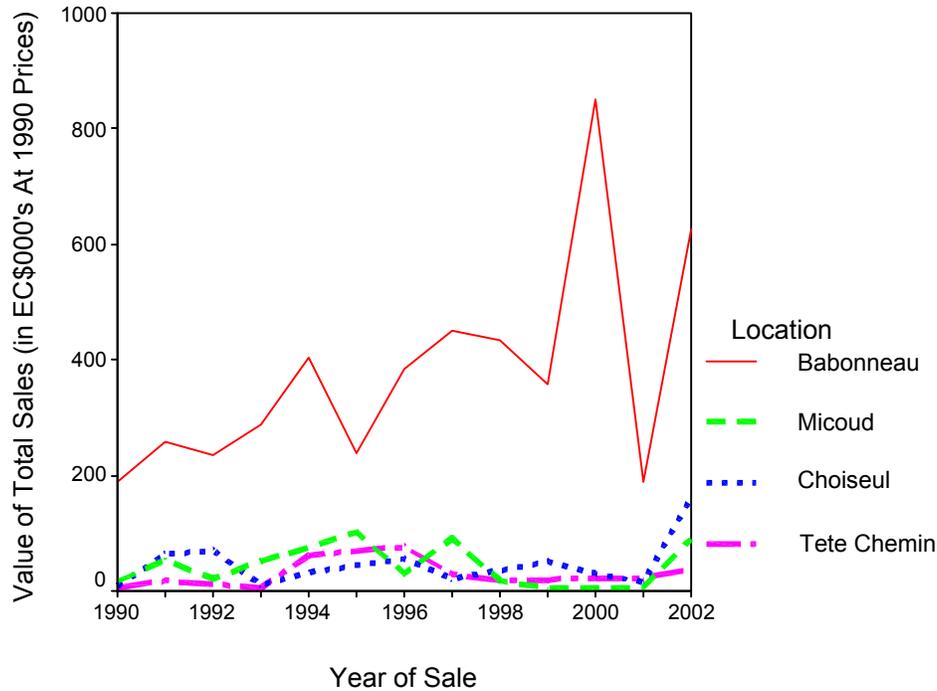


Figure 5-8. Value of sales per year adjusted to constant 1990 prices in ECS

The summary of the sale activity in the individual communities represented by the registry sheets is shown in Table 5-1.

Table 5-1. Sale activity by community (1987-2004)

Location		Whether at Least One Sale Occurred		Total
		None	At Least 1 Sale	
Babonneau	No.	723	219	942
	%	76.8%	23.2%	100.0%
Choiseul	No.	356	38	394
	%	90.4%	9.6%	100.0%
Micoud	No.	230	55	285
	%	80.7%	19.3%	100.0%
Tete Chemin	No.	348	38	386
	%	90.2%	9.8%	100.0%
Total	No.	1657	350	2007
	% of Total	82.6%	17.4%	100.0%

Welch statistic² indicates at least one difference in means amongst areas $p < 0.001$ (variances and sample sizes unequal)

² The Welch statistic was used because the variances of the mean sales per parcel in each area and the sample sizes in each area are both unequal. Welch statistic is preferable to the F statistic under these conditions.

Mitigating influences—location, tenure type, parcel size, mutation

To examine whether, and to what extent, tenure impacts the land market and therefore what effect the LRTP had on the land market by attempting to secure and individualize tenure, more detailed analysis was done on the data collected from the individual registry sheets.

The sale activity is highest in the urbanizing community of Babonneau where 23.2% of the private parcels have had at least one sale over the 16 years since the end of the LRTP. The lowest sale activity occurred in Micoud where 9.6% of the current parcels have had at least one sale over the same period. A statistically significant difference in the means of sales among the communities was computed so that the sale activity is statistically different amongst the communities. The mean number of sales per parcel that have occurred over the period since the Land Registry was installed to the current time is graphically depicted in Figure 5-9.

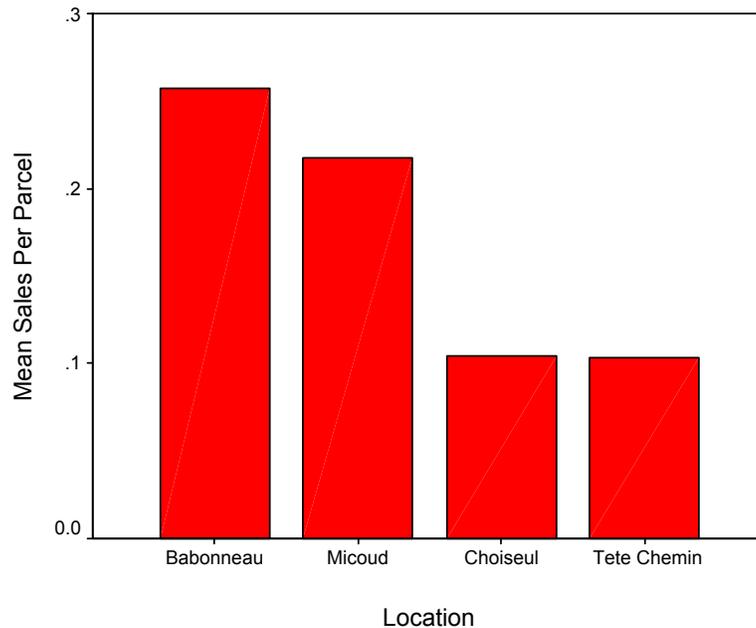


Figure 5-9. Mean number of sales per parcel over 16 years in sampled communities

The mean number of sales is higher in Babonneau and Micoud than it is in Choiseul and Tete Chemin. This suggests a correlation between tenure type and land market activity since there are more family land parcels in the rural area and fewer sales, and more individualized parcels in the peri urban area and more sales. It could also suggest a correlation between the land values and/or proximity to the peri urban area, and land market activity, since there are fewer sales in the rural area and more sales in the peri urban area.

Figure 5-10 shows the distribution of tenure categories of 1 or 2 owners, family land owners and crown land by the percentage of the total area covered by each tenure type in each of the four registry sampled communities.

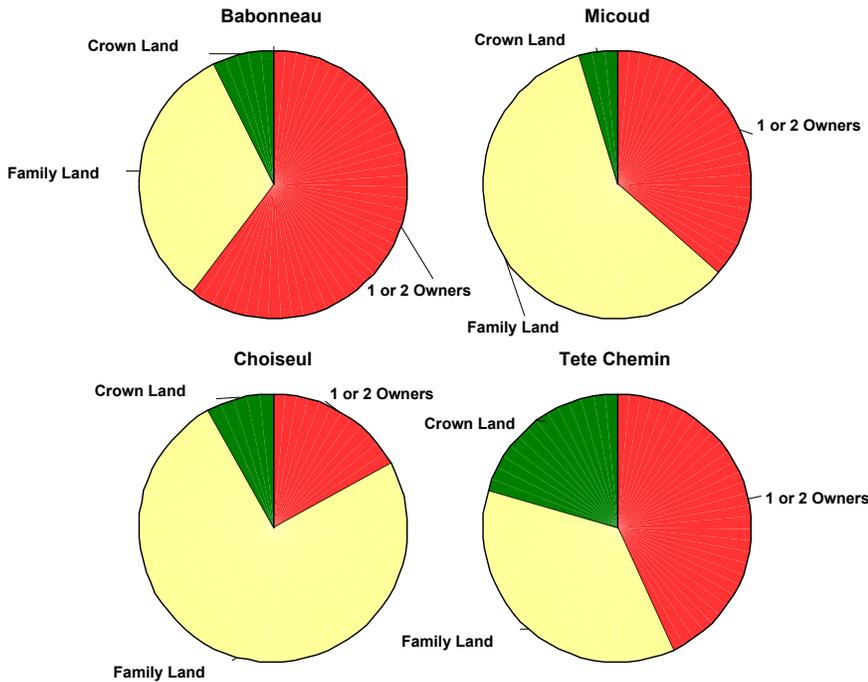


Figure 5-10. Distribution of tenure categories by percentage of area in each community.

Large areas of family land occur in Micoud and Choiseul, areas covered under family land are approximately equal to areas under 1 or 2 owners in Tete Chemin. In Babonneau a smaller area of land is held under family land ownership to that held by 1 or 2 owners. The impact of tenure type on land market activity was analyzed for presence of a relationship. Since Chi square measures only indicate whether there is a statistical possibility of a correlation, lambda measures were used to ascertain strength of the relationship. The lambda measure gives the degree of predictability of the dependent variable given the independent variable.

Tenure categories were the same as those used in the 1987 baseline survey where single ownership was separated from ownership in community between husband and wife (or in common as this type of ownership was registered as at first registration) and from family land ownership amongst 3 or more persons. State parcels were removed from the analysis in this instance to eradicate any distortion that may occur from analyzing sales on state land.

The data as depicted in Table 5-2, Table 5-3, Table 5-4 and Table 5-5 indicate a statistically significant relationship between tenure type and sale activity in all four areas individually by Chi-square measures (p values less than 0.001 in all cases).

Table 5-2. Relationship of tenure type (3 categories) to sale activity in Babonneau

Tenure Type		Whether Sale Occurred		Total
		None	At Least 1 Sale	
Individual	No.	412	125	537
	%	76.7%	23.3%	100.0%
2 Owners	No.	132	84	216
	%	61.1%	38.9%	100.0%
Family land	No.	144	10	154
	%	93.5%	6.5%	100.0%
Total		688	219	907
		75.9%	24.1%	100.0%

Chi-square 52.055 p-value <0.001 lambda 0.00 sale dependent and tenure dependent

Table 5-3. Relationship of tenure type (3 categories) to sale activity in Micoud

Tenure Type		Whether Sale Occurred		Total
		None	At Least 1 Sale	
Individual	No.	60	30	90
	%	66.7%	33.3%	100.0%
2 Owners	No.	57	20	77
	%	74.0%	26.0%	100.0%
Family land	No.	100	5	105
	%	95.2%	4.8%	100.0%
Total		217	55	272
		79.8%	20.2%	100.0%

Chi-square 26.727 p-value <0.001 lambda 0.150 tenure dependent p-value<0.001

Table 5-4. Relationship of tenure type (3 categories) to sale activity in Choiseul

Tenure Type		Whether Sale Occurred		Total
		None	At Least 1 Sale	
Individual	No.	48	19	67
	%	71.6%	28.4%	100.0%
2 Owners	No.	30	16	46
	%	65.2%	34.8%	100.0%
Family land	No.	249	3	252
	%	98.8%	1.2%	100.0%
Total		327	38	365
		89.6%	10.4%	100.0%

Chi-square 82.753 p-value <0.001 lambda 0.225 tenure dependent p-value<0.001

Table 5-5. Relationship of tenure type (3 categories) to sale activity in Tete Chemin

Tenure Type		Whether Sale Occurred		Total
		None	At Least 1 Sale	
Individual	No.	98	21	119
	%	82.4%	17.6%	100.0%
2 Owners	No.	74	12	86
	%	86.0%	14.0%	100.0%
Family land	No.	94	4	98
	%	95.9%	4.1%	100.0%
Total		266	37	303
		87.8%	12.2%	100.0%

Chi-square 9.565 p-value 0.008 lambda 0.0

However, only Choiseul and Micoud show statistically significant predictability for tenure type as at least one sale has occurred with p values of less than 0.001. This is indicated by the lambda values since lambda varies between 0 and 1 where 0 reflects no predictability and 1 reflects absolute predictability. Therefore in Micoud 15% fewer

errors are made predicting tenure knowing whether a sale has occurred. In Choiseul, 22% fewer errors are made predicting tenure knowing whether a sale has occurred. The reason for lack of predictability in the other direction, that is in predicting whether a sale has occurred knowing the tenure type of the parcel, is possibly because there are also a significant number of parcels under individual ownership and ownership in common on which no sales have occurred, so that there is less predictability of whether a sale has occurred given the tenure type.

Similar results were obtained for analyses of relationship and strength of relationship using only two levels of tenure type, 1 and 2 owners as opposed to family land ownership as shown in Table 5-6, Table 5-7, Table 5-8, and Table 5-9.

Table 5-6. Relationship of tenure type (2 categories) to sale activity in Babonneau

		Whether Sale Occurred		Total
		None	At Least 1 Sale	
1 or 2 Owners	No.	544	209	753
	%	72.2%	27.8%	100.0%
Family land	No.	144	10	154
	%	93.5%	6.5%	100.0%
Total		688	219	907
		75.9%	24.1%	100.0%

Chi-square 31.558 p-value <0.001

The spatial distribution of the relationship of tenure type to sale activity can be demonstrated as in Figure 5-11, which shows sheet 1247B in Babonneau as an example.

Table 5-7. Relationship of tenure type (2 categories) to sale activity in Micoud

		Whether Sale Occurred		Total
		None	At Least 1 Sale	
1 or 2 Owners	No.	117	50	167
	%	70.1%	29.9%	100.0%
Family land	No.	100	5	105
	%	95.2%	4.8%	100.0%
Total		217	55	272
		79.8%	20.2%	100.0%

Chi-square 25.334 p-value <0.001

Table 5-8. Relationship of tenure type (2 categories) to sale activity in Choiseul

		Whether Sale Occurred		Total
		None	At Least 1 Sale	
1 or 2 Owners	No.	78	35	113
	%	69.0%	31.0%	100.0%
Family land	No.	249	3	252
	%	98.8%	1.2%	100.0%
Total		327	38	365
		89.6%	10.4%	100.0%

Chi-square 74.195 p-value <0.001

Table 5-9. Relationship of tenure type (2 categories) to sale activity in Tete Chemin

		Whether Sale Occurred		Total
		None	At Least 1 Sale	
1 or 2 Owners	No.	172	33	205
	%	83.9%	16.1%	100.0%
Family land	No.	94	4	98
	%	95.9%	4.1%	100.0%
Total		266	37	303
		87.8%	12.2%	100.0%

Chi-square 8.930 p-value <0.001

Logistic regression was also performed to determine the impact of the related factors on the incidence of at least one sale on a parcel. The variables put into the model were a) the tenure type in 2 categories, b) whether the parcel was the product of a mutation, c) the area in hectares of the parcel, and d) the location of the parcel. The results of the regression are as shown in Table 5-10.

The size of the parcel in hectares was not found to be a significant predictor of the number of sales, but the other variables (location of the parcel, whether the parcel had individualized tenure and whether the parcel was a product of mutation of a larger parcel), were all statistically significant, as indicated in the table. The model adequately fits the data as indicated in Table 5-11 by the goodness-of-fit chi-square value, but since there are so few sales, the model does not increase the accuracy of prediction beyond the prediction that there are no sales on any of the parcels. The prediction data is shown in

Table 5-12. Even so, 81.1 % of the sales are predicted by the model. The Chi-Square goodness-of-fit test, tests the hypothesis that the data adequately fit the model. The hypothesis is not rejected in this instance, as indicated by the p value of 0.529.

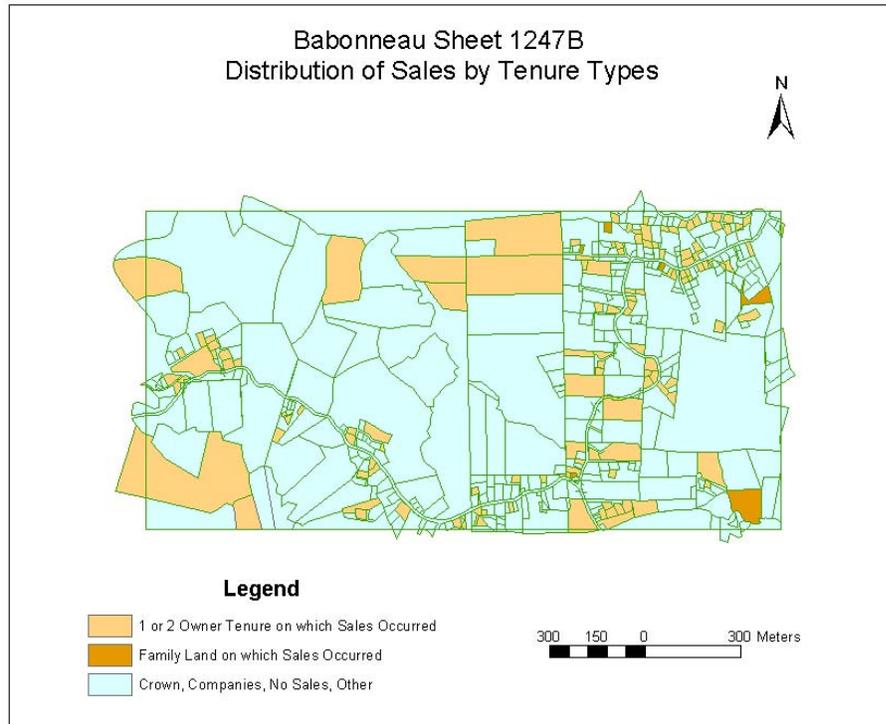


Figure 5-11. Spatial distribution of sales by tenure type on sheet 1247B, Babonneau

Table 5-10. Results of logistic regression explaining the incidence of at least one sale

Variable	Coefficient	S. E.	Wald chi square	df	Sig.	Exp (B)
Babonneau	.787	.203	15.054	1	.000	2.196
Micoud	1.166	.253	21.254	1	.000	3.208
Choiseul	.846	.271	9.755	1	.002	2.330
1 or 2 Owners	2.108	.236	79.588	1	.000	8.231
Product of mutation	1.142	.134	72.946	1	.000	3.134
Constant	-4.471	.302	219.502	1	.000	.011

S.E. = standard error, df =degrees of freedom

Table 5-11. Hosmer and Lemeshow Test of goodness-of-fit

Chi-square	df	Sig.
5.119	6	.529

Table 5-12. Predictive ability of the model

Observed	Predicted		Percentage correct
	No sale	At least one sale	
No sale	1495	0	100.0
At least one sale	348	0	.0
Overall Percentage			81.1

Table 5-13 shows the relationship between parcel size and sale activity. While 23.9% of the smallest parcel size category of less than 0.2 hectares have had one sale, this is the largest percentage of any of the size categories. More of the sales therefore occur on the smallest parcels.

Table 5-13. Relationship between parcel size and sale activity

No. of Sales		Area in hectares					Total	
		<0.2	0.21-0.4	0.41-2.0	2.01-4.0	4.01-8.0		>8.0
0	No. of parcels	637	109	513	259	95	43	1656
	% sale type	38.5%	6.6%	31.0%	15.6%	5.7%	2.6%	100.0%
	% of group size	74.2%	87.2%	88.6%	86.9%	93.1%	97.7%	82.5%
	% of Total	31.7%	5.4%	25.6%	12.9%	4.7%	2.1%	82.5%
1	No. of parcels	205	15	58	35	6	1	320
	% sale type	64.1%	4.7%	18.1%	10.9%	1.9%	0.3%	100.0%
	% of group size	23.9%	12.0%	10.0%	11.7%	5.9%	2.3%	15.9%
	% of Total	10.2%	0.7%	2.9%	1.7%	0.3%	0.0%	15.9%
2	No. of parcels	15	1	8	3	1	0	28
	% sale type	53.6%	3.6%	28.6%	10.7%	3.6%	0.0%	100.0%
	% of group size	1.7%	0.8%	1.4%	1.0%	1.0%	0.0%	1.4%
	% of Total	0.7%	0.0%	0.4%	0.1%	0.0%	0.0%	1.4%
3	No. of parcels	2	0	0	1	0	0	3
	% sale type	66.7%	0.0%	0.0%	33.3%	0.0%	0.0%	100.0%
	% of group size	0.2%	0.0%	0.0%	0.3%	0.0%	0.0%	0.1%
	% of Total	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Total no. in group		859	125	579	298	102	44	2007
% of all parcels		42.8%	6.2%	28.8%	14.8%	5.1%	2.2%	100.0%

Chi-square p-value <0.001

The number of cells with counts less than 5 in the table relating the categories of area with the categories of number of sales exceeded 20% of the total number of cells. A prerequisite for the use of the Chi-square goodness of fit test is that the observed cell counts must be no less than 1 and no more than 20% of the observed cell counts must be less than 5. The parcel size groupings were therefore collapsed into fewer groups in order to obtain chi-square measures of relationship. A statistically significant relationship with p value less than 0.001 was obtained when this was done, but further analysis using the lambda measure showed a weak relationship. Figure 5-12 shows graphically the relationship between parcel size and sale activity.

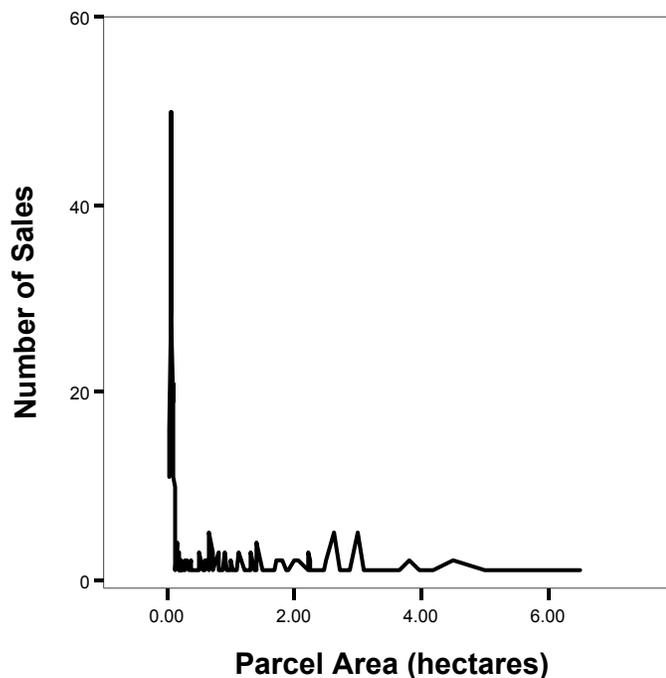


Figure 5-12. Relationship between parcel size and sale activity

The number of parcels that have registered at least one mortgage is also an indicator of the activity of the land market and whether land registration has increased

access to credit for landholders. Table 5-14 shows that 40.2% of the parcels in Babonneau have registered at least one mortgage as opposed to 7.4% of the parcels in Choiseul. The differences amongst the areas are statistically significant as indicated by the Welch statistic, which is a robust indicator when samples have differing variances and sizes as obtains in these samples.

Table 5-14. Credit use on parcel by location

Location		Whether at least 1 mortgage		Total
		No mortgage	At least 1 mortgage	
Babonneau	No.	563	379	942
	%	59.8%	40.2%	
Micoud	No.	224	61	285
	%	78.6%	21.4%	
Choiseul	No.	365	29	394
	%	92.6%	7.4%	
Tete Chemin	No.	272	114	386
	%	70.5%	29.5%	
Total		1424	583	2007
		71.0%	29.0%	

Welch statistic indicates at least one difference in means significant below 0.05
 $p < 0.001$ (variances and sample sizes unequal)

Figure 5-13 shows the number of mortgages entered into overall for the four selected communities. Figure 5-14 breaks the total into those falling in the separate communities. Short-term mortgages of 3 and 5 years duration cause a cyclic appearance to the graphs. The numbers of mortgages vary between 30 and 70 per year over all four communities. Figure 5-15 shows the total value of mortgages registered per year for the sampled sheets in all four communities. Figure 5-16 shows the total value of mortgages registered per year for each of the communities. At least one statistically significant difference in means was computed.



Figure 5-13. Total number of mortgages per year in all four communities

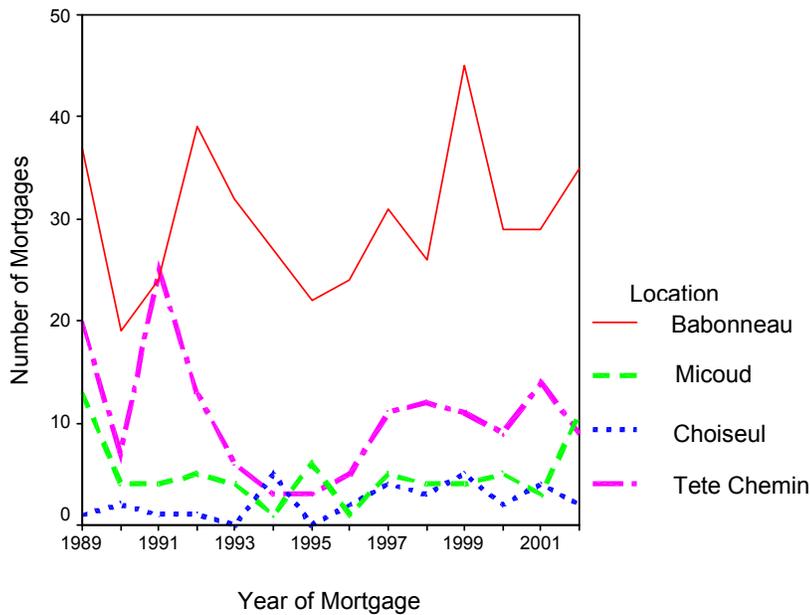


Figure 5-14. Total number of mortgages per year for each of the four communities

A logistic regression model was used to determine the impact of size of parcel, tenure type and location of parcel on the incidence of at least one mortgage on the parcel. The results are as shown in Table 5-15. Location, tenure type and whether the parcel was

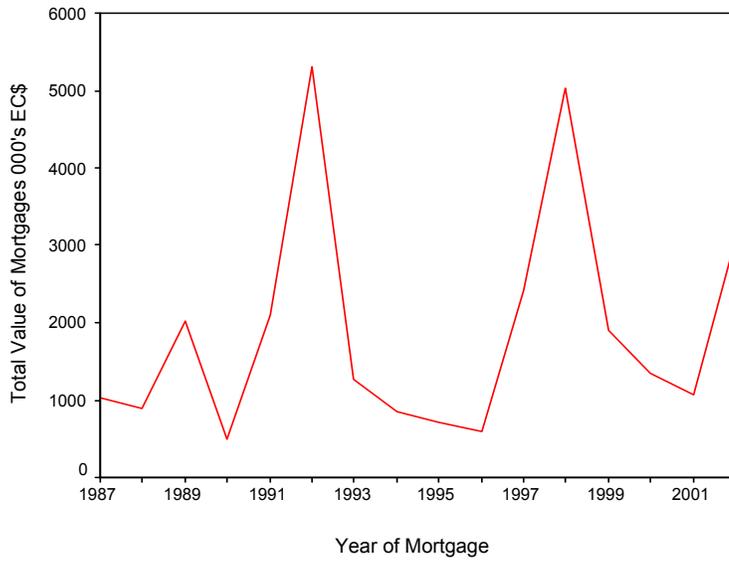


Figure 5-15. Total value of mortgages in EC\$ for all four communities

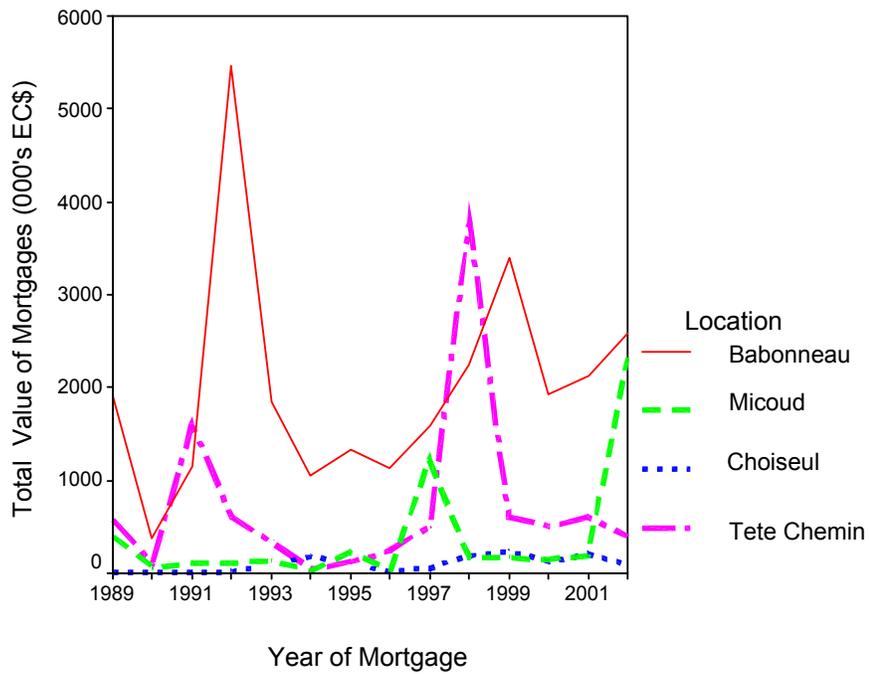


Figure 5-16. Total value of mortgages per year in EC\$ for each of the four communities

a result of a mutation are all significant to the model. Size of parcel is not significant to the model. The model fits the data adequately as indicated by Table 5-16. The model predicts 71.7% of the incidence of at least one mortgage as in shown in Table 5-17.

Table 5-15. Results of logistic regression on the incidence of mortgages in all 4 communities

Variable	coeff	S.E.	Wald	df	Sig	Exp(B)
Tete Chemin			43.848	3	.000	
Babonneau	.017	.147	.014	1	.906	1.018
Micoud	-.465	.202	5.313	1	.021	.628
Choiseul	-1.330	.240	30.668	1	.000	.264
1 or 2 Owners	1.534	.157	95.368	1	.000	4.636
Result of mutation	.800	.112	51.147	1	.000	2.225
Constant	-2.089	.190	121.294	1	.000	.124

Table 5-16. Hosmer and Lemeshow Test of goodness-of-fit of model

Chi-square	df	Sig.
3.389	6	.759

Table 5-17. Predictive ability of the model

Observed	Predicted		Percentage correct
	No mortgage	At least one mortgage	
No sale	1049	216	82.9
At least one sale	306	272	47.1
Overall Percentage			71.7

Comparing current credit use in the field sampled parcels with the credit use described during the baseline survey for the field sampled parcels at that time indicates a reduction in credit use rather than an increase as anticipated after the LRTP. Table 5-18 and Table 5-19 give the comparative figures and percentages for the field samples.

Table 5-18. Credit use by parcel—comparison 1987 to 2004

Credit use	1987	1987	2004	2004
	Frequency	Percent	Frequency	Percent
no	27	56.3	44	73.3
yes	20	41.6	16	26.7
Turned down	1	2.1	0	0.0
Total	48	100.0	60	100.0

Source for baseline data Lemel 1988

Table 5-19. Incidence of credit use on parcel by location—comparison 1987 to 2004

Location	No	Credit use 1987		Credit use 2004			
		Yes	Total	No	Yes	Total	
Babonneau	No.	15	13	28	22	8	30
	%	53.6%	46.4%	100%	73.3%	26.7%	100.0%
Micoud	No.	13	7	20	22	8	30
	%	65.0%	35.0%	100%	73.3%	26.7%	100.0%
Total	No.	28	20	48	44	16	60

Source for baseline data Lemel 1988

Binomial tests indicate a statistically significant difference between the population proportions of credit use in the 1987 sample and the 2004 sample with p value less than 0.001. A 95% confidence interval defines the difference to be between 15% to 40% based on the current sample size. Table 5-20 examines the relationship between credit use and tenure type. A statistically significant relationship was found based on the chi-square statistic with p value less than 0.001.

Table 5-20. Relationship between credit use and tenure type

Type of tenure		Whether mortgaged		Total
		None	At least 1	
Individual	No. of parcels	718	520	1238
	% of Individualized parcels	58.0%	42.0%	100.0%
	% of parcels mort or not mort	56.6%	90.0%	67.0%
Multiple Owner	No. of parcels	551	58	609
	% of Multiple Owner parcels	90.5%	9.5%	100.0%
	% of parcels mort or not mort	43.4%	10.0%	33.0%
Total No.		1269	578	1847
%		68.7%	31.3%	100.0%
		100.0%	100.0%	100.0%

Chi-square p value<0.001

Another measure of activity in land is the number of mutations (subdivisions) occurring over time. Table 5-21 indicates that formal mutations have resulted in a 57% increase in the number of parcels overall in the registry sheet sample since the LRTP. The largest increase occurred in Babonneau as a result of urbanization with a 123% increase in parcel numbers. Current mean parcel sizes are shown in Table 5-22.

Table 5-21. Increase in number of parcels through formal mutations by location

Location	No. 1987	No. 2004	No. increase	% increase
Babonneau	422	942	520	123
Micoud	263	284	21	8
Choiseul	347	393	46	13
Tete Chemin	247	384	137	55
Total	1279	2003	724	57

Table 5-22. Mean parcel sizes by location of parcel from 2004 data

Location	Mean parcel size (ha.)	Number of parcels	Std. Deviation
Babonneau	0.5941	942	1.33344
Micoud	2.7478	284	4.97084
Choiseul	1.9935	393	3.00359
Tete Chemin	1.5847	384	2.34412
Total	1.3640	2003	2.78997

Tenure Security

Data on tenure security was derived from using documented, registered tenure type, direct queries, and levels of cultivation on agricultural land as indicators.

Tenure type as a measure of security

The incidence of multiple ownership or family land tenure was compared between the initial registration in 1987 and the current research in 2004. Comparisons between the initial registration and current registration for all the non-crown, non-company and non-church parcels in the selected sheets in the sample communities indicated that, overall, there are many more individualized parcels in the sampled sheets. However, there has been no great reduction since 1987 in the number of parcels registered under the family land categories of “trustees for sale”, and “heirs of ...”. These comparisons are shown graphically in Figure 5-17. Comparisons between the field data in 1987 and the current field data were also performed. Table 5-23 compares both years in Babonneau and in Micoud. Both comparisons are depicted graphically in Figure 5-18.

These comparative data indicate that the percentage of family land in Babonneau has remained unchanged while there has been an increase in the incidence of both

individual and family land ownership in Micoud at the expense of ownership in community (usually because of the death of a spouse where land is held in community). The chi-square statistic for the comparison between both surveys of Babonneau and Micoud shows no statistically significant difference between the two years. Both current field situations reflect a different status than that held in the Land Registry.

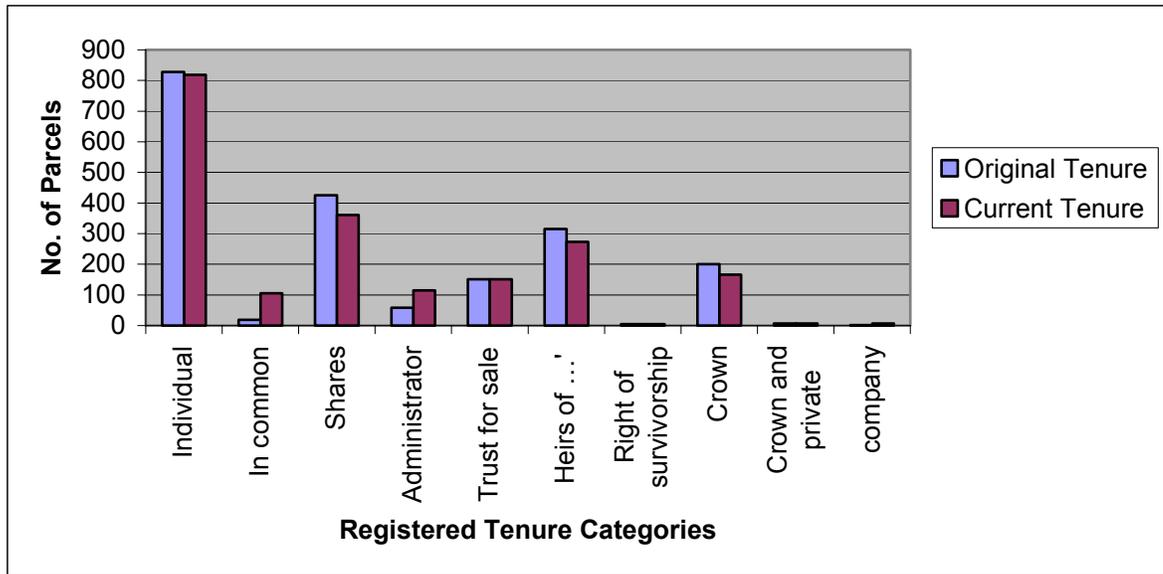


Figure 5-17. Comparison of tenure types in sampled sheets—1987-2004

Table 5-23. Incidence of family land parcels in Babonneau and Micoud—1987 and 2004

Type of Ownership	1987				2004			
	Number		Percent		Number		Percent	
	Bab.	Mic.	Bab.	Mic.	Bab.	Mic.	Bab.	Mic.
Individual	41	9	57.7	22.0	17	13	56.7	43.3
In common (husband and wife)	14	18	19.7	43.9	6	5	20.0	16.7
Family land	16	14	22.5	34.1	7	12	23.3	40.0
Totals	71	41	100	100	30	30	100	100

Source for 1987 data: Stanfield 1988b

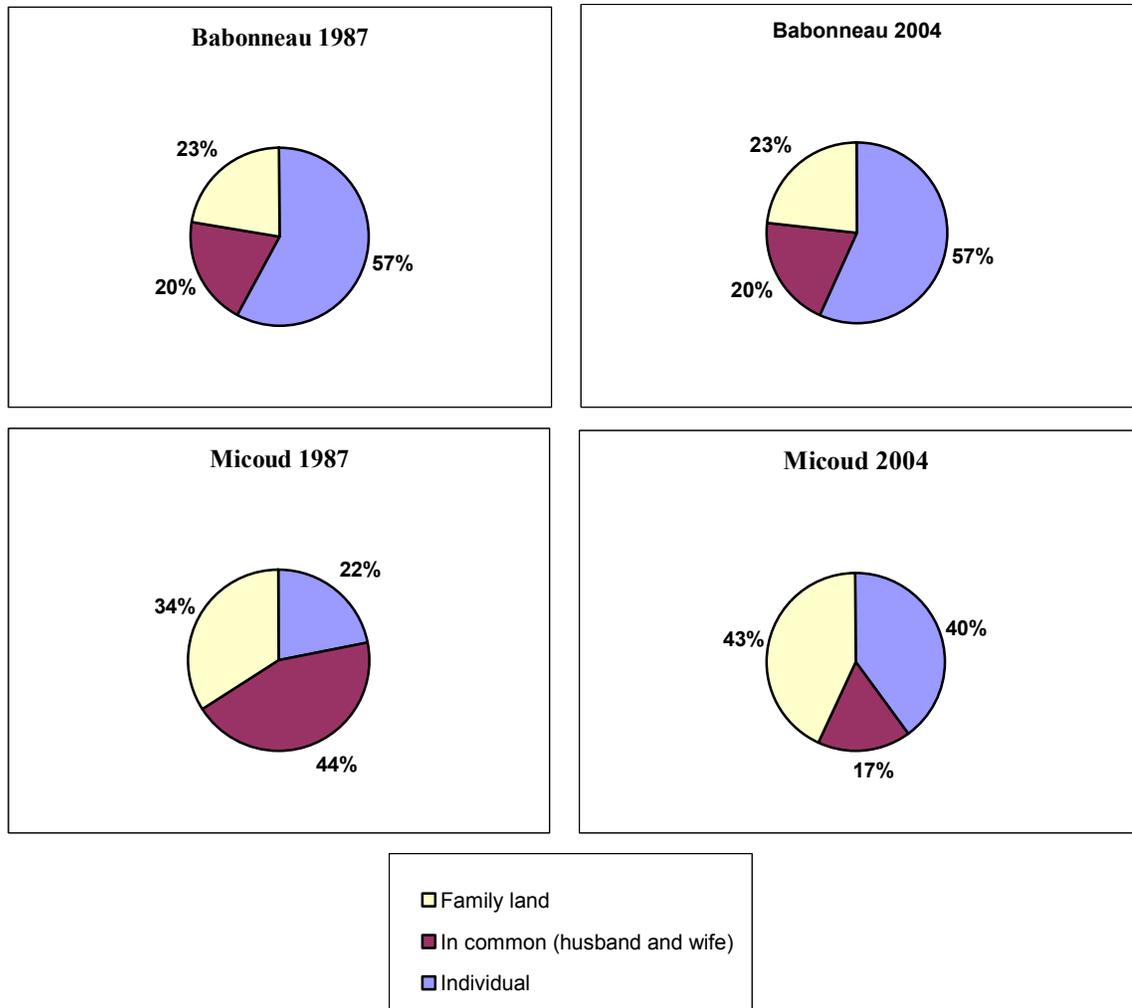


Figure 5-18. Comparison of incidence of tenure types in field samples—1987 to 2004

Table 5-24 compares the current percentage of family land in Babonneau with that in Micoud using the formal data in the registry. Table 5-25 indicates that there is a statistically significant relationship between tenure type and location as illustrated by the chi square value with p value <0.001 . The strength of the relationship as indicated by the lambda value is also statistically significant for both tenure type and location of parcel as the dependent variable. This implies that tenure type relatively strongly predicts location of parcel and location of parcel relatively strongly predicts tenure type. This also means that given the values of lambda, 18% fewer errors are made predicting location given the

tenure type than if the tenure type is not known, and 14% fewer errors are made predicting tenure type given the location than if the location is not known.

Table 5-24. Current incidence of family land in Babonneau and Micoud (registry sample)

Type of Ownership	Babonneau Number	Babonneau Percent	Micoud Number	Micoud Percent
Individual	537	59.3	90	33.1
In common (husband and wife)	216	23.8	77	28.3
Family land	151	16.7	105	38.60
Totals	906	100	272	100

Table 5-25. Current incidence of family land in all 4 communities (registry sample)

Tenure Type		Location				Total
		Babonneau	Choiseul	Micoud	Tete Chemin	
1 or 2 Owners	No.	753	113	167	205	1238
	%	60.8%	9.1%	13.5%	16.6%	100.0%
Multiple Owners	No.	154	252	105	98	609
	%	25.3%	41.4%	17.2%	16.1%	100.0%
Crown Land	No.	35	29	13	83	160
	%	21.9%	18.1%	8.1%	51.9%	100.0%
Total	No.	942	394	285	386	2007
	%	46.9%	19.6%	14.2%	19.2%	100.0%

Chi square 451.5 p-value <0.001 lambda tenure dependent 0.18 location dependent 0.14 both p-values <0.001

Figure 5-19 and Figure 5-20 show the spatial distribution of the tenure types on sheet 1247B in Babonneau and sheet 1228B in Micoud. The spatial distribution of tenure types on all the sheets selected for field survey can also be seen in Appendix D. These maps of spatial distribution indicate that the tenure types are both well distributed over the sheet areas and therefore the family land tenure is not isolated to a particular area of the community. Table 5-26 indicates a statistically significant relationship between tenure type and area of parcel by chi-square with p value less than 0.001 and lambda statistically significant with p values of less than 0.001 with either variable dependant. Figure 5-21 shows the distribution of parcel sizes in the sheet sample.

Table 5-26. Relationship between tenure type and area of parcel

Tenure Type		Area in hectares					Total	
		<0.2	0.21-0.4	0.41-2.0	2.01-4.0	4.01-8.0		>8.0
1 or 2 owners	No. of parcels	678	79	315	126	31	9	1238
	% of tenure type	54.8	6.4	25.4	10.2	2.5	0.7	100.0
	% of parcel group	86.3	69.3	58.6	45.3	32.0	26.5	67.0
Family Land	No. of parcels	108	35	223	152	66	25	609
	% of tenure type	17.7	5.7	36.6	25.0	10.8	4.1	100.0
	% of parcel group	13.7	30.7	41.4	54.7	68.0	73.5	33.0
Total no.		786	114	538	278	97	34	1847
Total %		42.6	6.2	29.1	15.1	5.3	1.8	100.0

Chi-square p-value <0.001. Lambda significant for either variable dependent.

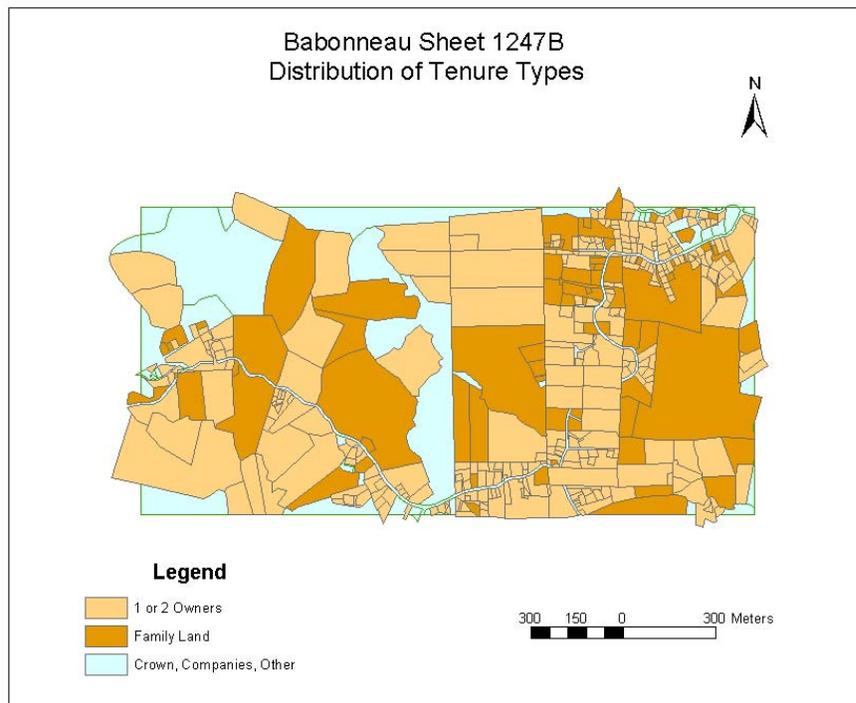


Figure 5-19. Spatial distribution of tenure types on sheet 1247B, Babonneau

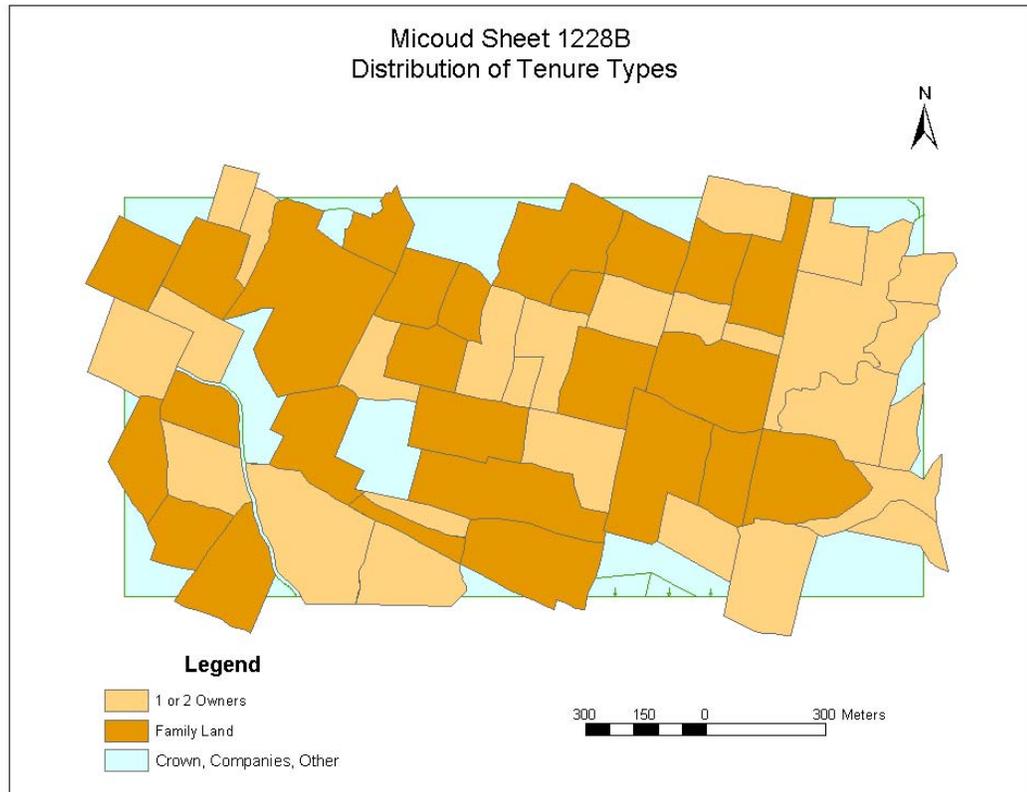


Figure 5-20. Spatial distribution of tenure type on Sheet 1228B, Micoud

A greater percentage of the larger parcels are family land. One or two owners own a greater percentage of the smaller parcels. These figures indicate that tenure type is a strong predictor of size of parcel and size of parcel is a strong predictor of tenure type. These data therefore indicate that family land tenure does not promote fragmentation of land parcels but restricts land market transactions. The figures also indicate that parcels become individualized upon mutation.

Documentation as a measure of security

The incidence of documentation can be compared with the situation prior to the LRTP to determine whether tenure security has improved and remains improved as a result of the LRTP. Prior to the LRTP, as shown in Table 5-27, 41.8% of landowners

held no documentation or documentation other than a deed to prove ownership (Stanfield 1988). Currently, as shown in Table 5-28, 27.8% of owners hold no documentation or documentation other than registered title to prove ownership.

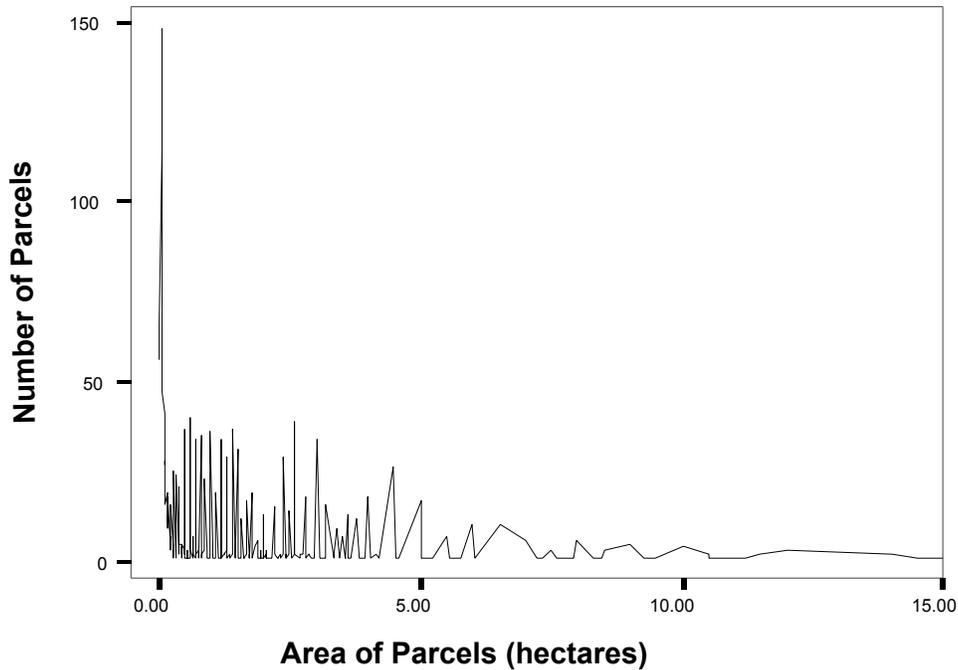


Figure 5-21. Distribution of parcel sizes in registry sample

Table 5-27. Documentation of ownership in baseline data—1987

Tenure	Documentation		Total	
	No or Other Document	Deed		
Individual	No.	22	48	70
	%	31.4%	68.6%	100.0%
Family Land	No.	44	17	61
	%	72.1%	27.9%	100.0%
2 owners	No.	11	42	3
	%	20.8%	79.2%	100.0%
Total		77	107	184
		41.8%	58.2%	100.0%

Source for baseline data: Stanfield 1988

Taking title registered in the name of the occupant as an indicator of tenure security, this indicates an increase in formal or objective tenure security from pre-LRTP

days but a drop in formal tenure security from the status at the end of the LRTP since all parcels besides parcels registered as crown would have been given at least provisional title during the LRTP.

Table 5-28. Documentation of ownership in field sample—2004

Tenure	Documentation		Total	
	No or Other Document	Registered Title		
Individual	No.	4	24	28
	%	14.3%	85.7%	100.0%
Family Land	No.	9	8	17
	%	52.9%	47.1%	100.0%
2 owners	No.	2	7	9
	%	22.2%	77.8%	100.0%
Total		15	39	54
		27.8%	72.2%	100.0%

Chi square 8.045 p-value 0.018 but 2 cells have count of <5

The number of conversions from provisional to absolute title can also be used as an indicator of increased tenure security. Table 5-29 indicates that 74.1% of those who were originally granted provisional title in the registry sample have not sought conversion to absolute title while 25.9% have converted. Therefore 85.9% of the current parcels in the registry sample have absolute title. Of the 25.9% that have converted, 34% have also had a sale on the parcel. Of those that have converted from provisional to absolute, 47% have also had a mortgage on the parcel. Therefore land market activity is somewhat related to the incidence of conversion but does not account for all decisions to convert.

Table 5-29. Conversions from provisional to absolute title since the LRTP (registry sample)

Original Title Type		Current Title Type		Total
		Absolute	Provisional	
Absolute	Count	1626	0	1626
	%	100.0%	.0%	100.0%
Provisional	Count	98	281	379
	%	25.9%	74.1%	100.0%
Total No.		1724	281	2007
Total %		85.9%	14.0%	100.0%

This shows complacency on the part of the owners who may consider provisional title to be adequate for perceived tenure security, or it may show lack of knowledge about the procedures to be followed to convert, or persisting conflict that would prevent a final determination of title. The legislation specifies that land registered as provisional remains subject to any adverse right or claim that existed prior to registration. However, since the legislation allows dealings in the land held under provisional title in the same manner as land held under absolute title, there is no incentive to convert, if the owner is sufficiently confident that his ownership will not be challenged after many years have elapsed.

Perceptions as a measure of security

Perceptions of security were directly queried by asking how likely was a counterclaim for ownership of the parcel. The majority of the respondents, 81.7%, felt secure enough to state that it was impossible for a counterclaimant to challenge their claim as indicated in Table 5-30 and illustrated in Figure 5-22.

Table 5-30. Perceptions of the likelihood of counterclaims

	Frequency	Percent
impossible	49	81.7
unlikely	3	5.0
likely	7	11.7
No response	1	1.7
Total	60	100.0

Land use intensity as a measure of security

The landholders were asked what percentage of the parcel was cultivated and gave an estimate of the percentage of the parcel that was under crops. While this measure only demonstrates change in intensity of agricultural use, since the land could have been put to

other productive use, many landholders stated that they were no longer interested in planting bananas and had simply abandoned the fields.

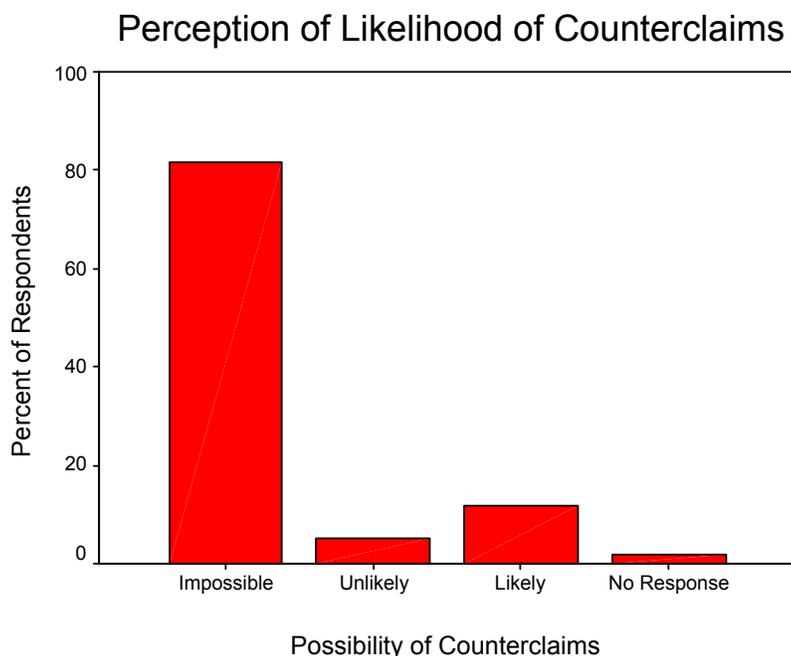


Figure 5-22. Perception of likelihood of counterclaim to ownership of parcel

Also, the rural communities in St. Lucia are primarily agricultural with very few alternatives for investment. If it is anticipated that landholders with greater security of tenure would be encouraged to use the land more intensively knowing that they would benefit from the returns, then this has not occurred.

Levels of intensity of cultivation in the field-sampled parcels are indicated in Table 5-31 and compared with baseline data in Table 5-32. Figure 5-23 and Figure 5-24 compare the changes in levels of cultivation, or intensity of agricultural use, in the two communities. It was anticipated that security of tenure would encourage the landholders to use the land more intensively, and also access credit to invest in the land, knowing that they would enjoy the profits without counterclaims of ownership from others.

Table 5-31. Levels of cultivation in Babonneau and Micoud

		Levels of Cultivation					Total
		≤ 25%	26-50%	51-75%	76-99%	100%	
Babonneau	No.	28	1	0	0	1	30
	%	93.3%	3.3%	0.0%	0.0%	3.3%	100.0%
Micoud	No.	16	2	1	3	8	30
	%	53.3%	6.7%	3.3%	10.0%	26.7%	100.0%
Total		44	3	1	3	9	60
		73.3%	5.0%	1.7%	5.0%	15.0%	100.0%

Table 5-32. Comparison of levels of cultivation between 1987 and 2004

		Levels of Cultivation					Total
		≤ 25%	26-50%	51-75%	76-99%	100%	
Babonneau	1987	3.7%	3.7%	7.5%	20.3%	64.8%	100.0%
	2004	93.3%	3.3%	0.0%	0.0%	3.3%	100.0%
Micoud	1987	20.8%	8.3%	16.6%	8.3%	47.8%	100.0%
	2004	53.3%	6.7%	3.3%	10.0%	26.7%	100.0%

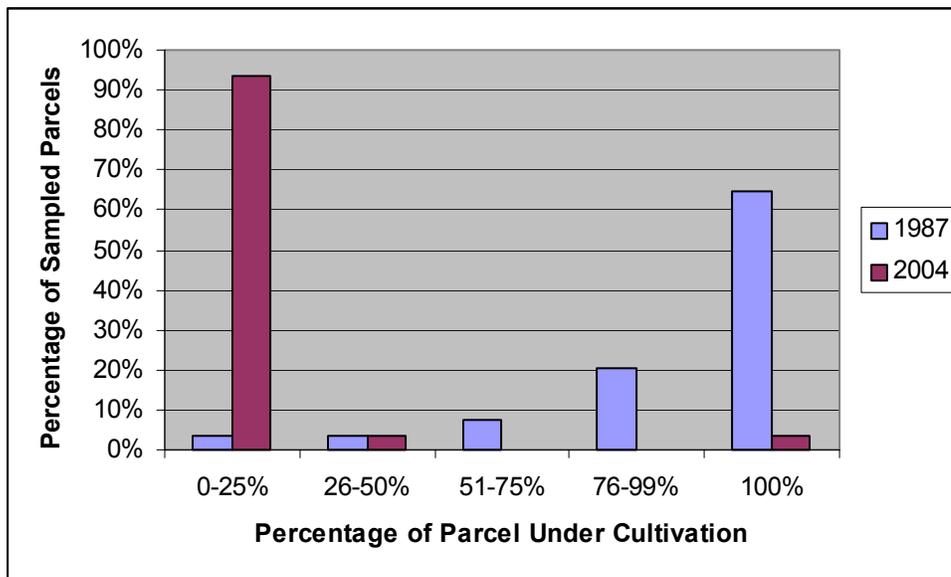


Figure 5-23. Comparison of percentage of parcels in field sample under different levels of intensity of cultivation (Babonneau—1987 and 2004)

This is therefore an indication that alternatives need to be provided in order for benefits to be achieved from titling and registration. Security of tenure is not a sufficient condition for putting the land to use or for increasing the intensity of use.

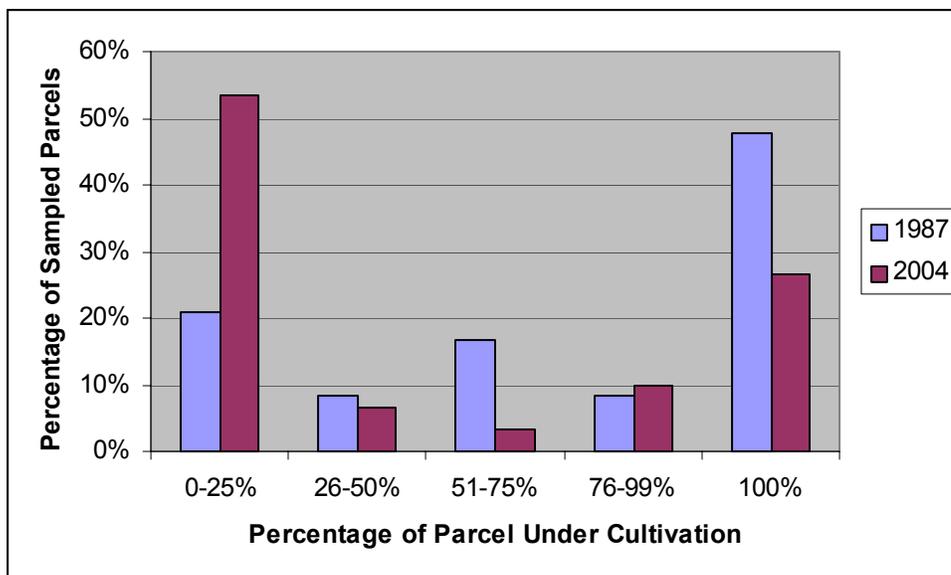


Figure 5-24. Comparison of percentage of parcels in field sample under different levels of intensity of cultivation (Micoud—1987 and 2004)

Summary

The statistical analysis of data acquired at the registry and in the field in St. Lucia unearthed information on the impact of land registration on the land market.

Formal registrations for both sales and mortgages, showed initial increases of 29% and 45% respectively with a subsequent slump of 12% and 17% respectively. However, indicators for sales as a percentage of total parcels and mortgages as a percentage of total parcels increased by 0.2% and remained at 3.8% respectively and subsequently decreased to 2.6% and decreased to 3% respectively. A statistically significant relationship between tenure type and both formal sale and formal mortgage activity was found.

The incidence of sale is predicted by a) the location of the parcel, that is, sales are greater in the peri-urban community of Babonneau and fewer in the rural community of Micoud, which is at greater distance from the capital of St. Lucia, b) the tenure type under which the parcel is held, that is, sales are greater on individually owned parcels than on family land and c) whether the parcel is a product of a mutation, that is, sales are

greater on parcels which had previously been subdivided. These 3 factors were also shown to predict the incidence of mortgage in the same way. There was no significant increase in the number of persons accessing credit over the 1987 figures. The field sample indicated a statistically significant reduction in credit use over the 1987 baseline sample. No reduction in the number of family land parcels was found in the field samples in the Babonneau and Micoud communities, so that the family land tenure type was found to be persistent.

Based on these empirical data and contrary to the premise of the project, the land registration and titling project in St. Lucia has not led to a sustained increase in volume of land transactions of sale and mortgage, over the medium term since the conclusion of the project.

Chapter 5 presented the analysis of the data acquired on land transactions in the case study of St. Lucia. Chapter 6 presents the analysis of the data acquired on land registration system sustainability in the case study.

CHAPTER 6
ANALYSIS OF THE SUSTAINABILITY OF THE LAND REGISTRATION SYSTEM
IN ST. LUCIA

Sustainability of the Land Registry

Sustainability of the Land Registry was investigated in this research by comparing data acquired in the Land Registry with data acquired from questionnaires for the landholders of the same sample set of parcels. The data acquired for comparison, and the analyses performed, are presented in this chapter. The reasons for non-conformity between the formal data and what exists on the ground were examined by obtaining the landholders' perceptions of the characteristics of the registration system. These perceptions are stated in diffusion literature to affect the adoption of technology. Data acquired for determining the land-users' perceptions of the characteristics and the analyses performed are also presented in this chapter.

Conformity Between Registry and Ground

Data were acquired from the Land Registry on the number of registered owners on the parcels. In the field interviews, data on the current number of de facto owners were also acquired. The categories of ownership were collapsed into three categories, (parcels with 1 owner, those with 2 owners and parcels with 3 or more owners), then the instances of occurrence were compared between the registry data and the field, and the results shown in Table 6-1 were obtained. There is 18% discrepancy between the tenure information in the registry and that in the field, based solely on numbers of owners. This

indicates non-conformity between the information in the registry and what actually obtains in the field.

Table 6-1. Conformity between tenure in the registry and tenure in the field

		Registry Tenure			Total
		1 owner	2 owners	>3 owners	
Field Tenure	1 owner	28	1	1	30
	2 owners	2	6	3	11
	>2 owners	2	2	15	19
Total		32	9	19	60

Data were also acquired in the registry on the names of the registered owners. The occupants of the sampled parcels were asked about their relationship to the registered owners and about the method by which they had acquired the land. If the documents held by the interviewed owners of the parcels only, (excluding users or renters) are examined, then a more detailed picture of the discrepancy between the registered tenure and the de facto tenure emerges. Table 6-2 and Figure 6-1 indicate that 72.2% of the owners had a registered title to the land. Twenty-seven point eight percent (27.8%) of the owners had some familial relationship with the deceased registered owner but were not themselves the registered owners.

Table 6-2. Incidence of registered title in field sampled parcels

	Title in occupant's		Total
	None or other document	name	
Number of parcels	15	39	54
% of total Parcels	27.8%	72.2%	100.0%

Alternative documents possessed by the owners of the land that evidenced their claim to ownership include copies of wills and letters of administration of the deceased's estate. Others based their claim to ownership on the kinship with the deceased registered owner. It should be noted that letters of administration are legally valid for only one year

and must be reapplied for if they are to be used for legally effecting decisions on the estate of the deceased. Renewal has not occurred in some instances.

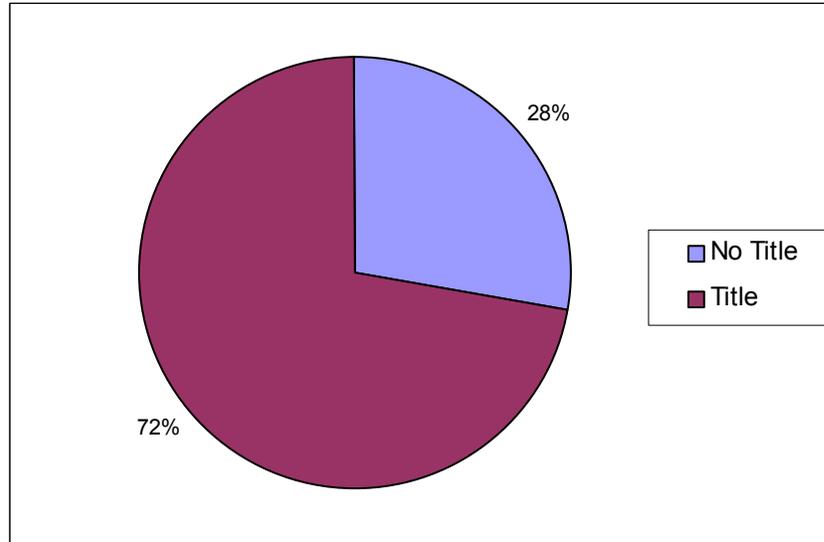


Figure 6-1. Incidence of registered title in field sampled parcels

Non-conformity between the data on encumbrances in the Land Registry and the situation on the ground was also found in relation to leased parcels. None of the 6 parcels in the sample that were occupied under some type of lease agreement between the owner and the user, was the subject of a registered lease. The lease periods had become continuous beyond the 2-year minimum required for registration under the Land Registration Act No. 12 of 1984.

All the landholders were also asked whether they would consider leasing their land. The owners offered various reasons for non-registration of existing leases and for their attitudes toward leasing in general. In one instance, the owner had not transferred the inherited title to his name so could not register a lease. Some owners felt that a lease is a private transaction between owner and lessee and did not require public registration. Others felt that leases that were month-to-month did not require registration. In some of the arrangements there was no rental payment or sharecropping occurring, and so the

activity could be better described as ‘borrowing’ of land. Some had negative attitudes to leasing of land, stating that they knew of situations where the lessee could not eventually be removed from the land. The non-registration of these arrangements reflects a further lack of accuracy and completeness of the registry data.

Perceptions Affecting Adoption of Technology

Data were acquired about the reasons for non-conformity between registry data and the reality on the ground, based on the interviewees’ perceptions of the characteristics of technology that influence its adoption and use. These characteristics are: relative advantage, compatibility, complexity, trialability and observability.

Relative advantage

In response to the open-ended question regarding whether there was any advantage to registering title to land, 15% of the land users stated that there was none, as is shown in Table 6-3. Three percent did not know whether there was any advantage while the majority of persons (82%) detailed various advantages to title registration such as security of tenure of the land, improvement in the ability to access credit, the elimination of prior conflict, and the prevention of future ones. Most of those interviewed therefore perceive some relative advantage to be obtained from registration of land. The 82% recorded as perceiving advantage compares to 91% of persons in the baseline study in 1987 who thought the LRTP to be beneficial (Gomes 1988). The decrease in the number of persons who view registration as an advantage will result in a decrease in willingness to register. Perception of a relative advantage to the adoption of an innovation motivates users to adopt.

In response to the open-ended question of whether there were any disadvantages to registration of title to land, 63.3% stated that there were none as shown in Table 6-3.

Eleven point eight percent of the respondents stated that cost was a negative factor in the registration of title as shown in Table 6-4.

Table 6-3. Perception of advantages of registration

Perceived Advantage of Registration	Frequency	Percent
security	14	23.4
prove ownership	10	16.6
prevent problems, conflicts	8	13.4
clarify past problems	3	5.1
easier transactions	3	5.0
access to credit	2	3.4
gov't knows you have land	2	3.3
better	1	1.7
has legal effect	1	1.7
individualization of family land	1	1.7
it is the law	1	1.7
know it is yours, selling easy	1	1.7
people got land	2	3.3
don't know	2	3.3
none	9	15.0
Total	60	100.0

Table 6-4. Perceived disadvantages to registration of title to land.

Perceived Disadvantage of Registration	Frequency	Percent
cost	4	6.7
people lost land	3	5.0
lawyers involved	2	3.3
cost, tax	1	1.7
cost, time	1	1.7
too costly esp. lawyers	1	1.7
family try to claim	1	1.7
forgery when illiterate	1	1.7
loss of confidentiality	1	1.7
potential tax	1	1.7
tax	1	1.7
wrongful claims	1	1.7
none	38	63.3
don't know	4	6.7
Total	60	100.0

The respondents' perceptions of the cost of registration is shown in Table 6-5 and illustrated in Figure 6-2. The actual costs are shown in Table 6-6. These actual costs

were obtained from responses to questions posed to professionals actively operating in the land market.

Table 6-5. Perceived cost of registration in EC\$

Perception of Cost in EC\$	Frequency	Percent
don't know	38	63.3
700	1	1.7
1200	1	1.7
2000	3	5.0
3000 Actual cost	5	8.3
4000	3	5.0
4500	1	1.7
5000	1	1.7
6000	1	1.7
7000	1	1.7
10000	3	5.0
12000	1	1.7
50000	1	1.7
Total	60	100.0

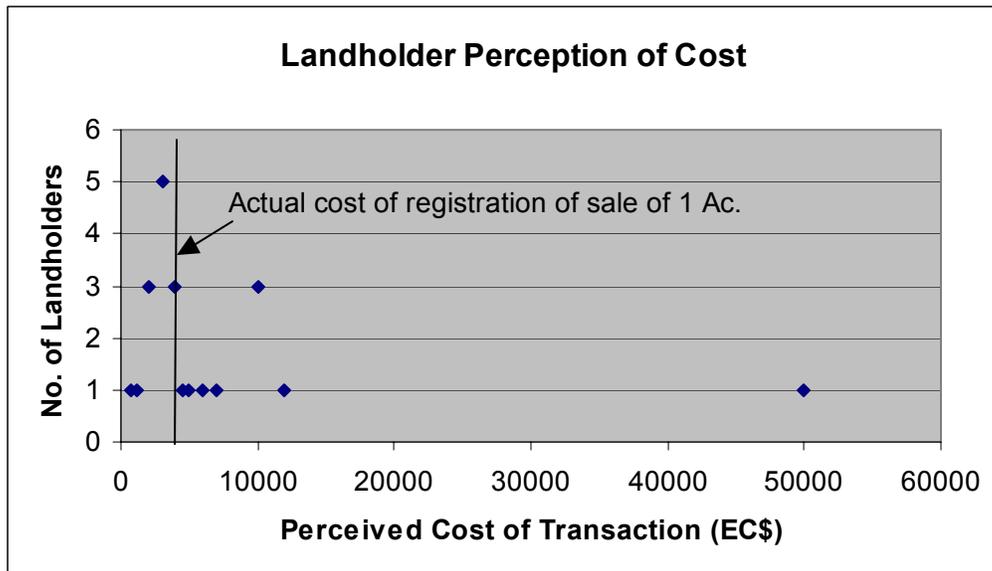


Figure 6-2. Landholder perceptions of cost of transaction in EC\$

The disparity between the actual figures and what is perceived as the cost reflects the fact that despite being asked about the cost of transfer of a parcel of land of a specific size and value, the respondents related the question to their own experiences with land of

a different value and size but also indicates that the perceived cost of the process is high. The values given by the respondents who could actually offer an estimate of the cost were generally clustered around the actual cost. Persons who are not aware of the potential benefits or the cost of entering the system would not be able to make sound decisions on whether to adopt the system.

Table 6-6. Actual land transfer and registration costs (US\$)

Inputs	Vacant Lot	Residential Lot	1 Ac. Agric	5 Ac. Agric
Land survey	926	925	1,037	2,185
Legal fees	926	2,593	259	1,296
Stamp duty	222	1,111	74	370
Vendor's tax	exempt	1,204	exempt	exempt
Registration fee	7	7	7	7
Total fees	2,081	5,840	1,377	3,858

System compatibility

The registration of title to land system replaces the registration of deeds system, which was the previous “technology” used in land transactions. For many persons the system has not changed markedly as deeds of transfer are still required as evidence of the transaction before title registration can take place. The Land Registration Act 1984 states that: “Every disposition of land, a lease or hypothec shall be effected by an instrument in notarial form or in such other form as the Registrar may in any particular case approve.” (Land Registration Act 1984, Section 67).

All notaries are required to be lawyers in St. Lucia. The perceived compatibility between the old deed system and the newer land title registration system is illustrated by the fact that 55% of the respondents believed that it was the documents they held that protected them from counterclaims on their land and not the state guarantee inherent in the land title registration system. (See Table 6-7).

Table 6-8 presents the logistic regression results that explain the incidence of title in the field based on the approximate age of the respondent and the tenure type of the parcel. The Wald statistic indicates that both variables are significant in the model.

Table 6-7. Reasons for personal perceptions about security of claim to land

Reasons	Frequency	Percent
documents	33	55.0
family land	5	8.3
people try anything	4	6.7
registry	3	5.0
land registration	2	3.3
Confidence in system	2	3.3
no response	1	1.7
errors occur	1	1.7
experiences	1	1.7
length of time	1	1.7
no encumbrances	1	1.7
only surviving relative	1	1.7
other members of family	1	1.7
Personal experience	1	1.7
title	1	1.7
truth will surface	1	1.7
Will document	1	1.7
Total	60	100.0

Table 6-9 indicates that the model predicts 81.5 percent of the observations.

Having individual tenure increased the incidence of having title and so did increased age.

Table 6-10 indicates that the model fits the data adequately. The test indicates that the older owners were the ones originally titled in the LRTP. After their death, their heirs are less likely to be registered. The records are becoming out of date by attrition.

Table 6-8. Logistic regression results explaining incidence of title in the field

	coefficient	S.E.	Wald chi-square	df	Sig.	Pred. change
Age of respondent	.063	.025	6.040	1	.014	1.065
Individual owner	1.523	.715	4.534	1	.033	4.585
Constant	-3.315	1.418	5.468	1	.019	.036

Table 6-9. Predictive ability of the model

Observed		Predicted		Percentage Correct
		Title or No Title		
		No title	Title	
Title or No Title	No title	8	7	53.3
	Title	3	36	92.3
Overall Percentage				81.5

Table 6-10. Hosmer and Lemeshow Test of goodness-of-fit of the model

Chi-square	df	Sig.
6.058	5	.301

System complexity

The perception of the respondents of the time required to transfer and register title to one acre of land, inclusive of the surveying, legal and registration processes, ranged from 2 to 3 days to 10 years, and again was affected by any personal experiences that the respondent had encountered. The majority of persons, 66.7%, however, did not know how long the process took, as shown in Table 6-11.

Table 6-11. Perceived time to transfer and register title

Responses	Frequency	Percent
don't know	40	66.7
2,3 days	1	1.7
2 wks	1	1.7
3 wks	1	1.7
1 month	1	1.7
1 ½ months	1	1.7
2 months	3	5.0
3 months	4	6.7
4 months	1	1.7
4-5 months	1	1.7
5 months	1	1.7
6 months	1	1.7
1 yr	2	3.3
2 yrs	1	1.7
4 yrs	1	1.7
Total	60	100.0

The actual time of approximately 7 weeks, as shown in Table 6-12 was obtained from responses to questions posed to professionals actively engaged in the land market.

The actual registration process at the Land Registry took less than a day to accomplish but the preliminary processes of survey, and legal preparation of documents were felt to be too lengthy.

Table 6-12. Actual time of transaction in the Land Registry

Inputs	Vacant Lot	Residential Lot	1 Ac. Agric	5 Ac. Agric
Valuation survey	1 wk	1 wk	1 wk	1 wk
Land survey	3 wks	3 wks	3 wks	3 wks
Legal document drafting	3 wks	3 wks	3 wks	3 wks
Paying duties and taxes	1 dy	1 dy	1 dy	1 dy
Total time	7 wks	7 wks	7 wks	7 wks

From the data collected on the disadvantages of the registration system, 5% of the respondents viewed the presence of the lawyer as complicating the transfer process and making it more costly. Two owners explained that the registration process was simplified, and that this should have allowed transfers to be possible without a lawyer.

System observability

Observability of the system is not high since there are no regulations requiring the owner to personally register transfers or to visit the registry for any other reason. As many as 75% of the respondents had not visited the registry for any reason as seen in Table 6-13.

Table 6-13. Whether respondent visited the Land Registry.

Response	Frequency	Percent
no	45	75.0
yes	15	25.0
Total	60	100.0

Since the legislation governing the registration of land, Land Registration Act No. 12 of 1984, mandates that all land transfers be by notarial document, the land market participant is, in effect, usually protected from having to access the Land Registry. In practice, the notary usually performs the task of registration of the transfer as part of the

services rendered to the client. Registration processes that do not involve transfer, such as partition, are also usually effected by the land surveyor involved, for a fee.

Persons who are involved in the land market for purchase, lease, sale or mortgage, whether on the sampled parcel or on other land in their possession, are more likely to have visited the Land Registry as indicated in Figure 6-3. These market participants, however, belong to a minority group of people.

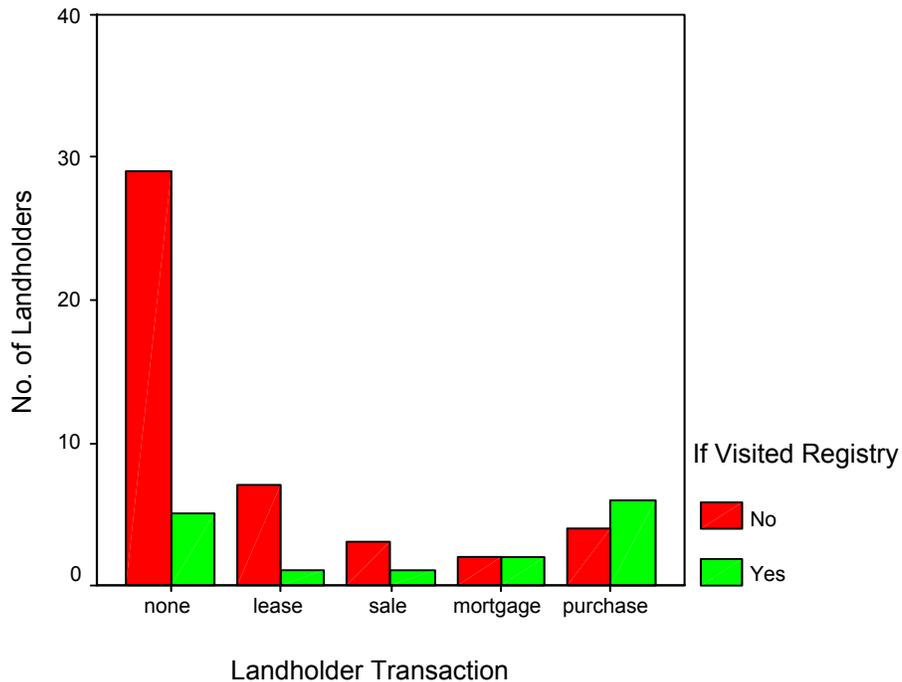


Figure 6-3. Frequency of visiting registry by type of transaction

The initial LRTP was highly observable and publicized, so participants were aware of not only the presence of the system, since maps were displayed in public places, but also about the participation of their neighbors and others in the society. Yet, at the time of the baseline study only 16% were found to have visited the registry to view the new system and to obtain certificates of title (Gomes 1988). Increasing the observability of the system might improve the adoption of the system.

Impact of Sustainability

Confidence in the accuracy and currency of the registration system should lead to increase in activity in the land market. Therefore, as the currency of the registration system decreases, it is expected that land market activity would decrease if prospective participants have lost confidence in the system. The method by which the current parcel holder obtained the land was evaluated for the sampled parcels. This was compared with the statistics compiled at the time of the baseline study. The figures are shown in Table 6-14 and illustrated in Figure 6-4. The percentage of persons acquiring land by inheritance has increased 7.6% while the percentage of parcels acquired by purchase has also increased, but by a lesser percentage of 0.6%. These differences were found to be not statistically significant. This does not indicate that a large number of persons are now market participants or that there is an increase in market participation.

Table 6-14. How parcel owner obtained land compared between 1987 and 2004

	1987		2004		2004		Total	
	No.	%	No.	%	No.	%	No.	%
Inherited	70	47.9	16	57.1	14	53.8	30	55.5
Purchased	64	43.8	12	42.8	12	46.1	24	44.4
Long possession	1	0.7	0	0	0	0	0	0
Other*	11	7.5	0	0	0	0	0	0
Total	146	100.0	28	100	26	100	54	100

Source for baseline data: Stringer 1988

* Partition of family land or other unspecified method

In Babonneau, 80% of the respondents and, in Micoud, 73.3% of the respondents had not leased out or mortgaged the parcel they occupied in the period since the LRTP had concluded. The number of parcels in Babonneau and Micoud on which transactions of lease or mortgage were performed by the parcel holder, is shown in Table 6-15. These figures indicate the level of land market activity in terms of number of parcels. The

majority of parcels in the total field sample (76.7%) have had no transactions performed on them. Again this indicates a low level of market participation on the part of the sampled landholders. The differences in proportions are not statistically significant between the two locations of Babonneau and Micoud.

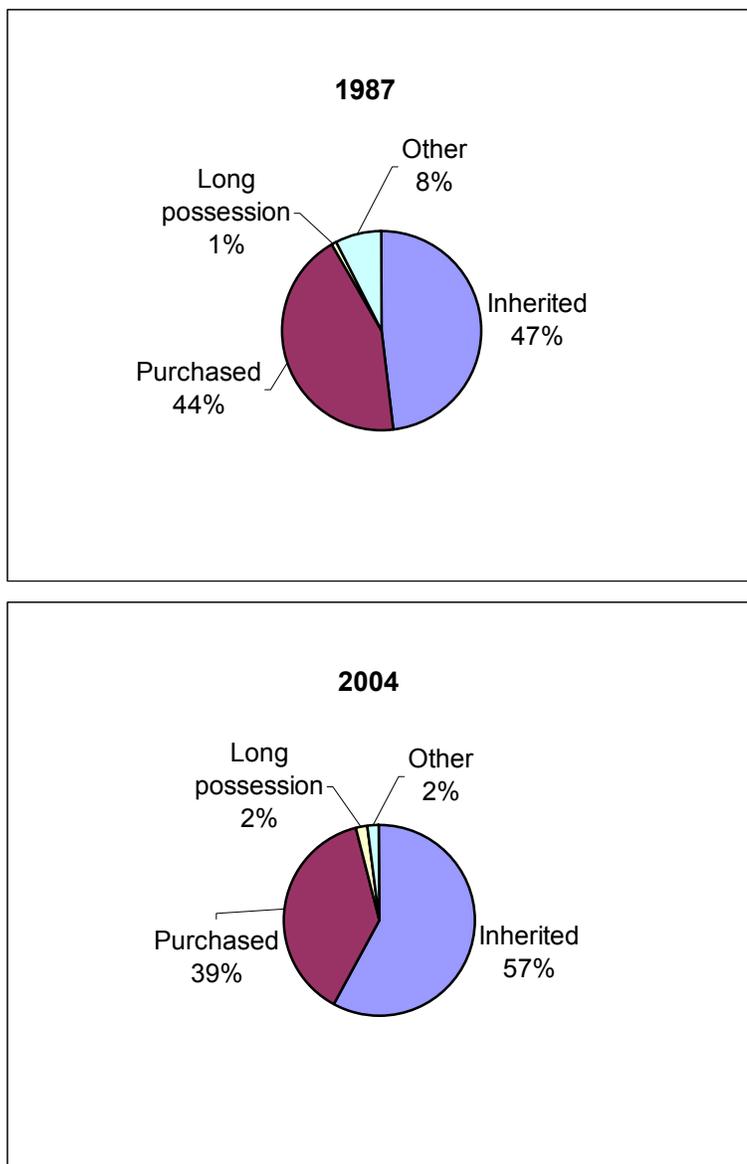


Figure 6-4. How parcel owner obtained land—comparison 1987 to 2004

Table 6-15. Transactions by parcel holder on parcel occupied in Babonneau and Micoud

		Transactions on Parcel			Total
		lease	mortgage	none	
Babonneau	No.	2	4	24	30
	%	6.7%	13.3%	80.0%	100.0%
Micoud	No.	4	4	22	30
	%	13.3%	13.3%	73.3%	100.0%
Total	No.	6	8	46	60
	%	10.0%	13.3%	76.7%	100.0%

In Babonneau, 73.3% of the respondents and, in Micoud, 63.3% of the respondents had not purchased, sold or rented-in any other parcel since the LRTP, as is shown in Table 6-16. These figures indicate the level of the parcel holder's activity within the land market. Most parcel holders are not land market participants.

Table 6-16. Transactions by parcel holder on other parcels in Babonneau and Micoud

		Other Transactions				Total
		none	purchase	rent in	sale	
Babonneau	No.	22	6	0	2	30
	%	73.3%	20.0%	.0%	6.7%	100.0%
Micoud	No.	19	7	2	2	30
	%	63.3%	23.3%	6.7%	6.7%	100.0%
Total	No.	41	13	2	4	60
	%	68.3%	21.7%	3.3%	6.7%	100.0%

To determine the level of confidence in the accuracy and currency of the data in the Land Registry, the landholders were asked whether they believed that the data in the Land Registry represented the true situation on the ground. Out of those interviewed, 81% believed that the data were accurate, as shown in Table 6-17.

Table 6-17. Perceptions on whether the Land Registry contains accurate data

Response	Frequency	Percent
don't know	5	8.3
no	4	6.7
yes	49	81.7
Yes and no	2	3.4
Total	60	100.0

The confidence in the Land Registry is, therefore, high and should not restrict potential land market participants from performing transactions in the land market. There is no evidence to show that the market participants are aware of the erosion in the registry data.

Summary

The statistical analysis of data acquired at the registry and in the field in St. Lucia unearthed information on the sustainability of the land registry.

Discrepancies between the registered information on tenure and what was found in the field indicated a 28% erosion of the registry since the LRTP. This 28% decline in the accuracy of the registry was primarily due to non-registration of inheritance and did not include the lease information that also was not registered. This decline in the currency of the registry data will be problematic for the functioning of the land market. At this rate of non-registration, the Land Registry would be more than 50% eroded by 2020, especially as the originally titled owners pass on.

Positive factors in the current environment that promote the maintenance of the land registry data were found to be the perceptions of relative advantage by the system users, and the perception of compatibility with the previous systems. Negative factors were the complexity of the system and its lack of observability. The users of the system indicated that they are not aware of the discrepancies in the system so this has not begun to affect the functioning of the land market. Since 70% of the landholders are not market participants, the erosion of the data in the Land Registry does not impact them.

Chapter 6 presented the analysis of the data acquired in the case study country of St. Lucia in relation to sustainability of the land registration system. Chapter 7 compares performance indicators derived from the data regarding the land market and the land

registration system with other international jurisdictions as a means of placing the status of the case study in context.

CHAPTER 7
COMPARATIVE ANALYSIS OF TITLING IMPACT AND SYSTEM
SUSTAINABILITY

Comparative Analysis

Comparative Indicators

The indicators used to analyze the impact of land titling over the medium term in St. Lucia were used in a comparative analysis with other jurisdictions in order to better understand the land market dynamics. Data from several countries are compared with the data acquired from the case study, and the indicators computed from the acquired data in this section.

A comparative study was recently completed on land administration systems around the world (Burns et al. 2003) using several indicators of the effectiveness of the land administration systems. The indicators used by Burns et al and selected for comparison in this research, were those for which data were available for other countries for comparative purposes. These indicators are given in Table 7- 1 together with some issues that need to be taken into consideration when viewing and comparing the values of the indicators.

The values of the indicators are given in Table 7-2. Data from the analysis of St. Lucia are compared with data acquired by Burns et al. (2003). Only the indicators from countries from which data are available and are directly related to the land market and the sustainability of the land title registration system are used here.

Percentage of parcels registered

Comparison of the number of parcels registered shows St. Lucia in a favorable light since 100% of the parcels are on the register, and this is comparable with the highly developed systems in West Australia, Hong Kong, England and Wales, and Singapore,

Table 7-1. Definitions of indicators

Indicator	Definition	Issues
Percentage of parcels registered	No. of parcels recorded in the national registry	Problems arise in the definition of the parcel. Communal parcels such as family land parcels in St. Lucia often have clearly understood demarcation lines between use areas.
Percentage of transfers registered	Formal transfers registered as a percentage of total transfers	Not all of the jurisdictions have had a field sample from which to derive estimates. In the case study the sample is small but has been used to determine the statistic
Annual registered transactions as a percentage of registered parcels	All transactions are used in this indicator	Relatively minor transactions can be included in this measure
Annual registered transfers as a percentage of registered parcels	These are all transfers of ownership rights.	There is difficulty in separating transfers that are actual sales from donations, gifts and bequests, which are all differently motivated
Annual registered mortgages as a percentage of registered parcels	No. of formal mortgages registered	This does not take into consideration discharged mortgages and so gives skewed picture. Also does not take into consideration value of mortgage.
Time to complete registration of transfer	Includes time for input of professionals in the land market	Does not take into consideration the value and other uses of the data
Number of registries per 1 million population	Total number of registries as a fraction of population	This measure is correlated with the time required to complete registration and accessibility
Number of registries per 100,000 sq. km area	Total number of registries as a fraction of area	Again accessibility is not apparent in this measure
Average working days to pay for average transaction cost	Cost of transaction as a fraction of income	Based on the per capita GDP

Indicators are those used by Burns et al. (2003)

Table 7-2. Indicators of Land market activity and land registration system sustainability

Indicator	West Australia	Hong Kong	England & Wales	Singapore	Moldova	Indonesia	Philippines	Thailand	Trinidad & Tobago	Peru	St. Lucia
Percentage of parcels registered (%)	100	100	100	100	61	23	30	63	53	67	100
Percentage of transfers that are registered (%)	100	-	-	-	-	-	15	-	-	-	75
Annual registered transactions as a percentage of registered parcels (%)	30.3	24	20.52	-	4	5.82	11	21.2	6.7	13.8	9.7
Annual registered transfers as a percentage of registered parcels (%)	10.24	9.2	12.11	-	-	-	3.7	13.1	3.0 ¹	3.9	3.5
Annual registered mortgages as a percentage of registered parcels (%)	11.08	5.96	7.69	-	0.7	-	-	-	1.8 ¹	2.1	3.2
Time to complete registration of transfer (days)	5.2	20	25	7	3-4	14	14	2.5hr	90	4-7	49
Number of registries per 1 million population	1.58	1.32	0.51	0.37	6.6	1.48	1.96	5.89	0.75 ¹	2.3 ²	6.3
Number of registries per 100,000 sq. km area	0.119	1,315	16.54	1,515	1.6	15.79	54	70.94	19.5 ¹	0.8 ³	162
Average working days to pay for average transaction cost	29.9	-	-	-	66	-	24	12	-	4.6 ²	88
										1.6 ³	

Data acquired in 2001

Source for data other than data on St. Lucia: Burns et al. (2003) except as noted below

¹Based on 1994 data (Registrar General's Department 1995)

²For land held under a deed system.

³For land held under a title registry system

for example. The figure also exceeds those for Moldova, Indonesia, Philippines, Thailand, Trinidad and Tobago, and Peru. However, the definition of the parcel used is to be noted. Some of the multiple owned parcels in St. Lucia are occupied in a fashion that suggests clear internal demarcation of use rights. Occupants own individual houses on the parcel and feel secure in that occupation even though legal subdivision has not taken place. Ownership of these separately owned and operated parcels is not formally registered since the parcels are extralegal and not legally acknowledged. If these were identified as de facto separate parcels the percentage of parcels would be a much lower figure.

Percentage of transfers that are registered

Burns et al. (2003) describe the problems attached to obtaining accurate information on this indicator. A rigorous field survey, as was performed for this research in St. Lucia, would be required in each of the countries to determine the extent of informal market transactions in comparison to registered transactions. Because of this there is very little recorded data to compare against. Estimates of the percentage of formally registered transfers to all transfers performed in Philippines are as low as 15%.

In the instance of St. Lucia, the percentage of transfers that are registered was determined as a percentage of the field sample. The figure of 75% transfers given for St. Lucia does not take into consideration the lease and land borrowing arrangement found in the field survey. This 75% is lower than the 100% given for the developed registry system in Western Australia.

Annual registered transactions as a percentage of registered parcels

The figure is also very much less than all the developed systems. The figures computed by Burns et al. (2003) include all transactions such as sale, gift, inheritance,

mortgage and discharges, leases, caveats, liens, easements, rights of way, and covenants.

The partial list of transactions offered as services and recorded in the St. Lucia Land

Registry is as follows:

- Land transfer
- Lease transfer
- Hypothec transfer
- Undivided share transfer
- Personal Representative transfer
- Lease or sub lease
- Surrender of lease
- Hypothec
- Discharge hypothec
- Discharge vendor's privilege

These transactions, as listed, can be relatively minor instances of accessing the registry but as a measure of the adoption of use of the land registry system the measure can be a valuable indicator. However, it is difficult to compare this indicator with other systems without knowing exactly which transactions were included in the count. Also, some services are not rendered, available nor required by some registry systems.

Comparative data would require a higher order of specificity in the definition of the indicators for comparisons to be more revealing.

Annual registered transfers as a percentage of registered parcels

The complete coverage systematic titling and registration performed in St. Lucia has not appeared to have led to a vibrant land market since the total number of annual registered transfers in St. Lucia is slightly below that of the other jurisdictions with undeveloped registration systems. The figure of 3.5% transfers in St. Lucia compares with 3.7% in the Philippines and 3.9% in Peru. These figures are considerably below the 9.2% of Hong Kong, the 10.24% of Western Australia and the 12.11% of England and Wales. This measure notes all transfers of rights, as stated by Burns et al. (2003, p.147)

including not only sales but donations, gifts, and bequests. Ideally, these various actions should be separated, as donations, gifts and bequests do not reflect activity in the land market but the natural progression of mortality and social linkages. The primary focus of the study by Burns et al. however, is to assess the functioning of land administration systems and not necessarily the land market. A comparison of the total transfers with the sale transfers only can illustrate the level of sustainability of the registry.

Annual registered mortgages as a percentage of registered parcels

The status in St. Lucia compares favorably with the sparse data available in some of the undeveloped registry systems but less so with the data available from the developed systems. The 3.2% registered mortgages in St. Lucia exceeds the 2.1 % in Peru and the 0.7% of Moldova but is below the 5.96 % of Hong Kong, 7.69% of England and Wales and the 11.08% of West Australia. These figures cannot be taken at face value as, while they indicate the level of access to credit available to the landowner, they obscure the actual value of the credit being accessed. Some terms and limits on value may be restrictive and cause frequent application for renewal, while others may be more lenient. The former situation would therefore appear as more vibrant activity in the land market.

Time to complete registration of transfer

Only Trinidad and Tobago (90 days) takes longer than St. Lucia (49 days) in this regard and this impacts on the incentives to register and thus maintain the sustainability of the system. Times required in other countries range from 2.5 hours in Thailand to 25 days in England and Wales. What is obscured in this indicator is the impact registration has on the integrity and value of the spatial databases of the jurisdiction. Some countries may require comprehensive checking procedures, surveys and the input of various

professionals to build and maintain the databases of the country. Other situations may involve cursory administrative checking.

Number of registries per 1 million population

The value of this indicator for St. Lucia (6.3) compares well with the other countries because of the small population in St. Lucia, despite the fact that there is only one registry. Figures range from 0.37 in Singapore to 6.6 in Moldova. This indicator adds to the description of the accessibility of the land registration system and therefore to the observability of the system and thus to the potential for adoption of the system by the society.

Number of registries per 100,000 sq. km area

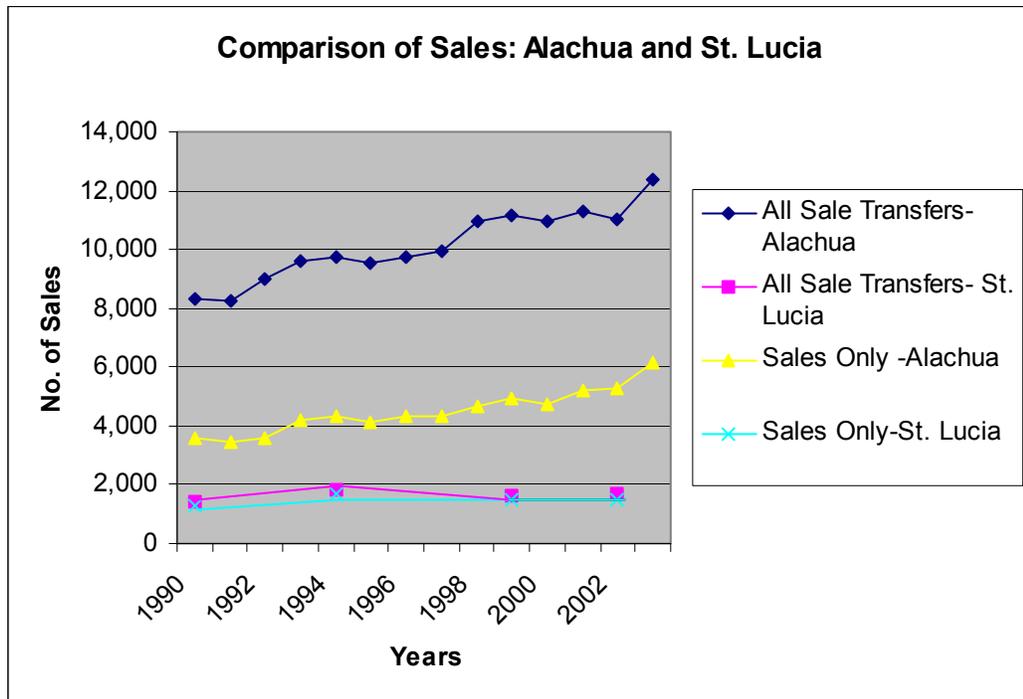
The value of this indicator for St. Lucia (162) also compares well with the other countries because of small area of St. Lucia again despite the fact that there is only one registry. This makes this indicator less realistic to compare with other jurisdictions.

Average working days to pay for average transaction cost

This value was derived for St. Lucia by dividing the total cost of an average transaction of sale of a parcel by the per capita GDP. The large value of 88 days for St. Lucia greatly exceeds the 66 days required by Moldova and the 12 and 24 days required by Thailand and Philippines respectively. In West Australia the number of days required is 29.9. The level of professional input and professional specifications is partly responsible for the number of days required in St. Lucia being so high. The input that the professional is making in the spatial and textual databases of the country needs to be taken into consideration when this comparison is assessed.

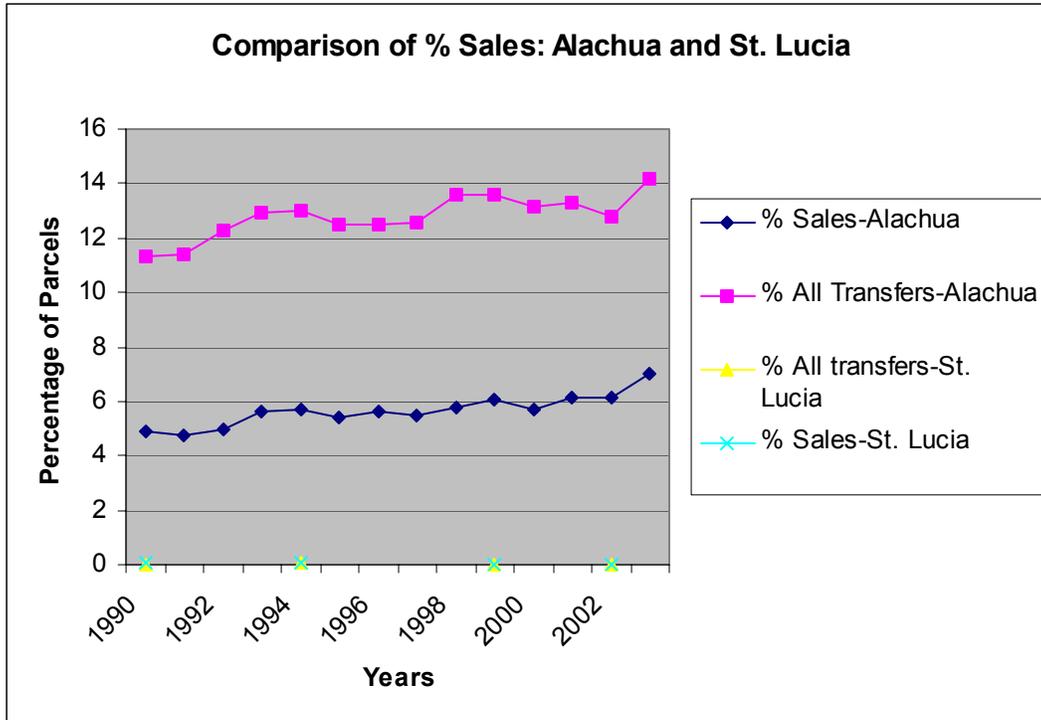
Comparison with Alachua County, Florida

Comparisons of sale activity were also made with a developed land market in Alachua County, Florida. Both the absolute number of all sale transfers, which includes sales, gifts or transfers between family members, and sales only land market sales, which indicates only true land market sales, show growth in the instance of Alachua County, but decline in St. Lucia’s case. This comparison is shown in Figure 7-1. Taken as a percentage of the total number of parcels in either jurisdiction to normalize the measure, the values of the indicators in Alachua County still far exceed those in St. Lucia. This comparison is shown in Figure 7-2.



Source for data for Alachua County: Alachua County Property Appraiser’s Office
 All sale transfers include gifts and donations while Sales Only Transfers denote true market value sales

Figure 7-1. Comparison of sales between Alachua County and St. Lucia



Source for data for Alachua County: Alachua County Property Appraiser's Office

Figure 7-2. Comparison of sales as a percentage of the total number of parcels

Benchmarking

Benchmarking, once applied to manufacturing and industrial processes, is now applied to business, academia and other industries both to assess the process used and the results obtained (Stuedler et al. 1997).

Several problems can arise from comparing with other dissimilar jurisdictions. There may be differing perspectives about the value of certain services and there may be differing definitions for the same or a similar term. Stuedler et al. (1997) list problems encountered in benchmarking cadastral systems. These problems can include:

- Different interpretations of definitions used in the area of cadastres
- Legal, social, cultural, institutional and physical differences amongst jurisdictions that affect impacts
- Data acquired at different scales, in different categories or computed into different performance indicators

- Data not documented

A fundamental problem is in the definition of a parcel. In the context of the cadastral system benchmarking exercise conducted between 1996 and 1997, Steudler et al. (1997) defined a parcel to be:

- Spatially and legally defined
- Registered
- Capable of being transferred

Parcels in fact may possess a subset of these characteristics. Burns et al. (2003) prefer to deal with the problem by stating a figure and then qualifying the figure with any notable clarification that would give a better understanding of what is considered a parcel in the particular jurisdiction.

Summary

Chapter 7 presented the comparative data that were used to determine the status of the land market and the status of sustainability within the Land Registry in the case study country. Considerable problems arise, however, from using comparisons and benchmarking in the determination of the statuses of individual systems, without regard to detailed and comprehensive background knowledge of the social, political and economic environment in which the titling and land registration system operates. This background knowledge modifies and qualifies the assessment of the status. Assessment of impact of land titling and land registration programs cannot be a strictly quantitative exercise.

However, in the comparison, St. Lucia was found to have all parcels registered, on par with developed jurisdictions such as West Australia and Hong Kong, and greater than Indonesia (23%), Philippines (30%) and others. Registered sales and mortgages in St.

Lucia (3.5% and 3.2% respectively) were, however, lower than the figures in the developed jurisdictions of West Australia (10.24% and 11.8% respectively), and Hong Kong (9.2% and 5.96% respectively), but were greater than at least one other developing country, such as Trinidad and Tobago (3.0% and 1.8% respectively). The comparison indicates that despite having a well titled and registered parcel system, St. Lucia's land market is not on par with several other countries with developed land registration systems.

The cost and duration of the land transaction registration process in St. Lucia (88 working days and 49 days respectively) stand out as being impediments to the growth of the land market since they drastically exceed those of West Australia (29.9 and 5.2 respectively), and all the other jurisdictions used in the comparison except for Trinidad and Tobago.

Chapter 8 concludes the dissertation by synthesizing the process and findings of the research and defining its impact within the discipline and then sets out recommendations for future research.

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The research questions posed in this dissertation were: (a) does land titling lead to the establishment and growth of formal land markets over the medium term and, (b) are land title registration systems sustainable over the medium term? These questions were successfully addressed in the research, as concluded in this chapter. Recommendations for future research are also presented here.

The Impact of Land Titling and Land Registration

Land Transactions

Overturning the theoretical land registration/land transaction link

The impact of the land registration and titling program on the number and type of land transactions in St. Lucia was determined empirically in this research. The ETLR predicts that land registration induces land transactions. Initially, in the case study, the absolute number of sales and mortgages, over the entire country, increased to a maximum number of 1675 (a 29% increase over 1989 sales total) and 2021 (a 45% increase over 1989 mortgages total) respectively. However, the number of sales declined after 1994 (by 12% up to 2002) and the number of mortgages declined after 1999 (by 17% up to 2002). The decline in transactions coincided with the decline of the banana industry (47% decline in volume of production and 25% decline in revenue between 1994 and 2002). Within the case study, impacting factors other than tenure existed over the country, therefore, the relative impact of land titling and land registration on volume of

land transactions at different levels of formal tenure—individualized tenure and communal tenure—was determined. Even if the economic impact of the problems in the banana industry is taken into consideration, the number of transactions conducted were far fewer on family land than on individually owned parcels (94% of the parcels that had had at least one sale since 1987 in the registry sampled data were individualized parcels as opposed to family land parcels and 90% of parcels that had had at least one mortgage between 1989 and 2002 in the registry sampled data were individualized parcels as opposed to family land parcels). Family land tenure, therefore, was found to restrict the number of sales and mortgages conducted on land. These findings are in keeping with established ideas that family land tenure restricts transactions, but does not explain why the tenure type persists in St. Lucia despite the mechanisms, such as trusts for sale, put in place during the LRTP to encourage individualization transactions even on family land. One conclusion to this research, therefore, is that land titling did not provide a sustained increase in the level of transactions in the land market and that land titling did not provide the same level of impact on the different levels of formal registration namely individualized registration and family land registration.

Overall there was a low level of sale and mortgage activity, as compared to other jurisdictions internationally, both where there are undeveloped land registration systems and where there are fully developed systems. Owing to a 68% increase in the number of parcels in St. Lucia between 1987 and 2004, the figure for mortgages as a percentage of parcels (3.8% in 1989) did not change between 1989 and 1994 but decreased after 1994 to reach 3% in 2002. The figure for sales as a percentage of parcels (3.6% in 1989) increased slightly to 3.8% in 1994 but decreased after 1994 to reach 2.6% in 2002. Using

these per-parcel measures of transactions for comparison purposes, St. Lucia's sales and mortgage figures, in 2000, were 3.5% and 3.2% respectively, while formal sales and mortgages for Western Australia, for 2000, were 10.3% and 11.1% respectively. The figures for Peru are more comparable with St. Lucia, with sales and mortgage figures of 3.9% and 2.1% respectively, even though Peru has only 67% of its parcels held in the registration system as opposed to 100% for St. Lucia. A conclusion of the research is, therefore, that the presence of a comprehensive registration system did not, as posited in the ETLR theory, induce a large volume of formal transactions in the case study.

Overturning the theoretical land titling/tenure security/credit use link

The ETLR credits the titling process with providing an increase in tenure security, which leads to increased credit use, increase in intensity of land use, and higher land values, the latter leading to more demand for individualization. Comparisons of current data with baseline data, from 1987, instead indicated a decline of between 15% and 40% in credit use in the field communities sampled, a reduction in intensity of cultivation (a 60% drop in the number of parcels that were 100% cultivated in Babonneau, and a 20% drop in the number of parcels that were 100% cultivated in Micoud), and no statistically significant decrease in the number of parcels held under family land tenure (currently 38% in Micoud and 17% in Babonneau). An increase in formal or objective tenure security was found, since, whereas prior to the LRTP 41.8% of landholders possessed no registered documentation in their name, the current quantity of landholders without title in their name is 27.8%. An important conclusion of the research was, therefore, that the titling process did not lead to increased credit use, increase in intensity of agricultural land use, and a demand for individualization, despite having increased formal tenure security.

There were other factors that impacted the ability of the land registration system to promote a land market besides the family land tenure, including the structure of the credit market, and the perception of, and actual high cost and great complexity of the land transaction process. While the land registration system has a key role to play in allowing transactions to be efficient and timely, land markets can flourish only where these other factors also facilitate transactions. A list of factors that negatively impact on land titling and land registration leading to formal land markets, as derived from this research, includes:

- Prevailing tenure type, perceptions and practices – family land
- Credit market status – lack of availability of, and stringent requirements for, obtaining credit, lack of alternative investment opportunities beyond agriculture, and lack of insurance
- Low demand for transactions in land
- Appropriateness of land related legislation – stringent requirements and complex procedures for transactions
- High cost of transaction registration
- Presence of alternative transacting arrangements including informal arrangements for recording of leases

From the case study and comparisons with international evaluative studies it can be concluded that instead of land titling and land registration leading to flourishing land markets as is posited in the ETLR, it is only one of several supportive factors that create an environment in which land markets would grow.

Sustainability

To assess the sustainability of the land registration system over the medium term in St. Lucia the difference between what was currently registered in the Land Registry and what existed on the ground was measured. Twenty-eight percent (28%) erosion in sustainability of the land registration system was found, primarily because of failure of

the landholders to register inheritances and leases. There is very little data to compare with in other jurisdictions (except for a reported drastic 85% erosion in the Philippines and 100% sustainability in West Australia) because of the considerable effort required to continuously assess this indicator. However, a loss in sustainability presents a problem for the growth of the land market and for the confidence in the land titling system.

Taking non-registration of inheritances as a return to family land tenure for parcels previously individualized, the erosion in sustainability indicates that positive perceptions of family land still exist, despite attempts to reduce the incidence of the tenure type during the project. The case study indicated that 57% of the current field sample of landowners obtained the land by inheritance. Ten percent of the field sample of occupiers had obtained the land through a private, unregistered lease agreement. Another important conclusion to the research was, therefore, that inheritances and leases require special attention when the sustainability of the land registration system is being considered. This attention is especially required when, as obtained in the case study, the majority of landholders acquire access to land via inheritance and lease.

The high cost of the entire registration process (for example, registration of a sale can cost 20% of the value of a vacant parcel), and the perception that it is higher than the reality (22% of the field sampled landholders gave estimated costs of a specific transaction as being higher than the actual) discourage the registration of inheritances and leases. The perception of the complexity of the entire registration process (75% of the field sampled landholders gave estimated times required for registration of a specific transaction as being higher than actual) also discourages the registration of inheritances and leases. The low level of land taxation, and lack of enforcement of payment does not

discourage lack of registration. The low level of visibility of, and low level of access to, the land registry data (75% of the field sampled landholders had never visited the registry and individuals are discouraged from accessing the land registry data unless they are interested rights holders on the parcel being researched) does not encourage registration of transactions.

The research, therefore, also answers questions about the medium term sustainability of land registration systems. A list of factors that negatively impact on the sustainability of social participation in land registration systems as derived from this research includes:

- Prevailing tenure type, perceptions and practices – family land
- High costs of registration of transactions
- Lack of awareness of the system, lack of observability of the system
- Complex transaction processes including lengthy processes
- Lack of penalties for failure to register transactions

A conclusion of this research is, therefore, that land registration information systems are not sustainable over the medium term in the presence of the factors listed.

Gaps in the Model

The posited ETLR model that links land titling and land registration to increases in land transactions has several gaps where the linkages do not hold. The factors that have been shown in this research to impact the ability of the land titling and land registration to lead to the posited outcomes, affect the model at different points as indicated in Figure 8-1. The tenure forms that pre-exist the titling project (family land tenure), and any alternative arrangements that can be entered into (informal leasing arrangements), together with the costs and complexities of the system, can affect whether the system is utilized fully and, therefore, whether the system remains current. In the case study, the

characteristics of the credit market, the state of the economy in the rural environment as a result of the decline in the agricultural industry, and the pre-existing tenure of family land affect the ability of the assurance, realizability and collateralization effects to lead to investment on land and therefore credit market transactions.

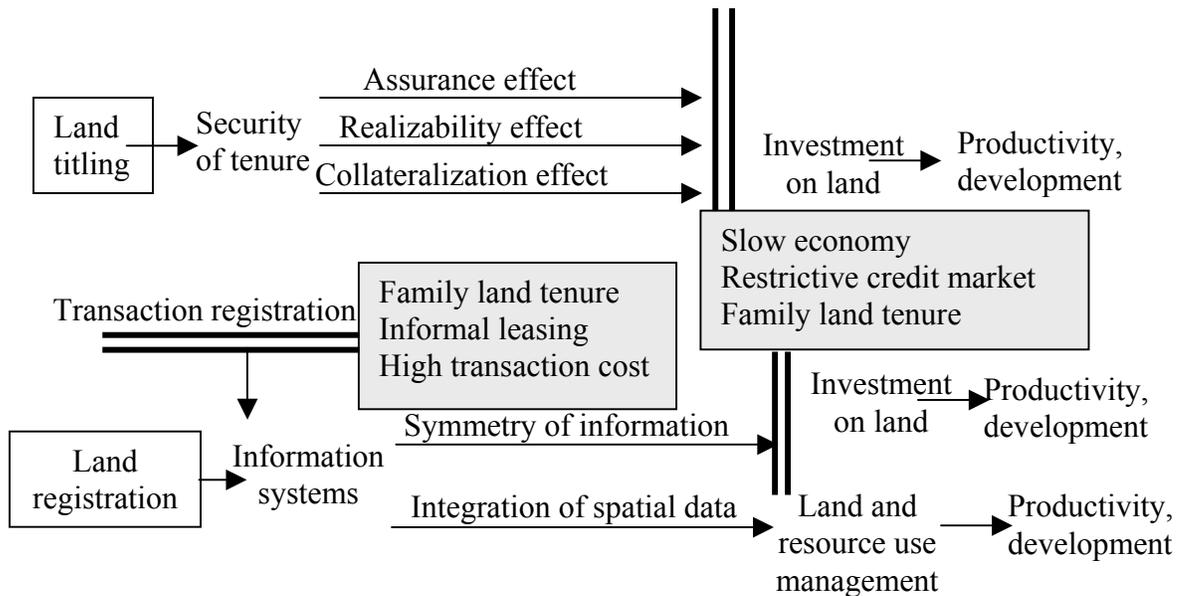


Figure 8-1. Gaps in the model linking titling and registration to posited outcomes

Recommendations

The fact that the family land tenure type has affected the ability of the land registration system to exhibit marked growth in land transactions and to retain complete sustainability does not indicate that a removal of family land tenure and replacement with individualized tenure should be recommended. Family land tenure has been shown to provide economic and psychological security to participants and therefore should be accommodated in any mechanism that is proposed to provide equity in the society. The tenure form must be acceptable to the society if sustainability of participation in the system is to be achieved. When the society resists replacement of the family land tenure type, as occurred in St. Lucia, then it would also resist participating in maintaining the

system. Sustainability, therefore, would be an expensive proposal of re-survey and re-title every few years. Growing urbanization increased the level of individualization in St. Lucia and this effect is in keeping with the ETLR but contrary to the ETLR, the communal tenure persists.

The effect of the family land tenure on the volume of transactions indicates that prior to embarking on land titling and land title registration programs, land administrators in developing countries should become aware of the status of the mitigating factors, such as the tenure type, that influence the outcome of the program within the jurisdiction. Knowledge of this status allows administrators to modify the expectations of the outcomes and to channel the focus of the program to suit the required outcomes. Knowledge of this status also allows land administrators to institute alternative and additional supportive measures to allow the outcomes to be attained. In St. Lucia, empirical information on the tenacity of the family land tenure could have been used to redirect the program towards a goal of providing and supporting equity in land distribution and access to land, instead of seeking the creation of a vibrant land market. Then, an alternative process for recording and maintenance of records on rights holders within family lands could have been instituted. Such a process would be based on institutional support from the state, and participation from the communities and the families within the communities.

Recording of rights in land is important for the administration of land and for providing equity in a society. Expectations of minimal impact on the land market should not deter governments from entering into titling and registration programs but should allow them to plan the implementation to suit the more probable outcomes based on local

conditions. For example, a project aim of creating a free land market is inconsistent with project aims of social equity or environmental sustainability. The ETLR goal of moving land from the less productive to the more productive can result in a growing landless group on one hand and overly exploited land resources on the other. Despite attempts to integrate all three demands within one policy there must be an overriding concern that would take priority in instances where dichotomous options are presented. The overriding concern would depend on the particular environment that is the subject of the development agenda.

The LRTP program aimed to individualize all land in St. Lucia, and there was a sense of failure when this could not be done because of resource constraints, and the difficulty of determining efficient mechanisms for so doing. The main benefit of the program was in the adjudication process, which many of the respondents referred to by stating that land problems were addressed. This was a significant benefit that served to clarify rights and resolve longstanding conflicts. It also served to create an information system that has potential applications, provided that it remains current, in many areas of land and resource management.

Further Research

The results of this research point to a need for further research on land markets in the Caribbean and other developing countries that would determine the feasibility of maintaining differentiated markets that satisfy active market participants, and also satisfy those unwilling to actively participate in the land market given the presence and the tenacity of communal tenure.

Future research in sustainability of land registration systems should be directed towards integrating systems for maintaining the land registry databases. Simple linkages

between different state institutions, for example between the Registrar of Births and Deaths and the Land Registry, would allow information to be exchanged, primarily when landowners die. The land registry records can be marked, by the Registrar, to denote that a death, or some other action, has occurred that would impact the status of the land rights. There would still be procedures that the administrator of the estate or the executor of the estate would be required to perform, but the system would then contain more information than it does at the moment in the form of an advisory to anyone accessing the system for information.

Epilogue

The family land tenure type has proven to be resilient in the face of pressures from urbanization and from implemented individualization programs. Family land as a communal form of land holding should be promoted and encouraged especially in the light of research that has demonstrated the benefits of this tenure form for equitable land distribution and optimal land resource management. Also, while land registration systems can assist in supporting the growth of a land market, other roles for land registration systems, in supporting land management and land resource use management, mandate that titling and registration programs continue to be carried out, albeit with a different focus. Therefore, in the implementation of land titling and registration programs, it is necessary to pay special attention to communal systems where they exist, and to try to accommodate them as much as possible into the cadastral fabric.

APPENDIX A
LAND REGISTRY MAP SHEETS: FIELD SURVEYED PARCELS

Micoud Map Sheets

164

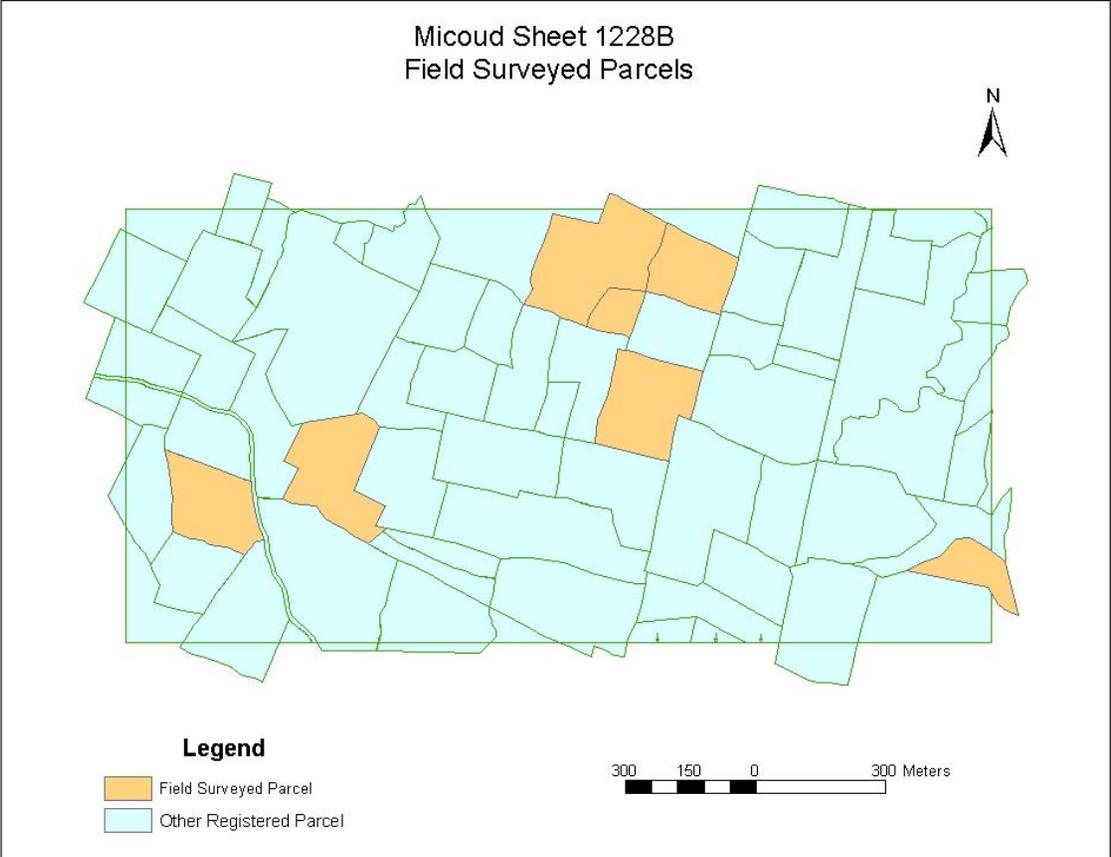


Figure A-1. Distribution of field surveyed parcels on Micoud Sheet 1228B

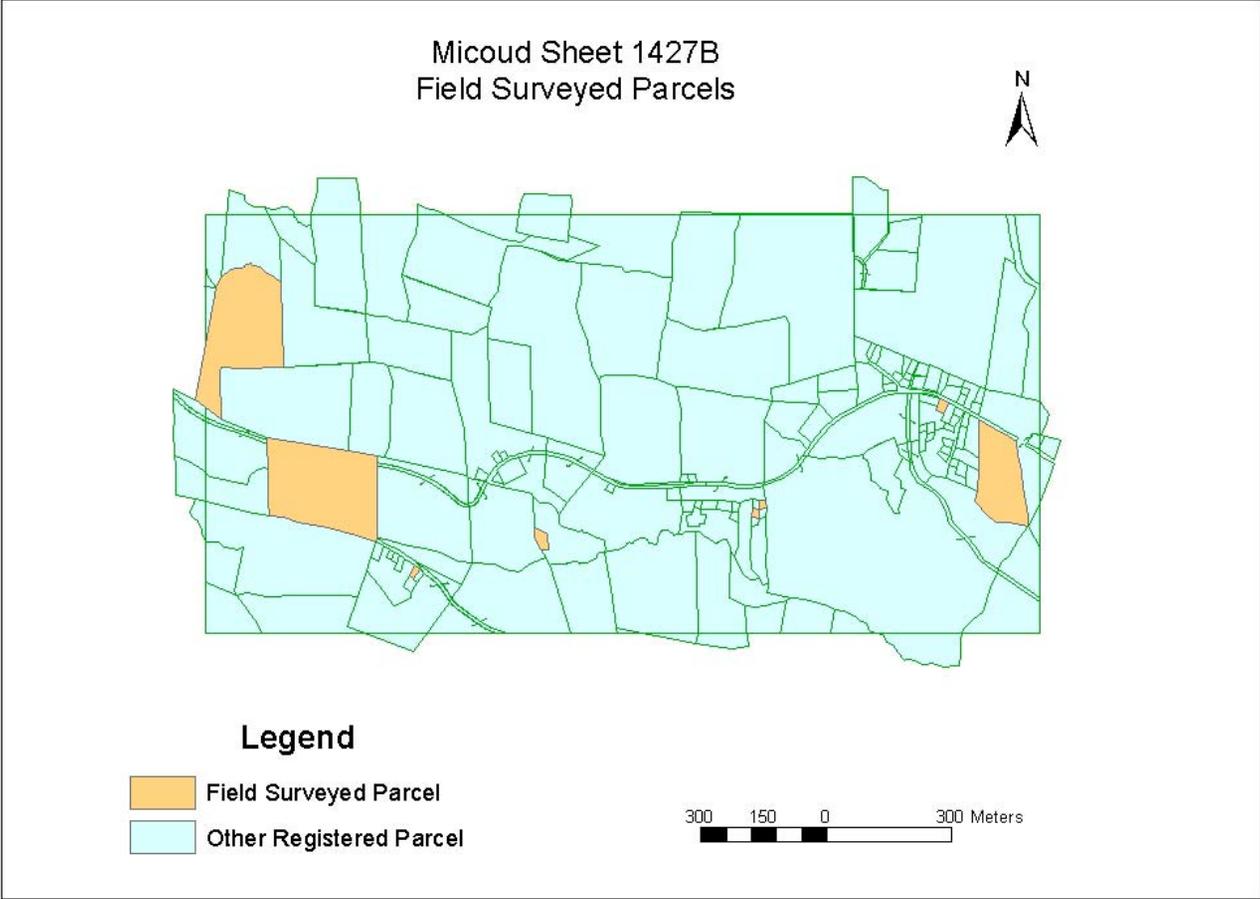


Figure A-2. Distribution of field surveyed parcels on Micoud Sheet 1427B

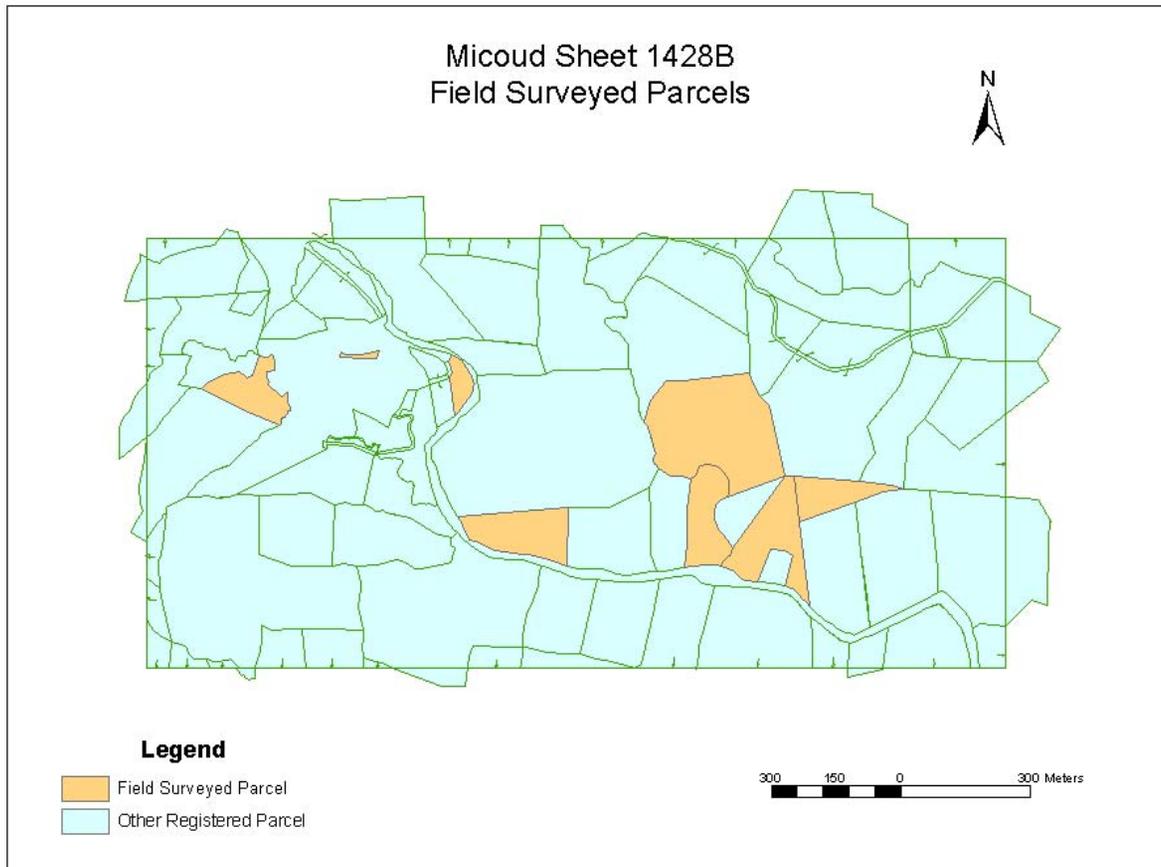


Figure A-3. Distribution of field surveyed parcels on Micoud Sheet 1428B

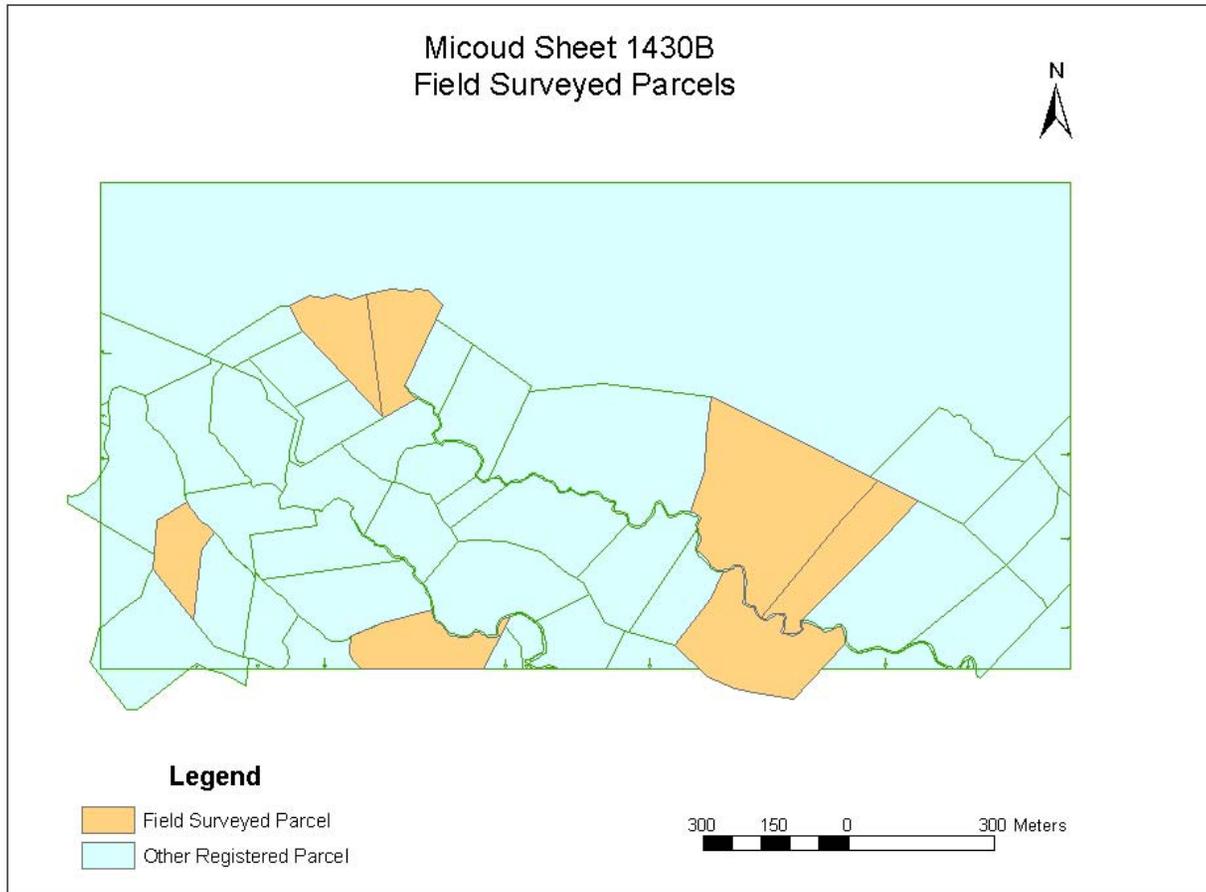


Figure A-4. Distribution of field surveyed parcels on Micoud Sheet 1430B

Babonneau Map Sheets

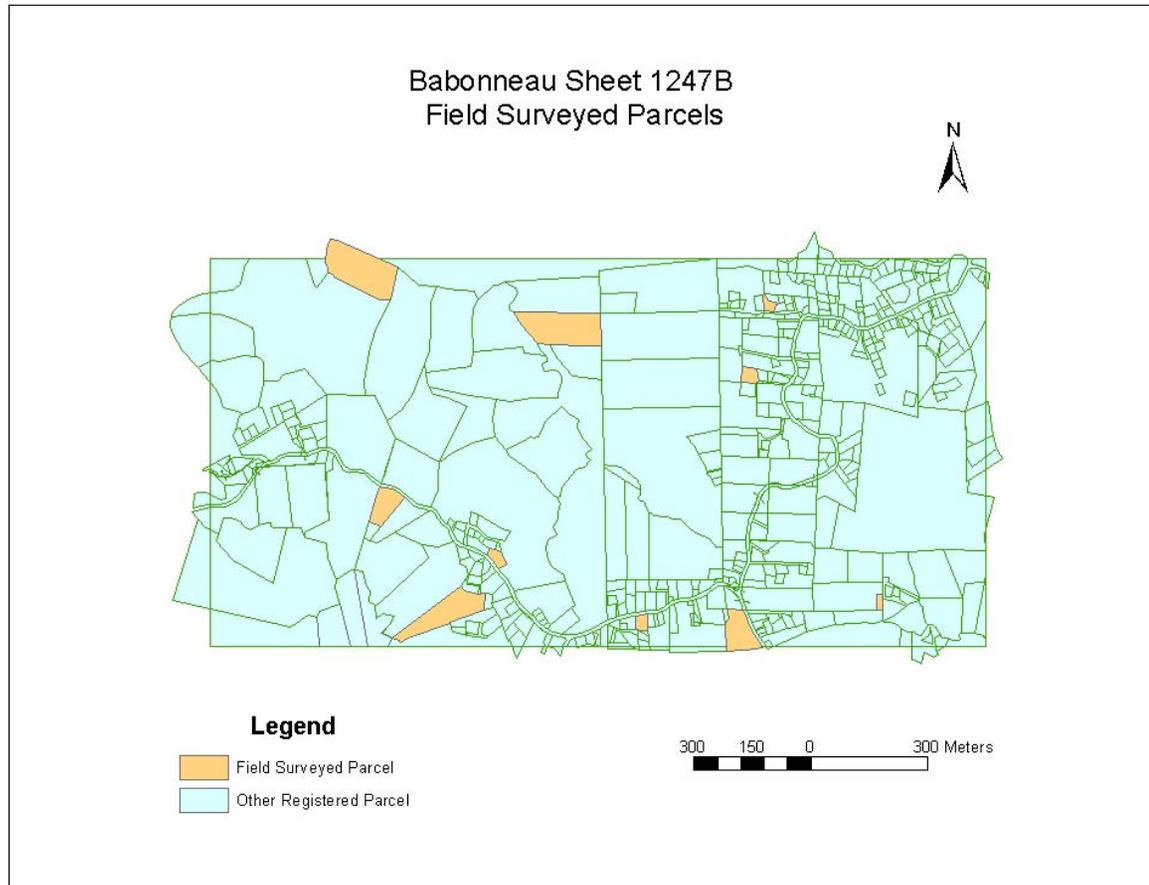


Figure A-5. Distribution of field surveyed parcels on Babonneau Sheet 1247B

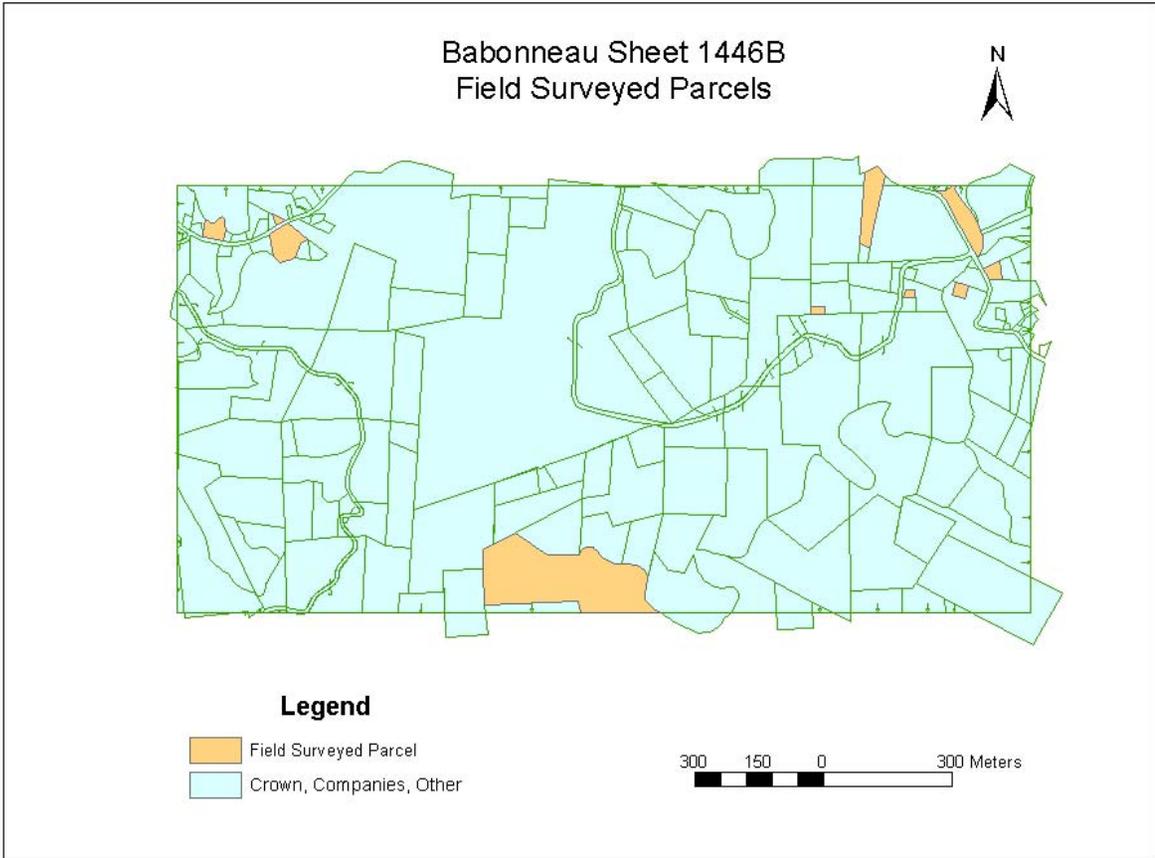


Figure A-6. Distribution of field surveyed parcels on Babonneau Sheet 1446B

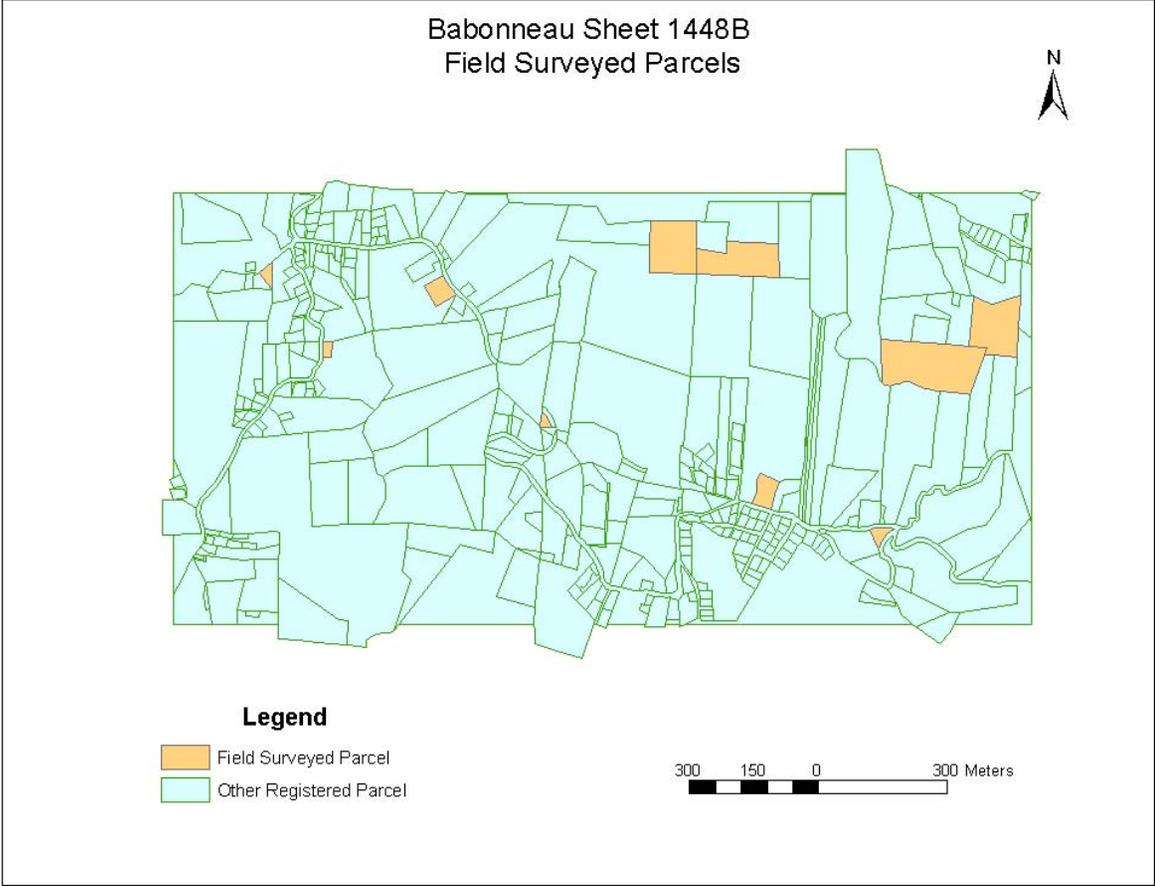


Figure A-7. Distribution of field surveyed parcels on Babonneau Sheet 1448B

APPENDIX B
QUESTIONNAIRES USED IN THE RESEARCH

Parcel ID: _____

Questionnaire on the Sustainability of Land Registration Systems

1. Name of participant: _____
2. Gender of participant: male female
3. Address of parcel: _____
4. Total number of buildings on the parcel:
5. Number of residences on the parcel:
6. Percentage of parcel under cultivation:
7. How many owners of this parcel are there?

8. Relationship of participant to owner:
Owner lessee manager caretaker
Other (specify) _____
9. How many years of school did you attend?
none primary 1-5 secondary 6-10 tertiary >10
10. Can you give an estimate of your total monthly income?

11. When did you obtain this parcel? _____
12. How did you obtain this parcel?
purchase lease inheritance occupation
other _____
13. What documents do you have to support your occupation?
Title deed contract none
other _____
14. Have you performed any of the following on this parcel?
Subdivision sale mortgage lease none
other _____
15. Did you register the transaction that you performed in the national registry?
Yes No
16. If 'no' why did you not register the transaction?

17. If you know the cost, give a figure for the cost of registering a transfer of ownership of 1 acre of land at the registry (including cost of lawyers for preparing documents, cost of surveyor, taxes, registration fees). If you do not know guess.

18. Do you think that this cost is:

Too high Too low About right

19. If you believe the cost is too high or too low, what do you think is a reasonable cost?

20. What **advantages** are there (if any) to registering your land transactions?

21. What **disadvantages** are there (if any) to registering your land transactions?

22. If you know for sure, how long does the process of registering a transaction take (including survey, legal process and registry process)? If you do not know guess.

23. Do you think that this time is:

Too long Too short About right

24. If you believe the time to be too long, what length of time do you think is reasonable?

25. Have you ever visited the registry?

Yes no

26. If 'yes' for what purpose?

27. Do you think that the registry information represents the true ownership on the ground?

Yes No

28. If 'no' why does the registry information not represent the true ownership on the ground?

END OF QUESTIONNAIRE

Parcel ID: _____

Questionnaire on the Growth of Land Markets in St. Lucia

For land held in ownership

Confidence in the system

:

1. Can someone else claim ownership of this parcel of land?

Likely unlikely impossible

2. Why?

	Lessee	other owners	family	relatives	state	nobody	Other (specify)
Exclusivity of rights							
3. Besides yourself and the other rights holders named, who else has rights to this parcel?							
Transfer rights							
4. Whose permission do you believe you will need to sell this parcel?							
5. Whose permission do you believe you will need to mortgage this parcel?							
6. Whose permission do you believe you will need to pass on land in a will to specific persons of your choosing?							
7. Whose permission do you believe you will need to lease out this parcel?							
8. Whose permission do you believe you will need to give this parcel as a gift or donation to persons of your choosing?							
Use rights							
9. Whose permission do you need to grow cash crops?							
10. Whose permission do you need to fence this parcel of land?							
11. Whose permission do you need to build agricultural structures on this parcel of land?							
12. Whose permission do you need to plant permanent trees on this parcel of land?							

	Lessee	other	family	relatives	state	nobody	Other (specify)
Investments							
13. Whose permission do you need to make short-term improvements to this parcel of land (e.g. fertilizer applications, improved varieties of seed)?							
14. Whose permission do you need to make long-term improvements to this parcel of land (e.g., irrigation wells & canals, terracing)?							
Market rights							
15. Whose permission do you need to sell the produce from your land?							

16. Could you recover this parcel of land if a lessee refuses to move at the end of the lease period?

Easily difficult impossible

For land held in leasehold:

Confidence in the system

17. Can the lessor deny that they leased this land to you?

Likely unlikely impossible

18. Why? _____

19. How easy do you think it would be to recover your improvements at the end of the lease period?

Easy difficult impossible

Exclusivity of rights

20. Does the owner of this land that you are leasing have the right to use this land in any way? Yes No

21. If 'yes' in what ways?

Length of use rights

22. Is the lease period available to you long enough for the purpose that you are using it for?

Long enough not long enough

23. Do you have the right to renew the lease on this parcel if you wish?

Yes no

Parcel ID: _____

	Lessor	Other lessees	Family	Relatives	State	nobody	Other (specify)
Transfer rights							
24. Whose permission do you need to transfer this leased parcel of land to someone else (sublease)?							
25. Whose permission do you need to pass on this leased parcel of land to someone else in case of death?							

	Lessor	Other lessees	State	nobody	Other (specify)
Use rights					
26. Whose permission do you need to grow cash crops on this parcel of leased land?					
27. Whose permission do you need to fence this parcel of leased land?					
28. Whose permission do you need to build structures on this leased parcel of land?					
29. Whose permission do you need to plant permanent trees on this leased parcel of land?					
Investments					
30. Whose permission do you need to make short-term changes to this leased parcel of land (e.g. fertilizer applications)?					
31. Whose permission do you need to make long-term changes to this leased parcel of land (e.g., irrigation wells & canals, terracing)?					
Market rights					
32. Whose permission do you need to sell the produce from the land you have leased?					

33. Are you required to share the proceeds from the sale of produce with the owner?

Yes no

Owners and lessees

Credit investments

34. Which credit institutions would give you a loan if you applied for it?

- | | |
|--|--|
| <input type="checkbox"/> commercial bank | <input type="checkbox"/> credit union or cooperative |
| <input type="checkbox"/> insurance company | <input type="checkbox"/> other financial companies |

informal arrangement _____

other _____

Have you tried to access credit since 1987? Yes no

35. For what purpose?

agricultural production (inputs, livestock, etc.)

agricultural investment (irrigation, machinery, fencing, etc.)

agricultural buildings (barn, machinery shed, processing shed, etc.)

residential building

non-farm business

other purpose _____

36. Were you successful in obtaining credit? Yes no

37. If no, why not? _____

38. If yes, what was the value of the loan? _____

39. When did you obtain the loan? _____

40. What type of credit institution did you obtain the loan from?

commercial bank credit union or cooperative

insurance company other financial companies

informal arrangement _____

other _____

41. What was the interest rate of the loan? _____

42. What was the repayment period? _____

Investments and improvements

43. Have you ever performed any of the following on your land?

Improvement of soils through application of organic matter, rotation of crops

Tillage practices that avoid erosion, Terracing on slopes

Planting of trees and orchards

Purchase of farm animals

Installation and maintenance of wells and/or irrigation systems

Purchase of agricultural machinery

Construction of farm buildings

Property boundary markers: these can be fences, trees, or boundary monuments

44. How were these investments financed?

%personal savings %commercial credit %informal loans

45. Has lack of credit prevented you from making investments on the land?

Yes no

46. What percentage of your monthly income is derived from agriculture?

Land transactions in respect to parcels other than this one since 1987

	Purchase	Sale	Rent in	Rent out
47. Year of transaction				
48. Size of parcel				
49. From whom/to whom*				
50. Approx. price/rental				
51. How price verified/arrived at				
52. How did you advertise/become aware of parcel availability?***				
53. How financed****	_____ %PS _____ %CC _____ %IL	_____ %PS _____ %CC _____ %IL		
54. Purpose*****				
55. Type of land				
56. Year recorded in LR				
57. If not recorded, why not				

- * 1. = family/relative
 2. = neighbour
 3. = outsider
 4. = commercial interest
 5. = other (specify)

- ** 1. =word of mouth
 2. =newspaper
 3. = real estate agent
 4. = sign posted on parcel
 5. = other (specify)

- *** PS = personal savings
 CC = commercial credit
 IL = informal loan
 O = other (specify)

- ***** 1. = agricultural production
 2. = residential
 3. = commercial
 4. = investment
 5. = other (specify)

END OF QUESTIONNAIRE

APPENDIX C
DISTRIBUTION OF TENURE TYPES IN STUDY AREAS

Babonneau

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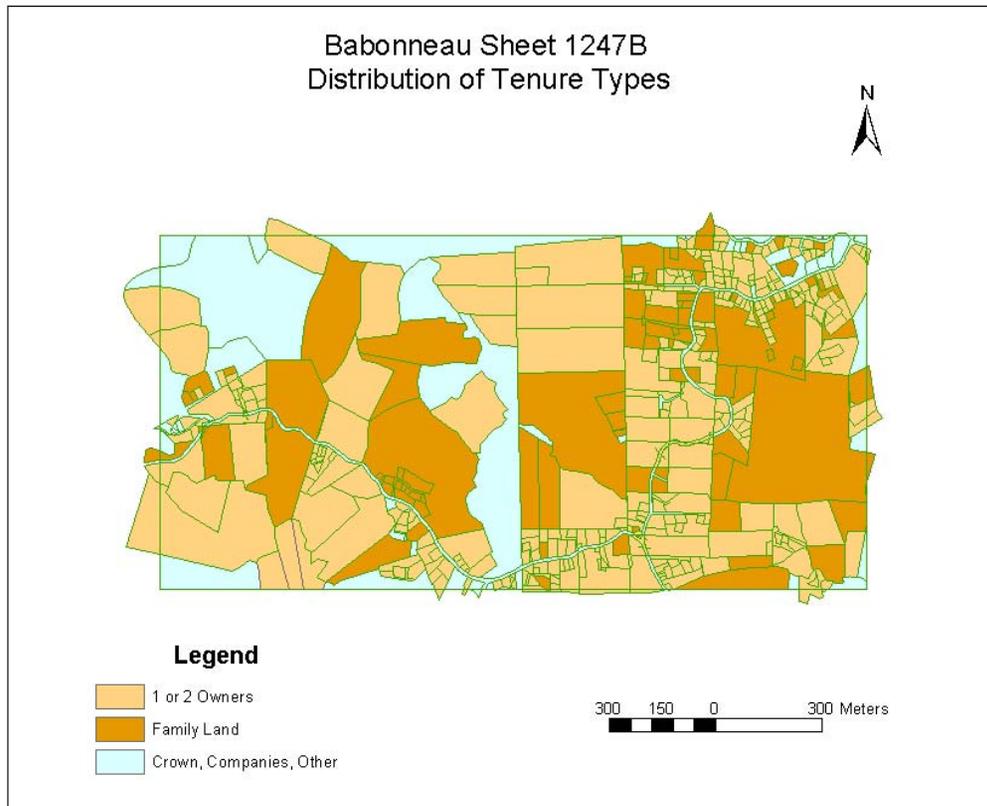


Figure C-1. Distribution of tenure types on Babonneau Sheet 1247B

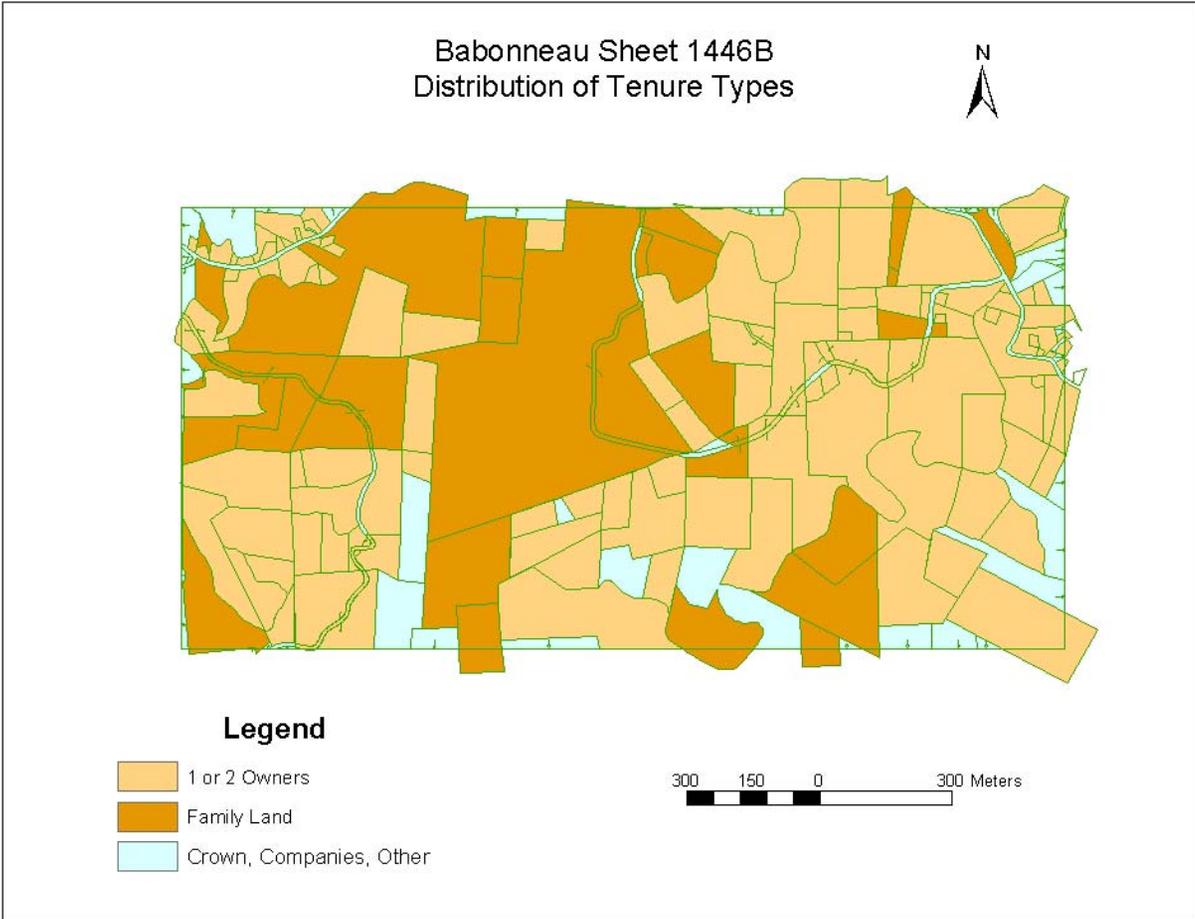


Figure C-2. Distribution of tenure types on Babonneau Sheet 1446B

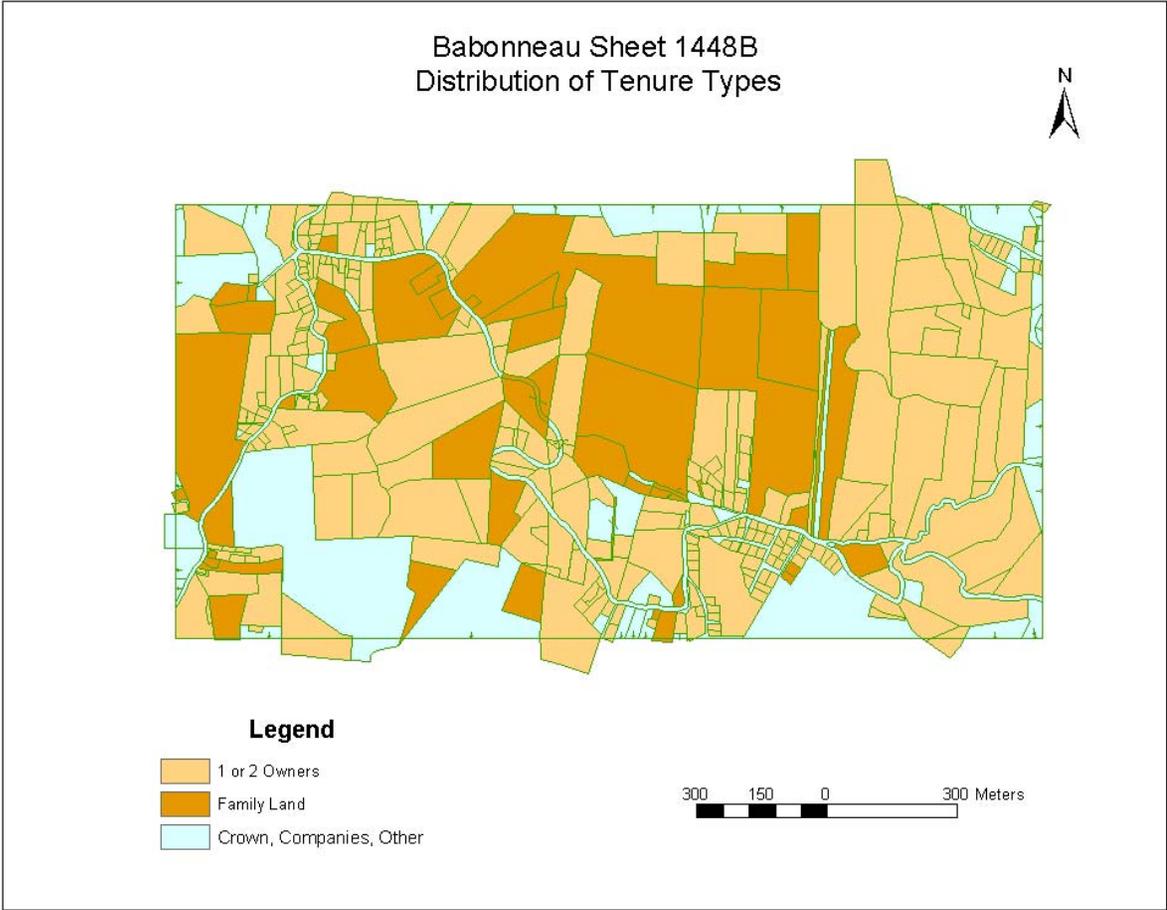


Figure C-3. Distribution of tenure types on Babonneau Sheet 1448B

Micoud

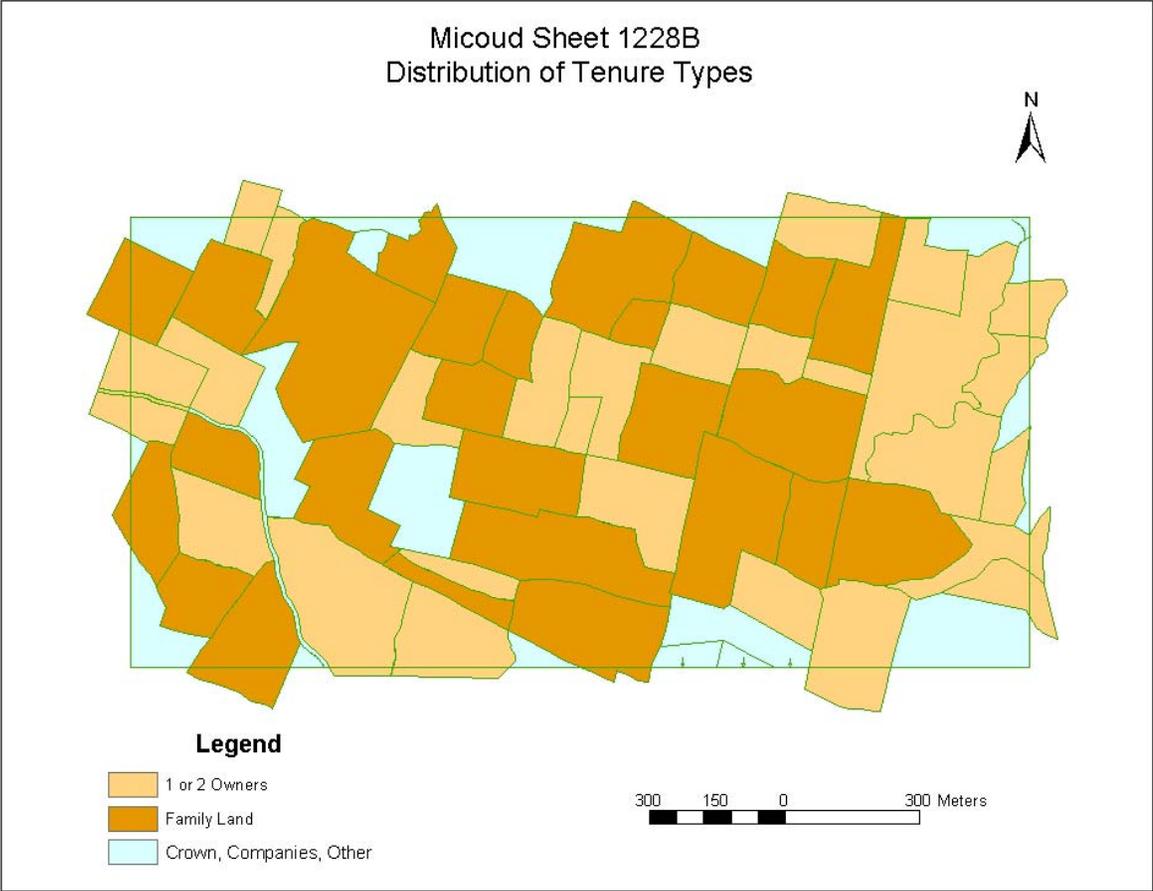


Figure C-4. Distribution of tenure types on Micoud Sheet 1228B



Figure C-5. Distribution of tenure types on Micoud Sheet 1427B

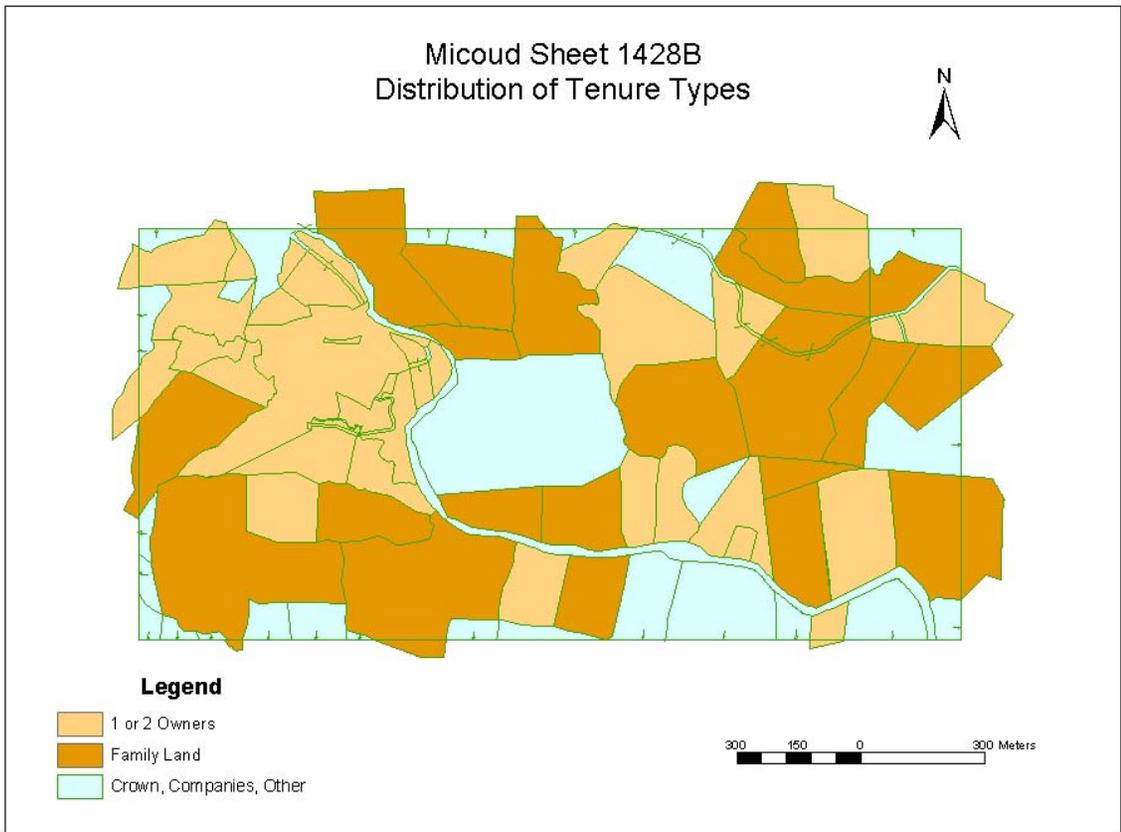


Figure C-6. Distribution of tenure types on Micoud Sheet 1428B

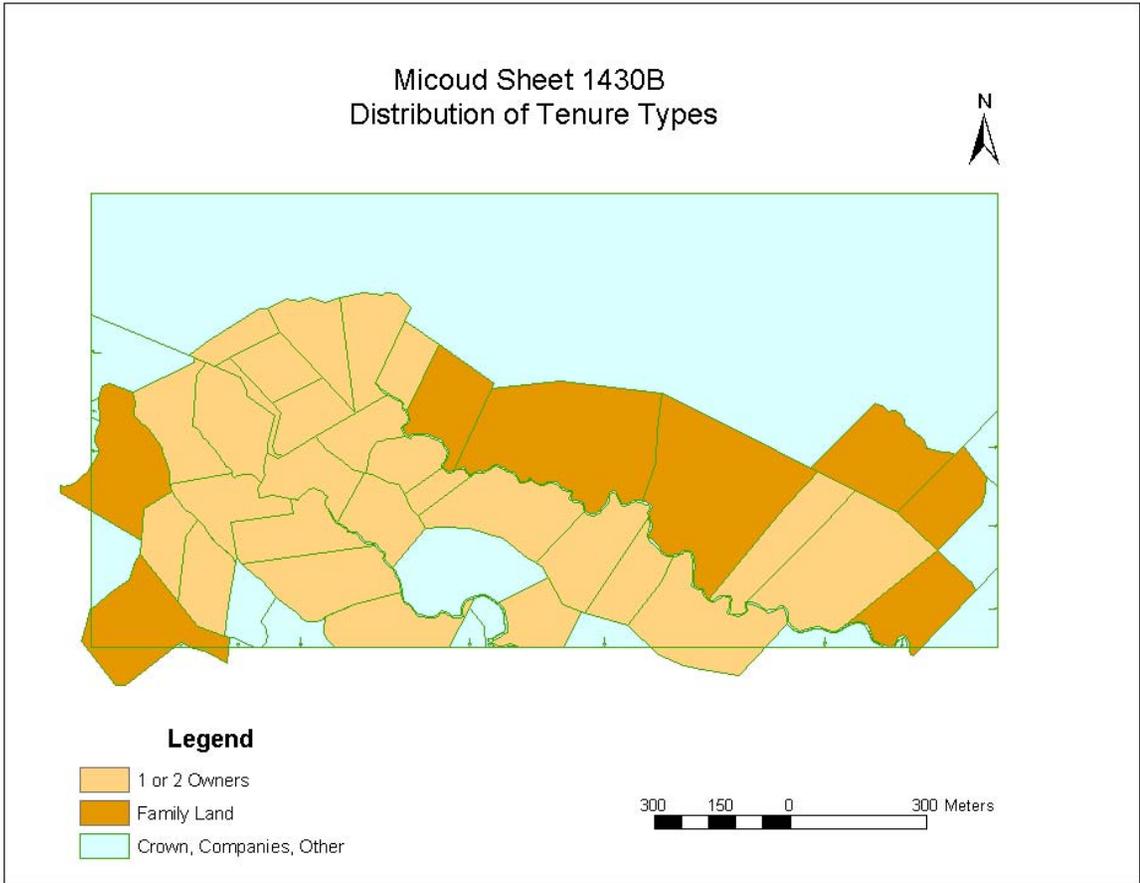


Figure C-7. Distribution of tenure types on Micoud Sheet 1430B

APPENDIX D
DISTRIBUTION OF SALES BY TENURE TYPE IN STUDY AREAS

Babonneau

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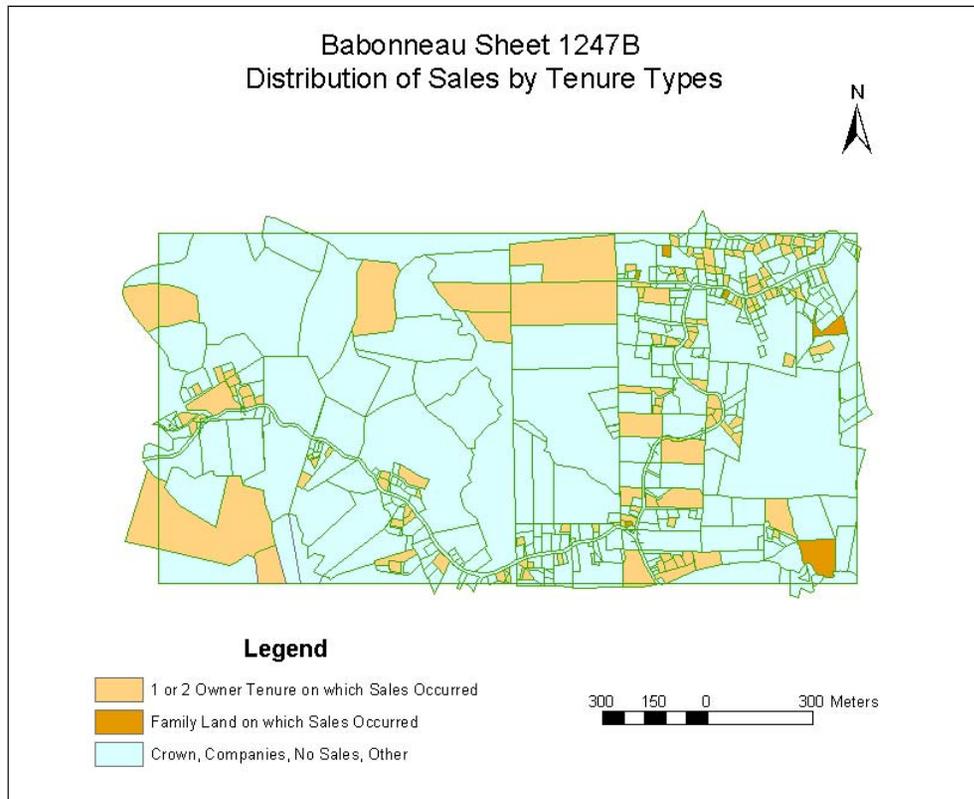


Figure D-1. Distribution of sales by tenure type on Babonneau Sheet 1247B

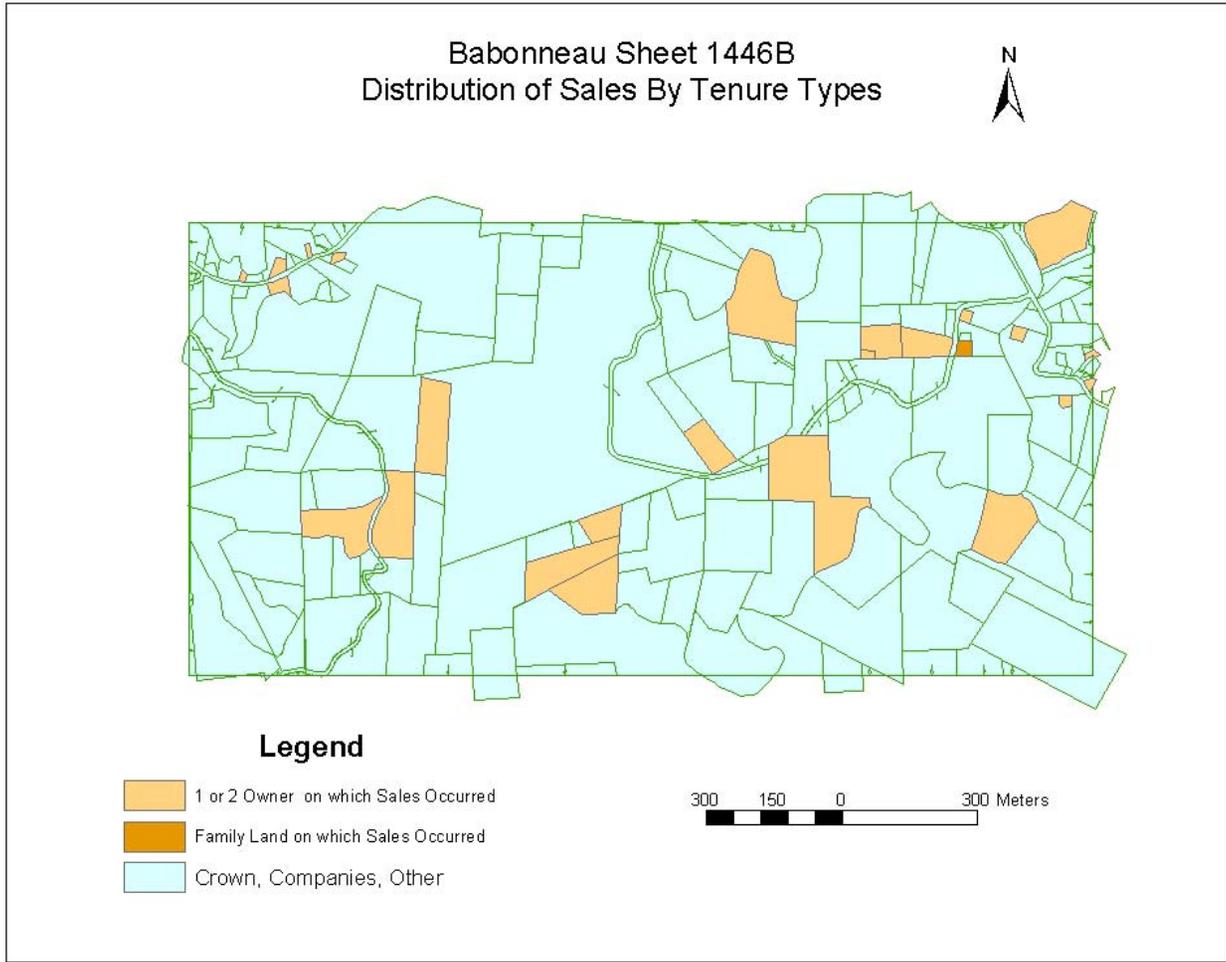


Figure D-2. Distribution of sales by tenure type on Babonneau Sheet 1446B

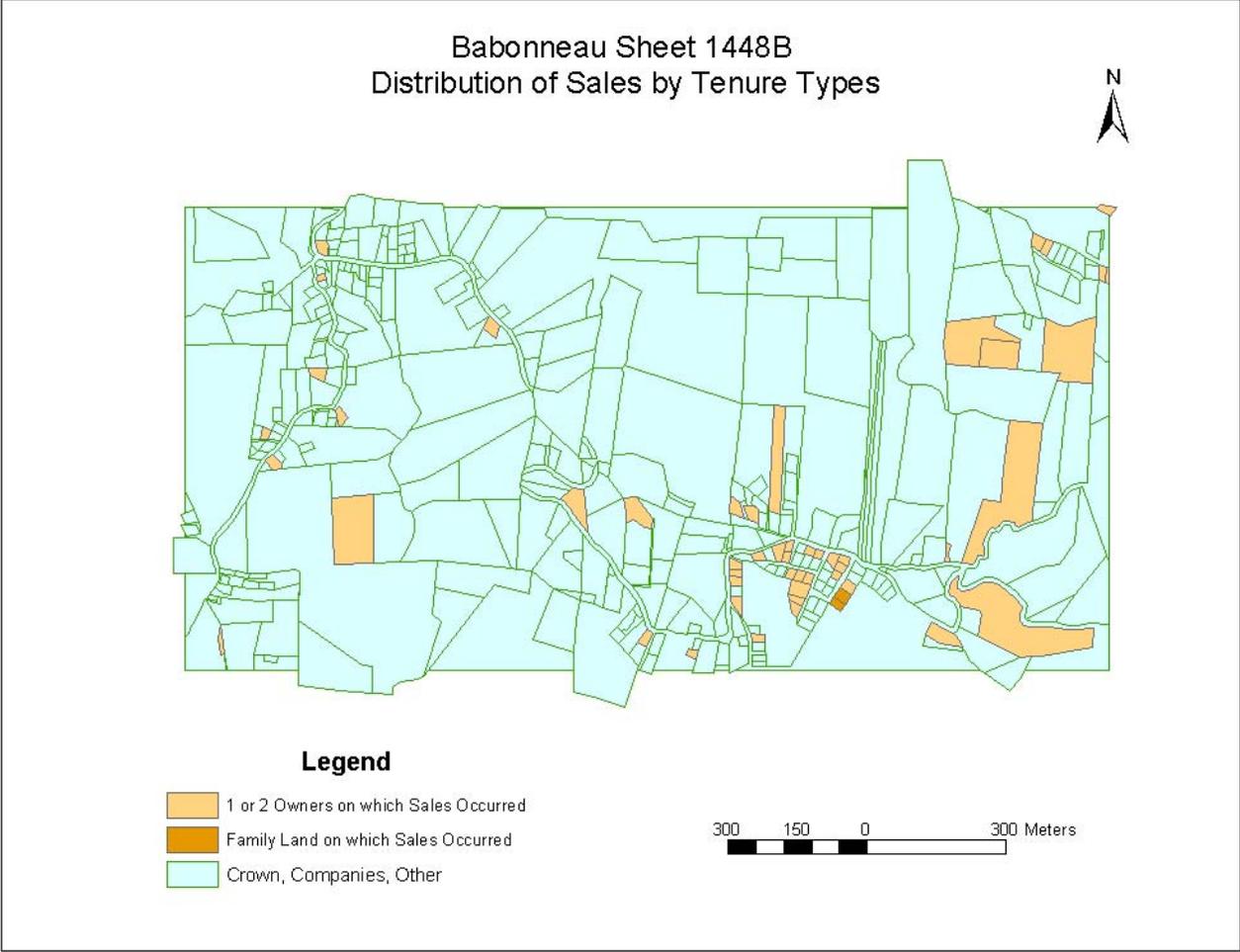


Figure D-3. Distribution of sales by tenure type on Babonneau Sheet 1448B

Micoud

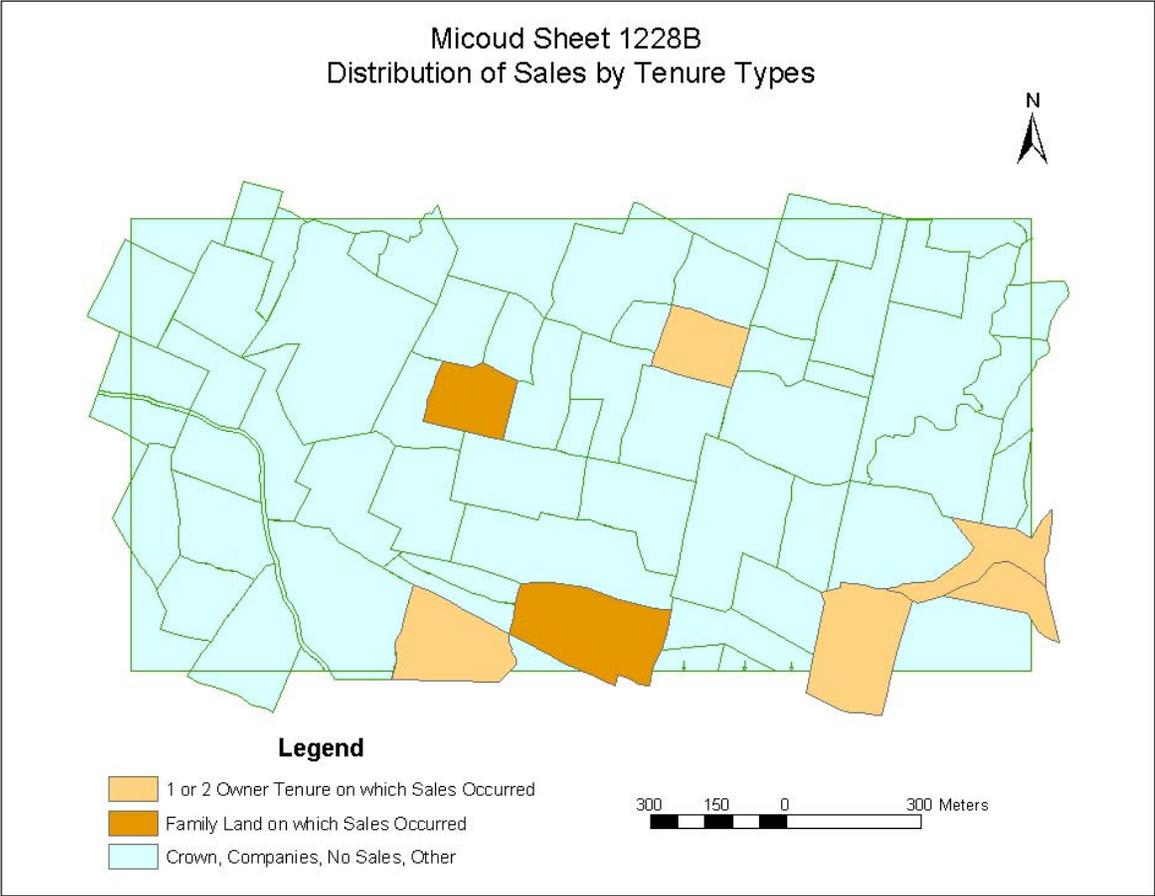


Figure D-4. Distribution of sales by tenure type on Micoud Sheet 1228B

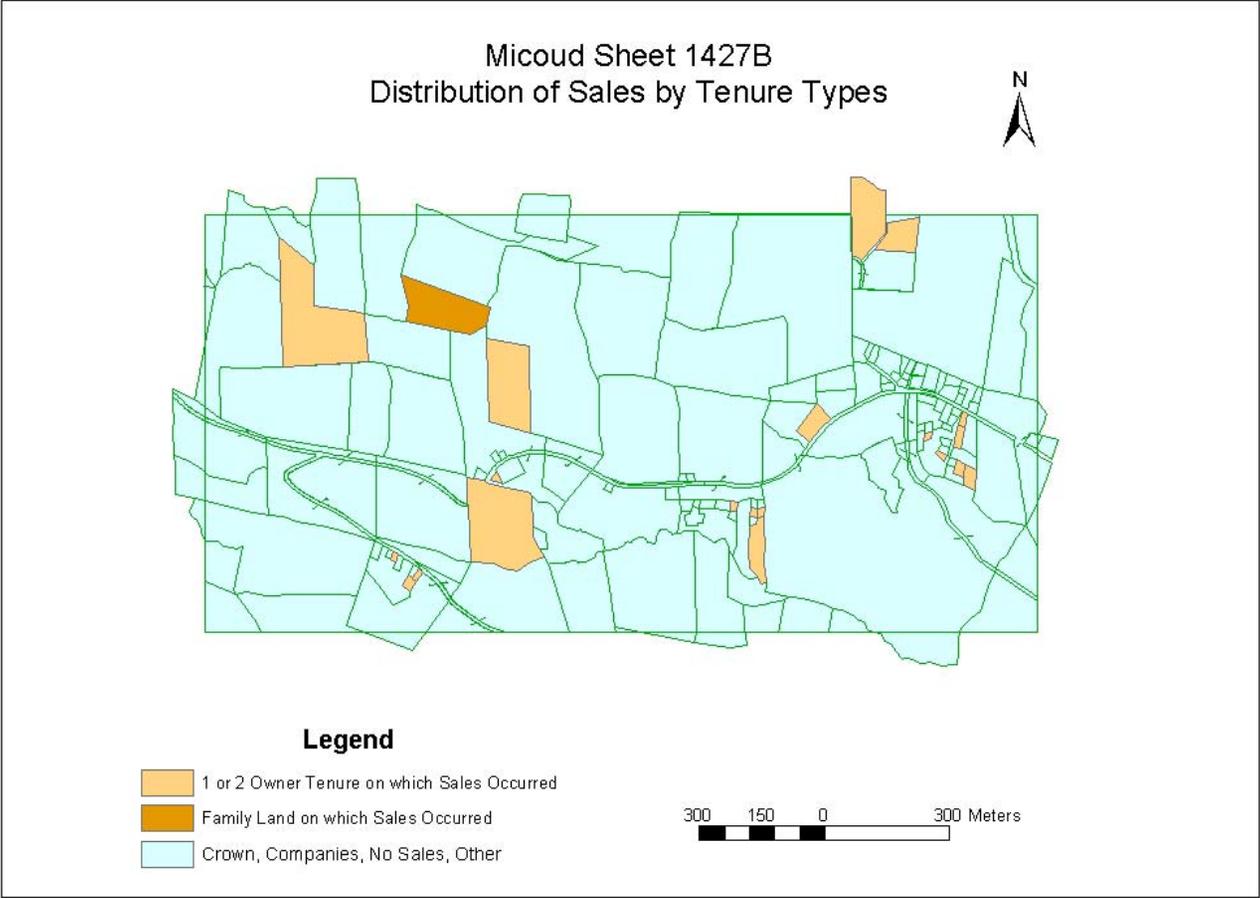


Figure D-5. Distribution of sales by tenure type on Micoud Sheet 1427B

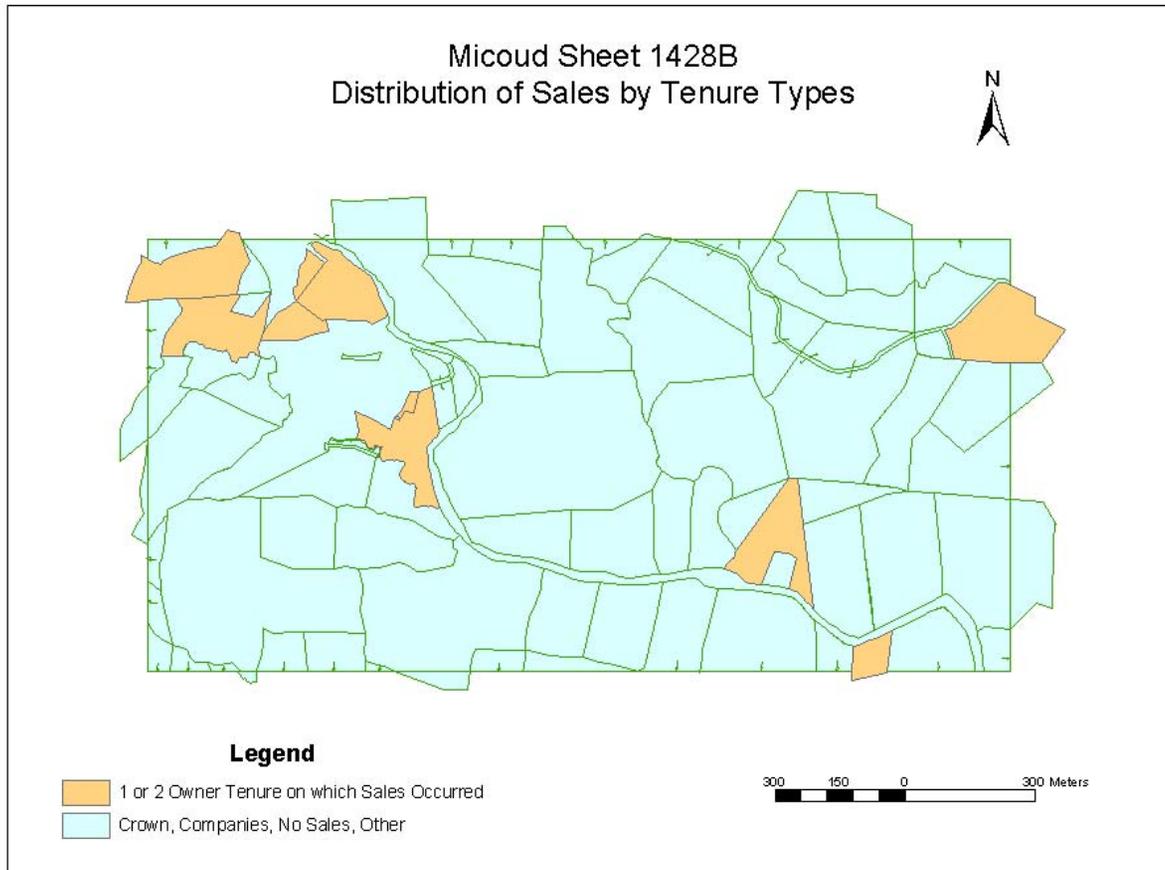


Figure D-6. Distribution of sales by tenure type on Micoud Sheet 1428B

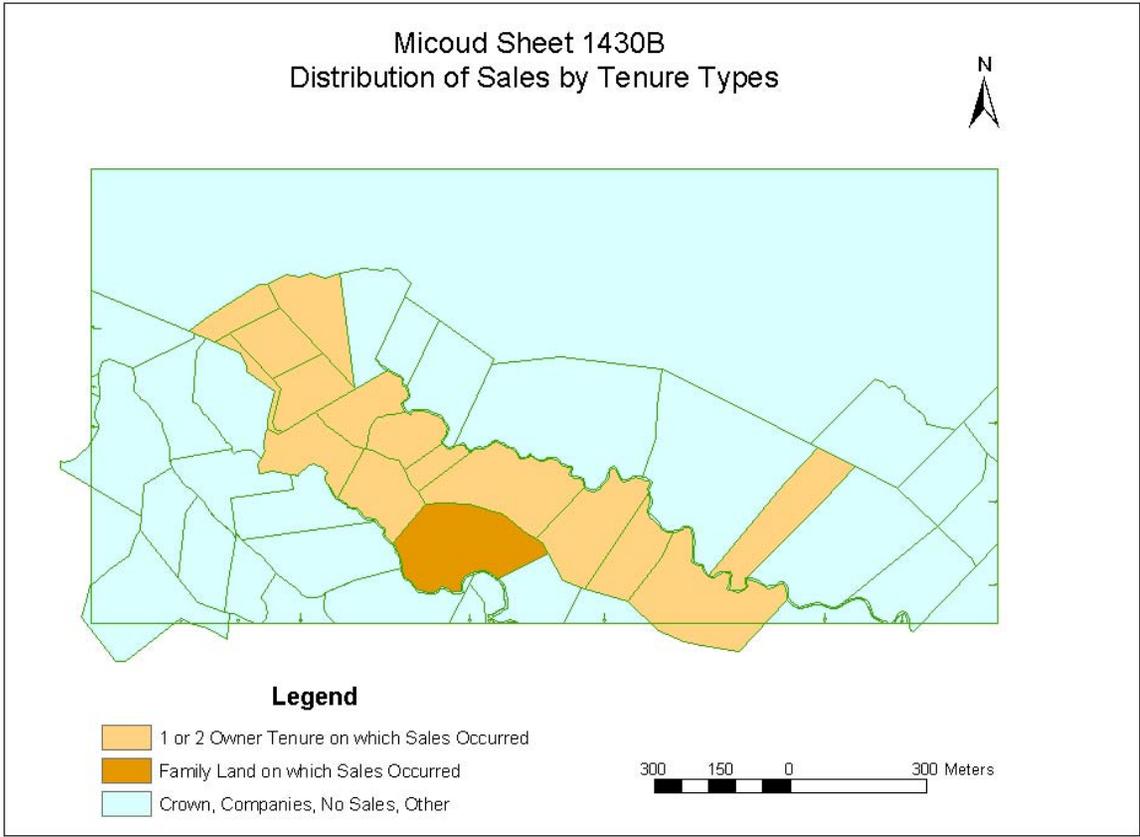


Figure D-7. Distribution of sales by tenure type on Micoud Sheet 1430B

APPENDIX E
ADDITIONAL TABULAR AND GRAPHICAL DATA

Table E-1. Conversions from provisional to absolute title related to sales

			Current title type		
	Original title type		Absolute	Provi-sional	Total
No sales on parcel	Absolute	No. of original Absolute	1323	0	1323
		% of original absolute	100.0%	.0%	100.0%
		% of current title	95.3%	.0%	79.8%
	Provisional	No. of original provisional	65	267	332
		% of original provisional	19.6%	80.4%	100.0%
		% of current title	4.7%	100.0%	20.0%
At least one sale on parcel	Absolute	No. of original absolute	303	0	303
		% of original absolute	100.0%	.0%	100.0%
		% of current title	90.2%	.0%	86.6%
	Provisional	No. of original provisional	33	14	47
		% of original provisional	70.2%	29.8%	100.0%
		% of current title	9.8%	100.0%	13.4%

Table E-2. Conversions from provisional to absolute title related to mortgages

	Original title type		Current title type		Total
			Absolute	Provisional	
No mortgages on parcel	Absolute	No. of original Absolute	1112	0	1112
		% of original absolute	100.0%	.0%	100.0%
		% of current title	95.5%	.0%	78.1%
	Provisional	No. of original provisional	52	259	311
		% of original provisional	16.7%	83.3%	100.0%
		% of current title	4.5%	100.0%	21.8%
At least one mortgage on parcel	Absolute	No. of original absolute	514	0	514
		% of original absolute	100.0%	.0%	100.0%
		% of current title	91.8%	.0%	88.2%
	Provisional	No. of original provisional	46	22	68
		% of original provisional	67.6%	32.4%	100.0%
		% of current title	8.2%	100.0%	11.7%

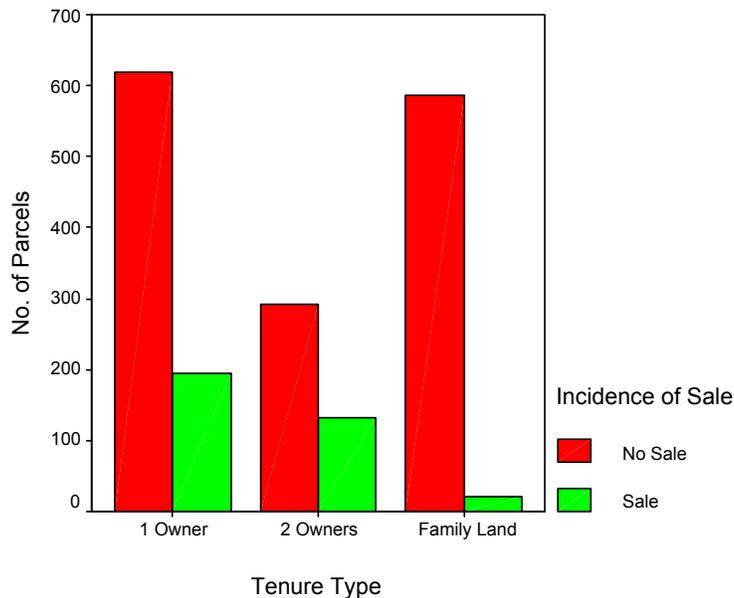


Figure E-1. Incidence of sales by tenure type

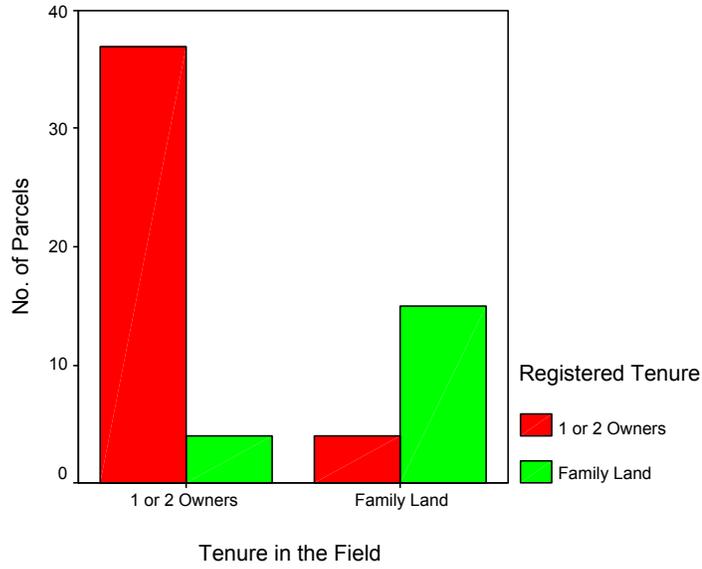


Figure E-2. Discrepancy in tenure between field and registry

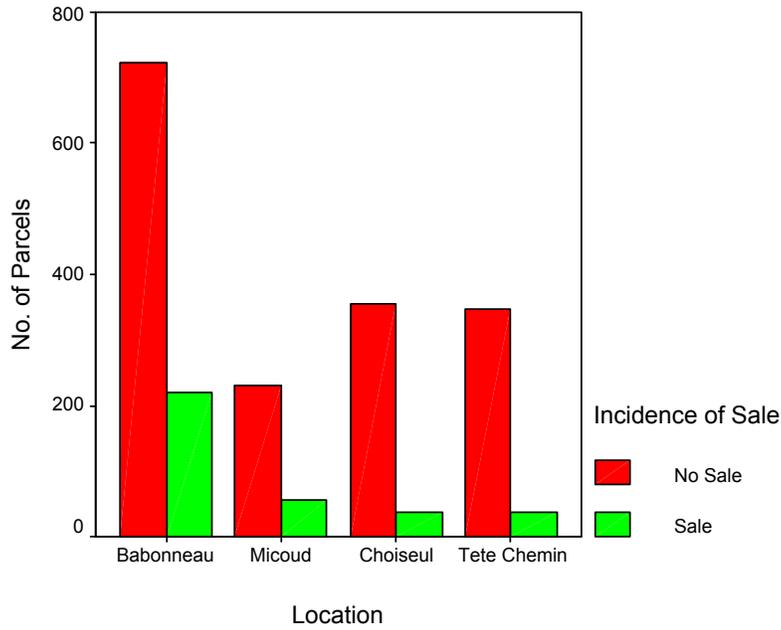


Figure E-3. Incidence of sale on parcel by location

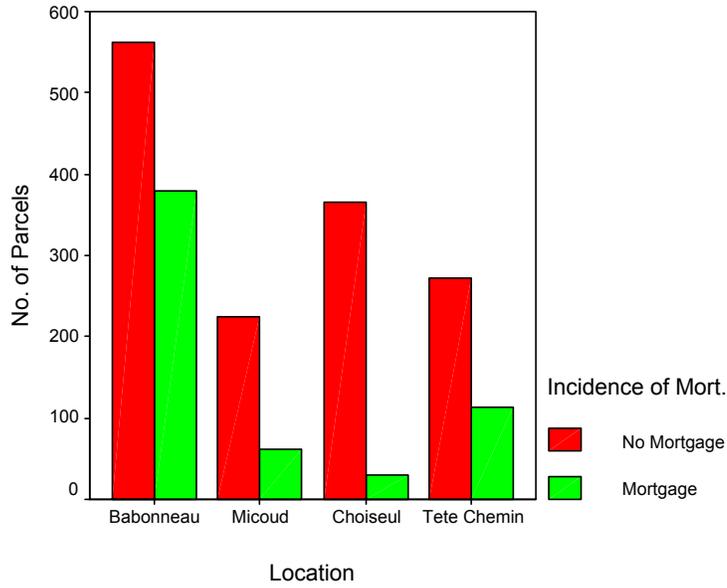


Figure E-4. Incidence of mortgage on parcel by location

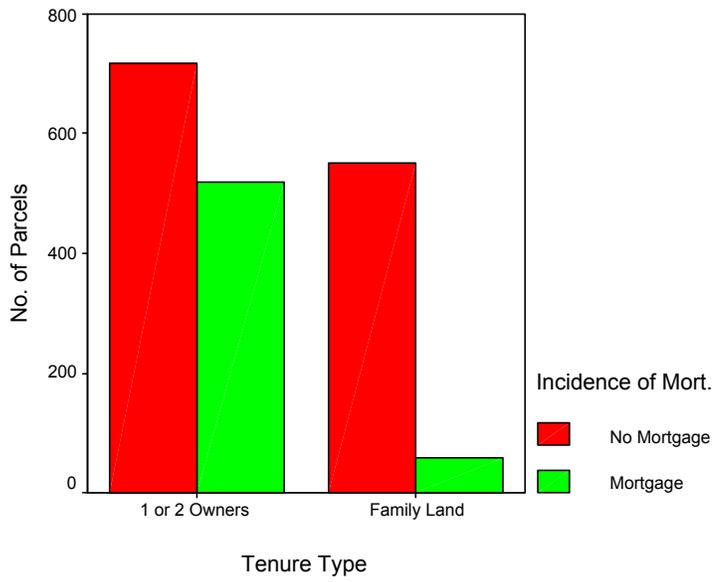


Figure E-5. Incidence of mortgage on parcel by tenure

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BIOGRAPHICAL SKETCH

Charisse Griffith-Charles was born in Trinidad and Tobago in the West Indies. She earned a BSc. in land surveying in 1986 from the University of the West Indies, St. Augustine, and an MPhil. in land surveying in 1999 also from the University of the West Indies, St. Augustine. Between BSc. and MPhil degrees, she worked at the Lands and Surveys Division of the Government of Trinidad and Tobago, earning a license to perform cadastral surveying within the territory of Trinidad and Tobago in 1989 and gaining experience in performing cadastral and geodetic surveying, land administration and cartography at the national level. She then moved on to lecture at the Department of Surveying and Land Information from 1998 to 2002 before receiving a Fulbright Scholarship to pursue a PhD in geomatics at the University of Florida.