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# Searching For Land Tenure Security In Africa

EDITED by JOHN W. BRUCE and SHEM E. MIGOT-ADHOLLA

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*If a farmer cannot look to the future with security,  
little can be hazarded by him beyond the expenses which  
the returns of the year will defray; and not only will all  
great improvements, but even the most common works of  
the season, be imperfectly performed.*

D. Low 1844  
*Landed Property and the  
Economy of Estates*  
LONDON





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# INTRODUCTION: ARE INDIGENOUS AFRICAN TENURE SYSTEMS INSECURE?

*Shem E. Migot-Adholla and John W. Bruce*

## THE PROBLEM

**A**t the heart of the studies in this book is an attempt to assess the relative efficiency of indigenous customary land use arrangements and state-imposed individual tenure in promoting agricultural production in Africa. The central issue of concern may be posed in a number of different ways:

- Do African customary tenure systems offer farmers sufficient security of tenure?
- Would African farmers make investments in land over which they have no official guarantee of continuous use rights and whose products they may not freely dispose of without sanctions from other sources?
- Given the prevailing macroeconomic conditions in Sub-Saharan Africa, are there compelling economic justifications for replacement of customary land use practices by state-guaranteed individual rights to property to agricultural land, represented by registered titles?

The parlous state of agriculture in Sub-Saharan Africa during the past two decades has rekindled debate over the suitability of customary land use practices for more capital-intensive agriculture. Dorner (1972) questioned the appropriateness of customary tenure systems for an agriculture which is capitalizing and adopting new technologies to increase productivity. Harrison (1987) argued that because customary tenure systems are deeply embedded in cultural and political systems and generally offer members of particular social groups overlapping mul-

multiple rights of land use, they tend to exclude nonmembers of the group from transactions in land. Thus they distort factor markets and undermine full integration of rural economies into national and international markets. In addition, because they permit partible inheritance, customary tenure practices contribute to land fragmentation and encourage incessant and uneconomically wasteful litigation. To remedy these problems, development specialists have favored intervention programs of land reform aimed at changing the rules governing access to land and introducing new institutions of land administration. So far, however, there have been no rigorous empirical analyses documenting the validity of the hypothesized causal relationship between individual rights in land and improved agricultural outputs in the African context.

A common feature of the studies in this volume is a keen concern about the policies African states have toward indigenous, customary land rights practices and the effects of such policies on improved agricultural production. These studies document the interplay between security of land tenure and agricultural productivity in a number of countries representing the variety of agroecological conditions in Sub-Saharan Africa. This book pulls together eight case studies summarizing farm-level research undertaken between 1988 and 1990. Up to now, the debate concerning the unsuitability of customary land use practices and the efficacy of individualized tenure has been carried out without the benefit of empirical tests of productivity responses of indigenous, customary tenure systems or of the effects of individual freehold tenure on agricultural output. The studies reported here represent an attempt to bring methodological rigor to this debate.

In order to test several related hypotheses, the studies adopted a broad theoretical model describing the relationship between tenure security and agricultural output working through land markets, credit, and investment. It would be extravagant to claim that the authors have reached complete agreement on the conceptual and methodological approach for studying such a complex topic. They have, however, all arrived at the same general conclusions, and they make broadly similar policy recommendations. This is especially significant in view of the fact that the studies carried out by the World Bank and the Land Tenure Center took two seemingly different approaches.

The World Bank studies in (Burkina Faso, Ghana, Kenya, and Rwanda) focused on the essential attributes of indigenous customary tenure practices, although in some areas formal registration had modified some customary land use practices. These studies sought to document the extent to which these tenure systems discourage investment and limit increased agricultural production. The studies by the Land Tenure Center (Kenya, Senegal, Somalia, and Uganda) examined the few cases where individual tenure systems have been established.



They investigated the extent to which state-instituted land registration and titling programs have accorded farmers sufficient security to promote increased investment and greater agricultural productivity. Critical to both approaches was the notion of security of land tenure broadly defined as the perceived right by the possessor of a land parcel to manage and use the parcel, dispose of its produce and engage in transactions, including temporary or permanent transfers, without hindrance or interference from any person or corporate entity. Because in practice none of these rights is enjoyed or exercised unequivocally at all times, the measurement of security of tenure under different social and economic circumstances to facilitate comparative analysis presented some challenges to the researchers, which we discuss in Chapter 2.

### ORGANIZATION OF THIS BOOK

This book is organized as follows. This chapter, presents an overview of the essential features of indigenous, African tenure, given that it remains the dominant land use system in much of Sub-Saharan Africa. This situation continues despite formal enactments under national law. Chapter 2 describes the methodological approaches adopted by the eight case studies to test a number of related hypotheses. First, the theoretical model is presented, then comes the meaning of security of land tenure and its measurement in each of the case studies. Data gathering methods and statistical analysis techniques are explained. Finally, the chapter addresses issues relating to sampling strategy, particularly site and household selection.

The case studies conducted by the World Bank researchers are presented in Chapters 3 to 6. The investigation of Burkina Faso differs significant from the rest of these studies. In Burkina Faso, the study relied on data previously collected by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). In this survey, information on tenure security was inferred indirectly. The studies in Rwanda, Ghana, and Kenya were jointly designed, and adopted a similar methodology, as Chapter 2 elaborates. The Land Tenure Center studies, beginning with the observation that tenure security and registered ownership are not necessarily the same, sought to elicit farmers' perceptions of their tenure insecurity.

### ESSENTIAL FEATURES OF INDIGENOUS AFRICAN TENURE

For many years, the belief that African customary practices were static and inflexible remained largely unquestioned despite occasional arguments by anthropologists and other careful observers of rural change (Morgan 1969, Gershenberg 1971, Ault and Rutman 1979). Indeed, there is substantial historical evidence in

the adoption of commercial tree crops (cocoa, oil palm, coconut, and coffee) suggesting significant flexibility of indigenous tenure. Nor was such adaptation restricted to tree crops. The spontaneous response by African farmers to market incentives in the early years of colonial rule in production of new crops—groundnuts in Nigeria and Senegal; cotton in Uganda; maize in Kenya, Southern Rhodesia (Zimbabwe), and South Africa; and winter wheat in Lesotho—suggests basic misconceptions inherent in popular notions of communal tenure and related processes of change in the context of agricultural intensification. The view that indigenous tenure is incompatible with capital-intensive agriculture persists, even as evidence mounts suggesting the need for more careful reexamination of old assumptions.

A major misconception about indigenous land tenure in Africa involves the terms customary, communal, or corporate, often used to describe the social arrangements governing allocation and use of land. These terms not only conjure up an image of unchanging, antiquarian, and immutable normative system but also imply more coordination in production and social egalitarianism than is supported by historical evidence. Although doubt about the communal and egalitarian attributes of indigenous tenure systems, has sometimes been expressed, the myth enjoys a persistence that has only recently begun to fade as a result of concerted and careful examination.

During the 1980s, some observers, such as Boserup (1981), Cohen (1980), Noronha (1985), Feder and Noronha (1987) and Bruce (1988), raised serious questions about the presumed rigidity of a customary land tenure systems. They suggested that indigenous tenure arrangements are dynamic and have historically adapted to economic and technological changes. In particular, it has been observed that, over time, customary tenure systems experience spontaneous simplification and individualization of rights whereby households increasingly acquire broader rights of exclusion and transfer as population pressure and levels of commercialization increase. Binswanger and McIntire (1987) have characterized the typical stages in the process of transition from more diffuse and collective to more specific and exclusionary individual rights, concluding that the trend toward increased privation of rights over specific parcels provides necessary incentives for investment in the particular plots. From this and similar observations it is evident that indigenous customary tenure systems may not be entirely inimical to capital-intensive agriculture.

Sub-Saharan Africa is characterized by a diversity of farming practices ranging from long forest fallow systems in areas of low population density to nearly continuous multiple crop cultivation in high-density areas. Between these two extremes are a whole range of farming systems characterized by relatively shorter but varying fallow periods. In addition to population density, other factors influ-

encing the length of fallow are climatic conditions, soil quality, political organization, inheritance patterns, agricultural technology, and degree of commercialization. Given the diversity of environmental conditions and cultures, it is hardly surprising that Africa exhibits a wide range of seemingly different land tenure systems.

Despite the varied cultures, indigenous, customary African tenure arrangements display striking similarities. A review of the large and growing literature of African customary tenure arrangements indicates that they have been historically governed by several broad principles relevant to preindustrial economies relying on kinship as the primary organizing factor. The rules governing access and use of land were predicated primarily on one's membership and status in the social group controlling a particular territory. But this was true only in a highly generalized sense. In common practice, access to and use of land by individuals and farmers were regulated by intricate customary traditions that vested control in minimal kinship or residential groups in a variety of usufructuary arrangements.

Generally, individual families enjoyed fairly clearly defined spatial and temporal rights of use over different parcels of cultivated land. Such family rights were transmitted to succeeding generations in accordance with prevailing rules of succession, which ordinarily allowed divisible inheritance. Initial rights were established by first occupation and investment of labor in land clearing and cultivation. While land was relatively abundant and population density remained low, fallow periods were long, and boundaries were poorly defined and hardly contested. But even under shifting cultivation, families enjoyed more or less continuous use rights over specific parcels of land, provided the period of fallow was not so long as to suggest that the plots had been abandoned. As the population increased and the land frontier diminished, fallow periods became shorter and cultivation of plots relatively continuous. Land was increasingly held by households rather than families.

Once the best farming land was occupied, boundaries were more distinctly marked. So long as the land was cropped, other members of the land-controlling social group were excluded from exercising their right of concurrent use. But all members of the community retained the right to graze livestock on the stubble, as on fallow and previously unclaimed land, and to use other common property resources—pasturage, forests, and water resources.

Some exceptions to this general pattern appear to have emerged in some areas where individuals and families were guaranteed access to an amount of land but not to specific plots. In such situations, it is conceivable that individuals may not be enthusiastic about making long-term investment in the improvement of soil fertility. But these kinds of arrangements guaranteeing access to some land rather than rights to a particular plot have been increasingly disintegrating under pres-

sure of agricultural commercialization and population pressure. Today they are found only in isolated pockets, for instance, in parts of Imo and Abia states in southeastern Nigeria.

Where population pressure led to internal conflict over the use of common resources, particularly pasture, members of the land-controlling groups often moved to establish new residence elsewhere, through military conquest or peaceful incorporation. Once continuous cultivation was established, transactions in land, limited to borrowing and seasonal or permanent exchanges, were restricted to members of the social group. Generally, however, land purchases did not emerge in many parts of Africa until the late 19th century. Even then, such transactions remained confined to a small number of buyers within the same land-controlling social group.

The emerging picture is that, in the majority of cases, individual and family rights to land under indigenous tenure have historically become more exclusive, although they fall short of private property. For instance, other members of the community may have secondary concurrent or sequential rights that permit entry, the collection of firewood and products of wild trees growing on the land or construction material, and the grazing of livestock on the stubble once a crop is harvested. Where population growth is rapid and commercialization of agriculture increasing, the necessity of making long-term improvements in the land has hastened the emergence of more exclusive individual rights, as well as some land sales. Evidence from Ghana, Kenya, and Kilimanjaro in Tanzania, however, indicates that some land sales were already taking place at the beginning of the colonial era (Kenyatta 1938, Simpson 1976, Kitching 1980, Noronha 1985, Moore 1986, Bates 1986) and it is likely that some sale-like transactions took place even before this period. These transformations, at best inchoate in a few isolated communities, were hastened by administrative regulations during the colonial period and after.

Except where large-scale expropriation of land for white settlement or commercial plantations was undertaken (Kenya, Zimbabwe, and South Africa), the major colonial powers launched no systematic legislative program to change the conditions of access and use of land. But as a strategy of control, colonial administrators often forged political alliances with local rural elites and sometimes, designated local notables as "chiefs," even in societies where there was no tradition of chiefdoms. In other instances, one contender to a chiefly position would be declared paramount chief and assigned powers over a defined territory in preference to less notable rivals. Nor was the idea of chiefs as widespread in Africa as it became under colonial rule. The notion of a clearly bounded socio-political unit identified with a definite territorial area governed by some "customary" ruler was often a contract conveniently created and sustained by those whose

interest is served. Yet an important consequence of the rigidities introduced by such delimitation of ethnic and subethnic boundaries is that it froze the regional migratory processes through which communities had previously adapted to land shortage by extending resource use and settlement into unpopulated land frontiers or by incorporation into communities controlling land surpluses.

The endorsement by colonial powers of what they believed to be traditional authority structures, including the indigenous systems of land rights, was in part an administrative convenience. The colonial state created a form of citizenship in which rights depended on "tribal" as well as "national" membership (Chanock 1985, Bates 1986, Woodman 1987). This arrangement was consistent with the dual economies that characterized the colonial situation. The nascent formal sector could thus recruit labor from the "tribal" sector at what amounted to less than subsistence wages and disband the workers when economic circumstances necessitated. Labor so disbanded were readily reincorporated in the "tribal" economy where, due to their "citizenship," individuals were guaranteed rights of access to land and, therefore, economic and social welfare.

The absence of social security in formal sector activities characterizing the colonial economy has not changed in most of Africa during the era since independence. African urban workers still have to maintain their "tribal" membership in order to ensure eventual residence in the communities of their rural origin and rights over agricultural land. Insofar as this requirement reinforces "tribal" social structures, it also underlines the importance of rural social formations as vehicles through which access to productive resources continues to be ensured. As the land frontier has diminished, inheritance of family land has emerged as the most significant method of acquisition of agricultural land. While rights to land so inherited are sufficiently secure, security of tenure is further enhanced by continuous occupation and cultivation—a process that may also lead to improvements that augment the capital value of land and its potential productivity. But such investment in land improvements has occurred to only a limited extent where rural areas have been closely integrated into the market economy or where population-induced intensified cultivation exists.

Where returns to agriculture are low, African farmers have sought income-earning opportunities in nonfarm activities. Yet they have also retained their rights over rural land by investing in the maintenance of rural social relations and agricultural activities. This situation may be seen not only as an affirmation of one's "tribal citizenship" but, more significantly, as premium payment to ensure secure rights of access to lineage land, which, in the specific circumstances, represents both old age "pension" and social insurance (Eades 1975, Murray 1981, Berry 1988). The consequence, given the predominance of agriculture in most African economies, is that the right of continuous, unchallenged use of

agricultural land is perhaps the most critical measure of security of tenure. A formal title certificate or other official document is, at best, merely an affirmation of this social guarantee; it does not create it. To the extent that the cultural systems legitimize transactions in land, including share tenancies, borrowing, pledging, and purchases, such transactions are accorded sufficient recognition and the farmers involved enjoy as much protection as the formal land tenure legislation is likely to give, if not more. It is a moot point, therefore, whether the replacement of indigenous customary tenure systems by state-imposed individualized tenure would accord African farmers greater security, particularly given the weaknesses of government institutions in Africa. Experience with attempts at tenure transformation suggests need for caution.

### STATE-IMPOSED TENURE TRANSFORMATION

The earliest tenure transformation programs in Africa were, not motivated by the desire to promote improved productivity among indigenous farmers. Land registration exercises in the early years of colonial rule were associated with measures designed to provide land for European settlers, plantation owners, and mercantile traders. This purpose was achieved largely through enactment of legislation extinguishing customary claims over land deemed unoccupied, and the subsequent issuance of leasehold or freehold titles to the new occupants. In most cases, little effort was made to transform indigenous, customary land tenure arrangements. The administration of land in areas of peasant agriculture—including regulation of access, enforcement of contracts, and settlement of disputes—was relegated to the realm of customary law under tribal authorities. The few exceptions where registration of land operated by African farmers was undertaken indicate that these were primarily associated with the production of important export crops under irrigation, as in Sudan in 1920, or to protect the interests of local elites, as in Uganda in 1922.

Attempts to transform tenure arrangements among African producers were made in the context of settlement and resettlement programs in areas where large tracts of land became habitable, for instance, following eradication of tsetse fly infestation (Kenya, Uganda). In other situations, resettlement programs were part of deliberate administrative efforts to redistribute populations (South Africa). In most cases, resettlement also involved the development of economic and social infrastructure, implying considerable control of land tenure rights by public institutions. Thus settlement projects have tended to provide somewhat temporary tenure, with only conditional rights. In cases of extreme land degradation, authorities have sought to change land use practices without resorting to resettlement. In a number of countries (Kenya, Zimbabwe, South Africa) such efforts became popularly known as land betterment schemes.

In recent years, land reforms and reorganization of tenure relations have had two principal objectives: to achieve social justice by removing undesirable politically embedded capital-labor relations and to promote greater productivity. Such reforms gained widespread popularity in Asian and Latin American countries in the period after World War II. This can be readily appreciated, given the highly skewed patterns of land distribution and often exploitative relations of production prevailing in those regions at the time. Following such reforms several countries, particularly in Asia, achieved impressive rates of growth in agricultural output. On the basis of this experience, development specialists have tended to recommend land tenure conversion, introducing individual property rights as a means of inducing increased agricultural productivity (Swynnerton 1954, Dorner 1972, World Bank 1974). So far, the most extensive implementation of a program under such a scheme in Sub-Saharan Africa has been the land adjudication, registration, and titling exercise that has been going on in Kenya since the mid-1950s.

Other significant attempts to change African customary tenure practices have involved instituting collectivized agriculture to reorganize relations of production. The longest and best known examples of such efforts were the Ujamaa Village scheme in Tanzania during the 1970s (McHenry 1976, 1979; Migot-Adholla 1984) and the *cooperative d'amanagement rural* in Benin during 1960s. Although the Ethiopian land reform during the 1970s had elements of both the Tanzanian and Beninois experiments, its primary goal appears to have been to distribute land more equally. Students of agriculture in Africa agree that such experiments in collectivization have been economic failures.

Several *ex post* evaluations of the state-imposed tenure conversion program in Kenya have observed that individualization has led to land concentration, increased marginalization and landlessness as people in positions of economic and political power take advantage of the less powerful (Brokensha and Glazer 1973, Coldham 1978, Njeru 1978, Achola Pala 1980, Haugerud 1983, Okoth-Ogendo 1986). A major problem inherent in such *ex post* assessment is that they tend to proceed from an overly idealized perception of traditional institutions and practices. In addition, they tend to confound influences on the observed inequality that may result from factors quite separate from those specific to land tenure.

So far, quantitative studies of the relationship between land tenure and agricultural productivity focusing on questions of sharecropping, wage rates, inter-linked markets for land, labor and capital, and their influences on incomes have been undertaken mainly in Asia (Hayami and Ruttan 1971, North 1981, Cheung 1969, Rosenzweig 1978, Binswanger and Rosenzweig 1984, Roumasset 1979, Hayami and Kikuchi 1978). These studies have helped shape the focus of the so-

called new institutional economics. Recently, attention has concentrated on the operations of rural factor markets, land tenure institutions, and farm productivity (Feeny 1982; and Feder et al., 1988), but none of these studies have been replicated in Africa. The studies collected here make an effort to discuss major issues addressed by some of the studies in Asia. These issues have more than topical interest as solutions are sought for managing the region's on-going agricultural transition. This book could not, therefore be more timely.

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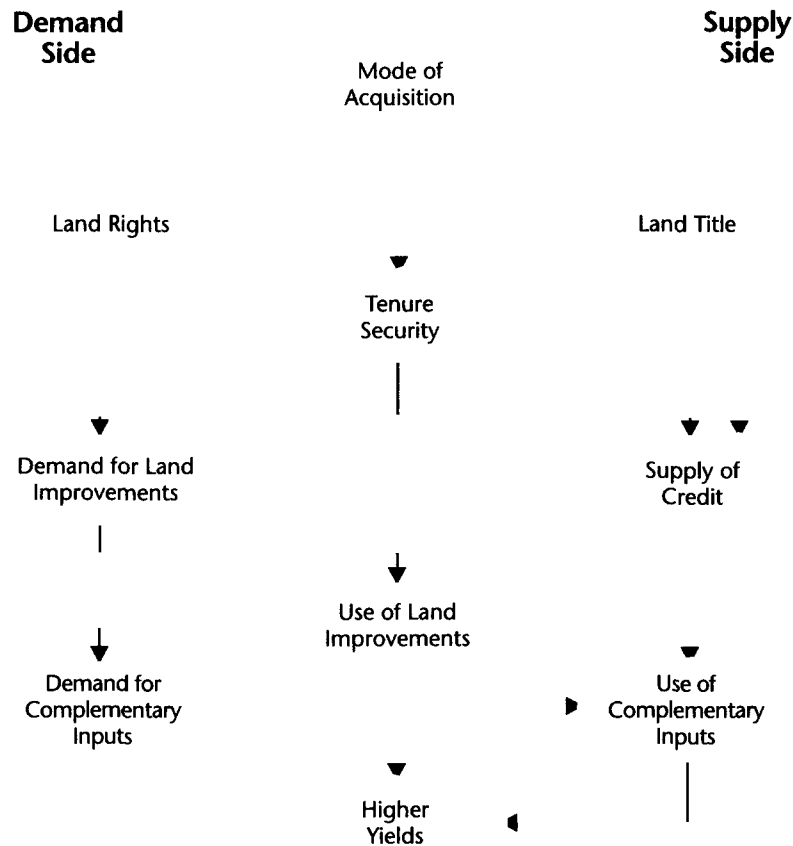
## LAND TENURE SECURITY AND AGRICULTURAL PERFORMANCE IN AFRICA: OVERVIEW OF RESEARCH METHODOLOGY

*Frank Place, Michael Roth, and Peter Hazell*

There is a widespread belief among development specialists that tenure security is an important condition for economic development. Compared with weak or insufficient property rights, secure rights based on economic theory are believed to (1) increase credit use through greater incentives for investment, improved creditworthiness of projects, and enhanced collateral value of land; (2) increase land transactions, facilitating transfers of land from less efficient to more efficient uses by increasing the certainty of contracts and lowering enforcement costs; (3) reduce the incidence of land disputes through clearer definition and enforcement of rights; and (4) raise productivity through increased agricultural investment (Feder et al. 1988, Barrows and Roth 1990). Whether greater security of land rights under indigenous or state tenures has a positive payoff through these linkages is a crucial empirical issue in the economics of land policy and tenure conversion.

This chapter provides an overview of the research methodology employed in the eight studies in this volume that empirically test one or more of the above hypotheses. It first presents a theoretical model of the effect of tenure security on agricultural output, investment, land markets, and credit use. It then examines in some depth the meaning of tenure security and its measurement, and presents a conceptual model that links security of tenure with the above performance indicators. Alternative methods of data collection and statistical and econometric

**EXHIBIT 2-1. Conceptual Model Linking Title and Tenure Security with Agricultural Performance**



techniques for analysis are then briefly reviewed. A final section addresses issues of survey design, site and household selection, definitions, and units of analysis.

### THEORETICAL MODEL

A theoretical model relating tenure security to agricultural performance is illustrated in Exhibit 2-1. Tenure security potentially has both demand-side (incentives to farmers) and supply-side (incentives to lenders) effects. On the demand side, an enhancement in tenure security increases demand for medium- to long-term land improvements and, to a lesser extent, for mobile farm equipment. This increase in demand is derived from two sources. First, greater tenure security

increases the likelihood that the operator will capture the investment returns. Second, increased tenure security is expected to reduce the incidence of disputes, freeing resources that otherwise would have been used for litigation. Demand for complementary short-term inputs (farm chemicals, labor) will increase as well, as a result of enhanced tenure security or derived from land improvements (e.g., higher water retention from construction of ridges increases fertilizer profitability). Assuming the existence of viable technologies, access to inputs and extension advice, and the availability of household labor and financial resources, enhanced tenure security will lead to higher investment and yields.

Because of potential supply-side effects, higher yields are possible even if households lack sufficient financial resources. Increased tenure security may enhance the land's collateral value and improve the creditworthiness of the landholder, thereby raising lenders' expected returns, especially for long-term credit. The latter effect is expected to be stronger in the Land Tenure Center (LTC) studies involving title possession.

Increased tenure security is also hypothesized to have a positive effect on land markets. Both rental and sale market activities depend on transfer rights held by individuals and on the costs of enforcing these rights. Potential buyers need assurance that the seller is indeed the holder of all rights involved in the transfer. Potential lessors need assurance that lessees will not acquire rights other than those agreed upon. In the absence of off-farm opportunities, marketable labor skills, or old age insurance, many rural households are unwilling to sell land at any price. Thus, in most of Sub-Saharan Africa, enhancements in tenure security are more likely to encourage markets for rentals than for sales. Efficiency gains would arise if enhanced tenure security reduces the cost of land transactions and productive users are able to outbid less efficient users in land transfers.

Increased tenure security will also affect land value as perceived by both demanders and suppliers. The value of land theoretically reflects the present value of the future income stream expected by the operator. Net income will be positively related to tenure security as long as the expected yield response to investment is positive and the output price response in the aggregate is sufficiently elastic. Thus sales of land in areas where individual rights to land are ubiquitous or titling programs are in operation should theoretically realize higher prices than sales in other areas, other things being equal.

There are several reasons why the improvements in agricultural performance just described may not come about:

First, farmers' investment demand may be weak for reasons other than security of tenure. Even where demand is enhanced by tenure security, farmers may be unfamiliar with technological options, investments may be unprofitable, or investment returns may be risky. Poorly devel-

oped input distribution systems may fail to supply enough complementary inputs or may result in unaffordable input prices.

Second, even if demand for investment is enhanced, financial constraints may prevent farmers from exercising this demand. Usury laws may prevent lenders from raising interest rates to mobilize capital. Although credit access for certain individuals with title may improve, credit supply in the aggregate may remain inelastic.<sup>1</sup> Poorly developed financial systems may result in exorbitant administrative charges and poor delivery of credit services to rural areas. Also, possession of land title is not sufficient to induce credit expansion unless *de facto* tenure permits lenders', through foreclosure and land transfers, to convert the land asset into a financial asset.

Third, it does not necessarily follow that more land improvements will increase yields. Households may prefer leisure or may pursue off-farm opportunities, substituting investment for farm labor. Also, investments may be targeted toward reducing yield variance rather than increasing mean yield.

Instead of undermining the importance of tenure security, the foregoing reasons simply suggest that secure tenure is necessary but not sufficient for agricultural development, and that the expected benefits would be strongest in situations of dynamic technology and well functioning markets. Whether registration would stimulate output response under these conditions would depend on whether tenure security is significantly higher than under the indigenous system and on whether credit use is enhanced.

## HYPOTHESES

The case studies to various degrees sought answers to the following general questions:

### Tenure Security

1. How are land rights distributed among and within households under the indigenous tenure system, how are these distributions affecting tenure security, and for whom?
2. Has land registration increased or decreased security of tenure in cases where the state has intervened, and for whom?

<sup>1</sup> As long as the aggregate supply of credit is highly inelastic, those individuals previously able to obtain credit may find themselves relatively less creditworthy due to the enhanced collateral and bargaining position of title holders. Title would thus increase credit access for certain individuals, but would not necessarily increase aggregate credit supply.



### **Agricultural Investment and Productivity**

3. Are current levels of tenure security in the indigenous tenure system constraining agricultural investment, use of complementary inputs, and agricultural productivity?
4. Under what conditions, if any, has land registration enhanced tenure security and stimulated higher investment and productivity?
5. Is inadequate tenure security adversely affecting lenders' decisions to supply agricultural credit and landholders' decisions to acquire credit? Would enhanced tenure security increase credit supply, credit demand, and credit use in agriculture?

### **Rural Land Markets and Disputes**

6. Is the indigenous tenure system impeding good farmers' access to land through the land market? Are land disputes or insecure land rights creating high transfer costs?
7. Has land registration improved land market efficiency by lowering transfer costs and facilitating land transfers? Have programs to increase security of tenure reduced land disputes and decreased the probability of losing land rights without fair and adequate compensation?
8. Does enhanced tenure security raise the value of land or bid price of the buyer? Does it increase the asking price of the seller?

### **Distributional Impacts**

9. How is the indigenous tenure system affecting the distribution of land rights between and within households in the community?
10. Has land registration contributed to an inequitable distribution of land resources? Has it promoted or arrested problems of land concentration, landlessness, or excessive fragmentation? Has it strengthened, protected, or adversely altered the distribution of land rights within the household and community?

### **INDICATORS OF TENURE SECURITY**

Land tenure security can be defined to exist when an individual perceives that he or she has rights to a piece of land on a continuous basis, free from imposition or interference from outside sources, as well as ability to reap the benefits of labor and capital invested in that land, either in use or upon transfer to another holder.

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This definition has three components—breadth, duration, and assurance—with legal and economic dimensions.

The legal dimension defines the composition (breadth) and duration of rights in the bundle and implies that a person holds with complete assurance the rights embodied in his or her tenure, even if that tenure is short and confers meager rights. As it emphasizes complete possession, it emphasizes with assurance the right to forbid others from exercising the land right in question. The economic component defines the value and certainty of economic benefits derived from *de facto* tenure in the land resource. Economic actions may diverge from legal allowances as a result of price incentives, high legal costs, or weak legal enforcement. The economic dimension, because of assurance, enables greater diversity of actions in the exercise of land rights than would be implied by strict legal terms.

Robustness, or breadth of rights, is the legal quantity or bundle of rights held, or the possession of key rights, if certain ones are more important than others. The bundle may include rights of use, transfer, and exclusion. If all other factors are held constant, the greater the number of rights associated with a parcel, the greater the economic value of the holding.

Duration is the length of time (or season) during which a given right is legally valid. The economic dimension requires, in addition, that the time horizon be sufficiently long to enable the holder to recoup with confidence the full income stream generated by the investment. As land rights are generally secure for each season, tenure insecurity is less an issue for short-term inputs (fertilizer) than for capital long-term improvements with benefit streams stretching far into the future (trees, irrigation).

Assurance, in strict terms, implies that right(s) and duration are held with certainty. But rights and duration are seldom absolutely present or absent. They are held with varying degrees of certainty at different points in time. Rights that are absolutely certain or assured (e.g. through registration<sup>2</sup> or unquestionable guarantee by the local community) should theoretically enhance incentives for long-term investment and resource conservation. Yet, due to limited resources and weak legal enforcement, assurance may be weakened, and the landholder may be unable to prevent squatting, encroachment, or loss of harvest.

Legal and economic dimensions are related. Duration and robustness follow from the legal definition of rights under state or indigenous systems of tenure. Yet lack of assurance adds an element of uncertainty associated with an individual's

<sup>2</sup> Registration indicates that the land parcel has been demarcated, adjudicated, and the holder's name(s) and other details of ownership have been officially recorded on the land register. However, registration need not imply possession of a title certificate by the landholder.

ability to exert those rights in practice. Tenure insecurity from an economic perspective is thus some function of four elements: (1) inadequate number of absolute rights, (2) inadequate duration in one or more rights, (3) lack of assurance in exerting rights, or (4) high costs of enforcing rights.

Overlapping tenure systems pose another degree of complexity. Security of tenure in most of Africa is fundamentally derived from the indigenous tenure system but is shaped to varying degrees by legal statutes and land administration procedures. Where state tenure is imposed and enforcement is absolute, the indigenous system would disappear leaving only the distribution of land rights imposed by the state administered system. However, in much of Sub-Saharan Africa, state enforcement is generally less than absolute, and the outcome is a syncretic mix of two or more systems of concurrent land rights that, depending on the situation, may be weak in definition and certainty.

Issues of tenure security must be framed in two dimensions—what piece of land and whose rights. It cannot be assumed that an individual with multiple parcels will hold uniform land rights on each (e.g., purchased or rented parcel), nor does an individual necessarily have equal certainty in his or her ability to exercise an identical set of rights over multiple parcels. It also cannot be assumed that land use decisions can be traced solely to the tenure security of one individual (household head), ignoring the rights of other family members. In many parts of Africa, family members other than the household head may be allocated rights to plots of land for their personal use, while the household head maintains suprafamilial authority over transfer rights (including intrafamilial allocation).

Devising an objective scale or index of tenure security is difficult because security is not directly observable. Different approaches were used by the World Bank (WB) and the Land Tenure Center (LTC) to arrive at operable definitions. The number or breadth of land rights is used as the primary measure in the World Bank studies, whereas the presence or absence of registration is the principal proxy employed in the LTC studies. In addition, three other indicators of tenure security are tested: (1) an index based on mode of acquisition and location of parcels in Burkina Faso, (2) an index derived from the breadth of land rights held by individual plot managers in Senegal, and (3) an index derived from landholders' perceptions of the risk of losing land in Somalia. Table 2-1 contrasts the different measures of tenure security employed in the various case studies.

### **World Bank Studies**

Theoretically, the greater the number of rights conferred by the tenure arrangement, the greater the real or potential value of the land resource to the holders. Three of the World Bank studies (Ghana, Rwanda, and Kenya) use farmers'

perceptions of their rights over their land parcels as proxies for tenure security. Each respondent (household head) was asked his or her perception of access to two sets of rights: (1) *use rights*—right to grow perennial crops, grow annual crops, make permanent improvements, bury the dead, collect firewood, collect wild fruit, and cut trees; and (2) *transfer rights*—right to sell, give, mortgage, lease, rent, bequeath, and register. In Rwanda, data were also collected on *exclusion rights*—right to exclude others from planting crops, collecting wild fruits and firewood, grazing animals, using footpaths, and cutting trees. Responses are binary, assigned a value of one if the right is held, zero if it is not (the necessity to obtain approval from others is also asked for transfer rights).

TABLE 2-1. Measures of Tenure Security

	Burkina Faso WB	Ghana WB	Rwanda WB	Kenya WB LTC	Senegal LTC	Somalia LTC	Uganda LTC
Robustness of land rights							
Rights of transfer		+	+	+			+ <sup>a</sup>
Intra-household control over land access/use					+		
Mode of acquisition	+						
Duration of rights							
Intra-household control over duration of use					+		
Risk of expropriation by the lineage group <sup>b,c</sup>	+						
Assurance of rights							
Perceptions of land loss <sup>c</sup>						+	
Land registration <sup>d</sup>							
Possession of registration				+	+	+	+
Currency of registration <sup>e</sup>				+			+

<sup>a</sup> Data collected but not reported.

<sup>b</sup> Also assurance.

<sup>c</sup> Also robustness.

<sup>d</sup> Measures the aggregate effect of robustness, duration and assurance relative to the indigenous tenure system(s). Registration backed by legal land codes may result in either greater or fewer rights, shorter or longer duration, and stronger or weaker assurance of rights depending on the case.

<sup>e</sup> Contains parcels that had once been adjudicated and registered, but registrations ceased to be renewed following succession.

Assuming land rights are equally important (no one right is more or less important than another), the number of distinct combinations (bundles) of rights is potentially enormous. Analysis of the World Bank data revealed very little variation among use rights across parcels. However, the number of different bundles of transfer rights was very large, making it impossible to rank bundles according to level of tenure security.

A number of assumptions were made to simplify the analysis of tenure security. First, transfer rights were assumed to imply greater tenure security than use rights. Second, among transfer rights, rights of permanent transfer were assumed to be superior to rights of temporary transfer. Third, among permanent transfer rights, the right to sell was assumed to be superior to the right to give, which, in turn, dominates the right to bequeath. These assumptions were justified as follows: If a parcel can be transferred, the landholder ought to be able to use the land as he or she wishes. But possession of use rights does not generally imply possession of transfer rights. A permanent transfer presumes the ability to make a temporary transfer, but not vice versa. Transfers through gift or bequest are more restrictive than those by sale because the latter can be made to a wider range of individuals.

These lexicographic relationships were exploited to derive three mutually exclusive categories of land rights. Parcels with *complete transfer rights* are those that can be sold by the current operator. Parcels that cannot be sold but may be given or bequeathed are classified as having *preferential transfer rights* because gifts or bequests are normally directed by normative preference to family or kin. The remaining parcels, those not permanently transferable, are placed into the *limited transfer rights* category. Analysis of the World Bank data verified these divisions (Place and Hazell 1993). Greater breadth (transfer plus use rights) of land rights was discovered on parcels over which holders enjoyed complete transfer rights, followed by those over which operators had preferential transfer rights, and finally those offering only limited transfer rights. These categories are assumed to correspond to decreasing levels of tenure security in the order presented.<sup>3</sup>

The final World Bank study, Burkina Faso, used an existing data set initially collected by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Instead of reliance on farmers' perceptions of their rights, mode of acquisition and parcel location are used to define tenure security categories.<sup>4</sup> Acquisitions through borrowing or renting typically imply the transfer of certain use rights but not transfer rights. Inheritance normally transmits to heirs rights of exclusion and temporary transfer (renting) in addition to use rights, whereas land purchase usually implies the ability of the purchaser to exercise all transfer rights. Land in all the study areas is generally acquired through inheritance or borrowing. More rights accompany inherited land than borrowed land. In addi-

<sup>3</sup> In accordance with prevailing land tenure arrangements, certain modifications are made which are discussed as they arise in the respective chapters. For example, the necessity to seek approval prior to sale forced minor modifications of the land rights category in Rwanda.

<sup>4</sup> The correlation is not exact because identical acquisitions may transfer different bundles of rights.

tion, parcels were recorded as being located on either lineage or nonlineage land (from the perspective of the current holder). Parcels on nonlineage land are considered less secure because they face greater risk of being reclaimed by members of the lineage group at a later date. Mode of acquisition and lineage domain thus combine to form four mutually exclusive tenure security categories, ranked from highest to lowest: (1) inherited/lineage land, (2) inherited/nonlineage land, (3) borrowed/lineage land, and (4) borrowed/nonlineage land.

The emphasis placed by the World Bank studies on breadth of land rights diverges from the conventional definition of tenure security (adequate breadth, duration, and assurance). By ignoring duration and assurance, the Bank proxy can lead to inconsistencies and contradictions in certain situations. For example, assurance can be low as a result of rising litigation or of excessive government expropriation in the area regardless of breadth of rights (robustness). An individual could claim full rights to a piece of land, yet have less-than-full assurance of being able to assert those rights because of concerns about latent aboriginal claims, risk of expropriation by a lineage group, or fears of family members returning from the city to claim family land. The great advantage of the approach in the World Bank studies is that it permits an empirically tractable method for analyzing land rights across indigenous tenure systems.

### **Land Tenure Center Studies**

The British colonial governments in Kenya and Uganda, the Italian government in southern Somalia, and the French government in Senegal all recommended programs of land registration to promote individualized tenure. In the eyes of colonial authorities, the indigenous system had a propensity to result in severe land fragmentation, land degradation, erosion, and land disputes. It further restricted the ability of those entrepreneurs with initiative and resources to acquire or expand their land holdings, and conferred inadequate incentives for individuals or groups to conserve and invest in the land resource. Colonial administrators believed that the Western model of land registration would increase security of tenure, reduce litigation costs, encourage investment, increase credit access, encourage development of a land market, and control land transfers to ensure an economic size of land holding (Swynnerton 1954). The LTC studies examining the presumed impacts of land registration in Kenya, Senegal, Somalia, and Uganda sought to determine the extent to which expected outcomes have been achieved in practice.

Individualized tenure, formally defined as surveying, demarcation and registration of freehold title, is generally assumed to be highly correlated with all dimensions of tenure security. However, land titling systems are not homog-

enous. At least two systems are distinguishable: (1) *voluntary, purposeful*, and *sporadic* registration and (2) *compulsory* and *systematic* registration.

Under voluntary, purposeful, and sporadic registration, the state maintains a network of land registries but landholders often initiate the process and bear the bulk of the cost of title acquisition. Costs normally include application fees, the expense of time and travel to the registry, and surveying and registration charges. Under compulsory and systematic registration, a geographically contiguous area of land is marked for adjudication, and the boundaries of all parcels within the area are systematically delineated, surveyed, and registered.<sup>5</sup> The state normally bears the bulk of the costs to ensure comprehensive registration. Once the original registration campaign is completed, compulsory registration programs in Africa have tended to revert to voluntary registration (in currency terms), as individual decisions are exercised on whether to update the registration following a succession or other transfer.<sup>6</sup>

Registration systems do not confer equivalent rules and land rights from country to country, (i.e., systems are not equally robust). The land law in Uganda (prior to the 1975 Land Reform Act) permitted alienation of land through the land market. However, the 1975 land law of Somalia and the 1964 Law of National Domain in Senegal granted landholders certain use rights but prohibited land transfers except with the approval of the state (Somalia) or rural council (Senegal). Landholders are not bound by number of parcels or size of holdings in Uganda. The Somali law allows only one parcel per household and imposes variable limits on the size of parcels, depending on soil quality (irrigated or rainfed) and land use (plantation or nonplantation agriculture).

Registration systems also do not confer rights for periods of equal duration. Freehold tenure implies that rights are granted to the landholder in perpetuity; leasehold tenure confers certain land rights for periods of finite duration. Registration in Uganda prior to 1968 was based on freehold title, but after 1975 freehold tenure was abolished in favor of 99- or 99-year leaseholds. Registrations in Somalia provide access rights for only 50 years.

Tenure security and registration of ownership are thus not necessarily the same. High levels of tenure security (robustness, sufficient duration, and assurance) are possible under indigenous tenure systems without formal registration.

<sup>5</sup> Registration would be expected to have a stronger effect under voluntary registration than under compulsory registration. Under the former, registrants purposefully acquire title to increase their tenure security or access to credit. Under the latter, some farmers, had they been given the choice, would have registered land, but others with adequate security would *not*.

<sup>6</sup> Land not reregistered following a transfer or partition is still legally registered, only the new holders have no legal protection.

Conversely, land market restrictions posed by legal statutes may strengthen use rights but result in lower overall tenure security because of limitations on transfer rights. Uncertainty over the renewal of leases may make land rights attached to leaseholds less secure than those under freehold. Certain landholders can experience tenure insecurity in the presence of registration, particularly nonregistered households who are unable to afford or acquire title once registration has started (e.g., Somalia), or other family members of registered households who lose land rights as a result of the practice of vesting legal rights in a single individual (as in Kenya). How registration programs are implemented and how legal statutes are written fundamentally affects tenure security. Some insecurity will persist as long as the land code confers inadequate rights, offers insufficient duration of key rights, or is poorly enforced, resulting in inadequate assurance.

The LTC sought to locate its research in countries that had some experience with land registration. But the registration programs varied among the selected countries. (Table 2-2). The Kenyan registration program was very extensive and compulsory, although the system has recently tended to change into purposeful and sporadic registration (in currency terms), and even revert to informal indigenous customary tenure practices, as individual landholders choose not to update partitions and transfers. The research in Uganda compared landholders on the Kigezi pilot registration scheme with those in a neighboring parish outside the scheme. Registration prior to 1968 was compulsory; after 1968, farmers outside the scheme were permitted to register land under sporadic registration. The Senegal case involves sporadic freehold title. Registration in Somalia is also sporadic, but involves leasehold rather than freehold tenure.

**TABLE 2-2. Land Registration Processes<sup>a</sup>**

	Kenya				
	WB	LTC	Senegal	Somalia	Uganda
Compulsory/systematic	+	+			+
Purposeful/sporadic			+	+	+
Purposeful choice following compulsory registration	+	+			+

<sup>a</sup> Registration programs not included in the sampling frames for Burkina Faso, Ghana, and Rwanda.

In addition to registration status, the LTC research attempted to derive indices of tenure security. In the case of Senegal, plots of field managers were stratified according to three levels of tenure security depending on (1) what percep-



tion of rights to plot access respondents reported, (2) who made land use and input use decisions, and (3) whether their children could farm the plot.<sup>7</sup> In Somalia, farmers were reluctant to disclose the full number of their land holdings, because provisions in the land law limited households to one parcel. Household heads were asked about general patterns of land disputes in the community, expropriation by powerful individuals (land grabbing), and security of rights associated with land rental, on the theory that responses would reflect the personal biases and views of the respondent. Factor analysis was then used to derive tenure security indices associated with fear of land loss, security of long-term use, and land rental security.

### Comparison of Indicators of Tenure Security

Efficiency impacts dealing with the effects of tenure security on yield, income and investment response were the predominant focus in most of the case studies. Equity impacts, dealing with variations in tenure security, and the distribution of land rights, income and investment within households, received only minimal attention. Nearly all studies, for example, examined the effect of tenure security of the household head on land improvements at the parcel level. Only the Senegal case study explicitly examined variations in land rights among individual members of family groups cultivating different plots within the same parcel.

Neither the proxies for land rights nor the proxies for land registration provide perfect or complete measures of tenure security. As the survey questions on land rights measure farmers' perceptions rather than objective fact, the responses are vulnerable to exaggerated claims of rights possession, deception or misunderstanding of rights not commonly exercised in the area. Moreover, they are not easily verified. These limitations are also true in the cases where tenure security indices are derived.<sup>8</sup> A land right coded as a binary variable can also only measure presence or absence of a right, not the gradation representing degrees of assurance in exercising that right. Presence or absence of registration is also an imperfect indicator of tenure security. The legal codes of Somalia and Senegal do

<sup>7</sup> Managers with the most *secure* rights were those who stated that no one could take the plot from them, they would work the plot next year, and their children could manage the plot. Managers of plots classified as *moderately secure* also stated that the plot could not be taken from them, but they did not determine cropping patterns or input use, did not know whether they would work the same plot next year, and did not feel certain that their children could operate the plot. Plot managers in the *insecure* category stated that someone else had the right to take the land from them; it also included those parcels that were borrowed regardless of individual responses.

<sup>8</sup> In Somalia, for example, those farmers facing the highest risk of losing land often asserted that the land was definitely theirs, in hope of convincing outsiders seeking land to go elsewhere.

not confer complete transfer rights, thus restricting the size of the land rights bundle. Nevertheless, title holders in both Somalia and Senegal and nonregistered landholders in Somalia revealed a very high demand for registration,<sup>9</sup> suggesting that assurance of use rights or of access rights was higher on registered parcels than under the indigenous system.

Self-selection biases are a concern in evaluating the impact of tenure security on agricultural productivity. Such biases may arise where greater tenure security or possession of registered title involve purposeful decision on the part of the landholder. In most areas studied by the World Bank, land is acquired chiefly through inheritance or other means which do not require individual volition by those acquiring land. The issue is more problematic in areas where those acquiring land rights through purchase or rental (some regions in Kenya and Rwanda) may be systematically different from those who do not rely on this method. Likewise, whereas the compulsory system imposes registration on all land regardless of household preferences, registration under the voluntary, sporadic system involves purposeful choice. In either case, to avoid incorrectly attributing higher investment or yield to tenure security, one must carefully distinguish the attributes of acquiring households and the characteristics of the parcels registered upon acquisition.

Despite these problems, when examined collectively, the studies provide a coherent and comprehensive picture of the various dimensions of tenure security and their linkages to agricultural performance in the African context. The World Bank's approach potentially allows comparisons of security of land rights across indigenous tenure systems. The LTC research examines the efficiency and effectiveness of tenure conversion. Although land registration, from a theoretical perspective, may not always be a highly reliable indicator of tenure security, the studies nonetheless address the "applied" question of economic justification for the use of scarce private and public funds for registration of agricultural land under present circumstances in Sub-Saharan Africa.

### EMPIRICAL MODEL

The conceptual model in Exhibit 2-1 can be formalized into a five equation structural model for a given household, under the assumption that tenure status is exogenous (Place and Hazell 1993):<sup>10</sup>

<sup>9</sup> As credit use is weak in both cases, one can assume that demand-side effects linking tenure security with investment demand and income security are higher than supply-side effects linking tenure security with capital access.

<sup>10</sup> See individual country studies for justification of this assumption or alternative treatment in cases where tenure status is a choice variable of households.

## A. Household level

$$(1) \quad c = f(hc, ts^*, t)$$

Credit Use

## B. Parcel level

$$(2) \quad l = f(hc, pc, ts, c)$$

Demand for Land Improvements

$$(3) \quad i = f(hc, pc, ts, c, l)$$

Demand for Complementary Inputs

$$(4) \quad y = f(hc, pc, l, i)$$

Yield

$$(5) \quad ts = f(t)$$

Tenure Security

where  $c$ ,  $l$ ,  $i$ , and  $y$  are endogenous variables and  $c$  is credit,  $l$  is land improvements,  $i$  is inputs,  $y$  is yield or income,  $hc$  is a vector of household characteristics,  $pc$  is a vector of parcel characteristics,  $ts$  is tenure security,  $ts^*$  is a composite household measure derived from the tenure security of individual parcels, and  $t$  is tenure status. Credit use in equation (1) is influenced by household characteristics, tenure security, and tenure status in the event that possession of title increases collateral value. Levels of investment in land improving technologies or input use in equations (2) and (3) are influenced by tenure security, household credit availability, and household and parcel characteristics. Yield or income in equation (4) is influenced by household and parcel characteristics, land improvements, and input use. Equation (5) implies that tenure security ( $ts$ ) is some function of tenure status.

Because of the recursive nature of the model (i.e., the unidirectional relationship among endogenous variables), it is possible to eliminate the endogenous variables that appear on the righthand side of equations (1) to (4), creating the following set of reduced-form equations:

$$(1a) \quad c = g(hc, t)$$

Credit Use

$$(2a) \quad l = g(hc, pc, t)$$

Demand for Land Improvements

$$(3a) \quad i = g(hc, pc, t)$$

Demand for Complementary Inputs

$$(4a) \quad y = g(hc, pc, t)$$

Yield

Under certain assumptions, equations (1a) to (4a) can be subjected to single equation regression analysis to give consistent and unbiased estimates of the tenure security variable.<sup>11</sup> The coefficient associated with tenure security measures the total direct and indirect impacts of tenure security on the dependent variables or set of performance indicators ( $c$ ,  $l$ ,  $i$ ,  $y$ ). The estimate obtained in equation (4a), for example, measures the sum of the indirect effects of tenure security (through credit, land improvements, and inputs) on crop yield or income ( $y$ ). Not all of the case studies were designed or able to adopt such a procedure,

<sup>11</sup> Provided that the unexplained portions, or error terms, of equations (1a) to (4a) are uncorrelated with each other.

or to examine impacts of tenure security on all indicators. Some estimate a subset of regressions (1a) to (4a), while others use alternative statistical techniques to test some of the hypotheses.

A key assumption in the above empirical model is that tenure status ( $t$ ) is exogenous. This is easier to justify in situations where registration has been compulsory and initial rights have not been transferred, since it is then imposed by government. But in many areas of Sub-Saharan Africa, the issue is more complex. In order to treat land rights as predetermined, it must be shown that farmers cannot alter their rights at will. Land rights normally adapt to population pressure, agricultural commercialization, as well as broader economic and political factors. But these changes generally affect land rights at the communal or regional level and are exogenously transmitted to the individual farmers. Farmers might be able to enhance long term claims to land by investing in improvements (e.g. planting of trees or fencing). Where this occurs, land rights and improvements are jointly determined. An examination of the relationship between land right categories and method of acquisition in the World Bank studies showed that possession of specific rights is, to a large extent, conditioned by acquisition method. However, even if land rights are predetermined, they need not behave as exogenous variables. For example, only poorer quality parcels might be rented, or only more skilled and successful farmers might purchase land.

If farmers can choose their rights to land at acquisition time, then land rights could be correlated with the error term in the model. The most direct solution to this selection problem would be to regress land rights on other exogenous instruments and then use predicted land rights as an explanatory variable in equations (1a) to (4a). Because there were not enough instruments with which to accomplish this task, the World Bank studies instead took advantage of multiple parcel observations per household and used fixed-effects or error components regression techniques. This procedure eliminates any correlation between land rights (or other parcel characteristics) and error terms which might emanate from unobserved household variables. However, it does not control for any unobserved parcel effects. Because multiple observations were not available over time on individual parcels, both the World Bank and Land Tenure Center studies had to rely on included parcel variables (such as soil fertility, topography, and distance from house) to capture both observed and unobserved cross-parcel variation in quality.

### PERFORMANCE INDICATORS

All the studies examined the effect of tenure security on at least one investment. As shown in Table 2-3, many types of land improvements were considered. The Burkina Faso, Kenya-LTC, and Somalia studies gathered information on the quan-

tities of fertilizer and manure applied during the agricultural season (also pesticides in the Kenyan-LTC study). The Kenya-LTC analysis compares mean quantities between titled and untitled parcels. The Burkina Faso study uses a fixed effects regression model to examine the effects of tenure security on manure and fertilizer at the plot level. Use of fertilizer in Somalia was too infrequent to permit a meaningful analysis.<sup>12</sup>

In the remaining studies, data on land investments are in binary form (1 if the investment is made, 0 if not). Measuring investment in this manner avoided the problems of having to value family labor or standardizing the prices of purchased inputs at different points in time. However, binary data cannot capture quality differences in investments (e.g., size of terraces, proportion of parcel terraced). Generally, use of fertilizer, manure, and pesticides is measured over one season, while other investments (e.g., drainage or trees) reflect activity over the entire period since parcel acquisition. The Senegal study compares the incidence of land improvements between one village with high tenure security and one with low tenure security. The remaining studies (Somalia, Uganda, Kenya-WB, Ghana, and Rwanda) use regression analysis to examine the effect of tenure security on the probability of making various land investments. In some cases, a single investment is analyzed in isolation and a binary logit approach is used. In others, several investments are examined simultaneously in a multinomial logit framework.<sup>13</sup>

The types of investments included in the respective studies were determined by the technological possibilities unique to each country. For many of the specific investments in Table 2-3, investments were not present or occurred on only a handful of parcels (e.g., terracing). The other extreme (adoption of the improvement by nearly all farmers) was also observed (e.g., planting trees in Kenya-WB, making cultivar beds in one region of Ghana, livestock and poultry housing in Uganda). In both extremes, there was too little parcel level variation in improvements to warrant statistical analysis.

Information on credit use was collected for Rwanda, Ghana, Kenya-WB, Uganda, and Somalia. Except in Uganda, where the incidence was too low, tests were carried out to determine whether tenure security has a positive effect on credit use. In all remaining cases, credit use is a binary variable reflecting the incidence (versus the amount) of credit during a specified period (i.e., the previous one, three or five year period). A binary logit regression model was employed in the Ghana, Rwanda, and Kenya-WB studies to examine the relationship between credit use and tenure security. The Somalia study presents a crosstabulation of credit use against possession of land title.

<sup>12</sup> Fixed effects models are discussed in Judge et al. (1985).

<sup>13</sup> See Maddala (1983) for an in-depth description of binary and multinomial logit models.

**TABLE 2-3. Comparison of Agricultural Performance Indicators Examined Across Case Studies**

Performance Indicator	Burkina Faso WB	Ghana WB	Rwanda WB	Kenya		Senegal	Somalia	Uganda
Productivity								
Yield		+	+	+	+			
Land use					+	+	+	
Income					+	+		
Land value							+	
Complementary inputs								
Fertilizer	+	+		+	+	+	+	+
Pesticides		+		+	+		+	+
Hired labor					+			
Land improvements								
Fencing			+			+		+
Drainage		+	+	+			+	+
Wind break								
Agroforestry			+			+		+
Tree crop		+	+	+			+	+
Access road								+
Continuous manuring	+		+		+	+		+
Terracing			+	+				+
Canal maintenance							+	
Leveling							+	
Mulching			+					+
Removing stumps		+						+
Bunding							+	+
Ridging		+						
Grass stripping			+					+
Wells						+	+	
Fallow						+		+
Crop rotation	+					+		
Credit use		+	+	+	+		+	+
Land markets								
Disputes		+	+	+			+	+
Rental markets			+		+	+	+	

+ = Data were collected and the respective performance indicator was analyzed with respect to tenure security. A blank cell indicates either that no data were collected on the respective performance indicator or that presence of the indicator was too small to permit analysis of tenure security impacts.

To test whether tenure security increases yield, agricultural output data were used in the Rwanda, Ghana, Kenya-LTC, and Kenya-WB studies. The Kenya-LTC study considered both farm yields and profits as a dependent variable in econometric regressions. An analysis at the farm level is possible because sampled households operated either all titled parcels in the case of adjudicated areas or all untitled parcels in nonadjudicated areas.<sup>14</sup> The other studies used parcel or field level yield as the dependent variable. Because households generally operate numerous fields concurrently, fixed effects and error components regression techniques were used.

Neither the World Bank nor the LTC studies were equipped to examine fully the relationship between tenure security and permanent land transfers. Although nearly all studies examined mode of parcel acquisition, information on household characteristics and tenure security was available only for the current landholder, not the former holder. An exception is the LTC research, which identified the title status of parcels rented out by households. There is also no reason to believe that the tenure security of the buyer at the time of parcel acquisition was the same as at the time of survey. Examining the relationship between tenure security and land rental markets circumvents the problem of time, as land rental decisions are generally made annually.

The effect of tenure security on land markets and disputes was examined empirically in most studies (but not in Burkina Faso, Senegal, or Kenya-LTC). In the Ghana, Rwanda, and Kenya-WB studies, land market activity was compared across regions in order to test whether greater perceptions of transfer rights have indeed encouraged land transactions. In Somalia and Uganda, the effect of tenure security on the renting out of parcels was examined with a parcel-level cross-tabulation. The Somalia case study also examined the relationship between possession of title and perceived land values using a parcel level regression analysis. As for land disputes, information was collected on the incidence of disputes over parcels since they were acquired in Ghana, Rwanda, Kenya-WB, Somalia, and Uganda. In each case, the incidence of dispute was cross-tabulated against possession of tenure security at the parcel level.

## STUDY DESIGN AND RESEARCH METHODOLOGY

### Definitions and Units of Observation

With the exception of the case study in Senegal, which emphasizes the family compound, all studies used the household as the primary economic unit of analysis. A *household* is composed of one or more persons, but the case studies ap-

<sup>14</sup> In the Njoro sample, almost all households operated a single parcel.

plied different definitions in selecting members. In the World Bank studies (Ghana, Rwanda, and Kenya) and LTC's Uganda study, a household is defined as a group of individuals who live on the same farm, work together on at least one parcel (for adults), and recognize the authority of a single head of household in major decisions relating to the farm enterprise. The recognition of a single household head also applies to the case of Somalia. In addition, a household in Somalia was defined to include resident and nonresident family members and permanent workers living and eating together in the primary place of residence for at least part of the year.

Farm production in the peanut basin of Senegal is organized at the compound level. The *compound* consists of one or more households. The nucleus of the compound is typically one man who has the "right of hatchet"<sup>15</sup> and his household (wives, children, older parents, aunts, sisters, unmarried male relatives, etc.). Besides being the compound head, the male with right of hatchet is also the head of his household within the compound. Other households in the compound are headed by married brothers, sons, or cousins of the compound head. These secondary households are either dependent or independent, the difference being that the latter prepare their own meals and are responsible for meeting their own millet needs.

A *holding* or *farm* is the aggregate of all parcels held by all family members within the household. It is composed of one or more parcels acquired through inheritance, purchase, gift, marriage, rental, pledge, borrowed, or settled from unclaimed land.<sup>16</sup> A *parcel* is the primary unit of land acquisition. It is normally noncontiguous with other pieces of land held by the household, although it is possible that contiguous but separate parcels have been acquired to form a farm. A *plot* is distinguished by individual management rights to a piece of land within the parcel. The compound or household head, for example, may allocate one or more plots within a given parcel to household members for their private use. A *field* refers to a distinct area of land use—sole crop, intercrop, pasture, fallow, idle, or unused land. A parcel thus contains one or more plots and one or more fields. Two or more plots belonging to the same person cannot be contiguous within a parcel; two or more fields of the same crop cannot be contiguous within a plot. Only the Senegal case identified plots as separate units of analysis; in all other studies, fields represent the third level of analysis.

<sup>15</sup> The first settlers in the Senegal basin claimed land by right of clearing by fire, and became known as "masters of fire". Unable to cultivate all of their holdings themselves, these men accorded use rights or "rights of hatchet" to men who could cultivate the land. Rights of fire and rights of hatchet in the basin are still passed on from father to son.

<sup>16</sup> The World Bank studies further differentiate between the "owned" farm, over which the household has permanent use rights, and the "operated" farm, which is owned land plus leased-in land less leased-out land.



Tables 2-4 and 2-5 compare indicators of research methodology across countries. Data are provided on research location, period of study, sample stratification, levels of detail in data collection (i.e., parcel versus plot measurement), sample sizes, presence of perennial crops, and whether the research site is rainfed or irrigated.

The World Bank studies (Ghana, Rwanda, and Kenya) and two LTC studies (Uganda and Kenya) collected data on land improvements at the parcel level and on complementary inputs and yields at the field level.<sup>17</sup> The Somalia study asked the household head about fields on the parcel (and the name of the field manager) and about agronomic practices, inputs, and outputs on the field. The Senegal case first identified all plot managers, then interviewed each manager individually about farming practices on their private fields. The Somalia case thus relies on the household head to answer field level questions, whereas the Senegal case relies on individual managers.

**TABLE 2-4. Survey Design and Sample Characteristics: LTC Studies**

	Kenya	Senegal	Somalia	Uganda
Region	A: Njoro	A: Keur Marie B: Keur Magaye C: Kaolock	A: Shalambood	A: Nyakaina B: Kayamakanda
Period of study	1985-86	1987	1987-89	1987
Sample strata	A1: Titled A2: Untitled	A+B: Nontitled C: Titled	A1: Small titled A2: Large titled A3: Non-titled	A1: Titled B1: Titled; B2: Non-titled
Units of observation (Sample size)				
Compounds	—	A:22; B:26 C:11	—	—
Households	109		A1:36; A2:35 A3:77	A1:100; B1:40 B2:100
Parcels	109	A:351; B:213	A1:38; A2:46 A3:142	A1:231; B1:78 B2:202
Primary Unit of land measurement	Parcel/field	Plot/field	Parcel/field	Parcel/field
Compound/household heads				
Male (%)	66.1		A1:97.2; A3:83.1	A:96; B:98
Female (%)	33.9		A1:2.8; A3:16.9	A:04; B:02
Primarily irrigated or rainfield	Rainfed	Rainfed	A: Irrigated	Rainfed
Perennial cropping	None	Trees	A: Bananas, Fruit trees	Coffee

<sup>17</sup> Due to lack of resources, only fields containing major crops were measured for output.

TABLE 2-5. Survey Design and Sample Characteristics: World Bank Studies

	Burkina Faso	Ghana	Kenya	Rwanda
Region	Woure Silgey Kolbila Koho Sayero Ouonan	Wassa Ejura Anloga	Wadzu Lumakanda Kianjogu Mweiga	Ruhengeri Gitarama Butare
Period of survey	1984–85	1987–88	1988	1988
Sample strata	Hand tillage vs Animal traction	Random	Random	Random
Units of observation (Sample size):				
Compounds	—	—	—	—
Households	150	423	406	232
Parcels		1,753	463	1,654
Primary unit of land measurement	Fields	Parcel/fields <sup>a</sup>	Parcel/fields	Parcel/fields
Compound/household heads:				
Male (%)		80.9	89.9	74.1
Female (%)		19.1	10.1	25.9
Primarily irrigated or rainfed	Rainfed	Rainfed	Rainfed	Rainfed
Perennial cropping	None	Cocoa, Kola	Coffee	Coffee, Bananas

<sup>a</sup> Ejura only

### Data Collection

The World Bank studies (Ghana, Rwanda, and Kenya) obtained household data from survey interviews. Instruments for the surveys were designed on the basis of anthropological and legal background papers by local scholars. The surveys (also in Uganda) were administered by trained enumerators in one or more visits, placing high reliance on the recall of respondents. The Senegal, Somalia, and Kenya-LTC surveys also relied on respondent recall. To reduce mental fatigue among respondents, the interviews were divided into multiple phases, three in the case of Ghana, Kenya-WB, Rwanda, and Somalia, and four in Senegal. The survey in Burkina Faso was carried out concurrently with agricultural activities. Questionnaires in Somalia were prepared in Somali; those in Burkina Faso, Rwanda, and Senegal in French; and those in Ghana, Uganda, Kenya-LTC, and Kenya-WB in English. During enumerator training for the World Bank studies standard translations of the survey instruments were made for each of the different linguistic areas. The cycle of interviews in Burkina Faso, Kenya-LTC, and

Somalia lasted more than one year, allowing considerable time for ethnographic observation by the research teams.

Measurement of output and land area is among the most time-consuming and costly information to collect. Approaches used to gather this information varied widely among studies. Crop output information was actually measured by enumerators in Rwanda and Burkina Faso. Other studies either relied on farmers' estimates or collected no information. In a number of studies (Ghana, Kenya-WB, Rwanda, Somalia, and Burkina Faso), land areas were measured using a programmable calculator with the aid of compass and counter. The hilly Rwandan landscape made it difficult to measure hillside parcels. Some parcels owned by Ghanaian farmers but located outside their village area or under long fallow were also not measured. Farmers' estimates of area were used in cases where direct measurement was impossible.

Most of the studies experienced problems in quantifying revenues, costs, output, land areas, and values. Limited knowledge of or difficulty in recalling exact dates (year of birth, year of dispute or investment) and costs (e.g., value of machinery and equipment, costs of investment) forced researchers to substitute binary for continuous data for many of the important investment variables.

The definition of the decision maker used among case studies presents some problems in addressing issues of investment and productivity within households. The majority of studies relied on a single household head (usually male) for information. While operationally convenient, this approach may reflect cultural bias in the studied communities and under report the importance of women as managers of farm enterprises. Decisions by women are captured only to the extent that they are recognized as household heads, which is between 3 to 33% of households across research settings (Table 2-4 and Table 2-5). Women's tenure security and access to land are best measured at the plot level, where women are involved as individual managers. However, as most of the studies examined tenure rights and land management at the parcel level, issues relating to tenure security by gender could be addressed only superficially. There are two exceptions. The Burkina Faso and Senegal studies involved intensive data collection and interviewed individual plot managers within the household. However, neither study reported major findings with regard to the effect of gender on tenure security and agricultural performance, and the tenure security indicator used in the Senegal study can be questioned.<sup>18</sup>

<sup>18</sup> In Senegal, communal fields are considered to be the most secure because they cannot be taken away from the compound head, whereas private or personal fields are considered the least secure. Yet because the fields of the compound head are used to produce grain for subsistence consumption and private fields are used for personal income, tenure security is found to have a negative simple correlation with cereal production and net income per hectare. The farming system, not tenure security, may be the primary factor determining the outcome.

### COMPARATIVE OVERVIEW

The case studies covered a variety of ecological and institutional settings. Certain countries (e.g., Ghana, Somalia) exhibit low densities of population in relation to availability of arable land, while others (e.g., Rwanda and Kenya) represent very high densities. Research sites in Burkina Faso, Senegal, and Ghana fall into arid and semiarid zones; the sites in Kenya and Uganda are subhumid and humid; Somalia is the single case of irrigated agriculture. The studies cover areas of impoverished soils and low rainfall (e.g., Burkina Faso, Ghana, Somalia) as well as areas of high potential and adequate rains (e.g., Rwanda, Kenya, Uganda). European settlement or predominance of commodity exports to Europe have influenced patterns of economic development and types of crops produced, as indicated by the histories of the British colonialism in Ghana, Uganda, and Kenya; the French in Burkina Faso and Senegal, the Belgians in Rwanda, and the Italians in Somalia. A wide variety of cash and subsistence crops are found across and within each of the countries. Among the cash crops are perennials such as coffee (Kenya, Uganda, and Rwanda) and cocoa (Ghana), and annuals such as cotton (Burkina Faso) and peanuts (Senegal).

The study areas also have diverse tenure arrangements. Indigenous systems in Burkina Faso, Ghana, and Rwanda exhibit considerable diversity in customary rules governing access to land, utilization, and transfer. Although all governments have declared some policy change and enacted legislation affecting land rights, land transactions, size of holdings, imposed land taxes, the substance of the law, and the extent to which laws are enforced differ very widely. Little effect of government intervention is felt in the study areas in Rwanda, Ghana, and Burkina Faso. Conversely, the influence of government intervention on land tenure practice has been strong in Kenya, Somalia, and Uganda, and to a lesser extent in Senegal. Case studies in areas where land has been registered cover situations of compulsory freehold (Kenya, Uganda), voluntary and sporadic freehold (Senegal, Uganda), and voluntary leaseholds (Somalia, Uganda).

The case studies together provide rich opportunities to examine the effects of tenure security on investment and output under diverse settings. Regardless of the tenure security indicator used, if enhanced security of tenure does not stimulate significant response in increased investment and output, a clear rebuke would be delivered to recommendations for large-scale programs of titling and registration based on claims of yield increasing benefits. This would be the case at least until farmers reveal a demand for higher intensity of land use, until access to technology and complementary inputs improves, and until markets provide farmers with greater commercial opportunities. If indigenous systems are found *not* to hinder productivity, any insurance or equity benefits such systems may continue to provide would strengthen recommendations against hasty government

intervention. Conversely, if tenure security under indigenous systems is deteriorating, the economic losses of maintaining illusory social insurance or equity become an important issue.

Land registration programs need not always be evaluated in efficiency terms. Where land grabbing by powerful elites is resulting in land dispossession, registration of smallholders may be a desirable option for ensuring security and equity. Where performance criteria are important, the presence or absence of titling effect is of crucial importance. Even if a positive relationship between registration and investment or production could be established, the analysis would require further consideration of costs and careful interpretation of market conditions that would be necessary in order for such benefits to be achieved and sustained in the long term.

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# 3

## INDIGENOUS LAND USE SYSTEMS AND INVESTMENTS IN SOIL FERTILITY IN BURKINA FASO

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The possibly negative effect of indigenous land right systems on the efficiency of input use and on incentives for land improvement in Africa is generating increased interest among researchers and policymakers. Concern has been heightened by low use of modern inputs and by the widening degradation of croplands on which negligible investments to improve land quality are being made.

This chapter examines this issue through a plot-level analysis of crop production using primary data collected within three zones of Burkina Faso. Although all study areas are in the semiarid region of West Africa, they represent a range of agroclimatic potential, effective land pressure, market development, and degree to which new production technologies are employed. The land tenure systems prevailing in each rural area have remained indigenous in the sense that although use rights are clearly vested at the household level, the household shares certain aspects of proprietary rights with higher kingroup or village level authorities. Although national legislation formerly provided for legal title (*titre foncier*) to be granted to landholders to register ownership and land transfers, in practice, formal land titling, commercial land exchange (rental and sale), and use of land as collateral are not practiced in any of the village areas studied.

The practices just described are at radical variance with government efforts to reform land tenure systems in both urban and rural areas of Burkina Faso. In August 1984 the government issued an *ordinance* (No. 84-050-CNR-PRES) that attempted to establish an antibourgeois agrarian system more compatible with

the philosophy of the revolutionary government of Thomas Sankara, which had taken power the preceding year. The law introduced the following major changes:

- All lands became the sole property of the state. This part of the law annulled previous formal contracts and titles to land, as well as use rights held under customary law.
- Usufruct rights could be granted and transferred only by state authorization. Use rights would be granted following a cadastral survey, with decisions made by land allocation committees on the basis of social need.
- Land allocation committees would be composed of revolutionary activists. Traditional village leaders and land chiefs would play no role in land allocation decisions or in subsequent conflict resolution.
- The grant of usufruct rights to land would be conditional, dependent on its "development" by the users of the land and payment of a usufruct tax upon receipt of the grant.
- Although occupation and exploitation of the land by family units and private enterprises were permitted, zones developed on behalf of the state had to employ collective organizational methods.
- Land use planning would be aimed at food self-sufficiency and would involve the integration of crop, livestock, and forestry activities.

Because of the vagueness of the law in many areas, particularly with respect to some key definitions and the processes for implementation, the law was not immediately applied but made subject to general study and discussion. At the time of this study, implementation had not yet been initiated in any of the present survey villages. Announcement of the law, however, did have the immediate effect of introducing a new element of uncertainty in land use planning at the village level.

The objectives of this study are as follows:

- to describe local tenure institutions within a broader context of environmentally influenced land use patterns;
- to assess how tenure institutions affect perceived tenure security;
- to measure the effects of tenure security on investments in soil fertility enhancement and maintenance; and to derive policy implications regarding the need for land tenure reform.

### **SURVEY METHODS AND CHARACTERISTICS OF THE STUDY SITES**

From June 1981 until December 1985, the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) economics program conducted a series of



farm-level surveys of some 150 farm households located in six villages of Burkina Faso.<sup>1</sup> Three study zones were selected following reconnaissance surveys conducted during 1980 and 1981 in approximately 30 villages of Burkina (McIntire 1982). Major characteristics of the three study zones can be summarized as follows:

- The Djibo region represents the low rainfall and generally deep sandy soils of the Sahel. Because the land has low production potential and large areas are suitable only for livestock grazing, effective pressure on arable land is high. The dominant ethnic groups are Fulani and Rimaibe, but a limited Mossi settlement is also present. The principal food crops are pearl millet, fonio, and cowpea, with white sorghum and maize limited to pockets of more fertile or humid soils adjacent to seasonal lowlands. Small amounts of groundnut are also produced as a cash crop. Livestock raising of both small and large ruminants is an important economic activity. Animal traction based on oxen power has made limited progress, so that hand tillage remains dominant. The use of chemical fertilizer is negligible, but manuring is commonly practiced.
- The Yako region is representative of large portions of the relatively densely populated Mossi Plateau in the Sudan savanna agroclimatic zone. Rainfall is low and the clayey sandy and gravelly sandy soils are mostly shallow with low natural fertility. Cropping systems in this zone are dominated by the food grains, white sorghum, millet, and red sorghum; yam, cotton, and groundnut serve as cash crops occupying relatively minor areas. Donkey-drawn scarifiers and weeders are the most common traction equipment employed, but hand tillage methods still dominate. Chemical fertilizer is widely used but at low rates of application.
- The Boromo region in the northern Guinea savanna has relatively good agricultural potential with high annual rainfall and generally low effective population pressure. Major food crops are white and red sorghum, maize, and, to a lesser extent, millet. Cotton is the most important cash crop. The region is inhabited primarily by Dagari and Bwa ethnic groups but has also experienced important immigration of Mossi and Fulani from more densely populated areas on the Mossi Plateau. The clayey sandy soils are of intermediate depth and fertility. Oxen-drawn traction is steadily increasing from a low base, and chemical fertilizer use is relatively high, being applied primarily to cotton and maize.

<sup>1</sup> A more thorough discussion of survey methods and data file contents are contained in Matlon (1988).

Two villages from each of these three zones were selected as sample clusters. Within each zone at least one village was located on an important feeder road and a second located more remotely. Table 3-1 presents a general description of the sampled regions and villages.

Gross population densities were moderate—approximately 41 persons per square kilometer (km<sup>2</sup>)—in both Sahelian villages, (Woure and Silgey), and in the Sudanian village of Ouonon—(40 persons per km<sup>2</sup> square). The Sudanian village of Kolbila had a relatively high population density of 67 persons per km<sup>2</sup>. Finally, the density of population varied widely between 25 and 85 persons per km<sup>2</sup> in the high potential northern Guinea sites of Sayero and Koho. Adjusting these figures to represent population pressure on arable land reveals greater land pressure in the Sahel and Sudanian villages as a result of the higher share of nonarable land (primarily barren, gravelly outcrops) in those sites.

Of the 25 households selected in each village, 12 (or the actual number, if fewer than 12 existed) households using animal traction were included. We do not believe that this stratification biases any of the econometric results reported below. For each household, numerous characteristics were collected on farm plots. Plots were defined as contiguous pieces of land sown to the same crop or crop mixture and under the management of a single household member. Because many of the selected households cultivated extremely large numbers of (often minor) plots, a subsample of plots was chosen for the weekly enumeration of

**TABLE 3-1. Characteristics of ICRISAT Study Villages**

	Sahel		Sudan Savanna		N. Guinea Savanna	
	Woure	Silgey	Kolbila	Ouonon	Koho	Sayero
Persons per km <sup>2</sup>	41	41	67	40	85	25
Arable land as percent of total	71	89	83	NA	99	99
Percent of arable land <sup>a</sup> under cultivation (R)	43	34	36	NA	32	17
Percent of households with animal traction <sup>b</sup>	10	7	15	17	24	18
Access to main road	Good	Poor	Good	Poor	Good	Poor
Major ethnic group	Rimaibe	Rimaibe	Mossi	Mossi	Dagari	Bwa
Percent of major ethnic group to total population	52	68	98	100	62	84
Average annual rainfall	480		724		952	

<sup>a</sup>  $R = [\text{Cultivated area} / (\text{cultivated area} + \text{fallow area})] \times 100$  (Ruthenberg 1980).

<sup>b</sup> In 1985.

input and output. This subsample was intended to include all plots for which the principal crop was a cereal, cotton, or root crop. For other plots on which the principal crop was a legume or a minor garden crop, only one plot each of the designated crops under the management of the household head and one plot of his senior wife were selected for intensive input-output surveys. Information on the land tenure status of surveyed plots was obtained only for the 1984 and 1985 cropping seasons.

### **SOCIO-HISTORICAL FACTORS AFFECTING THE DISTRIBUTION OF USE RIGHTS**

In addition to the socio-historical factors at the community level, a household's ethnic group, lineage, and political position can influence the application of land tenure rules in any given village context. Several examples from our study villages, while anecdotal are valuable for demonstrating the time and location specificity of how indigenous use rights systems operate in practice.

#### **Ethnic Settlement Patterns**

##### **The Case of Koho**

Vierich and Drabo (1987) provide an illuminating case study from Koho village that shows how historical ethnic group rivalries and associated settlement patterns continue to influence the present day application of tenure rules and cropping patterns. Koho comprises of three distinct farming communities that are divided on the basis of ethnicity: the Moslem Dagara-Djoula, who account for 62 percent of the village population; the animist Bwa, 34 percent of the population; and the pastoralist Fulani, 4 percent of the population. The land rights of the Fulari, the most recent immigrant group, are based entirely on borrowing from other farmers in the village for whom they work as herders. The allocation of rights between the other two groups is a function of historical settlement patterns.

Although the Bwa were the original founders of the village, they lost their land to the Dagara-Djoula through conquest approximately 150 years ago. Hostilities continued until the early 1900s, after which, under French imposed peace, the Dagara-Djoula chief allowed the Bwa to return. In doing so, herein, he allocated to them primarily poorer-quality upland fields.

After more than 70 years, these patterns persist, as the more fertile lowlands and even the intensively manured rings around Bwa dwellings are cultivated almost exclusively by the Dagara-Djoula. The Dagara-Djoula have 17 percent of their total cultivated areas in lower slope and swamp lands, whereas the Bwa

have only 3 percent of these relatively high potential types of land in their land holdings. This situation is further reflected in the cropping patterns of the respective ethnic groups: the Bwa plant largely upland crops, millet, sorghum, and cotton, whereas the Dagara-Djoula have more important shares of the higher potential and more profitable rice and maize, which are sown on the lowlands.

Traditions within each ethnic group and traditional tensions between these groups further define current land tenure practices and use right security in Koho. Moslem inheritance laws underlie Dagara-Djoula intergenerational transfers. In contrast, the Bwa system emphasizes lineage ties; individuals may inherit land from any senior man within the lineage. Moreover, the Dagara-Djoula extensively borrow land, on both short and long-term bases, among themselves but not from the Bwa or from households outside the village. A large share of their inherited lands, in fact, was originally borrowed from within the lineage but now enjoy a high degree of tenure security. The Bwa, conversely, borrow extensively from the Dagara-Djoula and from other villagers, both to expand their total areas and to obtain higher potential lowlands. But such short-term arrangements confer less security because such use rights are not inheritable.

### **The Case of Woure**

Woure is another village where control over land has shifted among different ethnic groups over time. In this case, however, the current proprietary rights are less clearly defined. Proprietary rights were originally vested with the Kurumba ethnic group, the first settlers of the village territory, but were subsequently lost to the Fulani through conquest in the early 1900s. Although the Fulani claimed proprietary control over the land, they granted cultivation rights to their agricultural serfs, the Rimaibe, to farm the land for themselves and to feed the Fulani through surplus production. Because Rimaibe households often represented an ethnic mix and were historically dependent on individual Fulani households for continuing cultivation rights, they remained fragmented and were slow to develop the lineage structure generally observed elsewhere.

With French-imposed peace, descendants of the original Kurumba settlers returned to Woure and reclaimed proprietary rights over portions of the village lands. The Kurumba applied this claim by restoring the land control functions of the original founding lineage through the institution of the village land chief. Simultaneously, Rimaibe households and larger kin groups continued to cultivate and to transfer to their descendants increasingly well defined areas over which they claimed exclusive use rights. Through this process they gradually assumed claims to proprietary as well as usufruct rights in their portions of the village area. During the past several decades this process has brought the Rimaibe into increasing conflict with the Fulani. Resolution has most often supported the

current use rights of the Rimaibe over the historical proprietary claims of the Fulani.

### **Lineage Settlement Patterns**

Inequality in access to land within the village can exist not only between ethnic groups but also between lineages of the same ethnic group. In their analysis of inherited holdings of nonbush plots in Sayero, for example, Vierich and Drabo found that, in comparing the five major lineages found in that village, the average cultivated land per capita varied fourfold, from only 0.19 and 0.29 hectare (ha) per capita in the two most land scarce lineages to 0.75 per capita in the most land abundant. Such a pattern is probably explained by the historical sequence in which lineages originally settled or by the political influence subsequently achieved by respective lineages.

The two factors, political dominance and control over land use rights, are not necessarily linked, however. In Kolbila village, for example, the original founding lineage, named Yili, was from the minority Samo ethnic group which settled the village area more than 200 years ago. Although in time they were acculturated into the language and traditions of the dominant Mossi, because of their different ethnicity that founding lineage remains even today politically subordinate vis-à-vis genuine Mossi lineages who settled later. Nevertheless, elders of the founding Yili lineage retain the key position of land chief and are thereby not in a subordinate position regarding the distribution of land use rights.

### **PATTERNS OF LAND HOLDINGS AND USAGE**

A common measure of land use intensity is the R index, calculated as  $[\text{cultivated area} / (\text{cultivated area} + \text{fallow area})] \times 100$  (Ruthenberg 1980). According to this measure, intensity is highest in the Sahel villages and lowest in the northern Guinean villages (Table 3-2). If these figures were to be adjusted to represent effective agroclimatic land pressure (deflating land areas in each zone according to its biomass production potential), the result would be to further increase the intensity indexes in the more arid zones. This has not been done, however, because no widely acceptable measure of potential exists. The data indicate that, with the exception of Sayero, production systems in all of the study villages can be characterized as being constrained by land. Cultivation has already expanded over the vast majority of available arable land in each village, with little additional expansion onto virgin land now possible. This situation is reflected in the limited remaining forest zones, varying between only 2 and 9 percent of arable land.

TABLE 3-2. Indexes of Land Availability and Distribution in the Study Villages

	Sahel		Sudan Savanna		N. Guinea Savanna	
	Woure	Silgey	Kolbila	Ouonon	Koho	Sayero
Average cultivated area per household (ha)	6.6	9.3	5.8	4.4	5.0	5.9
Average cultivated area per household worker (ha)	0.75	0.72	0.42	0.44	0.37	0.68
Gini coefficient—total cultivated area	0.35	NA	0.36	0.35	0.38	0.42
Total cultivated area of inherited land	0.42	NA	0.37	0.46	0.43	0.55
Gini coefficient—total cultivated area per household worker	0.23	NA	0.16	0.17	0.27	0.24
Total cultivated area of inherited land per household worker	0.34	NA	0.23	0.31	0.37	0.50

Shares of arable land under cultivation suggest that all villages except Sayero either have passed or are approaching the stage at which reliance on long bush fallow rotation to maintain soil fertility is no longer feasible. Farmers believed that at least two years of fallow were required for each year of cultivation to restore soils continuously farmed for several years under low input management. This is consistent with the little available evidence from elsewhere in Africa (Ruthenberg). Our results show that the ratios of cultivable fallow land to currently cultivated land are 0.8 in Woure (bush fallow systems are already defunct), 1.6 in both Silgey and Kolbila (bush fallow systems would lead to a steady decline in fertility); 2 in Koho (bush fallowing is marginal), and 5 in Sayero (more than adequate for full fertility regeneration through bush fallowing).

These results imply that tenure security is likely to have value in those villages other than Sayero where shifting cultivation has evolved into increasingly intensive grass fallow systems. The assurance that one can control land during extended fallow periods means not only that the soil regeneration period can be managed and its benefits captured by the household, but that the labor investment employed to remove trees during the initial clearing will not be lost.

A second factor contributing to the value of tenure security in intensified grass fallow systems is that, in order to extend cultivation period on preferred soils, thereby postponing (and reducing aggregate) labor costs for clearing, farm-

ers apply increasing amounts of fertilizer. Tenure security increases the probability of capturing the residual benefits of these investments.

The variety and relative importance of crop enterprises are presented in Table 3-3. The number of crops and enterprises increase and the area shares of individual enterprises decrease from the more arid to the more humid zones. Millet-based crop enterprises occupy about 91 percent of total cultivated area in the Sahel zone villages. White sorghum-based enterprises displace millet as the major crop in the Sudan savanna, occupying 42 and 68 percent of cropped area, respectively, in Kolbila and Ouonon. Millet's share in that transition zone falls to approximately 27 percent. Groundnut, red sorghum, and maize are the only other crops in the Sudan zone that occupy more than 1 percent of area, with shares of 8, 5, and 2 percent, respectively. Cropping patterns in the Guinea zone are the most diversified, with no single crop-based enterprise occupying more than one-third of cultivated area. At 32 percent, white sorghum is the largest crop, followed by cotton-based systems (28 percent), millet (18 percent), red sorghum (11 percent), and maize (5 percent).

**TABLE 3-3. Cropping Enterprises of Sampled Households by Village**

Percent of Area Sown to Major Crops <sup>a</sup>	Sahel		Sudan Savanna		N. Guinea Savanna	
	Woure	Silgey	Kolbila	Ouonon	Koho	Sayero
Millet	91.0	91.4	34.3	17.9	23.3	12.9
White sorghum	4.5	4.0	42.0	67.7	34.1	31.1
Red sorghum	0.0	0.3	6.4	2.4	6.0	15.0
Maize	1.0	1.0	1.8	2.0	4.8	4.0
Cotton	0.0	0.0	1.8	0.	24.6	29.9
Other	3.5	3.3	13.6	10.0	7.2	7.0

<sup>a</sup> Sown sole cropped or as base crops in mixtures.

Individual Burkinabe farmers generally cultivate a large number of plots in highly fragmented and dispersed patterns. Plot fragmentation is due in part to farmers' efforts to fit the best adapted crop enterprises into often small environmental niches. The average numbers of plots per household were 10, 15, and 23 in the Sahel, northern Guinea, and Sudan savanna zones, respectively. We measured plot fragmentation by the Simpson index (bounded between 0 and 1, with higher values indicating greater dispersion) and found that fragmentation was lowest in the Sahel and increased with zonal production potential. The indices were .75, .87, and .89, respectively.

Average cultivated area per household is given by region in Table 3-2, presented earlier. The average area planted by households in Silgey (9.3 ha) is

highest, while other regions are quite alike (averaging between 4.4 and 6.3 ha). On a per household worker basis, the figures for the two Sahelian regions and Sayero are highest, with average cultivated areas per worker around 0.7 ha. The remaining three regions are considerably lower, at approximately 0.4 ha on average. By almost any comparative standard, overall land use is equitably distributed across households. Gini ratios on cultivated land per worker are consistently below .30 ha in all villages, with both Sudan savanna villages actually below .20 ha. Although land per household shows greater concentration, the substantially lower figures when standardized on a per worker basis suggest that the difference is due largely to variations in the size of household work force. Households with more working members are able to expand cultivated area to equilibrate factor use ratios. Results also demonstrate that borrowings (and the clearing of bush land, in the case of Sayero) *reduce* differences in inherited land endowments across households, thereby resulting in a more equal and efficient distribution of factor use ratios.

## LAND TENURE CLASSES

### Access to and Transfer of Use Rights

Our survey identified three principal dimensions in which acquisitions and transfers of cultivation rights for individual plots could be most usefully characterized. These in turn were systematically associated with farmers' perceptions of tenure security. These dimensions are as follows:

1. whether the plot was located within the portion of the village originally allocated to the household's lineage,
2. from whom the land use rights were obtained (grandfather, father, uncle, matriarchal lineage, etc.), and
3. whether the land was obtained from that person through inheritance or borrowing.

Table 3-4 presents the shares of cultivated land in each village according to each of these three tenure characteristics.

### Lineage and Nonlineage Lands

The history of early land settlement in each village territory was the determining factor in the first dimension. As a village was first settled, unrelated families occupied separate portions of the then undefined village area. Descendants or relatives of the earlier arrivals tended to establish dwellings and cultivated plots in the vicinity of their family's initial settlement. Over time as the lineage area



**TABLE 3-4. Percentage Shares of Cultivated Area According to Tenure Characteristics In Three Agroclimatic Zones of Burkina Faso, 1984-85**

	Sahel Woure	Sudan Savanna Kolibla	Ounon	Northern Guinea Savanna Koho	Sayero
How obtained					
Inherited	78.9	79.7	84.8	83.1	20.6
Borrowed	18.5	20.1	15.2	16.3	10.2
Other <sup>a</sup>	2.6	0.3	—	0.6	68.8
Lineage lands					
Own lineage	57.7	84.6	92.4	86.1	21.6
Other lineage	42.3	15.4	7.6	13.9	6.1
Other <sup>a</sup>					72.2
From Whom obtained					
Grandfather	0.5	1.5	3.0	22.2	—
Father	48.6	70.3	82.3	58.6	19.1
Uncle	11.6	8.5	4.0	2.4	1.1
Brother	21.8	0.9	2.2	1.2	4.4
Cousin	6.2	5.0	1.2	0.2	0.7
Matriarchal family	5.4	1.5	—	2.2	0.5
No relation	2.4	4.6	6.2	5.9	1.2
Other <sup>a</sup>	3.5	7.8	1.2	7.2	72.9

<sup>a</sup> Generally represents clearing of fallowed land.

expanded and (with the arrival of other lineages) assumed more definite boundaries, village territories were gradually subdivided into lineage domains that were more or less agreed upon.

Members of one lineage could cultivate land within the general domain of another only with the explicit permission of the latter. In all such cases, the prior claim of the first lineage was acknowledged. Requests by nonlineage members to inhabit and cultivate unoccupied areas were generally approved, by the elder of the original founding lineage who assumed the role of village land chief.

With generally minor exceptions, each of our study villages displayed similar historical processes. Despite settlement histories that often dated back several centuries, the respective lineage domains were still recognized and remained as important elements in current land use decisions. Within each village for which we have reliable data, sample farmers maintained 80 percent or more of their cultivated area on their own lineage lands. The sole exception is Woure village where, during its history, practical control over the land had passed among three different ethnic groups (Fulani, Kurumba, and Rimaibe), whose conflicting property rights claims continue today.

### Source of Use Rights

The second dimension characterizing land use transfers was the person from whom the plot was obtained. Our results reflect the strong family nature of land transfers. In each village, again with the exception of Woure, the majority of cultivated land involves use rights that have been passed in a direct nuclear family line. And in all villages more than 85 percent of land was obtained from relatives more broadly defined. The importance of other sources displays wide variations among villages. For example, transfers from the brother of the current cultivator represented more than 5 percent of total area only in Woure and Sayero. Shares from uncles and cousins exceeded 5 percent only in Woure and Kolbila. Transfers from the matriarchal wing of the household occurred in all villages except Ouonon, but exceeded 5 percent only in Woure. Transfers from nonrelatives exceeded 5 percent of cultivated area only in Ouonon and Koho.

### Mode of Acquisition: Inheritance or Borrowing

The third dimension that characterizes land use rights is the method through which rights were acquired by the present user. The only methods reported by the surveyed farmers are inheritance, borrowing, and clearing of previously unallocated lands. The last still exists only in the case of bush fields in land abundant Sayero. Inheritance is the dominant mode of transfer, representing more than 70 percent of total cultivated area in each village other than Sayero (Table 3-4, presented earlier). It is particularly significant that sales, leasing, and pledging of land were not observed in any of the study villages.

Most inherited lands were obtained from the father of the current cultivator. Significantly, this method carries with it the privilege of being able to lend cultivation rights temporarily to other individuals. The vast majority of inherited land was also lineage land, with only small areas involving inheritance of use rights on nonlineage lands. (Woure is the exception, where more than 20 percent of land was inherited in nonlineage domains). These cases represent what Vierich and Drabo call long-term borrowings. Ancestors of the current cultivator had obtained permission to cultivate on the lands of another lineage at some time in the past, and the source lineage had not yet recalled these rights from that person's descendants. Whether recall was still feasible is unclear, but farmers considered it to be an inverse function of the duration over which the current using family had maintained cultivation.

Vierich and Drabo report that most farmers consider withdrawal of use rights unthinkable for long-term borrowings that have been within the current user's household for more than one generation. They also found that land is more easily borrowed and less likely to be recalled if it is used for cereal production on

TABLE 3-5. Percentage Shares of Cultivated Area Under All Observed Tenure Arrangements, in Three Agroclimatic Zone of Burkina Faso, 1984-1985

Sahel				Sudan Savanna				Northern Guinea Savanna											
Woure				Kolbila				Ouonon				Koho				Sayero			
A <sup>a</sup>	B <sup>b</sup>	C <sup>c</sup>	%	A	B	C	%	A	B	C	%	A	B	C	%	A	B	C	%
1	1	2	35.2	1	1	2	70.1	1	1	2	78.7	1	1	2	58.8	3	3	8	66.7
1	1	4	14.7	2	2	8	7.1	2	2	7	3.7	1	1	1	22.1	1	1	2	16.1
1	2	2	13.4	2	2	7	4.6	2	1	3	3.5	2	2	8	6.7	2	3	8	3.0
1	2	4	7.0	1	1	3	4.3	1	1	1	2.9	2	2	7	5.7	3	2	8	2.5
1	1	3	5.9	2	1	3	3.0	2	1	7	2.5	2	1	3	2.3	1	1	4	2.3
2	2	3	5.2	2	1	5	2.5	2	1	4	1.8	1	1	4	1.2	2	1	4	2.1
2	2	5	4.5	1	1	5	2.2	1	2	2	1.7	2	1	6	0.9	2	3	2	1.6
2	2	8	3.4	1	1	1	1.3	2	2	2	1.7	1	2	6	0.8	2	2	8	1.1
2	2	6	2.9	2	1	4	0.9	2	1	5	1.0	3	2	8	0.6	2	2	2	0.7
1	2	6	2.5	1	2	8	0.6	1	1	3	0.5	1	1	6	0.3	1	3	2	0.8
2	2	7	2.4	1	2	3	0.6	2	2	8	0.5	2	2	6	0.2	2	2	7	0.8
3	1	5	1.7	2	2	3	0.5	2	1	8	0.4	2	1	5	0.2	1	1	3	0.5
3	2	3	0.5	1	2	6	0.5	1	1	4	0.4	2	1	7	0.2	1	2	6	0.5
3	2	1	0.4	2	2	5	0.2	1	1	8	0.3	2	1	1	0.1	1	2	7	0.3
1	1	1	0.1	2	2	1	0.2	2	1	2	0.2	1	1	3	0.1	2	2	5	0.3
1	1	3	<sup>d</sup>	3	1	2	0.2	1	1	5	0.2	2	2	3	0.1	2	1	5	0.2
3	2	8	<sup>d</sup>	3	1	5	0.1	1	2	1	0.2	2	1	4	<sup>d</sup>	1	1	5	0.2
1	2	8	<sup>d</sup>	1	2	7	0.1	2	2	3	<sup>d</sup>	1	2	3	<sup>d</sup>	2	1	3	0.1
2	1	6	<sup>d</sup>	2	2	2	<sup>d</sup>	1	1	7	<sup>d</sup>	1	2	8	<sup>d</sup>	3	2	4	0.1
2	1	4	<sup>d</sup>	1	2	2	<sup>d</sup>									2	1	2	0.1
2	1	5	<sup>d</sup>	2	1	8	<sup>d</sup>									3	1	8	<sup>d</sup>
3	1	8	<sup>d</sup>													2	2	6	<sup>d</sup>
3	2	6	<sup>d</sup>													8	3	8	<sup>d</sup>
2	2	4	<sup>d</sup>																

<sup>a</sup> A = How land was obtained by current cultivator: 1 = inherited, 2 = borrowed, 3 = other

<sup>b</sup> B = Lineage status of the land: 1 = own lineage, 2 = other lineage

<sup>c</sup> C = From whom land was obtained by the present cultivator: 1 = grandfather, 2 = father, 3 = uncle, 4 = brother, 5 = cousin, 6 = matriachal family, 7 = no relation, 8 = other.

<sup>d</sup> D = <.01%

collective household plots than if it is used for cash crop production on individual plots.

If present households have inherited insufficient land, use rights can be borrowed for a fixed term or for an indefinite period, but always with the understanding at the outset that rights can be withdrawn on request. Use rights could be borrowed either from members of the same lineage or from outside the lineage, and on either lineage or nonlineage domain lands. Table 3-5 shows that, with the exception of Ouonon, the majority of such borrowings were for use rights on nonlineage lands. Woure represents the extreme case where nearly all borrowed land was from nonlineage domains. Our results also show that between 31 percent (Sayero) and 81 percent (Koho) of borrowed land was ob-

tained from persons outside the lineage of the present cultivator. The very high proportion of borrowings from nonlineage households in Koho reflects unequal access to inherited land of good quality between two ethnic groups that were historically in conflict.

### **Determinants of Tenure Security**

Vierich and Drabo conclude that the types of usufruct rights observed in the study villages are associated with considerable short-term as well as inter-generational tenure security, despite the absence of formal title. It is also clear from their analysis, however, that the degree of security in any particular case is a function of at least five factors:

1. whether the plot was inherited or borrowed,
2. the duration of cultivation by the current user,
3. plot location within lineage or non-lineage lands,
4. whether use rights were obtained from a member of the lineage, and
5. how the plot is currently being used.

Mode of acquisition appears to weigh most heavily in determining the security of use rights. Because of the strong tradition of transfer of intergenerational use right, inheritable use rights prevail even for fields on long-term borrowing arrangements (borrowed by ancestors and subsequently passed down to current users through inheritance). The same applies in the case of inherited fields remaining in long fallow. With the sole exception of fields under bush fallow in Sayero, use rights for inherited fallow fields cannot be transferred without prior consultation with and approval from the household that last cultivated the land. The relationship of the person from whom use rights are inherited also affects tenure security. Inheritance from a father is considered to be more secure than, for example, inheritance from an uncle, because land acquired from the former remains within the nuclear family.

An extended period of cultivation further strengthens tenure security. Continuous cultivation over a long period can establish valid claim even to land that had been borrowed on an indefinite term arrangement. For this reason, in areas where land is becoming increasingly scarce, Vierich and Drabo report that farmers are becoming increasingly less willing to lend good-quality fields to other households for more than a season.

Security is also stronger for plots within the domain of one's lineage, especially if received from a lineage member, compared with plots which are located within the domain of another lineage and over which use rights are received from nonlineage members.

Finally, the security of use rights can be further influenced by the use to

which the plot has been put and the nature of its intrahousehold tenure status. Farmers reported that land being used as collective fields for food production are less likely to be lost to a contesting claim than individual plots being used for cash crop production.

Because of the large number of possible combinations of factors, distinguishing parcels based on all five factors is not useful for statistical analyses. For tabular purposes, we chose to exclude how long the plot had been cultivated and whether the plot was farmed collectively or individually as factors. Following discussions with farmers we used the remaining three variables to form the following hypothesized ordering of tenure status according to use rights security (1 is most secure and 6 is least secure):

1. inherited plot on lineage land from a lineage member,
2. inherited plot on nonlineage land from a lineage member,
3. borrowed plot on lineage land from a lineage member,
4. borrowed plot on lineage land from a nonlineage member,
5. borrowed plot on nonlineage land from lineage member, and
6. borrowed plot on nonlineage land from a nonlineage member.

Finally, within each of these situations, security is greater where current cropping is for meeting family subsistence needs rather than individual cash cropping. Table 3-6 summarizes the distribution of cultivated areas over six security strata in accordance with the foregoing subjective ranking.

The shares of cultivated village areas in the most secure tenure stratum (inheritance of lineage land from a lineage member) are consistently high, varying between 69 and 83 percent, with the sole exception of Woure, where it nevertheless represents a majority of land at 56 percent. Conversely, the two least secure strata, composed of borrowed land on nonlineage domains, are consistently low, exceeding 13 percent only in the case of Woure.

### **Characteristics of Land in Various Tenure and Security Classes**

The distribution of land in the separate tenure classes across locations, land types, and crops is of interest for two reasons: (1) to better understand the basis of possible empirical relationships between soil fertility management and tenure, and (2) to determine the patterns and rationale of land transfers. For the analytical work in the remainder of this chapter, we drop the dimension of "from whom the land was acquired" in constructing our proxy for security of tenure in order to obtain groups bearing sufficient numbers of observations.<sup>2</sup>

<sup>2</sup> Of the three variables used earlier, "from whom the land was acquired" varied the least and therefore did not contribute much toward the discrimination of plots based on expected security of tenure.

**TABLE 3-6. Percentage Shares of Cultivated Area by Tenure Status, Ranked in Order of Use Rights Security, Burkina Faso, 1984-85**

Degree of Security	Tenure Component			Sahel	Sudan	Savana	Northern-Guinea Savanna	
	How Obtained	Land Domain	Source Person	Woure	Kolibia	Ouonon	Koho	Sayero
More	Inheritance	Nonlineage	Lineage	55.9	77.8	82.7	82.2	68.7
	Inheritance	Nonlineage	Lineage	22.9	1.1	1.8	0.8	1.8
	Borrowed	Lineage	Lineage	0.1	6.5	6.5	3.6	9.2
	Borrowed	Lineage	Nonlineage	—	—	2.9	0.2	—
	Borrowed	Nonlineage	Lineage	12.5	1.9	1.7	0.3	4.1
Less	Borrowed	Nonlineage	Nonlineage	5.9	11.7	4.1	12.3	5.7
	Other			2.7	1.0	0.3	0.6	10.5

**TABLE 3-7. Percentage Shares of Area Under Various Land Tenure Classes According to Plot Location and Crop, Woure Village, 1984-85**

	Inherited Plot on Lineage Land	Inherited Plot on Nonlineage Land	Borrowed Plot on Lineage Land	Borrowed Plot on Nonlineage Land	Total <sup>a</sup>
Location					
Dwelling	31.5	65.0	—	—	32.1
Village	65.6	25.4	65.7	98.9	63.9
Bush	2.8	9.6	34.3	1.1	4.0
Toposequence					
Plateau	1.5	0.2	—	3.4	1.4
Upper slope	44.8	30.7	46.3	46.2	41.0
Mid slope	42.4	59.1	37.3	41.1	47.1
Lower slope	5.0	9.0	16.4	3.1	5.4
Swamp	6.3	1.1	—	6.3	5.1
Major Crops					
Millet	89.5	87.1	—	87.6	88.5
White sorghum	7.7	9.3	—	8.1	8.1
Maize	1.3	2.0	34.3	0.1	1.3
Fonio	0.8	0.7	41.2	3.2	1.3
Groundnut	—	0.4	—	0.3	0.2
Earthpea	0.1	0.4	10.7	0.4	0.3
Total	53.9	23.3	0.1	17.4	100.0

<sup>a</sup> Totals represent the shares of land in each sub-class in the first column (inherited on lineage land).

Tables 3-7, 3-8 and 3-9 present the shares of land within each major tenure category according to location, land type, and crop. The results show that borrowed lands are not strictly limited to a certain location, microenvironmental niche, or use. Farmers in each village borrow some land from across all locations and types, and cultivate a full range of crops. Differences in the relative size of shares, however, point to several clear patterns. Borrowed land in both Sudan savanna villages is disproportionately concentrated near household dwellings and on lowland soils. We speculate that this concentration reflects efforts by the borrowing farmers to obtain plots in preferred locations and land types in an effort to augment their initial inheritance. In the case of dwelling plots, this situation represents an efficient transfer of land to households for whom the land has greater value by nature of its proximity. We also note that borrowed lands in the Sudanian villages are disproportionately sown to red sorghum and groundnut, both of which serve in part as cash crops.

The data reveal substantial differences in borrowing patterns between the villages of Koho and Sayero in the northern Guinea zone. The Koho pattern is

**TABLE 3-8. Percentage Shares of Area Under Various Land Tenure Classes According to Plot Location and Crop, Sudan Savanna, 1984-85**

	Kolbila				Ouonon			
	Inherited Plot on Lineage Land	Borrowed Plot on Lineage Land	Borrowed Plot on Non- lineage Land	Total	Inherited Plot on Lineage Land	Borrowed Plot on Lineage Land	Borrowed Plot on Non- lineage Land	Total
<b>Location</b>								
Dwelling	9.1	0.3	12.2	9.3	7.7	2.6	12.9	7.4
Village	18.3	16.5	44.8	22.8	46.6	30.0	63.5	44.9
Bush	72.6	83.2	43.0	68.0	45.7	67.4	23.6	47.7
<b>Toposequence</b>								
Plateau	4.0	0.4	5.7	3.9	1.8	0.1	4.5	1.7
Upper slope	15.5	24.8	13.2	15.9	25.0	9.7	29.6	23.5
Mid slope	73.8	74.0	74.7	74.1	69.1	89.2	54.3	20.7
Lower slope	3.2	—	—	2.5	2.7	1.1	11.7	2.9
Swamp	3.4	0.8	6.4	3.6	1.4	—	—	1.1
<b>Major Crops</b>								
Millet	34.6	23.4	32.5	33.4	22.2	19.9	20.3	21.8
White sorghum	45.1	28.2	25.0	41.1	59.4	60.9	46.9	59.4
Red sorghum	5.4	14.7	5.8	6.4	6.6	2.2	9.0	6.0
Maize	1.3	0.3	2.4	1.5	1.6	0.8	0.8	1.5
Groundnut	7.7	18.4	26.4	10.9	6.8	11.1	11.1	7.4
Yam	0.4	0.5	0.5	0.4	0.6	0.3	—	0.5
<b>Total</b>	<b>77.6</b>	<b>6.4</b>	<b>13.9</b>	<b>100.0</b>	<b>79.7</b>	<b>10.5</b>	<b>5.7</b>	<b>100.0</b>

**TABLE 3-9. Percentage Shares of Area Under Various Land Tenure Classes According to Plot Location and Crop, Northern Guinea Savanna, 1984-85**

	Koho				Sayero				Cleared	Total
	Inherit- ed Plot on Line- age Land	Borrow- ed Plot on Lineage Land	Borrowed Plot on Non- Lineage Land	Total	Inherit- ed Plot on Line- age Land	Borrow- ed Plot on Lineage Land	Borrowed Plot on Non- Lineage Land			
Location										
Dwelling	1.6	—	10.1	2.6	9.4	0.3	66.3	10.3	11.3	
Village	26.1	41.3	23.6	26.2	63.0	80.7	17.2	13.9	25.3	
Bush	72.4	58.7	66.4	71.3	27.6	19.0	16.6	75.8	63.4	
Toposequence										
Plateau	33.7	9.9	50.2	35.0	41.2	78.6	60.7	67.8	62.7	
Upper slope	13.4	2.8	9.8	13.0	34.2	17.0	38.4	24.3	26.4	
Mid slope	49.5	78.4	37.1	48.4	14.9	2.2	0.9	4.3	6.2	
Lower slope	2.4	3.1	1.0	2.2	6.3	2.0	—	2.5	3.1	
Swamp	1.1	5.8	2.0	1.4	3.5	0.3	—	1.2	1.6	
Major Crops										
Millet	19.7	24.7	15.9	19.4	7.6	—	3.4	27.5	22.2	
White sorghum	26.0	22.8	50.0	29.3	11.5	1.1	44.2	31.6	27.2	
Red sorghum	8.4	7.3	5.3	7.8	17.0	30.2	1.7	5.3	8.4	
Maize	3.9	5.1	2.8	3.8	9.8	—	12.0	1.8	3.6	
Rice	1.4	7.0	2.1	1.7	2.2	0.3	—	0.2	0.5	
Groundnut	2.6	5.9	2.3	2.6	9.9	16.4	10.9	5.2	6.5	
Cotton	34.8	14.0	18.4	31.8	39.1	49.5	20.1	25.3	28.5	
Total	80.9	3.5	13.8	100.0	19.1	2.5	2.7	74.9	100.0	

similar to that of the Sudanian villages: disproportionate shares of borrowed lands are located near dwellings and on lowlands, with the latter being used frequently for rice cultivation. Very little land that has been borrowed is planted in cotton, possibly because of high investments required to enhance soil fertility. Cleared lands, generally distant bush fields, represent the largest share of cultivated plots in Sayero. But again, borrowed plots, especially those on nonlineage lands, are disproportionately located in close proximity to the household. Unlike Koho, a high proportion of borrowed plots located on relatively more secure lineage lands are planted in cotton.

The pattern of borrowings in the Sahelian village of Woure is distinct from that in other zones. The share of inherited plots (often located on nonlineage lands) near dwellings is substantially higher than that observed elsewhere, so



that farmers more frequently borrow distant fields to add to their holdings. Although millet dominates all tenure classes, a greater share of borrowed plots are planted in "women's crops", such as fonio and groundnut.

### **Soil Fertility Management by Security Class**

Through simple tabular analysis, we can compare levels of soil fertility management levels across the security classes developed earlier to determine whether there is an empirical association between security and investment in fertility maintenance. This relationship is tested more rigorously with an econometric model later.

F-values in Table 3-10 show that there are highly significant differences for most soil fertility management variables across land tenure classes. Moreover, the directions of these differences are generally consistent with expectations. Organic fertilizer applications are consistently highest on inherited lineage lands, despite the fact that land use intensity (as approximated by years since last fallow divided by duration of last fallow) is highest for this tenure class in only two of the five villages, and that average distances to such plots (cost of manure transport) is lowest only in the village of Woure. The patterns of chemical fertilizer use are less clear, partly because incidence of use is much lower. Nevertheless, fertilizer doses are highest on lineage lands in three of the five villages, including both of the northern Guinean villages where fertilizer use is greatest.

Manuring of plots on borrowed land is consistently low, and, unexpectedly, manure application is higher for plots borrowed on nonlineage lands than on lineage lands. Moreover, these differences are not associated with variation in distances to dwellings. These patterns are not consistent with the hypothesis that lower security on borrowed nonlineage lands is a disincentive to manuring. The patterns are consistent, however, with the hypothesis that manuring to prolong cultivation periods is a method of enhancing security of land use rights in marginal security situations.

It is clear that given the number of excluded variables and the complexity of the interactions, simple means tests are inadequate to determine the presence and strength of functional relationships. We now develop a more complete and realistic causal model to test these relationships econometrically.

**TABLE 3-10. Soil Fertility Management According to Plot Tenure In Three Agroclimatic Zones of Burkina Faso, 1984–85**

Region/ Village	Tenure Class	Fertilizer		Fallow	Duration Last (Year)	S/D <sup>a</sup>	Distance from Dwelling (meters)
		(kg/ha) Org.	Chem.	Since Last (Year)			
Sahel							
Woure	Inherited L/land <sup>b</sup>	121	0.04	7.7	7.6	1.0	822
	Inherited on NL/land <sup>c</sup>	48	0.14	1.7	7.8	0.2	1,074
	Borrowed on L/Land	—	—	1.2	4.8	0.3	1,305
	Borrowed on NL/Land	12	0.03	1.6	5.9	0.3	1,001
	<i>F</i> -statistic	2.6	0.6	9.6	0.8		0.7
Sudan Savanna							
Kolbila	Inherited on L/land	87	3.7	8.0	7.9	1.0	811
	Borrowed on L/land	44	3	4.6	5.1	0.9	607
	Borrowed on NL/land	61	1.4	8.2	6.2	1.3	698
	<i>F</i> -statistic	2.9	6.5	4.1	5.2		3.3
Ouonon	Inherited on L/land	105	0.3	8.4	4.3	2.0	587
	Borrowed on L/land	58	1.6	5.0	4.9	1.0	919
	Borrowed on NL/land	93	3.1	2.9	1.8	1.6	314
	<i>F</i> -statistic	17.1	80.5	6.2	5.7		12.1
Northern Guinea							
Savanna							
Koho	Inherited on L/land	199	31.2	10.0	10.4	1.0	1,105
	Borrowed on L/land	42	8.9	9.6	5.5	1.7	864
	Borrowed on NL/land	80	13.5	4.6	11.3	0.4	2,237
	Other	—	1.4	1.4	14.0	0.1	2,104
	<i>F</i> -statistic	1.2	7.5	6.7	1.7		20.0
Sayero	Inherited on L/land	319	35.6	33.8	52.8	0.6	582
	Borrowed on L/land	—	14.2	9.4	11.4	0.8	874
	Borrowed on NL/land	73	9.2	12.0	30.5	0.4	580
	Other	343	30.5	5.4	30.7	0.2	1,763
	<i>F</i> -statistic	0.2	1.4	36.5	6.6		23.1

<sup>a</sup> S/D stands for the ratio of years since last fallow/duration of last fallow.

<sup>b</sup> L/land = Lineage land

<sup>c</sup> NL/land = Nonlineage land

## TENURE SECURITY AND INVESTMENTS IN LAND IMPROVEMENT

### Determinants of the Model

Survey results discussed in the previous sections suggest that within indigenous West African tenure systems similar to these studied in Burkina Faso, land use security is likely to be associated with more intensive land management. Spe-

cifically, the more secure the farmers are in their ability to maintain long-term use over their land, the higher the return on long-term land improvements. The situation will increase the demand for land improvements and, subject to the availability of necessary resources, will lead to an increased use of land improvements.

Large, discrete-capital intensive or labor intensive investments in land improvement (terracing, bunding, drainage systems, planting of trees to exploit technical complementarities with crops, large-scale fencing) are not yet practiced within the farming systems studied.<sup>3</sup> Seasonal fencing with low cost indigenous materials is done on a very small scale, primarily to protect garden crops from livestock on microplots located adjacent to dwellings. Live fencing is rare, constructed largely on microplots.

Only two types of investments in land quality are common in the present farming systems. The first is the fallow system, which removes land from production, necessitating the subsequent use of labor to clear the bush in order to capture regenerated soil fertility. The second is application of manure and chemical fertilizer to maintain or enhance soil fertility for extended periods of cultivation.

### Model Specification

The equations to be estimated are given in (1) and (2) below. They state that the amount of fertilizer ( $F$ ) and manure ( $M$ ) on plot  $i$  for household  $j$  are functions of numerous exogenous plot characteristics ( $X_{ij}$ ) and a household effect ( $D_j$ ). In addition to the security of tenure proxies (discussed later), the  $X_{ij}$  vector includes the following variables: the gender of the manager of the plot, the distance between the plot and the dwelling, the number of years since the last fallow, and the toposequence location.

$$(1) F_{ij} = D_j\alpha + X_{ij}\beta + e_{ij}$$

$$(2) M_{ij} = D_j\alpha + X_{ij}\beta + e_{ij}$$

In alternative runs of the model we specified the dependent variable  $F_{ij}$  first, as the absolute dose of manure or fertilizer applied to plot  $i$  as measured in kg/ha, and, second, as an index of the relative intensity of total manure or fertilizer applied to plot  $i$  within household  $j$ . The latter was calculated by dividing each plot dose by the average dose for household  $j$  across all its plots. The second specification is probably a more accurate representation of farmers decision to allocate a more or less fixed quantity of fertilizer (especially manure) available to them at the beginning of each season.

<sup>3</sup> Although development projects exogenously introduced soil-based bunding systems for erosion control on upland fields in a limited number of locations among the study villages, farmers have not adopted such systems.

Tenure variables were also introduced in the model in two ways in alternative specifications. To measure the separate effects of how the plot was obtained (inheritance or borrowing) and where it was located (on lineage or nonlineage land), each factor was first included as a separate variable. Then we defined three composite variables to represent types of contracts hypothesized to have a clear ordering in terms of tenure security:

1. inherited plots on lineage land,
2. borrowed plots on lineage land, and
3. inherited land on nonlineage land (Woure only).

Borrowed plots on nonlineage land served as the reference category.<sup>4</sup> We also included, as a separate variable in all equations, a binary indicator of whether the plot was farmed collectively by the household or by an individual. Finally, the high frequency of zero observations for plot-level fertilization led us to use a Tobit model to estimate both equations. Data for 1984 and 1985 have been pooled for the analysis.

## Results

Tables 3-11 and 3-12 present test statistics for the null hypothesis that each of the underlying parameters of the use equations is zero for manure and chemical fertilizer. Coefficients for the household binary variables are not shown. The signs of the *t*-statistics indicate the direction of the relationship, while the absolute value measures the significance of the relationship. A *t*-value measuring 1.64 in absolute value is considered the minimum for a statistically significant result. As expected, equations in which the dependent variable is expressed as a share of total household fertilizer give a better fit in most villages. Although *R* squares are consistently low, this is not unusual for the Tobit specification.

Interhousehold tenure variables are generally not significant determinants of manure allocation. Only in the villages of Ouonon and Koho is inheritance associated with greater manure use; and in most villages, plots on lineage domain lands reflect negative coefficients on manure use rather than the positive signs that would be expected if tenure security improved incentives for manuring. Moreover, the hypothesized ordering of tenure arrangements according to security, as specified in models 3 and 4, suggests no significant impact of varying degrees of security in any of the villages.

The regressions modeling chemical fertilizer use also suggest little effect of

<sup>4</sup> Cleared plots on unclaimed land (representing a relatively high level of security) were also included in the case of Sayero, where they constitute a substantial share of total cultivated area.

TABLE 3-11. Test Statistics (*t*-ratios) for Manure Use Equations In Three Agroclimatic Zones of Burkina Faso, 1984-85

Independent Variables	Dependent Variable: kg manure/ha					Dependent Variable: share of household manure				
	Sudan		New Guinea			Sudan		New Guinea		
	Sahel	Savanna	Savanna			Sahel	Savanna	Savanna		
	Woure	Kolbila	Ouo-non	Koho	Say-ero	Woure	Kolbila	Ouo-non	Koho	Say-ero
Models 1 and 2										
Interhousehold tenure										
Inherited (1) or borrowed (0)	—	0.25	1.84	1.27	0.50	0.06	0.21	1.90	1.69	0.12
Lineage (1) or Nonlinear (0)										
land	0.63	-0.76	-0.7	-0.77	-1.22	0.85	-0.92	-0.85	-0.96	-1.73
Cleared					-0.88					-1.30
Intrahousehold tenure										
Collective (1) or individual (0)										
plot	—	4.29	-0.17	3.25	1.54	—	4.13	0.14	3.46	2.93
Male (1) or female (0)										
manager	—	-0.26	1.58	2.12	—	—	0.30	1.63	2.18	—
Plot characteristics										
Distance from dwelling	-2.51	-6.26	-4.72	-2.70	-2.98	-2.77	-6.25	-5.07	-2.64	-3.77
Years since last fallow	1.61	3.19	4.05	2.66	-1.21	2.16	3.20	3.90	2.84	-1.66
Upper slopes	2.24	2.04	—	-1.50	-0.02	2.54	1.82	—	-1.44	-0.94
Midslope	2.85	2.05	—	-2.80	1.57	2.67	2.00	—	-2.67	1.11
R	.06	.05	.08	.13	.04	.14	.05	.12	.16	.17
Interhousehold tenure										
Secure 1	0.91	-0.75	1.13	0.29	-0.89	1.23	-1.04	0.97	0.52	-1.56
Secure 2	—	-0.53	-0.66	-0.80	—	—	-0.54	-0.82	-1.08	-0.15
Secure 3	-0.37									
Cleared					-1.10	-0.36				-1.36
Intrahousehold tenure										
Collective (1) or individual (0)										
plot	—	4.28	-0.16	3.23	1.24	—	4.11	0.15	3.44	2.63
Male (1) or female (0)										
manager	—	-0.23	1.57	2.10	—	—	-0.24	1.63	2.15	—
Plot characteristics										
Distance from dwelling	-2.50	-6.25	-4.72	-2.72	-3.01	-2.79	-6.24	-5.07	-2.70	-3.75
Years since last fallow	1.58	3.24	4.03	2.66	-1.39	2.14	3.28	3.88	2.83	-1.90
Upper slopes	2.29	2.03	—	-1.48	0.94	2.58	1.79	—	-1.44	-0.82
Midslop	2.91	2.06	—	-2.76	1.59	2.73	2.01	—	-2.65	1.13
R	.06	.05	.06	.13	.04	.14	.05	.11	.16	.17
Degrees of freedom	509	1311	912	805	583	504	1311	912	805	583

TABLE 3-12. Test Statistics (*t*-ratios) for Chemical Fertilizer Use Equations In Three Agroclimatic Zones of Burkina Faso, 1984–85

Independent Variables	Dependent Variable: kg fertilizer/ha					Dependent Variable: share of household manure				
	Sudan		New Guinea			Sudan		New Guinea		
	Sahel	Savanna	Savanna			Sahel	Savanna	Savanna		
	Woure	Kolbila	Ouo-non	Koho	Say-ero	Woure	Kolbila	Ouo-non	Koho	Say-ero
Models 1 and 2										
Interhousehold tenure										
Inherited (1) or borrowed (0)	0.15	0.88	0.6	2.54	-1.35	0.18	0.56	0.46	1.73	-1.72
Lineage (1) or Nonlinear (0)										
land	-1.06	-0.01	-0.3	-1.66	0.72	-0.99	1.21	-0.18	-1.17	0.36
Cleared					-0.68					-1.16
Intrahousehold tenure										
Collective (1) or individual (0)										
plot	1.75	0.16	—	-2.72	-1.14	1.99	0.40	—	-1.83	-1.25
Male (1) or female (0)										
manager	1.50	4.11	—	9.94	5.24	1.21	4.24	—	8.96	6.42
Plot characteristics										
Distance from dwelling	2.24	0.67	-0.31	-2.42	-1.54	2.40	0.96	-0.29	-1.98	-0.98
Years since last fallow	-1.90	-1.03	-0.45	0.39	-1.29	-1.92	-1.02	-0.55	0.39	-1.62
Upper slopes	1.52	-1.19	0.63	3.18	1.34	1.53	-0.91	0.52	3.64	1.15
Midslope	1.91	-0.90	0.61	2.96	2.64	2.01	-0.68	0.30	3.39	2.33
R	.20	.01	.05	.19	.09	.18	.02	.17	.12	.10
Models 3 and 4										
Interhousehold tenure										
Secure 1	-0.75	0.89	0.20	0.63	-0.14	-0.62	2.06	0.22	0.34	0.72
Secure 2	—	-0.12	-0.18	-2.13	1.25	—	1.06	-0.12	-1.38	1.04
Secure 3	-0.56					-0.69				
Cleared					-0.28					0.67
Intrahousehold tenure										
Collective (1) or individual (0)										
plot	1.60	0.18	—	-2.79	-1.08	1.82	0.41	—	-1.87	-1.20
Male (1) or female (0)										
manager	1.50	4.08	—	9.94	5.24	1.21	4.21	—	8.96	6.42
Plot characteristics										
Distance from dwelling	2.09	0.67	-0.34	-2.58	-1.52	2.26	0.96	-0.30	-2.03	-0.94
Years since last fallow	-1.80	-1.03	0.50	0.42	-1.20	-1.80	-1.03	-0.58	0.41	-1.55
Upper slopes	1.66	-1.17	0.65	3.10	1.30	1.71	-.89	0.55	3.62	1.12
Midslope	2.01	0.89	0.66	2.90	2.64	2.14	-0.64	0.34	3.38	2.33
R	.19	.01	.05	.20	.09	.18	.02	.18	.12	.09
Degrees of freedom	504	1311	912	805	583	504	1311	912	805	583

interhousehold tenure status on allocation decisions. The effect of inheritance alone shows the expected positive sign only in Koho, although it is barely significant. In Sayero, which has a land surplus we observe the opposite effect, with borrowed-plot status contributing to a greater allocation of chemical fertilizer. Lineage domain land has no effect in any of the study villages. The ordering of tenure arrangements according to hypothesized security status in model 4 shows the only expected (and significant) result in Kolbila, with inheritance of lineage lands contributing to a greater share of fertilization. But overall fit in that village is poor, and the results on the security proxies variable are unstable across models.

## SUMMARY AND CONCLUSIONS

### Principal Findings

Land use intensity in all but one of the study villages is sufficiently high to provide strong incentives to obtain secure control over land use rights. Shifting cultivation over common village lands is no longer a feasible method of maintaining soil fertility on most land areas in any of the study villages. Rather, shifting cultivation has given way to increasingly intensive grass fallow systems in bush land locations, and nearly continuous cultivation on locations closer to habitation.

In this context, land tenure security has value through the power to control bush plots during extended fallow, in order to manage the soil regeneration period to capture its full potential benefits, and to avoid reinvestment of labor in tree and bush removal in other locations. In village areas that are more continuously cultivated, tenure security also provides assurance of receiving the residual benefits of investments aimed at improving or maintaining land quality.

Despite distinct ethnic, historical, and institutional backgrounds in the six study villages, there is relatively little variation in the land tenure systems as well as in the underlying land tenure status of plots within and across the villages. Tenure systems in all villages can be classified as indigenous in the sense that use rights are still perceived as separable from rights of expropriation or proprietary rights; use rights are normally vested at the household level, whereas many aspects of expropriation or proprietary rights are vested at the level of the higher kin group or village. Consequently, land is not yet alienable by individuals through commercial sales, rental, or credit-related pledging.

Despite the absence of title and of individual proprietary rights, farmers in all villages perceive a high degree of security in their right to continuously use most land now under cultivation, except for land borrowed for the short term. Use rights for the large majority of cultivated lands in each village were obtained

through inheritance within the domain of the lineage. In none of the villages does borrowed land, both long- and short-term, account for more than 20 percent of cultivated area.

An important finding of the present study is that although security is in part determined by method of acquisition (farmers retain use rights over inherited land even during long fallow periods), security itself changes in response to long-term use of the land. Thus, land that has been borrowed from another household or lineage historically but has been continuously exploited by a household for a sufficient time can be subsequently transferred through inheritance to the descendants of the current user.

Prevailing land tenure systems not only provide security but also have resulted in highly equitable distributions of cultivated area per household and per individual adult worker. Borrowings of plots serve to shift current use from land surplus to land scarce households, with a net increase in both equity and efficiency.

Current tenure systems appear to have a benign, complex, but, in the end, barely measurable effect on incentives in improvements to land quality. Major capital intensive investments in the land are not yet practiced in the study areas; thus manuring and fallowing are still the principal means that farmers employed to maintain or enhance the value of their land. We can conclude that the indigenous systems observed create no major disincentives to such investments.

### **Policy Implications**

Four benefits are often cited to justify the costs of reforming indigenous land tenure systems:

1. facilitating greater production efficiency by equilibrating factor use ratios and eliminating production inefficiencies caused by plot fragmentation and miniaturization;
2. providing the conditions for interpersonal income equity by ensuring equitable access to land as a production input;
3. improving incentives for undertaking long-term agricultural investments, particularly investments related to land improvement;
4. facilitating the development of medium- and long-term credit markets by enabling the use of land as collateral.

Our study has shown that, under current conditions (i.e., at present levels of demographic pressure, with available technologies, and with the currently low level of market orientation), existing indigenous systems of land tenure for crop



production in Burkina Faso perform adequately with respect to the first three goals. As to the fourth, because of the lack of land titling or registration, land does not serve as collateral for loans. But whether the use of land as collateral would improve the performance and efficiency of credit markets and whether the subsequent benefits would justify the high administrative costs of titling are both questionable and outside the scope of this analysis.

In short, on the basis of the four sets of benefits just identified, land tenure as such does not *currently* appear to be a constraint to crop production in Burkina Faso. As a result there is little justification for instituting major reforms in land tenure at this time.

Having said this, we also recognize that farming systems in Burkina Faso are in a state of transition in several dimensions. Demographic pressures in both the Sahel and Sudan savanna subregions have already exceeded the sustainable maximum under current low-input crop production systems, and localized environmental degradation is increasingly locally evident.

On the basis of experience elsewhere (e.g., close settled zones in northern Nigeria) as well as from developments already observed in the present study, we can anticipate the following trends in land tenure arrangements:

- further individualization of land holdings and the evolution of use rights into permanent proprietary rights,
- an increase in short-term lending of land and the eventual elimination of long-term borrowings,
- the development of land markets with sale and rental prices gradually approaching efficiency levels,
- the use of pledged land as collateral,
- marginalization of subordinate ethnic groups and lineages leading to a less equitable land use pattern, and
- a relative decline in the importance of local resolution of land conflicts and greater reliance on civil authorities.

The issues, then, are where, at what pace, and in what ways will the existing tenure systems adapt and ultimately give way to new systems that meet the rapidly changing circumstances, and how should government policy intervene to provide safeguards to guide this process toward technically and socially sustainable land use patterns? Because of the speed of current changes and the serious environmental problems already in evidence, we should not expect as smooth and costless a transition into market oriented tenure systems as has occurred in other closely settled Sudan savannah zones in West Africa. Nevertheless, reforms that radically depart from existing systems are unlikely to be efficacious.

We conclude by suggesting that policy interventions, such as land titling, that are designed to guide the development of formalized tenure arrangements should have five attributes:

1. *Timeliness.* Movement toward tenure reform should be initiated only when technical and socioeconomic conditions warrant. The evolution of existing systems should be monitored to determine the point at which inefficiencies or inequalities reach threshold levels that economically justify intervention. Premature interventions—before threshold levels are reached and before there is a general perception of the need for change among the rural population—would be uneconomic, extremely difficult to implement, and unlikely to be sustainable.
2. *Regional Focus.* The nature and urgency of land use problems vary across distinct subzones. To influence early results and to test various approaches, regional priorities should be established and pilot programs implemented first in areas of highest priority.
3. *Village Based.* Titling and land use development should use the village as the basic unit for planning and implementation. Local historical and institutional considerations must be taken into account if new systems are to be sustainable; hence village authorities must participate fully both in the planning and implementation stages.
4. *Adaptation.* Interventions and methods of enforcement should build on local land tenure practices to the maximum extent possible. Existing systems already contain the basis for efficient and equitable tenure arrangements. Integration of local practices will also reduce the costs for implementation and control.
5. *Conservation Orientation.* The most urgent threat facing densely populated areas in the Sahel and Sudan savanna zones is degradation of the land base. Land registration or titling requirements can be structured to further increase the incentives for initiating appropriate land conservation measures. For example, in areas where the techniques are appropriate, titling could be made contingent on the construction and maintenance of erosion control and run-off management systems, wind breaks, and the like.

The outlines of a revolutionary land reform announced by the government of Burkina Faso in 1984 were described in the introductory section of this paper. That land reform effort was in clear contradiction to at least four of these attributes: The reform was premature in the sense that the preconditions for sus-

tainable change had not been met over most of rural Burkina Faso; it was not regionally focused but attempted to introduce a uniform reform at a national level; it contradicted fundamental village-level practices and institutions; and it explicitly excluded the participation of traditional authorities in both planning and implementation. However, depending on how the law is interpreted and applied, the conditionality provisions of obtaining usufruct rights could be implemented in a manner consistent with the final land conservation attribute.

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# 4

## TENURE SECURITY AND AGRICULTURAL PRODUCTION UNDER LAND SCARCITY: THE CASE OF RWANDA

*Benoit Blarel*

The objective of this chapter is to determine whether the land tenure system now prevailing in Rwanda is conducive to agricultural development. The study of the system is particularly interesting and topically relevant because of the multitude of conditions that have shaped its evolution over time. A very high population density puts Rwanda in a situation comparable to that of many Asian countries. Nevertheless, Rwandan agricultural technology has remained simple and irrigation is almost nonexistent, moreover, the extent of commercialization in agriculture and the development of export crops, as well as economic opportunities outside agriculture, have remained extremely limited. Finally, in contrast to the situation in Kenya, the state had little involvement in land matters, except at the time of independence when the then exploitative tenure system based on a caste system was abolished. Three aspects of the tenure system in Rwanda are analyzed here: the land distribution, land tenure security, and farm fragmentation.

Given the population pressure prevailing in Rwanda, among the highest in Sub-Saharan Africa, it is important to understand the determinants of access, distribution, and use of one of the most important factors of production, namely, land. In particular, it is essential to determine whether the current distribution of land results in its most efficient use, and to assess the performance of the land market and the reasons that may cause it to operate inefficiently.

Does tenure insecurity hinder agricultural development? If farmers feel insecure on the land they operate, they may have little incentive to invest in land improvements or to maintain existing land improvements that raise land productivity. A similar incentive problem may arise if farmers are not assured that the benefits from improvements they make to the land will accrue to them or their children (through increased land productivity or increased land value). It is clear that tenure security plays an important role in agricultural development, as well as in erosion control, because it affects the behavioral relationship between the operator and his land.

A second mechanism linking tenure security to agricultural development arises through the credit market. Commercial bank's wish to lend to creditworthy projects and individuals. In the first place, a bank will be reluctant to lend money if the potential borrower is not certain to reap the returns from the prospective investment project. Second, the bank prefers collateral in case the borrower defaults. Increased tenure security in the form of a land title facilitates farmers' access to credit, which may be used to purchase productivity enhancing inputs or to invest in land improvements.

Regarding farm fragmentation, we needed to determine both its incidence and its effects on agricultural production. In that context, we pay particular attention to the benefits and costs of farm fragmentation to farmers.

To analyze the three aspects of the tenure system in Rwanda just outlined the Agriculture and Rural Development Department of the World Bank, in association with the Services des Enquêtes et des Statistiques Agricoles (SESA), undertook a farm survey in the prefectures of Butare, Gitarama, and Ruhengeri during the second agricultural season of 1988. In total, a random sample of 232 farm households were surveyed.

Rwanda is a small but highly heterogeneous country in terms of its altitude, soil quality, rainfall, and topography. The three selected prefectures are not intended to be representative of the highly diversified environments prevailing in Rwanda. Because they are among the most highly populated prefectures in the country (997, 505, and 440 persons per square kilometer of cultivated land in Butare, Ruhengeri, and Gitarama, respectively), they provide a good indication of the relationships between the land tenure system and agricultural production that are likely to exist under population pressure. Similar demographic situations will prevail throughout Rwanda within a couple of decades.

The three prefectures differ in some important respects. Butare is the oldest settled area, which partly explains its very high population density. Ruhengeri was more recently settled, in particular the northern sections, where rich volcanic soils predominate. The Gitarama and Butare prefectures have also experienced some recent settlement in their eastern sections in the Mayaga region. The

three prefectures have a good agricultural potential that stem from fertile soils and ample rainfall. Traditional food crops grown include beans, sweet potatoes, cassava, beer bananas, and sorghum. The major cash crop is coffee, except in the northern volcanic highlands of Ruhengeri, where a high altitude and a cooler climate make the cultivation of pyrethrum and commercial irish potatoes more profitable.

The remainder of this chapter contains five main sections. The first focuses on land distribution issues. The second provides a brief account of the indigenous tenure systems and official land laws. The third examines the extent to which indigenous land rights constrain agricultural productivity, and the fourth addresses farm fragmentation. The final section summarizes the results and discusses major important policy implications.

### LAND DISTRIBUTION AND FARM MINIATURIZATION

Two aspects of the land distribution are considered in this section. First, we examine whether the current land distribution leads to its most efficient use. Land distribution has important implications not only for food security at the household level, but also for overall production and its composition at the national level. The second set of questions relate to strategies devised by households in response to increasing land scarcity, and their implications of these strategies.

Although operated farms are of modest size (1.1 ha on average), their distribution remains unequal (Table 4-1), although less so than the owned land distribution (i.e., permanently held). This is so because temporary land transactions enable smaller farms to significantly expand the scale of their agricultural operations. Indeed, more than two-thirds of the smallest farms (less than 0.37 ha) lease in additional land, thereby increasing their scale of operation by an average of 67 percent (Table 4-2); conversely, larger farms (above 1.5 ha) reduce their scale of operation by about 7 percent on average by leasing out "surplus" land.

The remaining inequality in the distribution of operated landholdings can be explained by several factors, among which the size of the household and the

TABLE 4-1. Distribution of Operated Farm Size in Hectares

Prefecture	Mean	Minimum	Maximum	Median	Gini Coefficient
Ruhengeri	0.87	0.14	4.91	0.70	.38
Butare	1.14	0.09	4.40	0.93	.40
Gitarama	1.25	0.24	10.11	0.84	.42
Pooled Prefectures	1.10	0.09	10.11	0.83	.41

TABLE 4-2. Land Market Transactions by Owned Farm Area

Owned Farm Area (in ha)	Percent of Households Leasing In	Percent of Households Leasing Out	Average Amount of Land Leased In (in ares <sup>a</sup> )	Average Amount of Land Leased Out (in ares)	Average Percentage Change Between Owned & Operated Areas
<b>Pooled Prefectures</b>					
0.00–0.37 ha	63.8	23.4	23.02	3.92	+ 67.15
0.37–0.60 ha	70.2	8.5	20.71	16.39	+ 29.06
0.60–0.90 ha	60.9	28.3	16.68	5.44	+ 11.81
0.90–1.50 ha	43.5	32.6	24.28	18.81	+ 2.87
1.50–and above	43.5	56.5	12.96	43.03	– 6.86
<b>Ruhengeri</b>					
0.11–0.32 ha	60.0	20.0	25.57	4.31	+ 63.28
0.32–0.49 ha	53.3	6.7	27.76	2.39	+ 34.33
0.49–0.73 ha	50.0	7.1	16.14	6.23	+ 12.85
0.73–1.18 ha	14.3	42.9	15.93	3.83	+ 0.68
1.18–and above	35.7	50.0	20.21	51.69	– 8.98
<b>Butare</b>					
0.00–0.23 ha	81.3	12.5	24.66	3.32	+175.20
0.23–0.65 ha	87.5	18.8	16.66	4.13	+ 30.80
0.65–1.01 ha	87.5	12.5	19.51	3.99	+ 20.41
1.01–7.70 ha	50.0	37.5	35.94	9.76	+ 11.85
1.70–and above	68.8	81.3	13.75	32.86	– 6.39
<b>Gitarama</b>					
0.00–0.48 ha	62.5	56.3	21.37	4.69	+ 40.26
0.48–0.65 ha	62.5	18.8	14.05	15.27	+ 13.18
0.65–1.00 ha	50.0	37.5	12.59	7.61	+ 4.28
1.00–1.70 ha	43.8	18.8	16.51	35.59	+ 0.49
1.70–and above	31.3	56.3	9.37	48.01	– 7.45

<sup>a</sup> One hectare = 100 ares.

household labor force play an important role. Larger operated farms are associated with larger household sizes and, hence, larger household labor endowments. However, this phenomenon, often associated with Chayanov's life-cycle hypothesis, is not sufficient to further explain inequality in operated distribution of land among farms, because the operated farm size increases more than proportionally with household size (Table 4-3). A second factor, which could further explain inequality in operated land distribution, is soil quality. We expect that farms located on poorer soils will be larger to sustain the needs of households of given sizes. However, even after we controlled for regional soil quality differentials (using a regional soil quality indicator devised by Delepiere), the operated land distribution remained unequal.

A third factor explaining the unequal distribution of operated land is related



TABLE 4-3. Operated Farm Size Classes and Their Land-Labor Ratios

Operated Farm Size Class (ha)	Number of Households	Mean	Land—Labor Ratio		
			Minimum	Maximum	Median
Less than 0.45	48	.19	.07	.45	.17
0.45–0.70	50	.31	.14	.69	.29
0.70–1.0	47	.41	.15	1.00	.38
1.0–1.6	40	.45	.14	.80	.42
Greater than 1.6	47	.86	.27	4.40	.69
All households	232	.44	.07	4.40	.33

to the increasing scarcity of land, because this may imply a reduction in operated farm size for the “younger” households. The available data confirm this hypothesis; the operated land area per household member increases significantly with the household head’s age (Table 4-4). This result confirms that rural population growth plays a significant role in the reduction of the operated farm area over time.

The unequal distribution of operated land prevailing in the three prefectures may lead to production inefficiencies if land is not used with equal intensity across households. Production inefficiencies imply that it would be possible to produce more aggregate output with the same amount of resources by simply redistributing the land among households. There are, however, several other mechanisms that could increase the efficiencies of production among households. For example, the relatively land rich households could hire labor from the relatively land poor households, equalizing factor proportions across households.

TABLE 4-4. Household Head Age Groups and their Operated Farm Area per Household Member

Age Group	Number of Households	Operated Farm Area Per Household Member	
		Mean (ha)	Standard Deviation (ha)
20–30 years	29	0.1504	0.0726
30–40 years	64	0.1576	0.1565
40–50 years	42	0.1830	0.1116
50–60 years	41	0.2317	0.1532
Over 60 years	56	0.3315	0.3215
All households	232	0.2164	0.2078

F Ratio = 7.3682      F Probability = 0.0

Alternatively, relatively land rich households could specialize in crops that use land intensively (e.g., bananas), and relatively land poor households could specialize in crops that use labor intensively, such as beans.

To identify the possible presence of production inefficiencies resulting from the unequal distribution of land, several tests were performed. In particular, econometric regressions were estimated to test the relationship between farm size and land productivity at two different levels. The first measured the relationship between operated farm size and land productivity using SESA's national sample data on farm-level production. A second regression was performed on yields measured for individual plots in the three study prefectures only. In the farm-level regression, a negative and significant relationship between farm size and land productivity was found, indicating the presence of production inefficiencies. For the plot-level regression, although farm size is negatively related to plot-level yields, the relationship is not statistically significant. The relationship between plot size and yields, however, is negative and highly significant, indicating that as plots get smaller, farmers adopt more labor-intensive techniques and achieve higher yields.

The presence of a negative relationship between farm size and land productivity confirms that small farms follow an intensification strategy when land gets scarce. This intensification strategy translates into more intensive use of household labor resources, and is achieved through crop substitution toward higher yielding crops per unit of land, higher sowing rates, more intensive and careful weeding, reduction in the amount of fallow lands, and expansion of mixed cropping.

It is important to note that this inverse relationship between farm size and land productivity is offset by a positive relationship between farm size and labor productivity. That is, as farm size decreases, returns to labor fall. What happens is this: smaller farms increase their land productivity by applying higher levels of labor without significant modifications in technology (fertilizer, pesticides, herbicides, improved seeds) that could counteract the diminishing returns to labor. Diminishing returns to labor carry important implications for household food security, because they mean that food is produced per unit of labor. This pattern of declining returns to labor as farm size decreases is somewhat compensated by the fact that returns to land (land rents) are, to a large extent, captured by farm households and do not accrue to the landlord or patron. Indeed, despite population pressures similar to those found in Asia, the extent of tenancy and sharecropping relationships appears to be much more limited in Rwanda.

Increasing land scarcity leading to the progressive reduction in operated farm size induces farmers to adopt more intense farming strategies, yet, as SESA data show, this intensification is not sufficient to satisfy food requirements for nearly

60 percent of the Rwandan farm households. Thus households are pursuing other income-earning strategies. Migration to other rural areas, urban centers, or neighboring countries and off-farm employment or agricultural wage labor enable households to augment their low agricultural incomes. Of more immediate interest to our study is to determine how rural communities are adapting to increasing land scarcity, and in particular how the land market has been evolving under such conditions.

The inheritance system is unequal because, generally, only male children inherit land, and their entitlement is not equal. Data from the national sample show that 18 percent of the farm households inherited no land; inherited land accounts for only 44 percent of the total operated land area in the three study regions (Table 4-5).

**TABLE 4-5. Distribution of Total Operated Area by Mode of Acquisition in Each Prefecture**

Mode of Acquisition	Ruhengeri %	Butare %	Gitarama %	Pooled Prefectures %
Purchased	14.9	3.3	4.2	6.5
Cleared	0.3	1.0	3.3	1.7
Inherited	46.0	46.7	40.4	44.0
Gift	12.5	15.0	1.6	9.1
Government allocation	2.3	6.3	29.6	14.5
Paysannat	7.6	9.8	14.7	11.2
Exchanged	0.6	0.3	—	0.2
Rented in	4.8	6.0	7.7	4.4
Borrowed	6.3	7.8	3.5	5.7
Polygamous female-headed land	4.7	3.8	—	2.6

Inspection of the data indicates both a transformation over time in the modes of access to land and strong regional patterns. As indicated in Table 4-6, land purchases have clearly increased over time and have become more important than government land allocations. Government land allocation was instrumental in relieving some of the population pressure at the time of independence, particularly in Gitarama (under the Paysannat scheme), but its importance has diminished over time. Another important means of obtaining land is allocation through the extended family, either on a temporary (borrowed land) or permanent basis (gifted land). As indicated earlier, this source is particularly important for the land-poor households. It provides them with means of producing food and enables them to reap returns to both their labor and the land they cultivate. Inspection of the data clearly show that these nonmarket types of land transfers are

**TABLE 4-6. Changes in Mode of Permanent Access to Land**

Mode of Land Acquisition	Held more than 25 Years	Held less than 25 Years
Purchased	2.4	20.4
Cleared	1.6	4.7
Inherited	72.2	67.5
Given	8.3	4.7
Allocated by Government	15.5	2.6

especially targeted toward those households who inherited little or no land (see Table 4-7). Therefore, these non-market land transfers play an important social safety net role in the context of land scarcity, high population pressure and limited off-farm opportunities.

Strong regional patterns in the operation of land markets are also evident (Tables 4-5 and 4-7). In Butare, land transactions appear to operate outside the sphere of the market and often translate into permanent gifts, temporary borrowings, or long-term rentals from the extended family, whereas land purchases are much more common in Ruhengeri. In contrast, land allocations from the government have been much more important in Gitarama than in any of the other two prefectures.

Given the almost total absence of new lands to distribute, government land allocations are bound to be replaced by land transactions that operate through the marketplace (purchases or rentals) or outside the marketplace (gifts, borrowings, or rentals from relatives).

Given the presence of an inverse relationship between farm size and land productivity, combined with evidence of a national agricultural production deficit, an improved distribution of land among households would achieve the dual objectives of improved efficiency (thereby increasing national agricultural production with the same amount of resources) and social equity (more egalitarian distribution of land resources). These objectives could be attained by imposing ceilings on landownership, facilitating land transactions among households by reducing the associated transaction costs, and monitoring the possible emergence and development of exploitative tenancy relationships. In addition, it is imperative to raise both land and labor productivity by promoting the use of modern agricultural inputs, the development of high value crops with scale-neutral technologies and designing improved agricultural technologies adapted to small farm needs. At this point, it is important to note that nonmarket land transactions appear to be fairly effective in providing for some of the efficiency and equity objectives. Absolute landlessness is extremely rare in Rwanda.<sup>1</sup>

<sup>1</sup> There is, however, significant migration to the neighboring countries of Zaire, Uganda, and Tanzania.

TABLE 4-7. Households with Inheritance Mode of Acquisition to Land and Share of Operated Area

Mode of Acquisition	Small Farms (< 1 ha) with Low share of inheritance (< 50%)			
	Ruhengeri N = 10	Butare N = 13	Gitarama N = 15	Pooled N = 38
Average Operated Size (in ha)	0.69 (0.68)	0.47 (0.40)	0.67 (0.65)	0.61 (0.64)
Mode of Access				
Family				
Permanent	12 (0)	14 (0)	0 (0)	8 (0)
Temporary	11 (0)	41 (44)	5 (0)	19(0)
State				
Permanent	28 (0)	0 (0)	70 (49)	35 (0)
Temporary	1 (15)	6 (0)	6 (0)	5 (0)
Nonrelatives				
Given	5 (0)	0 (0)	5 (0)	3 (0)
Purchased	27 (22)	10 (0)	5 (0)	12 (0)
Rented	11 (1)	15 (6)	6 (0)	11 (0)
Borrowed	0 0	0 (0)	3 (0)	1 (0)
Inheritance	20 (19)	14 (12)	22 (21)	19 (17)

### INDIGENOUS AND FORMAL LAND TENURE SYSTEMS

The current land tenure system in Rwanda is the result of the complex interactions between the set of indigenous rules and the body of written laws. The indigenous land tenure systems were far from homogeneous across the country, and they have not been static through time. Nonetheless, because of the homogeneity of population throughout the country, the current systems have many common features.

Before the arrival of the Tutsi pastoralists around the 16th century, the tenure system developed by the Hutu agriculturalists was characterized by a collective tenure system (the *ubukonde*), whereby the land was the property of the lineage or clans whose members were related by birth or allegiance to a common ancestor, ideally, the first occupant of the land. *ubukonde* represented an arrangement for the use of tribute labor in clearing and establishing farms in forest lands. Under this system, ownership of the land was vested in the community (lineage or clans) instead of individuals, and the leaders of the clan or lineage acted as trustees. Land, however, remained inalienable. The clan or lineage elders allo-

cated land to the members of the community, on which individual households enjoyed long-term, exclusive usufruct rights, transmissible only through inheritance to male children. Use and alienation rights were distinguished under the *ubukonde* system. When land was abandoned or unused, it reverted to community control and could be allocated to a different household. The recipient of the customary usufruct rights was able to rent portions of the land to customary or temporary tenants (customary *abagererwa* or *abatisha*). The *ubukonde* system weakened over time as a result of two phenomena: (1) With increasing population, it became necessary for segments of the lineage to depart and to clear new forest area, leading to the gradual erosion of the power and control of the maximal lineage chiefs; and (2) in response to increasing land scarcity and control of access to land resources in the *ubukonde* domain by the kinship group, a clientele system eventually emerged between individuals who controlled access to land and those who did not enjoy secure access to land resources.

The parcelization of the *ubukonde* domain, the emergence of exploitation by the Hutu patrons, segmentation and dispersion of lineages compounded by political involution facilitated the immigration of the Tutsi pastoralists and accelerated the ascendancy of their centralized political system over the indigenous and segmentary *ubukonde* system.

The land tenure rules gradually imposed by the *batutsi* operated mainly through two distinct systems: *isambu*, applying to agricultural areas and *igikingi*, applying to pastoral areas. Although distinct, the two systems shared a number of important characteristics. Under these systems, usufruct rights were no longer entrusted to the community as a whole and its representative, but were instead allocated individually by the political authority. The new tenure system was predicated largely on the political decision of the Tutsi chief rather than on notions of membership in the kinship group, and in that sense was less secure than the *ubukonde* tenure system. The rights of the client (political *abagererwa*) were limited to usufruct rights, as alienation rights were vested in the central authority or *mwami*. Individual tenure entailed a number of duties, such as fees, taxes in kind, corvée labor, and the right by patrons to graze their livestock on agricultural fields.

The political domination by the Tutsi was exacerbated under the Belgian colonial administration, which, following the principle of indirect rule, recognized the authority of the Tutsi king over the entire country, in particular, extending it over the northwestern highlands of Rwanda. In addition to the discrimination inherent in kinship and political tenure systems, the colonial rule introduced a new law distinguishing between indigenous and nonindigenous land

(decree September 14, 1886). The decree distinguished between the land effectively used by the indigenous population, which remained under the jurisdiction of the customary rules, and the land acquired by foreigners, which fell under the jurisdiction of the codified land tenure rules following land registration and was recognized by full ownership rights in the Western sense.

In an attempt to limit the mounting social problems resulting from surplus extraction by the political chiefs and the insecurity of tenants and clients, the colonial authorities progressively limited the extent of taxes and corvee and eventually abolished the various patron-client relationships (*ubuhake* in 1954, *igikingi* in 1960, and *ubukonde* in 1961). An important decree (July 11, 1960) provided that all nonregistered land, under either customary rights or occupancy rights, would henceforth become part of the domain of the state, from which the holder's rights could not be expropriated without compensation. The same decree established procedures for the establishment and purchase of customary rights. It also allowed current holders of customary rights to obtain private individual ownership by reclassifying the land on which private exclusive use rights from the indigenous tenure system were held to the codified and legal tenure system by the process of land registration.

The foregoing decrees were ratified after independence by the Rwandan constitution of 1962. The discrimination between kinship (*bahutu*) and political (*batutsi*) tenure systems was abolished because both the customary *ubukonde* and the clientele system were outlawed. Only in the northwest prefectures of Ruhengeri and Gisenyi was the customary *ubukonde* system, along with the customary patron-client relationship, maintained. The tenure system today remains essentially dualistic, distinguishing between nonregistered and registered land. All nonregistered land belongs to the State, on which individuals are granted exclusive private and inviolable usufruct rights, protected by the law. The 1960 decree, however, stops short of granting full ownership to traditional landowners and tenants and does not abolish the existing distinction between registered and nonregistered land. Traditional land owners and tenants are nevertheless given the opportunity to convert their rights to full ownership by registering their land.

Since independence, the state has intervened little in land matters, and only three decrees have been issued. The 1976 decree specifies that for land under customary or occupancy rights, sales may occur only if the seller would retain at least two hectares of land and if prior authorization from the government is obtained. Two additional decrees (July 23 and 25, 1975) define the rules and procedures for compulsory acquisition by the state and corresponding compensation principles. These latter decrees introduce an additional discrimination among the nonregistered lands. Households operating under customary rights receive

compensation in kind in the form of land allocation, whereas recipients of the occupancy rights are not entitled to land reallocation unless they possess no land anywhere else.

### **IS LAND TENURE SECURITY A CONSTRAINT ON AGRICULTURAL DEVELOPMENT?**

Land tenure security may promote agricultural development through two mechanisms. The first is the increased incentive for farmers to invest in land improvements as a result of enhanced tenure security. The second mechanism acts through the credit market, whereby increased tenure security may encourage lenders to increase the supply of long-term credit (through higher expected returns from projects or use of land as collateral). The combination of increased demand for investment and increased supply of credit results in higher levels of land investment. In turn, higher levels of land investment raise land productivity, both directly through improving the quality of the land, and indirectly, by inducing higher use of complementary inputs, such as fertilizer. A greater use of complementary inputs is also facilitated by the greater supply of short-term credit resulting from improved tenure security.

Land tenure security is a concept that does not lend itself easily to direct measurement, and only proxy indicators can be obtained, for two reasons: First, tenure security corresponds to the state of mind of the farmer, which cannot be measured directly. Second, as we have already noted, the tenure system in Rwanda has remained predominantly indigenous, its rules are not well known or uniform across regions, and it is also constantly evolving over time in response to changes in the prevailing economic and social conditions.

We constructed two distinct indicators of land tenure security. The first indicator involves the set of land rights (use, transfer, and exclusion) that the household heads believe they are entitled to on each of the blocks they now operate. The second indicator is based on the number of land disputes that have ever occurred on each of the blocks operated by the sampled households.

#### **Security as Land Rights**

Following the enumeration of approximately 24 land rights on each operated parcel, five categories of land rights were created, each consisting of parcels with similar bundles of rights and *potentially* corresponding to a distinct tenure security category. The distribution of the enumerated land rights by class of tenure security is presented in Tables 4-8 and 4-9. The first two tenure security categories correspond to land on which the farmer only has usufruct rights. We distin-



**TABLE 4-8. Use and Exclusion Rights & Security Classes**

[illegible]

TABLE 4-9. Transfer Rights &amp; Security Classes

	Short Term Use Rights		Long Term Use Rights		Family Land		Alienation Rights Within the Lineage		Complete Rights Land	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Right to Lend										
No	188	94.9	147	67.4	25	15.8	—	—	12	1.2
Yes	10	5.1	71	32.6	133	84.2	63	100.0	1005	98.8
Right to Rent Out										
No	189	95.5	167	76.6	18	11.4	2	3.2	—	
Yes	9	4.5	51	23.4	140	88.6	61	96.8	1017	100.0
Right to Sell										
No	198	100.0	218	100.0	158	100.0	63	100.0	—	—
Yes	—	—	—	—	—	—	—	—	1017	100.0
Right to Give										
No	198	100.0	218	100.0	158	100.0	—	—	468	46.0
Yes	—	—	—	—	—	—	63	100.0	549	54.0
Right to Bequeath										
No	198	100.0	218	100.0	—	—	8	12.7	1	0.1
Yes	—	—	—	—	158	100.0	55	87.3	1016	99.9
Right to Pledge										
No	198	100.0	209	95.9	34	21.5	8	12.7	37	3.6
Yes	—	—	9	4.1	124	78.5	55	87.3	980	96.4
Right to Mortgage										
No	198	100.0	208	95.4	32	20.3	—	—	21	2.1
Yes	—	—	10	4.6	126	79.7	63	100.0	996	97.9
Right to Register										
No	196	99.0	209	95.9	21	13.3	—	—	21	2.1
Yes	2	1.0	9	4.1	137	86.7	63	100.0	996	97.9
Total Number of Blocks	198	100.0	218	100.0	158	100.0	63	100.0	1017	100.0

(1) Number of blocks

(2) Column percentage

guish between blocks on which the operator enjoys only “short-term use rights” and blocks on which the operation holds “long-term use rights”. The following three tenure security classes almost always have long-term use rights, but also have permanent transfer rights which vary from one tenure security category to another. Blocks in the “family lands” category are limited to rights of bequest only, whereas for the “lineage lands” category, blocks can be given to immediate relatives or other lineage members. The third category is designated “complete rights” because it contains blocks that may be sold, in addition to having most other rights.

The first set of findings has to do with the transformation of the indigenous tenure system over time. The indigenous tenure system seems to have largely evolved toward individualization because farmers claim complete land rights (i.e., including the right to sell) on 61.5 percent of the blocks in the three study regions (Table 4-10), despite the fact that none of the inventoried parcels have been officially registered. This is clearly a significant departure from the indigenous tenure system of former times which, as we saw earlier, limited household land rights to long term usufruct rights transferable through inheritance. This is also in clear contrast with the 1976 land decree, which restricts land sales for nonregistered lands.

The second set of findings has to do with regional differences in the responses to prevailing socioeconomic conditions. We found that in Ruhengeri, where the indigenous *ubukonde* tenure system was officially reaffirmed after independence, the transformation process toward individualization is most advanced: virtually all blocks with permanent transfer rights fall under the complete rights category (see Table 4-10). The degree of privatization of land rights is clearly conditioned by the prevalent modes of land acquisition there. Remember that land purchases were much more common in Ruhengeri than in any other prefectures. By contrast, the process of transformation toward individualization is the least advanced in Butare, where the customary *ubukonde* and the clientele system were officially abolished at independence. Blocks of land with usufruct rights only (short and long term), together with those for which usufruct rights are restricted to transmission by inheritance account for 53 percent of all the blocks examined (see the top three rows for Butare in Table 4-10). Similarly, for those blocks falling within the complete rights category, we found that the amount of control on the right to sell is significantly higher in Butare than in the other two prefectures; and much of that control is exercised by the extended family or lineage: 48 percent of complete rights blocks require approval from the extended family

TABLE 4-10. Distribution of Land Rights Categories by Prefecture

Land Rights Category	Ruhengeri		Butare		Gitarama		Pooled Prefectures	
	No. of Blocks	%	No. of Blocks	%	No. of Blocks	%	No. of Blocks	%
Short-term use rights	41	7.4	106	16.9	51	10.9	198	12.0
Long-term use rights	45	8.1	125	19.9	48	10.2	218	13.2
Family Land	17	3.1	102	16.2	39	8.3	158	9.6
Alienation rights within the lineage	0	0.0	2	0.3	61	13.0	63	3.8
Complete rights land	453	81.5	294	46.7	270	57.6	1,017	61.5

prior to selling in Butare, as opposed to only 16 percent and 9 percent in Ruhengeri and Gitarama, respectively.

Regional differences in the level of land commercialization and the extent of land rights farmers claim may be explained by differences in population pressures, the development of food markets, economic opportunities both outside and within agriculture, and historical factors. The sample in the Ruhengeri prefecture has a high proportion of excellent-quality soils (lava soils at the foothills of the Virunga mountains) with a relatively flat topography, a high proportion of land that has been settled recently compared to the other two prefectures, and a relatively high degree of commercialization evidenced by the important potato cultivation. The proximity of Ruhengeri to Uganda and Zaire and to the less densely populated areas of the east, also probably facilitates outward migration along with trading activities. Butare, as noted earlier, has been settled for a much longer period of time, and its soils are presumably suffering from exhaustion. Migration from Butare is made more difficult by the virtual absence of new land and by the high population pressure in the surrounding prefectures (and in neighboring Burundi). On average, population density computed on agricultural land is much higher in Butare than in Ruhengeri.

Given the more limited economic opportunities both inside and outside agriculture in Butare, economic security is an overriding concern for which access to land resources is an essential component. The greater control over land rights by the lineage in Butare would appear to be a reflection of the desire by the lineage to retain control over the land resources operated by its individual members. The restriction on land rights could be viewed as an insurance premium that households are willing to pay in exchange for security of access to economic opportunities. As the earlier analysis of land transfers indicated, it is in Butare that non-market land transfers benefitting land-poor households (those who received little or no inheritance) are most pronounced. At the risk of over simplifying, as land resources become scarcer and commercial opportunities do not emerge, the lineage entrusts its land resources to a limited number of individuals (*Umutware w'Inzu*) who are then responsible for managing, controlling and allocating them among households of the lineage.

### **Security as the Absence of Land Disputes**

Regarding the second land tenure security indicator, namely land disputes, the incidence of land disputes is found to be low; only 3.8 percent of all operated blocks had ever been involved in a land dispute. In addition, most land disputes appear to be confined to a specific household group, those headed by separated and single women. Both the transformation of rights toward individualization

and the low incidence of land disputes strongly suggests that land tenure security is fairly high in Rwanda, despite the absence of comprehensive government intervention in rural land tenure regimes.

### **The Effects of Tenure Security on Productivity**

In the following subsections, we present our findings about the effects of tenure security on measures of agricultural productivity. As a proxy for tenure security, we used the land rights categories formed earlier. This variable most closely approximates farmers' perceptions of security. Another possible indicator, the incidence of land disputes, cannot be used because it measures only past disputes (and hence past security), and it exhibits too little variation.

### **Land Rights and Credit**

No relationship was found between tenure security and credit. This was confirmed by the almost total absence of land pledging and mortgaging (only 7 out of the 1,654 blocks sampled had ever been pledged or mortgaged), the limited incidence of credit (especially agricultural credit), the short term maturity of loans (less than a year), and the casual observation that land investments are mostly labor-intensive rather than capital-intensive, therefore requiring little credit. In addition, land investments are fairly limited because investment alternatives seem to be few in Rwanda.

Notwithstanding the limited amount of agricultural credit, strong regional patterns of other bank-client relationships were identified. It was found that in Ruhengeri, where the Banque Populaire (a cooperative rural bank) has long been established, the incidence of savings accounts and credit was higher than in the other two prefectures, and credit was often used for nonagricultural purposes.

### **Land Rights and Land Improvements**

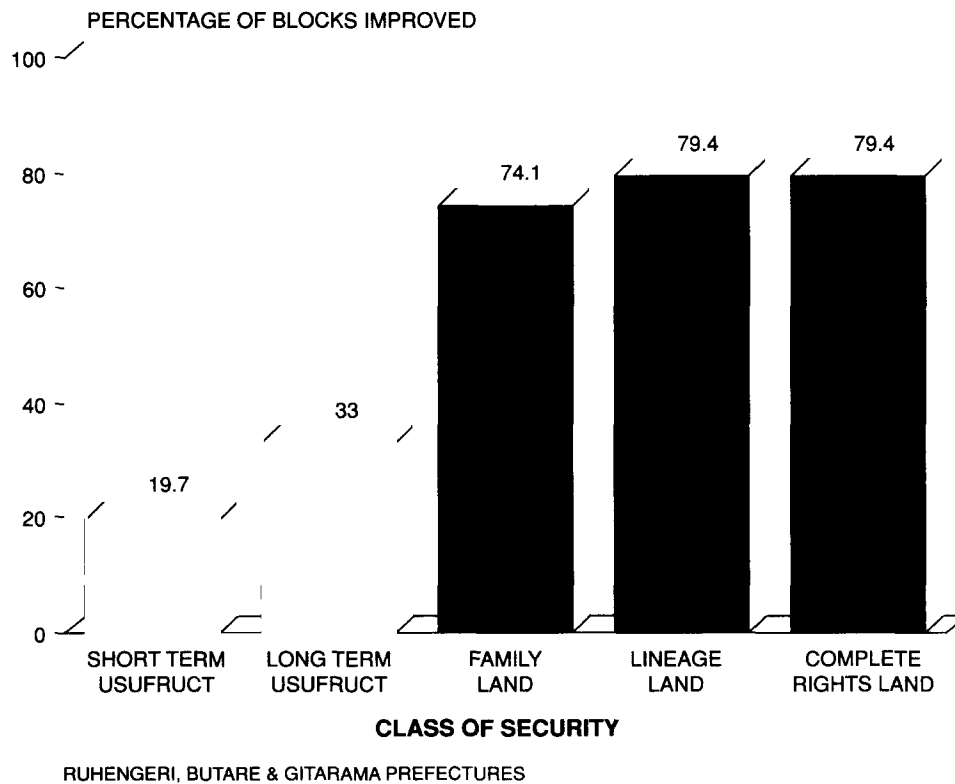
Information on the incidence of 14 types of improvements made since acquisition was collected for each block. These data were combined to create dependent variables corresponding to the incidence of short-term boundary and long-term land improvements. The expected theoretical relationship was found to be strong and significant.<sup>2</sup> Blocks of land with long-term use rights are more likely to be

<sup>2</sup> Multinomial logit analysis was used to determine the relationship; it is presented more formally in "An Econometric Analysis of the Efficiency of Indigenous Land Tenure Systems in Sub-Saharan Africa". by F. Place, L. Lau and P. Hazell, World Bank, 1990.

improved than those with short-term use rights, but much less so than blocks characterized by family, lineage, and complete rights. Once farmers have the right to bequeath the land to their kin, it appears that they have sufficient incentive to make investments in land improvements (Exhibit 4-1). Only 19.7 and 33 percent, respectively, of the land under short-term and long-term usufruct, and thus not able to be bequeathed, had been improved. In contrast, a larger proportion of land over which current operators had broader security (74.1, 79.4 and 79.4 respectively, for family, lineage and complete rights) had been improved.

The final set of findings were obtained from regressions of plot yields on land rights and other control variables in the three study prefectures.<sup>3</sup> In none of the regressions did land rights significantly affect yields. In fact, the insignificant coefficient estimates on the "secure" land rights categories were negative. This is

**EXHIBIT 4-1. Any Voluntary Improvement by Class of Security**



<sup>3</sup> Having multiple plot yield observations permitted us to use a fixed effects regression technique which better controls for household level impacts on yields.

consistent with the finding that the land-poor households are more likely to rent in land (and to have only short-term use rights) and, in turn, need to obtain higher land productivity to feed themselves.

The fact that investments and yields do not significantly increase when additional permanent transfer rights supplement the right to bequeath strongly suggests that tenure security across the three classes (family, lineage, and complete rights) is equally sufficient. The right to bequeath is necessary and, in the Rwandan context, probably sufficient to confer adequate tenure security to the household. This result is not surprising, especially in view of the social insurance mechanisms, that appear to be embedded in the tenure system. Permanent land transfer rights restricted only to bequest do not necessarily correspond to lower levels of tenure security because they reflect a social insurance mechanism the purpose of which is to maintain economic security within the lineage or extended family. Policymakers must consider these social insurance mechanisms when contemplating substantial changes to indigeneous land tenure systems.

### **Prospects for Formal Registration**

A few blocks had been "registered" by the burgomasters (less than 10 percent), but our data do not reveal any systematic difference in the productivity or the extent of rights between these blocks and other blocks acquired under similar conditions. In fact, it is probable that in some communes, the registration process is motivated by the need to raise revenue rather than a desire to give farmers access to full ownership under the terms described in the July 11, 1960 decree. We also found some instances where, shortly after registration of the blocks by a burgomaster, blocks were sold or subdivided without a record of the transaction being made or the "title" being updated.

Under these conditions, the need for land titling and registration appears to be low. Opportunities for land investments are few, tenure security does not appear to be lacking, and the indigenous tenure systems seem to have adapted efficiently to the prevailing socioeconomic conditions. Therefore, the costs of land registration are likely to be much higher than its benefits. Moreover, indiscriminate land registration would weaken the social insurance mechanisms and functions that the current indigenous tenure systems are fulfilling.

### **THE FARM FRAGMENTATION ISSUE**

Fragmentation is often, wrongly, confused with the farm size issue. Farm fragmentation is defined as the geographical dispersion or scattering of a farm into distinct and noncontiguous blocks. It is clear from this definition that farm fragmentation applies to small as well as large farms. Our data indicate that the

relationship between farm size and level of fragmentation is weak. At the national level, although the correlation coefficient between operated farm size and the Simpson index of farm fragmentation is both negative and significant, it is still quite small at  $-0.1207$ . The problem of insufficient farm size should therefore be viewed as a separate problem than the extent of farm fragmentation.

Supply and demand factors explain the presence and persistence of farm fragmentation. On the supply side, three distinct mechanisms can be identified. First, it is possible that increasing land scarcity and the lack of alternative economic opportunities oblige farmers who need more land to farm any land, irrespective of its location, distance, and size. Hence, with continual reduction in the choice of new land to be operated, farm fragmentation will probably increase over time. A second mechanism consists of the limits and constraints imposed by the state on land transactions, which raise transaction costs and make possible adjustments (e.g. toward consolidation) by the farmers more difficult and costly. Finally, the inheritance system, characterized by the division of each of the blocks among the male inheritors also may help explain farm fragmentation.

Although these mechanisms may contribute to farm fragmentation, there are several reasons to believe that they do not represent the fundamental cause of farm fragmentation. Although land scarcity has a direct influence on farm miniaturization, its influence on farm fragmentation *per se* is only indirect and requires the presence of other conditions. In particular, it is necessary to assume the presence of transaction costs, which reduce the number of land transactions and therefore land consolidation opportunities, or to assume that the costs of fragmentation are sufficiently small or more than compensated for by its benefits. In the absence of transaction costs and the presence of significant costs stemming from farm fragmentation, farmers would exploit the benefits by trading land among themselves in order to consolidate their holdings.

As far as the inheritance system is concerned, three remarks can be made. First, subdivisions of blocks among heirs leads to increased miniaturization, and not necessarily to increased farm fragmentation. Second, we know that inherited land accounts for only 44 percent of all operated area in the three study regions; more than half of the operated land has therefore been acquired through means other than inheritance. Finally, if farm fragmentation were costly, it seems unlikely that farmers would continue to bequeath such scattered holdings to their descendants.

These anomalies raise the likelihood that farmers may be receiving significant benefits by fragmenting which translates into demand for farm fragmentation by farmers. Farm fragmentation can be a rational response to prevailing imperfections or failures in the markets for credit, labor, farm inputs, and foods in Rwanda, and to the fact that land is not a homogeneous factor of production. Under labor market failures (the presence of which was strongly suggested by the inverse



relationship between farm size and yield), farm fragmentation could smooth labor requirements over time, hence avoiding seasonal labor bottlenecks and resulting in higher land productivity. Farm fragmentation can also be explained as a response to failure in commodity markets whereby farmers put a high premium on food self-sufficiency; if different blocks are suitable for the cultivation of different crops, fragmentation facilitates crop diversification and improves match between diversified food requirements and production. In Rwanda, a considerable degree of soil and agroclimatic diversity exists within relatively small areas. In the absence of perfect capital or insurance markets, fragmentation also provides insurance to the farm household against fluctuations in yield on individual blocks. This is particularly important in Rwanda, where rainfall, flooding, pest and bird attacks, and damage from hail, wind, and low temperatures are highly variable across small geographical areas.

The data on temporary land transactions (see Table 4-2, presented earlier) strongly suggest that the demand-side aspects are important in explaining farm fragmentation. Apart from a small proportion of large farms that only lease out land, almost all sampled households that lease in or borrow land actually increase their level of fragmentation. Even the 14 percent of farmers who "swap" blocks through simultaneous leasing in and out arrangements increase their level of farm fragmentation, on average.

The private costs of farm fragmentation are also limited. In the three study regions, the average distance between the homestead block and other operated blocks can be covered in less than 10 minutes, and the perimeter formed by all blocks can on the average, be covered in approximately one hour (Table 4-11). Of course, there are some extreme cases of fragmentation, but the evidence strongly suggests that labor wastage due to travel time between blocks is more than compensated for by the benefits to be gained from fragmenting.

The econometric results at the plot level in the three prefectures (both pooled and individual prefecture-level regressions) indicate that farm fragmentation is not significantly related to plot yields. Thus fragmentation imposes no productivity costs on farmers and probably provides benefits in risk reduction.

In this context, the policy recommendation is *not* to impose consolidation upon farmers. Consolidation alone will not increase farm size and may increase the risk of total crop failure. Policy interventions should instead attempt to alleviate the constraints and market failures to which farmers adjust through fragmentation. In particular, if labor, farm inputs, commodity, and credit markets were expanded and made more efficient, farmers should willingly reduce their level of farm fragmentation because the benefits from fragmentation will have been greatly reduced. This strategy should be complemented by a policy of reducing the transaction costs in land markets. In particular, constraints on land sales and exchanges should be removed in order to facilitate land transactions among farm-

TABLE 4-11. Alternative Measures of Farm Fragmentation

Measure	Pooled Prefectures %	Ruhengeri %	Butare %	Gitarama %
Number of blocks				
1-2	9.5	8.3	2.5	17.5
3-4	22.4	19.3	18.8	28.8
4-7	27.6	27.8	30.0	25.0
8-10	22.4	25.0	27.5	15.0
-10+	18.1	19.4	21.3	13.8
Mean*	7.1	7.7	7.9	5.9
Median*	6.0	7.0	7.0	5.0
Topographical dispersion				
Zero	25.4	38.9	6.3	32.5
0-0.2	22.4	9.7	37.5	18.8
0.2-0.3	12.9	8.3	16.3	13.8
0.3-0.4	11.6	12.5	15.0	7.5
0.4-0.5	14.6	12.5	12.5	17.5
-0.5+	13.4	18.1	12.5	10.0
Mean	.24	.25	.26	.21
Median	.22	.23	.23	.17
Simpson dispersion index				
0-0.2	7.3	2.8	7.5	11.3
0.2-0.4	10.3	5.6	10.0	15.0
0.4-0.6	21.1	12.5	20.0	30.0
0.6-0.8	35.8	44.4	41.3	22.5
0.8-1.0	25.4	34.7	21.3	21.3
Mean	.61	.69	.62	.54
Median	.66	.75	.66	.57
Average distance (minutes)				
0-3	22.4	11.1	16.3	38.8
3-6	16.8	15.3	21.3	13.8
6-9	20.3	20.8	20.0	20.0
9-15	21.1	30.6	26.3	7.5
Over 15	19.4	22.2	16.3	20.0
Mean	9.8	10.9	9.6	9.1
Median	7.5	10.0	7.9	5.4
Sum of distance (minutes)				
0-10	19.0	11.1	12.5	32.5
10-30	15.5	9.7	17.5	18.8
30-60	22.0	26.4	23.8	16.3
60-120	22.4	29.2	23.8	15.0
Over 120	21.1	23.6	22.5	17.5
Mean	80.1	95.1	78.6	68.2
Median	53.5	65.5	58.0	27.5
Perimeter (minutes)				
Zero	17.2	6.9	11.3	32.5
0-30	19.4	18.1	25.0	15.0
30-60	22.0	18.1	23.8	23.8
60-90	16.8	26.4	17.5	7.5
Over 90	24.6	30.6	22.5	21.3
Mean	67.4	83.5	59.1	61.2
Median	47.7	71.1	44.2	38.3

\*Expressed in number not percentage.

ers, thereby enabling them to reach their optimal level of farm consolidation. The availability of credit also would facilitate land transactions and enable farmers to achieve their desired level of farm fragmentation.

### **LONG-TERM SUSTAINABILITY OF THE AGRARIAN STRUCTURE**

Although the rural communities in Rwanda are showing a remarkable ability to adjust to increasing land scarcity, the present research has identified some potentially important phenomena for the future of the agrarian structure and its long-term sustainability.

The reduction in operated farm size has been accompanied by intensified use of land. At the same time, farmers use few modern inputs (e.g., compost, chemical fertilizer), even though these may be essential for replenishing the productive capacity of the soil and they do not use lime to counteract soil acidity problems. These trends raise important concerns about the long-term sustainability of Rwandan agriculture. The apparent trade-off at the household level between short-run productivity (and satisfaction of immediate food needs) and long-run productivity highlight the necessity of developing technical and investment packages that are profitable to farmers in the short run, while conserving the land and its long-term productive potential. This trade-off is particularly important given the lack of alternative economic opportunities to Rwandan farmers.

We also know that although investments in land conservation are being made on a voluntary basis on blocks which farmers can bequeath, they are rarely made voluntarily on other blocks. Hence, the development of short term rental markets (which benefits land-poor households in the short run) may jeopardize the long-term productivity of agriculture, because such land investments are less likely to be made and properly maintained.

The continuing population pressure on the land, coupled with a lack of economic opportunities outside agriculture, raises other important concerns about the future development of the Rwandan agrarian structure. It is indeed possible that, as in Asia, landlord-tenant relationships, coupled with the permanent indebtedness of land-scarce tenants to resource-rich landlords, may develop. The evidence, however, suggests that land scarce households have so far been able to rely, to a large extent, on kinship and family relationships, which limit the potential for exploitative contracts and land concentration. Government intervention in the form of ceilings on land accumulation or controls over rental contract terms, instead of the current restrictions imposed on land transactions, would probably be a more efficient way to check the development of land concentration and exploitative relationships, as well as to limit the efficiency losses identified earlier.

In addition, the extent of control over land and its alienation by the (extended) family and the beneficial effects of this land redistribution on land-scarce households, which have been identified through this research, strongly argue against the absolute and indiscriminate privatization of all the land. Such privatization could lead to social destitution for households with little legal endowments, and to the disintegration of the socially useful linkages between families that appear to prevail under the current conditions of economic uncertainty. Clearly, the situation varies greatly across households and agro-ecological conditions, and any fundamental changes in the current land tenure system would require flexibility and local adaptation.

The present legal system already provides flexibility by enabling farmers to register their own land and to acquire full ownership. Such a system could probably be decentralized and made cheaper and more accessible to the farmers, but registration should continue to be left to the farmer's (and the family's) discretion.

Government programs in land conservation investments also could be strengthened. Indeed, it could be a powerful mechanism for encouraging farmers to invest in and maintain land improvements. Government-sponsored land investment programs could also be productively used to redress some of the negative effects on land improvement identified in this study (e.g., those stemming from reduction in farm size, distance, and short term rights of tenure).

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# 5

## LAND, SECURITY OF TENURE, AND PRODUCTIVITY IN GHANA

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In this chapter, we present findings about tenure security under indigenous tenure institutions in Ghana, and its effects on agricultural productivity. Following a brief overview of the study, we summarize the land legislation and indigenous tenure arrangements prevailing in the study regions, present some of the findings pertaining to land holdings and markets, and discuss security of tenure and its relationship to credit, land improvements, and land productivity. The chapter ends with a summary of policy implications of the findings.

The issue with which this study is concerned is one that preoccupies many scholars of agricultural development: To what extent does security of landholding rights influence long-term investment decisions of Ghanaian farmers and, ultimately, the productivity of their land? To shed some light on this broad question, the study provides an analysis of the prevailing land tenure arrangements among selected farmers in Ghana. The information on which the analysis is based was obtained from representative samples of farmers in three areas in the southern part of the country, representing coastal scrubland savanna, tropical rain forest and woodland savanna, respectively. These areas are also characterized by significant cultural diversity, especially in inheritance rules, giving a representative picture of the major indigenous land tenure practices in Ghana.

The study sought to examine the efficiency implications of existing institutional arrangements for rural land tenure in Ghana. In this respect, an attempt is made to empirically assess the extent to which uncertainties created by pressures on existing land laws and customs have constrained agricultural productivity. This assessment leads to consideration of specific policy measures that may be necessary for enhancement of land tenure security as a means of promoting increased agricultural efficiency.

### GHANAIAN LAND TENURE

Ghana has a relatively small population for its land area. The population is, very unevenly distributed resulting in extreme disparities in densities between regions. This diversity in land pressure, and variations in agroecological features make the country suitable for an examination of land tenure arrangements and their influence on agricultural productivity. With a total area of 239,400 square kilometers, Ghana is roughly the same size as Britain and about one-quarter the size of Nigeria. The population was estimated at 13.2 million in 1986, giving the country a density on arable land of 0.21(ha) per person, which compares favorably with Rwanda (0.18) and Kenya (0.11), but unfavorably with Cameroon (0.69) or Cote d'Ivoire (0.36). Between 1960 and 1984, population growth in Ghana, was among the highest in the world, aggravated by high fertility rates and falling infant mortality. Not only has there been rapid expansion in absolute terms but there has also been fast growth of the urban population. Most of this expansion is concentrated in the southern part of the country which accommodates more than two-thirds of the country's rural population.

The highest concentration of population is found within the area bounded by Accra-Tema, Kumasi and Sekondi-Takoradi, where rural densities as high as 200 per square kilometer have been recorded.

Ghana's economy is based on agriculture and mining, although there is also significant import substitution manufacturing. Agriculture accounts for more than 75 percent of exports. Cocoa beans and related products contribute nearly 72 percent of total merchandise exports. The Ghanaian economy recorded impressive growth in the 1950s and early 1960s, when the country was the world's leading cocoa producer. The period since the mid-1960s was characterized by serious economic decline and infrastructural decay. Since the mid-1980s, however, there have been significant policy improvements, which have stimulated increasing cocoa output, provided the incentive for some agricultural diversification and attracted investments in the mining sector.

### Evolution of Land Tenure Systems

The establishment of cocoa production in Ghana since the 1870s is itself an important example of the adaptability and resilience of indigenous land tenure arrangements. But this development has also created a new set of problems relating, for example, to security of rights of migrant farmers over their land, litigation over the legitimacy of land transactions, iniquitous sharecropping arrangements, and fragmentation and miniaturization resulting partly from land pressure and customary systems of succession in some locations. Many of these problems emerged much earlier but, remained latent for much of the 1970s and



early 1980s, essentially because of the near collapse of the economy and deterioration of the rural infrastructure which was reflected in the steep decline in the export trade. But recent economic revitalization has caused rural land tenure problems to assume urgency all over the country.

The basic land laws in Ghana are deeply embedded in the sociocultural system and political institutions of its indigenous societies, even though they have also been fundamentally influenced by administrative and statutory rules. Given Ghana's numerous ethnic groups distinguishable by linguistic and cultural differences, considerable diversity might be expected in indigenous tenure systems. But because land use systems also reflect cultural adaptability to specific agroclimatic conditions and farming systems, land tenure practices in Ghana display some distinct regional similarities, which tend to coincide with broad agroclimatic zones. The most important distinction in land tenure practices, however, is based on the indigenous systems of descent, which is often also the basis for local political organization (Benneh 1970, 1975).

The Akan groups, which occupy the area west of Lake Volta and south of the Black Volta, have a hierarchy of political authority in which religious and economic activities are decentralized to lower levels, while jural functions are more centralized. The Akan practice matrilineal descent on the basis of which inheritance to land and political office is determined. The basic unit of social organization is the matrilineal clan consisting of persons claiming real or putative descent from a common ancestress through women. But because members of Akan clans are today widely dispersed, the clan no longer plays so important an economic role as its segments, which constitute local matrilineal lineages (*abusa*). The matrilineage exercises control over some specified territorial area within which families and households may claim land. All unallocated and abandoned land is vested in the matrilineage (symbolized by the chief's "stool"), which is distinguished from the person of the chief. Once allocated to a family, land is inherited traditionally, by one's nephew and is ideally, not subdivided.

Among the non-Akan who occupy much of the northern, eastern and southern savanna, indigenous political organization varies greatly, although patrilineal rules of descent predominate, whereby property passes from father to son. The main groups in this category include the Kwa-speaking Ga-Adangbe and Ewe; Guan-speaking Gonja and Gur-speaking Dagomba; Mamprusi, and Kusansi-Talensi. In their political organization, some of these groups have centralized authority similar to that of some Akan groups, but the majority are somewhat small acephalous societies. The most important unit of social organization is the exogenous patrilineal lineage, whose members include all persons able to establish descent through the male line to a known male ancestor, and theoretically to each other. The patrilineage exercises intermittent jural-political functions, in-

cluding the organization of control over its territory. It maintains general administrative authority over the lineage land, but its leadership varies significantly among these groups, depending on the level of centralization and degree of stability. There are also significant differences in systems of succession to land inheritance relating, for instance, to the share of entitlement due to each.

The rules of succession to land practiced by both the Akan and non-Akan groups have significant long-term implications for land distribution and land use. Sometimes among the matrilineal groups, nephews do not inherit family land because only one of them is formally selected in each case. But so long as the matrilineages controlled adequate unallocated land, landlessness did not emerge as a serious problem. Those unable to acquire family land through the succession process were able to establish use rights on new land allocated to them by the lineage head. Once all land controlled by the lineage group had been allocated, those who found themselves landless had little option but to migrate.

Because indigenous political systems were sufficiently accommodating, migrant cocoa farmers or "strangers" were able to establish use rights in land at their new places of settlement through political incorporation, marriage, purchase-like transactions, long-term lease arrangements or sharecropping agreements. These arrangements have historically played an important role in making land available to those who needed it, particularly during the first half of this century. The emergence of a land market, stimulated by the establishment of oil palm and cocoa production during the 19th century, not only indicates the adaptability of indigenous tenure systems but also underlines the response of Ghanaian farmers to demand potential.

Cocoa was established in Akwapim in the 1870s by local merchants who had previously accumulated the necessary investment capital from trade in slaves, kola nuts, palm oil and rubber. The scarcity of good farming land in this area soon led to migration of cocoa farmers toward the northeast into Akyem Abuakwa and eventually Ashanti. Akwapim farmers were joined in this movement by Ga-Adangbe and some Guan groups. Because most of the areas settled by the early migrant farmers were not inhabited by local people, it was not difficult to arrange for land purchases or other types of traditional leases. There is some disagreement concerning the nature of particular rights acquired by migrant farmers over land. This disagreement underlines prevailing normative confusion compounded by convenient re-interpretations concerning the nature of indigenous institutions. Some foreign anthropologists, legal reconstructionists, and national idealists claim that the arrangements under which migrant farmers obtained land could not have amounted to "sale" because land is customarily not "saleable". Historical evidence, however, indicates that the purchase of previously unallocated forest land on a large scale, initially for oil palm plantations or gold prospecting and later for cocoa, had taken place since the 19th century (Hill 1963, 1970,

McPhee 1971). It is important to note that although land sales to strangers could take place in situations characterized by land abundance, indigenes had no need to purchase land in their own home areas as they were able to obtain whatever land they needed on the basis of their membership in the social group controlling land allocation in a given territorial area.

Two modes of settlement by migrant farmers, reflecting their indigenous social organization, have been distinguished. The patrilineal groups, notably the Krobo, formed land-buying "companies" composed of unrelated individuals. These "companies" (adaptations of the local *huza* agricultural system) subsequently divided the purchased land into strips and allocated shares to individual members in accordance with their contribution toward the purchase price (Hill 1963). The matrilineal groups bought land individually or in association with a few members of their matrilineage. In many cases, migrant farmers bought far more land than they would be able to develop for a long time. This practice not only suggests a view toward purchased land as secure saving, but may also underline the desire by matrilineal migrants to pass on the benefits of this investment to their own sons, who would have contributed considerable amounts of labor to the development of the farm. Thus, in addition to stimulating market transactions in land, the commercial production of cocoa also contributed to the modification of inheritance rules among both the patrilineal and matrilineal migrant groups.

Over time, as land became increasingly scarce, indigenous arrangements under which individual members of the lineage enjoyed general rights of access to land have been rendered untenable. Indigenous tenancies have gradually been replaced by sharecropping (*abusa*, *abunu*) and piecework contracts (*nkotokuano*), which enable local landowners to obtain labor for their farming enterprises. As might be expected, commercial transactions in land and the transformation of inheritance rules, compounded by population pressure, have given rise to increased litigation over land, as individuals seek to exclude those they believe to hold illegitimate claims, especially migrant farmers. Ghana's colonial legacy, with respect to rural land policy and administration, is characterized by a grossly inadequate land information system. Weaknesses in existing land administration procedures have been dramatized, for example, by an increasing number of litigations over supposedly officially sanctioned sales of the same piece of land to different individuals.

### Statutory Modifications of Land Use Rights

Since independence, successive governments have initiated legislation to resolve some of the problems arising from the conflicts outlined above. Some legislation enacted during the 1960s had the objective of protecting the rights of land pur-

chasers as well as tenants, while circumventing speculation by landowners. Some of these statutes have been subsequently revised, for instance, to provide a legal minimum period for leaseholds or to limit the rates for land rents.

Recent enactments of Intestate Succession, Marriage and Divorce, Administration of Estate and Head of Family (Accountability Laws) may also be said to have been an attempt to give recognition to the nuclear family as the basic unit of production, and to protect the interests of wives and children over family land where the father/husband dies intestate. But the bulk of statutory law relating to rural land in Ghana has remained largely nugatory. Most land matters are handled by lineage elders and local chiefs in accordance with current interpretations of indigenous land law. This persistence of legal duality, or more correctly syncretism, is not only compounded by weak and ineffectual institutions of land administration, but also reflects official ambivalence, since Ghana's independence, about appropriate political role of traditional authorities in Ghana. The continuing lack of resolution of these issues implies a heightening of uncertainty among migrant farmers, tenants, and others who have entered into transactions over land, about the security of their investment. Such uncertainty is bound to stimulate costly litigations and also lead to reduced productivity, particularly on contested land.

### **Study Objective**

It is evident from the foregoing discussions that while land remained relatively abundant in Ghana, indigenous tenure systems provided sufficient security to facilitate increased commercialization of agricultural production. But as land has become increasingly scarce or acquired high market value, the sociocultural basis of indigenous tenure arrangements have fundamentally weakened and indigenous tenure rules have not adjusted sufficiently quickly. Already, pressure for modification in tenure arrangements is being exerted in areas of high population densities or intensive commercial farming. While the government of Ghana has enacted legislation for registration of rural titles as a solution to emerging problems of land administration, registration in itself may not yield the expected security and desired productive responses without commensurate economic incentives, including adequate infrastructure and effective implementation. But an even more fundamental problem relates to the government's ability to implement large scale systematic registration and titling and to maintain and update the land records.

### **The Study Areas and Design**

The areas chosen for study were Anloga in the Volta region, Ejura in the Ashanti region, and the Wassa-Amenfi in the Western region. These together represent many of the important features of Ghanaian agriculture.

The Anloga area is located about 150 kilometers to the northeast of Accra, along the Atlantic coast. Both the road to Accra and the road to the Togo border are relatively good. The population density in the immediate Anloga surroundings is extremely high (over 360 persons per square kilometre, and population pressure is high for the entire southern Volta region. The population is composed almost entirely of the patrilineal Ewe. The terrain is flat and the soils are sandy and extremely poor. Rainfall is quite low (750 to 800 millimeters per annum) and occurs in the major season between September and November and the minor season in April to June. These characteristics have led to the development of intensive cultivation of shallots (*sabala*). In our study area, the shallots are grown on raised beds, situated on minuscule, long and narrow plots, generally about 1 meter wide and 3 meters long. Shallot plots are found in two locations, one between the ocean (to the south) and the villages in a flat depression (largely man-made) and the other between the villages and several lagoons to the north (Nukunya 1978, 1988). These areas run parallel to the ocean and are less than 100 metres wide in some places.

The Ejura area is located about 100 miles north of Kumasi, Ghana's second largest city. The area is served by a road of only average quality leading to Kumasi. The population of the area is low relative to the amount of land, about 40 persons per square kilometer. The predominant ethnic group is the matrilineal Ashanti, but migrant groups, mainly from northern Ghana, account for over half of the area's population (Arhin 1988). This area lies in a derived savanna region just to the south of a dry savanna and to the north of a forest region. The topography is fairly undulating with elevation ranging mainly between 150 and 300 meters. The soil is generally deep, well drained, and sandy clay loam. Mean rainfall is about 1,400mm and occurs chiefly between March and July, with minor amounts falling between September and November. A wide range of crops, including maize, yam, groundnut, sorghum, and tobacco, are produced.

The final region, Wassa, is the most remote of the study areas, located in the heart of the western region. The population to land ratio of 30 persons per square kilometer is low, but much of the land is not arable. The indigenous Wassa (Akan speaking) make up 33 percent of the population and are joined by numerous migrants, of which the Ashanti are the most prevalent. The terrain can be characterized as a low rolling plateau with the highest elevation recorded at 360 meters. The oxychrosol intergrade soils have a rather low pH value under 5.5 on a scale of 0 to 14, and can become acidic from heavy rains. Rainfall is the highest among our study regions—about 1750mm per year, much of it between May and July. Much of the land is devoted to cocoa production, despite its marginal suitability for cocoa. Farmers diversify their rather large holdings into the production of other crops such as maize, yam, cassava, plantain, and kola.

The study draws on random samples of households in each area (115 in Anloga, 150 in Wassa, and 158 in Ejura). For each area, an extensive set of variables pertaining to farm, household, and parcel characteristics were collected. Of particular importance to this study are the parcel variables concerning soil quality, the mode of acquisition, land improvements made, and rights of use and transfer held by current operators. A selected number of parcels<sup>1</sup> were for other enumerated for inputs and outputs during a single season in 1987.

## **PATTERNS OF LAND HOLDINGS AND MODES OF LAND ACQUISITION IN THE GHANA STUDY REGIONS**

### **Farm Size**

The average farm sizes (medians in parentheses) were found to be 0.39 (.26) ha in Anloga, 3.81 (2.59) ha in Ejura, and 18.6 (13.3) ha in Wassa. In order to assess the potential availability of land for the next generation, farmers were asked whether they thought that the land they currently held would be sufficient for their children and whether the land would be subdivided upon inheritance. In Anloga, approximately two-thirds of farmers felt that they did not have sufficient land for their children; moreover, 95.7 percent are likely to subdivide their parcels further. In Wassa, more than 45 percent of farmers reported that they did not have sufficient land for their children, and 85.3 percent expected that their holdings would be subdivided. In both regions, inactive markets for land (mainly constrained by supply) make it impossible for many farmers to obtain additional land for their children. In Ejura, there is less concern over the availability of land as large uncultivated land remains in the area. Thus, in addition to reporting fully sufficient farm sizes for the current generation of farmers, 81 percent of the farmers there felt that they had sufficient land to bequeath to their children. However, there are signs that the average farm size in Ejura is likely to decrease, as 54.4 percent of farmers plan to subdivide their parcels at inheritance.

### **Inequality of Holdings**

In addition to wide variations of average farm size across the three study areas, land holdings within each region vary greatly. The largest 20 percent of farms account for 56.3 percent of land in Anloga, 51.7 percent in Wassa, and 51.4 percent in Ejura. The Gini coefficients for operated land area were 0.51 for

<sup>1</sup> In Ejura, the unit of observation was a plot, which is a portion of a parcel devoted to a single cropping pattern.

Anloga, and 0.46 for Wassa and Ejura. This comparison suggests that the Anloga region is beset by the most severe degree of inequality in land distribution. It should be recalled, however, that absolute inequality is smallest in Anloga. The largest shallot farm was only 3.47 ha, making it 3.42 ha larger than the smallest farm. By comparison, the Wassa region had maximum and minimum farm sizes of 153.2 ha and 1.1 ha; for Ejura, the two extremes were 24.2 ha and 0.15 ha.

The relative inequality of land holdings remains the same in Anloga and Wassa after adjusting for household size. In Ejura, inequality worsens considerably as the Gini coefficient on land holdings per capita is .54. On a per capita basis, the bottom 20 percent of households in Anloga have holdings of under .017 ha for each household member, while the top 20 percent have at least .082 ha per household member. In Wassa, the 20 percent households with the least land operate up to .87 ha per individual versus 4.00 ha per individual for the households with the most land. The corresponding figures for Ejura are .2 ha per individual (land-scarce households) and 1.11 ha per individual (land-abundant households).

### Fragmentation

Highly fragmented holdings were observed in Anloga and Wassa but not in Ejura. The median number of parcels operated was 5 in both Anloga and Wassa, but only 1 in Ejura. The severity of fragmentation in Anloga and Wassa was somewhat mitigated by the proximity of the parcels to homesteads. The median distance to parcels is 1 kilometer in Anloga and 1.5 kilometer in Wassa. Farmers in Ejura, though typically cultivating a single parcel, have a median distance of 3 kilometers to reach their parcels.

### Modes of Acquisition

In Anloga, permanent land transfers outside of inheritance are virtually nonexistent (see Table 5-1). This situation reflects the very high value of land attributable to population pressure. There are numerous temporary land transactions but the high number of rentals and pledges overstates the actual development of these markets. First, half of all rented and pledged parcels currently operated were acquired between 1982 and 1984, when Ghana suffered its second severe drought in a short period of time. The drought caused desperation among many households, who reluctantly pawned land for cash. Second, 80 percent of rentals and 55 percent of pledges occurred between relatives, further underlining sociocultural limitations in the land market, even in case of leases and other temporary transfers.

**TABLE 5-1. Mode of Acquisition by Ghanaian Region (operated parcels)**

Mode of Acquisition	Anloga	Wassa	Ejura
Purchased	0.9	18.0	6.3
Inherited	57.5	6.3	22.1
Given	0.8	44.2	43.1
Appropriated	—	22.1	14.7
Allocated from government	—	—	—
Other permanent acquisitions	—	1.7	0.4
Rented	21.5	7.0	9.6
Pledged	19.3	0.6	0.4
Borrowed	—	0.1	—
Squatter	—	—	3.7
Total	100.0	100.0	100.3

The relative importance of certain modes of acquisition in Wassa results directly from local rules of descent, which are predominantly matrilineal. In order to pass cocoa farms to the children who contributed in their development, farmers tend to transfer land through gift before death in contravention of customary rules of succession. Some 44.0 percent of land acquisitions were made through this method, attesting to substantial shift from the ideal norm of matrilineal transmissions (see Table 5-1). A significant share of parcels (22.1 percent) had been acquired through appropriation or allocation of village land. Owing to increased population pressure, however, no land had been appropriated in the past five years and only four parcels were acquired through this method in the past 10 years. Appropriation from the pool of unallocated village land is not expected to remain a significant method of land acquisition in Wassa in the near future.

Land markets are poorly developed in Wassa. Almost all purchased lands were village lands bought by migrants; sales among individuals were rare. Markets for temporary land transfers are weak too. Because land markets in Wassa remain weak while the population is increasing, land-abundant households hire labor on cocoa farms rather than lease out land. Relatives are an increasingly important source of land resources in Wassa. Whereas 50.9 percent of all permanent land acquisitions were obtained from relatives, the proportion for acquisitions made during the past five years is 75 percent.

In Ejura, the methods of land acquisition suggest a mixture of matrilineal and patrilineal rules of inheritance in the region. For instance, two types of transfers within the family are common: inheritance (22.1 percent of all parcels) and gifts from relatives (43.1 percent). It is believed that gifts are used in many instances to circumvent existing matrilineal rules so that children may become heirs to their parents' land. Gifts and bequests accounted for 67.2 percent of acquisitions in Ejura.



As the data indicate, land market transactions in Ejura are limited. Purchases accounted for only 6.3 percent of all parcels. It is unlikely that land purchases will increase during the next few years because village lands are still being used to satisfy some of the demand for land by members of the villages forming new households who are not able to obtain land from their kinsfolk.

Land rentals in Ejura accounted for 26 of the 272 operated parcels (9.6 percent). All but two rentals occurred between nonrelatives. It may seem that the coexistence of appropriated lands and rentals is an anomaly, but rented land is found mainly on migrant's farms while appropriated land is found on natives' farms. We are unable to assess the trend in renting over time because many rental agreements contracted some years ago have lapsed and were not included in the survey. In sum, land transfers among relatives are likely to remain significant in the future. The proportion of acquisitions from relatives has remained steady over time at around 70 percent, and the incidence of market transactions shows no sign of accelerating.

### **The Effects of Land Holdings and Modes of Acquisition on Land Improvements and Productivity**

In both Wassa and Ejura<sup>2</sup> the pattern of land holdings did not influence the incidence of investments in land improvements made by farmers after acquisition. The only significant finding was in respect of farm size and mulching investment in Anloga. There we found that investment in mulching was made on 21.1 percent of the sampled parcels on farms above 0.4 ha. but on 43.3 percent of the parcels below 0.4 ha (the difference is significant at the .001 level). In no other cases did farm size or level of fragmentation affect land improvements. This evidence suggests that land improvements may not be related to the pattern of land holdings.

The mode of acquisition was examined for its influence on behavior relating to land improvement after acquisition for only Wassa and Ejura. In both areas, the mode of acquisition was unrelated to improvements made on the land after it was acquired by the current operator. This may suggest that policies that encourage the development of formal markets in land, in contrast to customary methods of acquisition, or policies that forbid tenancies, are not justified on grounds of enhancing land improvements.

In all the three areas, econometric regressions were carried out relating parcel-level yields to a host of right-hand side variables, including size of holding,

<sup>2</sup> In Anloga, data on land improvements were collected only on owned parcels, 97 percent of which were inherited.

fragmentation, and mode of acquisition. Yields are inversely related to parcel sizes (plot sizes in Ejura). This finding signals the presence of diminishing returns to scale or a decline in intensity of input use as parcel size increases. Some factor markets are generally inefficient, attempts to cultivate larger parcels at intensive levels are not justified. Because farm size is not related to yield in any of the study regions, the distribution of land holdings does not appear to have a major effect on production efficiency. Thus there would be no support for redistribution of land on efficiency grounds.

The effect of fragmentation on yields is not significant in any of the study areas. The mode of acquisition did not affect yields in Ejura and Wassa, and data limitations prevented its analysis in Anloga.<sup>3</sup> It is unlikely, however, that the relationship would be different in Anloga. Thus it may be observed that policies that seek to alter the modes of acquisition (and therefore tenure) cannot be justified on grounds of improving yields.

### **SECURITY OF TENURE AND ITS RELATIONSHIP TO AGRICULTURAL PRODUCTIVITY**

Security of tenure implies to the ability of a farmer to cultivate a piece of land on a continuous basis, free from imposition, dispute, or approbation from outside sources, as well as the ability to claim returns from input or land improvements while the farmer operates the land and when it is transferred to another holder. In this sense, therefore, security of tenure involves the perception of a farmer about his rights over a particular parcel of land. The variable that most closely reflects the security of tenure is thus the set of rights that the farmer may exercise with respect to a specific piece of land. The ability (right) to cultivate perennial crops, to make permanent improvements, or to grow annual crops over many seasons conveys the concept of continuous use of land. Furthermore, the possession of transfer rights, whether temporarily through rent, or permanently, through sale is important in the recovery of returns from land improvements upon transfer or alienation of land.

Table 5-2 gives the incidence of use and transfer rights that farmers may exercise with respect to their parcels in the sample areas. Within each area use rights do not vary much across parcels. Farmers in all areas have the power to exercise all the use rights on nearly all parcels (e.g., the rights to grow annual crops for more than one season; in Wassa and Ejura, the rights to collect fruit and firewood). Other rights, such as the right to be buried on the parcel, are

<sup>3</sup> After rented and pledged parcels were excluded, only one method of acquisition remained (inheritance).

**TABLE 5-2. Incidence of Land Rights in Ghana (in percentages of parcels for which the rights exist)**

Land Rights	Anloga	Wassa	Ejura
<b>Use Rights</b>			
Grow annual crops more than one season	93.6	100.0	100.0
Choose of annual crops	100.0	99.5	99.3
Grow perennial crops	—	98.4	80.9
To be buried	—	1.0	0.7
Collect wild fruit	0.2	98.8	99.6
Collect firewood	—	98.3	98.5
Use commercial trees growing wild	—	6.0	98.2
Make permanent improvements	79.6	99.2	79.4
<b>Transfer Rights</b>			
Register	59.0	92.1	79.4
Rent	56.7	85.6	77.2
Mortgage	47.7	92.9	73.2
Pledge	72.7	85.9	75.0
Bequeath	45.6	92.0	75.4
Give	43.8	85.3	69.9
Sell	45.4	64.9	72.4

nonexistent for nearly all parcels, as all villages have long established public cemeteries on family burial grounds.<sup>4</sup>

Rights of transfer are widespread and exhibit more variation across parcels. The right to sell was found on 64.9 percent of parcels in Wassa and 72.4 percent of parcels in Ejura. In Anloga, the proportion is lower (45.4 percent) because a high proportion of parcels were acquired through rental and pledge markets. Other rights of permanent and temporary transfer are even more common. The right to pledge occurs for 72.7 to 85.9 percent of parcels across Ghanaian regions.

### Formation of Land Rights Categories

If each land right is given equal weight, the formation of "bundles" of rights based upon as many as 15 rights, could contain an enormous number of combinations. For each region, we attempted to form bundles of rights, including all transfer rights and selected use rights<sup>5</sup>, but, this still created many distinct bundles of rights. The ranking and grouping of bundles in terms of security of tenure

<sup>4</sup> Some of the use rights that were reported as nonexistent should instead have been recorded as not applicable (e.g., collecting firewood in Anloga is not an issue because there are no trees).

<sup>5</sup> Most use rights could be excluded since they exhibited little variation across parcels.

proved to be impossible. We simplify the process by focusing on selected transfer rights (the rationale for this was explained in Chapter 2).

Three main land rights categories based on ability to transfer were formed. “Complete rights” parcels were those that could be sold by the current operator. Parcels that could not be sold but could be given away or bequeathed during a landholder’s lifetime were classified as “preferential transfer” parcels, the label indicating that gifts or bequests are normally directed, as a matter of innovative preference, to members of families or lineages. The remaining parcels, which may not be permanently transferred, were placed into the “limited transfer” category.

These categories are designed to permit a ranking of parcels from most secure (complete rights) to least secure (limited transfer). In each of the study areas, broader land rights are enjoyed on complete rights parcels than on parcels in other land rights categories. Parcels over which the current operators have only limited transfer rights are not widely transferrable, even on a temporary basis. Our categorization scheme, based on a rather simple method of discrimination, has captured most of the variation found in the enumeration of 15 use and transfer rights.

The land rights categories are highly associated with the mode of acquisition. That is, once the mode of acquisition is known, land rights can be predicted in most cases. For example, in Anloga, virtually no renters have any rights of transfer. All pledged land, however, can be temporarily transferred by the current operators. Finally, most inherited parcels can be transferred in any manner. This means that most land rights are fixed at the time of acquisition and individual farmers are generally not able to expand the range of those rights during the period of operation of the parcel.

The ability to exercise rights freely without approval may increase tenure security relative to cases where prior approval must be sought. For each region, we separated complete rights parcels into those for which the right to sell was conditional on prior approval and those for which it was not. We encountered problems in repeating this procedure for other land rights categories. The preferential rights categories often contained too few observations to permit further disaggregation and the issue of approval was not applicable for most limited transfer parcels (recall that rights of transfer did not apply at all in case of rented parcels).

Therefore we partitioned only complete rights parcels on the basis of approval. The two subgroups are labeled “complete rights with approval” and “complete rights without approval”. Preliminary analysis found this partitioning to have some significance only in Anloga and Wassa. Our analysis in this report

retains the partitioning only in these two regions. For Ejura, we report results for the aggregated complete rights category.

For comparison of security of tenure across regions, we prefer to concentrate only on owned parcels. If rented and pledged land were included, Anloga would then be found to have little tenure security. This would be misleading, because the owners rather than the current operators of the temporarily held parcels are likely to have some rights over the parcels.

Tenure security, as measured by rights over land and low incidence of dispute, is high in all regions. The percentage of parcels over which current operators claim rights of ownership and enjoy complete rights of disposal is 82.5 percent in Ejura, 76.7 percent in Anloga, and 70.3 percent in Wassa. Thus despite the absence of any formal government titles to land, farmers already enjoy most of the rights that a registered title would confer. The implication is that any program of land registration in the study areas would merely confirm existing land rights rather than create new ones.

Another way to illustrate security of tenure among the majority and Ghanaian farmers is to present the incidence of land disputes reported during the survey. The percentage of operated parcels over which there had ever been a dispute was 4.4 percent in Anloga, 9.5 percent in Wassa, and 3.7 percent in Ejura. Similarly, the proportion of households that had ever lost land as a result of dispute was very low: 4.3 percent in Anloga, 1.3 percent in Wassa, and 3.8 percent in Ejura.

These aggregate data conceal one group of farmers who may be suffering extreme levels of tenure insecurity: the group of migrants in Wassa and Ejura. In Wassa, migrants are more likely than locals to have been involved in land dispute. Disputes occurred on 14.7 percent of migrant operated parcels, whereas, local farmers have faced litigation over only 5.4 percent of their parcels. However, migrants do not possess significantly fewer rights over their parcels than do indigenes. For instance, indigenes had complete disposal rights over 73.9 percent of their parcels, as opposed to 65.4 percent for migrants over their parcels. In Ejura, the incidence of dispute is similar between migrants and local farmers, but, migrants have significantly fewer rights over their lands. The proportion of owned parcels that may be sold is 67.7 percent for migrants and 87.8 percent for indigenous Ejurafie farmers. The protection of migrants' rights is an extremely sensitive political issue, as national policy favoring an improvement of migrant security often clashes with local sentiments. (This issue is discussed later.)

Table 5-3 shows the percentage of owned parcels for which current operators have the rights to sell, bequeath, rent, and mortgage (with and without approval from family or lineage) across regions. The proportion of owned parcels that may be transferred by any method without approval is always highest in Anloga.

**TABLE 5-3. Land Rights on Owned Parcels (percent of parcels)**

Land Rights	Anloga	Wassa	Ejura
Right To Sell			
None	23.3	29.7	17.5
With approval	14.0	55.6	73.5
Without approval	62.7	14.7	9.0
Right To Bequeath			
None	23.1	3.3	14.1
With approval	9.1	79.5	74.8
Without approval	67.9	17.3	11.1
Right To Rent			
None	4.7	7.2	12.0
With approval	8.8	68.8	75.6
Without approval	86.5	24.0	12.4
Right To Mortgage			
None	19.4	2.0	16.7
With approval	10.4	76.8	73.1
Without approval	70.2	21.2	10.3

Furthermore, the difference between Anloga and the two other regions is extremely high. For example the proportion of parcels that may be sold without approval is 62.7 percent in Anloga, 14.7 percent in Wassa, and 9.0 percent in Ejura. Parcels in Wassa are generally more likely to be freely transferred (i.e. without approval) than those in Ejura, but, the differences are quite small. If the ability to transfer freely is indeed the paramount measure of the individualization of rights, the data strongly support the notion that increases in population pressure and commercialization result in more privatization of rights.<sup>6</sup>

If the ability to exercise a right freely is less than the existence of the right (with or without approval), however, a different conclusion must be made. The proportion of parcels that may be sold, regardless of approval, is highest in Ejura. If the right to bequeath during a landholder's lifetime is considered, the Anloga region contains the lowest proportion of owned parcels that fall in this category. In several villages in the Anloga sample farmers claim to have fewer rights over their inherited parcels.

### **The Effect of Security of Tenure on Agricultural Productivity**

Numerous analyses, including single-equation econometric regressions, were made to measure the effect of individual land rights on credit, investment in land

<sup>6</sup> This does not imply that more land transactions will occur. As shown earlier, without access to other resources, farmers are reluctant to alienate land regardless of population density.

improvements, input use, and crop yields. Details of the regressions can be found in Place and Hazell (1993), but we summarize the results here.

### **Credit**

Our evidence indicates that the link between security of tenure and use of credit is weak. First, the use of land as collateral is limited. In Anloga, only 8 of 36 commercial bank loans were secured against land or required proof of land-ownership. In Wassa, 5 of 18 formal sector loans used land as guaranty. Land was not used in the 7 formal sector loans in Ejura. Whereas, 47.8 percent of households in Anloga and 22.0 percent of those in Wassa used credit in 1987, only 5.7 percent of households in Ejura used credit. Thus, the link between security of tenure and credit could be tested only in Anloga and Wassa.

Following our formation of land rights categories at the parcel level, we created household-level security variables reflecting the proportion of land held in each of the land rights categories. Using logit regression analysis, we found a positive relationship, in Anloga, between the proportion of operated land held under "complete rights" and use of informal credit. It may be that the ability to transfer land is desirable to moneylenders, who were found to require the use of land as collateral for 9 of 10 loans. In Wassa, we found the counterintuitive result: informal loans are more prevalent in households with smaller proportions of land held under complete rights which could be transferred without approval. This finding may indicate that the land rights variable is capturing credit demand rather than credit supply effects.

### **Land Improvements**

Multinomial logit regression analysis was used to test the relationship between security of tenure and incidence of various land improvement bundles at the parcel level.<sup>7</sup> Improvements made after the parcel was acquired were highly associated with security of tenure in Anloga, but to a lesser extent in Wassa, although not in Ejura. In Anloga, owned parcels over which operators had "complete rights" were more likely to have drainage or excavation improvement.<sup>8</sup> Cross-tabulations of the data showed that 78.7 percent of parcels that may be bequeathed were improved, as opposed to 26.7 percent for those that could not be bequeathed (Migot-Adholla et al 1991). The ability to freely transfer land (as opposed to first obtaining lineage or family approval) also was positively related to investment in drainage or excavation improvements.

In Wassa, tree crops were more likely to be planted on land over which

<sup>7</sup> The types of land improvements analyzed were: drainage and land excavation for Angola, tree crops, for Wassa, and tree crops and destumping for Ejura. Others were mainly invariant.

<sup>8</sup> Only owned parcels were enumerated for land improvements in Anloga.

operators had “preferential” or “complete rights” of disposal than on parcels on which they had only limited transfer rights. However, the results were not significant across different specifications (although the coefficient estimates always implied a positive relationship between land rights and improvements). Finally, in Ejura, there was no relationship between category of land rights and investment in tree crop planting on destumping.

The differing results are partially explained by the types of improvements made by farmers. In Ejura, destumping is the major improvement made on parcels and could be considered essential for cultivation. In the circumstance, security of tenure may be of little consequence to this particular investment. In Anloga and Wassa, however, the types of improvements made are not essential and therefore may be influenced by land rights.

### **Use of Inputs**

We tested for the effect of land rights on various types of purchased inputs. The only improved input used in Wassa is pesticide. Information was available only on its incidence, so a logit analysis was employed. In Anloga and Ejura, use of individual inputs did not vary much over parcels<sup>9</sup>, so we used total costs of improved input per hectare as the dependent variable. Land rights were not related to input use in any of the regressions. This finding is not necessarily unexpected because the conceptual relationship between the two is somewhat weakened by the short-run nature of the benefits from seasonal inputs.

### **Crop Yields**

Rigorous testing was done to determine the effect of tenure security on land productivity. The types of crops examined varied across regions. Shallot yields were analyzed in Anloga, cocoa and its intercropped (maize, plantain, and kola) in Wassa, and groundnut, maize, and yam in Ejura. Having a continuous dependent variable (yield) and several parcel observations per household allowed us to better control for household level impacts on yields.<sup>10</sup>

## **POLICY IMPLICATIONS AND RECOMMENDATIONS**

### **Implications**

We found little evidence that land tenure insecurity has contributed to agricultural inefficiency. Therefore, any program that would alter property rights in

<sup>9</sup> For example, in Anloga all parcels received some fertilizer.

<sup>10</sup> Both fixed effects and error component models were used to control for unobservable household level effects.



land is likely to increase farm output only modestly, if at all. The variations in the extent of individualization in our three study areas suggest that privatization of land rights is enhanced by population pressure and agricultural commercialization. This finding implies that markets for land are more likely to develop in the densely populated areas particularly after the prospects for nonagricultural employment and alternative sources of livelihood are improved. Given these findings, it may be concluded that a costly national land-titling program by itself, without improvements in rural infrastructure, marketing, credit institutions, input supply and extension services, would be ineffective and probably counterproductive.

There may, however, be some justifications for favoring alternative tenure systems, but this is beyond the scope of our study. It has sometimes been argued that by providing some form of insurance indigenous tenure systems may inhibit the expansion of the nonfarm sector. While this argument is conceptually plausible, practical experience shows that in situations of agricultural stagnation, where individuals must find nonfarm careers, they have often tended to migrate to urban areas rather than start rural nonfarm businesses. Rural economic diversification appears to be closely associated with significant transformations in social organizations and adaptations in land tenure practices.

Indigenous tenure systems may not be amenable to rapid economic change because they reflect contemporary local desires. In situations of rapid economic change this could lead to tenure uncertainty, as perhaps is the case in Wassa, where uncertainties over the rights of migrant farmers versus the autochthons remain unresolved. Such a situation may cause undue loss of output, as farmers spend considerable time and money on litigation or lobbying. However, national legislation does not necessarily offer a lasting solution, unless such law is preceded by a process of political negotiations with the involved communities.

To the extent that formal credit institutions require collateral, it is arguable that indigenous tenure systems may discourage expansion of the use of credit. But this is not the most important constraint to the expansion of formal credit. There are many other obstacles to the expansion of formal rural credit that may be more important. There are limited funds in the banking system; an expansion of rural credit might imply a general decrease in lending. Agricultural loans to smallholders are often too small implying very high costs to formal lending institutions. Finally, risks in agricultural lending are inherently high because of the risks associated with the climate and the health of household labor. Thus formal credit institutions would not rush to provide credit to large numbers of smallholder farmers, even if they had state guaranteed titles. This is clearly illustrated by findings in the Kenya case study (Chapter 6).

### Recommendations

We do not find evidence that "incorrect" land tenure arrangements are the primary cause or even a minor cause of low agricultural output. Many other factors such as health, education, credit availability, and infrastructure appear to be more urgent problems facing rural households. Unless these conditions are altered, local tenure arrangements will continue to respond to these problems by offering some insurance against the income risks that the conditions create. It is conceivable that once rural conditions are significantly improved, tenure systems are likely to adopt to become more individualized as agricultural production intensifies. Nonetheless, the current pace of individualization appears to have provided farmers sufficient security to undertake productivity enhancing improvements on their land. Attempting to change tenure arrangements or land rights alone is unlikely to achieve higher output and incomes for farmers.

The Government of Ghana already passed a Land Title Registration Law in 1985 to provide the machinery for the registration of titles to land and interests in land. However, implementation of this law throughout the country will probably take a long time and be very expensive. A more cost-effective method for registering interests in land may therefore be required. One approach is to engage the active participation of traditional rulers, members of the newly created district assemblies, and lineage heads. Provision has already been made for determining boundaries between traditional areas. Therefore, an immediate objective could be adjudication of the boundaries of traditional areas to be followed by lineage and family lands and, ultimately, individual lands. Cadastral maps showing these boundaries could be prepared for each district or traditional area.

Ultimately this process would facilitate the adjudication and registration of individual parcels and the rights pertaining to them, following the pattern adopted in Kenya since the 1950s. Although the land registration process in Kenya has now covered more than 80 percent of farmland, the exercise is yet to be completed, nearly 40 years since its initiation. In the meantime, many of the title registers are already moribund because subsequent changes in boundaries arising from subdivisions and changes in ownership resulting from succession, sales, and other transfers have not been consistently reported to authorities. One reason for this situation is the cost involved much of which is borne by the farmers.

Alternatively, land registration could be selectively applied in Ghana. The government could proceed only where there appears to be a local demand for reform in land tenure institutions. In such areas, farmers might be willing to finance part of the cost of the program and they might update the registers following land transactions. Unless all parcel boundaries are formally adjudi-

cated and mutually validated, however, voluntary and spontaneous registration may cause costly inefficiencies.

Rural land tenure arrangements must be viewed in the context of the macroenvironment in which they exist. As described earlier, in much of rural Ghana, as well as some urban areas, few nonfarm opportunities for employment exist. Land has historically remained the sole means of economic livelihood and social security to rural people. Early in the colonial period, the control of land resources became vested in local chiefs, who often assumed the right to sell or otherwise alienate land to migrants and foreigners. But local lineage members continued to gain access to land by simply clearing a piece of hitherto uncultivated land.

As population has grown and the land frontiers closed, it became more important for lineages to satisfy the resource needs of its members. Lineages thus exerted controls over the transfer of land by its members, such as restricting permanent alienation of land to nonlineage members. This appears to have limited the extent to which farmers may freely exercise certain rights over their land. Yet security of access to some land by lineage members remained ensured. In the absence of equity funding, many rural people could be rendered landless and without access to alternative means of production or income.

Some observers, ignoring temporarily the insurance aspects of indigenous tenure systems, have argued that widespread insecurity of tenure, stifling of investment and low productivity are symptoms of indigenous tenure systems. We have tried to demonstrate with empirical evidence that this argument cannot be universally applied. The indigenous tenure systems in the three study regions in Ghana have all been flexible and accommodating to external economic stimuli.

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## SECURITY OF TENURE AND LAND PRODUCTIVITY IN KENYA

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Kenya has a total area of 580,367 km<sup>2</sup>, about the size of Texas or one-quarter the size of Zaire. Only about 20 percent of Kenya's land is considered to have high or medium potential for farming or intensive livestock production. Another 10 percent of the land is categorized as marginal for agriculture, while the remaining 70 percent is used for extensive grazing or taken up by national parks and forests. With a population of about 28 million, Kenya has one of the highest agricultural population densities in the world when its agroclimatic potential is taken into consideration.<sup>1</sup>

When Kenya was founded as a settler colony, large tracts of the most fertile agricultural land were set aside for exclusive occupation of white settlers under freehold tenure or leasehold. Africans were confined to specific "native reserves", where land pressure was soon aggravated by rapid population growth, restriction of movement, prohibition of production of high-value commodities, and price discrimination. The combined effects of agricultural stagnation and landlessness in the reserves became critical after World War II leading to political ferment and culminating in the Mau Mau rebellion (1952-59). The colonial administration responded with a series of political reforms and an agricultural intensification program, the most significant features of which were transformation of indigenous land tenure through land consolidation of fragmented peasant holdings and registration; development of infrastructure, input supply network, and rural

<sup>1</sup> In a ranking on the basis of potential carrying capacity, assuming intermediate levels of technology, persons per million of potential calories by Binswanger and Pingali (1986), Kenya ranked well ahead of India and Bangladesh.

credit; and removal of restrictions on production of export commodities (coffee, tea, pyrethrum).

The agrarian policies initiated toward the end of the colonial period have been pursued by successive governments since Kenya's independence in 1993. The country's impressive agricultural growth in the two decades after independence is often attributed to these policies, particularly to continued official commitment to land registration. Over the past 35 years Kenya has had the most extensive land registration program in Sub Saharan Africa. But a number of studies have raised serious doubts about land registration as a mechanism for achieving increased agricultural output in Africa. Many of these studies reveal surprising recalcitrance of indigenous institutions and land use practices, resulting, for instance, in incessant subdivisions necessitated by inheritance. Most such subdivisions go unrecorded, as do other transactions, thus rendering the land registers moribund. Because of the role of land as the ultimate source of economic security, the persistence of social embeddedness of rules of access to land, and the lack of alternative means of subsistence, land has not developed into a fully salable commodity within the former "native reserves". Its utility as collateral is therefore limited.

So far, there have been few empirical attempts at establishing the relationship among land tenure, agricultural investment, and farm productivity in Kenya. Given the country's extensive registration program and the high density of its agricultural population, Kenya provides an interesting opportunity not only to investigate the efficacy of tenure conversion as an instrument for increased agricultural output, but also to document some of the reasons for the observed imperfections in factor market operations. In order to establish these relationships, the Agriculture and Rural Development Department of the World Bank, in conjunction with the Agricultural Economics Department of the University of Nairobi, undertook a survey of 406 households in the densely populated Nyeri and Kakamega districts of Kenya during 1988.

Nyeri district, in central Kenya, is bounded by Mount Kenya to the east and the Aberdare range to the west. The western part is relatively flat, while to the south and east the topography is characterized by steep ridges and valleys. Rainfall varies from 750 millimeter in the central-northern part of the district to 1750 millimeter in the southwestern and northeastern parts of the district. The long rains normally begin in March and end in May, while the short rains begin in October and end in December. The two sites in this district chosen for the study are Kianjogu and Mweiga. Kianjogu is situated in the upper midland zone and has very high agricultural potential, while Mweiga is in the northern part of the zone and has lower agricultural potential.

Nyeri district has very high population density with some areas of high agricultural potential such as Tetu division, which includes Kianjogu, having more

than 400 persons per km<sup>2</sup>, whereas new settlement areas such as Kieni West have about 100 persons per km<sup>2</sup>. The infrastructure in the district is better developed than in other rural districts of Kenya. Major agricultural products are coffee, tea, maize, pyrethrum, dairy and vegetables. The principal town is Nyeri, with a population of about 50,000 persons.

Kakamega district, located in western Kenya, covers about 3,500 km<sup>2</sup> in area. The district's altitude varies from 1,250 meters above sea level in the west to 1,500 meters in the east. The south is dominated by hilly areas with deep river valleys, while the northern, central, and eastern parts of the district have slightly undulating penepains. One study site, Madzu, in Vihiga division, is located in the southern part of the district. The other site, Lumakanda, in Lugari division, is in the northeastern part of the district. The mean annual rainfall varies from 1,250 mm to 2,000 mm. The highest averages are found in the central part of the district. The long rains fall from March to June, peaking in April/May, whereas the short rains begin in July/August and peak in September, ending in October.

The southern and central parts of Kakamega district have two cultivation seasons per year, with maize, beans, and sorghum dominating the cropping pattern. In the northern part, where rainfall is relatively low, farmers grow only one crop per year. Most of the high-potential land is to be found in the southern part of the district, where the highest population densities also exist. Although there are pockets of fertile soil in the district, about 85 percent of its land area is covered with infertile soils as a result of leaching from high rainfall and intensive cultivation over a long time without appropriate measures to maintain the soil fertility (Ministry of Agriculture, 1983). The main cash crops in the district are maize, coffee beans, sugarcane, and tea.

The population structure is similar to that found in Nyeri; more than half of the residents below the age of 15. The district has a high dependency ratio. Because young men tend to migrate out of the district, women provide the bulk of farm labor in the district.

The questionnaire for the study described in this chapter was designed to collect information in three phases and to cover one cropping season, beginning with the long-rain season of 1988 (April). The first section contained questions about household-socioeconomic characteristics, family size, structure, distribution, assets, and education and occupation of its members. The second section contained questions pertaining to the farm and land parcels owned and rented, such as their size, method of acquisitions, status of registration, and the use and transfer rights held on each of them.<sup>2</sup> Other questions concerned the types of investments made on each parcel, disputes, official document held in respect of

<sup>2</sup> A farm was regarded to consist of parcels. Parcels could be divided into plots for cultivation. A parcel could well consist only of one plot, just as a farm could consist of only one parcel.

the land, and the types of exchanges of land. This section also contained questions on the kinds of inputs used on each of the plots cultivated with the major crops of maize and coffee. These two crops chosen because they were the most common in a system in which there is a wide range of intercropping patterns. (In many instances, up to 10 crops were grown on one acre of land.) The third section sought information on credit and farm output, the latter specifically from plots with maize or coffee crops.

This chapter presents a summary of a larger report (Migot-Adholla, Place and Oluoch-Kosura 1990). The first section following this introduction gives an overview of the prevailing land tenure systems in the country. The second section describes the patterns of landholdings, modes of acquisition, and land transactions in the study areas. The third section examines security of tenure and its relationship to credit, investment on land improvement, and land productivity. Policy implications are discussed in the final section.

### CONTEMPORARY TENURE SYSTEMS IN KENYA

Patterns of tenure are generally influenced by population density, agroclimatic factors, toposequence and sociocultural systems (Boserup 1965, Ruthenberg 1980, Podolefsky 1987). Given the diversity in Kenya's topography, climate, and ethnic groups (there are almost 40) it may be inadvisable to make generalizations about patterns of indigenous agricultural tenure. Yet certain common features are discernible. Historically, nearly all the major agricultural peoples in Kenya had segmentary, acephalous political organization, followed patrilineal rules of succession, and lived in scattered homesteads rather than in agglomerated villages. Access to land was based on membership in a land-controlling social entity defined by birth, marriage, ritual adoption, or incorporation. Once individuals acquired rights to land those rights remained inheritable within the family. Where land was abundant, succession was governed by the rule of ultimogeniture among groups such as the Kikuyu. The youngest son inherited the father's homestead and other developed plots, while his eldest brothers established new farms in unoccupied land controlled by his lineage. Persons unable to find suitable land often migrated elsewhere, as segments of their lineage or isolated individual families, and were incorporated into their communities of destination. Such movements continued well after the establishment of colonial rule although it remained more of an adjustment within regions and ethnic (Mbithi and Barnes 1975, Migot-Adholla 1984).

As population growth caused first the reduction and then the virtual disappearance of unoccupied farmland and common pasture, inheritance emerged as



the most important mode of land acquisition. Succession to land has increasingly become more truly adelphic, with entitlements among the sons being more or less equal regardless of birth order. An important aspect of this development is that, in the quest to provide each son a share of different microecological conditions in the catena, nearly all plots were subdivided lengthwise into strips down the slopes, particularly in hilly environments (e.g., Kikuyu and Taita). While land sales, as a means of adjusting factor endowments among families, remained rare, most groups allowed land transfers through gifts and loans. Pledging, which is well-established indigenous transaction in West Africa, has not been prominent among Kenyan peoples, nor have long-term tenancy arrangements.

Under colonial rule a dual system of tenure was instituted in which white settlers and private corporations were granted freehold titles or leaseholds in accordance with the provisions of the Land Titles Act, 1908, later amended to provide for registration under the Torrens system (Registration of Titles Act, 1919, 1920). During this period, most of the African areas were considered Native Trust Reserves, in which traditional tenure systems remained intact. As a strategy of political control, colonial administrators designated some local notables as "chiefs", or installed certain marginal persons to the position, creating customary authorities with jurisdiction over almost all local matters except criminal justice. Thus the colonial state created a form of dual citizenship in which rights were dependent on "native" or "tribal" as well as "national" citizenship (Chanock 1985, Woodman 1987).

As others have observed (Bates 1986, Chanock 1991), this arrangement was consistent with the dual economies that characterized the colonial situation. The formal sector of the economy (mines, plantations), dependent on labor from the "tribal" sector at subsistence wages, did not have to bear welfare costs for the unemployed during recessions. Because all "native" workers were defined in terms of their "tribe" and in relation to their "chief", they were readily reincorporated in the tribal economy, where they continued to maintain their citizenship and thereby held claims to productive resources, primarily land.

In the period after World War II, the colonial administration faced serious economic and political problems in the African reserves. Land was exhausted as a result of overcultivation without sufficient fallow or fertility enhancing technologies. Destruction of vegetative cover and overstocking was also causing soil erosion. Rural stagnation and poor income opportunities led Africans to demand land distribution and economic reforms. A major change in colonial policy was made following the report of the East African Royal Commission, 1953-55, which argued that indigenous tenure was a constraint to increased investment and agricultural output. In addition to recommending broad political and

macroeconomic policy changes, the commission proposed transformation of indigenous tenure through individualization and registration. The scheme for implementation of this policy was embodied in the Swynnerton Plan of 1954, the main goal of which was to intensify agricultural production in the African reserves. The operational legislation for effecting individualization of land rights was the Native Land Registration Ordinance of 1959 which was superseded by the Registered Land Act in 1963.

Although the policy of individualization of land was justified on economic grounds, its early implementation had a decidedly political motive. Colonial policymakers thought that it would be the beginning of a process that would create a class of African rural elite, rooted in land and committed to private enterprise, which would also provide liberal political leadership. The policy did not entirely depart from the benevolent paternalism of the earlier colonial period, which explains its persistent ambiguity. To protect African peasants from dispossessing themselves, policymakers felt that local land committees should closely monitor land transactions. In fact the land committees have acted instead to undermine the free operation of land transactions, permitting them only among members of local communities. Thus despite more than 30 years of registration a land market, which was considered a key benefit of tenure conversion has not yet clearly emerged in the former reserves. This situation, in turn, has nullified the credit and investment objectives of registration. A recent amendment, providing for referral of land cases in the first instance to arbitration by officially approved "elders", has further thrown the administration of registered land into confusion.

Some observers have suggested that because only male heads of households are generally registered as parcel owners, land registration has undermined the rights of women and children (Pala-Okeyo, Achola 1978, Okoth-Ogendo 1982). Others have argued that registration has also threatened the security of economic opportunity of families by conferring rights of disposal to the male household head (Shipton 1987). Because it is such potential abuses that the land control boards were expected to remedy, their existence is a clear indication of the ineffectiveness of the boards.

Tenure conversion does not appear to have extinguished indigenous tenure systems in Kenya. Indeed, recent amendments suggest official recognition of the persistence of indigenous land tenure practices. Yet the administrative selection of "elders" with neither recognized expertise in indigenous tenure practice nor good knowledge of provisions of the Registered Land Act appears to reduce dispute settlement to a costly bureaucratic travesty. It is therefore debatable whether land registration and administration as practiced in Kenya today can still be justified on the grounds of their economic benefits. We discuss this subject later, after reviewing findings from the survey.

## **PATTERNS OF LANDHOLDINGS, ACQUISITION, AND TRANSACTIONS**

### **Farm Sizes and Operated Parcels**

Farm sizes in the original reserve areas in both districts are relatively small. Because the 406 households operated 463 parcels, it is clear that most households operated only one parcel. This situation indicates a low level of fragmentation which results from a process of land consolidation prior to registration in both areas. Madzu had the smallest parcel sizes of the four regions, with a mean parcel size of 0.53 hectare (ha), which is not much higher than the median of 0.45 ha. All but 11 percent of the parcels in Madzu were below 1 ha. Similarly, in Kianjogu, only 10 percent of the parcels were greater than 2 ha, while 32 percent were under 0.5 ha. The mean parcel size in Kianjogu was 1 ha, and the median, and 0.8 ha. Parcel sizes in the settlement areas were relatively large, with the mean sizes being 4.1 ha for Lumakanda and 3.5 ha for Mweiga. Except for Mweiga, which had a coefficient of 1.34 for variation of size distribution of parcels, the rest of the regions had a coefficient below 0.9, signifying little variation in the size distribution of parcels. It was also found that most of the parcels were adjacent to the homes of the farmers.

As expected, farm and parcel sizes have generally been shrinking over time. Young farmers often acquire subdivided parcels either through inheritance or purchase. This is especially true in Mweiga, where a great disparity exists between the holdings of original settlers and people who have since acquired land. There is clearly the potential for continued subdivision in the settlement areas. In heavily populated areas such as Madzu, where parcel sizes are already small however, most parcels are acquired whole.

### **The Modes of Acquisition of Land**

In the original reserve areas of Kianjogu and Madzu, the major mode of acquisition continues to be inheritance. In Madzu, about 68 percent of parcels were acquired through inheritance, and in Kianjogu the proportion was 82 percent (see Table 6-1). Inheritance within the settlement scheme was not very high because most of those who were allocated the parcels have not yet bequeathed the parcels to their heirs. Only about 30 percent of the households in Lumakanda acquired their land through this method, as compared with 35 percent for Mweiga.

Acquisition through allocation by the government was expected to be predominant in Lumakanda and Mweiga. However, only 34 percent of the respondents in Lumakanda were allocated land by the government and 58 percent in Mweiga. This indicates that many transactions had taken place since the initial allocation.

Many policymakers thought that the land registration program would lead to more active markets in land. Although there have been a significant number of purchases, relatively few of them have occurred since 1980 (except in Luma-kanda). The proportions of parcels purchased ranged from 6 percent in Mweiga to 28.6 percent in Madzu (Table 6-1). In all, 19.4 percent of parcels were purchased across the four regions, but only 4 of 50 purchases in Madzu and Kianjogu have taken place since 1980. The small number of recent sales can be

**TABLE 6-1. Modes of Parcel Acquisition**

Mode of Acquisition	Mean Size of Parcel (ha)	Number of Parcels	Area of Land (ha)	Percent of Parcels	Percent of Land Area
<b>Madzu</b>					
Inherited	0.51	86	44.11	68.3	66.0
Purchased	0.59	36	21.06	28.6	31.5
Rented	0.19	2	0.37	1.5	0.6
Share of land	1.21	1	1.21	0.8	1.8
Borrowed	2.27	41	93.11	31.3	17.2
<b>Lumakanda</b>					
Inherited	2.27	41	93.11	31.3	17.2
Purchased	4.35	43	147.77	26.0	27.3
Allocated	6.42	44	282.53	33.6	52.2
Rented	0.80	10	7.97	7.6	1.5
Share of land	1.62	1	1.62	0.8	0.3
Exchanged	7.77	1	7.77	0.8	1.4
<b>Kianjogu</b>					
Inherited	1.08	87	93.78	82.1	86.3
Purchased	0.92	14	12.94	13.2	11.9
Allocated	0.28	2	0.55	1.9	0.5
Rented	0.22	2	0.43	1.9	0.4
Borrowed	0.94	1	0.94	0.9	0.9
<b>Mweiga</b>					
Inherited	0.86	35	30.06	35.0	8.5
Purchased	2.05	6	12.27	6.0	3.5
Allocated	5.33	58	308.87	58.0	87.0
Given	3.95	1	3.95	1.0	1.1
<b>Aggregate</b>					
Inherited	1.05	249	261.06	53.8	24.2
Purchased	2.16	90	194.04	19.4	18.1
Allocated	5.69	104	591.95	22.5	55.2
Rented	0.63	14	8.77	3.0	0.8
Share of land	1.42	2	2.83	0.4	0.3
Given	3.95	1	3.95	0.2	0.4
Exchanged	7.77	1	7.77	0.2	0.7
Borrowed	0.52	2	1.06	0.4	0.1

attributed to increasing lack of land resources and to lack of alternative employment opportunities.

The reasons for buying land may be economic or uneconomic. Four main reasons for buying land were identified: First, land was purchased to generate additional income. It was hoped that land registration would allow these types of transactions to be made more efficiently, but households do not always have access to the complementary inputs necessary to realize the full benefits from the land. Second, land was bought to give to additional wives; and third, land was purchased to bequeath to children. These acquisitions may be beneficial, in that land-to-labor ratios are improved, but land that is left idle for children may have social costs. Finally, land is bought for speculative purposes, which has clear social costs in terms of lost output.

Approval from the Land Control Board prior to sale was not always sought. Authorized sales made up 75 percent of sales in the settlement areas, but only 10 percent of those in Madzu. Therefore, in addition to unrecorded subdivisions to heirs, sales of land are not always legally recognized, thereby widening the gap between the land register and actual holdings.

Land rentals are surprisingly low in the study regions, considering the high population-to arable-land ratios that are found. There were no land rentals in Mweiga and only two each in Madzu and Kianjogu. The Lumakanda region had the most rentals, with 10 (7.6 percent of all acquisitions in the region).

Most of the leases were short-term, mainly for growing seasonal crops. In Lumakanda, where parcel sizes were bigger, portions of parcels were often rented. In the densely populated areas of Madzu and Kianjogu, the whole parcel would be rented because the sizes were already very small. In Lumakanda, 40 percent of the transactions on rentals had written documents specifying the terms; the agreements varied from fixed rentals to exchanges for use of factors (tractors and labor).

### **Women and Mode of Acquisition of Land**

Women were found to head 41 of the 406 households (10 percent). In all but one case, the female-headed households operated only one parcel, so that 42 parcels were under the management of women. However, the proportion of parcels initially acquired by women is much lower. Often a woman's husband acquired a parcel, which she would then manage. The least accessible modes of land acquisition by women were through purchase (3.3 percent) and inheritance (3.6 percent), compared with 6.7 percent for acquisition through government allocation.

### Land Use Patterns

In the study areas, subsistence crops occupied most of the available land. The proportion of land used for various activities is shown in Table 6-2. Intercropping was the predominant practice, largely because of the pressure to get the most from limited land. Although technically farmers could specialize in a high-value cash crop such as coffee or tea and depend on the market for subsistence needs, farmers opted not to pursue such a risky strategy. There are many risks associated with specialization on the small parcels of land we are considering here, including risks arising from crop disease, fluctuation of output prices, lack

**TABLE 6-2. The Proportion of Land Under Various Activities in the Study Areas of Kakamega and Nyeri Districts (in percent)**

Product	Kakamega		Nyeri	
	Madzu	Lumakanda	Kianjogu	Mweiga
Coffee	4.3	0.36	25.36	2.65
Tea	3.64	—	1.48	—
Pyrethrum	—	—	—	0.19
Maize (monocrop)	2.23	9.06	8.16	5.26
Bananas	1.74	0.20	0.09	0.02
Sugarcane	—	1.44	0.09	0.08
Sunflower	0.10	0.37	—	—
Sorghum	0.42	—	—	—
Millet	—	—	0.05	—
Potato	0.14	0.10	1.00	3.6
Wheat	—	—	—	0.76
Peas	—	—	0.039	0.018
Paddock	0.11	0.23	—	—
Trees (wood)	9.4	2.89	4.62	—
Trees (fruit)	—	0.18	1.4	0.39
Other (monocrop)	3.65	2.57	0.54	2.17
French beans	1.02	—	—	—
Maize intercropped with other	38.65	51.32	28.15	8.99
Coffee intercropped with other	1.53	0.98	0.18	0.34
Vegetables	0.1	0.46	0.30	0.08
Homestead	18.5	5.59	9.87	3.13
Beans intercropped with other than maize and coffee	—	—	0.19	2.07
Swampy	—	0.63	—	—
Pasture	1.46	11.93	12.03	65.4
Commercial plot	0.003	—	—	—
Fallow	8.65	11.19	1.12	3.9
Fodder	1.5	0.6	5.19	0.96
Total	100	100	100	100

of availability of foods and labor and other inputs to production in the market. As a result, the rational farmer may strive for "*food first*" produced on the farm, irrespective of the efficiency of production. For example, the average yield of maize on the Madzu farms was less than 10 bags per hectare, compared with the potential of more than 30 bags per hectare. Cash cropping appeared more common in the Kianjogu and Mweiga sample, where the infrastructure and market opportunities are better developed.

Unimproved pasture accounted for 65 percent of the land in Mweiga, 12 percent in Kianjogu, 12 percent in Lumakanda, and 1.5 percent in Madzu. Fodder crop production was significant only in the Kianjogu area, where stall feeding (zero grazing) is already widely practiced. Paradoxically, the proportion of land taken by homesteads was relatively high in Madzu (18 percent), where the land sizes are very small. Although portions of homestead areas are also used for intensive gardening, especially of vegetables, stall feeding could be accommodated in such areas, if the fodder crops could be grown in some portions of the existing grazing or fallow lands.

## SECURITY OF TENURE, FARM INPUTS, AND INVESTMENT

### Land Rights

The types of rights held by farmers over each of their parcels formed the approximate measure of their tenure security with respect to the parcels. The prevalence of nine use rights and eight transfer rights was ascertained from the questionnaire. The proportions of parcels that may be used or transferred in various ways are given in Table 6-3 by region data. Rights of usage are enjoyed widely by land holders. All the land use rights identified in the survey, except the right to cut trees, may be exercised on at least 85 percent of parcels. Hence, a small proportion of parcels, generally under 10 percent, may not be put to various uses by operators.

The incidence of transfer rights across sampled parcels showed greater variation. The right to sell occurs on 49.7 percent of parcels. The right of sale, while having the lowest incidence of any transfer right, is much more common in the Kakamega district (where we earlier found that more land purchases occur) than in Nyeri. All other rights of transfer are enjoyed by more farmers in Kakamega than in Nyeri. There are two explanations for this. First, Kianjogu farmers are somewhat restricted by the desire of the ethnic group (Kikuyu) to retain control over the land. In addition to facing this limitation, the perception of individual rights of Mweiga farmers is further reduced because of their failure to fully repay settlement loans to the government.

TABLE 6-3. Incidence of Land Rights In Kenya (in percent of parcels for which the rights exist)

Land Rights	Madzu	Lumakanda	Kianjogu	Mweiga
Use Rights				
Choose annual crops	99.2	100.0	100.0	100.0
Grow perennial crops	82.5	91.6	95.3	79.0
Make permanent improvements	84.9	90.1	95.3	81.0
To be buried	96.0	90.8	95.3	79.0
Collect fruit growing wild	96.8	93.1	96.2	94.0
Collect firewood	96.8	93.1	98.1	99.0
Use commercial trees growing wild	91.3	87.0	92.5	96.0
Cut trees growing wild	96.8	87.8	96.2	74.0
Graze livestock	96.8	93.1	96.2	95.0
Transfer Rights				
Register	73.0	87.8	92.5	75.0
Lend	75.4	77.9	30.2	40.0
Rent	72.2	83.2	27.4	49.0
Mortgage	70.6	85.5	37.7	26.0
Pledge	72.2	82.4	17.0	18.0
Bequeath	73.8	90.1	68.9	21.0
Give	71.4	84.7	42.5	15.0
Sell	67.5	75.6	8.5	37.0

### Grouping Parcels by Category of Rights

In order to analyze relationships between land rights and other variables, it is useful to create an aggregate measure of rights rather than to examine each right separately. Theoretically, it can be argued that the right to sell is the paramount right. The right to sell logically presupposes the ability to exercise other rights of transfer and use as well. Therefore, our first group, representing the highest level of tenure security, includes those parcels that may be sold; these are referred to as "*complete rights*" lands. A second class of rights are parcels that cannot be sold but may be given to close relatives or bequeathed. The rights to give and bequeath suggest that they function mainly to transfer land within a family or lineage. We label these lands *preferential transfer* parcels, to reflect the nature of the permissible permanent transfers. Additional distinctions could be carried out on remaining parcels, such as the ability to transfer temporarily or the ability to make permanent land improvements. From an empirical point of view, however, there were not enough parcels remaining to warrant such distinctions. Hence all remaining parcels, those that cannot be permanently transferred, constitute what is termed "*limited transfer*" parcels. These groupings serve to distinguish parcels on the basis of bundles of rights and work extremely well in Kakamega and to a lesser extent in Nyeri.



Within the "complete rights" category, the proportion of parcels for which use rights may be exercised is nearly 100 percent for all use rights. The same is true for use rights in the preferential transfer group. However, parcels in the limited transfer category are noticeably less likely to contain many use rights. Aside from the right to choose the type of annual crops grown, the proportion of limited transfer parcels that may be used in various ways ranges from 57.3 percent (growing perennial crops) to 87.9 percent (collecting firewood). The proportion of parcels that may be transferred in various ways increases significantly from limited transfer parcels to those in the higher security categories.

By looking at the proportion of parcels falling into each group, one can compare the levels of tenure security across the study regions. The Kakamega regions had far more parcels in the complete rights category than did the Nyeri regions. In Lumakanda, 75.6 percent of parcels were in the complete rights group, and another 14.5 percent were in the preferential transfer group. In Madzu, the comparable figures are 67.5 percent in the complete rights group and 6.3 percent in the preferential transfer group. There are only 9 parcels in Kianjogu over which farmers enjoy complete rights of disposal, just over two-thirds of parcels are classified as preferential transfer parcels. In Mweiga, 37 percent of parcels belong to the complete rights category, while 10 percent are found in the preferential transfer category.

### Land Rights and Household Characteristics

Using the entire sample, household wealth<sup>3</sup> was found to be related to category of rights. The major discernible pattern was the influence of wealth on the proportion of parcels in the limited transfer category. Higher levels of household wealth is related to a lower incidence of limited transfer parcels (and a higher percentage of parcels in other security classes).

The age of household head was significantly related to the category of land rights (significant at less than 0.001 level). As the age of household head increases, the proportion of parcels over which operators enjoy only limited transfer rights decreases, while the proportion of parcels with complete rights of disposal increases. Younger farmers tend to share rights with other family members and are more likely to be renters.

The formal education of household head had a rather unexpected relationship to class of rights. Heads of households without formal education were less likely to operate limited transfer parcels and more likely to operate complete rights

<sup>3</sup> Household wealth includes all buildings, livestock, machinery, and equipment. We did not collect information on financial assets.

parcels than were household heads who received primary or secondary education. However, household heads who had some postsecondary education, and uneducated household heads, had an equal percentage of complete rights parcels. The explanation for these results is primarily that younger household heads are much more likely to have been formally educated than older household heads. At the same time, younger household heads did not have access to allocated lands and appear not to have succeeded in purchasing land (the two methods of acquisition most closely associated with higher levels of tenure security). The lone exception to this rule is that college-educated household heads (who are also younger) were more likely to purchase land than other household heads.

### Written Documentation on Land

Some form of written documentation existed with respect to 81.4 percent of parcels in the sample. The most widely held document was a land title, held for 41.5 percent of parcels. The next most common document was a parcel card, held for 17.9 percent of parcels.<sup>4</sup> Other documents reported to be held by landholders for more than a handful of parcels were inheritance agreements (9.3 percent of parcels), purchase agreements (4.3 percent), and letters of consent (3.2 percent). All other forms of documentation accounted for 5.1 percent of parcels.

The prevalence of land certificates and other forms of documentation varied considerably across regions. The incidence of any document was highest in Madzu (95.2 percent) and lowest in Mweiga (69 percent) and Lumakanda (74 percent). If only land certificates are considered, the Nyeri regions contained a much greater incidence. The proportion of parcels with title was 74.5 percent in Kianjogu and 65 percent in Mweiga. Only 22.9 percent of parcels in Lumakanda and 14.3 percent of parcels in Madzu were titled.

The use of nontitle documents is widespread in Kakamega. Claims over nearly 80 percent of parcels in Madzu were documented by parcel card, inheritance agreement, or purchase agreement. In Lumakanda, seven different types of nontitle documents were present, with parcel cards being the most common (22.1 percent of parcels).

The major occupation of the household head, farming or nonfarming activities, was related to the incidence of documentation and land title only in Kianjogu and Mweiga, both indicating that farmers were more likely to have some formal documentation or registered titles than nonfarmers. This situation may be ex-

<sup>4</sup> Parcel cards are given to the farmer at the time of adjudication and may be later replaced by title certificate.

plained by the fact that a title is more important to farming households to minimize the likelihood of dispute. Nonfarming heads may be able to obtain credit based on the income from their nonfarming occupation. However, the results may also be related to an association between age (or stage in the family cycle) and main occupation of household head (farming heads are generally older).

Both aggregate household wealth and household wealth per capita were highly related to possession of land title. In all regions, higher household wealth or per capita wealth implies a higher likelihood of having registered titles for land parcels. The best example of this pattern occurs in Mweiga. Households with less than KSh 6,400<sup>5</sup> of wealth have titles on 31.6 percent of their parcels, while households with more than KSh 36,000 of wealth have titles on 87.9 percent of their parcels. This is an indication that perhaps the cost of obtaining a title, in terms of monetary and opportunity costs, is too high for the poorer households. Similarly, wealthier households may be able to obtain titles without as much disruption of farming schedule or the costs of bureaucratic red tape. In the settlement areas, the wealthier households may have repaid their loans to the land administration earlier than required, while the poorer households have not yet fully repaid and received their titles.

It is somewhat surprising to find a lack of correspondence between the breadth of land rights and possession of land title. Table 6-4 presents a cross-tabulation between the two variables, which shows that of 192 parcels for which title is held, only 80 could be sold by the current operators. Viewed from another perspective, of the 230 parcels that could be sold, titles were held for only 80 (34.8 percent). This illustrates the recalcitrance of indigenous institutions and suggests that the attempt by the government of Kenya to transform land rights has not been fully realized. But it may also expose major weaknesses in the macro-economic environment. Lack of alternative means of economic livelihood and social security may have put a premium on land much beyond its economic value.

**TABLE 6-4. The Incidence of Land Title by Category of Land Rights**

Category of Land Rights	Incidence of Land Title		Number Row
	No. Title	Title	
Limited transfer	66.1%	33.9%	124
Preferential transfer	35.8%	64.2%	109
Complete rights	65.2%	34.8%	230
Number in column	271	192	463

<sup>5</sup> In 1986, the exchange rate between Kenya shillings and U.S. dollar was above 16:1.

### **Land Disputes and Land Rights**

Land disputes occurred mainly in the traditional regions of Madzu and Kianjogu. As many as 28.6 percent of parcels in Madzu and 24.5 percent of parcels in Kianjogu had been under dispute. Conversely, 9.9 percent of parcels in Lumakanda and only 5.0 percent of those in Mweiga had been under dispute. This is no doubt a result of the shorter history of Africans in the settlement areas. Many farmers are cultivating parcels originally allocated to them by the government; hence, it is impossible for other individuals to legitimately dispute ownership or boundaries on these lands. It may be that the rates of dispute between settlement and nonsettlement areas will converge as time passes.

Most disputes were over boundaries (48.3 percent) or ownership (42.7 percent). There is a great disparity in type of dispute across the nonsettlement regions of Madzu and Kianjogu. In Madzu, there were 29 disputes over ownership and 14 over boundaries. In Kianjogu, there were 24 boundary disputes and only 1 disagreement over ownership. Forty of the 43 boundary disputes were with a neighbor, while the 38 disputes over ownership occurred among relatives (55.3 percent) and neighbors (39.5 percent).

The incidence of dispute at the parcel level was not related to the type of document (or whether any type was present) or to the category of rights. These results were upheld in both aggregate and regional level cross-tabulation analysis, showing that possession of title does not imply freedom from dispute. Reduction of dispute was a major objective of land registration, but our study finds that most reported disputes have occurred after the land adjudication and registration process.

### **Prospects of Mortgaging Land for Credit**

The incidence of formal credit use was low in each region. Table 6-5 shows that the proportion of households borrowing from formal lenders during 1987-88 (commercial banks, rural banks, cooperatives or the Agricultural Finance Corporation) ranged from 1 percent in Mweiga to 10.7 percent in Lumakanda. Out of a total of 28 formal loans received during the period, only 12 were secured by land title.

Records from the Ministry of Lands also indicated that by October 1989 more than 150,000 title deeds had not been collected from the Land Registry in Kakamega district as a whole, while in Nyeri slightly more than 20,000 titles remained uncollected in the district headquarters. This situation shows the reluctance on the part of smallholders to use titles as collateral despite the government effort to encourage them to do so.

TABLE 6-5. Aspects of Credit Markets in the Study Region

	Proportion of Households Receiving Formal Credit	Formal Sector Loans	
		Number	% Secured With Land
Madzu	4.0	5	50.0 <sup>a</sup>
Lumakanda	10.7	13	69.2
Kianjogu	8.7	9	0.0
Mweiga	1.0	1	100.0

<sup>a</sup> The type of collateral was mentioned for four of five loans.

Land titles are seldom used for a variety of reasons. First, borrowers are wary of risking the loss of their main economic asset and source of social security. For people who lack marketable skills and opportunities for other careers, the loss of land through default would have severe consequences. Lenders do not always attach much significance to titles. In most of the former African reserves, lenders have difficulty foreclosing and reselling land because potential buyers are discouraged by the local community. In fact, our data revealed that of borrowers who obtained credit in the past two years, 6 percent had title deed and 6 percent had no title, signifying that title deeds did not really matter in obtaining credit in the weak credit market.

In place of land titles, other forms of security were sometimes used. Those who had buildings or off-farm employment also qualified for formal credit. Some form of group guarantee common among the women's groups and cooperatives could be used to apply for credit successfully from the formal market, and the pledging of crop output was used to secure most of the formal credit in Kianjogu.

### Input Use on Farms

The survey results revealed that very few households used chemical fertilizer in Madzu (30 percent) and Mweiga (25 percent). In contrast, the figures for Lumakanda and Kianjogu, were 90 and 93 percent. Almost all the chemical fertilizer in Lumakanda was applied on maize. Lumakanda is an important maize growing area in Kenya, and a large proportion of the crop is actually sold. In Kianjogu most of the fertilizer used was applied to coffee, an important cash crop in the area. In the other areas, there was very limited adoption of cash crops that would compel the farmers to make use of chemical fertilizer, especially if its availability and price were problematic.

In contrast to the use of chemical fertilizer, more than 50 percent of the households in each of the areas studied reported using farmyard manure for their

crops. The only limitation to the use of the manure is the high labor requirements, even if it is readily available. To the extent that technical research shows that making use of both chemical fertilizer and manure gives greater yields, the practice needs to be encouraged if farm productivity is to be increased in these areas. Pesticides were not widely used except on some coffee plots.

Because coffee seedlings are normally supplied from the crop authority, almost all the farmers growing the crop reported using certified seed. Lumakanda, Kianjogu, and Mweiga farmers producing maize and beans reported 100 percent adoption of the hybrid seed. In Madzu only about 60 percent of the households reported having used certified seeds.

Almost all the households relied on the use of hand tools for land preparation, planting, and weeding. Only in Lumakanda, where the farm sizes were relatively larger than 44 percent of the households report hiring an ox to plough their land. Similarly, it was only in Lumakanda where about 50 percent of the households used a hired tractor for land preparation. For the transportation of farm inputs and products, 30 percent of the households in Lumakanda reported using either a hired ox-cart or their own ox-cart. Otherwise the other areas depended on carrying their equipment on their heads, or their backs or in wheelbarrows.

Most households relied on family labor, but, there were some months in the year when family labor was not sufficient and some of the households reported having hired casual labor. In Madzu, labor constraints were reported by less than 20 percent of the households, apparently because of small plots cultivated. In Madzu, for instance, only 11 percent of the households hired labor in the peak period of April. However, 42 percent of the households reported family labor constraints in April. Of the households which had family labor constraints, the majority felt they were able to hire labor from within the village or in the neighboring villages if they could afford the wages. An exception was Mweiga, where farmers often mentioned difficulty in finding agricultural labor from outside the family. This may partly explain why so little land is under cultivation there (see Table 6-2).

### **Tenure Security and Farm Investments**

This study collected information on 14 types of land improvements, including terracing, fencing, drainage, planting trees, building access roads, continuous manuring, liming, irrigation, mulching, and stump removal made prior to or after the acquisition of land. In general, few improvements had been made before the land was acquired. The most common improvements made by current operators were, in descending order: continuous manuring (81.7 percent of parcels), planting trees (73.9 percent), planting tree crops (65.8 percent), fencing (63.9 per-

cent), and terracing (61.8 percent). The least common types of improvements were irrigation (6.3 percent); cultivating beds (14.7 percent); digging wells (16.2 percent) and building access roads (19.8 percent).

The effects of land rights and land title on land improvements were tested using logit regression analysis.<sup>6</sup> Numerous types of land improvements were dropped from the analysis because of lack of variation or lack of correspondence to long-run productivity of the parcel. We found that neither land rights nor land title was related to tree crops or terracing improvements, after controlling for other possible effects. For other improvements, simple tests were made (cross-tabulations and means tests). We found that more individualized land rights were associated with greater land improvement activity in Lumakanda (significantly more types of improvements made) but had little effect elsewhere.

### TENURE SECURITY AND AGRICULTURAL PRODUCTIVITY

The real effects of the land distribution, modes of acquisition, and security of tenure on agricultural productivity need to be assessed by controlling for other effects. Therefore, use was made of regression analysis with production yield<sup>7</sup> (the dependent variable) explained by a host of independent variables.

The results for the land rights variables can be summarized as showing a weak, relationship to crop yields, if any. None of the land rights variables were significantly related to yields in any of the regional regressions. Therefore, the effects of indigenous tenure institutions, through their effects on land rights, do not appear to constrain agricultural productivity. It is likely that farmers feel sufficiently secure in their ability to continuously cultivate their land, regardless of land rights category.

The presence of land title did not affect yields in any of the regressions. This result is found when the title variable is entered alongside the land rights variables or is substituted for them. The lack of significance probably stems from the limited use of titles in obtaining credit.

Separate regressions were made to test the effect of the mode of acquisition (substituted for the land rights variables) on plot yields. According to one hypothesis parcels that are actively sought, because of their desired productivity potential, may exhibit higher yields, reflecting the incentives of the farmers who acquire them. Another hypothesis argues that inherited parcels may be less secure since rights over them are shared with other family members, and thus

<sup>6</sup> Place and Hazell 1993.

<sup>7</sup> Output yields are regressed in value terms, using median prices, so that different crops could be aggregated to form a plot yield.

exhibit lower yields. However, we found that yields did not differ significantly across parcels characterized by different modes of acquisition.

Some other control variables were significantly related to yields in the regressions, and those pertaining to landholdings are briefly summarized here. The most robust result involves the size of plot. In all regressions, plot size was negatively related to yields for all cropping patterns. Because the coefficient estimates were between  $-1$  and  $0$ , diminishing returns to scale were indicated whereby increases in variable inputs on a fixed land area lead to lower and lower marginal increases in output. The results may also indicate the presence of inefficient factor markets. When factor markets do not function smoothly, yields will be lower on larger plots because more purchased inputs are required to offset the less-intensive use of household labor.

The size of farm was positively related to yields in the Lumakanda and Kianjogu. In Lumakanda, this situation may imply the existence of economies of scale. Larger farms may be able to enhance productivity by adopting capital-intensive techniques. Our data show that 46.7 percent of farms above 1.53 ha in Lumakanda hired tractors, whereas, only 23.0 percent of those below 1.53 ha hired a tractor. In Kianjogu, mechanized farming is rare. Farm size may be a proxy for household wealth or easier access to the factor markets. It is also likely that larger farms are able to leave land fallow for longer periods of time, resulting in more productive soils.

## CONCLUSIONS AND POLICY IMPLICATIONS

The hypothesis that security of tenure leads to higher yields through its effects on credit, inputs, and land improvements was not supported by evidence provided by our data and analysis. In each of the regional regressions, the land rights variables were found to be statistically insignificant. Therefore all different levels of tenure security identified by the study appeared to provide equivalent incentives to farmers.

We found that land titles were not closely related to the breadth of rights. A prime example is Kianjogu, where 75 percent of parcels are titled but only 8 percent may be sold. This finding shows the persistence of indigenous tenure systems and suggests that it is difficult for governments to legislate changes in the way that communities control their most precious resource. Likewise, land titles have not prevented a high incidence of disputes in Madzu and Kianjogu. Finally, possession of title did not significantly affect the productivity of farmers. This situation is probably explained by the limited use of land titles in obtaining formal credit.



Farmers are reluctant to apply for credit because they lack confidence in their ability to repay the loans and fear of losing their land. With appropriate advice, close supervision of credit, and education, it is likely that the farmers' fear of obtaining credit would disappear. Very few farmers in the study areas have lost their land after defaulting on loans, but given the imperfections in the land market, formal lenders have faced real difficulties in disposing of the land because of lack of buyers. Neighbors in the more traditional farmer native reserves (Kianjogu and Madzu) become hostile to purchasers of land titles following foreclosures, particularly non-locals who attempt to take effective possession of the land. Thus, while the farmers are increasingly reluctant to use the title deed as collateral, formal credit institutions do not put much faith in the title deed because they find it difficult to sell the land, when a farmer defaults to recover the value of their loan principles and interest.

Because the possession of a title does not appear to benefit farmers through credit use and increase in yields, many farmers will continue to find the cost of obtaining a title greater than its benefits. One obvious implication is that land registers will become even more outdated. In the areas studied, most transactions in land have been carried on in accordance with indigenous practices rather than statutory law. While unregistered dealings are considered illegal, the reintroduction of elders is itself a tacit affirmation of the persistence of indigenous tenure practices. But more significantly, the Kenyan situation dramatize a policy ambivalence arising from legal syncretism. It is not clear which law the elders are expected to apply: customary, statutory, or natural justice. This ambivalence suggests the need for a simplified land administration system requiring existing land legislation to be unified and updated to conform with current social and economic reality.

It may be argued that the value of tenure conversion in Kenya lies not so much in its stated benefits as in the alternative uses to which it might be put. One of these might be an updated cadastre, on the basis of which more comprehensive land information systems could be developed to improve land use planning. This will, however, require that the responsible agencies coordinate their efforts more closely and adopt common standards. It may also be essential that land registers be decentralized to subdistricts, perhaps even lower levels, in order to facilitate timely updating of subdivisions, charges and transfers. This will be necessary if land records are to be used at some future date as the basis of a land tax.

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## TENURE SECURITY FOR WHOM? DIFFERENTIAL EFFECTS OF LAND POLICY IN KENYA

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The perception that existing land tenure patterns inhibit agricultural productivity and growth in areas of sub-Saharan Africa has stimulated interest in programs to provide individuals with registered titles to their agricultural land. Tenure reform, by enhancing individual ownership security, is expected to increase agricultural investment and to improve the performance of the agricultural sector. A pioneering study of Thailand by Feder et al. (1988) suggests that these expectations, while clearly ambitious, are entirely reasonable.

Land registration and titling programs are not new in sub-Saharan Africa. Tenure reform carried out under the Swynnerton Plan in Kenya in the 1950s gives that country claim to substantial experience with such programs. What is perhaps more important, Kenya exhibits significant land scarcity; thus the economic value of land, and consequently the potential returns to land titling programs, should be relatively high.

Using a cross-sectional farm-level data set from Kenya's highly commercialized Njoro area, this chapter analyzes the effects of tenure status on agricultural productivity. The goals of this analysis are twofold. First, we try to lay out in a clear and general way the problems that hamper easy identification and measurement of the effects of tenure reforms. These problems are *not* substantively uninteresting methodological artifacts; they are rooted in the economic behavior and market structure that ultimately shape the effects of land tenure reform. A clear statement and understanding of these problems should be of general interest and value for land titling program design and research. In addition, integrating the

analysis of land titling with consideration of market structure and other factors that influence title's effects helps shed light on the controversy over whether such programs prompt land concentration over the longer term. Applying lessons derived from this first exercise, we then try to evaluate the productivity effects of those tenure patterns that have resulted from Kenya's particular experiences with land-titling efforts.

This chapter is organized as follows: The first section uses descriptive statistics from the Njoro data set to describe the range of factors that temper the effects of tenure status on productivity and may hamper the identification of tenure reform program effects. The second section performs a series of preliminary or "naive" analyses of the Njoro data. Criticism of these analyses structures presentation of general theoretical concerns about the way tenure security influences agricultural performance. The third section substantiates the empirical relevance of these theoretical concerns by demonstrating the importance of nontenure factors on agricultural performance. The fourth section then presents a unified analysis of the land title issue. In the fifth section, we conclude that land tenure reform will probably prove ineffective if conducted in a vacuum: title status appears to be less important in the determination of farm productivity than do factors such as farm size and mode of access to land, together with their implications for access to markets, nonfarm income, and wealth.

### **AGRICULTURE IN NJORO: FARM SIZE, FACTOR MARKETS, AND ACCESS TO LAND**

The Njoro study area is located about 200 kilometers northwest of Nairobi in Kenya's Rift Valley. Despite its location on the equator, an altitude of about 2,000 meters gives the area a subtropical climate. Rainfall averages about 1,000 millimeters annually, concentrated in the long rains of March–May and the short rains of July–August (Kenya 1983). Maize, beans, wheat, and a variety of garden crops are grown. Pasture and forage crops support a sizable dairy industry.

During the colonial period, Njoro was a "Scheduled Area," and agriculture was restricted to white settlers. Land was divided among large-scale farms, ranches, and, in the upper zone, forest. Following independence it was decided, for both economic and political reasons, that the large-scale structure of farming in the Scheduled Areas should be left intact. The large-scale sector was perceived as an important source of foreign exchange earnings and a net supplier of food to urban areas. Intact transfer of the large farms to Africans took place through purchases either by private individuals or by land purchase companies or cooperatives.

Some immediate redistribution and resettlement of small-scale individual farms

did take place within the large-scale agricultural and forest reserves of the Scheduled Areas. Yeoman Schemes, the Million Acres Scheme, and Squatter Settlement Schemes were among the programs implemented for these purposes, the latter two being managed by the Settlement Fund Trustees (SFT) (see, for example, Leo 1978). On a national level, the three schemes transferred to Africans 17 percent of all land originally held by European settlers (Okoth-Ogendo 1981).

Njoro today contains almost the full range of the processes through which land has been transferred since independence. Large farms were bought intact by the SFT and redistributed to the landless. A Squatter Settlement Scheme opened up what was previously a forest reserve and distributed portions of European farms to squatters. Through these various schemes, a new small-scale farming sector emerged, as individuals were allocated parcels ranging from 5 to 10 acres in size. In addition, those large-scale units that were purchased intact by land-buying companies (LBCs) and farmed initially as single units were also quickly (and unofficially) subdivided among the share members. This *de facto* subdivision was ultimately ratified by the government in its Fourth Development Plan for 1979 to 1983. By 1986 more than a third of Njoro's large farms had been subdivided by one mechanism or another; resulting farms today vary from less than 1 acre to more than 20 acres in size.

With resettlement and subdivision, Njoro Division's population density has climbed to 193 persons per square kilometer (Kenya 1979) while average landholdings have decreased to about 5 acres per household (Kenya 1977). Landownership in Njoro remains concentrated. The stratum of largest farms (those greater than 50 acres in size) comprises less than 1 percent of ownership units but controls approximately 40 percent of agricultural area. In addition, land controlled by the large-farm sector is generally of better quality, characterized by flatter terrain and better served with feeder roads, water, and electricity. Subdivided formerly large-scale farms—and, to an even greater extent, settlement schemes—are hillier, have poorer soils, and are often poorly connected with roads and water supplies.

The sample of farms analyzed in this study was drawn exclusively from the Njoro small-farm sector created through the postindependence settlement and subdivision processes. (Blarel et al. 1989 detail the sampling methodology.) Table 7-1 displays size, tenure, and mode of access characteristics of the sample. The 109 sampled farms average 9.5 acres, ranging from just under 1 acre to more than 80 acres in size. Labor and capital access are likely to differ substantially over such a range, with farms facing different effective prices and exhibiting distinctive economic behavior and productivity patterns. For example, maize yields averaged 782 kg per acre on farms of 3 to 5 acres but more than twice that on farms larger than 20 acres.

The exhibit also distinguishes farm characteristics by mode of access—whether the farm was established through an SFT settlement scheme, via the subdivision of a large-scale farm purchased by a land-buying company, or through rental or borrowing arrangements. Only five farms surveyed had been transferred (through sales) since their establishment as part of the original subdivision process; these are incorporated in the exhibit on the basis of their original status. The sample included no transfers by inheritance.

Mode of access is a potentially significant factor because the wealth and other characteristics of land-buying company (LBC) shareholders, who acquired land commercially, are likely to be quite different from those of participants in settlement schemes, who acquired land at concessional terms on the basis of need. Collier and Lal (1986) have argued forcefully that access to nonagricultural income and wealth carries special significance in Kenyan agriculture, where factor (especially capital) markets are highly imperfect. As with farm size, mode of access to land is thus likely to signal the presence of other factors that may shape farm productivity and that may be related to and condition the effects of tenure security. SFT farms generated maize yields averaging 873 kg per acre, for example, whereas, LBC farms were 50 percent more productive.

Table 7-1 also distinguishes farms on the basis of tenure arrangements. All land in the study area is titled. Because of the different institutional environments under which subdivision and resettlement have taken place, however, not all farmers have yet been granted individual title to their land. On some SFT settlement schemes, individual land titles have been withheld pending repayment of land purchase loans. Problems of demarcation, allowance for public roads, and, more important, sales of excess shares by some land-buying company managers have hampered the titling process as well. A farm is considered titled only if title has been issued for the parcel of land established in the original subdivision process. Additional fields acquired subsequent to that process may also be titled or untitled. Sampled farms include some that are held with title, some that are held without title, and some that are composed primarily of land that has been rented or borrowed. Whereas titled farms produced 1,125 kg of maize per acre, untitled farms produced about 20 percent less.

In this study we examine the behavior of producers in these different tenure categories in order to identify the economic effects of security offered by individual land title and to assess thereby the value of titling and registration programs. It is important to point out that such programs are highly controversial. Coldham (1979) and Haugerud (1983), for example, note the widespread persistence of some customary tenure patterns, despite efforts at formal registration. Conversely, Barrows and Roth (1989) and Shipton (1989) observe the emergence of individualized property rights in the context of population pressure,

TABLE 7-1. Size, Tenure, and Mode of Access Characteristics (acreage)

Tenure/Access	Size in Acres					All
	<3	3-5	5-10	10-20	>20	
All						
No. of farms	18	32	31	18	10	109
Average size	2.1	4.2	7.8	15.1	35.3	9.5
Maize (kg/acre)	1,046.2	782.5	946.4	1,102.4	1,756.0	1,053.0
	Mode of Access					
SFT <sup>a</sup>						
No. of farms	3	25	25	4	—	57
Average size	2.7	4.2	7.9	10.4	—	6.2
Maize (kg/acre)	991.7	750.4	905.3	1,029.7	—	873.0
LBC <sup>b</sup>						
No. of farms	10	5	5	13	10	43
Average size	1.9	4.2	7.3	16.9	35.3	15.1
Maize (kg/acre)	1,175.2	1,172.3	1,079.4	1,170.8	1,756.0	1,332.0
Rented/Borrowed						
No. of farms	5	2	1	1	—	9
Average size	2.1	4.3	5.9	10.2	—	3.9
Maize (kg/acre)	879.3	399.7	1,281.1	677.6	—	776.2
	Tenure					
Title						
No. of farms	2	10	26	16	10	64
Average size	2.7	4.4	7.9	15.6	35.3	13.4
Maize (kg/acre)	954.3	771.8	916.8	1,181.7	1,756.0	1,125.4
No Title						
No. of farms	11	20	4	1	—	36
Average size	1.9	4.1	7.5	11.1	—	4.0
Maize (kg/acre)	1,160.0	837.7	1,033.1	663.8	—	912.9
Rented/Borrowed						
No. of farms	5	2	1	1	—	9
Average size	2.1	4.3	5.9	10.2	—	3.9
Maize (kg/acre)	879.3	399.7	1,281.1	677.6	—	776.2

<sup>a</sup> Farms established through Settlement Fund Trustees schemes.<sup>b</sup> Farms established via land-buying companies.

even when formal registration efforts are absent. Okoth-Ogendo (1982) argues that title provision is neither necessary nor sufficient to enhance the supply of credit to smallholders, and Odingo (1982) makes a similar point with respect to credit demand.

Another frequent criticism of individual land registration and titling is its potential for increasing land distribution inequality (Njeru 1978, Okoth-Ogendo

1982, World Bank 1983, Shipton 1988). Although there is little evidence with which to evaluate this criticism, land concentration was an integral part of the objectives set forth by the Swynnerton Plan in Kenya in 1954:

In the past Government policy has been to maintain the tribal system of tenure so that all the people have had bits of land and to protect the African from borrowing against the security of his land. . . . In future, if these recommendations are accepted, former Government policy will be reversed to enable energetic or rich Africans to acquire more land and bad or poor farmers less, creating a landed and a landless class. This is a normal step in the evolution of a country (Swynnerton 1954, p. 10).<sup>1</sup>

Specifically, Swynnerton expected land concentration to result from individualization of tenure and the spread of market forces within the relatively egalitarian customary sector. In Njoro, where the processes of subdivision and resettlement have created a structure of market-oriented holdings already characterized by individual tenure and marked inequality, one might expect such dynamics to operate even more strongly.

In the context of contemporary realities, Swynnerton's "normal" step is of dubious desirability. Limitations on Kenya's supply of good agricultural land (18 percent of its total land area) and on opportunities outside agriculture combine with high population growth rates (3.9 percent annually) to raise serious doubts about the suitability of land concentration as an engine for growth. Although thorough evaluation of the longer-term effects of titling programs on land concentration is beyond this study's focus on productivity, attention to the conditioning effects of farm size, market access, and wealth also helps shed light on this important issue.

### **IDENTIFYING THE ECONOMIC EFFECTS OF TENURE SECURITY PROGRAMS: THEORETICAL CONSIDERATIONS AND EMPIRICAL COMPLICATIONS**

This section develops a simple but general model of farmer decision making and the effects of individual land title on agricultural productivity. After illustrating the standard economic case for land titling, the framework provides the basis for

<sup>1</sup> In addition to tenure reform, Swynnerton recommended that African farmers be permitted increased access to cash-crop production, technical assistance, and marketing facilities—in short, a complete reversal of their former exclusion from opportunities available to European farmers.



a critique of an effort to identify the effects of title from a simple analysis of the Njoro data. The critique considers two specific identification problems:

1. The identification of title effects separate from the effects of mediating factors that may be related to title status.
2. The identification of credit-supply-induced effects versus security or demand-induced effects.

Consideration of the first identification problem (or, more precisely, of the economics that create it) permits clarification of the criticism of land-titling programs summarized in the first section.

### **A Model of Title, Tenure Security, and Productivity**

A farmer considering whether to sink a medium- to long-term investment in a particular field (e.g., whether to invest in soil fertility through fertilization or to install an irrigation system) might be expected to compare the cost of the investment with the present value of the expected net returns from the investment. Financially, the farmer would be motivated to undertake investment projects for which the expected net present value exceeded the investment cost. Note that, among other things, the expected present value of the investment would be influenced by the farmer's general access to the factor and product markets necessary to take full advantage of the investment once undertaken. In general, investments (e.g., an irrigation systems) will be more valuable for those best able to exploit them (i.e., those who have access to capital to buy annual inputs and access to the market to sell the products).

Because of their longer-term nature, the expected present value of investment projects would also be influenced directly by tenure security—that is, by the farmer's perception of the probability that he or she could maintain rights over the field for the duration of the investment. The higher the perception of tenure security, the higher would be the farmer's expected net returns to the investment project. Other things being equal, investment would be greater in fields with greater degrees of tenure security. An economic argument for land titling and registration programs is that they do reduce perceived tenure insecurity and thereby increase the farmer's valuation of, and demand for, investment. Whether formal land titling in fact operates this way is a matter for empirical investigation and analyzed is formally with regard to "demand-induced" effects of title later.

Formal land titling and registration could also have an indirect effect on the farmer's valuation of an investment project. By enhancing the collateral value of the farmer's land, land title could increase the supply of investment funds to the farmer, reducing credit constraints and lowering the farmer's discount rate.

Through this indirect or “credit supply” effect, land titling could, other things being equal, increase agricultural investment. In later sections we try to empirically distinguish the credit supply from the demand effects of title.

### **A ‘Naive’ Statistical Analysis of the Effects of Title in Njoro**

A total of 100 farms in the sample are owned, 64 of them with title. The remaining 9 farms are operated under other tenure patterns, namely, rental and land-borrowing arrangements. Table 7-2 presents a profile of agricultural activities on the basis of farm tenure status. Mean values of inputs, outputs, and net returns from principal agricultural activities are summarized from biweekly survey data, along with several measures of land allocation and crop yields. Values of all inputs and outputs, including labor, are imputed at sample average prices reported for inputs purchased and outputs sold.

Titled farms can be immediately distinguished from untitled and other farms on the basis of size and cropping patterns. Titled farms are substantially larger, on average, than are all other farms, and allocate significantly less (in percentage terms) of their agricultural land to maize and bean cultivation. Maize yields differ significantly by title status, with titled farms averaging 210 kg per acre more than untitled farms—a gain in productivity of about 23 percent. Wheat production within the sample is found exclusively on titled farms. These findings provide some initial support for a link between title status and productivity.

To determine the existence of a relationship between title and investment, however, such a link must be traced back to farmers’ resource allocation decisions. Surprisingly, input levels are highest on farms without title. The total value of inputs on titled farms averages less than half of that on farms operated without title or under other arrangements. Differences in input levels arise primarily from differences in labor application, which constitutes over half of the value of total inputs per farm acre. Untitled farms report nearly three times the family labor applied on titled farms, for example, and nearly half again as much as that applied under other tenure arrangements. (Family labor is here valued at average market wages paid to casual labor for the various agricultural activities.) The differences in labor application are related to clear differences between titled and untitled farms in average farm size and in patterns of land allocation to maize and wheat. These differences are discussed further in a later section.

In contrast to the general pattern of input application, fertilizer and chemical input levels are highest on titled farms. This finding lends support to the hypothesis that tenure security in the form of a title increases investment in the maintenance of soil fertility, either through a security-induced demand effect or a credit-supply effect.

Outputs show less variation in absolute levels but are markedly different in

**TABLE 7-2. Value of Inputs and Outputs on Maize-Beans, Wheat, and Livestock Activities by Farm Tenure Status (Kenya shillings<sup>a</sup> per farm acre, unless otherwise indicated)**

	Title	No Title	Other	All
Number of farms	64	36	9	109
Farm size (acres)	13.40	4.00	3.94	9.51
Percent land in maize	37.92	76.59	82.47	44.82
Percent land in wheat	20.26	—	—	16.75
Maize yield (kg/acre)	1,125.37	912.89	776.15	1,052.96
Wheat yield (kg/acre)	1,269.58	—	—	1,269.58
<b>Inputs</b>	<b>1,277.86</b>	<b>2,701.02</b>	<b>2,445.65</b>	<b>1,515.51</b>
Nonlabor	418.58	438.97	493.22	423.95
Seeds	142.91	171.85	162.82	147.62
Manure	0.42	11.36	2.26	2.00
Fertilizer	78.26	24.68	13.58	68.60
Chemicals	11.94	5.24	2.15	10.68
Livestock	177.64	211.42	299.63	186.50
Other	7.41	14.42	12.78	8.55
Family Labor <sup>b</sup>	560.10	1,495.05	1,071.90	707.51
Male	204.14	656.16	336.77	271.49
Female	266.56	623.97	667.15	329.91
Child	89.40	214.92	67.98	106.11
Hired Labor	165.28	696.65	834.23	261.97
Casual	85.71	274.26	287.08	118.79
Regular	79.57	422.39	547.15	143.18
Machine Services	133.90	70.35	46.30	122.08
<b>Outputs</b>	<b>2,671.55</b>	<b>2,941.99</b>	<b>2,310.49</b>	<b>2,696.79</b>
Maize-Beans	1,056.93	1,951.30	1,641.28	1,201.17
Wheat	845.36	—	—	699.01
Livestock	796.26	990.69	669.21	796.61
<b>Net Returns</b>				
Family income	1,953.79	1,736.02	936.74	188.79
Profits	1,393.69	240.97	-135.16	1,181.28

<sup>a</sup> In 1986, the exchange rate between Kenya shillings (KSh) and U.S. dollars was about 16:1.

<sup>b</sup> In adult equivalent units: male = 1.00, female = 1.00, child = 0.50.

terms of composition. Specifically, wheat production generates almost one-third of the average value of gross output on farms with title, but does not contribute at all to the output of untitled and other farms.

Finally, two measures of net returns also vary with title status. Family income represents the per-acre value of returns to agricultural activities when the value of all inputs besides family labor has been subtracted from gross output. Profits measure the difference between gross output and the value of all inputs including

family labor. (In effect, the family-income measure imputes a value of zero to family labor, whereas “profits” value family labor at the market wage. The true value of family labor, and thus of net returns to agricultural activities, lies somewhere between the two.)

Family income, at just under KSh 2,000 per acre, is not significantly higher on titled farms than it is on farms held without title (because, as noted, differences in input levels consist largely of differences in family labor application, which is not included in this first measure of net returns). Rented and borrowed farms generate family income levels averaging less than KSh 1,000 per acre, significantly less than on owned farms with or without title.

Lower input costs in the form of family labor compensate for lower output levels on titled farms, which thus earn sharply higher profits (KSh 1,000+ per acre more) than do untitled farms. Negative profits imputed for other farms reflect the fact that market wages, at which all labor is valued, almost certainly overstate the actual opportunity cost of family labor applied to own production.

Overall, Table 7-2 offers only mixed support for the general hypothesis that tenure security in the form of a title induces farmers to apply inputs more intensively and to generate greater levels of output and net returns per acre. Tenure security may indeed provide such incentives, but these appear to be confounded by other factors that have not yet been formally incorporated. Two sets of issues in particular need to be addressed. First, factors other than title—farm size, mode of access, and farmer characteristics, for example—also affect resource allocation and productivity. And second, tenure security-related demand incentives may be constrained by supply-side restrictions, for example, as in the provision of smallholder credit. These issues are examined in subsequent sections.

### **Identification Problem 1: Title Effects versus the Mediating Effect of Market Access and Other Farm Characteristics**

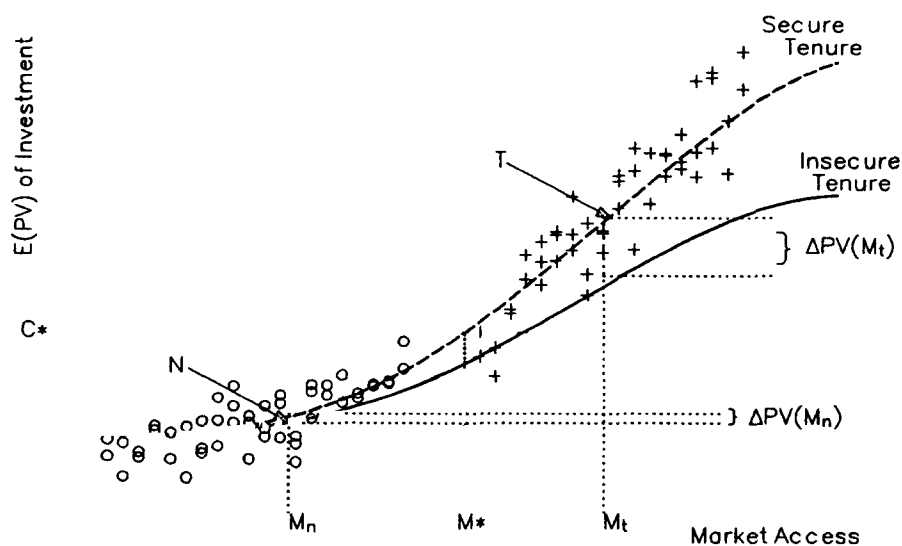
The analysis presented earlier displayed a statistically significant productivity gap between titled and untitled farms. Leaving aside for now the question of whether the gap reflects a security-induced demand effect or a credit-supply effect, a more fundamental question is whether the gap reflects an effect of title at all, or whether it simply reflects the effects of other characteristics of the farms that have title. As noted earlier, other factors (such as the farm’s market access) affect the economic value and likelihood of investment. In this section we argue that, in general, we would expect observed title status to be systematically related to other factors that influence farm productivity. The effects of title per se therefore cannot be identified without explicitly taking these other factors into account. In addition, consideration of these factors suggests another question: For what kind of farmer do we wish to measure the effects of land title? The fact that such a

question may indeed be relevant—that some farmers may benefit from enhanced tenure security while others may not—underlies the criticism that titling programs may drive rural inequality and differentiation.

Exhibit 7-1 displays a hypothetical relationship between a farm's market access and the expected present value of an investment project to that farm. The term *market access* is used here in a shorthand way to indicate the terms on which a farm unit can gain access to capital and participate in other commercial relationships. As we demonstrate empirically later, market access has a major effect on agricultural choice of technique and productivity in Kenya. The present value of an irrigation investment, for example, is higher for a farmer who can obtain the capital needed to buy additional seeds and fertilizer, and who can sell the additional produce generated at favorable prices, than it is for a farmer who is less favorably placed.

To keep matters simple, the current cost of the investment,  $C^*$  in Exhibit 7-1, is assumed to be constant and independent of market access. In conformity with the earlier discussion, any farm for which the expected present value of the investment ( $E[PV]$ ) exceeds the cost  $C^*$  would be expected to undertake the investment project.  $M^*$  represents the level of market access at which investment

EXHIBIT 7-1. Differential Returns to Tenure Security and Title



in a field with secure tenure would become worthwhile. The solid curves in the exhibit, labeled insecure tenure, represents the expected present value of the investment for farms lacking tenure security on the field in which the investment would be made. The dashed curve gives the expected present value of an investment project on a securely held field. At any given level of market access, an increase in tenure security (perhaps through titling and registration) for a particular field would increase the expected present value of investment on that field, moving the farmer from the insecure to secure tenure curve in the exhibit. The shift in the  $E[PV]$  function with enhanced tenure security asymmetrically favors farms with better market access under a variety of reasonable conditions.

As noted, the curves, the exhibit represent hypothetical population relationships (or regression functions). True population relationships are, of course, not observed—data are necessary to estimate them. A question confronting the effort to identify true title effects is whether existing titled and untitled farms are randomly distributed over market access. Assuming for the moment that title indeed enhances tenure security, if title acquisition and maintenance are costly, a random distribution of title status across farmers is unlikely. Only farmers who anticipate sizable gains from titling will be likely to acquire titles. In this case, the separation of farms into titled and untitled groups is likely to be systematically related to factors such as market access.<sup>2</sup>

To illustrate the importance of nonrandom, systematic sample separation, Exhibit 7-1 shows hypothetical data points on titled and untitled farms (shown as “+’s” and “o’s,” respectively) which are scattered around the respective population regression functions. By assumption, the observed titled farm units have better market access than the untitled farms. Mean expected investment returns for the observed titled farms is at point  $T$ , well above the mean for the group observed without title,  $N$ . The vertical gap between  $T$  and  $N$  is analogous to productivity gaps in yields and net returns that were found empirically in the previous section.

What does the large gap defined by the vertical distance  $T-N$  mean? It does not measure the gains in expected present value of investment which untitled farms would experience if they were granted land title. The average impact that titling those farms would have is given by the vertical distance labeled  $\Delta PV(M_u)$ . Nor does the gap identify the gains that currently titled farms experienced when they received land titles. The vertical distance labeled  $\Delta PV(M_t)$  measures that

<sup>2</sup> A true experimental design—where the population of farms was randomly divided into experiment (titled) units and control (untitled) units—would yield a situation to which the simple mean difference between the two groups gives an unbiased estimate of the average effect of title.

gain. The  $T-N$  gap does estimate (without bias) the difference between existing titled and untitled farms. But the size of the gap reflects differences both in title status and in market access; it does not separately identify the two influences. In short, the naive statistical approach does not identify the effect of land titling when there is nonrandom separation of farms into titled and untitled groups.

Exhibit 7-2 extends the example developed in Exhibit 7-1 to consider the population relationship between net farm income and market access. As in Exhibit 7-1, land titling would induce no investment for farms with market access below  $M^*$ , as the expected present value of returns even with title remains below investment cost  $C^*$  for farms with weak market access. For these farms, net farm income would be unaffected by land titling. For farms with market access in excess of  $M^*$ , net farm income would increase as acquisition of title makes heretofore unprofitable investment worth undertaking.

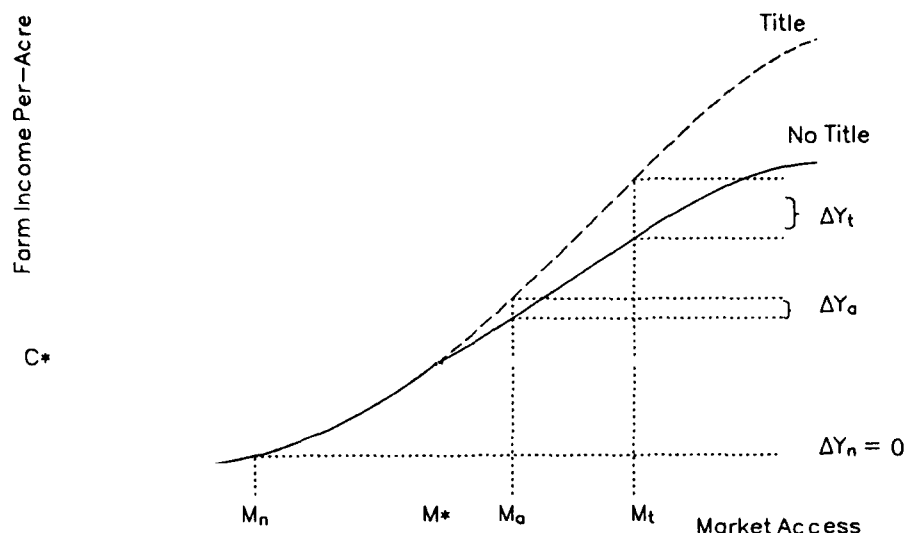
Exhibit 7-2 thus suggests a simple reason why possession of land titles is likely to be systematically related to market access, leading to the sort of nonrandom sample separation shown in Exhibit 7-1. Assuming that title enhances tenure security and or credit supply, re-turns to title are likely to be higher for farms better situated in terms of market access or other productivity-enhancing characteristics. If title acquisition and title maintenance require real expenditures, the better-situated farms are more likely to anticipate sufficient gains from titling to justify such expenditures. They are consequently more likely to make (or to have already made) the necessary titling expenditures and thus to appear in any data set as titled farms.

Given these microeconomic foundations of the effects of land title, a statistical analysis that simply compares the values of outcome variables between groups of titled and untitled farms will yield incorrect results. More complex analysis, which tries to control statistically for mediating factors such as market access, is required. The ease with which that task can be done depends critically on whether the relevant farm characteristics are measured and measurable. It may be relatively simple to control for market access: prices, wages, and interest rates can be readily observed. But farming skill and land quality—which, like market access, would enhance the returns to land titling—are much harder to measure and to control for.<sup>3</sup> In any event, the likely importance of mediating factors raises the need to consider carefully the statistical identification problem.

Those same factors also raise the question, For what kind of farmer do we wish to measure title's effects? Suppose that all statistical identification prob-

<sup>3</sup> "Selectivity bias" econometrics offers one response to such latent variable problems. See Boldt (1989) for an application of this method to land titling in Ecuador.

EXHIBIT 7-2. Market Access, Income and the Differential Value of Title



lems were resolved and that the population relationships displayed in Exhibit 7-2 were unambiguously known. What then is the desired measure of the effects of title acquisition? The gap labeled  $\Delta Y_t$  in Exhibit 7-2 measures the effects that title has on income of farms that are relatively well endowed in terms of market access for which  $M = M_t$ . The gap  $\Delta Y_n$  shows the zero effects of titling on farms with market access less than  $M^*$ . Farms selected at random from the entire population would, on average, experience a gain of size " $\Delta Y_a$ ." With these alternative indicators, there is no single measure of the effects of land titling.

These alternative measures of the gains from title also have implications for program design. Should a program try to title all farms even when average gains will be small? Should a self-selection process be permitted to occur, so, that only the large gainers seek out title acquisition and are perhaps charged fairly high fees to cover program costs?

Differentiation in the benefits to titling thus has important consequences for the effects of tenure reform policy. For less advantaged farmers, with size and wealth levels which leave them unfavorably situated with regard to market access, land title may be fairly meaningless. Its potential effects are overwhelmed



by market access problems, leaving little incentive for title acquisition. Stronger incentives tempt farmers who are relatively well off. A title raises the value not only of their initial land endowment, but also the value to them of the land of less advantaged neighbors. To the extent that land titling programs also facilitate transactions in land, freeing up mechanisms of land transfer, they may have the unintended consequence of boosting the relative land acquisition incentives and economic power of the already well-endowed. It is this possibility that seems to underlie the criticism of land-titling programs summarized earlier.

### **Identification Problem 2: Demand versus Supply Effects of Title**

It was just demonstrated that market access and other factors may obscure the effects of title on productivity apparent in the previous section. A second question to ask of the results already presented is whether the measured maize productivity gap of 210 kg per acre between titled and untitled farms, for example, identifies demand effects of land title or supply effects. In terms of the investment model introduced earlier, a shift in the tenure security of a particular field  $k$ , affects the eviction probability on that field, and thus enhances the expected value of investment on that field. The inverse relationship between eviction probability and expected returns to investment reflects a security-induced demand effect of title by making the farmer more confident of realizing returns to investment on a particular field.

A shift in tenure security of field  $k$  also influences the aggregate tenure status of the farm. As discussed earlier, a shift in aggregate tenure status may affect the discount rate (or shadow price of capital) for the farmer, and thereby influence investment behavior and observed productivity. Changes in investment and productivity that occur through changes in the shadow price of capital are called the credit-supply effects of land title.

For farmers who are quantity constrained in the capital market (that is, who cannot borrow as much as they would like at the observed interest rate), the shadow price of capital will generally exceed the market interest rate.<sup>4</sup> A legally recognized, mortgageable land title is likely to enhance the farm's collateral value as perceived by the financial system. Consistent with many studies of agricultural credit (for example, Carter 1988), the increase in collateral value may reduce the interest rate at which the farm can borrow and, more important, is likely to increase the amount the farm can borrow (perhaps from zero to a positive value).

<sup>4</sup> Carter and Kalfayan (1989) give a more detailed exposition of the shadow price of capital.

Either change in the conditions of credit supply will reduce the farmer's shadow price of capital. The expected present value of investment returns would increase for all projects, and incrementally more projects would be economically worthwhile and hence undertaken; thus, observable agricultural productivity would increase.

Disentangling credit supply effects from security-induced demand effects of land title is important because the two effects have distinct welfare and policy implications. The importance of the supply effects of land-title provision is underscored by the work of Feder et al. (1988) on Thailand. They conclude that credit-supply effects are the "main source of greater productivity of lands owned legally" (p. 142). Supply effects indicate that collateral constraints, rather than tenure insecurity per se, inhibit agricultural production. In this situation, addressing the collateral problem directly (perhaps through the formation of mutual-responsibility borrowing groups) may be the most effective policy, particularly if land-titling programs are expensive or involve some of the other trade-offs mentioned earlier. In addition, as Roth et al. (1989) note in a commentary on Feder and Onchan's (1987) Thailand work, aggregate social returns to land titling may be minimal if the banking system has a fixed supply of loanable funds.<sup>5</sup>

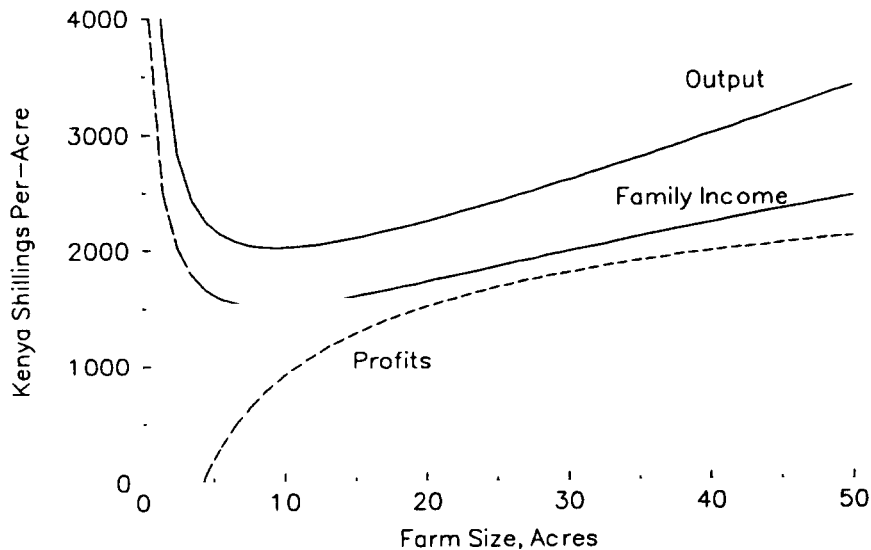
In sum, appropriate policy formation requires the differentiation of supply effects from security-induced demand effects. While the latter may justify land tenure intervention, the former offer a much weaker case for policy action of any sort. Such a distinction is pursued later.

#### **FACTORS THAT MEDIATE THE ECONOMIC EFFECTS OF TENURE SECURITY PROGRAMS: MULTIPLE MARKET FAILURES IN LAND, LABOR, AND CAPITAL**

Tenure security considerations aside, farmers within the Njoro study area display highly diverse, differentiated patterns of behavior. An indication of this diversity can be seen in Exhibit 7-3, which displays fitted farm-productivity/farm-size regression functions. (The annex to this chapter presents the estimated regression results that underlie the exhibit.) The U-shaped output regression curve relates the total value of output per farm acre (at standardized prices) to the size of the farm. The family income curve shows the relationship between farm size and the per-acre value of output less the value of all inputs other than family labor. The profit curve further subtracts the imputed value of family labor. Beneath these economically and statistically significant farm-size-related patterns lie two

<sup>5</sup> In their reply to this comment, Feder and Onchan (1989) dispute the relevance of this assumption.

EXHIBIT 7-3. Output and Net Returns per Acre

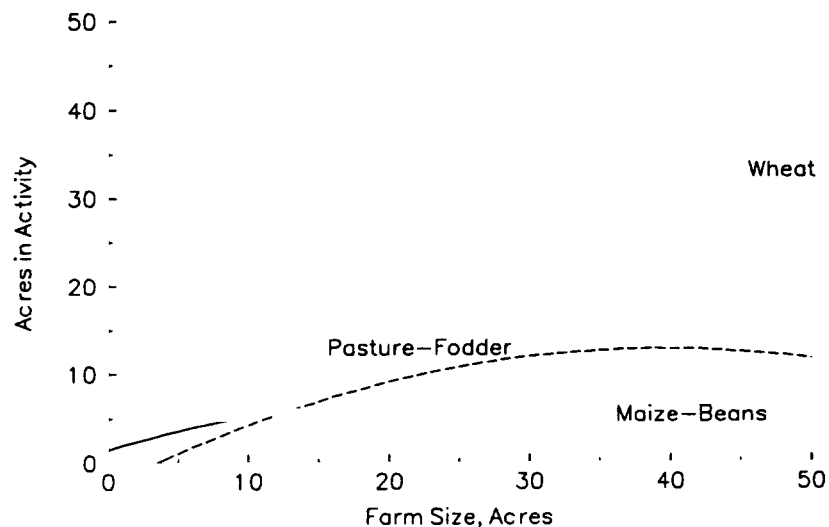


sorts of differentiated behavior: differentiation in choice of activity and differentiation in choice of technique.

The primary uses for land and other farm resources within the Njoro study area are in maize-bean intercropped fields, pastures to support dairy activities, and wheat fields. Exhibit 7-4 graphs the fitted regression functions that show the relationship between farm size and choice of activity. All farms seem to put their first 4 or 5 acres into maize-bean production. Marginal acreage beyond that is allocated to pasture and fodder crops. Beyond about 15 acres, additional land is allocated to wheat cultivation. Of these activities, wheat cultivation is by far the most profitable (when inputs and outputs are valued at market prices), as Blarel et al. (1989) show in detail.

This shift to increasingly more profitable activities as farm size grows underlies in part the productivity-size relations in Exhibit 7-3. In addition, choice of technique for given activities changes radically as farm size increases. The smallest farms use massive doses of family labor per acre in relatively unremunerative food crops, keeping up output per acre but creating large negative imputed profits. As farm size increases, family labor stays constant in absolute terms but is spread over a larger area. The use of purchased inputs increases only slowly, so

EXHIBIT 7-4. Land Allocation by Farm Size



that yield, total output per acre, and family income all fall. As farm size increases further, the use of purchased inputs rises dramatically, and those inputs are increasingly applied to more remunerative activities (Blarel et al. 1989).

The existence of such sharp behavioral differentiation among producers is evidence of what Jonakin and Carter (1987) have called "multiple market failures." First, cheap family labor, in classic Chayanovian style, appears limited in its access to remunerative off-farm opportunities. While family labor is exchanged on a casual basis among small farms, there is little systematic transfer of hired labor between labor-abundant small farms and land-abundant large farms. At the same time, the failure of larger producers to transfer land to small holdings (as a way to exploit the cheap labor in residence there) indicates a second market failure that limits the economic capacity of the smaller units. Third, given that the smaller classes of farmers choose activities and techniques which require little working capital, a reasonable hypothesis is that the capital market is strongly imperfect and that access to capital is strongly stratified by farm size (Blarel et al. 1989). Finally, and related to the hypothesis of a capital market failure, the apparent subsistence-first strategies of small and large holders may be related to imperfect risk and insurance markets (see, e.g., Wiebe 1991).

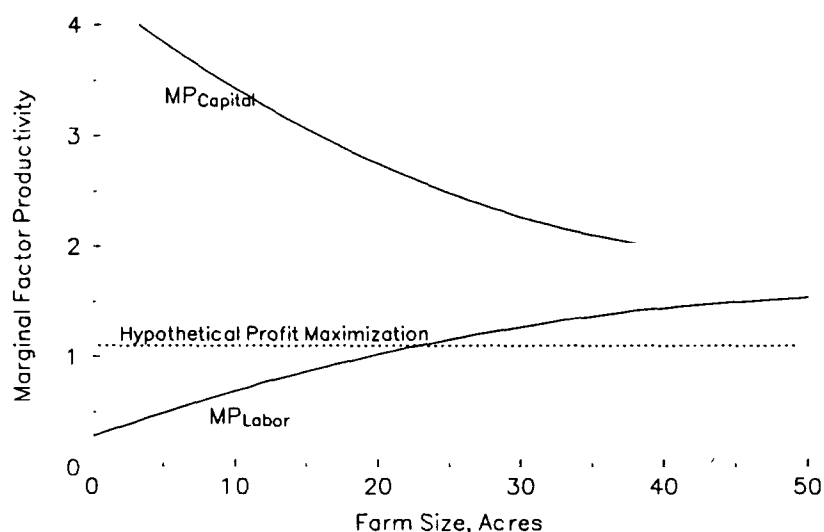
If this multiple-market-failures explanation of farm-size-differentiated behavior is correct, the shadow prices of capital and labor ought to be strongly related to farm size, with the shadow price of labor positively related to farm size and the shadow price of capital inversely related to farm size. Shadow prices themselves are not observable. Marginal factor productivities can, however, be taken as reasonable representations.<sup>6</sup> After using data on maize-bean cultivation to estimate a Cobb-Douglas representation of the production technology, we estimated marginal products of capital and labor for each farm in the Njoro sample. These estimates were then regressed on farm size, yielding the fitted regression functions graphed in Exhibit 7-5 and confirming expectations about capital and labor market failures. Specifically, divergence between estimated shadow prices and market prices suggests that small farms are constrained in their access to capital, while larger farms appear constrained in their access to labor.

Market access is thus an important factor in Njoro's agricultural decision-making environment and appears strongly related to farm size. As we argued earlier, market access may condition or mediate the effects of land title on individual production and investment incentives. In addition, in environments where land title is not randomly allocated (nor costlessly maintained), market access may also influence which farms are actually observed to possess title. In the Njoro study area, severe capital constraints, which seem to limit expansion of small farms into more remunerative activities, may completely overwhelm any potential benefits to title for small-scale producers (except to the extent that title acquisition itself has a major effects on access to capital). Within this imperfect market environment, the effects or potential effects of land title are likely to be differentiated across producers, something which empirical and policy analysis must take into consideration.

#### **IDENTIFICATION OF THE DIFFERENTIATED EFFECTS OF LAND TITLE WITHIN IMPERFECT MARKET ENVIRONMENTS**

Titled farms in the Njoro sample differ, on average, from untitled farms, as the statistics presented in the second section showed. But, as the intervening sections have argued, it is inappropriate simply to identify title as the cause of these "naively" estimated differences between titled and untitled farms. Within the imperfect market environment that characterizes rural Kenya, other factors that

<sup>6</sup> The value of an input's marginal product represents the gain in output that would be generated by an additional unit of that input. As such, the marginal product indicates the maximum value, or shadow price, that a producer is willing to pay for such an additional unit.

**EXHIBIT 7-5. Marginal Factor Productivity by Farm Size**

may well be correlated with title status, particularly market access, are expected to have a major effect on farm resource allocation and productivity. In addition, careful consideration suggests that the effects of land titles may well be different for farmers who enjoy different degrees of market access. The question of land title's effects must be modified in order to determine what kind of farmer is the subject of such effects.

In the section that follows, we try to resolve the underlying identification problem and estimate what part (if any) of the observed differences between titled and untitled farmers can be identified as a true effect of title, and what part is simply a spurious correlation between title and other mediating factors. The statistical model will be specified to test for the possibility of size-differentiated land title effects. Finally, we implement a methodology to distinguish what we earlier called the credit-supply effects of title from the security-induced demand effects.

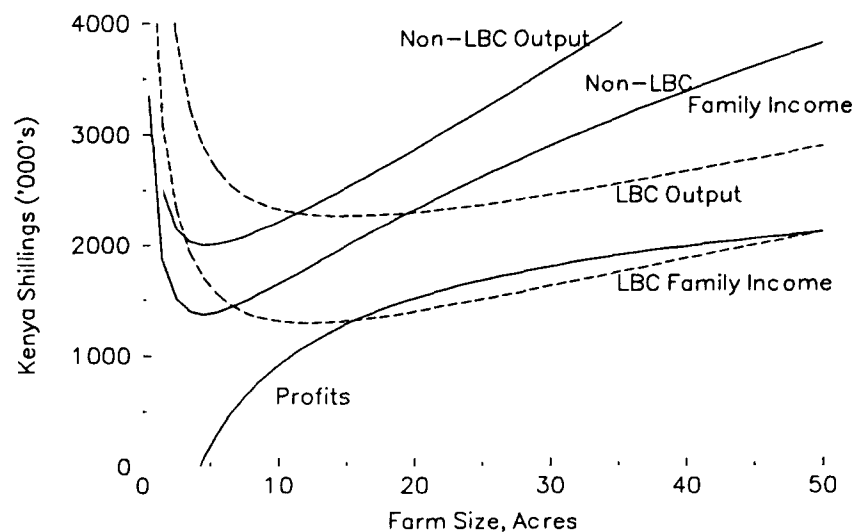
### **Identifying True Effects of Title on Productivity in Njoro**

In Exhibit 7-3, three measures of farm productivity were seen to vary significantly with farm size. Do these size-productivity relationships hold when the effects of title are incorporated simultaneously? We now consider formally the

relationship between productivity and title net of the effects of farm size, which, along with mode of access, has been introduced as a proxy for farmers' access to resources and markets. This is accomplished in Exhibit 7-6 which extends earlier analysis by including dummy variables for title and for that particular mode of access—the land-buying company—that is expected to be most strongly associated with active market participation. (Various measures that may reflect market access in Njoro, such as the use of commercial inputs, formal credit, and remittances, sharply distinguish farms on the basis of land-buying company participation as well as of farm size. This may be understood when one considers that although participants in LBCs had the resources to acquire land competitively, beneficiaries of settlement schemes are more likely to have been targeted on the basis of need.) In addition, the potential effect of title is allowed to vary with farmers' degree of market access. Three dependent variables—output, family income, and profits—are evaluated in turn. This specification will indicate whether potential gains from land-titling efforts are universally distributed or limited to particular groups of farmers.

Weak coefficients on title variables (see the numerical regression results in the annex) indicate that the significant differences between titled and untitled

EXHIBIT 7-6. Output and Net Returns per Acre



farms observed earlier in Table 7-2 are due not to true title effects but to the spurious correlation between title status and other important mediating factors. In general, coefficients on size and LBC participation dominate title in magnitude and in statistical significance for all three productivity measures. It thus appears that farm size and mode of access, as measures of producers' market access, are powerful enough to overwhelm title effects between farms in the sample.

Correlated productivity relations are presented in Exhibit 7-6. The "U" shape of output and family income and the monotonically increasing form of profits revealed in Exhibit 7-3 are reaffirmed in the current expanded specifications, indicating the importance of the relationship between farm size and productivity in general. Exhibit 7-6 also illustrates the special productivity features that characterize farms originating from the subdivision of LBCs. Both output and family income are significantly higher on small LBC farms and lower on larger LBC farms than they are on non-LBC farms. This situation suggests that the higher levels of nonfarm income and market access that may have enabled some farmers to participate in LBCs in the first place are particularly beneficial to the sample's smaller farms. Profits do not differ significantly by mode of access.

Although title effects tend to be overwhelmed by the effects of differences in size and mode of access between sampled farms, it remains possible to investigate the potential role of title within individual farms, where the two proxies for market access are held constant but the title status of particular fields may vary. This possibility is pursued in the next section in an analysis of the second identification problem, raised earlier: distinguishing security-induced demand effects from credit-supply effects.

### **Identification of Demand versus Supply Effects of Title in Njoro**

While both the security-induced demand effects of land title and the credit-supply effects imply greater agricultural investment and productivity, there is one key difference in their implications that can be used to identify separately the magnitude of the two effects.

Suppose a farmer receives legal title to a particular field  $k$ , enhancing tenure security on that field. Following this change, security-induced demand effects will increase investment and productivity only on the newly titled field  $k$  because it is only on that particular field that the farmer's likelihood of realizing returns to investment has increased. However, credit-supply effects will also occur for the farm as a whole. In contrast to demand effects, however, the supply effects of title will symmetrically increase investment incentives on all the farm's fields. This is because credit-supply effects will increase capital availability for the farm as a whole, increasing the profitability of any given investment on the farm.



To the extent that security-induced demand effects are operative, investment and productivity effects of land title should be disproportionately high on a given farmer's titled fields, as opposed to fields held without title. Confirmation of demand effects would support the hypothesis that reduced legal exposure to eviction actually implies reduced insecurity of tenure. If only credit-supply effects occur, for any particular farm there should be no difference, on average, between levels of investment and productivity on its titled versus its untitled fields. In this latter scenario, investment and productivity on farms that are least partially titled could be higher than on other farms that on average have a lesser degree of titling.

It is thus possible to disentangle potential supply and demand effects of title if there are producers whose farms are composed of fields held under different tenure arrangements. Of the 109 farms surveyed in Njoro, 26 cultivated multiple maize and beans fields under more than one tenure arrangement. For the subsample of 26 farms with fields under multiple tenure arrangements, field-level data were transformed as follows:

$$x_{ik}^* = x_{ik} - \bar{x}_i$$

where  $x_{ik}$  is the untransformed observation for field  $k$  on farm  $i$ , and  $\bar{x}_i$  is the mean across all of farm  $i$ 's fields. For example, if  $x_{ik}$  measures maize yield from field  $k$  of farm  $i$ , a positive value of the transformed variable  $x_{ik}^*$  would indicate that yields on field  $k$  are higher than the average of the farm's other fields. If security-induced demand effects are systematically operative, these field-level indicators of relative economic performance ought to be positive on average for titled fields. If only credit-supply effects are operative (or if title has no economic effects), the value of such transformed indicators should bear no relation to field-specific tenure status and the average of transformed variables would be zero for titled (and all other) fields.

Principal maize-beans inputs and outputs are presented in deviation form in Table 7-3. On average, nonlabor inputs are applied less intensively on titled fields than they are on the untitled or other fields of the same farm. (Maize seeds, for example, are applied at a rate of 0.77 kg per acre less on titled fields than they are on farms considered as a whole. Rented fields receive 2.11 kg per acre more than do titled fields, or 1.34 kg per acre more than does the farm overall.) Chemicals, however, are applied more intensively on titled fields than they are on untitled or other fields.

The statistics for labor allocation are mixed. Male labor is applied more intensively on untitled fields than on titled fields, but female labor, is applied most intensively on titled fields. This holds true for regular hired labor as well, though more casual labor is hired to work on untitled and rented fields than on titled fields.

**TABLE 7-3. Deviations from Farm-Mean Quantities of Inputs and Outputs in Maize-Beans Cultivation by Field Tenure Status (per acre of maize-beans cultivated)**

	Title	No Title	Rented	Given
Number of fields	19	16	33	4
Field size (acres)	3.38	1.64	1.56	1.10
<b>Inputs</b>				
Non-labor				
Maize seeds (kg)	-0.77	0.10	1.34	-5.09
Bean seeds (kg)	0.64	-2.62	0.94	-4.60
Potato seeds (kg)	-4.33	2.08	4.26	0.98
Manure (kg)	-49.09	164.19	-14.85	-87.62
Fertilizer (kg)	-3.00	-4.32	6.92	-11.41
Chemicals (KSh)	4.18	-12.67	2.30	-12.67
Family Labor (hr*)				
Male	-1.84	6.89	-4.12	34.18
Female	20.42	-0.13	-18.72	-78.14
Child	-2.06	19.07	-7.66	6.29
Hired Labor (hr)				
Casual	-43.62	38.86	42.82	-96.34
Regular	9.36	-10.02	-5.35	-14.46
Machine Services (KSh)	3.33	-59.04	32.36	-75.91
<b>Outputs (kg)</b>				
Maize	-121.87	-168.51	279.29	-488.12
Beans	14.88	-17.57	-6.22	-39.58
Potatoes	-69.59	138.44	21.10	-55.83

\* In adult equivalent units: male = 1.00; female = 1.00; child = 0.50.

Results for outputs are mixed as well. Maize yields are more than 400 kg per acre higher on rented fields than they are on both titled and untitled fields of the same management unit. Potato yields, by contrast, are highest on untitled fields, while bean yields are greatest on titled fields.

Data disaggregated by particular inputs and outputs thus provide no confirmation of the existence of security-induced demand effects of title. Are such effects visible in more aggregated measures? Title's effects on the aggregate value of inputs and outputs were tested using ordinary least squares regression analysis incorporating dummy variables for ownership with title, ownership without title, rental arrangements, and borrowing. Coefficients indicate the average deviation from farm *i*'s mean value of inputs or outputs (per acre of maize and beans cultivated) on fields held under the various tenure arrangements. The existence of security-induced demand effects should be revealed in input and output levels,

which are highest on those fields held under the most secure tenure arrangements. If registered title does indeed offer such security, we would expect to find significant productivity gains demonstrated on titled fields.

Actual regression results are presented in the annex. Estimated coefficients are not significantly different from one another or from zero, indicating that tenure security-induced demand effects, if operative at all, are overwhelmed by other factors that influence farmer decision making with respect to production. (Rented fields may, for example, differ in quality from owned fields and may be sought especially for characteristics favorable to commercially oriented production.) This failure to find any significant evidence of security-induced demand effects of land title parallels the similar failure of Feder et al. (1988) in their study of Thailand, and indicates that provision of legal title has little effects on farmers' perceptions of the security with which they hold land.

### SUMMARY AND CONCLUSIONS

The standard argument for tenure reform centers on the role of uncertainty in discouraging investment on land that is held without long-term security. Land title that enhances such security may induce investment and productivity increases both from the demand side, as farmers become more certain of reaping the benefits of investment in the future, and from the supply side, by affording farmers better access to credit.

In a world where access to markets is imperfect, both demand and supply effects may be limited to those farmers who are already well endowed with agricultural resources and access to markets. As a result, tenure reform policies may have very different effects on different classes of farmers. An important question is raised: "For whom does enhanced tenure security bring productivity gains?"

In addition, when title acquisition is costly, identification and measurement of the effects of tenure reform are complicated because the best-endowed farmers, most likely to benefit from enhanced tenure security, are also most likely to seek title to their land. Farmers less favorably endowed, are in turn, less likely to acquire title. Simple comparison of the performance of observed titled and untitled farms thus tends to overstate both the realized effects of title on farmers who have obtained it and the potential effects of title on those who have not.

This chapter began with a "naive" presentation of the apparent effects of registered land titles on agricultural productivity in Njoro, Kenya. Subsequent theoretical and empirical development sought to disentangle true title effects—whether induced by investment demand or by credit-supply considerations—from those of other mediating factors. It was demonstrated that title's effects are

indeed overwhelmed in Njoro by factors such as farm size and mode of access to land. In particular, multiple failures in land, labor, capital, and insurance markets contribute to the persistence of pronounced size-related patterns of technique and activity choice among smallholders. Within this imperfect environment, the effects of land title are differentiated across producers, and market access conditions the effects of land title on farmers' production and investment incentives.

Efforts to enhance smallholder productivity via land tenure reform alone are thus likely to meet with limited success: title status appears to be less important in the determination of farm productivity than are other factors, such as market access. Furthermore, in light of the link between these other factors, and farmers' existing endowments of land and other resources, tenure reform's distributional effects may prove as worthy of future attention as are its potential consequences in terms of efficiency.

**Annex—Regression Results**

Explanatory Variables	Exhibit 7-3 Estimates Dependent Variables (Kenya shillings per acre)			Exhibit 7-6 Estimates Dependent Variables (Kenya shillings per acre)		
	Log Output	Family Income	Profit	Log Output	Family Income	Profit
Constant	8.576*	3016.265*	-1928.707*	8.014*	2290.911*	-1470.510*
ln(Size) [lnSz]	-0.856*	-1376.827*	1524.031*	-0.531*	-1239.767*	1286.993*
lnSz <sup>2</sup>	0.190*	315.466*	-125.765	0.171*	416.371*	-43.573
Title [T]	—	—	—	-0.083	251.083	188.126
T x lnSz	—	—	—	0.032	-3.921	-283.602
Land Buy Company (LBC)	—	—	—	0.961*	1603.682*	-963.019
LBC x lnSz	—	—	—	-0.395*	844.670*	337.489

\* Estimated coefficient is statistically different from zero at the 5 percent level.

**Supply versus Demand Effects of Title**

Explanatory Variables	Dependent Variables (Deviation from Farm Specific Means of)	
	Inputs	Outputs
Title	87.63	-58.44
No title	108.82	71.21
Rented	34.08	324.15*
Given	-289.86	-496.66

\* Estimated coefficient is statistically different from zero at the 5 percent level.

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# 8

## TENURE SECURITY, CREDIT USE, AND FARM INVESTMENT IN THE RUJUMBURA PILOT LAND REGISTRATION SCHEME, UGANDA

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The colonial government of Uganda, in response to proposals of the East Africa Royal Commission (1955), implemented a pilot land registration scheme in Kigezi District of Uganda in 1958.<sup>1</sup> The commission, citing the failure of the indigenous tenure system to foster accelerated economic development, proposed a nationwide program of individualized land tenure based on adjudication and registration. According to the colonial administrators, the diffusion of land rights among individual, community, and clan created tenure insecurity for the individual and provided neither individuals nor groups sufficient incentives to develop the land. Twenty-nine years later, the pilot scheme was revisited to study the effects of land registration on tenure security, credit use, and agricultural investment. Data were collected in 1987 from a sample of households in Uganda's first registered parish and a neighboring parish.

This chapter gives a brief overview of the settlement of Kigezi district, its indigenous land tenure system, the legal framework and system of land administration, and establishment of the pilot scheme. Details are then provided on research methodology including sample selection and the stratification of households used for the subsequent descriptive analysis. A final section uses logit

<sup>1</sup> What was originally Kigezi District in 1958 has since been subdivided into three districts, namely, Kabale, Rukungiri, and Kisoro.

analysis and a discrete choice model to evaluate determinants of selected short- and longer-term agricultural investments, including the effect of land registration. The analysis indicates that supply-side benefits of title on farm investment through enhanced credit use are negligible, but, the positive relationship found between certain investments and land registration provides some evidence of demand-side effects through enhanced tenure security.

### **KIGEZI DISTRICT**

The former Kigezi District was situated in the extreme southwest corner of Uganda, bordered by Zaire to the west, Rwanda to the south, and Ankole District to the east and north. Stretching to the shores of Lake Edward, the entire district covered 2,039 square miles (sq. mi.). Three-quarters of the district is covered by rugged escarpments that rise over 8,000 feet (ft.) and precipitous gorges and valleys that sometimes descend below 5,000 ft. This mountainous terrain changes to undulating landscape on the eastern boundary with Ankole District. Rainfall averages about 40 inches per year. Population density is high. At the time of the pilot registration program in 1958, the district average was 260 persons per sq. mi. but reached as high as 800 in the southernmost counties (Obol-Ochola 1971, Lawrance 1960). Moderately sloping hillsides and valley floors provide rich and cultivable soils, but the more rugged hillsides contain rocky soils that are easily eroded. Competition for land is keen. As early as 1970, population pressure had begun to push cultivation onto these marginal hillsides, with a marked increase in soil erosion (Obol-Ochola 1971).

### **Land Tenure in Kigezi District**

Three main tribal groups lived in Kigezi District: the Bantu Bakiga, the Bantu Banyaruanda mainly in the southwest, and the Bahima pastoralists mainly in the east. The Bakiga originally emigrated from Rwanda. Strongly independent and led by powerful and ruthless leaders, the Bakiga clans eventually drove the Bahima, the then native inhabitants, off the land eastward to Ankole District. Each Bakiga clan occupied demarcated territories with land reserved only for clan members. Strangers encroaching on clan territories were killed or beaten. Interclan wars, skirmishes, and fights over land were common prior to the advent of colonial rule (Obol-Ochola 1971).

Rights to land in Bakiga society were divided among individuals, community, and clan. Clan members held individual rights to land, subject to the oversight of family or clan. These rights included using the land, renting and leasing land,



pledging crops but not the land itself, selling land subject to family consent<sup>2</sup>, disposing of land through inheritance, and prohibiting grazing and fencing areas near the homestead or fields (Gayer 1957, Makubuya 1981). The community had free access to communal grazing land, salt licks, watering holes, springs, and other resources considered common property. The clan or family had the right to settle land disputes within its jurisdiction, exercise the option to buy any land offered for sale by its members, prohibit the sale of clan land to "undesirable" buyers, and declare void any land transaction it had not approved.

The extent to which the land tenure system of the precolonial Bakiga was in fact individualistic remains a debated issue. Edel (1969) contends that land rights were strongly weighted toward individual control. Obol-Ochola (1971) agrees that the Bakiga were quite independent and individually minded, yet their land tenure system in many respects was communal. These differences aside, the modern-day land tenure system in Kigezi is quite individualistic. Land can be sold, mortgaged, leased, or pledged without the permission of clan elders. In cases where land transfer involves alienation, the consent of social groups is sometimes sought to maintain good social relations, but mandatory consent has ceased to be a precondition.

Prior to the pilot land registration scheme, the incidence of disputes and boundary encroachments had reached major proportions.<sup>3</sup> On the basis of his discussions with Bakiga elders, Obol-Ochola (1971) states (p. 278):

Most of the former and present chiefs . . . stressed . . . there were many cases of unscrupulous cheating and encroachments on boundaries. [According to the chiefs,] "we all know our boundaries, but people with small plots of land try to . . . extend their holdings by cheating and fraudulently altering the boundaries. These practices lead to quarrels and litigations."

<sup>2</sup> The origin of land sale in Kigezi District is obscure. Although land sales are now well established, Obol-Ochola (1971, p. 233) states that cash sales were not an established Bakiga custom. According to Bakiga elders, "sale of land was first introduced . . . by the Baganda chiefs who ruled the District during the first two decades of the Protectorate. These chiefs sold land whenever parcels . . . within their jurisdictions were vacant. . . . They also sold all the land they acquired . . . when they returned to Baganda. The indigenous Bakiga chiefs emulated the Ganda chiefs and adopted the practice of selling land. . . ." Another view is that Bakiga chiefs started the practice about 1930 when they started receiving cash salaries and using the cash to invest in land. A third view is that sale of land was practiced long before the advent of the Europeans; the emergence of the money economy simply converted the barter system of exchanging a goat or cow for use of land to a cash system.

<sup>3</sup> According to Obol-Ochola (1971, p. 279), "land disputes had advanced to such a serious stage that . . . in 1962 . . . [200 of] 224 Civil Appeals to the [Kigezi] District African Court . . . [involved] land disputes." In the process of adjudicating claims in the pilot scheme, one in three parcels (of 3,200 parcels initially adjudicated) involved some form of dispute (Lawrance 1960).

### Rujumbura Pilot Land Registration Scheme

Uganda has long had substantial land under individual and registered tenure—the *mailo* land of Buganda.<sup>4</sup> As independence approached, the 1955 report of the East Africa Royal Commission urged broader individualization programs. The colonial government in Uganda reacted with a series of pilot schemes. Rujumbura was the first county in Kigezi District to be targeted for registration under the 1955 Land Tenure Proposals, pursuant to the Crown Lands (Adjudication) Rules of 1958. Nyakaina was the first parish selected for adjudication and registration in the county, later to become known as the Rujumbura Pilot Land Registration Scheme. Besides the intent of registering the land rights of Africans, the pilot scheme sought to provide information on techniques of adjudication, survey, and registration, and on the cost and time of converting native customary rights to freehold title (Lawrance 1960).

Nyakaina parish within Rujumbura County was chosen partly to meet the demand for registration, partly to avoid unduly difficult terrain for surveying purposes, and partly to avoid fragmented or severely subdivided areas. The government wanted the registration exercise to be based on conditions of demand and need. Demand was met by the high number of applications made to the District Land Office, and by perceptions that land registration would be well received by rural landholders. Many landholders had acquired their land through resettlement programs,<sup>5</sup> and wanted the boundaries of their land surveyed and registered because of concerns that there might be latent aboriginal claims to the land and fears that the government would bring more settlers to the area, causing yet higher population pressures and more boundary encroachments. Need according to colonial authorities meant high population density, land scarcity, presence of valuable crops, individualization indicated by widespread sales, or indica-

<sup>4</sup> Article 15 of the Uganda Agreement of 1900 created a form of freehold tenure for political notables (West 1972). Land was allocated in sq. mi. blocks (termed *mailo*). A small amount (573 sq. mi.) was given to the Kabaka (king) and high officials, 8,430 sq. mi. to other political officials, and less than 300 sq. mi. to churches, the central government and non-Africans (Barrows and Kisamba-Mugerwa 1989).

<sup>5</sup> Resettlement policies, aimed at moving people from densely populated pockets to relatively underpopulated areas, had been implemented by the Resettlement Allocation Authority in Kigezi since 1945. Under the indigenous system in Kigezi, each son upon marriage gets a piece of land from his father. The subdivision associated with each generation, along with population pressures, had resulted in overcropping, soil exhaustion, and landlessness. The Department of Agriculture in 1944 investigated areas for resettlement of the surplus population from South Kigezi. Less populated areas of North Kigezi and West Ankole were targeted to receive the first groups of settlers. About 31,000 people were eventually settled in North Kigezi (Agricultural Task Force 1987).

tions of disintegrating customary tenures (widespread disputes and litigation), all of which were present in Kigezi (Lawrance 1960).

The pilot scheme covers about 70 sq. mi. in the northeastern part of the district. At the time of its inception, southern portions were undulating open grasslands used almost entirely for grazing cattle; farther north, the Bahororo (of the Bahima tribe) cultivated subsistence crops (grain and bananas) over most of the area and kept some cattle (Lawrance 1960).

Proceeding with registration proved far more difficult than had originally been envisaged. When the proposals were submitted to the Kigezi District Council in 1956, as many people opposed registration as supported it. The minister of lands mounted a district-wide campaign to promote the proposals. The district secretary general, the Kigezi Legislative Council, and other local government officials also undertook an aggressive lobbying effort. Some chiefs who opposed the proposals were sacked for being reactionary and unprogressive. Only after the district secretary general and other dignitaries took the lead in registering their own land did the District Council pass a resolution favoring grants of title to those who wanted them.

The Crown Lands Rules established the procedures for adjudicating and registering land. An adjudication committee was to consist of 10 to 20 taxpayers chosen by adult members of a parish, with the parish chief as chairman. Once the rules were applied to an adjudication district, any occupier of land under customary tenure became eligible to apply for registered freehold. Each application required completing two forms plus a deposit of 110 Uganda shillings (USh) (then about U.S. \$18) for open land, or USh 137 (U.S. \$23) for bushy land. The completed application then had to be returned to the District Land Office. Once the district commissioner became satisfied there were enough applications to warrant a survey, he would declare the parish an adjudication area.

By the time the Rujumbura scheme was completed in March 1962, 6,000 plots had been adjudicated and 6,400 had been demarcated and surveyed (Obol-Ochola 1971). Parcel size averaged 4.9 acres (based on the first 800 properties surveyed), and 9 markstones were required, on average, per parcel.<sup>6</sup> The average number of parcels per proprietor was 1.6.<sup>7</sup> The cost of demarcation and survey, including aerial photography, plotting, field survey, computation, and cadastral plans, averaged USh 32 per acre (Lawrance 1960). A title certificate could be obtained by paying a USh 10 assurance of title fee. By 1968, only 1,800 out of

<sup>6</sup> Because holdings were so irregular, Lawrance cites one case where a parcel required at least 46 markstones.

<sup>7</sup> Much of this fragmentation stems from the fact that bananas, a staple food, are grown on one large plantation where individuals own separate plots.

the 6,400 titles available for issue to the public had been paid for and taken by proprietors. According to the district commissioner (Obol-Ochola 1971, p. 308):

Titles were not obtained from the District Land Office . . . [because] of lack of knowledge on the advantages of possessing title; . . . Kabale was too far away from Rujumbura for many proprietors to . . . collect their titles; . . . the majority of the unsold titles . . . belonged to the small and poorer land owners; and . . . most of the plots were too small and devoid of mortgage value . . . [to warrant] . . . purchase of title.

The adjudication committees were suspended in Kigezi in 1968 although, according to records at the Rukungiri district land office, follow-up surveys and issuance of freehold titles continued until the 1975 Land Reform Decree. Although registration was intended to be voluntary and sporadic, nearly all parcels in Nyakaina parish were adjudicated and registered, resulting effectively in comprehensive and systematic registration.

### INDEPENDENT UGANDA

Fundamental legal changes in Uganda's land tenure system were invoked by the Land Reform Decree of 1975. Under this decree, all land in Uganda is declared to be public land to be administered by the Uganda Lands Commission in accordance with the provisions of the Public Lands Act of 1969. No person may occupy public land by customary tenure except with written permission of the prescribed authority. All freeholds, including mailo ownership that existed before commencement of the decree, were converted to long term leaseholds of 99 years for public bodies and religious organizations and 99 years for individuals. Written consent of the commission is necessary before the lessee can transfer the whole of the lease for value. Any transfer of public land except under these conditions is an offense by law.

However, the de facto effect of the 1975 Land Reform Decree in Kigezi has been minimal. Although the decree converted all freehold land to long-term leasehold, freeholders in Kigezi are generally unaware of its provisions or of the change in registration status. Transactions of previously registered concessions continue to be registered as before using the same procedures and forms. Only people seeking first registrations (as leaseholds) of previously unregistered land are made aware of the change.

## RESEARCH DESIGN

The Land Tenure Center and the Makerere Institute of Social Research conducted a survey of landholders in the vicinity of Nyakaina in 1987. The research had originally intended to compare a sample of registered households in Nyakaina parish with a second sample from an adjacent control parish, Kyamakanda. It had been assumed that the control parish was similar in all respects, except that land holdings would not be registered. However, upon suspension of the adjudication committees in 1968, sporadic registration continued in surrounding parishes until 1975, when the Land Reform Decree abolished freehold title. Every parish adjacent to Nyakaina had some parcels surveyed and registered.

The notion of simply comparing agricultural performance under freehold tenure via registration with that of land rights under the indigenous tenure system also proved to be naive. The tenure matrix in practice was far more complex and intractable than had initially been believed. Prior to 1968, registration in Nyakaina parish was freehold, and although in theory registration was based on voluntary choice, in practice it was somewhat compulsory and nearly comprehensive. Between 1969 and 1975 land registration in Nyakaina and Kyamakanda involved freehold tenure based on voluntary and sporadic registration. Following the 1975 Land Reform Decree, existing freeholds continued to be renewed in practice, but registrations of previously unregistered land were granted only as leaseholds and on the basis of voluntary and sporadic registration.<sup>8</sup>

Sporadic registration requires a voluntary and purposeful (endogenous) decision about whether to register land and which parcels to register. Under systematic and compulsory registration, the decision to register is exogenously imposed upon the household. Presence of registration based on purposeful choice raises the concern of possible self-selection biases that lead to spurious conclusions about titling impacts (i.e., differences in output and investment between registered and nonregistered households are incorrectly attributed to registration, when they are, in fact, due to systematic differences in household and parcel characteristics). As long as parcel and household characteristics are randomly distributed among parishes and tenure strata, analysis of mean differences in input use and performance indicators (investments, productivity) would represent a reasonable first approach for hypothesis testing. Conversely, if household and parcel characteristics are strongly correlated with registration status, the analysis of perfor-

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<sup>8</sup> Out of 206 parcels reported as being registered in the study, only 6 are leaseholds, the rest are freeholds.

mance indicators would require econometric procedures that control for their influence.<sup>9</sup>

The research design targeted three strata of households: (A) Nyakaina registered landholders ( $n = 100$  households), (B) Kyamakanda registered landholders ( $n = 40$ ), and (C) Kyamakanda nonregistered landholders ( $n = 100$ ). Strata A and C correspond to the original research design of comparing exogenously registered households in Nyakaina with nonregistered households in Kyamakanda, except that household and parcel characteristics of the nonregistered sample have been biased by the exodus of households registering parcels under purposeful registration (stratum B). As the exogenously registered stratum A contains both households that would have purposefully registered land had they been given the choice of doing so, and other households that would have not, attributes of the sample would tend to fall somewhere between that of strata B and C, other things being equal.

As indicated in Table 8-1, the final research design is complicated by the distinction between purposeful (endogenous) and exogenous choice in registration status, and the presence of "mixed" households with both registered and unregistered land. After eliminating cases with missing or unreliable data, the sample was reduced to 29 households, with all parcels purposefully exogenously registered entirely from Nyakaina, 38 households with all parcels purposefully registered split between Nyakaina and Kyamakanda, 52 households with some parcels purposefully registered and others not, and 109 households with all parcels unregistered mostly from Kyamakanda.

These 228 households in total controlled 505 parcels (Table 8-2). Of the 229 parcels in Nyakaina parish, 94 had been adjudicated in the name of the current holder under the pilot scheme, 60 parcels that had once been adjudicated had been purposefully renewed by the current holder after acquisition, and 75 parcels that had once been adjudicated had *not* been renewed by the current holder after acquisition.<sup>10</sup> Of the 276 parcels in Kyamakanda, 52 had been purposefully registered and 224 parcels had *not* been registered.

<sup>9</sup> Registration status is highly correlated with certain household characteristics. Parcel registration, based on systematic registration, is positively correlated with the length of time the parcel has been held ( $\rho=.376$ ), age of household head ( $\rho=.298$ ), farm size ( $\rho=.148$ ), number of parcels held ( $\rho=.147$ ), and household head not born in the area ( $\rho=.120$ ), all significant to at least the .01 level. Parcel registration, based on purposeful choice, is positively and significantly correlated with possession of farm equipment other than hand tools ( $\rho=.198$ ), parcel size ( $\rho=.197$ ), possession of durable assets ( $\rho=.196$ ), and farm size ( $\rho=.150$ ), and negatively related with length of parcel ownership ( $\rho=-.134$ ).

<sup>10</sup> As the registration program in Nyakaina was not strictly compulsory, it is possible that some of these 75 parcels might never have been adjudicated.

TABLE 8-1. Final Household Classification in the Research Design

Household Classification	Households With All Parcels Registered	Households With Some Parcels Registered	Households With No Parcels Registered	Total
Registration imposed	A (29) <sup>a</sup>	B —	C —	29
Purposeful choice	D (38)	E (52)	F (109)	199
Total	67	52	109	228

A = Households in Nyakaina parish having only parcels that were acquired before 1969 and were adjudicated under the Pilot Land Registration scheme.

B = No households were prevented from registering at least one parcel.

C = No households were prevented from registering all their parcels.

D = Households in Nyakaina parish with only parcels acquired between 1969 and 1987, and households in Kyamakanda parish with parcels acquired prior to 1987, all registered.

E = Households in Nyakaina parish with parcels acquired between 1969 and 1987, and households in Kyamakanda parish with parcels acquired prior to 1987, some registered, some not.

F = Households in Nyakaina parish with only parcels acquired between 1969 and 1987, and households in Kyamakanda parish with parcels acquired prior to 1987, none registered.

<sup>a</sup> Figures in parentheses are respective household sample sizes.

TABLE 8-2. Final Parcel Classification in the Research Design

Parcel Classification	Nyakaina	Kyamakanda	Total
Compulsory registered	94	—	94
Purposefully registered	60	52	112
Unregistered	75	224	299
Total	229	276	505

The population of Nyakaina and Kyamakanda parishes was derived from a list of registered holders obtained from the District Land Office and lists of taxpayers obtained from parish and subparish chiefs. Cross-checking tax and registration records proved useful because records in the District Land Office were often out of date, as transactions have gone unrecorded. With the assistance of the chiefs and residents, those taxpayers who had no land holdings in the area were eliminated from the list (mainly young men still living with parents), and other landholders who paid no taxes were added (mainly the elderly and widows). Landholders were then stratified by parish and registration status, and households were randomly selected from each of the three strata.

English-language questionnaires were drafted and administered to the head of

household in a single-round interview. The enumerators' fluency in both English and the local dialect enabled simultaneous translation in the field. Land-related questions were addressed only to parcel and field levels, not to the land rights of household members to plots within the parcel. Data on size of parcels and income were based on respondent recall or estimation. Questionnaires were checked for accuracy and completeness each evening as they were completed. A follow-up interview was conducted in situations where information was incomplete or inconsistent. Further information on the questionnaire, enumerators manual, and research design appears in Kisamba-Mugerwa et al. (1989).

### **SOCIO-ECONOMIC PROFILE**

Selected data on household and parcel characteristics are presented in Tables 8-3 and 8-4 for five strata of households: (I) Nyakaina parish, (II) Kyamakanda parish; (III) households possessing only parcels that were exogenously registered under the pilot registration program in Nyakaina; (IV) households regardless of parish that have purposefully registered at least one parcel (other parcels held may be exogenously registered or nonregistered), and (V) households regardless of parish with no registered parcels. Parish comparisons (I and II) permit a preliminary assessment of whether structural differences between the two sites may be biasing registration impacts. Data by registration status (III, IV, and V) help assess whether systematic differences in household and parcel characteristics are resulting in the self-selection of households into the various tenure categories.

#### **Parish Comparisons**

With regard to parishes, households in Nyakaina (I) tend to have larger family size (7.6 vs 6.2 persons), a greater proportion of active workers listing their main occupation as farming (37 vs 30 percent), fewer household heads born in the area (63 vs 83 percent), and more years spent by household heads in farming (32.2 vs 27.0 years). Households in Kyamakanda (II) tend to have more family members with secondary (8.7 vs 5.5 percent) and higher education (2.7 vs 1.5 percent), greater orientation of active workers toward nonfarm employment (laborers/porters, housework, trader/shopkeepers, teaching, artisanry, and other) (15 vs 7 percent), have higher average monthly cash incomes (US\$ 169.1 vs US\$ 86.1) and cash remittances (US\$ 37.2 vs US\$ 14.2), and a greater number of barns (0.66 vs 0.36 barns) and livestock units (2.38 vs 1.64 units). Residents in Kyamakanda thus appear to be more prosperous, slightly better educated, more dependent on livestock, and more reliant on nonfarm sources of income. Overall, 96 to 98 percent of the household heads interviewed were male.



**TABLE 8-3. Household Socioeconomic Profile, Uganda Land Registration Study**

Household Characteristics	Nyakai-na (I)	Kyama-kanda (II)	Households With All Parcels Exogenously Registered (III)	Households With Some Parcels Purposefully Registered (IV)	Households With No Parcel Registered (V)
Mean family size (persons)	7.6	6.2	6.9	7.6	6.3
Mean family age (years)	24.6	28.0	29.4	26.5	25.4
Family education (% with)					
Primary education	56.5	53.6	58.3	56.7	53.4
Secondary education	5.5	8.7	5.8	11.8	5.4
Technical or university	1.5	2.7	1.6	4.0	1.0
Main occupation (%)					
Farming	37	30	41	27	33
Student	28	32	25	30	31
Laborer/porter	2	4	1	4	4
Housework	1	3	1	3	2
Trader/shopkeeper	1	2	1	2	2
Teaching	—	2	1	1	1
Artisan	2	—	1	1	—
Other	1	4	2	4	2
Young and unemployed	27	23	27	28	25
Family monthly cash income (1st + 2nd sources, USh)	86.1	169.1	71.9	160.9	128.7
Cash remittances (USh)	14.2	37.2	1.5	27.1	38.9
Assets (mean no./household)					
Barns	.36	.66	.31	.63	.52
Bicycles	.14	.16	.03	.30	.12
Hand sprayers	.04	.07	—	.14	.02
Livestock housing	.14	.15	.03	.27	.09
Livestock units	1.64	2.38	1.94	3.32	1.18
Radios	.21	.22	.17	.39	.14
Store buildings	.69	.44	.52	.79	.36
Water sources	.44	.42	.38	.70	.27
Wheelbarrows	.03	.06	—	.13	.02
Iron sheet roofs (%)	41.0	36.5	37.9	46.5	29.6
Household heads					
Percent male	98	96	100	96	96
Percent born in area	63	83	62	67	85
Mean years of age	54	52	62	54	48
Mean years farming	32.2	27.0	40.0	30.4	24.3
Primary education (%)	48	51	48	50	55
Secondary education (%)	4	1	—	6	1
Technical or university	—	4	—	6	1

**TABLE 8-4. Farm Size, Cropping Patterns, and Land Quality Characteristics, Uganda Land Registration Study**

Household Characteristics	Nyakaina (I)	Kyamakanda (II)	Households With All Parcels Exogenously Registered (III)	Households With Some Parcels Purposefully Registered (IV)	Households With No Parcel Registered (V)
Mean parcels/household	2.3	2.1	1.7	2.7	1.9
Maximum parcels/household	12.0	6.0	4.0	12.0	6.0
Mean parcel size (acres)	4.1	3.5	5.4	4.4	2.7
Mean farm size (acres)	9.5	7.1	9.1	11.7	5.0
Land quality (% parcels)					
Flat land	23	21	19	24	22
Hillside	53	61	69	53	64
Swamp	—	3	—	2	2
Other	24	15	12	21	12
Ownership time (years)	21.6	22.6	35.4	19.8	20.8
Mode of acquisition (% parcels acquired by)					
Adjudication <sup>a</sup>	2	2	6	2	1
Borrowing	1	1	—	—	—
Gift	—	—	—	—	—
Inheritance/transfer	37	56	44	37	63
Pledge	—	—	—	—	—
Purchase	59	39	50	60	33
Rent/lease	—	3	—	1	2
Cropping patterns (% field area)					
Banana	32.7	29.8	29.3	27.6	34.9
Beans	8.4	6.7	7.7	6.2	9.1
Coffee	6.1	6.1	11.1	4.1	7.1
Fallow	6.1	16.2	6.6	9.3	16.8
Maize	6.2	5.5	5.2	4.0	8.0
Millet	4.6	3.2	3.7	3.5	4.7
Pasture	9.9	7.9	3.0	9.3	6.1
Sweet potatoes	5.1	6.2	4.9	5.0	7.4
Other crops	20.9	18.4	28.5	31.0	5.9

<sup>a</sup> Some parcels appear to have been acquired in the process of adjudication itself.

Differences in farm and parcel characteristics between the two parishes are negligible. Mean number of parcels per household (2.3 in Nyakaina vs 2.1 in Kyamakanda) and mean parcel size (4.1 vs 3.5 acres) are quite similar. Nyakaina tends to be a bit flatter (23 vs 21 percent of parcels); Kyamakanda tends to be more hilly (61 vs 53 percent). Some differences are apparent in mode of land acquisition. Land purchase has been more important in Nyakaina than in

Kyamakanda (59 vs 39 percent), while inheritance/transfer has been more important in Kyamakanda (56 vs 37 percent). A large amount of land in Kyamakanda is still under fallow (16.2 vs 6.1 percent); otherwise cropping patterns are not very different.

### Comparisons Among Registration Strata

Households with all parcels exogenously registered (III) tend to be older (29.4 years) compared with either purposefully registered households or those without registered land (26.5/25.4 years), have a greater percentage of workers listing their main employment as farming (41 vs 27/33 percent), have lower monthly cash income (US\$ 71.9 vs US\$ 160.9/128.7) and cash remittances (US\$ 1.5 vs US\$ 27.1/38.9), and are important coffee producers (11.1 vs 4.1/7.1 percent of arable land). Household heads are older (62 vs 54/48 years) and have more farming experience (40.0 vs 30.4/24.3 years). Mean parcel size is larger (5.4 vs 4.4/2.7 acres), and mean ownership time of parcels is longer (35.4 vs 19.8/20.8 years). This profile depicts a group of households that are near the end of their life cycle, are heavily dependent on farming, and have only limited dependence on nonfarm income and remittances. They also own fewer productive assets.

Households that have purposefully registered at least one parcel (IV) tend to have larger family size (7.6 persons vs 6.9 for exogenously registered households and 6.3 for unregistered households), are better educated (11.8 vs 5.8/5.4 percent secondary education; 4.0 vs 1.6/1.0 percent higher education), have fewer active workers engaged mainly in farming (27 vs 41/33 percent), have larger farm size (11.7 vs 9.1/5.0 acres), used purchase as the primary means of land acquisition (60 vs 50/33 percent), have higher cash incomes (US\$ 160.9 vs US\$ 71.9/128.7), have more livestock (3.3 vs 1.9/1.2 units), have greater number of consumerables (0.39 vs 0.17/0.14 radio and 0.30 vs 0.03/0.12 bicycle), and have greater number of productive assets (0.63 vs 0.31/0.52 barn, 0.14 vs 0/0.02 hand sprayer, 0.79 vs 0.52/0.36 store, 0.70 vs 0.38/0.27 water source). These households also tend to have higher dependence on livestock farming indicated by number of livestock owned, units of livestock housing (0.27 vs 0.03/0.09 unit), and access to pasture (9.3 vs 3.0/6.1 percent of arable land). This profile suggests a group of medium-aged households, with larger size farms, with greater involvement in livestock farming, whose members are wealthier, have greater access to nonfarm opportunities, who are better educated and more progressive than their counterparts in the exogenously registered strata.

Compared with households in the exogenously registered/purposefully registered categories, households with only unregistered parcels (V) tend to be younger (25.4 vs 29.4/26.5 years mean family age, and 48 vs 62/54 years for the house-

hold head), have smaller farm sizes (5.0 vs 9.1/11.7 acres), have relied on inheritance as the primary mode of land acquisition (63 vs 44/37 percent), and have high dependence on nonfarm income (US\$ 128.7 vs US\$ 71.9/160.9) and cash remittances (US\$ 38.9 vs US\$ 1.5/27.1). A greater percentage of household heads were born in the area (85 vs 62/67 percent), and have spent fewer years in farming (24.3 vs 40.0/30.4 years). Despite the lowest land-per-resident ratio of any farm size category (0.79 vs 1.32/1.54 mean acres per resident), they have the highest frequency of fallow (16.8 vs 6.6/9.3 percent of arable land) indicating an insufficient supply of farm labor. This profile characterizes a group of households nearer to the beginning of their life cycle with smaller farms, substantially younger household heads, most of whom have been born in the area and have inherited their land from their fathers.

These findings lend weak support for the view that Nyakaina has somewhat higher quality land (flat vs hilly) and may have been settled earlier than Kyamakanda, that registration did accommodate if not facilitate land transfers to outsiders, and that Kyamakanda residents are in part sons and daughters of parents from Nyakaina.<sup>11</sup> Furthermore, these findings reveal that household and parcel characteristics are not randomly distributed among registered strata. Wealth and progressivity, in particular, appear to be highly correlated with purposeful registration. Self-selection biases will be an important concern in evaluating registration impacts in the subsequent analysis.

### **Tenure Security, Land Disputes, and Credit Access**

Despite a registration process that involves a costly and cumbersome set of procedures for potential registrants, and a legal system that is imperfect in scope and implementation, the majority of landholders indicated that they perceived important benefits to land registration. In discussions with registered landholders, some respondents ascribed a certain status to title possession. Certificates of landownership are highly prized, carefully guarded, and hidden. Others mentioned a sense of freedom and independence associated with no longer having to consult chiefs in land transfers. Furthermore, registration confers a form of insurance against four vagaries associated with land rights under the indigenous system, as described in the following paragraphs.

First, growing population pressure and in-migration have sharply increased demand for land, and weakened the confidence of those people holding land

<sup>11</sup> Data are not sufficiently detailed to determine whether unregistered households are those headed by the sons of fathers in Nyakaina who moved away because land was more plentiful, whether restrictions on subdivision forced sons to seek land outside the scheme, or whether they are sons of older farmers in Kyamakanda many of whom immigrated to the area.

rights, particularly on "unutilized land," under indigenous tenures. Under the indigenous system, an occupant "pays" a one-time tribute to the chief to legitimate his or her land use rights, but use must be confirmed to guarantee possession.<sup>12</sup> Permanent buildings, tree crops, or graveyards are generally sufficient to ensure recognition of land use rights. Evictions from cultivated land are rare, although ownership claims to bushland have grown more precarious in recent years. Landholders strongly assert their claim to their bushland as a reserve for fallow, grazing, and future inheritances. However, the recent boom in southwestern Uganda's economy has brought an influx of outsiders with capital searching for land, and the chiefs have been exercising their felt right to allocate or sell "unutilized" land to outsiders and to entrepreneurs.

Second, the processes for allocating and distributing land rights under the indigenous system confer a greater sense of tenure insecurity than formal and legal processes. This uncertainty arises from different views about what constitutes "unutilized" land. Eviction within the indigenous system is a family or clan affair decided by the chief and elders. Use rights are reasonably secure as long as the holder is physically residing on the land and the parcel is cultivated and in continuous use. A parcel reverts to the chief or clan when it is left "unutilized," or when the holder emigrates from the area. In contrast, eviction from a registered parcel is very rare and can be decided only at a high level within government, in most cases the court of law. Even when a registered parcel is not cultivated, people will generally not attempt to use it without the consent of the registered owner.

Third, the land market is beginning to undermine the powers and authority of the chiefs, as individuals have begun selling land among themselves. The very fact or perception that the chief's authority is being weakened increases the tenure insecurity of those landholders who have historically relied on the chief's authority for securing access to land.

Fourth, land grabbing has increased, mainly from political elites enclosing land, using one or more variants of the following process: Someone with political connections and money will visit a chief and negotiate the purchase of bushland. That person will then visit the District Land Office to apply for a lease. A survey team from the District Land Office will demarcate the parcel but, lacking a cadastre, the boundaries incorporate land (cultivated land, bushland, or both) that is currently claimed. The occupants are then given three months' notice to vacate. These dislocations are sometimes passive, as the registrations unwittingly incorporate land that is claimed by another. In other instances, a purchase is

<sup>12</sup> Recent developments indicate that land purchases under the indigenous system are conferring greater tenure security (although not to the extent of registered tenure) than land allocated through inheritance or by the chief.

negotiated for a small piece of bush- or swampland, but the person buying the land purposefully registers a block much larger in size (e.g., 100 acres).

It is difficult to accurately assess the level and scope of tenure insecurity in the area. The hyperbole that sometimes accompanies land grabbing and land disputes distorts the evaluation of real tenure security effects. The assessment is further complicated by the fact that many people still behave as if the law does not pertain to them, thus clouding issues of legal compliance and effectiveness of legal enforcement. But tenure security under the indigenous system is weakening due to the following factors: (1) growing population pressure; (2) a booming economy that is increasing the demand of outsiders and entrepreneurs for land; (3) the sale of bushland by chiefs without the consent of existing landowners to meet the increased demand for land; (4) witting or unwitting registration of allocations by elites through administrative channels, sometimes incorporating current land claims; (5) improper adjudication; and (6) a private land market that is beginning to circumvent the chiefs in land allocation. It is against this backdrop that landholders perceptions of registration must be gauged.

Respondents, both with and without registered land, were asked whether registration increases security against disputes or evictions, increases security for credit, has other benefits, or provides no benefits whatsoever. The results (percent of household heads responding affirmatively) are reported in Table 8-5. Nearly all respondents saw some benefits to registration. Very few landholders were able to cite benefits beyond increasing security against disputes and evictions and enhancing security of access to credit. Table 8-6 provides complementary information on incidence and causes of disputes. A number of salient points stand out from the data.

First, most registered households felt that registration enhances security against disputes (65.5 percent for all exogenously registered and 62.0 percent for purposefully registered households). Only a minority felt that registration increases security against eviction (31.0 and 33.8 percent). Eviction is a more stringent condition because the government can ultimately invoke its right of eminent domain. The possibility also cannot be discounted that provisions in the 1975 law giving government greater powers of custodianship and the shift from freehold to leasehold tenure may be undermining registration's perceived ability to prevent eviction.

Second, a smaller percentage of unregistered households perceive that registration enhances security against disputes (47.8 vs 65.5/62.0 percent). Perceptions toward security of eviction are nearly equal to those of the registered category (32.2 vs 31.0/33.8 percent). The lower percentage could indicate that land rights are already quite secure under indigenous tenures, but the fact that only 11.3 percent of nonregistered households prefer the indigenous system seems

TABLE 8-5. Perceptions of Titling Benefits, Uganda Land Registration Study

Landowners' Perception of Titling Benefits	Nya-kaina (I)	Kyama-kanda (II)	Households With All Parcels Exogenously Registered (III)	Households With Some Parcels Purposefully Registered (IV)	Households With No Parcels Registered (V)
Believe that registration increases (percent of sample responding affirmatively)					
Security against disputes	57.0	51.8	65.5	62.0	47.8
Security against eviction	30.0	36.5	31.0	33.8	32.2
Security for credit	29.0	62.8	31.0	43.7	59.1
Other benefits	3.0	2.9	3.4	1.4	2.6
No benefits	—	0.7	—	—	0.9
Reasons for not registering land					
Prefer indigenous system	15.0	10.9	27.6	11.3	11.3
Do not know procedures	29.0	30.7	44.8	22.5	34.8
Find procedures too complicated	45.0	48.2	51.7	47.9	49.6
Find procedures too costly	8.0	33.6	3.4	14.1	33.0
Do not wish to upset family and neighbors	24.0	15.3	31.0	22.5	16.5
Other	4.0	12.4	—	9.9	9.6

Note: Column totals do not sum to 100 percent because of multiple responses.

contradictory. Another hypothesis is that disputes are already low under the indigenous system. Data in Table 8-6 seem to refute this hypothesis; land disputes in the unregistered category are much higher (40.0 vs 27.6/26.8 percent) than in either of the registered categories. Finally, a high incidence of disputes under the indigenous system, combined with lack of experience with registration, may be causing unregistered landholders to underestimate the effectiveness of registration in curbing disputes.

Third, land registration appears to have had an important effect on the frequency and nature of land disputes. Compared with the unregistered category, landholders in the exogenously/purposefully registered categories experienced fewer disputes (27.6/26.8 vs 40.0 percent). Of the disputes that were experienced, boundary encroachments (87.5/52.6 vs 60.9 percent) and disagreements over grazing rights (12.5/10.5 vs 4.3 percent) were predominant. No disputes were experienced by exogenously registered households with regard to the most serious infractions—ownership disputes (0 vs 21.1/19.6 percent) or inheritance disputes (0 vs 21.1/6.5 percent). Results for the purposefully registered category are difficult to interpret; ownership and inheritance disputes are higher relative to nonregistered households, but the implication is impossible to assess because

TABLE 8-6. Land Disputes, Uganda Land Registration Study

Land Disputes	Nya-kaina (I)	Kyama-kanda (II)	Households With All Parcels Exogenously Registered III	Households With Some Parcels Purposefully Registered (IV)	Households With No Parcels Registered (V)
No. of households	100	137	29	71	115
Total no. of disputes reported <sup>a</sup> by all households for past 5 years	24 (24.0)	54 (39.4)	8 (27.6)	19 (26.8)	46 (40.0)
Dispute over (% of total) <sup>b</sup>					
Boundary	66.7	59.3	87.5	52.6	60.9
Ownership	20.8	18.5	0	21.1	19.6
Inheritance	8.3	9.3	0	21.1	6.5
Grazing rights	4.2	7.4	12.5	10.5	4.3
Common resources	4.2	1.9	0	0	2.2
Other	4.2	3.7	0	0	6.5

<sup>a</sup> Figures in parentheses are total disputes as a percent of households.

<sup>b</sup> Column totals exceed 100 because certain disputes have multiple causes.

the survey did not inquire whether the disputes arose prior to registration (prior disputes under the indigenous system may have been the causal factor in choosing title) or after.

Fourth, perceptions on the usefulness of registration as security for credit are mixed. Only 31.0 and 43.7 percent of households in the exogenously registered and purposefully registered categories, respectively, responded affirmatively. Conversely, 59.1 percent of unregistered households felt that registration enhances credit access. Responses of nonregistered households are influenced by exaggerated claims of registration benefits in the absence of actual experience with registration ownership. Registered owners by experience have learned that registration is not sufficient to gain access to credit.<sup>13</sup>

Use of credit in the research area is very low, mostly acquired from informal lenders rather than from commercial banks, and mostly applied to nonfarm uses. Of 228 households in the survey, only 15 loans had been acquired sometime in the previous five years. All were received by households in Kyamakanda—4 by purposefully registered households (5.6 percent of sample) and 11 (9.6 percent) by unregistered households. Of these loans, 46 percent were obtained from money lenders, 20 percent each from commercial banks and neighbors, and 7 percent

<sup>13</sup> Title possession is normally a prerequisite for land to be considered as security for loans, but not all registered landholders in the sample actually held the title certificate. Of the 206 parcels listed as registered freeholds and leaseholds in the two parishes, 80.6 percent were currently in the hands of the owner, 11.6 percent were at the survey office, 6.3 percent were still being held by the original owner, and the whereabouts of 1.5 percent were unknown.



each from relatives and cooperatives. Some 27 percent of loans were used for education, 53 percent for general nonfarm uses, 13 percent for farm use, and 7 percent for ceremonies. At the time of the field research in 1987, the nearest agricultural bank was three hours away by road in Kabale. A Uganda commercial bank established a branch in the area the year previous to the research, but commercial banks generally extend credit only for business enterprises not for agricultural loans.

Despite the lack of formal credit sources, farmers provided a variety of other explanations for their low use of formal credit. When asked why applications were not made to banks or cooperative associations, the majority of landholders responded (most important reason) that they fear debt 35 (37) percent. Other responses included fear of losing collateral especially land 19 (3) percent, lack of collateral 4 (17) percent, not aware of these credit sources 12 (12) percent, have no need 11 (11) percent, have other sources 6 (7) percent, have enough money 6 (4) percent, and none or other 7 (9) percent. Regardless of the reason, these data indicate that registration has had a negligible effect on credit use. To the extent that a positive investment response to registration is found in the subsequent analysis, it must be due to demand-side effects (through enhanced tenure security), because supply-side effects (increased access to credit) are negligible.

If landholders perceive positive benefits to registration, why do more farmers *not* register their land? According to registered landholders (judging the actions of nonregistered households), procedures are too complicated (51.7 and 47.9 percent for exogenously and purposefully registered households, respectively), nonregistered landholders are inadequately informed about registration procedures (44.8/22.5 percent), landholders do not wish to upset family and neighbors (31.0/22.5 percent), landholders prefer the indigenous tenure system (27.6/11.3 percent), and registration is too costly (3.4/14.1 percent). However, non-registered landholders gave a different ordering: they felt that procedures were too complicated (49.6 percent) or not clearly known (34.8 percent), thought procedures were too costly (33 percent), feared upsetting family and neighbors (16.5 percent), and preferred the indigenous system (11.3 percent). Registered landholders thus tended to overestimate the importance of family or neighbors and the indigenous system, and to underestimate the effect of costs, as constraints to acquiring registration.

## REGISTRATION AND AGRICULTURAL INVESTMENT

### Short-term Investments

Only limited use is made of chemical inputs and improved seeds in the survey area, regardless of registration status. Data on number of fields having been treated with a given input are provided in Table 8-7. Of the 193 fields located on

exogenously registered parcels, 1.6 percent had acaricide applied to them, 0 percent fertilizer, 0 percent herbicide, 2.6 percent improved seeds, and 0.5 percent pesticides. Applications on fields of purposefully registered and nonregistered households are similarly negligible. The region's remoteness partially explains the low intensity of commercial input use, yet its dependence on the external economy for coffee exports would seem to lessen the importance of high transport costs as an explanatory factor. Whatever the reason, so few field observations with input use make it impractical to conduct further analysis of variations in input use among tenure categories.

**TABLE 8-7. Use of Short-Term Inputs, Uganda Land Registration Study**

	Nya- kaina (I)	Kyama- kanda (II)	Households With All Parcels Exogenously Registered (III)	Households With Some Parcels Purposefully Registered (IV)	Households With No Parcels Registered (V)
Short-term Input Use					
No. of fields	712	813	193	517	650
Percent of fields w/input					
Acaricide <sup>a</sup>	1.7	1.5	1.6	2.3	0.9
Fertilizer	0.1	—	—	0.2	—
Herbicide	—	0.1	—	0.2	—
Improved seed	2.2	0.5	2.6	1.5	0.8
Pesticide	0.3	0.4	0.5	0.2	0.5

<sup>a</sup> Acaricide is used to kill snails.

### Intermediate- to Long-Term Investments

Compared with the dearth of purchased inputs, a high percentage of households have invested in intermediate- to long-term land improvements (Table 8-8). Households with all parcels exogenously registered under the pilot scheme have the highest percentage with access roads (62.5 percent), continuous manuring (43.8 percent), destumping (35.4 percent), drainage (27.1 percent), fencing (35.4 percent), grass stripping (37.5 percent), terracing (41.7 percent), and tree crops (52.1 percent). Investments are generally lowest on those parcels falling under the unregistered household category. Drawing conclusions based on mean comparisons, however, can lead to spurious conclusions. Rather than due to registration, the higher frequency of tree crops and terracing by exogenously registered households could simply be due to their higher holdings of hilly land (69 percent, Table 8-4). The higher proportion of parcels with access to roads may simply be caused by parish location and site selection biases introduced at the time of the scheme's inception. The effect of registration on investment, while controlling

**TABLE 8-8. Intermediate- to Long-Term Fixed-Place Investments in Land, Uganda Land Registration Study**

Longer-term Investment in Land	Nya-kaina (I)	Kyama-kanda (II)	Households With All Parcels Exogenously Registered (III)	Households With Some Parcels Purposefully Registered (IV)	Households With No Parcels Registered (V)
No. of parcels	231	280	48	188	213
Access road	45.9	38.2	62.5	48.9	33.3
Continuous manuring	25.1	31.4	43.8	32.4	26.8
Drainage/bunding	17.7	26.4	27.1	26.1	20.2
Fencing	28.1	15.0	35.4	29.3	8.9
Grass stripping	27.3	24.3	37.5	24.5	26.8
Making beds	6.1	5.7	8.3	4.3	8.0
Mulching	63.2	65.4	70.8	67.0	67.6
Removing stumps	23.8	16.8	35.4	23.4	16.9
Terracing	22.5	2.1	41.7	14.4	4.2
Tree crops (mainly coffee and bananas)	44.6	25.7	52.1	36.7	28.2

Note: Percentages include parcels with investments existing at time of acquisition and made since acquisition.

for the influences of other household and parcel characteristics, is discussed in the next section.

### Investment Demand Equations

A logit model was estimated for six intermediate- and long-term fixed-place investments. Model results are presented in the annexes to this chapter. Intermediate-term investments with benefits occurring over a one- to five-year period include (A) continuous manuring, (B) mulching, and (C) fencing. Long-term investments with benefit streams occurring over a longer time horizon include (D) tree crops (mainly coffee and bananas), (E) terracing, and (F) nonfarm buildings (dwelling house, restaurants, pub/bar, and shops).<sup>14</sup>

Two variant models are estimated for each type of improvement. Model I includes registration as an independent variable regardless of type (compulsory or purposeful). Model II includes registration proxies for two separate processes—parcels exogenously registered prior to 1969 under the pilot registration scheme, and parcels registered based on purposeful choice from 1969 onward. The theo-

<sup>14</sup> Each investment variable is binary (1 if the investment is present, 0 if not). A parcel with a fraction of its area under an investment, using the binary definition, has the same weight (i.e., 1) as it would if its entire area were covered by the investment. This definition has important implications for model fit, although gauging the cost, value, or scope (percent of area covered) of investments in practice proved to be prohibitively difficult.

retical logit investment model used and variable definitions are provided in Roth, Cochrane, and Kisamba-Mugerwa (1993).

### Effect of Household Level Attributes

Investment demand in this analysis is theorized to be a function of the following attributes: *experience*, measured by age of household head; *managerial skills* of the household head, measured by years of education; *political status*, measured by current or past involvement in one or more political offices;<sup>15</sup> *farm involvement*, an indicator of whether the household head is a full time farmer; *wealth*, measured by household income, livestock (standardized units) owned, or land per resident ratio; and *land dispersion*, measured by number of parcels held.<sup>16</sup>

*A priori*, experience and managerial skills would be expected to increase the likelihood that an investment would occur through application of improved techniques and better farm management. Results indicate that age of household head has a modest positive effect on manuring, tree crops, and terracing, but results are statistically insignificant at the 5 percent level. Age has a significant positive effect on fencing (I and II .048) and a significant negative effect (I -.035, II -.034) on nonfarm buildings. Thus older household heads appear to be making the investments in fencing, while younger household heads are making the investments in nonfarm buildings and businesses. Results for the education variable are mixed, some positive and some negative, but the positive coefficient for nonfarm buildings (I .464, II .479) is the only significant one. Education thus appears to be encouraging diversification of economic activity (bars, restaurants, pubs, shops, or housing rental units).

Political status would have a negative effect if time is diverted away from farm management but would have a positive effect if it increases control over labor in the community, enhances access to inputs, improves financial management or strength, or increases acceptance of new technology. Results again are inconclusive. Only for mulching (I .757, II .807) are the odds significantly improved with political status.

Degree of farm involvement can also produce different theoretical outcomes: full-time farming would have a positive effect on investment demand if greater effort and management are applied to the farm enterprise, or a negative effect if it entrenches old ideas and techniques, reduces exposure to government services,

<sup>15</sup> Whether the household head is holding or has held an office in the Land Adjudication Committee, Village Development Committee, Farming Cooperative, or Savings and Credit Society (yes = 1, no = 0).

<sup>16</sup> Other proxies were tried without improving the current specification: experience (years of farming); progressivity (an index derived from presence or absence of fertilizer, pesticide, or herbicide use); and farm size.

or lessens involvement in markets. Model results show that being a full time farmer significantly decreases the odds of nonfarm buildings (I -1.146, II -1.156) and continuous manuring (I -.904, II -.903). The odds of mulching and tree crops improve, and fencing and terracing decline, but coefficients are not statistically significant.

Wealth would have a positive effect if it relaxes financial constraints or if economies of size are realized from a larger asset base. It would have a negative effect if households are unable to attract sufficient labor to fully operate the farm enterprise, or if it increases leisure time or dampens economic initiative. Results show that neither family income nor number of livestock units have a significant influence on the likelihood that any investment will occur, with the exception of income's positive effect on nonfarm buildings (I and II .170), and the positive effect of livestock ownership on manuring (I and II .081). Those households with higher land per resident ratios are more likely to invest in terracing (I .320, II .329) and nonfarm buildings (I .286, II .284). An insignificant negative coefficient was found for tree crops. While coffee is normally grown in plantations, bananas are a subsistence crop grown mainly on small plots, and the tree crop variable includes both.

Greater dispersion of land holdings could negatively affect investment in two ways. A higher number of parcels could increase exposure to disputes, particularly if those parcels are widely dispersed and far removed from the household. Number of parcels is also a crude proxy for fragmentation and for higher labor costs in farming activities. Model results indicate that the number of parcel holdings is negatively related to investments in terracing (I -.342, II -.338), manuring (I and II -.319), and mulching (I -.233, II -.239), but positively related to nonfarm buildings (I .531, II .535).

### Effect of Parcel Level Attributes

Land investment may also be influenced by parcel characteristics: *locational factors*, measured by location of parcel relative to place of residence, presence of access roads, and parish location; *land quality*, measured by parcel size and topography; *investment status*, that is, whether the investment was already present at the time of acquisition; *temporal attributes*, measured by ownership time; and *registration status*.

Three proxy variables are incorporated in the model to control for spatial factors affecting investment decisions. Parcel location relative to the homestead (whether inside or outside the parish of residence) is a crude proxy of costs associated with monitoring and enforcing investment claims. Parcels farther away from the homestead (outside the parish) would be expected to experience more disputes and higher tenure insecurity than parcels nearer the homestead (within

the parish). Model results indicate that closer proximity increases the likelihood of all farm investments, and significantly so for tree crops (I 2.420, II 2.395) and mulching (I 1.558, II 1.554). Investment in nonfarm buildings shows the opposite effect.<sup>17</sup> Presence of an access road prior to acquisition was included as a proxy for transport costs, ease of access, and ease of monitoring and enforcement.<sup>18</sup> Presence of an access road strongly increases the odds of terracing (I 2.109, II 2.113), manuring (I 1.228, II 1.231), tree crops (I .818, II .793), fencing (I .646, II .658), and mulching (I .421, II .386). Parish location is incorporated to capture the effects missed by other independent variables. Location of a parcel in Kyamakanda tends to significantly decrease the odds of terracing (I -3.130, II -3.044), tree crops (I -1.093, II -1.317), mulching (I -.796, II -1.026) and fencing (I -.650), suggesting that latent structural differences between the two parishes are affecting investment demand.

Mixed results are obtained for land quality attributes. Larger parcel size improves the probability that all investments will be undertaken, but is significant only for tree crops (I .085, II .082) and fencing (I .082, II .083). Terracing (I -3.500, II -3.494), continuous manuring (I -1.266, II -1.267), tree crops (I -.722 and II -.715) and mulching (I -.613, II -.597) generally tend to be undertaken on hilly land. Swamplands and marginal lands are the most likely to be fenced (I .935, II .947).

Ownership time (years passed since acquisition) is included as a proxy for time required to make, and to accumulate capital for, land improvements. In the first few years following parcel acquisition, increasing ownership time would be expected to have a positive impact on investment. However, once long-term improvements are made, further investments are unnecessary until their benefits are fully exhausted. Thus ownership time would tend to have a zero or positive effect on short-term investments, but the effect would become more ambiguous as the time horizon lengthens (i.e., increasing years does not increase investment). Results for short-term investments (continuous manuring, mulching), as expected, are positive but not significant. Results for fencing (I -.025, II -.029) and terracing (I -.031) are negative and statistically significant.

<sup>17</sup> As these investments would be made closer to towns/villages, they would more likely be found outside the parish than other investments.

<sup>18</sup> Including investment in access roads after acquisition would have created a causality problem (i.e., whether the investment or access road came first). However, the majority of access roads were already in place at the time of parcel acquisition. Of the 106 parcels in Nyakaina that had investments in access roads, 69.8 percent already had the investment in place at the time of acquisition. In Kyamakanda, 80.4 percent of the 107 parcels with access roads had the investment present at the time of acquisition. The vast majority of other investments were made after acquisition.

Investment status is incorporated in the model to control for investment already in place at the time of acquisition. Presence of the long-term investment at acquisition would have a negative effect on post-acquisition investment as long as the investment at acquisition covered the entire parcel, and ownership time has not exceeded the investment's residual income stream. The effect for short-term investments would tend to be zero or positive if habits have formed in management practices. Model results show that presence of the investment at time of acquisition has a positive (but insignificant) effect on continuous manuring and mulching, and a negative (also insignificant) effect on fencing, tree crops, and terracing.

### Effect of Registration

Registration in Model I measures presence of registration regardless of type (compulsory and purposeful). Results indicate that registration is significantly and positively related to investments in fencing (I .869), continuous manuring (I .682), and mulching (I .521), and positively but insignificantly related to all remaining long-term investments. Model II includes two separate variables for registration, one for those parcels systematically and compulsorily registered under the pilot scheme, the second for those registered voluntarily and purposefully. One would expect a priori that purposeful registration would have a larger positive effect than exogenous registration; under the pilot scheme, some farmers, had they been given the opportunity to do so, would have purposefully sought registration, others would not have registered land in any case. Model results indicate that purposefully registered parcels consistently had a positive effect on all land investments, and significantly so for fencing (II .782), mulching (II .768), continuous manuring (II .663), and tree crops (II .528). Exogenous registration had a significant positive effect on fencing (II 1.123) and continuous manuring (II .746), but coefficients for other investments are mixed and insignificant.

### IMPLICATIONS

When the colonial protectorate government of Uganda implemented the pilot registration scheme in 1958, Kigezi district was experiencing population pressure, increasing commercialization, soil erosion, and acute land disputes. According to colonial authorities, the diffusion of land rights among individuals, community, and clan provided neither individuals nor groups sufficient incentives to develop the land. Land registration proposals sought to reduce land disputes and to lay the foundation for accelerated economic development. Twenty-

nine years later, upon revisiting the scheme, this research shows that supply-side benefits of registration on farm investment through enhanced credit use is negligible. However, the positive relationship found between certain investments and land registration provides some evidence of demand-side effects through enhanced tenure security.

In general, very few farmers appear to be favorably disposed to the indigenous tenure system. Nearly all farmers interviewed perceived positive benefits to registration in helping to curb land disputes and in enhancing tenure security. The possession of registration certificates is highly valued. The two main reasons why farmers do not register land are a lack of knowledge about the procedure and the cost. The 1975 Land Reform Law that prevents people who did not previously register their land from obtaining freehold also is a constraint. The government has four policy options to meet farmers' demands: (1) reduce the cost of land registration by reducing direct application fees and the transactions costs of time and travel involved in the application process, (2) increase the efficiency of the land registry to reduce costs, (3) ease procedures and conduct information campaigns to improve farmers awareness of registration, and (4) reform the 1975 land law to again allow freehold registration on demand.

Has registration had a positive effect on investment and productivity? Data shortcomings prevent analysis of output effects. The analysis of land improvements reveals that registration may have had a positive influence on the presence of certain investments, but causality remains an issue. The data do not permit analysis of whether registration stimulated the investment, whether presence of investment under worsening conditions of tenure security stimulated registration acquisition, or whether farmers registered higher quality land on which subsequent investments were made. Whatever the process—whether registration improved tenure security and investment demand or lowered the risk of asset/investment loss—registration has offered positive benefits for the holder.

Credit use is low in the research area. Of the limited credit used, most was obtained by nonregistered landholders without title through informal sources, and used primarily for nonagricultural purposes. Thus the supply side effects of credit (stimulation of agricultural investment) observed elsewhere (e.g., Thailand, Feder and Onchon 1987) are not apparent in the Uganda case. The investment effects that are occurring must therefore be due to improvements in tenure security of the landholder, derived from increasing expected values of investment returns or lowering investment costs.

Agricultural development cannot depend on greater security of property rights alone. Very low use of chemical inputs, improved seeds, and productive assets in the project area suggest that farms either have low demand or are experiencing difficulties acquiring inputs. Conversely, certain public investments are having



an important effect on both farm and nonfarm investments. Presence of roads adjacent to parcels was strongly correlated with all agricultural investments, especially manuring and terracing. Education is having a positive effect on diversification of economic activity in the research area. While these results show positive returns to such public investments, low use of inputs and difficulties experienced in acquiring registration indicate that the government still has a long way to go in providing the means to achieve accelerated economic development.

# ANNEX 1. Logit Investment Models and Registration, Uganda Land Registration Study

Household- and Parcel-Level Attributes	Continuous Manuring		Mulching		Fencing	
	(I)	(II)	(I)	(II)	(I)	(II)
Constant	-1.75 (.940)	-1.194 (.945)	-.488 (.782)	-.371 (.791)	-4.157* (1.025)	-4.199* (1.027)
Parish (Kyamakanda = 1)	.053 (.305)	.085 (.352)	-.796* (2.60)	-1.026* (.287)	-.650* (.322)	-.512 (.369)
Location (1 = within parish)	.403 (.579)	.403 (.579)	1.558* (.471)	1.554* (.473)	.387 (.563)	.404 (.565)
Size of parcel (acres)	.031 (.033)	.031 (.033)	.033 (.030)	.030 (.030)	.082* (.037)	.083* (.037)
Flat land (y = 1)	-1.266* (.358)	-1.267* (.358)	-.613* (.259)	-.597* (.261)	-.456 (.385)	-.465 (.384)
Swamp/other land (y = 1)	-.523 (.359)	-.521 (.359)	-.353 (.287)	-.384 (.290)	.935* (.349)	.947* (.350)
Access road present (y = 1)	1.228* (2.60)	1.231* (.260)	.421** (.238)	.386** (.240)	.646* (.293)	.658* (.293)
Registration (y = 1)	.682* (.315)		.521* (.263)		.869* (.325)	
Imposed registration (y = 1)		.746** (.464)		-.039 (.377)		1.123* (.463)
Voluntary registration (y = 1)		.663* (.331)		.768* (.294)		.782* (.347)
Investment made prior to acquisition (y = 1)	.917 (.615)	.904 (.619)	.118 (.251)	.103 (.253)	-1.071 (1.165)	-1.079 (1.169)
Ownership time (years)	.006 (.011)	.005 (.011)	.008 (.009)	.014 (.010)	-.025* (0.11)	-.029* (.013)
Age of household head (years)	.006 (.011)	.006 (.011)	-.001 (.010)	-.002 (.010)	.048* (.013)	.048* (.013)
Education of household head	-.219 (.210)	-.216 (.211)	-.186 (.181)	-.205 (.183)	.063 (.229)	.072 (.228)
Full-time farmer (y = 1)	-.904* (.299)	-.903* (.299)	.047 (.272)	-.061 (.274)	-.495 (.345)	-.509 (.346)
Political office (y = 1)	.373 (.272)	.364 (.276)	.757* (.235)	.807* (.237)	-.131 (.311)	-.162 (.314)
Total family income (Ush 000)	-.060 (.100)	-.058 (.100)	.094 (.100)	-.100 (.100)	.055 (.200)	.066 (.200)
No. of livestock units	.081* (.029)	.081* (.029)	-.029 (.026)	-.026 (.026)	.044 (.029)	.042 (.029)
No. of parcels	-.319* (.095)	-.319* (.095)	-.233* (.067)	-.239* (.067)	-.118 (.077)	-.115 (.078)
Land-per-resident ratio	.078 (.098)	.080 (.098)	.009 (.087)	.005 (.087)	.070 (.098)	.075 (.099)
No. of observations	480	480	480	480	480	480

Note: Figures in parentheses are standard errors of the coefficient. A squared term for income was also included to control for outlier points.

\* = Significant at the 5 percent level.

\*\* = 10 percent level.

## ANNEX 2. Logit Investment Models and Registration, Uganda Land Registration Study

Household- and Parcel-Level Attributes	Tree Crops		Terracing		Nonfarm Buildings	
	(I)	(II)	(I)	(II)	(I)	(II)
Constant	-3.938 (1.192)	-3.893* (1.195)	-2.821 (1.681)	-2.844** (1.687)	-2.122* (1.036)	-2.214 (1.046)
Parish (Kyamakanda = 1)	-1.093* (.288)	-1.317* (.324)	-3.130* (.690)	-3.044* (.733)	.319 (.398)	.448 (.441)
Location (1 = within parish)	2.420* (.927)	2.395* (.924)	.781 (1.082)	.827 (1.093)	-.699 (.551)	-.681 (.551)
Size of parcel (acres)	.085* (.031)	.082* (.031)	.011 (.052)	.011 (.053)	.007 (.034)	-.005 (.034)
Flat land (y = 1)	-.722* (.329)	-.715* (.331)	-3.500* (1.098)	-3.494* (1.095)	.300 (.353)	.289 (.354)
Swamp/other land (y = 1)	.411 (.327)	.387 (.329)	-2.502* (1.107)	-2.495* (1.108)	-1.003* (.458)	-.997* (.458)
Access road present (y = 1)	.818* (.258)	.793* (.259)	2.109* (.468)	2.113* (.470)	.391 (.326)	.419 (.328)
Registration (y = 1)	.329 (.289)		.281 (.608)		.521 (.389)	
Imposed registration (y = 1)		-.094 (.396)		.438 (.761)		.835 (.582)
Voluntary registration (y = 1)		.528** (.313)		.198 (.658)		.446 (.406)
Investment made prior to acquisition (y = 1)	-.319 (.445)	-.324 (.447)	-1.918 (39.52)	-1.895 (39.55)		
Ownership time (years)	.021* (.010)	.027* (.011)	-.031** (.019)	-.036 (.024)	.001 (.014)	-.005 (.016)
Age of household head (years)	.009 (.011)	.009 (.011)	.032 (.021)	.032 (.021)	-.035* (.016)	-.034* (.016)
Education of household head	.130 (.206)	.122 (.207)	-.219 (.393)	-.218 (.393)	.464* (.222)	.479* (.222)
Full-time farmer (y = 1)	.020 (.319)	.038 (.321)	-.063 (.581)	-.074 (.582)	-1.146* (.363)	-1.156* (.363)
Political office (y = 1)	-.052 (.267)	.008 (.271)	-.107 (.566)	-.130 (.569)	.494 (.333)	.470 (.334)
Total family income (Ush'000)	-.030** (.010)	-.030* (.010)	.010 (.030)	.010 (.030)	.170* (.040)	.170* (.040)
No. of livestock units	.009 (.028)	.012 (.028)	-.021 (.040)	-.023 (.040)	-.054 (.034)	-.055 (.035)

(continued on next page)

## ANNEX 2. Logit Investment Models and Registration, Uganda Land Registration Study *continued*

Household- and Parcel-Level Attributes	Tree Crops		Terracing		Nonfarm Buildings	
	(I)	(II)	(I)	(II)	(I)	(II)
No. of parcels	-.101 (.074)	-.103 (.073)	-.342* (.153)	-.338* (.154)	.531* (.097)	.535* (.098)
Land-per-resident ratio	-.043 (.089)	-.051 (.088)	.320** (.168)	.329* (.171)	.286* (.099)	.284* (.098)
No. of observations	480	480	480	480	480	480

Note: Figures in parentheses are standard errors of the coefficient. A squared term for income was also included to control for outlier points (maximum values in Table 8-3), but were found to be nearly zero and insignificant.

\* = significant at the 5 percent confidence level.

\*\* = 10 percent level.

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## LAND REGISTRATION, TENURE SECURITY, CREDIT USE, AND INVESTMENT IN THE SHEBELLE REGION OF SOMALIA

*Michael Roth, Jon Unruh, and Richard Barrows*

Macroeconomic forces and donor interventions contributed to a sharp increase in the demand for land and land value in Somalia's river valleys during the 1980s.<sup>1</sup> Price inflation averaging in excess of 45 percent per annum between 1980 and 1987 (World Bank 1988) and banking disruptions shifted incentives away from financial assets toward land or commodities (gold) in investment portfolios. Saudi Arabia's 1983 import embargo on live animals from Somalia severely curtailed animal exports and lowered economic incentives in the livestock sector. Official development assistance, which averaged \$80 per capita and 21.2 percent of gross national product in 1985-86 (World Bank 1987, 1988), helped to increase the supply of irrigated land and the expectations of profits from irrigated agriculture. Private and official market incentives also improved, as a result of a 100 percent real increase in official maize prices between 1980 and 1985 and a decline in food aid imports from 330,000 tons in 1981 to 73,000 tons by 1988-89. These forces had a twofold effect: by the end of the 1980s crop agriculture had become Somalia's most profitable sector, and land had become an important means for storing and accumulating wealth.

<sup>1</sup> This study was undertaken during the period May 1987 to May 1989, just prior to the outbreak of the Somali civil war. The official government agencies responsible for land registration and land policy, at the time of this writing, have either been destroyed or rendered inoperational.

These factors have influenced rural land markets in three principal ways:

1. Rising demand for land, particularly for irrigable land in the Shebelle and Jubba river valleys, has led to rising land value and to claims of land speculation and land grabbing.
2. The changing terms of trade between rural and urban areas, rampant inflation, declining real urban incomes, poor pay scales in the public sector, and stagnating economic growth in the manufacturing and service sectors have resulted in the acquisition of land in the river valleys by urban residents, traders, and civil servants.
3. Rising land values and land grabbing are raising concerns of inadequate tenure security and incentives for farm investment.

Economists have hypothesized that individualized tenure via possession of title (typically leasehold or freehold) is superior to indigenous tenure systems because it increases security of property rights, enhances lenders' security by increasing land's collateral value, and increases credit use and investment demand (Barrows and Roth 1990). This chapter examines which households acquire title and which parcels are registered under a sporadic system of registration;<sup>2</sup> the costs and problems landholders face in registering land; and the relationship between land registration and tenure security, credit use, and investment in the context of irrigated agriculture on the Lower Shebelle River.

## **LAND POLICY**

### **Historical Overview**

Two decrees under the Italian regime formulated the first official land tenure policies in southern Somalia. Royal Decree 695 of June 8, 1911, and the Governor's Decree 815 of January 19, 1912, together established the Italian state's right of sovereignty over vacant lands (those in excess of the needs of the then Somali population) and the state's right to issue agricultural concessions out of state domain to Italian citizens or other foreigners. From the early 1900s until independence in 1960, large tracts of land along the Shebelle River were appropriated for concessionary development and large-scale private production of bananas and sugar.

<sup>2</sup> Registration means that the process of registering land has been completed, whereas title implies the additional possession of the registration certificate. The latter is required by banks for land to be considered viable collateral. As registered households were selected only if they possessed the certificate, registration and title are used interchangeably.

Following the socialist revolution of October 1969 up to 1976, the new government passed as many as 22 laws regulating the agricultural sector (Robleh and Hussen 1977). Among the more important developments were the Law on Cooperative Development of 1973, which established the legal basis for farm cooperatives; the Agricultural Crash Program of 1974, which established a program for temporarily allocating land to government employees and students from agricultural training colleges; the Agricultural Land Law of 1975, which created the current state leasehold system; and the creation of the Agency for Resettlement and Community Projects of 1976, which authorized the government to settle nomads and refugees in riverine areas.

According to Robleh and Hussen (1977), the reforms were intended to enhance agriculture's growth and prominence, tap Somalia's underexploited land resources, increase resource efficiency, and reduce the country's dependence on food imports. Gunn (1986) asserts that government planners at the time believed common ownership was environmentally degrading, nomadic pastoralism was unproductive, and traditional institutions were inefficient and outmoded. The reforms were thus intended to vest land management in the hands of the state, to draw population into settled farming, and to substitute modern institutions of production and marketing for traditional forms.

Policymakers saw modern corporate structures as the solution for Somalia's agricultural decline. The government promoted the establishment of state farms, cooperatives, and large private farms under the rubric of agricultural modernization. By 1979, 233 group cooperatives controlled nearly 35,000 hectares (ha), and 48 multipurpose cooperatives controlled more than 32,000 ha (Fadal et al. 1985). In 1984, state farms controlled more than 45,000 ha in the Shebelle valley and nearly 25,000 ha in the Jubba. Areas reserved for the Crash program contained 20,000 ha, and for resettlement schemes, another 27,000 ha.

### **Agricultural Land Legislation**

The Agricultural Land Law of 1975 and subsequent decrees are the principal statutes governing statutory tenure. The law asserts state ownership over all agricultural land but provides for the issuing of concessions to cooperatives, state farms, autonomous agencies, municipal governments, and private farmers. Concessions are limited to one per family or individual. A family or an individual can obtain a concession up to 30 ha of irrigated land and 60 ha of rainfed land; the ceiling increases to 100 ha for a banana plantation. The duration of the lease is 50 years renewable. State farms, cooperatives, private companies, and other autonomous agencies are exempt from these time and size ceilings. Originally, concessions could not be bought, sold, or rented, but these restrictions have been

relaxed in recent government circulars (Roth et al. 1989). A concession may be revoked if it exceeds size restrictions, is used for nonagricultural purposes, is not used productively, is unnecessarily fragmented, is transferred, or is not farmed for two successive years. However, weak enforcement of these provisions results in wide disparities in practice between statutory tenure and actual land use and allocation.

The law and various circulars also lay out the procedures for registering land. By law, the process starts with an application at the local district office of the Ministry of Agriculture (MOA) and ends at the central land registry in Mogadishu with the signing of the land certificate by the minister of agriculture. However, in practice the registration process is sometimes initiated at the national level with a letter written to district or regional MOA offices directing officials to find unregistered land for an applicant. This latter process has been the source of many disputes between "outsiders" and local residents in the river valleys.

### Registration

By 1988, government registry offices had cumulatively issued 13,340 titles for concessions covering 380,500 ha nationwide (MOA 1988), an area roughly 0.6 percent of Somalia's surface. More than 75 percent of this land is described as irrigable, meaning it is near a river, but it is not necessarily irrigated.

Based on a random sample of 722 entries drawn from the central (Mogadishu) land registry in May 1989 (covering the period 1981 to 1989), Roth et al. (1989) provide the following profile of registered farms nationally:

- Although most concessions are registered to individuals, a large number are registered to private companies. Of the 722 registrations, 76.3 percent involved individuals and 23.5 percent private companies (*shirkadda*). Because a company can be registered in an individual's name, the proportion reported for private companies is probably underestimated.
- Sizes of concessions are considerably larger for private companies than for individual concessions. Private companies in the sample average 194.0 ha per concession, compared with 26.4 ha for individual concessions, considerably in excess of 3.8 ha, the national average farm size (MOA 1987).
- Parcel measurement during adjudication generally results in an odd fraction for area being recorded in the register. However, a directive from the central MOA headquarters in Mogadishu may be issued to district or regional MOA offices to find land for an individual or company, the person or group making the application to the central office naturally requests a concession equal to the ceiling allowed by law, and that area is delineated



by district offices, surveyed and registered.<sup>3</sup> Although not a precise measure of land registered in this manner, the data suggest widespread use of government concessions to gain access to land, usually by those with political and economic influence. Of the 722 entries, 23.3 percent are precisely 30, 60 or 100 ha in size.<sup>4</sup>

- A number of concessions involve very large land holdings. Of the 7,220 registrations recorded in the national registry (1981–89), 40 concessions fell in the range of 500 to 1,000 ha, 8 between 1,001 and 2,500 ha, 5 between 2,501 and 5,000 ha, and 1 concession was 7,000 ha. Fifty of these 54 concessions were registered as private companies, 1 as a cooperative (*iskaashatadda*), 1 as a religious organization (*xerta*), and 2 as individual concessions. With the possible exception of the individual registrations, all these are exempt from legal ceilings on concession size.
- The vast majority of concession holders are men. Of the individual concessions in the sample, 92.7 percent were registered in the names of men and 7.3 percent in the names of women.

### RESEARCH METHODOLOGY

Conflicts between state leasehold tenure and informal tenure arrangements were relatively innocuous as long as demand for land and water resources remained low relative to the resource base. However, demand for high-quality land in Somalia's river valleys, began sharply rising in the 1980s as a result of four external factors: rampant price inflation, foreign assistance and public investment programs, foreign barriers to Somalia's livestock exports, and a substantial increase in real crop prices over the period 1980–85 (Roth 1993). By the mid-1980s these developments had begun to raise a number of fundamental questions about tenure security and land registration that motivated the following research in the Shebelle valley:

- What is the extent of tenure security among farms operating under indigenous tenures?
- Is the indigenous tenure system, because of weak tenure security, constraining agricultural investment and productivity?

<sup>3</sup> It is also possible that the size of some private farms exceeded the legal limits, but areas are recorded at the land ceilings to appear legal.

<sup>4</sup> This process, while common in the 1970s, had slackened considerably by the mid-1980s, as land scarcity increased, the government moderated its support for corporate farming, and disputes intensified with smallholders over land disposessions.

- Has land registration been effective in enhancing tenure security, and promoting agricultural investment?
- What costs are incurred in registering land, and what constraints do farmers face in acquiring title?

### Research Site

The Shalambood research site consists of an 8,500 ha rectangle on the Lower Shebelle River near Merca at the heart of Somalia's most important food and export crop-producing region. Boundaries of the site mark the area of the Shalambood irrigation scheme developed by the Italians starting in 1926. The town of Shalambood, with a population of 22,240, is located at the southwestern corner of the site nearest the ocean. The badly deteriorated paved road from Shalambood to Mogadishu delineates the eastern boundary. The Genale dam and reservoir are situated at the northwestern corner toward the inland. The Shebelle River runs southeast from the reservoir, parallel to the coast, and marks the inland boundary. Twelve minutes away by vehicle lies the coastal city of Merca. Although Merca was once a deepwater port, its docks are now closed, and all exports (mainly bananas) must be shipped to Mogadishu to the north or Kismayo to the south.

The boundaries of the scheme enclose 63 former Italian *aziendas* or former colonial estates. The majority of Italian landholders departed around Somalia's independence in 1960, leaving the land to government, farmworkers, and private Somali investors. The abandonment of colonial plantations has resulted in a multiethnic workforce and settlement. Water for irrigation comes from the Genale reservoir and flows by gravity through the Dhamme Yassin primary canal and a web of secondary and tertiary canals to farmers' fields. The irrigation system is in a state of disrepair. Broken gates, clogged canals, and small reservoir size cause water shortages over wide areas in the dry season and excessive flooding on parts of the scheme during the rainy season.

The research site contains a complex matrix of farms with different tenure status and varying access to land and water resources. Larger private, state, and cooperative farms, growing mainly bananas for export, tend to be concentrated close to the Dhamme Yassin canal and river. These farms are normally registered, are commercially oriented, have the best access to irrigation water, and employ permanent and temporary workers from surrounding towns. Extending outward from the Dhamme Yassin are smaller holdings, normally unregistered. Parcels in smallholder areas adjacent to the secondary canals have relatively good access to water, while those on the scheme's outer periphery have poor access.

### Survey Design

An in-depth household survey was undertaken in the Shalambood scheme from May 1987 to January 1989, involving three strata of landholders: (I) 77 unregistered smallholders, (II) 36 registered smallholders, and (III) 35 registered largeholders. Leaders of the smallholder *aziendas* were asked to prepare lists of all farmers holding parcels within their *azienda*. A list of registered farmers was obtained from the Genale land registry, and another list of large farms from SOMALFRUIT (Somalia's banana production and exporting parastatal). These combined lists with 2,165 families represented the scheme's population. Two groups of households were eliminated from the sampling pool to better control for sources of tenure insecurity: farmers belonging to smallholder cooperatives and farmers holding land in Crash program areas, both because of ambiguity over ownership rights.<sup>5</sup> After excluding these subpopulations and cross-checking to remove multiple entries (farmers with parcels in multiple *aziendas*), 1,237 households remained. The sample of unregistered farmers was randomly drawn from this population.

The subsample of small registered landholders was randomly selected from the Genale registration list after eliminating companies, cooperatives, and those households with registered parcels greater than 25 ha in size.<sup>6</sup> Many registered landholders were engaged in other economic activities, and lived and worked in Mogadishu. Because of the difficulty in finding household heads who had knowledge about their farm operations to interview, frequent resampling was necessary. Even greater difficulty was experienced locating owners of large private farms. Many of these landholders are absentee landlords who leave the day-to-day management decisions to a foreman. Although usually very knowledgeable about the farm's operations, most foremen have little knowledge about investment decisions, registration, land histories, or financial transactions. We took a nonrandom approach of referrals to resolve this problem; we located large farmers who lived near Shalambood who were willing to participate in the study.

In the case of the smallholder samples, a three-round questionnaire was administered to each head of household. Questionnaires were translated into Somali, field pretested, and meticulously checked following completion. In the event

<sup>5</sup> Local officials representing the Crash program office and small-farmer cooperatives firmly stated that the land belongs to their respective agencies. Some farmers welcomed agency control as protection against the grabbing of land by outsiders while others were adamant that farmers owned the land.

<sup>6</sup> Farm size can exceed 25 ha because of multiple parcel holdings; despite legal restrictions to the contrary.

of inconsistencies or missing data, a situation experienced for 26 households, researchers revisited respondents to verify information. Area measurements were taken on all parcels.<sup>7</sup> Even identifying parcels proved to be problematic in some cases. Because of land grabbing in the project area and restrictions in the land law against multiple parcel ownership, farmers proved very reluctant to reveal the location, number, and size of all their holdings. An analysis of various cross-checks revealed that 30 smallholders (27 percent) had underreported the full number of their parcel holdings.<sup>8</sup>

The deteriorating political situation in late 1988 and tight time constraints of owners and foremen forced the researchers to prepare and administer a more narrowly focused one-round questionnaire to the large-farm sample. The data limitations that resulted forced the elimination of large sample farms in the regression analyses presented later in this chapter.

### HOUSEHOLD AND PARCEL INDICATORS

Although smallholder households have similar family size, composition, age structure, and number of parcels, the data in Tables 9-1 and 9-2 also reveal a number of important differences:

- A large proportion of household heads in the registered categories either now hold or have held positions in government. Of the 77 household heads in the unregistered smallholder category, 72.0 percent have never held an official position, 12.0 percent have held a position in the community, 2.3 percent in local committees or associations, and 1.3 percent in government. By contrast, 25.0 percent of registered smallholders have held positions in government, and 8.3 percent in local committees or associations; the figures for largeholders are 37.1 percent and 11.4 percent.
- The average size of registered farms in the smallholder sample (9.3 ha) is larger than that for households without registered title (2.3 ha). The size of large registered farms (82.6 ha) is, by definition, substantially larger.
- Heads of registered households tend to be better educated (2.6 years) than heads of unregistered households (0.95 years). Furthermore, mean years of

<sup>7</sup> Farmers' estimates of land area were used in the case of large farms because parcels had been surveyed for registration.

<sup>8</sup> Some of the reluctance of smallholders to fully disclose the number and location of their parcels stemmed from worries that the research team (perceived as coming from government) was attempting to identify land for acquisition. Also, provisions stipulating one parcel per family in the land code provided a legal basis for government to expropriate parcels (there is no evidence of this occurring in the area), or for an "outsider" to claim parcels in excess of the limit.

public education by family members (years education/family size) is higher for the registered group (1.9 years) than for the unregistered group (0.83).

- The share of women household heads with title is disproportionately low. Whereas 16.9 percent of heads in the unregistered group are women, only 2.8 percent of the household heads in the registered smallholder group are women.
- The majority (69.3 percent) of heads of households in the unregistered category were born and reared in the area, compared with 33.3 percent of registered smallholder households. Yet farmers in all categories appear to have been settled in the area a long time. On average, parcels have been held 16.2 years in the smallholder unregistered category, 16.6 years in the smallholder registered category, and 13.9 years in the largeholder registered category.<sup>9</sup>
- Farmers in the unregistered category acquired their holdings primarily through purchase (31.0 percent), from the foreman following the Italians' departure (25.4 percent), through inheritance (14.8 percent), and from the government (12.0 percent). Registered smallholders acquired their holdings principally from the government (37.8 percent) or the foreman (27.0 percent), while larger registered landholders tended to purchase farms (35.6 percent), occupy land (22.2 percent), obtain land from the government (22.2 percent), or through inheritance (13.3 percent).
- Two means of acquisition—government allocation and simple occupation—are especially vulnerable to land conflicts. In the first case, concerning land appropriated by the government following the departure of the Italians and later reallocated, there is risk of disputes from former workers and squatters settling on the land in the interim. In the second case, people who occupy land, even apparently idle land, may later face claims that were latent at the time of settlement. Grants of concessions would involve both forms of occupation, and the data indicate higher levels of disputes among registered households. Only 9.1 percent of households in the unregistered category reported ever having had a dispute over land. However, 25.0 percent of households in the registered smallholder category and 25.7 percent in the registered largeholder category reported having experienced land disputes sometime in the past.<sup>10</sup>

<sup>9</sup> These means correspond to the 1970–76 period (1987 base), when the government was promoting the settlement of the river valleys.

<sup>10</sup> Data are not sufficiently detailed to detect whether registrations created disputes or whether registration was acquired following disputes.

**TABLE 9-1. Mean Characteristics of Sample by Household Landholding Size and Registration Category**

Mean Characteristic of Sample	Smallholder Unregistered	Smallholder Registered	Largeholder Registered
<b>Demographics (persons)</b>			
Adult males	2.2	2.5	—
Adult females	2.5	2.8	—
Children (under 15 years of age)	3.3	4.2	—
Male-headed households (%)	83.1	97.2	—
Female-headed households (%)	16.9	2.8	—
Age of household head (years)	49.7	50.4	44.0
Public education (household head; years)	0.95	2.6	—
Public education (family; years)	0.83	1.9	—
Always lived in this area (% yes)	69.3	33.3	—
Always a farmer (% yes)	77.3	58.3	—
Households reporting having experienced a land dispute (%)	9.1	25.0	23.1
<b>Official positions held (% household head)</b>			
None	72.0	61.1	45.7
Community	12.0	5.6	5.7
Government	1.3	25.0	37.1
Religious sheikh or imam	6.7	—	—
Committees or associations	2.7	8.3	11.4
Military	5.3	—	—
<b>Land</b>			
Total farm size (ha/farm)	2.3	9.3	82.6
Number of parcels	1.7	1.4	1.4
<b>Off-farm dependence</b>			
Days of off-farm work by family	111.4	134.2	231.1
Sample size (no. of observations)	77	36	35

- Farmers in the registered category, on average, spend more time on off-farm activities. The annual average for family members of largeholder registered households is 231.1 days, 134.2 for smallholder registered households, and for unregistered households 111.4.

Compared with unregistered smallholder households, families of registered households tend to be better educated, to control more land, to have greater experience with or knowledge of government administration and bureaucracy, to have come from outside the area, and to have more nonfarm experience.

**TABLE 9-2. Mean Parcel Characteristics of Sample by Household Landholding Size and Registration Category**

Mean Parcel Characteristics of Sample	Smallholder Unregistered	Smallholder Registered	Largeholder Registered
Means of acquisition (% of parcels)			
Given by government <sup>a</sup>	12.0	37.8	22.2
Given by foreman <sup>a</sup>	25.4	27.0	2.2
Inherited	14.8	8.1	13.3
Bought	31.0	8.1	35.6
Rented in	7.0	8.1	—
Simple occupation w/o allocation	4.2	8.1	22.2
Gift	5.6	—	2.2
Claimed from Crash program area	—	2.7	2.2
Size of land holding (ha/parcel)	1.4	8.3	59.4
Term of land holding (years)			
Between acquisition and 1987	16.2	16.6	13.9
Between registration and 1987	—	3.8	6.8
Parcel use			
Fallowed	3.6	—	—
Cultivated	95.7	100.0	—
Idle	.7	—	—
Land rental (% of total)			
Parcels rented in (1987)	7.0	7.9	—
Parcels rented out (1987)	—	—	—
Sample size (no. of parcels)	142	38	46

<sup>a</sup> After Italians departed.

### REGISTRATION COST

Registration in Somalia is voluntary, purposeful, and sporadic. The government maintains a district/regional land registration office (Genale), but landholders must bear the transactions cost of acquiring title. Registry operations are hampered by tight budgets and lack of facilities. Shortages of paper, filing cabinets, and fuel, plus low staff salaries, pose significant constraints on the registry's operations. While registration is, in principle, free, applicants in reality must pay for officials' to visit the site, and for surveys and maps. Multiple trips must be made to the Genale land registry office. Frequently, because of delays in processing applications, applicants feel obliged to visit the central registry in Mogadishu as well. Registrants, on average, reported making 7.2 trips to Genale and 5.9 trips to Mogadishu (2.5 hours by car, 8 hours by bus).

Information on registration costs was obtained from two sources: estimates by respondents who cited "high" costs as the main reason for not registering their land and costs actually paid by those landholders who registered their land.<sup>11</sup> With regard to the first group, the average cost of title estimated by unregistered landholders was Somalia Shillings (SSh) 7,107/parcel (U.S. \$1=SSh 100, 1987). Costs paid for registration reported by the second group were adjusted with the annual gross domestic price deflator of 11.3 percent for the 1975–79 period, and 45.4 percent for 1980–87 (World Bank, 1987, 1988). After adjusting for inflation, registration costs averaged SSh 129,512/parcel (1987 shillings). Such costs greatly exceed the annual cash income of most smallholders. Based on a regression analysis of the relationship between cost of registration and parcel size, costs were found to increase 6.6 percent for every 10 percent increase in land area, indicating sizable economies of scale in registration. Farms with larger parcels thus have a significant comparative advantage in registration.<sup>12</sup>

Despite the high costs of registration, many of the 77 unregistered landholders gave other reasons as their primary motive for not registering their land: application was made but no title received (32.3 percent), the registration process is too costly (24.4 percent), procedures are too complicated (18.9 percent), they were unfamiliar with registration procedures (11.0 percent), and various other responses, including they didn't want the government involved, registration would upset the family, parcel is too small, they had no time, or they saw no need to register (cumulatively 13.4 percent). The fact that one-third of the unregistered smallholders had made application but did not have title in itself reflects the high cost of registration or imperfect information.<sup>13</sup>

<sup>11</sup> The first estimate is biased toward small parcels, as title is negatively correlated with farm size, but estimates are for a constant year (1987). The second estimate is biased toward large parcels, but payments were made over the 1975–87 period and thus require adjusting for price inflation.

<sup>12</sup> Registration costs were regressed on parcel size:

$$C_j = 9.03 + .661A_j \quad R^2 = .437$$

$$(.287) (.099) \quad n = 60$$

where,  $C_j$  is the logarithm of the actual cost of registering the  $j$ -th parcel in 1987 constant Somalia shillings (SSh), and  $A_j$  is the logarithm of the area of parcel  $j$ . Since both cost and area are in logarithmic terms, the coefficient for area (.661) represents the cost elasticity of title associated with parcel size. For 1987, the exchange rate was \$1.00 = SSh 100.

<sup>13</sup> Some of those farmers making an application believed that filing an application form was all that was required to register land.



## BENEFITS OF LAND REGISTRATION

Benefits from land registration are examined in two ways: (1) by asking farmers to state, using a weighted scale, whether land registration has specific benefits and (2) by comparing observed differences in indicators of land value, tenure security, credit use and land investment between registered and unregistered farms and parcels. The first scale is highly subjective and vulnerable to exaggeration. The second method measures theoretically derived benefits that either have or have not yet been realized, but this method suffers from two problems. First, the time between registration and the present may have been insufficient to make intermediate- and long-term investments.<sup>14</sup> Second, investment depends not only on land tenure incentives but also on management expertise and on access to labor, capital, and complementary inputs. Yet information collected on these variables (in 1987) does not necessarily reflect the situation at the time of investment. Using both methods together provides a broader picture of titling impacts and possibilities than either method individually.

### Perceptions of Titling Benefits

Respondents were asked to evaluate five theoretical benefits of registration using a five-point scale, specifically, whether title makes the household head (1) more or less secure in his or her tenure, (2) more or less inclined to lease out land, (3) more or less inclined to sell land, (4) more or less certain to get credit from banks, and (5) more or less disposed to invest in land. Possible responses included a lot more, more, no difference, less, and a lot less. The results are presented in Table 9-3.

Registration appears to have the greatest affect on perceptions of tenure security. Unregistered farmers felt that land registration *would* greatly increase their security of tenure, whereas registered farmers felt that having registration *does* greatly increase their tenure security. The data also suggest that registration would or does increase smallholders' inclination to lease or sell land. In both cases, however, the largeholder registered group was more strongly inclined to engage in these transfers, perhaps in part because of the greater land holdings at their disposal. Registered largeholders also perceived that registration brings much greater access to credit and much higher inclination to invest in land. However, the responses of the smallholder registered group were not perceptibly different from those of the unregistered group, suggesting that registration is closely entwined with greater market access and investment options.

<sup>14</sup> The average parcel in the smallholder registered group had been registered for only 3.8 years, and in the largeholder group, 6.8 years.

**TABLE 9-3. Perceptions of Titling Benefits by Household Landholding Size and Registration Category (in percent)**

Perceptions of Titling Benefits	Smallholder Unregistered	Smallholder Registered	Largeholder Registered
More or less secure in land?			
A lot more	97.1	100.0	100.0
More	2.2	—	—
No difference	0.7	—	—
More or less inclined to lease land?			
A lot more	67.2	65.8	97.1
More	19.1	31.6	2.9
No difference	13.7	2.6	—
More or less inclined to sell land?			
A lot more	73.7	73.7	100.0
More	19.5	23.7	—
No difference	6.8	2.6	—
More or less certain about getting credit from banks?			
A lot more	85.6	75.8	97.1
More	11.9	18.2	2.9
No difference	2.5	6.1	—
More or less disposed to invest?			
A lot more	75.0	71.1	97.1
More	22.7	28.9	2.9
No difference	2.3	—	—

### Analysis of Observed Differences in Performance Indicators<sup>15</sup>

In theory, economic benefits of land registration are derived from three sources: increased incentives for investment and credit use resulting from enhanced tenure security, expansion of credit supply through land mortgage and increased security to lenders, and lower transaction costs in land transfers stemming from greater certainty in land rights (Ault and Rutman 1979, Johnson 1972). These benefits, if valid, should increase the net income stream flowing from the parcel and increase the convertibility of the land asset into a financial asset, thereby

<sup>15</sup> Data for the large registered farms were excluded from the following regression analyses because of incomplete household and parcel data.

increasing land value. A general model of land title and tenure security requires careful consideration of the household and parcel characteristics that determine which households acquire title and which parcels are registered. Failing to control for these characteristics using simple correlations can result in mistakenly attributing to registration the effects of investment due to superior management or higher land quality.

### Land Value

The land value regressions in Annex 1, at the end of this chapter, evaluate the effect of registration on estimates of land value while controlling for parcel quality. Using factor analysis, detailed information on the physical attributes of the parcel were condensed into six indices of parcel quality:<sup>16</sup> soil *texture* (factor score correlating questions a and b), parcel *slope* (c to e), ease of *tillage* (f and g), *fertility* (h and i), *irrigation use* (j and k), and *irrigation access* (l). Also included in the model are size of parcel, the parcel's distance from the household, and title status. Mean, minimum, and maximum values for all variables included in the land value regressions are presented in Table 9-4. For all parcel quality indices, low (negative) values indicate poor quality and high (positive) values indicate superior quality.

Pearson correlations among title and parcel characteristics are presented in Table 9-5. By nature of factor analysis, correlations among factor scores (indices) are zero, hence coefficients have been omitted. Land title is highly correlated with size of parcel ( $\rho = .504$ ), distance from household ( $\rho = .203$ ), slope ( $\rho = -.180$ ), and irrigation water use ( $\rho = .397$ ), all significant to at least the .01 level. Larger parcels with the best access to irrigation water are the most likely to be registered under the current system of purposeful registration. Distance is highly correlated with closeness of parcels to the primary canal; those that are close have higher probability of being registered. The negative coefficient for slope is somewhat difficult to interpret. As problems of water logging, flooding, and drainage problems decline, the parcel is less likely to be registered. But parcels with these characteristics also tend to be poor-quality land located on the periphery of the scheme.

<sup>16</sup> The parcel factor indices were derived from the following categorical variables of parcel quality: (a) soil texture, (b) soil color, (c) the respondent's assessment of the frequency and severity of water logging on the parcel, (d) frequency and severity of drainage problems, (e) soil topography, (f) ease of tillage, (g) frequency and severity of soil compaction, (h) soil fertility, (i) parcel quality relative to other parcels on the scheme, (j) duration of the first irrigation during the *Der* (light or secondary rainy season), (k) duration of the first irrigation during the *Gu* (heavy or primary rainy season), and (l) frequency and severity of lack of water.

**TABLE 9-4. Descriptive Statistics for Variables in the Smallholder Land Value Regressions**

Variable	Mean	Minimum	Maximum
Land value per parcel ('000 SSh)	42.65	3.62	1,162.79
Land value per hectare ('000 SSh/ha)	114.70	2.50	3,000.00
Log of land value	3.56	0.92	8.01
Size of parcel (ha)	2.81	0.21	39.20
Distance (minutes walking)	41.19	5.00	150.00
Color and texture index	—	-2.91	1.74
Slope index	—	-3.71	1.24
Ease of tillage and compaction index	—	-3.28	1.74
Fertility and parcel quality index	—	-3.75	3.17
Irrigation use index	—	-1.14	6.38
Access to water index	—	-1.91	2.09

Three alternative regression models for land value are presented in Annex 1. Model I includes a dummy variable for registration status (1 if the parcel is registered, 0 if not). In model II, parcel size is excluded because of its high correlation with title status. In model III, both title and land size are omitted because of their high collinearity with certain parcel quality indices.

Results from models I and II suggest that title has a highly significant positive impact on farmers' assessment of land value. Land title increases the log of parcel value (in '000 SSh) by 1.2 SSh to 1.6 SSh. Based on these coefficients and the mean value for land in Table 9-4, the marginal value of title is 44,300 to 57,300 SSh.<sup>17</sup> Based on the mean size of registered parcels (12.7 ha), the cost of title in 1987 adjusted terms is 44,800 SSh.<sup>18</sup> The near equality between the marginal value and marginal cost of registration has three important implications. First, there does not appear to be systematic rationing of titles by the registry. Price seems to provide the main rationing mechanism, and high costs are primarily determining the low volume of registration. Second, the results imply that substantial cost reductions would be necessary if registration volume is to increase significantly. Third, the high economic premium observed for title suggests that title holders perceive substantial benefits from title acquisition.

<sup>17</sup> Manipulation of derivatives yields the expression:

$$d LV/dT = LV * dV/dT = e^{3.56} * 1.23$$

<sup>18</sup> From footnote 12 the marginal cost of title based on the mean registered parcel size of 12.69 ha is:

$$d C/dA = e^{9.03} * 12.69^{.661}$$

**TABLE 9-5. Pearson Correlation Coefficients for Selected Variables in Smallholder Land Value Regressions**

Variable	Land Value	Size of Parcel	Distance	Title to Land
Land value ('000 SSh; log)	1.000			
Size of parcel	.542**	1.000		
Distance	.123	.072	1.000	
Title to land	.580**	.504**	.203*	1.000
Slope	-.156	-.092	-.136	-.180*
Color and texture	.113	-.079	-.069	-.029
Ease of tillage	.145	.115	.006	.006
Fertility	.093	-.134	.046	.113
Irrigation use index	.360**	.622**	.082	.397**
Access to water index	-.055	-.066	.096	.044

Note: By nature of factor analysis, correlations between the indices for slope, color and texture, ease of tillage, fertility, irrigation use, and access to water index are zero.

\* = Significant at the .01 level (one-tailed significance).

\*\* = Significant at the .001 level (one-tailed significance).

This benefit may partially reflect differences in education, wealth, official position, or status in the community between titled and nontitled groups. These characteristics are linked with title and land quality indicators in the following household analysis of tenure security.

### TENURE SECURITY

Direct questions about tenure security were made prohibitively difficult because of the population's extreme sensitivity toward land disputes in the area. Farmers often expressed concerns about outsiders' grabbing land.<sup>19</sup> In several instances, well-connected individuals who attempted to claim land with certificates issued by the government were taken to court by small farmers. Because of concerns about land grabbing, it was decided to phrase questions in the second person (i.e., whether area farmers are concerned about losing their land), the hypothesis being that responses would reflect the personal biases and views of the respondent.

<sup>19</sup> The spouse of one high-ranking official in Mogadishu reportedly appeared one day with a certificate claiming the land of about 40 smallholders. She gave the farmers two choices: (1) wait until the season's end, harvest the crop, then leave peacefully, or (2) have their crops burned now and be kicked off. Although some hyperbole exists, reports of such cases highlight the sources of concern about tenure insecurity expressed by smallholders in the area.

Factor analysis was again used to derive tenure security indices based on responses to eight questions regarding various aspects of security of tenure:<sup>20</sup> (1) fear of *land loss* (a to d), (2) security of *long-term use* (e and f), and (3) *land rental* security (g and h). The first of these tenure security indices is the most important indicator of the perceived risk of losing land. The derived index has a range of -1.99 (farmers are losing land much more frequently, outsiders taking land is a serious problem, disputes over landownership are much more serious, farmers are extremely worried about losing land) to 1.75 (farmers seldom lose land, outsiders' taking land is not a problem, landownership disputes are not a problem, and farmers are not worried).

Three alternative regression models with the ownership security index as the dependent variable are presented in Annex 2. In models I and II, land title is the proportion of registered land relative to total land holdings (range 0 to 1). In model III, the registration variable is binary (1 if registered, 0 if not). Three additional sets of titling variables are incorporated to capture interaction effects between registration and parcel quality: an interaction variable between title and irrigation use, between title and irrigation access, and between title and parcel size. These test the hypothesis that possession of poor-quality land, even in the presence of title, would not increase tenure security because the probability of land loss is low. Conversely, high-quality land in the presence of registration is hypothesized to affect tenure security positively because higher land value is at risk. Model I examines only the titling effect based on proportion of land registered. Model II examines the effect of the same variable including interaction effects (title  $\times$  irrigation, title  $\times$  land area). Model III includes the same interaction effects, but for the title binary variable.

The effects of land title in model (I) are perplexing. While title was shown to have a high economic premium in the previous land value analysis, title in the tenure security equations in model I shows a negative but nonsignificant effect

<sup>20</sup> Respondents were asked various questions dealing with different aspects of tenure security: (a) the extent to which small farmers today are losing land more or less frequently than in the past; (b) the extent to which outsiders are taking land; (c) whether disputes over landownership now are more or less serious than in the past; (d) the extent to which farmers in the area are more or less worried about losing land; (e) the extent to which living in the area a long time helps guard against land loss; (f) the extent to which permanent and long-term continuous use of land guards against loss of land; (g) the risk of losing land if it is rented out for only one year; and (h) the risk of losing land if it is rented out over a longer period of time. See Roth, Unruh, and Barrows (1992) for further details on the derivation of parcel quality and tenure security indices.

on tenure security.<sup>21</sup> Once interaction effects are included, however, overall model results improve. The interaction effects between title and higher irrigation water use (.073 and .141), and between title and water availability (.142 and .136) are positive as expected but not statistically significant. The interaction effect between title and land area (.171 and .163) is relatively large, positive, highly significant, and consistent with expectations. The single title variable in both models II and III is negative and significant, indicating that possession alone does not by itself enhance tenure security.

Two conclusions can be drawn from this analysis. First, possession of title for smallholders with higher-quality land (superior water access and larger parcel size) appears to increase ownership security. However, the negative effect of title alone tends to indicate that registered farmers are more insecure. Title is negatively correlated with years of residency ( $\rho = -.242$ ) and whether the household head has always lived in the area ( $\rho = -.348$ ), and positively correlated with involvement in any past land disputes ( $\rho = .213$ ). These phenomena, combined with restrictions on multiple parcel holdings and transfers in the land law, may simply indicate that land registration in the current framework of statutory law provides only a tenuous basis for tenure security. This latter suggestion would imply that land registration has permitted some registered smallholders the means to acquire land, but title is only an imperfect substitute for the indigenous system in conferring tenure security.

### Credit Supply and Demand Effects

The Somali Development Bank, which provides most of the agricultural credit in Somalia, now requires registered land as collateral for agricultural loans,<sup>22</sup> but not all land has equal value. The bank prefers land under perennial crops (mango, grapefruit, and lemon); land under bananas is considered to be reasonably good security, but only as long as the area is large. Land under cereals may be suitable

<sup>21</sup> The finding that registration is negatively associated with ownership security and that very few farmers actually use title to enhance credit access begs the question of why farmers acquired registration. For outsiders, registration through official channels has been a means to acquire land. It is also possible that the expectations of benefit held by some at the time of registration were greatly exaggerated relative to the benefits achieved.

<sup>22</sup> Because of restrictions in the land law on land transfers, the courts have been turning to the Law Relating to the Transfer of Immovable Property of December 15, 1986, as the legal basis for deciding on transfers of land. With legal changes permitting transferability of land, its suitability as collateral would increase accordingly.

as security as long as the season is good; ironically, credit is normally required early in the season before crop success is known with certainty. Most of the credit in agriculture goes to plantations and to farms greater than 30 ha in size.

More important than the land itself is the value of investment in the land. For perennial crops (citrus) with a lifespan of 50 to 100 years, the banks consider the future income stream as collateral, not the land itself. Restrictions in the land law on land transfers have increased the costs of converting land as a fixed asset to a more liquid financial asset, reducing the value of land as collateral. Banks have thus chosen to assess the collateral value of land in terms of their efficiency in managing investments on the property, rather than on the real estate value of the property itself.

Respondents were asked two sets of questions concerning their borrowing patterns: (1) how much money they still owed banks, money lenders, and traders at the end of the dry season (*jilaal*) before the onset of the main agricultural season (*gu*); and (2) how much money was borrowed during the *gu* season from these sources.<sup>23</sup> Both measures exclude borrowing that may have taken place in the informal sector, where land as collateral is much less important than family relationships and peer-group pressure. Between smallholder categories, registered farmers tend to have slightly higher borrowing rates (Table 9-6), but differences are not significant. Of the four loans taken out by registered and unregistered smallholders, three were from family and friends and one from a moneylender. When asked why loans were not taken out, smallholders responded they wished to avoid debt (31.2 percent), did not need credit (25.7 percent), had a loan (11.0 percent),<sup>24</sup> had insufficient collateral (10.1 percent), did not know where to go (8.3 percent), had not repaid previous loans (7.3 percent), tried but could not obtain credit (4.6 percent), and found procedures too difficult (1.8 percent).

Only the large-farm registered group indicated an important level of borrowing activity. About one-fourth (eight farms) of these farms borrowed money (nine loans) during the 1987 *gu* season, five from banks, three from family and friends, and one from an agricultural extension agent. The average loan value was SSh 1,423,750. Collateral included the farm (land and fixed investment) in all instances where banks were involved. Of the eight farms that borrowed money, the average farm size was 115.7 ha, with an average of 3,387 fruit trees per farm. Registration has enabled these large farms to gain access to formal credit, but farm size and presence of productive trees are important factors as well.

<sup>23</sup> Enquiries on credit were made following the *gu* season harvest.

<sup>24</sup> The fact that 11.0 percent of these households reported having loans but only 3 to 6 percent took out loans from banks, money lenders, and traders in the *Gu* season suggests the existence of other informal sector lending activities.



**TABLE 9-6. Household Use of Credit and Investments by Household Land Holding Size and Registration Category**

Household Use of Credit/Investments	Smallholder Unregistered	Smallholder Registered	Largeholder Registered
<b>Credit</b>			
Households owing money to banks at the end of the dry season (%)	—	2.9	11.8
Households owing money to money lenders or traders at the end of the dry season (%)	6.7	—	5.9
Households borrowing money since the end of the dry season (%)	2.7	5.7	24.2
<b>Investments (% of households with or using)</b>			
Pumps	—	—	21.2
Tractors	—	—	32.4
Wells	—	—	14.7
Fertilizer	3.8	3.9	22.4
<b>Parcel investments (% of parcels with)</b>			
Leveling by hand	18.3	—	—
Leveling with equipment	28.9	47.4	34.8
Fencing	0.7	2.6	39.1
Drainage	0.7	—	32.6
Bunding	64.1	81.6	91.3
Fruit trees	2.8	13.2	43.5
Fertilizer (kg/parcel)	1.6	0.3	654.4
Fertilizer (kg/ha)	0.7	0.4	2.8

Title may affect investment demand in two ways: by increasing access to capital through the linkage between title and credit and by increasing investment incentives through enhanced tenure security. As shown in the previous section, the first link is weak, given the current financial situation in Somalia, unless the borrower is a large landholder with long-term, productive investments on the land. The second mechanism, through enhanced tenure security, is examined in this section.

Table 9-6 provides data on agricultural investments at household and parcel levels. At the household level, no differences are observed between smallholder registered and unregistered groups. Neither group owns pumps, tractors, or wells. Similar proportions of households in both groups use minimal amounts of fertilizer (3.8 vs 3.9 percent). Investments of large registered farms are significantly larger: 21.2 percent own at least one pump, 32.4 percent tractor(s); 14.7 percent well(s); and 22.4 percent, fertilizer.

A higher frequency of investments is experienced at the parcel level. Parcels of the registered smallholder group show a higher percentage of households with investments in leveling by equipment (47.4 vs 28.9 percent), bunding (81.6 vs 64.1 percent) and fruit trees (13.2 vs 2.8 percent). The unregistered group shows a higher propensity to invest in leveling by hand, probably because their parcels are smaller. No significant differences are observed between the two smallholder groups concerning fencing, drainage, and fertilizer use. By contrast, large farms make substantially higher investments in fencing (39.1 percent), drainage (32.6 percent), and fruit trees (43.5 percent).

The relationship between title status and investment is confounded by the relationship between technology and location (Table 9-7). Bunding is highly correlated with ease of tillage ( $\rho=.228$ ) and access to water ( $\rho=.332$ ). Investment in canal maintenance (value of labor plus cash expenditures) is highly correlated with parcel size ( $\rho=.258$ ), irrigation use ( $\rho=.180$ ), hand leveling ( $\rho=-.219$ ), and fruit trees ( $\rho=.217$ ). Ease of access to complementary inputs influences the farmers' ability to make investments. Respondents were asked to evaluate the availability of specific capital inputs, using the following weighted scale: no problem (1), a little difficult (2), difficult (3), very difficult (4), and impossible (5). Mean responses are shown in Table 9-8. In general, hand tools and wheel barrows are relatively easy to acquire, pesticides and improved seeds are a little difficult, fertilizer is difficult, and irrigation equipment is very difficult to obtain. While the larger group of registered farms found fertilizers and irrigation equipment more accessible, they still reported these investments as difficult to very difficult to obtain (2.26 and 2.70, respectively). While registration might increase the tenure security of smallholders, their investment response will probably remain constrained by lack of access to capital inputs and technology.

Investments embody different demands for labor and capital. Bunding is the most widespread investment, found on 124 out of 183 parcels. Bunds are constructed by hand to control the direction and flow of irrigation water within the parcel, or to control flood waters. Leveling is the most important and constraining technology affecting productivity on the scheme. The best leveling requires machines, although machine leveling is expensive. Other things being equal, enhanced tenure security would be expected to have greater influence on equipment leveling than hand leveling. Bunding would be expected to have the weakest link with tenure security.

Canal maintenance is essential to ensure a sustained flow of water through the system. Canals become clogged with silt and weeds and thus require frequent cleaning. Households either working alone or through the local Water Users Associations worked an average of 2.0 times (6.2 days/time) in the *gu* season and 1.3 times (4.4 days/time) in the *der* season cleaning canals. Government excavators periodically clean the primary and secondary canals. Households contrib-

uted money for this service. Households lacking sufficient labor also pay the local Water Users Association for canal maintenance. Cash payments averaged SSh 2,714. The investment variable is the logarithmic transformation of total cash outlays spent on canal maintenance (i.e., actual cash payments plus imputed value of labor).

The parcel-level regressions in Annexes 3 and 4 examine the relationship between registration and four sets of investments, while controlling for household and parcel characteristics. Models A and B assess the incidence of leveling by machine, a binary variable. Observations for hand and machine leveling are

**TABLE 9-7. Pearson Correlation Coefficients for Smallholder Investments and Parcel Characteristics**

Investment and Parcel Characteristics	Land Title	Bunding	Fruit Trees	Hand Leveling	Equip- ment Leveling	Canal Main- tenance
Bunding	.146	1.000				
Fruit trees	.217*	.063	1.000			
Hand leveling	-.219*	.046	-.029	1.000		
Equipment leveling	.134	-.100	.143	-.113	1.000	
Canal maintenance	.254**	.075	.021	-.137	-.093	1.000
Title to land	1.000	.146	.217*	-.219*	.134	.254**
Size of parcel	.504**	.175*	.151	-.143	.096	.258**
Color and texture	-.024	-.004	-.111	-.104	.001	-.001
Slope	-.180*	-.063	-.066	.125	.161	-.138
Ease of tillage	.006	.228**	-.013	.004	-.091	-.106
Fertility	.113	-.014	.170	.009	.121	.078
Irrigation water use	.397**	.070	.243**	-.065	.095	.180*
Access to irrigation	.044	.332**	.124	-.003	-.144	.130

\* = Significant at the .01 level (one-tailed significance).

\*\* = Significant at the .001 level (one-tailed significance).

**TABLE 9-8. Ease of Access to Capital Inputs by Household Landholding Size and Registration Category (Mean Response)**

Capital Input	Smallholder Unregistered	Smallholder Registered	Largeholder Registered
Ease of Access to			
Fertilizer	2.53	2.88	2.26
Pesticides	1.75	2.06	2.35
Improved seed varieties	1.67	1.90	1.97
Hand tools	1.01	1.06	1.00
Wheel barrows	1.20	1.28	1.09
Diesel pumps and irrigation equipment	4.59	4.56	2.70

Ranking scale: 1=no problem, 2=a little difficult, 3=difficult, 4=very difficult, 5=impossible.

pooled in models C and D. Models E and F evaluate the incidence of bunding, again a binary variable. Models G and H analyze the imputed value of time and cash expenditures spent on canal maintenance. The first equation in each set examines the effect of the binary title variable. The second equation in each set incorporates the tenure security indicator evaluated in the previous section. Logit regression analysis is used to estimate models A–F; OLS regression is used to estimate equations G and H.<sup>25</sup>

### **Bunding**

Model results in annex 4 indicate that the incidence of bunding tends to increase with ease of tillage and greater availability of irrigation water. Bunding also tends to be carried out on the periphery of the scheme nearer to Shalambood. As the quality of the canal improves, the incidence of bunding tends to decline.<sup>26</sup> More bunding tends to be carried out by men, as men's parcels tend to be located nearer to the primary and secondary canals. Neither title nor the tenure security index significantly influences the incidence of bunding; although bunding is carried out on titled plots and those with secure tenure, many untitled/insecure parcels have bunding as well.

### **Leveling**

Parcel size has a positive effect on leveling, indicating economies of size in mechanized operations or the greater ability of smallholders with larger farms to hire workers for hand leveling (Annex C). The positive effects observed for commercial and animal wealth indicate that households are meeting the cash requirements for mechanical leveling through nonfarm activities. Leveling also tends to increase with family size, years of residency, and official government status. Improvements in water access tend to reduce leveling demand. The negative relationship between leveling and farm size indicates either a resource constraint (resources are too limited to carry out leveling on all parcels) or the effect of risk spreading (households hold land in both irrigated and rainfed zones, the latter not needing leveling). Presence of title is positive in the regression analysis of machine leveling and negative for hand/machine leveling, but neither coefficient is statistically significant. The negative effect for the ownership security index (also insignificant) may partly reflect the observation that smallholders on the

<sup>25</sup> Household-level variables are replicated if a household controls two or more parcels (i.e., each of the parcels in the household is assigned an identical set of household characteristics).

<sup>26</sup> The quality of canal variable is a rank measure of canal quality, ranging from (1) the canal leaks all the time and the leakage is very severe to (8) no leakage.

scheme's periphery with higher tenure security have less need for leveling. This explanation would imply that parcel quality indicators and the distance variable are not completely capturing the site-specific effects.

### **Canal Maintenance**

The imputed cash value of costs for canal maintenance tends to increase with higher irrigation water use, water availability, size of parcel, and ownership term, all consistent with expectations. Canal maintenance is positively related to days of nonfarm work, wealth, and livestock ownership, suggesting that farmers are turning to nonfarm sources of employment or income to finance canal improvements, in the absence of formal credit access. Ownership of land title appears to have a negative effect on canal maintenance, although the relationship is not statistically significant. The structure of water allocation on the scheme may at least partially explain this result. Parcels immediately adjacent to the primary and secondary canals generally have access to irrigation water, whatever the state of river flow. Holders of registered farms that tend to be located nearer to the source have no incentive to clean canals downstream. Farmers at the end of the canal, however, must devote greater effort to cleaning canals upstream, to ensure that water reaches their parcels.

## **CONCLUSIONS AND POLICY IMPLICATIONS**

Titling in Somalia has historically involved sporadic registration. The government provides a network of registry offices, but registration is a voluntary and purposeful decision. The registry's operation has been hampered by low salaries, limited funds, and critical shortages of paper, fuel, and equipment. Although registration, in principle, is free, applicants must pay all the costs for site visits, surveys, and maps. Consequently, registration costs have been high and people have poor knowledge of registry procedures. Nonprice rationing does not appear to be influencing the supply of titles, as the marginal cost is roughly equivalent with marginal value. Rather, price seems to provide the main rationing mechanism, and high costs are primarily determining the low volume of registration activity. Substantial improvements in the efficiency of the registration process, and cost reductions, would be necessary for registration volume to substantially increase.

Under sporadic registration, self-selection biases are important in determining which households acquire title and which parcels are titled. Parcel selection is most crucial for multiple-parcel households, which, according to the land law, are able to register only one concession. Those obtaining title tend to hold or to have held government positions, to be better educated, to have larger holdings,

to come from outside the area, and to be heavily engaged in nonfarm activities. Registered parcels tend to be larger in size with better access to irrigation water than nonregistered ones.

Provisions in the law that give all citizens the right to hold and register a concession have provided "outsiders" with the mechanism to obtain land in rural areas. Directives are sometimes handed down to regional coordinators to find land for applicants. Sometimes displacement of existing landholders has ensued. Conflicts are most intense in frontier areas where use rights are imperfectly defined. Problems of land displacement were quite severe in the Shebelle region from 1975 to the early 1980s. While the granting of concessions still results in occasional disputes, land scarcity has begun to curb this process, and smallholders have now begun taking disputes to court.

Acquiring registered title to land is particularly difficult for women. There is no evidence that women are overtly or systematically prohibited from registration. Nonetheless, conventions of one name per concession in the register, the tendency of women to defer all decisions about land to the husband or brother(s), and women's general lack of familiarity with government bureaucracy impose more subtle barriers to registration.

With few exceptions, farmers felt that registration either increased or would increase their tenure security, but this finding is somewhat confounded by the past tendency of the registration program to increase the insecurity of nontitle holders. During the research, farmers constantly asked researchers to help them register their land. Seeing others register land can produce a burning urge to register, particularly if abuse is apparent. While the results of the tenure security regressions showed that possession of title does not necessarily increase security of tenure, title does tend to increase tenure security in instances where households have higher-quality land (larger parcel sizes with good water access).

The fact that banks now require land title for obtaining agricultural credit, and that most large farms that obtained loans used land as collateral, suggest two conclusions: (1) title increases the security of lenders and (2) title has helped larger farms gain access to credit. The fact that so few households obtained credit, however, suggests that more fundamental institutional rigidities in the capital market must be alleviated before title can meaningfully increase credit access.

Title appeared to have some positive influence on investment in machine leveling, which requires substantial capital outlays, and to have negative influence on bunding and canal maintenance. However, three points must be kept in mind when interpreting these results: (1) none of the effects of title on investments were significantly different from zero; (2) most registered parcels on average had been registered only in the past 3 or 4 years; and (3) farmers expressed

considerable difficulty in obtaining capital inputs. A comparison of smallholder untitled and titled farms showed little difference in investment in equipment, fencing, drainage, bunding, irrigation pumps, or wells, and the overall level of investment was extremely low. Large registered farms invested more heavily in land, but this situation partially reflects the organization and structure of plantation agriculture and the preferential access of such farms to inputs and to commercial markets. The fact that all large farms hold title to their land is testimony in itself to the potential benefits they perceive in registration. Despite the limited amount of investment in the area, more than 90 percent of registered and unregistered farmers in the sample stated that registration does or would greatly increase their credit access, and does or would increase their incentives to invest in the land.

Fundamental changes in the land law are needed. The land law has not been conducive to strengthening land rights under the indigenous system or to providing flexible transfer rights under leasehold tenure. Fundamental improvements in the market environment also will be required if farmers are to make optimal use of enhanced tenure security from registration. Conversely, an improved market environment without tenure security runs the risk of offering inadequate incentives for investment, particularly in areas of rapid economic development (e.g., Shebelle) or in areas of rapid settlement (e.g., the Jubba).

The war has, at least temporarily, brought possibilities for land policy reform to an end. However, many of the forces that brought about Somalia's land problems—population growth, settlement programs, inflation, an insecure banking system, donor interventions, and the urban push toward agriculture—remained unabated at the end of the 1980s, and will most likely reappear once political stability returns. The important issue is not whether land registration was important in stimulating investment in Somalia; demands for high fixed-place investment will ultimately create demands for greater security of property rights, and that will mean some form of registration. The important questions concern when and whether land registration programs can be implemented in such a way as to grant greater security of property rights to those who need it without expropriating the rights of those who do not. Given the financial plight of most African governments at the beginning of the 1990s, and the high transactions costs involved in adjudicating and recording land rights, the answers to these questions are far from clear.

**ANNEX 1. Estimates of Land Value Regression for Smallholder Parcels<sup>a</sup>**

Parcel Quality Attributes	Land Value <sup>a</sup>		
	Model I	Model II	Model III
Constant	2.982 ** (.144) <sup>b</sup>	3.176 ** (.145)	3.396 ** (.164)
Color and texture index	.207 ** (.075)	.172 ** (.078)	.159 * (.090)
Slope index	-.066 (.076)	-.084 (.080)	-.192 * (.091)
Ease of tillage and compaction index	.135 * (.075)	.190 ** (.078)	.193 ** (.090)
Fertility and parcel quality index	.130 * (.077)	.047 (.079)	.119 (.090)
Irrigation water use index	-.031 (.097)	.211 ** (.086)	.471 ** (.090)
Access to irrigation index	-.067 (.075)	-.105 (.079)	-.084 (.090)
Distance from household (minutes)	.001 (.003)	.001 (.003)	.004 (.003)
Title dummy	1.230 ** (.218)	1.616 ** (.212)	— —
Size of parcel (ha)	.091 ** (.020)	— —	— —
F-value	17.0	14.8	6.18
R <sup>2</sup>	.469	.404	.198
Number of parcels/observations	183	183	183

<sup>a</sup> Land value ('000 SSh) is in logarithmic terms.

<sup>b</sup> Figures in parentheses are standard errors.

\* = coefficient significant at the 10 percent level.

\*\* = coefficient significant at the 5 percent level.



### ANNEX 2. Regression of Smallholder Land Ownership Security on Parcel, Household, and Land Registration Attributes

Dependent Variable: Index of Ownership Security	Ownership Security Model I	Ownership Security Model II	Ownership Security Model III
Constant	1.906 ** (.444) <sup>a</sup>	1.964 ** (.416)	1.949 ** (.418)
Color and texture index	.019 (.084)	.061 (.083)	.067 (.083)
Slope index	-.071 (.097)	-.107 (.091)	-.114 (.092)
Ease of tillage and compaction index	-.128 (.091)	-.091 (.085)	-.094 (.085)
Fertility and parcel quality index	.006 (.090)	.071 (.087)	.076 (.087)
Irrigation use index (A)	.023 (.090)	-.131 (.222)	-.173 (.224)
Access to water index (B)	-.139 (.090)	-.188* (.107)	-.188* (.108)
Age of household head	-.010 (.007)	-.008 (.007)	-.008 (.007)
Sex of household head (1=male)	-1.460 ** (.272)	-1.286 ** (.255)	-1.280 ** (.256)
Always lived in area (y=1, n=0)	.098 (.192)	.202 (.180)	.185 (.181)
Government official (1=yes)	-.610 ** (.223)	-.660 ** (.211)	-.671 ** (.211)
Years public education (household head)	.073 ** (.033)	.061 ** (.031)	.064 ** (.031)
Total farm size (ha) (C)	-.013 (.017)	-.149 ** (.035)	-.142 ** (.035)
Maize purchases (Qx)	-.087** (.041)	-.093 ** (.039)	-.092 ** (.039)
Title (proportion farm registered) (T1)	-.187 (.243)	-.710 ** (.257)	— —
Title (any registered land, y=1, n=0)(T2)	— —	— —	-.768 ** (.250)
T1 × A (II) or T2 × A (III)	— —	.073 (.242)	.141 (.240)
T1 × B (II) or T2 × B (III)	— —	.142 (.188)	.136 (.182)
T1 × C (II) or T2 × C (III)	— —	.171 ** (.040)	.163 ** (.040)
F-value	4.09	5.11	5.04
R <sup>2</sup>	.369	.477	.474
Number of household/observations	113	113	113

<sup>a</sup> Figures in parentheses are standard errors.

\* = coefficient significant at the 10 percent level.

\*\* = coefficient significant at the 5 percent level.

**ANNEX 3. Smallholder Investment Demand Regressions for Land Leveling**

Parcel and Household Attributes	Leveling by Machine		Leveling by hand/machine	
	Model A	Model B	Model C	Model D
Constant	1.463 (1.341)	2.071 (1.461)	1.242 (1.229)	1.672 (1.304)
Color and texture index	.149 (.200)	.158 (.202)	-.028 (.180)	-.020 (.181)
Slope index	.534 ** (.230)	.525 ** (.226)	.605 ** (.205)	.610 ** (.203)
Ease of tillage/compaction	-.327 * (.198)	-.348 * (.201)	-.207 (.190)	-.224 (.192)
Fertility and parcel quality	.348 * (.212)	.376 * (.211)	.226 (.192)	.206 (.187)
Irrigation water use	-.027 (.251)	-.039 (.253)	-.011 (.238)	-.021 (.241)
Access to irrigation	-.502 ** (.220)	-.497 ** (.221)	-.231 (.191)	-.232 (.192)
Size of parcel (ha)	.543 ** (.209)	.654 ** (.231)	.719 ** (.204)	.781 ** (.222)
Ownership term (years)	.017 (.023)	.018 (.022)	-.011 (.021)	-.016 (.020)
Quality of canal index	-.135 ** (.046)	-.134 ** (.046)	-.095 ** (.040)	-.091 ** (.040)
Age of household head	-.057 ** (.025)	-.064 ** (.026)	-.038 ** (.019)	-.045 ** (.020)
Sex of household head (1=male)	-2.246 ** (.729)	-2.581 ** (.788)	-2.049 ** (.738)	-2.291 ** (.784)
Years household resident in area	.033 * (.018)	.035 ** (.018)	.027 * (.014)	.030 ** (.014)
Government official (y=1)	1.070 * (.573)	.846 (.609)	.858 (.538)	.660 (.561)
Family size (persons)	.106 * (.062)	.098 (.062)	.122 ** (.056)	.111 ** (.056)
Total number of parcels	.505 (.418)	.611 (.436)	.995 ** (.409)	1.112 ** (.429)
Total farm size (ha)	-.476 ** (.197)	-.577 ** (.220)	-.695 ** (.194)	-.766 ** (.215)
Wealth ('000 SSh, log)	.001 * (.001)	.001 ** (.001)	.001 (.000)	.001 (.000)
Standard livestock units	.149 ** (.071)	.146 ** (.071)	.077 (.064)	.065 (.062)
Title (parcel titled) (y=1)	.236 (.607)	—	-.290 (.568)	—
Ownership security index	—	-.334 (.287)	—	-.237 (.249)
Number of parcels	183	183	183	183

Note: Figures in parentheses are standard errors.

\* = coefficient significant at the 10 percent level.

\*\* = coefficient significant at the 5 percent level.

# ANNEX 4. Smallholder Investment Demand Regressions for Bunding and Canal Maintenance

Parcel and Household Attributes	Bunding		Canal Maintenance	
	Model E	Model F	Model G	Model H
Constant	1.613 (1.133)	1.365 (1.161)	1.341 ** (.345)	1.307 ** (.356)
Color and texture index	—	—	-.080 (.061)	-.083 (.061)
Slope index	—	—	-.184 ** (.061)	-.174 ** (.061)
Ease of tillage/compaction	.568 ** (.214)	.586 ** (.214)	—	—
Irrigation water use	-.267 (.282)	-.263 (.280)	.172 ** (.079)	.162 ** (.079)
Access to irrigation	1.106 ** (.240)	1.112 ** (.240)	.206 ** (.062)	.205 ** (.062)
Size of parcel (ha)	.191 (.232)	.152 (.230)	.125 ** (.052)	.112 ** (.055)
Distance to household (minutes)	-.016 ** (.008)	-.017 ** (.008)	.002 (.002)	.001 (.002)
Ownership term (years)	.032 (.023)	.034 (.023)	.017 ** (.006)	.016 ** (.006)
Quality of canal index	-.096 ** (.043)	-.097 ** (.043)	-.030 ** (.013)	-.029 ** (.013)
Sex of household head (1=male)	1.167 (.735)	1.414 * (.781)	-.271 (.239)	-.258 (.257)
Years household resident in area	-.018 (.013)	-.018 (.013)	—	—
Government official (y=1)	-1.102 * (.581)	-.981 * (.592)	—	—
Family workers (persons)	-.012 (.097)	-.002 (.098)	.041 (.029)	.042 (.029)
Days of nonfarm work (family)	—	—	.001 ** (.000)	.001 ** (.000)
Total number of parcels	-.171 (.382)	-.253 (.393)	.163 (.117)	.169 (.119)
Total farm size (ha)	.152 (.168)	.219 (.185)	-.055 (.049)	-.047 (.053)
Wealth ('000 SSh log)	—	—	.000 * (.000)	.000 * (.000)
Standard livestock units	-.101 (.062)	-.099 (.062)	.044 ** (.019)	.041 ** (.019)
Title (parcel titled) (y=1)	-.041 (.638)	—	-.197 (.181)	—
Ownership security index	—	.252 (.273)	—	.024 (.078)
Number of parcels	183	183	183	183

Note: Figures in parentheses are standard errors.

\* = coefficient significant at the 10 percent level.

\*\* = coefficient significant at the 5 percent level.

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## LAND TENURE REFORM IN THE PEANUT BASIN OF SENEGAL

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The history of land tenure reform in Senegal reveals a number of attempts to replace the customary system of land tenure with a state-initiated system. The French colonial government applied the French Civil Code to Senegal to provide a legal regime for private, individual ownership of land, and then attempted to establish land registration systems. The independent government of Senegal initiated its own attempt at reform on June 17, 1964, with the Law of National Domain. With this law, all land that had not been registered became part of the national domain and hence state property. Only a small proportion (no more than 2 percent) of land in modern Senegal is officially registered. As a result of the uneven and incomplete application of the Law of National Domain, the vast majority of farmers in Senegal hold land under local forms of customary law. The Law of National Domain has influenced those forms more in some areas than in others. Such land will here be referred to as under modified customary tenure.

The objective of the study described in this chapter was to determine the degree of land tenure security afforded by the different tenure arrangements in Senegal and to investigate the effect of tenure security on the land-management practices of farmers in Senegal's Peanut Basin.

In the first section of the paper, the study area is described. In the second section, we examine land management practices on land that was registered under French colonial law. A third section describes the 1960 Law of National Domain and explores the effects of tenure security by examining the different effects of that law in two sample villages. We find that the village most affected by the law has less secure tenure. By comparing land use in the two villages, we

explore tenure security impacts on land improvements, on land-use practices such as fallow and crop rotation, and on land-allocation patterns. We also examine the effects of different degrees of tenure security at both parcel and plot level. A summary and conclusion are provided.

### THE PEANUT BASIN

The majority of Senegal's population lives and farms in the Peanut Basin, Senegal's agricultural heartland. This region extends southward from Louga to Kaolack and eastward from Thiès to Tiaf, and broadly follows the distribution of peanut production in Senegal. The inhabitants of the Basin are predominantly Wolof and, secondarily, Serer, although other ethnic groups are present throughout the region. As of 1980, population densities in the Basin ranged from 30 to 40 people per square kilometer in the north and east, to approximately 100 people per square kilometer in the south and central districts.

Drought poses an ever-present risk to the livelihoods of farmers in the zone. Between 1960 and 1987 average rainfall was below the minimum necessary for successful peanut, cotton, sorghum, and maize crops five different times. The Peanut Basin is one of the areas that has suffered the most from environmental degradation.

Farm production in the Basin is organized at the compound level. Each compound consists of one or more households. The nucleus of the compound is typically one man who has right of use of the land and his household (wives, children, older parents, aunts, sisters, unmarried male relatives, and other kin). This man with use rights is not only the head of his household but also the head of the compound. Other households in the compound are headed by married brothers, sons, or cousins of the compound head. The position of head of the compound, along with land rights, is passed from father to oldest son.

The compound head is responsible for distributing compound land and ultimately for assuring the food needs of the compound. Millet and peanuts are the predominant crops, although occasionally land is set aside for manioc, vegetables, and condiments. The compound head's first priority is to allocate enough land to millet fields then the compound head distributes the remaining land among the various compound members for their personal use. Peanuts, the government sponsored cash crop, are usually the crop of choice on these personal fields. The compound head also cultivates a peanut plot for his own cash needs. Plots are usually rotated yearly so that, from one year to the next, compound members do not know which plots they will be allocated for their personal crops.

### THE FIRST REFORM: LAND REGISTRATION

On November 5, 1830, the French colonial government introduced the French Civil Code into Senegal with a law that stated that insofar as land transactions involved French people, French law governed. The French Civil Code was initially applied in the communities of Dakar, Gorée, Rufisque, and St. Louis. In 1906, the French colonial government attempted to bridge the gap between the French Civil Code and customary land law by introducing a tenure regime (*Régime d'immatriculation*) similar to the Torrens system of land registration. This system stipulated that any person who could produce an "administrative certificate," which stated rights of ownership as determined by the local colonial administration and a committee of village notables, could apply for registration. Only 50,000 hectares (ha) had been registered by the time of independence in 1960.<sup>1</sup> The bulk of this land was in urban or peri-urban areas.

In order to examine management practices on registered land, we attempted to compile an exhaustive list of registered land in the area. To do so, we worked from lists taken from the Cadastre Office in Kaolack, the capital of the Sine Saloum Region, crosschecking with files in the National Domain Office there. We could locate only 11 registered tracts of agricultural land originally registered to seven individuals within the Basin. (Many titles were registered, but these were for urban land, mainly in Kaolack.) We interviewed every titleholder who could be located. If the owner was unavailable, we contacted the village chief for information concerning the parcel. The history and current status of each parcel we compiled have been individually reported elsewhere.<sup>2</sup>

We could not make rigorous comparisons of land use between these registered holdings and modified customary holdings given the small number of registered holdings, their broad dispersion geographically, their large size, and the distinctive backgrounds of the owners. Instead, we conducted case studies of the registered holdings to determine whether they fitted the profile associated with a successful land registration program. Specifically we checked whether the title holders were small owner-operators, whether farm production was intensified, whether mortgage credit was used to make capital investments in the land, and whether registered title was in fact more secure. Unfortunately, for the most

<sup>1</sup> The 50,000-ha figure is from the *Commission de Réforme du Régime Foncier*, "Éléments et documentation pour une réforme agraire rurale foncière au Sénégal" (Dakar 1960). A typographical error, corrected in the copy of the report in the Archives Nationales in Dakar, inflated this number to 500,000 ha (personal communication, Carol Dickerman, Land Tenure Center). This incorrect figure was picked up and cited in a number of subsequent publications.

<sup>2</sup> See Golan (1990, pp. 12–15). It is possible that a few registered agricultural parcels were missed, as I was denied access to the land registry after my first few visits. Other lines of inquiry failed to turn up additional parcels.

part, the registered tracts in our sample did not fit the successful profile of small farmers securing their tenure right.

The people who first acquired these registered titles were not typical Senegalese farmers. Of the seven original title or leaseholders, two were *chefs de canton*, two were Muslim religious leaders (*marabouts*), two were commercial farmers, and one was a village chief. The *chefs de canton*, *marabouts*, and the village chief were all in positions of privilege, both in traditional society and with the colonial government. In most cases, men in these positions had access to information about colonial law and in fact were often used by the colonial government to disseminate such information to the rural population. The two commercial farmers were educated men, and both represented foreign concerns.

The facts lend some credence to the concerns of Senegalese lawmakers at independence about land concentration through individualized registration. The two *marabouts* in the sample were able to amass and register huge tracts of land, 603 and 492 ha. The village chief and one of the *chefs de canton* manipulated traditional law to register village land in their own names. At least one of the commercial farmers was engaged in land speculation. But registration did not necessarily increase tenure security. The heir of one *chef de canton* has lost effective control of the use of the three titles registered, to the villagers from whom it was appropriated.

The registered parcels do not represent stellar cases of efficient use of land or of mortgage credit to enhance agricultural production. It appears that the two commercial farmers and one of the *chefs de canton* did make investments in their land, including tomato plants and fruit trees, cashews and mangoes, and a tree nursery. These investments may be attributable in part to the availability of a secure title, or, more likely, to the individual characters of the men. In every case, the descendants of the original titleholders have allowed the investments to die, and no other improvements in the land have been made. The land of one of the commercial farmers has now been completely abandoned.

The land was used to acquire credit in six cases concerning five parcels (there were two mortgages on one parcel). In two cases the loans were defaulted upon, and the bank instituted foreclosure proceedings, which have not been carried through to conclusion. In another case, where the loan was secured for a third party, confusion about ownership of the land has ensued. In one case the loan was used to build a pharmacy, but for most loans the actual use of funds was impossible to trace. There was no evidence that they had been used in agriculture, but also little clear evidence to the contrary. One registered parcel was sold to a German who later sold it to a Frenchman.

Although the number of case studies is small, they notably fail to reflect the effects associated in theory with greater security of tenure. This fact was not lost upon policymakers following independence.



### THE CURRENT REFORM: THE LAW OF NATIONAL DOMAIN

At independence, a commission to study land tenure reform was formed (Commission de Réforme du Régime Foncier 1960). The conclusions of this commission, along with observations contributed by the Commission Interministerielle d'Etude de l'Application de la Loi sur le Domaine National (Ministère du Plan et du Développement 1967), and the Ministry of Finance and Economic Affairs (Peytavin 1963), are discussed in this section.

Senegalese lawmakers mentioned four considerations time and again. First, despite their stated preference for registration, they were faced with the reality that every attempt by the French to establish a system of individualized, registered tenure had failed. The vast majority of the rural population had no need for registered land tenure. Second, lawmakers rejected the possibility of returning to a customary tenure system. The Commission de Réforme du Régime Foncier (1960) considered "that the legitimation of custom would be a step backward, with the capacity to block all modern development." Third, lawmakers were extremely wary of the growing power of the Islamic brotherhoods. Lawmakers described the developing situation as one of neofeudalism, with religious leaders establishing themselves as overlords using dependent laborers, such as migrant workers or disciples, to work their vast landholdings. The fourth consideration influencing the direction of Senegalese land reform was the difficulty of allowing for the different cultural inclinations and tenurial customs of the many village communities in Senegal through enactment of any one law. The only option that lawmakers saw as feasible was to devise a general tenure system that allowed rural organizations to work out the practical details at the local level.

The newly formed Senegalese government laid the cornerstone of Senegalese land law with Law No. 64-46, the Law of National Domain of June 17, 1964. All land that had not been registered or was not registered in the grace period granted by the law (between 98 and 99 percent of all land) became part of the national domain. New registration of land became impossible with Law No. 64-46, but the rights of people who had registered land prior to 1964 remained protected, and registration was allowed in a grace period of six months after enactment of the law.

The 1964 law divides the national domain into four categories: urban zones, classified zones, rural zones, and pioneer zones (*zones urbaines*, *zones classées*, *zones de terroir*, and *zones pionnières*, respectively). Rural zones, which are the primary focus of this study, are the administrative responsibility of the rural councils. These councils are composed of members elected by the community. Anyone who personally cultivates land within a rural zone has use rights over that land, but vacant or poorly used land can be redistributed as the rural council sees fit. Farmers who work their land by merit of traditionally having done so, or

through grant by the rural council, possess only use rights. Farmers cannot sell, rent, or lend their land. All transactions, even matters of inheritance, must be conducted through the rural council. With the death of the original cultivator, heirs must obtain permission from the rural council to continue working the land. With the Law of National Domain, traditional tenure rights were in theory completely abrogated, and rural councils were vested with ultimate authority in land matters; they could reallocate land according to "merit."

### **Exploring the Effects of the National Domain Law**

Funding and logistical limitations required a more localized approach to the study of modified customary tenure, so we conducted this research in two village sections in the Sine Saloum Region. (A village section is the area governed by a rural council, and may consist of one or more villages.) Each section is less than an hour's drive from the huge daily market at the regional capital of Kaolack, and each section is within walking distance of a large weekly market. Keur Marie is located to the west of Kaolack, where population densities are highest in the Peanut Basin; Keur Magaye lies to the east, where population densities are at their lowest.

We acquired a list of compound heads for each section from the section's extension agents. We then chose approximately one-third of each section's compounds randomly for the study. Twenty-two compounds were selected from Keur Marie and 26 from Keur Magaye. Interviewing was conducted in four stages from January 1987 to May 1987, the slow period in the agricultural year. First compound heads, then plot managers within the compound, were interviewed.

Compound composition in the two village sections is very similar. Ethnically, Keur Marie is predominantly Serer and Keur Magaye is predominantly Wolof, but the adoption of Islam has blurred some ethnic differences. For example, before the advent of Islam, Serer inheritance, unlike that of the Wolof, was matrilineal; now inheritance in both groups is patrilineal.

The 48 compounds in the two sample villages owned or operated 736.8 ha of land, corresponding to 351 parcels. The breakdown is 138 parcels and 190.6 ha for Keur Marie and 213 parcels and 546.2 ha for Keur Magaye. The land areas held by compounds from the two villages are quite different, as would be expected, given that Keur Marie is located in a more densely populated area. Owned land area per compound in Keur Magaye ranged from 0.13 to 59.66 ha while that in Keur Marie ranged from 0 to 18.10 ha. The average compound in Keur Marie owned 7.7 ha while the average compound in Keur Magaye owned 19.34 ha.

We explored the effects of tenure security by examining the different effects of the Law of National Domain in the two study villages. As will be seen, the village most affected by the law was found to have less secure tenure. By compar-

ing land use in those two villages, we explored tenure security impacts on land improvements, on land use practices such as fallow and crop rotation, and on land allocation patterns. We also examined the effects of different degrees of tenure security at both parcel and plot level, the latter in recognition that different plot managers within a compound enjoy different levels of tenure security by virtue of their status within the compound.

### **The Operative Law and Insecurity of Tenure**

In order to characterize correctly the land tenure situation in the area, it is important to state specifically the tenure rights held by the sample compounds. Tenure "labels" such as "usufruct" are of little help in these situations, where the *de jure* and *de facto* tenure situations can diverge markedly. Each specific right embodied in a tenure must be specified, to provide a basis of comparison with other tenures (Simpson 1976, p. 7). Compound heads were asked about their compound's tenure and about each particular right. Five principal rights were identified: right of secure access, right of selection of heirs, right of disposition (including sale), right of mortgage, and right of leasing or lending. This exploration of rights indicated important differences between the level of security of tenure in the two village sections.

The vast majority of compound heads perceive their right of access to land to be clearly defined and secure. When asked whether someone could take compound land from them, most compound heads in both villages responded firmly in the negative.<sup>3</sup> In Keur Marie, the compound heads reported that no plots could be taken from them, whereas in Keur Magaye, 63 of the 73 plots could be taken. The fact that compound heads in Keur Magaye said that in 8 cases that plots could be taken from them by the village chief or a relative probably reflected the fact that the village chief was responsible for clearing a fairly high percentage of village land in Keur Magaye and that many tracts of land were obtained from relatives. One plot, it was indicated, could be taken by an administrative authority, such as the village council. This plot is, however, on land for residential purposes, not agricultural land, and the owner may realize that someday a house might be built on the land.

Responses to the question "Who cleared the parcel?"<sup>4</sup> indicate that a similar amount of land in both villages was cleared by someone in the compound head's lineage group, that is, by the compound head, a relative of the compound head,

<sup>3</sup> Here the basis of analysis is plots cultivated by the compound head, not the parcel. The sample size is 52 plots for Keur Marie, and 73 plots for Keur Magaye.

<sup>4</sup> The unit of analysis here is the parcel. Because borrowed parcels are not included, the sample size for Keur Marie is 113 parcels, and for Keur Magaye, 188 parcels.

or a current member of the compound. In Keur Marie, 78 percent, and in Keur Magaye, 77 percent, of the parcels were cleared by a compound member or a relative of the compound head. According to customary tenure practices, compounds have the most secure right over land that someone in the lineage group cleared.

As for the means by which the current parcel-holder acquired the land, the majority of parcels were inherited (66 percent in Keur Marie and 63 percent in Keur Magaye), which represents a strong traditional claim to the land. The proportions received from the village elders were 11 percent in Keur Marie and 18 percent in Keur Magaye.<sup>5</sup> In both villages, small proportions of parcels were obtained through sale or trade, 5 percent for Keur Marie and 6 percent for Keur Magaye. In Keur Marie, almost 5 percent was obtained through defaults on loans secured by land, but this did not occur in Keur Magaye. In neither village did any respondents indicate that they had received land from the rural council. No one in the village looks to the rural council to determine inheritance or approve it.

The majority of compound heads claimed the right to dispose of land, contrary both to the Law of National Domain and stereotypes of customary law. As the selling of land is strictly forbidden by the Law of National Domain, compound heads were asked about their right to give compound land to someone outside the compound rather than to sell land. Again, the unit of analysis is plots cultivated by the compound head. In Keur Marie, only one compound head (2 percent) responded that he could not give the plot away, while in Keur Magaye this number was 15 (21 percent). Again, the difference probably reflects the strength of traditional norms in Keur Magaye. The fact that some compound heads now feel that they have the right to alienate land seems to point to change in the traditional tenure system, change unrelated to and contrary to the Law of National Domain.

Although mortgaging is now strictly illegal on land under the Law of National Domain, a number of plots in the sample were acquired through defaults on loans secured with land. These foreclosures point to the fact that mortgaging land was not incompatible with the customary tenure practices. As a result of the law, the mortgaging of land is no longer openly practiced.

The right to lend or borrow land also is denied by the Law of National Domain. According to the law, land must be reallocated by the rural council. Customary law allows for the free lending of compound land and, in fact, there was a high incidence of borrowing and lending of land in the sample areas. In all

<sup>5</sup> Using a two-tailed test for difference between proportions, one can conclude that the two village sections differ at the 10 percent level of significance in the proportion of land that was obtained from the village elders.

TABLE 10-1. **Borrowing and Lending of Land by Village**

	Number of Parcels		Hectares		Proportion of Hectares in Sample (%)	
	K. Marie	K. Magaye	K. Marie	K. Magaye	K. Marie	K. Magaye
Borrowed	25	24	25.2	40.6	13	7
Lent	15	39	13.4	90.8	7	17
Borrowed/lent	—	1	—	0.1	—	—

the cases of borrowed or lent land, there was no formal contract and no monetary or in-kind payment for use of land. Table 10-1 shows the amount and proportions of land that was lent or borrowed in the samples.<sup>6</sup>

The farmers in the sample are clearly ignoring the provisions of the Law of National Domain. Overall, the impression that emerges is that the most rights are still customary in origin but that the content of these rights is evolving in response to the Law of National Domain and to other new pressures. Another impression emerges: customary rights in relatively densely populated Keur Marie have evolved further toward individual rights, away from lineage and village rights, than is the case in relatively sparsely populated Keur Magaye. The link between the rights of the clearer of the land and current access rights is less strong in Keur Marie than in Keur Magaye, and the role of the village elders in allocating land is less important in Keur Marie. In addition, more farmers in Keur Marie have begun to include the right to alienate land among their rights.

This evolution of customary tenure rights usually involves uncertainty in a transitional period, and raises the possibility that land tenure rights may be less secure in Keur Marie than in Keur Magaye. Informants in Keur Marie reported greater insecurity than in Keur Magaye, not just because of evolutionary changes in custom but also because of greater penetration of the Law of National Domain. Consciousness of the law and resentment of its provisions are greater in Keur Marie than in Keur Magaye. Compound heads in Keur Marie tended to have strong negative opinions of the law, while those in Keur Magaye professed only grapevine knowledge of the law and tended to be have more vague opinions.

The vast majority of the compound heads in the Keur Marie sample expressed negative opinions of the Law of National Domain. In all cases, the complaint

<sup>6</sup> The "borrowed" category specifies land that was borrowed by the interviewed compounds in 1986. The "lent" category denotes land that was lent by the interviewed compounds. Note that there is a possibility for double accounting of land areas in that land lent by one compound in the sample could have been borrowed by another compound in the sample. The "borrowed/lent" category in the table specifies a case where land was borrowed by one compound and then lent out by the same compound.

against the law centered on lending land. Those with enough land complained about the risk of losing land that they lent out or were unable to cultivate. One put this sentiment succinctly, "All we had to our names was the land, and now they have even taken that away from us." Another stated that the Law of National Domain allowed people to steal the land of others. Those with too little land complained about their inability to borrow it. When asked why they did not ask the rural council for more land, one of the land-short compound heads stated that he would not think of approaching the rural council for fear of ostracism by the village.

In Keur Magaye, conversely, 10 compound heads explicitly stated that the law was not obeyed in the region, and the general vagueness or secondhand quality of most of the other responses indicate that this is indeed true.<sup>7</sup> The general attitude was that in their community the law was not obeyed, and therefore problems or benefits associated with it did not exist.

The incidence and type of land disputes in the two village sections also serve to confirm the evidence that the Law of National Domain has proved more obtrusive in Keur Marie than in Keur Magaye. Among the 22 sample compounds in Keur Marie, there have been six land disputes since the passage of the Law of National Domain. All but one of these disputes involved cases in which one compound head had lent land to another and the borrower approached the rural council to take "possession" of the land. The remaining dispute was a case in which someone approached the rural council to take possession of a piece of fallow land belonging to someone else. Among the 26 compounds in the Keur Magaye sample, there had been three land disputes since the passage of the Law of National Domain, not one of which was over borrowed land.

The confusion over tenure in Keur Marie has served to introduce an element of insecurity into the tenure situation in that village. Given that tenure rights are less secure in Keur Marie than in Keur Magaye, a number of hypotheses concerning the role of tenure security in agricultural performance can be tested. These hypotheses center on two issues: land stewardship and allocative efficiency.

### **Security of Tenure and Land Stewardship**

In this section we discuss the hypothesis that compounds that securely own their parcels will (1) be more willing than other compounds to make improvements on the land and (2) husband their land better through sound land use practices such as fallowing and crop rotation. Translated to the Peanut Basin sample, the hypothesis is that the compounds of Keur Marie, more subject to the influence of

<sup>7</sup> In both villages, although not always aware of the Law of National Domain, most farmers were knowledgeable about the rural councils because in addition to administering rural zones, the rural councils were responsible for managing development funds in their village sections.

TABLE 10-2. Land Improvements

Improvement	Keur Marie	Keur Magaye
None	75 (54%)	133 (62%)
Trees	66 (48%)	70 (33%)
Fences	8 (6%)	14 (6%)
Pasturage	2 (1%)	1 (0.5%)
Manure	— (0%)	1 (0.5%)
Wells	8 (6%)	— (0%)
No response	— (0%)	3 (1%)
Total	138 plots	213 plots

Note: Borrowed parcels are included.

the Law on National Domain, will, on average, exhibit lower rates of investment in the land than those of Keur Magaye. The primary difficulty that arises in testing this hypothesis is that the level of land-improving or land-maintaining investment among the Peanut Basin farmers is extremely low. The types of improvements are set out in Table 10-2.

The most common type of improvement found in both villages is trees. The lower proportion of parcels with trees in Keur Marie may reflect more clearing because of higher population densities. The two villages had virtually the same proportions of parcels with each of the other improvements, except for wells, which the water table permitted only in Keur Marie.

There is no support here for the hypothesis that farmers with more secure tenure make more improvements in the land. Indeed, the appropriateness of the hypothesis in this case may be questioned (Bruce and Fortmann 1989, pp. 5-7). In the present legal context, farmers with insecure tenure rights might be more motivated than those with secure rights to prove visibly their stewardship of the land. Under the Law of National Domain, rights of access are validated by showing that improvements have been made to the land (that the land has been *mise en valeur*). It can be argued that, in making improvements, the farmers in Keur Marie are seeking to establish more firmly their tenure rights.

Fallow, which would not have the same probative value because it is not readily evident, could provide a better test. Two hypotheses were considered: (1) that insecure tenure rights would lead to a diminished level of fallowing as an investment in land maintenance and (2) that there would be a tendency for the amount of fallow to increase because of a reluctance to lend land, in light of the strictures against lending in the Law of National Domain.

The study found that, in almost every case, compounds had more land in fallow than they wished and, aside from deciding which parcels to leave fallow, very little planning went into determining the total amount; compounds simply left land in fallow because of one or more resource constraints, especially, the difficulty of getting peanut seed. The proportion of land left in purposeful fallow

were almost exactly the same for the two villages, 24 percent for Keur Marie and 22 percent for Keur Magaye. Insecure tenure does not appear to lead to a greater or lesser amount of productive fallow.<sup>8</sup>

Field rotation was also examined. For the most part, farmers maintain a millet-peanut-millet-peanut rotation. Farmers recognize the benefits to soil quality and hence to productivity. Most compounds within the sample have enough land to permit rotations between millet, peanuts and fallow. Data were collected for the three-year period from 1984 through 1986. The sample size was 103 plots for Keur Marie and 151 plots for Keur Magaye. In Keur Marie, 2 percent of peanut plots and 12 percent of millet plots had not been rotated for two years, and 1 percent and 2 percent, respectively, for three years. For Keur Magaye, the figures were 5 percent and 1 percent, and 7 percent and 0 percent, respectively.

On average farmers in Keur Marie are less meticulous about following rotation schedules than farmers in Keur Magaye. In particular, they are more likely to designate a plot as the compound's millet plot and cultivate millet there for several years in a row. It could be argued that this practice is explained by shortsightedness induced by insecurity of tenure, but it is more easily explained by reference to the expected decline in rotations as increased population pressure forces more emphasis on food crops. In any case, the numbers are not large enough to support a persuasive argument.<sup>9</sup>

Examination of the improvements made on the land, the extent of fallow, and the frequency of rotation fails to lend support to the hypothesis that the land management practices of the less secure farmers of Keur Marie are less good than those of the more secure farmers of Keur Magaye.

### Security of Tenure and Transactions in Land Rights

The hypothesis with regard to land allocation is that compounds that are less secure in their traditional rights because of the Law of National Domain will be

<sup>8</sup> The null hypothesis, that the proportion of plots left fallow for productive reasons in Keur Marie ( $p_1$ ) is equal to the proportion in Keur Magaye ( $p_2$ ), is rejected if:  $p_1 - p_2 < -.225$  or  $p_1 - p_2 > .225$ . Because  $p_1 - p_2$  equals 0.01, the hypothesis cannot be rejected. It is only at the 91 percent level of significance that the hypothesis can be rejected, which means that the proportions are statistically identical.

<sup>9</sup> Again using a two-tailed test for difference between proportions, the null hypothesis must be rejected at the 1 percent level of significance if:

$p_1 - p_2 < -.116$  or  $p_1 - p_2 > .116$ , where  $p_1$  is the proportion of land that had not been rotated for two or more years in Keur Marie (16 percent) and  $p_2$  the same proportion for Keur Magaye (14 percent). Since  $p_1 - p_2 = 0.02$ , the null hypothesis cannot be rejected and it can be concluded that the two village sections do not differ at the 1 percent level of significance in the proportion of land that was not rotated. It is only at the 66 percent level of significance that the null hypothesis is rejected, but such a high level of significance reflects the fact that the two proportions are statistically identical.



unwilling to engage in borrowing and lending. Because formal and informal lending of land is forbidden by the Law of National Domain, a farmer who lends land risks losing it; the borrower could claim rights over the land and, as the current cultivator, would have a strong case before the rural council. Where land cannot be transferred to accommodate household labor availability, landholding will be frozen into inefficient patterns among compounds. If tenure is less secure in Keur Marie, as has been suggested, the incidence of lending and borrowing in Keur Marie should be lower and the ratio of hectares per compound member more unequal across compounds than in Keur Magaye.

Focusing first on the incidence of borrowing and lending in the two villages, it is surprising to note that despite the complaints of the villagers of Keur Marie about the risk of lending land, quite a few compounds in the village do so. In Keur Marie, 9 compounds had borrowed land, 6 had lent land, and 3 had done both; in Keur Magaye, the figures were 4, 13 and 7, respectively.

It seems that land in both villages is still reallocated informally with neighbors lending to one another because of rotation considerations, or because of distance considerations, and very rarely because the borrower does not have enough land. A review of the number of hectares each compound owned, borrowed, lent, and left fallow during the 1986 season shows that in Keur Marie and Keur Magaye only 4 out of the 23 borrowers did not have some of their own land in fallow at the same time they were borrowing land. In Keur Marie, where land is more scarce, 3 of the 12 borrowers did not have land in fallow; in Keur Magaye, only 1 of the 11 borrowers did not have fallow.

Ratios of hectare per compound member should mirror reallocation practices. The fact that compounds are using the same technology implies that efficient land allocation would indicate fairly equal distribution of cultivated land across compound members. This being the case, if allocative efficiency were indeed hindered by insecure tenure rights, it would be reasonable to expect the ratios of cultivated land per compound member in Keur Marie to be more unequal than those in Keur Magaye. Table 10-3 gives three different calculations of the ratio of land per compound member for the two village sections. Column A is the ratio of owned land per member; column B, the ratio of cultivated land per member; and column C, the ratio of cultivated and fallow land per member.

In both villages, reallocation due to borrowing and lending serves to reduce the variation in land per compound member, as does the exclusion of fallow from the calculations. Land borrowing occurs with a similar frequency in both village sections and in both sections it appears to be effectively performing its function in adjusting land access to labor availability. There is nothing to substantiate the hypothesis that less secure tenure in Keur Marie is impeding this useful dynamic.

TABLE 10-3. Ratios of Land per Compound Member (ha per member)

	A <sup>a</sup>	B <sup>b</sup>	C <sup>c</sup>
Keur Marie			
Mean	.89	.69	.85
Standard deviation (sd)	1.12	.62	.74
Range	5.60	3.18	3.66
Minimum	—	.11	.31
Maximum	5.60	3.29	3.97
Coefficient of variation (sd+mean)	1.26	.90	.87
Keur Magaye			
Mean	1.87	.88	1.63
Standard deviation	1.41	.65	1.09
Range	6.13	2.62	4.36
Minimum	.01	.18	.27
Maximum	6.14	2.80	4.63
Coefficient of variation (sd+mean)	.75	.74	.67

<sup>a</sup> A = owned land per member.

<sup>b</sup> B = owned land + borrowed land – fallow – lent per member.

<sup>c</sup> C = owned land + borrowed – lent per member.

### Manager Security in Particular Plots

So far, the comparisons involved in this investigation of tenure security have been comparisons between the two study villages, tested against the behavior of compounds in these villages. Comparisons of behavior of compounds in relation to tenure security are potentially flawed. This is because they do not take into account that different plot managers sometimes make key decisions about improvements and management. Tenure security for a manager in a given plot may have as much to do with the personal status of the manager as it does with the more general tenure situation of the manager's village or compound.

We constructed two social accounting matrices, one for each village section, to allow us to distinguish land managed by different compound members and to compare plots held securely by their managers with plots held insecurely.<sup>10</sup>

First, plots had to be classified according to their relative tenure security. In the two villages, 136 different plot managers, supervising 231 plots, were identi-

<sup>10</sup> The SAMs have been reported in detail elsewhere (Golan 1990, pp.41–52 and Appendix 3). The socioeconomic structures of the two village systems proved to be virtually identical, based on single cash-crop and single staple-crop economies that revolve around peanuts and millet, with very little economic exchange of production between compounds within each village section. However, remittances, salaries, and extra-agricultural income played a more important role in Keur Marie than in Keur Magaye. This may be related to the greater tenure insecurity in Keur Marie, but the evidence of causality is not conclusive.

fied. In order to gauge the tenurial rights of the plot managers, the manager of each plot was asked:

1. How did you obtain this plot? / Who gave you this plot to work?
2. How many years have you been the manager of this plot?
3. Who could take this plot away from you?
4. Will you manage this plot next year?
5. Will your children operate this plot?
6. Who determines who the heirs to this plot will be?
7. Can you give this plot away?
8. Who determines the crop planted on this plot?
9. Who determines the quantity of seeds planted?
10. Who determines the amount of pesticide used?

The concept of "security" used here thus includes not only security in the sense used earlier in this chapter (lack of fear of loss of the plot) but also autonomy in management. In accordance with the managers' responses to these questions, we divided the 231 plots into three classes: those managed by managers possessing secure tenure rights (126 plots), those managed by managers possessing moderately secure rights (30 plots), and those managed by managers with insecure tenure rights (75 plots).

Managers with the most secure rights over a plot were those who stated that no one could take the plot from them, that they would work the plot next year, and that their children would manage the plot. These managers determined what crops they planted, how many seeds were planted, and how much pesticide was used. Of the 126 plots in this category, in the sample 31 were managed by managers who had the added rights of determining who would inherit the plot and stated that they had the unconditional power to give the plot away, although most said that they never would. All of the secure managers stated that their children would take over the plot in question.

The 30 plots in the moderately secure classification are cultivated by managers who stated that no one could take the plot from them but, at the same time, they either (1) did not determine the crops planted or the quantities of seeds or pesticide, or (2) did not know whether they would be working the plot next year or whether their children would operate the plot.

In the insecure classification are the 75 plots cultivated by managers who felt that someone had the right to take the land away from them. Of these plot managers, 60 said that the compound head could take the plot from them; 8 said the village chief; 1, the rural council; 1, another relative; and 3 said someone else. (Also included in this classification are 2 plots whose managers did not know whether someone could take the land from them.)

Adding a fourth category, for borrowed plots (41), brought the total number of plots to 272.

The organization of the compound's internal land-distribution system surfaces in the analysis of manager security. The results are set out in Table 10-4. (The compound heads' plots, universally secure, are not included in the table.) The most secure managers tend to be brothers of the compound head. These men are often independent household heads who cultivate their own millet plots and manage their own landholdings. No one has the right to take their land. The most insecure managers tend to be the women in the compound. They are usually allocated a different plot each year for peanut cultivation. Whereas the bundle of rights accorded to brothers and married sons often includes rights denoting ownership (including the right to determine heirs), the rights accorded women and younger sons tend to denote a right to some land in the compound rather than rights to a particular parcel.

Examination of Table 10-5 reveals the extent to which the plot classification correlates with millet or peanut production. Secure plots tend to be planted in millet; insecure plots, in peanuts. This situation mirrors the fact that compound heads and independent household heads are responsible for the compound's millet production, while wives and other insecure managers cultivate peanut plots for their personal income.

The small proportion of land allocated to moderately secure and insecure managers in Keur Marie is striking. These managers received only 10 percent of village land in Keur Marie, whereas in Keur Magaye they received 32 percent. Because the composition of compounds in the two villages is almost identical,

**TABLE 10-4. Relationship of Manager to Compound Head and Degree of Security**

Relationship to Compound Head	Total Number of People	Total Number of Plots			
		Secure	Mod. Secure	Insecure	Borrowed
Wife	31	3	7	14	5
Son	24	4	12	10	2
Brother	13	11	3	2	5
Sister-in-law or daughter-in-law	10	—	1	3	2
Mother	4	—	1	3	—
Nephew	2	1	1	4	—
Aunt	1	—	—	1	—
Father	1	—	—	—	1
Cousin	1	—	—	—	1
Sister	1	—	—	—	1
Brother-in-law	1	—	1	—	—
Unknown	1	—	—	2	—

TABLE 10-5. Hectares by Crop and Plot Security

Plot Security	Peanuts	Millet	Other	Total
Keur Marie				
Secure	2.0	62.0	3.5	87.5
Moderately secure	1.7	4.4	0.6	6.7
Insecure	5.1	0.8	0.1	6.0
Borrowed	5.0	15.8	1.5	22.3
Keur Magaye				
Secure	44.3	65.3	4.3	113.9
Moderately secure	17.2	5.2	1.3	23.7
Insecure	29.8	12.3	0.9	43.0
Borrowed	15.6	9.5	0.8	25.9

the smaller amount of land allocated to insecure managers is not a reflection of fewer women or dependent children in the compounds of Keur Marie. Instead, the small amount of land allocated to these managers may reflect the difficulty that the compounds in the Keur Marie area have in acquiring peanut seed. It appears that compound heads and other secure managers plant their own peanut plots before allocating any of the seed to other compound members. Compound members who fall into the insecure category of plot manager are also insecure in their rights to other factors of production such as peanut seed. Alternatively, the difference may reflect a tendency for plots to be allocated more broadly among compound members when land is still relatively plentiful, as it is in Keur Magaye.

### SUMMARY AND CONCLUSIONS

Case studies of the very few parcels of agricultural land under registered ownership provided little support for the proposition that this theoretically more secure tenure has encouraged investment and intensification of agricultural production. Land was frequently used as security for loans, but often the lending could not be established to be for agricultural purposes, and default and attempted foreclosure have been common. Two other phenomena are reminiscent of the experience with land registration elsewhere in Africa: (1) the conflict engendered by initial registrations, which involved an element of appropriation of village lands by individuals, and (2) the dilution of the legal certainty attained at first registration through subsequent unregistered dealings and successions (Dickerman 1989, p. xxiv).

To examine the effects of the Law of National Domain, we investigated two village sections of different population densities. In order to characterize correctly the tenure systems in the area, we enumerated specific land tenure rights

and questioned both the compound head and other members of the compound as to their rights. The law appears to have had a greater effect in the more densely populated village, which also had more substantial off-farm employment. The law appears to have undermined security of tenure, partly because of the discretion it has vested in the state to overturn existing land rights but also because of its incomplete implementation. In the comparison between the relatively insecure tenure situation of Keur Marie and the more secure situation of Keur Magaye, more secure tenure did not result in more land-saving investments or more efficient land allocation. Nor was it possible to discern a difference in management practices among plots held by plot managers with secure, moderately secure, or insecure rights as regards investment.

What became evident through this study is the array of constraints that confront the Peanut Basin farmers: environmental degradation, the unavailability or even inappropriateness of land-saving technologies, the absence of a market structure to support commerce in crops other than peanuts, and a poorly functioning input-distribution system that makes the expansion of peanut cultivation and the introduction of other cash crops almost impossible. All these constraints combine to decrease to near zero the land-management options in the Basin. The first conclusion of this study, therefore, is that although tenure insecurity might be a constraint to efficient land management at some point in the future, it is not now the binding constraint in Senegal's Peanut Basin.

This study also attempted to explore the complex nature of the compound's internal land tenure system. Women, older relatives, poor relations, and other compound members have rights to compound land. The comparisons showed little response to different degrees of tenure security, but the implications of this are not clear because of the unavailability of production improving investments or land-conserving technologies.

What do our findings imply for future tenure reform programs? First, obviously, no particularly high priority can be attributed to reforms to enhance the security of land tenure in relation to all the other needs of Peanut Basin farmers. But we can offer some insights into the content of an eventual reform.

If policymakers contemplate an individualized tenure system the question immediately arises as to under whose name to register compound land. The most obvious choice is the compound head; his is the name that appears on all official lists, from village to cooperative. If all compound land is registered in the compound head's name, the compound head may become more secure in his control over compound land. But the other plot managers will then be dispossessed of rights, and the hypothesized link between tenure security and efficient land management would be broken on the plots they manage. The literature on major land registration programs in other African countries has documented the erosion of plot managers' rights (Dickerman 1989, p. xxv). The compound head is vested

with the legal authority to sell, rent, or mortgage land, and the tenurial status of the other compound members becomes very insecure. Customary tenure rules appear to have evolved toward this same result, without benefit of registration.

An alternative is to register land in the name of the manager with the most secure rights to that particular piece of land, in other words, compound heads and other household heads, both dependent and independent, would have their traditional rights of access to a plot legally recognized. Wives and younger compound members would again not be legally assured of continued right of access to land, and their incentive structure would thus be weakened.

We could propose solutions that cut even more finely, but such strategies pose a number of difficulties.

1. The bureaucratic machinery that would be needed to handle the registration not only of compound heads but of other compound members as well could prove impossible to maintain.
2. Within the compound, the distinction between where one member's tenurial bundle stops and where another's begins is often very hazy. The legal and social battles that could result from a registration effort of this type could be overwhelming.
3. It would be counterproductive if the compound were to lose the flexibility it has today to reallocate land to crops and fallows under aggregate management of its holding.

The land improvement and efficiency arguments for recognizing individual title are confounded when confronted with the complexity of the compound.

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## THE FINDINGS AND THEIR POLICY IMPLICATIONS: INSTITUTIONAL ADAPTATION OR REPLACEMENT

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### WHAT IS AT ISSUE?

The vast majority of Africa's farmers still hold their land under indigenous, customary land tenure systems, whatever the formal legal position might be under national law. Chapter 1 of this volume reviewed the debate over the adequacy of those systems, and Chapter 2, the conceptual model linking title and tenure security with agricultural performance. In the mid-1980s some voices in major bilateral and multilateral donor organizations called for large-scale tenure individualization and title registration programs to provide the tenure security necessary for investment in agriculture.

The large literature on African land tenure did not provide convincing empirical proof of the benefits of land registration programs (Dickerman et al. 1989, Bruce 1986, Barrows and Roth 1990). But the logic of the economic model involved was compelling, and it had recently been tested with impressive results in Thailand (Feder et al. 1988). At the same time, there was a recognition that a formal title did not necessarily mean an increase in tenure security (Roth et al. 1989), and a substantial body of microstudies, especially from Kenya, raised questions about the effects of title registration programs in African circumstances (e.g., Haugerude 1983, Okoth-Ogendo 1986).

The research reported here grew out of a sense that the time had come to attempt a careful quantitative study of these issues, based on survey research and econometric analysis. The World Bank studies asked whether or not customary land tenure systems provided insecure tenure, hampered increases in agricultural

productivity and required replacement. The Land Tenure Center (LTC) studies asked whether formal, registered tenure provided by the nation-state has in fact delivered greater security of tenure than customary arrangements and stimulated agricultural development. Agricultural productivity was defined in terms of investments in the land and increased crop production per hectare.

### SEARCHING FOR 'SECURITY OF TENURE'

When the research teams sought to operationalize the concept of "security of tenure" so they could test for it, they discovered that the confident discussion of the concept in the literature cloaked important differences as to how it was conceived. Three elements were present, in different combinations from case to case. The first element was the formal duration of rights. Did the landholder have a right to the land for long enough to have an incentive to invest? The second element was the protection of rights. However long the formal entitlement, it would not provide incentives in a situation in which rights were arbitrarily overridden by other individuals or the state. The third element was robustness of rights: the freedom to use and dispose of land, free from interference of community or family.

All three elements are obviously relevant, and we do not want to suggest that any one formula for security of tenure is appropriate for all purposes. The various studies reported in this volume took somewhat different approaches.

The World Bank studies sought to test for different degrees of security of tenure under customary systems and to establish the effects of those differences on improvements and productivity. These studies involved fairly large samples and cut across different customary tenure systems within countries. They escaped the particularities of the diverse customary tenure systems by treating tenure as a bundle of specific rights and testing for the presence of particular rights. The Bank's research team concluded that robustness of land rights was by itself a sufficient measure of security of tenure. Because of a hierarchical relationship among land rights, a subset of transfer rights could be used as a proxy for robustness. For example, freedom to sell implied durable, safe rights to be transferred. Using a gradation of "temporary transfer rights," "preferential transfer rights," and "complete transfer rights," they correlated investment and productivity with the extent of those rights, as perceived by the holders themselves.

The LTC research sought out opportunities to study the use of land under customary tenure and under formal, registered tenure in close juxtaposition. These microstudies attempted to measure security of tenure under the local tenure options and to isolate the effects of any differences in security of tenure on investment and production. The studies used several different indicators for se-

curity of tenure, both facts (e.g., frequency of disputes, currency of registration) and holders' perceptions (e.g., likelihood of still having the land after a certain number of years). The indicators represented all three of the elements mentioned earlier: formal duration of rights, protection of rights, and robustness of rights. Each study emphasized indicators relevant to the local situations, which are not identical in any two cases.

In addition, both World Bank and LTC researchers examined differences in security within the system of registered ownership in Kenya, asking whether landholders with up-to-date registrations behaved differently from those who had failed to register changes of ownership, leaving new holders vulnerable to other claims. And in Uganda, an LTC study explored whether landholders who had taken the initiative to get their land registered or to maintain its registration current took greater advantage of their registered title than those who had receive their title as part of a compulsory, systematic registration program, without any initiative on their part.

### SECURITY UNDER CUSTOMARY LAND TENURE

Do customary tenure systems provide weak security of tenure in some cases? The World Bank studies confirm that the extent of transfer rights varies considerably, and sought to identify the factors responsible for the variability. They found a correlation between the progression toward "full transfer rights" and population pressure.

The effect of population pressure on tenure is best tested by comparing regions in Ghana. Although each Ghanaian region is fairly commercialized (Anloga, shallots; Wassa, cocoa; Ejura, large food-crop farms), only Anloga experiences high population pressure. Among permanently held land, the proportion of "complete transfer" parcels is 82.5 percent in Ejura, 76.7 percent in Anloga, and 70.3 percent in Wassa. However, if the necessity for approval is also taken into account, the results change considerably. The proportion of permanently held parcels that may be sold without approval is much higher in Anloga (62.7 percent) than in either Wassa (14.7 percent) or Ejura (9.0 percent). If the ability to transfer land without approval is indeed the paramount measure of the individualization of land rights, the Ghanaian data strongly support the notion that increased population pressure results in greater privatization of land rights.

Our best basis for testing the effect of commercialization on the privatization of land rights is Rwanda. In Rwanda, each of the three regions has high population density, but Ruhengeri is the most commercialized and Butare the least. In Ruhengeri, 81.5 percent of permanently held parcels are those over which current operators have "complete transfer" rights, as opposed to 57.6 percent in Gitarama and 46.7 percent in Butare (Table 4-10). If approval to sell is consid-

ered, the Butare region exhibits by far the lowest proportion of freely salable parcels. These patterns provide support for the argument that increased commercialization hastens the individualization of land rights (Migot-Adholla et al. 1991).

The studies tend to confirm hypotheses that customary tenure rights evolve toward stronger, more alienable individual rights as population pressure on land increases, technologies change, and agriculture becomes more commercialized (Boserup 1981, Feder and Noronha 1987). The LTC Senegal study provides corroboration, finding that a right to sell was more commonly asserted in the locality where there is heavier population pressure on land.

If customary tenure systems do not simply break down under such pressures but instead often evolve in a responsive fashion, there is a need to reexamine the extent to which more intrusive programs, which seek to replace those systems, are necessary. The necessity for such programs hinges on whether low security of tenure is seriously retarding agricultural development. To answer this question, the World Bank studies tested the relationship between security (represented by transfer rights and credit use) and land improvements and productivity. The studies controlled for parcel characteristics and observable household characteristics, and corrected for unobservable household characteristics by using either dummy variables or an error component model.

The relationship between land rights and productivity is hypothesized to proceed as follows: Increased individualization of rights improves the farmer's ability to reap returns from investments on land, which, in turn, leads to a greater demand for land improvements as well as for complementary inputs. Increased individualization of rights may also improve the creditworthiness of the farmer and enhance his chances of receiving formal credit. Both of these demand- and supply-side mechanisms interact to increase investments in land and input use, which, in turn, lead to greater land productivity.

The use of formal credit in the study regions is limited, reflecting the poor development of formal rural banking institutions. In 9 of the 10 study regions, less than 13 percent of the farms received formal credit during 1987-88. Furthermore, in Ghana and Rwanda, all formal credit loans were short term, none being extended for more than one year. It is therefore not surprising to find a weak relationship between land rights and the use of formal credit. For instance, we found no significant relationships between the use of formal credit and the proportion of land held by current operators with "complete transfer rights."

Given the low incidence of formal borrowing, the absolute number of cases in which land is used to secure loans is also very low. Kenya differs considerably from Ghana or Rwanda in that formal titles to land are held by many farmers and could be obtained by countless others. However, researchers did not find a significant relationship between the possession of title and use of formal credit. The

use of land titles also did not imply an increase in the period of loan maturity or loan size. In light of these findings, we conclude that there is little relationship between land rights or land title and the use of formal credit in the countries of our study at this stage of their agricultural development. The low incidence of formal credit in Kenya also suggests that transformation of land tenure alone will not lead to the development of active rural credit markets.

In terms of their effect on the incidence of various land improvements, land rights have mixed results. The ability to bequeath land is the most important distinguishing right in each Rwandan prefecture. Farmers are much less likely to improve, in any manner or with long-term investments, parcels that cannot be bequeathed ("limited transfer" parcels). For example, 78.7 percent of parcels that may be bequeathed (family land, lineage land, and complete rights land) were improved, as opposed to 26.7 percent for those short- and long-term usufructs that could not be bequeathed (Exhibit 4-1). Among permanently held parcels, there is no difference in the incidence of land improvements between those over which current operators have "preferential transfer" and those over which they have "complete transfer" rights. Nor does the requirement of prior approval before entering into a transaction affect the incidence of land improvements. In Anloga, Ghana (only permanently held parcels were surveyed for investments), 61.8 percent of "complete transfer" parcels were improved (by drainage, mulching, or excavation) as opposed to only 5.4 percent of "limited transfer" parcels. Moreover, the parcels that could be transferred freely were more likely to have been improved than were those requiring prior approval. In Ejura and in Wassa, the incidence of investment was not related to land rights. A similar lack of relationship was also found for each of the Kenyan study areas. From these varied findings, it is not possible to make any general assertions regarding the effect of land rights on land improvements.

To test the relationship between land rights and land productivity, we estimated reduced-form yield equations using parcel-level data for selected crops. We found no significant relationship between land rights and yields in any of our study regions. This result is surprising for Rwanda, where some positive relationships between land rights and productivity-enhancing land improvements were found. The discrepancy cannot simply be dismissed as the result of noisy yield data, because the results for many other variables included in the regressions were satisfactory, both in terms of statistical significance and expected signs. Moreover, the yield data for Rwanda are the most reliable, having been physically measured by resident enumerators.

A more plausible explanation arises from the fact that land over which operators have "short-term use rights" in Rwanda is mostly rented or borrowed by younger families who also operate smaller farms. With lower land-to-labor ratios

than average, they may well use family labor more intensively than do farmers who have more secure access to land, compensating to some extent for the lower levels of yield-improving investments on their land. Unfortunately, we have no data on use of family labor to test this hypothesis.

If the degree of alienability of land under customary tenure adequately captures the extent of tenure security, the results of the World Bank studies suggest that increasing such security is not, by itself, a sufficient incentive for land improvements and heightened productivity. We believe that two factors account for this counterintuitive finding. First, in many areas in Sub-Saharan Africa, land is still an abundant good, and however secure tenure may be, it is easier to clear and use other land than to invest in the existing holding. Second, an analytical model that focuses on land alone assumes that other markets—labor, capital and farm produce—are functioning reasonably well. In a fully-developed market economy, this may be a reasonable assumption, but not in most of Africa. The benefits expected from a land market rely on its interaction with other factor markets. In most of the World Bank study areas, for example, the formal credit market hardly functioned for the smallholders studied.

Might it not still make sense for the state to anticipate events and short-cut the evolutionary process, surveying and registering individual holdings? Why not do it all at once, systematically, and capture the economies of scale involved in surveying and determining title to all land in an area at the same time? Would it not be better to provide robust, secure tenure now rather than later?

It is possible to answer these questions positively only if the positive economic benefits of those programs can be clearly established. After all, they are costly. LTC comparative studies indicate that survey and registration costs in smallholder agriculture, even in a systematic process using the most cost-efficient methods, run at least \$50 and often \$100 or more per parcel. Multiplying this figure by the number of parcels in any country produces alarming figures, such as the \$13 million which the U.S. Agency for International Development spent to survey and register all the land on the small Caribbean island nation of St. Lucia in the early 1980s. Are survey and registration of titles in fact effective in increasing investments and productivity? Can they produce the same benefits as the evolutionary process, but quicker? The LTC studies addressed this question.

### **LAND SURVEY AND REGISTRATION: REPLACING CUSTOMARY TENURE**

The LTC studies explored whether the nation-state, when it attempts by titling to substitute its own guarantee to land rights for those under custom, actually provides greater security and prompts greater investment and improvements in the land. Researchers sought out titling programs and evaluated their effectiveness.

In Somalia, a study in an irrigation scheme compared the situation of farmers with registered long-term leaseholds from the state with that of their neighbors holding land under legally unrecognized local practices. In Senegal, the study explored the effects of the country's reorganization of land administration, which places farmers' security of tenure in the hands of local committees and stresses regular use as the basis of rights to land. It also examines the situation of a dozen scattered parcels registered in private ownership just prior to independence. A Uganda study examined the effects of the conversion of smallholders from customary tenure to freehold under a pilot land registration scheme. A Kenya study compared the behavior of private owners who did and did not hold title documents for their land.

In these studies, security of tenure was equated with a danger of loss of access. In Somalia, there was a strong perception that titling increased security, and title in fact had a high economic premium. When title was related to a set of indicators of tenure security, a positive correlation appeared only in the cases where households had better quality land, larger parcels with good water access (i.e., the land most likely without registration to have been sought after by others). In Senegal, the Law of National Domain abolished tenancy, and, under the law, tenants could use the fact that they had farmed the land as the basis for claims to own it. This situation introduces a new factor: the state and its titles as the source of insecurity. The new tenure provided by the state was so conditioned as to cause resentment and concern on the part of landholders. Similarly, in Uganda a majority of the sample did not view the freehold titles originally conferred in the land registration as providing security against eviction because recent government legislation had converted them to leaseholders from the state and exposed them to new dangers of loss of their land. Registration under a weak tenure from the state does not provide meaningful security and may, in fact, decrease security of tenure.

Several of the LTC studies used land disputes as an indicator of insecurity. In Senegal, the locale more deeply penetrated by the Law of National Domain experienced a higher level of litigation, because of disputes in which tenants attempted to nullify the rights of their former landlords. For the freeholds in Senegal from before independence, there were also many disputes, based on challenges to the rights of those who were registered by their local communities. In Uganda, in contrast, most respondents saw the avoidance of disputes as the main benefit of registration. Disputes related to registered parcels were much more unusual, and they tended to concern boundaries or grazing rights rather than ownership.

As in the World Bank studies, formal credit was sometimes not available at the LTC study sites. This was the case in Uganda, and although respondents were aware of the theoretical possibility of using registered land as security for a loan,

those who did not hold registered land thought it more of an advantage than those who did hold such land. In Senegal, those with the preindependence freeholds who had used their land to secure loans had in fact frequently defaulted, but foreclosure appears not to have been successfully pursued. In Somalia, title made no difference in the poor access of smallholders to credit, but large holders, all of whom were registered, did in fact use credit from formal lenders and most of those who borrowed used their land as collateral. In Kenya, access to credit proved to be related more to scale and market access than to registered title.

Had land for which the state had provided title been improved more than other land, as a consequence? Virtually none of the old freeholds in Senegal were in commercial agricultural production; those who had received the titles were persons in privileged positions and their economic interests seem to have lain elsewhere. In the locale studied to observe impacts of Senegal's Law of National Domain, there was no relationship between land improvements, such as tree growing, and the degrees of security in different villages. This is hardly surprising, given the mixed effects of the new tenure system on security of tenure. Within the households, the research showed varying degrees of security of tenure among different plot managers, but there was little or no variability in investment or management practices between or within households to be explained by tenure differences or any other factor, for that matter. In Somalia, titling appeared to make no difference in levels of smallholder investment. The larger holders, who were all registered, had much higher fixed-place investments associated with large-scale citrus production, but this situation is likely to have been more a function of scale, better access to water, and a better access to credit unconnected to title.

In the Uganda case, however, where coffee growing remained viable even during the difficult Idi Amin years because of access to markets in Rwanda, there is a positive and significant correlation between registration and fencing, manuring, and mulching, and a positive but insignificant correlation with tree crops, terracing, and nonagricultural buildings.

What were the effects of land registration on productivity? The Somalia research did not collect production data. The Senegal research did so but found no evidence of tenure effects. In Uganda, data inadequacies prevented confident analysis, although the association of terracing, manuring, and mulching with title suggests that some productivity effects may have existed. In Kenya, farmers who had been issued title documents used less inputs (much lower labor inputs, but also slightly less of other inputs), had much higher levels of mechanization and somewhat lower value of production per hectare, and achieved considerably higher net returns per hectare. But titled farms are consistently larger than small farms, and when the effects of size and market access are separated out, it becomes



clear that it is these factors, rather than title, that are responsible for the correlation. The World Bank's Kenya study tested the effect of land title on productivity by including it alongside the land right variables and by considering it by itself in separate regressions. The lack of any significant relationship between title and yields may be explained by the limited use of credit in the Kenyan study regions.

Several key facts emerge. First, in generally depressed conditions of agriculture, as in Senegal, there is no reason to hope that titling will have an effect. As concluded in the World Bank studies, the land market relies on interaction with other markets for its effect. Where land is scarce or unusually productive, produces cash crops (and especially tree crops), and has good access to markets, as in the Somalian and Ugandan cases, registration may have a positive effect on land improvements and thus on productivity. Second, giving landholders weak titles constrained by conditions and prohibitions will not have the anticipated incentive effects. Third, when farmers value titles even if constrained by conditions and prohibitions or when farmers concentrate improvements on registered land, as was found in Somalia, it is because the titles were felt to provide greater protection than custom did against arbitrariness on the part of the state itself. Much of the titling demand for smallholders in Africa can be viewed as "preemptive"—representing an attempt to prevent the state from allocating to the land to someone else, rather than the expression of a felt need for new operating rules of tenure. Fourth, even in a vital and heavily market-oriented agriculture such as that in Kenya, factors such as farm size and market access may overwhelm titling impacts, especially where land is not used to secure credit and only demand-side, security-induced effects of title are available.

A final conclusion, supported by both the LTC and World Bank studies, is that national legislation of tenure reform has a limited capacity to change behavior. The theme has been stressed in the literature on the Kenyan tenure reform (Coldham 1979). The World Bank's Kenya study found in Madzu and Kianjogu regions that although the titling and registration program had individualized tenure, indigenous values concerning land persisted and the majority of titleholders felt that they could not sell the land without approval of their families. Such behavior is not perverse. It reflects a judgment on the part of smallholders that the social security function of land remains paramount in these circumstances and that compliance with community mores and access to community mechanisms for coping with hard times are still of great importance.

The limitation of the law's ability to change behavior applies equally to state attempts to limit privatization of land rights, when the economic prerequisites for individualization do exist. In Rwanda, the World Bank researchers found that, despite laws forbidding land sales without government authorization, farmers reported that they were able to sell most of the sampled parcels. The LTC

Senegal study found the prohibition of tenancy ineffective, and the Uganda LTC study found land transactions broadly and evenly distributed across registered holdings, where sales without government consent were prohibited, and unregistered land, where tenure practice had evolved to permit sales. In Somalia, a similar prohibition on sales was disregarded, and transactions occurred involving both registered and unregistered land.

### IMPLICATIONS FOR POLICY

These studies were focused on critical propositions about the relationship between security of tenure and development. Their findings are cautionary in a number of respects. "Security of tenure" is a multifaceted concept, not easily operationalized, and development professionals must use it with far more care than they have done so far. Title does not equal security of tenure; the extent to which it does depends on the quality of the title conveyed and the broader context of respect for law. Unsuccessful attempts to substitute state titles for customary entitlements may reduce security by creating normative confusion, of which the powerful may take advantage. Moreover, security of title, whether defined in terms of low risk of loss of access or of robustness of rights and alienability, does not by itself result in greater investment or productivity. Its effect may be entirely insignificant if farmers are overwhelmed by other risks and disincentives, such as frequent drought, or if the economic environment is otherwise stagnant.

To reach an informed decision about the implications of the findings for policies, however, it is necessary to step back and place the studies within a broader experience with titling. One important part of that experience, which colors the attitude of many observers toward titling, is its relationship to agricultural development policies that seek to mobilize urban capital by offering free land, often resulting in land grabbing and alienation of peasant or foreign holdings. The World Bank and LTC studies instead dealt largely with the titling of existing users.

Titling by the state is important to prospective investors precisely because their claims to land lack legitimacy under indigenous systems (Myers 1991). Cadastral survey and titling are commonly a means by which elites and dominant ethnic groups strip pastoralists and other unintensive or seasonal users of resources which they nonetheless need (Besteman 1990, Bruce 1989). Rarely does such investment have significant effects on local welfare, and resentment results, as in northern Ghana (Goody 1986) and Guinea Bissau (Bruce et al. 1992), and serious social conflict may erupt, as in Mauritania (Park et al. 1991). Environmental degradation through nonsustainable use may also be encouraged by free land policies, as in eastern Sudan (Simpson 1987, Republic of Sudan 1986).

Many African states have used titling programs to redistribute land and have done this unfairly so often that many people question whether the state can be trusted in this role. The corruption of the land allocation process seems inevitable when a valuable good is allocated free and rationed administratively.

A second consideration must loom large in any discussion of the appropriate role for titling and registration in the future: There is extensive evidence that systematic registration exercises are followed by widespread failures to register transfers and successions. The accuracy of registry records achieved at considerable cost is lost, as the position on the ground (and in the minds of local people) gradually diverges from that on the register. This has been documented in the comparative studies (Dickerman et al. 1989), and was evident in the World Bank's Kenya study. The findings of our studies suggest some likely reasons. Most smallholders, even after registration, do not do the things with their land that registration seeks to empower them to do, such as selling or mortgaging their land without consulting family and neighbors. The exercise of those powers would contravene important cultural norms, norms that were reflected in the indigenous tenure system. Those norms are likely to be transformed as a result of increasing population pressure and commercialization of agriculture. It is clear that we cannot legislate them out of existence, even where the legal reform is followed up with a costly and extensive field procedure such as systematic cadastral survey and registration.

If we return to our findings and place them within this broader landscape of experience, what do they imply for policymakers? Broadly stated, they:

- cast doubt on the wisdom and cost-effectiveness of large-scale, systematic programs of compulsory titling for smallholders in rainfed agriculture;
- redirect attention to more incremental approaches to change in indigenous tenure systems; and
- redirect support of titling activities toward efforts focused on localities of particular need.

We believe that the task of tenure policy research for the next decade is to elaborate such gradualist approaches, relying to a significant extent on incremental patterns. We should be moving away from a "replacement paradigm," in which indigenous tenures are to be replaced by tenure provided by the state, toward an "adaptation paradigm." Can we define the basic legal and administrative requirements of a land policy that uses an adaptation paradigm? And can we identify circumstances in which systematic or sporadic titling and registration are still appropriate and cost-effective?

An adaptation paradigm requires a supportive legal and administrative environment for the evolutionary change in indigenous law. Such a supportive legal

environment implies a clear recognition of the legal applicability and enforceability of indigenous land tenure rules. An indigenous system whose entire status is unclear under national law is unlikely to be able to respond to new challenges. We understand a certain amount about the process of transformation in indigenous legal systems, including the centrality of conflict resolution in that process (Moore 1986) and the importance to the process of compromise and reconciliation rather than strict rule enforcement in indigenous dispute settlement (Rose 1992). There is a need to review the experience of African countries as to how and on what terms recognition of indigenous land tenure rules is most effective, and how dispute settlement mechanisms can best be framed to facilitate the process of legal evolution. As Sara Berry suggested after reviewing the body of research presented here, "Rather than rewrite the laws governing property rights—an effort which will serve mainly to introduce another set of arguments into ongoing debates over access to land—governments should focus on strengthening institutions for the mediation of what, in changing and unstable economies, will continue to be conflicting interests of farmers and others with respect to rights in rural land" (Berry 1990). Adaptation as a general strategy does not, of course, preclude legislation to deal with specific problems, such as gender issues or power relationships, as when customary land administration enshrines the dominance of one ethnic group over another.

Cadastral survey and registration will remain an important part of any country's land policy repertoire. The adaptation path we sketch here, though neither simple or unidirectional, assumes that a market economy will eventually produce a land tenure system that, while not identical, will bear a strong family resemblance to the Western concept of ownership. But cadastral survey and registration must be done cost-effectively, at the most efficient point in time. They may be best used as a capstone on an evolutionary process of tenure change, rather than as an attempt to compel tenure change.

The studies suggest that programs of compulsory and systematic titling and registration should be confined to circumstances in which:

- land has become valuable and is the subject of intense competition and disputes (as in urban and peri-urban areas), and the customary tenure system is failing to cope with the conflicts; or
- land is being distributed by the state in connection with a project involving resettlement, and there is no customary tenure system.

Where registration is compulsory, costs should be borne by the government. Proposals for broad, systematic registration of lands under rainfed agriculture by smallholders will have difficulty demonstrating favorable cost-benefit ratios. Governments and aid donors should examine especially critically programs for allo-

cation of "unused" state land by titling programs, which often deprive nearby communities of their commons areas and undermine their economic viability, or initiate environmental degradation.

In situations where customary systems provide reasonable tenure security for most holders but some innovators want registered title (e.g., to gain access to credit), sporadic, voluntary registration on a "user pays" basis may be recommended. This recommendation does not refer to programs that make "unutilized" land available free—which, historically, are profoundly problematic because of their association with grabbing land from local households—but programs to secure existing producers. In all cases, special care is required to guard against inadequate adjudication procedures, resulting in extinction of other households' land rights. This is a special problem in sporadic adjudication because not all local claims are adjudicated at the same time. Clear legal recognition of customary rights coupled with a highly participatory adjudication process will provide the best safeguard.

Aid donors should be receptive to strengthening registry facilities and capabilities and to upgrading land survey capabilities. Rehabilitation of deteriorated registry systems, such as the system in Uganda, should generally take priority over expansion of the systems to new areas. A sound strategy in this area will generally first seek to build the capability of dealing with high-value land in urban and peri-urban areas, then gradually expand the system. Planners should bear in mind that installation and management of a registry system should lead to revenue that will cover the costs involved in the operation of the system. Registry fees can cover operating costs. Covering the cost of creation of the system, where essential, will most easily be accomplished by taxes on high-value urban land and fees in areas where there are active markets in high value land. The normal and financially sound progression for the expansion of registry systems is outward from high value land areas.

The broad distinction made here between adaptation and replacement in tenure policy obviously does not capture effectively all the important tenure issues that African policymakers face. For example, both indigenous and registered tenures have left women disadvantaged, and reforms may be needed to allow women to inherit land from parents and deceased spouses. Critical steps may involve greater freedom to pass land by will to women and inclusion of daughters and widows as heirs in the intestacy scheme of property distribution. In some cases, where market transaction has become an important means of access to land, a community property regime for marital property may deserve consideration. Where titling and registration do take place, policymakers should realize the danger of cutting off rights of household members other than the owners, and take care to preserve those rights.

The studies and conclusions reported here do not do justice to the full complexity of social and economic interactions that are played out through the medium of land in today's Africa. We realize, too, that perverse policies often have their roots not in misconceptions that can be resolved through research but in the self-interest of individuals and groups. Land tenure is profoundly political, and its control continues to be a critical factor in the development of African politics and economies. We welcome the renewed and broadened interest in and research on land tenure issues.

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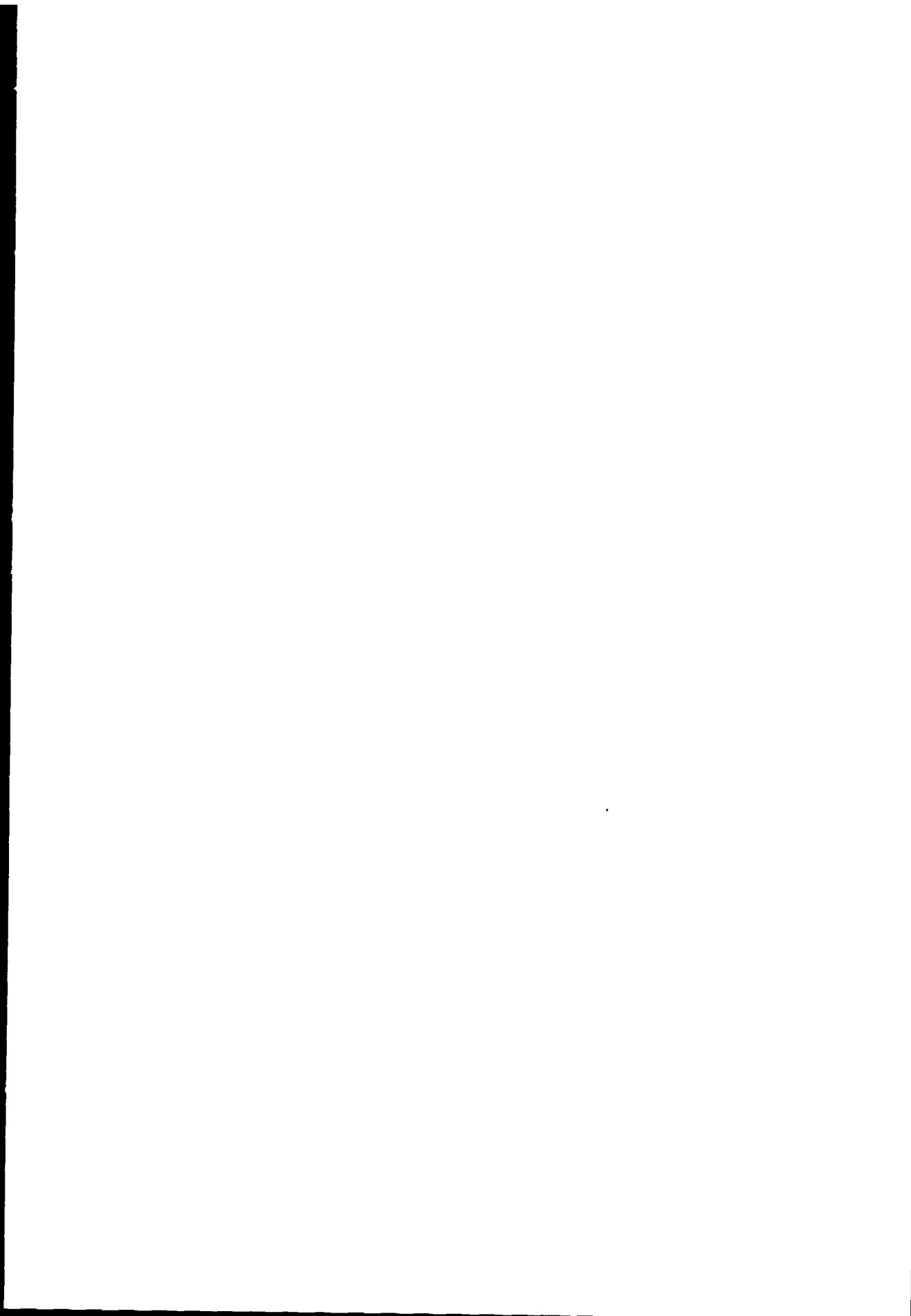
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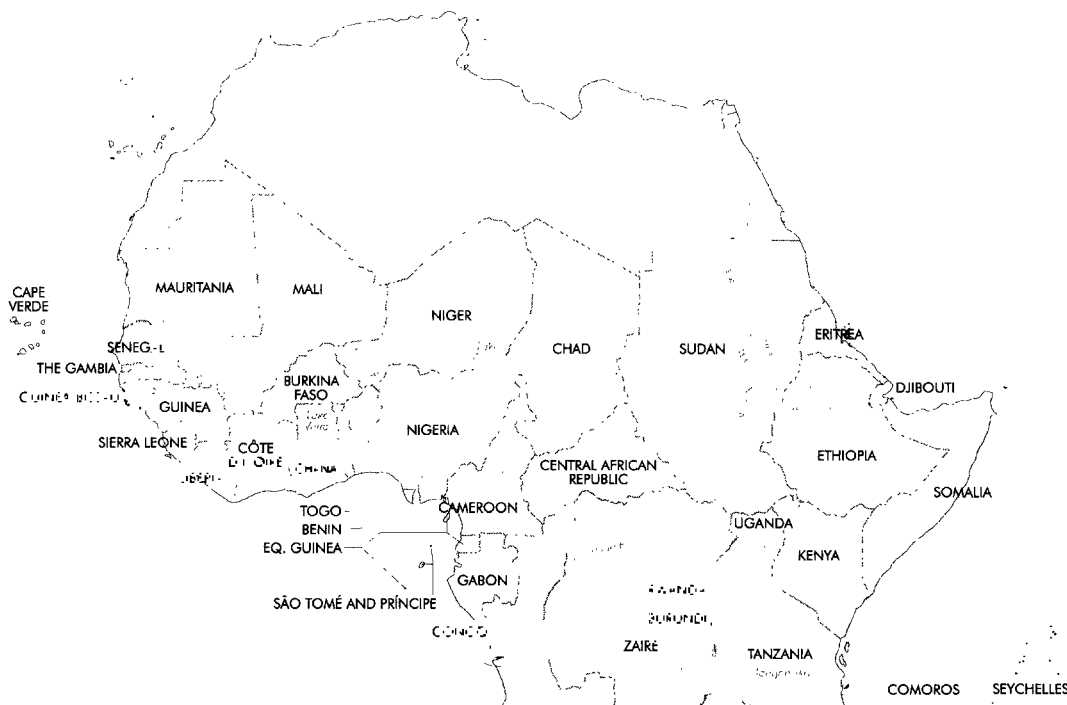
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***Searching For Land Tenure Security In Africa*** is based on eight case studies in seven countries relying on new data to examine the relationship between land holding rights and agricultural production.

Land remains the most important source of economic livelihood, security and social status in Sub-Saharan Africa. But the extent to which existing tenure rules and practices influence agriculture is unclear.

- Do indigenous African land tenure systems accord farmers sufficient security for long-term investment in agricultural production?
- What are the major effects of land registration and titling on agricultural production?

The studies represent the first rigorous quantitative analysis of the relationship between land tenure security and agricultural production in the context of contemporary political economies of African countries.

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