The Farm Investment and Food Security Implications of Privatized Land Tenure and Cash Crop Production: Evidence for a Cooperative Tenure Alternative for West African States

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ABSTRACT

The Farm Investment and Food Security Implications of Privatized Land Tenure and Cash Crop Production: Evidence for a Cooperative Tenure Alternative for West African States

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In view of the continuing crisis in African agricultural development and particularly food production, and the inefficacy of past policies by African governments and international institutions in improving the investment incentives and productive capacity of low-resource farmers, attention is now being redirected to the institutional context of these farmers, especially the terms on which they own and utilize land. The main debate in this discourse has been about whether or not African indigenous customary land tenure institutions constrain the region's agricultural development and therefore should be replaced with formally privatized tenure systems.

The purpose of this doctoral thesis is to contribute to this debate by explaining and demonstrating how under certain social, political, and institutional governing conditions such customary institutions may evolve into cooperative tenure alternative rather than privatization, promote efficient land use and, in the process, encourage rural farm investments; and by showing that

cash crop production, which is linked to land privatization, may impede national food security.

Although previous authors have stressed the need for more inclusive models to address these two research questions, none have provided analyses and evidence that clearly highlighted the linkage between both questions. This dissertation has attempted to accomplish this by demonstrating that farmers operating under a cooperative land tenure system, as facilitated by their social capital and access to state-local institutions, will have less incentive to overexploit any available communal forest land and therefore invest more in intensive farming and agricultural modernization than those producing under a non-cooperative or privatized tenure. The empirical evidence for this conclusion shows that households farming under cooperative systems have a greater average investment spending than those under privatized systems. The dissertation has also shown that cash crops as produced mainly on privatized land and food crops are substitutes in production. On average a percent increase in cash crop production is associated with a 0.18 percent decrease in food crop production for most West African countries.

Thus it may be the case that cash crop production conflicts with the food security needs of these countries, just as it is supported by a land privatization that undermines farmers' investment incentives.

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I owe the greatest debt to my family in Liberia for their tireless understanding, and especially to my deceased father and mother who "scratched" the farm laboriously so that I could obtain my early education. To them I say in our traditional Kru language, "Nyenswah Boh Noun Boe" ("May God be with you"). Finally, I wish to thank my fiancé Leonie Morris for motivating and inspiring me to complete this dissertation.

DEDICATION

This dissertation is dedicated to the people of my home village Niffu, Liberia, and to the memories of my father John Nyanty Tiepoh, mother Doyen Teah Monah, grandfather Togba Nah Tiepoh, and cousin Reverend Samuel Togba Roberts.

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1 INTRODUCTION

1.1 Statement of the Research Problem

Amid the persistent weakness in African agricultural performance and particularly food production over the last three decades, various perspectives have been advanced regarding the magnitude and origins of the problem as well as how it should be resolved. The predominant and more alarming view, supported largely with statistics published by major international and regional development institutions, points to a pervasive and deepening agrarian and food production crisis in all of Sub-Saharan Africa (SSA).[1]

According to the published statistics, sub-Saharan Africa almost always lags behind developing regions in all agricultural performance indicators. For instance, data from the UN Food and Agriculture Organization (FAO), cited in Singh and Tabatabai (1990), show that during the pre-oil-shocks "golden age" period (1961-73), when the world economy was growing at the unprecedented rate of 5 percent per annum and the economies of the developing countries expanded even faster, total agricultural production and food production in the region grew at only 2.4 percent and 2.2 percent per annum, respectively. Such rates were below the average growth rates of 3.1 percent and 3.0 percent for all developing regions. During the same period, the SSA per capita agricultural and

[1] Sub-Saharan Africa (SSA) represents the group of countries that are south of the Sahara desert, although SSA countries like Chad, Mali, Mauritania, Niger, and Sudan have parts of their northern territories located in the desert region. SSA includes the 42 countries located in the continent's mainland and 8 island countries: Madagascar, Mauritius, Reunion, Seychelles, and The Comoros (in the Indian Ocean); and Cape Verde, Sao Tome and Principe, and St. Helena (in the Atlantic Ocean). It excludes the 6 northern countries bordering the Mediterranean Sea: Algeria, Egypt, Libya, Morocco, Tunisia, and Western Sahara. In this dissertation, the words *Sub-Saharan Africa* and *Africa* are used interchangeably.

food production declined by 0.3 percent and 0.4 percent per annum, respectively, while on average all developing regions experienced positive per capita growth in production (Singh and Tabatabai, 1990). Not surprisingly, in the wake of the world economic crisis prompted by the OPEC oil price shocks (1973 and 1979) and the consequent changes in US monetary policy, these production trends worsened against Africa in both relative and absolute terms. A recent progress report published by the UN Economic Commission for Africa (ECA) indicates that between 1991 and 2001 the annual growth rate in SSA agricultural output was 4 percent and 3 percent for food production. However, per capita agricultural output grew by only 2 percent while per capita food production did not increase at all (ECA, 2003).

The African agricultural and food crisis was also highlighted in a report on the state of food and agriculture in Africa prepared by the FAO for the Africa Union Ministerial Meeting held in 2003. Data provided in that report, presented here in Table 1.1, illustrate the dimensions of the food crisis. According to these data, in all periods, sub-Saharan Africa has the largest percentage of the population undernourished and in poverty. In terms of the absolute numbers, which are not shown in the Table, during the 1990s, the number of chronically hungry people in SSA increased from 168 million to 194 million. Africa (including Near East and North Africa) is the only region of the world where hunger has thus affected an increasing number of people, with only 10 countries experiencing a decrease in the number of undernourished people. Other statistics included in the FAO report, also not shown in Table 1.1, indicate that the proportion of the population stricken by chronic hunger at the end of the 1990s

exceeded 20 percent in 30 countries and 35 percent in 18 countries (ECA, 2003). Moreover, even though the FAO projects a decline in the proportion of the undernourished in SSA population to 22 percent by 2015, the absolute number is projected to rise to 205 million (FAO, 2003).

Table 1.1: Food, Hunger, and Poverty Indicators by region

Country Group	Year	Sub-Saharan Africa	Near East & North Africa	South Asia	East Asia	Latin America & Carib-bean	All Deve-loping Countries
Per Capita Food consumption (kcal/person/ day)	1964-1965	2050	2290	2017	1957	2393	2054
	1997-1999	2195	3006	2403	2921	2824	2681
	2015	2360	3090	2700	3060	2980	2850
% of[1] Population Malnourished	1990-1992	36	7	26	20	13	20
	1997-1999	32	7	23	13	10	16
	2015	22	6	12	8	6	10
% of[1] Population in Poverty (US$1/day)	1990	52	2	45	33	17	32
	1999	49	2	37	18	15	24
	2015	40	1	17	4	10	13

Source: FAO, 2003.
1The percentages are estimates from dividing the FAO statistics on the populations malnourished and in poverty by each region's UN world population estimates.

Without denying the gravity of the crisis, some authors have argued that its dimensions have been largely exaggerated, and its causes and prescribed solutions distorted (Loxley, 1984; Allison and Green, 1985; Bienefeld, 1986; Jamal, 1988). According to this view, many analyses of the African food problem tend to wrongly construe mounting cereal imports as evidence of the existence of a general food production crisis in Africa. Under the current food crisis, Africa

produced an estimated 116 million tons of cereals and imported an additional 51 million tons (about one-third of the total supply) to cover consumption needs in 2002 (ECA, 2003). But the alternative view contends that while such imports are significant, they do not necessarily signify a domestic food production crisis, given that cereal imports consumption represents a relatively small part of both rural and urban food supplies in the region. Unlike Asia where the "normal" level for cereal consumption is 70 percent, in African countries the level for cereal consumption is only 45 percent. Roots, tubers, livestock and other types of food account for about 55 percent of African diets (Jamal, 1988). Moreover, since the early 1970s sub-Saharan Africa has had the highest urbanization growth rate of all regions, averaging about 5 percent per annum (UNCHS, 1996). These increasing cereal imports are a reflection of such a rapid urbanization trend which has been shifting African urban diets away from local staples, such as the coarse grains (sorghum and millets) and roots and tubers, to the "superior" cereals (rice and wheat) which are not grown in most African countries (Jamal, 1988).

Until the mid-1990s, the standard explanation given of the crisis, by the World Bank and other mainstream institutions and economists, emphasized "economic mismanagement", a shorthand label for domestic policies assumed to have interfered with the natural working of the markets and created insufficient price incentives for agricultural producers. In short, this thesis claims that the African agricultural crisis came about as a result of internal government policies that have depressed rural producer prices through overvalued exchange rates and the operations of marketing boards which underpaid rural farmers, and as a

result of politically-inspired policies that raised urban wage incomes through minimum wage legislations (World Bank 1981; Bates, 1981; Lofchie and Commins, 1982; de Wilde, 1984). Illustratively, assuming P_w is the world market price of the farmers' produce, and ER the exchange rate defined as the foreign currency price of the domestic currency, then the maximum price P_d in domestic currency that the marketing board would be willing to pay the farmer is $P_d = P_w/ER$. Clearly, an overvalued exchange rate lowers this producer price. Based on this diagnosis, the cure prescribed for the ills of African agriculture centered on measures such as currency devaluation, as a means of offering price incentives to farmers in order to increase agricultural production (Takane, 2002).

Contrary to the mismanagement thesis, other perspectives have laid much of the blame for the African crisis on long-term colonial-historical factors that predetermine Africa's structural position in the world economy and on adverse conditions in the present global economic order (Amin, 1972; Rodney, 1974; Tiepoh, 2000). In particular, the crisis is linked to the region's narrow, mono-cultural production base bequeathed to it by centuries of slavery and colonialism, and reinforced currently through various unfair global trade policies and practices, whereby the majority of African economies have been structurally conditioned to rely on a few primary commodities (e.g. cotton, coffee, cocoa, sugar, and copper) for their main source of export earnings. That such a narrow industrial structure still marks Africa's economic processes is exemplified by the fact that 28 out of 45 SSA countries in 1998 were identified as relying on primary commodities for their main source of export earnings, and for a sample of 10 African countries in 1995 the percentage share of the single main commodity in

total export earnings ranged from 40 percent in Mauritania to 78 percent in the Republic of Congo (see IMF, 1998: Table C; Boote and Thugge, 1997: Table 2). Because of the volatility in the global demand for such commodities compared to manufactured products, the volume of African agricultural exports and their terms of trade have often suffered much more from world market demand and other exogenous changes than those of other low-income countries. Thus, sceptics of the mismanagement thesis have argued that instead of putting all the blame for the region's poor agricultural performance on internal price policies, the finger should also be pointed at adverse global economic policies and market conditions over which African governments have no control (Loxley, 1984; Allison and Green, 1985; Bienefeld, 1986; Jamal, 1988).

Critics have also pointed out the contradiction in the fact that while persuading African and other developing nations to liberalize their agricultural markets, the industrialized nations have restricted access to their own markets through heavy subsidies, thus undermining the agricultural exports of developing countries (Hillman, 1994). Instead of cutting these subsidies, as was promised during the 1994 Uruguay Round of trade talks, they have in fact increased them to US$350 billion a year (Oxfam International, 2001). Such restricted market access to industrialized countries costs SSA nations an additional US$2.5 billion a year in non-oil export earnings (Oxfam International, 2001). And, others point to the increasing transnational-corporate monopolization of patents on genetically modified seeds and the biotechnologies required for creating them, showing how this has undermined vital food production in developing countries by diverting crucial international agricultural research funding to the production

and export of off-season exotic fruits (bananas, pineapples), vegetables (tomatoes, cucumbers), and fresh-cut flowers (roses, lilies), which are not mostly consumed locally (Friedman 1993; Little and Watts, 1994; Pray and Umali-Deininger, 1998; Puplampu and Tettey, 2000; Arends-Kuenning and Makundi, 2000;Barton and Berger, 2001).

The above-mentioned argument that it is changes in African urban diets which explain the continuing increases in cereal and other food imports, and that the region's food crisis has been exaggerated, can be true only to an extent. Africa's population has been rising rapidly during the past three to four decades and is now projected to reach about 1.1 billion in 2010, growing at an average annual growth rate of 3.2 (OAU, 1995), and taking into the possible impact of the HIV/AIDS epidemic. Given such population dynamics, the rate of domestic food production will have to be increased dramatically in order to reduce or dispense with increases in food imports. As argued in this dissertation, most West African countries cannot achieve food security by depending largely on food imports. This requires that the appropriate conditions be identified under which the productive capacity of the region's overwhelming farming population (i.e. the low-resource farmers) can be improved.

Low-resource farmers (LRFs), also referred to as resource-poor farmers (RPFs), constitute the vast majority of Africa's farming population. They engage in what is known as "low-resource agriculture"[2] (LRA) which is a form of farming system based primarily on the use of local resources (i.e., family labor, traditional

[2] For a detailed explication of the concept of low resource agriculture, see Dommen (1988). Also, Lomoro (2001, pp. 8-11) provides an excellent summary discussion of this concept.

hand tools, farm-produced seeds, manure and organic wastes, minerals from ashes, and so on) with limited use of external inputs including modern technology and information (Lomoro, 2001). While LRFs have served as the predominant source of SSA's food security in the past, responsible for at least 95 percent of food production in the region (Wash, 1988), they can no longer sustain the burgeoning demands of the world's fastest growing population, without expansion of their productive capacity (Lomoro, 2001). At the same time, the problem of improving the productive capacity of low-resource farmers is inextricably linked to the question of increasing their rate of investment in agricultural innovations. Since the 1960s, most African countries have been attempting to improve the investment incentives of small farmers in agricultural innovations through various models of technology transfer, adoption and diffusion. Ogbu et *al.* (1995) defines a typical example of such models as the 'evolutionary-structuralist' conception of the role of technology in economic development, which assumes that long-term structural change is technology driven; technological and organizational learning is boundless; and that investments and capital accumulation are essential preconditions for learning and development (see also Rosenberg, 1976; Nelson and Winter, 1982; Freeman, 1982; Bell, 1984; Justman and Teubal, 1991; and Bell and Pavitt, 1993). While much of the evidence is mixed, the prevailing consensus, based on many case studies, suggests that technology adoption and diffusion has not overall been effective in the African context (Ogbu, Oyeyinka, and Mlawa, 1995).

Given the inefficacy of existing policy interventions in improving the rate of investments and the productive capacity of African LRFs, there is now an

unprecedented and increasing attention being redirected to the institutional context of these farmers, particularly the legal and informal social rules governing their rights and access to land. The issue of land tenure is not new in the discourse on African agricultural development; however, it has received an added intellectual and policy impetus in the last fifteen years, due partly to a shift in policy thinking within the major international financial institutions (IFIs), especially the World Bank, via the so-called post-Washington consensus, which now seems to recognize the importance of state, non-price, and other non-market institutional factors in development. In a sense, the post-Washington consensus, as explained by Fine (2001), is a new paradigm in development economics and policy debate that has risen from the crises of structural adjustment, and seeks to reestablish an 'appropriate' role for the state, institutional, and social factors in development, given the imperfections of market.

An important and persisting debate in this discourse has been about whether or not indigenous, customary, or traditional land tenure institutions constrain African agricultural production and development and whether or not outright privatization of land tenure conforming to Western capitalist property rights systems is the solution. In this context, an indigenous land tenure system is defined as a set of interlocking land ownership relations, in which local social structures and institutions, such as family structure with its marriage laws and inheritance practices, determine who can have access to and/or control over land

(Lastarria-Cornhiel, 1997).[3] The purpose of this doctoral thesis is (a) to contribute to this debate by providing a new interdisciplinary analysis of how under certain social, political, and institutional governing conditions the cooperative management of land, as opposed to its full-fledged privatization, may promote its efficient use and, in the process, encourage rural farm investments and capital formation; and (b) to investigate whether or not agricultural commercialization, which is linked to land privatization, facilitates or impedes national food production and sufficiency. These research objectives and questions are discussed fully in section 1.4.

1.2 Defining Customary and Privatized Land Tenure Institutions

Before discussing the key issues in this debate, it is important to first establish how institutions in general and customary and privatized land tenure institutions in particular are defined. In part, the increased attention now being given to the role of institutional factors in development is a result of the remarkable developments that have occurred in the last two decades or so, dubbed by Williamson (1975, 1985) and others as the New Institutional Economics (NIE), which seek to expose the shortcomings of the traditional, neoclassical economics paradigm and provide powerful insights into how institutions are formed (Nabli and Nugent, 1989). Within the NIE framework, a social institution is defined as a "regularity in social behavior" agreed to by all members of society, which specifies behavior in specific recurrent situations, and is either self-enforced or enforced

[3] Because indigenous tenure systems are regulated primarily by local social customs, conventions and norms, and traditions, they are also described in the literature as *customary* or *traditional* systems. Thus, in this dissertation the three terms are used interchangeably.

by some external authority (Schotter, 1981, p. 11). In contrast to this behaviorist interpretation, the more common definitions put emphasis on the "rules" aspect of institutions. Douglas North, who was awarded the Nobel Prize for Economics in 1973 for his work in the NIE, defined institutions as "rules, enforcement characteristics of rules, and norms of behavior that structure repeated human interaction" (North, 1986, p. 6). He also defined them as the rules of the game in society, or the "humanly devised constraints that shape human interaction" (North, 1990, p. 3). From these two types of definitions, a consensus seems to be emerging, defining institutions as a set of normative social rules and constraints which govern the behavioral relations among individuals or groups, enforced either through formal law or through some other informal mechanisms of social control that shape human interactions (Nabli and Nugent, 1989).

From the above definition, land tenure systems can be considered as institutions because they are defined by sets of social relations and rules that determine who can have access, use and ownership rights to land. When such rules are enforced through local social customs, conventions and norms, rather than by the formal legal and bureaucratic institutions of the state, then the system of land tenure is regarded as *customary*. On the other hand, a *privatized* tenure system or institution is one whose constituent rules are formally enforced by the state or other external authority. Tenure systems can also be classified into four broad categories on the basis of who enjoy exclusive rights: *open access*, *communal*, *private* and *state* (Rukuni, 1997). Under open access systems, no one has exclusive rights, whereas under communal systems exclusive rights are assigned to a defined group. Under a private tenure system, exclusive rights are

held by an individual legal entity, whereas under a state tenure system ownership of exclusive rights is held by the public sector. Most African customary tenure institutions can best be described as composite systems, combining elements of communal, individual, and family rights (Rukuni, 1997). Under the communal ownership system, uncultivated forests and woodlands are owned communally under the control of an authority such as a village chief, whereas exclusive usufruct rights to cultivated land are assigned to individual households of the community and ownership rights to cultivated land are vested in the extended family (Quisumbing et al., 2001).

1.3 Issues in the Land Tenure Debate

Two divergent positions regarding the relative roles of customary and privatized land tenure systems in agricultural investments and production, labeled as the 'replacement' and 'adaptation' paradigms by Lomoro (2001), have defined the debate. The former, represented in the writings of authors, such as Dorner (1972), World Bank (1974), Harrison (1987), and Firmin-Sellers (2000), sees indigenous land tenure institutions as static constraints on agricultural development and therefore a root cause of the African agrarian crisis. It advocates for the replacement of African indigenous tenure systems governed by customary laws and practices, with formally privatized tenure systems founded on the capitalist property rights model. Informed by this paradigm and the broader philosophy of structural and macroeconomic adjustment, the World Bank and the International Monetary Fund (IMF) are promoting land privatization in African and other developing countries as an important rural development strategy for the twenty first century by making multilateral aid to

these countries conditional on capitalist land tenure reforms (Lomoro, 2001; Pereira, 2005).

The argument of the replacement paradigm rests on three key reasons given for the assumed positive impacts of privatized land tenure. The first is that such a tenure system enhances agricultural investment and production because of its 'assurance effect'. When farmers feel more secure in their ownership rights, they believe that the return on long-term land improvements and conservation measures is higher, and therefore they have greater incentives to undertake investments. The second reason is the 'realizability effect'. When land can be more easily transferred (with minimum transaction costs), due to secure property rights, farmers expect a higher return which can be realized via land-improving investments. Thus investment incentives are again enhanced (Besley, 1995; Platteau, 1996). Third, when freehold private titles are established, formal lenders feel more confident in the value of land as credible collateral. Thus access to credit is increased. This is the 'collateral effect'. It is worth noting, however, that in the context of many rural African economies where micro-lending, rather than formal credit, plays the major role in rural finance, the use of social capital as existing in the structure of social relationships between actors may be a more significant and effective collateral than a private land title in regulating the flow of credit.

The adaptation paradigm, exemplified in the works of Hill (1963), Morgan (1969), Jones (1980), Boserup (1981), Noronha (1985), Bates (1986), Bruce (1988), Migot-Adholla et al. (1991), and Ballantyne (2000), counters that customary tenure regimes have proven to be very flexible, dynamic and capable

of adapting to the new realities of increasing agricultural commercialization, population pressure, and technological change. These authors have argued variously that the African indigenous tenure systems have historically evolved spontaneously from institutions of communal control towards more decentralized but co-operative management of land in response to increasing agricultural commercialization, population pressure, and technological change. Increasing population density, coupled with commercialization of agriculture, has caused households and individuals to engage in much intensive and long-term use of farmlands, and this has enhanced the process of spontaneous adaptation. The central suggestion from this paradigm is that the performance of customary tenure systems should not be weaker than that of formal land privatization, and therefore rather than seeking to replace these systems, the challenge should be to recognize them and identify policies that facilitate the process of their adaptation (Migot-Adholla *et al.*, 1991; Bruce & Migot-Adholla, 1994). In West Africa, specifically, Guèye et al. (2002) argued that there is no evidence for farmers being unwilling to invest their labour and capital in land held under customary tenure. The main threats faced by traditional small farmers have often been caused either by dumping of cheap rice and frozen beef, destroying their market opportunities, or by limited access to markets in third countries and the developed world (Guèye et al., 2002).

The above conclusion that customary tenure institutions may adapt and evolve towards different outcomes other than outright privatization is challenged in property rights theories (Demsetz, 1967; Alchian and Demsetz, 1973), in development theories with an evolutionary approach to property rights (Boserup,

1965), and by proponents of the so-called induced institutional innovation hypothesis (Hayami and Ruttan, 1985; Hayami, 2001). These and similar analyses suggest that as population increases, farming systems naturally evolve from land-using shifting cultivation to land-saving intensive cultivation, and such intensification must be accomplished by long-term land-improving investments requiring formally privatized land rights. Thus the key implication of these theories is that, as a precondition for enhancing agricultural investment incentives and production efficiency, customary land tenure institutions must inevitably evolve towards privatized tenure. The exact linkage between such privatization of land rights and investment incentives has been the subject of many studies and debates (Bruce, 1988; Noronha, 1985; Robertson, 1987; Atwood, 1990; Place and Hazell, 1993; Sjaastad and Bromley, 1997; De Zeeuw, 1997) and is also a major question addressed by the present work.

Both the replacement and adaptation schools share the common perspective that land tenure security is the most critical factor through which agricultural investment incentives and production are enhanced, but they disagree on the determinants of such security and the extent to which it promotes investment incentives. Land tenure security, in this context, refers to the feeling or perception by an individual that he or she enjoys rights to a piece of land on a continuous basis, free from outside imposition or interference, as well as the "ability to reap the benefits of labor and capital invested in that land, either in use or upon transfer to another holder" (Place et al., 1994). While the replacement paradigm considers tenure security as being determined primarily by the ownership of formal private legal title to land, the adaptation school views it as a

result of a broader set of social factors (Brasselle *et al.*, 2002). Furthermore, the replacement argument that tenure security, agricultural investment and productivity can be enhanced more under land privatization than customary tenure has been widely contradicted by recent empirical evidence supporting the adaptation position (Bruce and Migot-Adholla, 1994; Platteau, 1992, 1996, 2000; Atwood, 1990; and Brasselle *et al.*, 2002). In this connection, some observers believe that although Kenya, the country in sub-Saharan Africa with the longest history of land tenure privatization, has had the highest food productivity increases over the past four decades or so (Lomoro, 2001), it is the substantial investments made by this country in communication infrastructure and human capital development, improvement in rural health and extension services, and the establishment of rural credit and marketing institutions that have been far more important than land privatization (Anthony et al., 1979; Migot-Adholla, 1985; and Place *et al.*, 1994). The replacement argument is further undermined by the fact that so many other SSA countries, such as Ghana, the Ivory Coast, and Cameroon, which have not implemented any significant land tenure privatization, experienced substantial increases in the production of tree crops (cocoa, coffee, tea, and palm oil) (Lomoro, 2001).

1.4 Questions, Objectives, Relevance, and Methodology of the Research

As a contribution to the above debate, this dissertation proposes an alternative theoretical framework that reformulates the arguments in slightly different terms in the context of West African countries. The main contribution consists of answering two sets of interrelated theoretical and policy questions: (a) Do West

African customary land tenure institutions evolve inevitably towards increasing privatization, as proposed by the replacement paradigm and private property rights theories? Put in other words, is privatized land tenure an inevitable and the best evolutionary path of customary tenure institutions in West Africa? Could there be an alternative evolutionary path for these institutions that bypasses the privatization route and supports agricultural investments and production? And if so, what are the political and social determinants of this path? (b) Can land privatization in an era of increasing agricultural commercialization and globalization support the objective of food security in West African countries?

The first set of questions concerns the relationship connecting the type of land property rights, tenure security, and investment incentives, and the factors determining the evolution of such rights. As noted previously, a dominant idea argued cogently by private property rights theorists and their evolutionary followers, is that as land assets become scarcer, customary land rights must evolve inevitably towards increasing privatization. While this dissertation agrees that population expansion and agricultural commercialization must lead to the evolution of land rights and the intensive use of land over time, and that such intensification requires long-term investments in land improvement and technical innovation, it questions the replacement view that it is only through privatized tenure institutions that the security of land tenure and thus agricultural investment incentives can be enhanced. It argues that West African customary tenure institutions may evolve in alternative ways that enhance tenure security, farm investments, and production efficiency. These questions also inquire into what the determinants of this alternative evolution of customary

tenure institutions might be for enhancing tenure security and agricultural investments. That is, to the extent that tenure security and thus farm investments are possible within a different institutional evolutionary path, what are the determining factors or preconditions for such a path?

The second set of questions inquires into whether in an era of increasing agricultural commercialization and market liberalization formally privatized land tenure institutions or different forms of tenure arrangements would be more effective in supporting food security needs in West African countries. Within this set of questions, the key issue is not mainly about which tenure system enhances farm investments *per se* but more importantly the nature of investments supported. It will be argued that insofar as land privatization enhances agricultural investment incentives, in the context of globalization and market liberalization such investments are likely to be skewed towards the production of export cash crops rather than domestic food crops. The overall opportunity cost of such cash crop production in terms of the acquisition costs of food grains foregone may however be too high to make production of cash crops an economically viable food security strategy in West African countries (Jayne, 1994).

An appropriate way to answer the first set of questions will be to create a model through which such political and social determinants are identified and their possible effects on agricultural investments and production tested and compared with those generated under the privatized tenure option. The second question can be addressed and operationalized through a model that links land

privatization to agricultural commercialization and then tests the effects of such commercialization on food crop production.

By advancing the above sets of questions, the dissertation becomes a critique of the main theses of the property rights school; an attempt to design an alternative evolutionary path for West African customary tenure institutions; and a research agenda aimed at informing an appropriate food security strategy for West Africa. In summary, the primary objective of the dissertation is (a) to show that depending on the structure and character of state institutional involvement in rural local-level development and the stock of social capital within local institutions, customary land tenure institutions can evolve in ways other than privatization to enhance tenure security and farm investments, and (b) to explain the implications of land privatization for the nature of farm investments and food security in West African countries. These two research objectives are interlinked in the sense that if, for instance, evidence were to indicate that West African tenure institutions can best evolve inevitably towards privatization, then policy makers would have no choice but to work with the implications of such a result for farm investments and food security (whatever these implications may be from the second set of questions). If, however, the evidence shows otherwise (i.e. customary tenure can evolve in alternative ways), then policy makers would have the option of comparing the investment and food security implications between land privatization and the customary tenure evolutionary alternative and supporting the system with the better implications. The following three subsections provide brief overviews of the issues underlying these research questions and objectives.

1.4.1 State Intervention and Land Tenure Evolution

Land scarcity due to increasing population pressure, which results in growing competition, causes increasing negative externalities among users. There is an overcrowding effect through which conservation of the land becomes jeopardized, and the income levels of existing producers decline with entries of additional users. Under growing population, a strategy of excluding outsiders from use of the resource is rarely sufficient as this often leads to tenure conflicts between locals and people from other regions or ethnic groups, as now happening in various rural areas of the Ivory Coast (Chauveau, 2000). Thus, in order to prevent efficiency losses and resource degradation, the community either accepts division of the resource and the consequent emergence of private ownership rights, or it takes steps towards regulating the collective use of the resource (Platteau and Baland, 2001). In the absence of transaction costs, these two ways of assigning property rights lead to theoretically equivalent solutions and a Pareto-efficient outcome (Coase, 1960). However, in the real world, there are positive transaction costs, and the central claim of the property rights school is that these transaction and governance costs are so pervasive in collective property regulation that private property rights become the natural solution. Accordingly, as the scarcity value of land increases due to population growth and commercialization, a point will be reached where the gains from its privatization exceed the costs (Davis and North, 1971; Johnson, 1972; Alchian and Demsetz, 1973; North and Thomas, 1973; Feder and Feeny, 1991; Libecap, 1996).

An important question investigated in this research is to understand how the state's local institutions-building strategies may change the above conclusion,

which is the assumed superiority and inevitability of private land rights. This question centers on how the structure and functioning of the state's political authority and administrative apparatus in relation to local-level societies, and the behavior of government decision makers may influence the evolution and the impact of land tenure. More specifically, it inquires into how the degree and quality of state institutional intervention defined in terms of its political, administrative, legal, and fiscal decentralization can strengthen local capacity for a successful co-operative land property regulation in West Africa.

The influence of the state on the evolutionary outcome of land tenure institutions can go in varied directions. For instance, the legal support given by the state to property rights held by co-operative farming associations over the use of adjacent irrigational waters may be crucial to a successful collective regulation of this common resource (Ruddle, 1987; Asada *et al.*, 1983). Evidence on the experience of the East Asian newly industrializing countries (NIC) supports the case for state intervention by showing that such intervention reduced transaction costs by enabling the coordination of technology acquisition at lower costs (Wade, 1990; Amsden, 1989; Chang, 1994). On the other hand, other kinds of state intervention may destroy local capacities for collective resource management (Thompson *et al.*, 1986). It is therefore the case that a satisfactory theory of institutional change cannot dispense with a theory of the state.

It will be argued in this dissertation that depending on the structure and character of state intervention (i.e. the way the state engages with local-level institutions and the governing behavior of state authorities, whether or not they adhere to a democratic rule of law), local capacity for co-operative resource

governance may be strengthened, and thus land tenure institutions may evolve in different ways other than privatization that enhance tenure security and farm investments. Theoretically, this question will be addressed by synthesizing selected theoretical traditions which discuss the possibility of "state-society-market synergy",[4] such as the social capital theories that emphasize the role of norms, trust and social networks in economic development (Putnam, 1993; Helliwell and Putnam, 1995; Knack and Keefer, 1997; Temple, 1998; Temple and Johnson, 1998; Whiteley, 2000; Heller, 1996; Evans, 1996); the theories of the "East Asian Miracle" that focus on the central role of public institutions in capitalist development (Wade, 1990; Amsden, 1989); and the theories of the new political economy and the new institutional economics (Toye, 1993; Dasgupta, 1998; Harriss *et al.*, 1995).

1.4.2 Social capital and Land Tenure Evolution

The evolutionary path of tenure institutions also depends on the state of the social norms and values prevailing in a particular society or community (i.e. on the stock of social capital). For instance, co-operative land tenure and management is more likely to emerge in societies marked by extensive norms, trust and social networks than in those pervaded by distrust, defection, shirking, and exploitation. While in the latter case private property rights in land may be a better institution, on efficiency grounds, in the former communal or co-operative ownership may prove to be superior. In most West African societies, culture and traditions are the glue that holds people together and allows communities to

[4] State-society synergy refers to the idea that active government and mobilized local communities can facilitate each other's developmental needs and efforts (see Evans, 1996).

function (Rukuni, 1997). Various authors have explained how, even in the face of the adverse social and cultural impacts of increasing economic globalization, West African societies are still guided by the societal values of equity, communal sharing, and solidarity (Ki-Zerbo, 1972; Reisman, 1978; and Fisk, 1991). Thus the second question addressed by the dissertation is to explicate the role of social capital in determining the evolution of land tenure institutions in West Africa. It is argued that depending on the stock of social capital in a community, co-operative land tenure and management may be more likely to emerge and succeed.

1.4.3 Food Security and Land Tenure

A principal objective of land privatization is to increase individual ownership and control of farm land. In the context of globalization and market liberalization, the production of cash crops has become a logical objective and consequence of such privatization. Cash crops are by definition crops that are grown primarily for markets (either domestic or international) (Poulton et al., 2001). Private land rights and cash crop production are essentially linked through the common argument that in order to ensure profitability of farm investments and the needed privatization of land rights, farm produce must be those that have high-value and are marketable internationally or domestically. This suggests that in the context of market liberalization food crops intended entirely or primarily for home consumption are less likely to be produced on privatized farm land.

An important issue that has been debated extensively by economists is whether or not small farmers should produce cash crops or food crops as a food security strategy for Africa (von Braun and Kennedy, 1994; Govereh and Jayne,

1999). Essentially, this debate has persisted between two opposing sides: those who argue that cash crops such as cotton, groundnuts, cocoa, and coffee provide higher returns to land and labor than food grains and thus have the potential to promote smallholder income growth, food security, and national foreign exchange generation (Dione, 1989; Von Braun et al., 1990; Goetz, 1993;) and those who contend that despite providing higher returns to land and labor than food grains, cash crop production may be an economically unviable food security strategy for poor countries (Jayne, 1994). The dissertation addresses this question in the context of land privatization in West African countries by linking cash crop production to privatization and then analyzing the investment and food security implications of such a linkage.

1.4.4 Relevance of the dissertation

The above research objectives and questions are relevant for West African agricultural and rural development in that the knowledge gained from this dissertation can be used to guide development policy formulation. For instance, if the analysis were to show that West African customary land tenure institutions are dynamic and can evolve in ways other than privatization that enhance farm investments, and that land privatization is not supportive of national food security objectives, then such information would be helpful to policy making for many West African countries where these issues are rising rapidly up the policy agenda of governments and donor agencies. For these countries, the question of the relative agricultural investment and productivity performances of the two types of tenure institutions is far from academic but rather a critical policy issue, since it brings into question the very need for expensive land registration and

titling programs at this stage in the economic development of Africa in general and West Africa in particular. As Migot-Adholla *et al.* (1991) have argued, if the indigenous systems are dynamic, then it is relevant to ask if there are more useful things that governments can do to facilitate the process of spontaneous adaptation rather than replacing them through such costly privatization programs. This dissertation will therefore assist African governments, policy makers, and international institutions in understanding and making the required policy decisions regarding land tenure issues facing West Africa.

1.4.5 Notes on Research Methodology

Broadly, the thesis research will involve the reading and synthesizing of theoretical and empirical literature and specific case studies on West African agricultural and rural development and particularly land tenure issues. Specially, the two sets of questions proposed above will be addressed through a systemic development of strong and coherent arguments and the use of existing survey, case study, and institutional data to support such arguments. Both questions are largely empirical questions and, as such the ideal approach would have been to design a formal empirical model through which each questions would be tested appropriately. However, given the paucity of the available data, only certain aspects of the questions will be treated formally. Others will be discussed using appropriate illustrations with survey and case study data already published in the literature.

State Decentralization, Social Capital, and Tenure Evolution: The question of whether customary tenure institutions in West Africa can best evolve towards privatized systems or other institutional structures may be

operationalized by answering the related question of which alternative evolutionary path (e.g. the path towards privatized tenure or co-operative land management) generates a better outcome. Such an answer can be obtained from a synthesis of various models offered by the New Institutional Economics (NIE), evolutionary theory of farming systems, theories of property rights, induced innovation, and the role of the state and social capital. For instance, an important methodological insight from the NIE perspective suggests that in deciding on the better alternative institutional structure, two types of outcomes should be compared across alternative structures. Besides comparing outcome generated by the existing institutional structure with the outcomes generated by the available alternative structures, the efficiency of the *process* through which the existing institution changes relative to alternative processes needs to be compared as well (Khan, 1995).

The NIE uses the concepts of transaction costs and *transition* costs (i.e. political costs imposed by potential losers on proponents of an institutional change) to estimate and compare net benefits associated with alternative institutional structures. NIE analysis also stresses that the transaction cost performance of a formal institution depends ultimately on the types of informal institutions (social norms and conventions) which can be supported in a country, and that these norms and conventions are, in turn, critically conditioned by the "balance of power between the classes and groups affected by that institution, that is, on the *political settlement*" (Khan, 1995: 77). It is therefore crucial, as North (1990) argues, that the political conditions (i.e. the political settlement) which sustain the appropriate informal institutions be created as well. In the

context of the present research, such a discussion implies three broad methodological outlines:

1. Designing an analytical framework in which state institutions-building strategies strengthen local capacity by formally involving local indigenous institutions in those strategies. This means offering an analysis that shows, for instance, how the inclusion of local land-asset management groups (and the stocks of internal social capital by which they are governed) in the decentralized institutional structures of the state may strengthen their collective resource-management capacities by reducing the costs of monitoring and enforcing common agreements.
2. Comparing transaction costs between the existing customary tenure structure and the alternative privatized tenure, and between the former and the alternative co-operative tenure.
3. Comparing the transition costs of change from customary tenure to privatized tenure with those associated with the change from customary tenure to the co-operate alternative.

Land Privatization, Cash Crop Production, and Food Security: The question of whether or not under current economic adjustment and globalization policies land privatization orients agricultural investments towards cash crop production and thus undermines food security in WA countries, can be addressed at three levels:

1. The necessary linkage between land privatization and cash crop production needs to be established. What are the channels through which land privatization induces investments in cash crops rather than food

crops? The argument is not that cash crops are never produced on land held under other types of tenure arrangements, but that they are more likely to be produced on privatized plots than under such arrangements. Cash crop production requires privatized land tenure, since the latter facilitates investments in the former. Given an appropriate data set, a more systematic approach to confirming this hypothesis would be to compare the types of crops (cash or food crops) that are predominantly produced on privatized farm plots and those grown on non-privatized plots in each selected WA country. If the comparison showed more cash crops relative to food crops on privatized plots and fewer cash crops relative to food crops on non-privatized plots, this would confirm the argument. In the absence of such data, however, the argument will be pursued theoretically and supported illustratively using results of available survey and case studies on the issue.

2. Once the link between land privatization and cash crop production has been established, the next level of inquiry is to determine the extent to which agricultural investments are actually skewed towards cash crops. This is a slightly different objective from the one discussed above. Land privatization may facilitate investments in cash crop production, but this does not necessarily prove the extent to which investments are actually spent on such production. In order to show this, data on the distribution of actual investment and input expenditures between cash crops and food crops for each selected country can be analyzed to determine where such expenditures are used.

3. If land privatization has been found to facilitate agricultural investments and these investments are actually employed in cash crop production, then it is useful to further inquire about the impact of such production on food crop production. Moreover, given any appropriate data, such food production impacts could be contrasted with the value of the best alternative use of the land and investments made therein. Various authors, including Govereh and Jayne (1999) and Lamb (2000) have applied different econometric techniques to estimate the effects of agricultural commercialization and cash crop production on food production in a number of African countries. Relevant aspects of these approaches will be adapted to this study to estimate the relationship between cash crop production and food production, using data from various institutional sources.

1.5 Organization of the Dissertation

The dissertation is organized as follows. Chapter 2 provides an historical perspective of the development of West African land tenure institutions from indigenous customary toward Western-styled private property rights systems. While the majority of land in Africa, particularly in the West, has remained under customary tenure systems, these institutions have been shifting toward individualized tenure structures, due to the impacts of agricultural commercialization, colonization, global economic restructuring policies, and rapid population growth. The analysis in this chapter focuses exclusively on the external historical factors of commercialization, colonization, and economic restructuring, leaving out the internal evolutionary dynamics of population

growth which are discussed in Chapter 3. The aim here is to assist the reader to understand the nature of West Africa's customary tenure institutions as they existed in pre-colonial times and the deliberate actions that have been taken since then to change their course of evolution.

Chapter 3 presents a theoretical and empirical discussion of the evolution of land rights in West Africa under the impact of population growth. The chapter will attempt to address the first set of research questions posed in this Introduction, which is whether under population pressure privatized land tenure is an inevitable evolutionary path for West African customary tenure institutions. The objective here is to design and, where possible, empirically illustrate an analytical framework in which an alternative evolutionary path of customary tenure is deemed to be feasible under certain political and social conditions. This will be followed by Chapter 4 in which the second set of questions regarding the investment and food security implications of land privatization is considered both theoretically and empirically. The dissertation ends with a concluding chapter which offers interpretation of all important empirical results, summarizing their policy implications and relating them to findings in the existing literature.

2 CHANGES IN WEST AFRICAN LAND TENURE INSTITUTIONS: AN HISTORICAL PERSPECTIVE

2.1 Introduction

Evolutionary and property rights theorists tend to view changes in land tenure institutions as a product of evolutionary processes driven by 'internal' population dynamics, while conventional analyses view such changes as a product of 'external' factors defined by exogenous historical events and policy interventions, such as colonization, agricultural commercialization and globalization. In this context, analyses by many government policy makers and international funding agencies, such as the World Bank and the IMF, tend to minimize the impacts of these deliberate policy factors on the African land tenure evolutionary process, while emphasizing the role played by 'internal' population growth pressure.

Clearly, human population growth dynamics have been a major force in the land tenure change process. However, minimizing the role played by colonization, commercialization, and current economic restructuring policies in amplifying these population effects may be a purposeful attempt on the part of advocates of land privatization to make it appear as the natural and inevitable path of tenure evolution for Africa. While customary land tenure patterns in West Africa have been shifting towards individualized systems over the years, such changes have occurred primarily as a result of deliberate human historical and policy actions rather than an inevitable, natural force. Even to the extent that internal demographic factors can be considered as 'natural', their effects on

tenure change have not been unavoidable. Human economic and political policy interventions have primarily allowed or at least conditioned this evolution.

This chapter employs the historical perspective, providing a review of the development of West African land tenure institutions from indigenous customary toward Western styled property rights regimes. The analysis focuses on the historical factors of agricultural commercialization, colonization, and economic restructuring policies, leaving out the internal evolutionary dynamics of population expansion to be discussed in Chapter 3. The chapter is organized into three major sections. In the first section, immediately following this introduction, the state of West African land tenure institutions as existed within the region's pre-colonial economic and social system is discussed. The objective here is to provide a comparative-historical account of developments in Europe and West Africa in order to elucidate and put into proper perspective the impact of the European colonial contact on West African land tenure change. The second section reviews the influences of agricultural commerce and colonization on land tenure change. This will be followed by the final section which discusses the role of post-independence land tenure reforms, first under state nationalization policies from the late 1960s to the late 1970s, and then under global economic restructuring and structural adjustment policies spearheaded by the major international financial institutions in the 1980s.

2.2 Pre-Colonial Tenure Institutions

In discussing the changes in West African land tenure institutions, it is important to begin the analysis with the region's pre-colonial economic and social system. This is because such a level of historical analysis will not only reveal the truth and

dispel some of the age-old presuppositions held about African indigenous property rights systems in general and land tenure institutions in particular but also provide a useful baseline against which to contrast changes engendered during subsequent epochs.

The economic history of West Africa since the first days of European contact and until the establishment of formal colonial rule may be subdivided into three periods: the Slave Trade, which unfolded during the fifteenth century and was legally abolished in 1807, but lingered on until the middle of the nineteenth century; the so-called "Proto-colonial" or "Traders' Empire" period (Crowder, 1968: 18; McPhee, 1971: 4-6), which began at the turn of the nineteenth century with the legal abolition of the slave traffic and marked the start of the era of European "legitimate trade" in palm oil and ground nuts with West Africa; and the period of formal colonial rule which began with the Berlin Treaty of 1885 and ended in the 1960s.[5] While colonial rule was formally established in 1885, and therefore the official end of the pre-colonial era may be set at this point, for the purpose of this analysis, it is appropriate that the beginning of the colonial era be set at the very beginning of the nineteenth century.

This is essential for at least three reasons. First, the Berlin Conference of 1885 merely gave international recognition to a colonial situation that was already well developed. Prior to that year European powers, especially France,

[5] Even though The Gambia, Portuguese Guinea, and Sierra Leone were not independent by 1960, some historians, including Michael Crowder (1968), have established this year as the terminal date for the colonial period, because this was the year when most other nations of West Africa had gained their independence.

had established and were managing certain enclaves on the West African coast from which they could secure their commercial interests and occasionally interfere in the political affairs of the interior whenever such interests were threatened (Crowder, 1968). Second, insofar as the European influence on West African land tenure systems relates to the expansion of commercialization of crops, mineral resources, and other commodities, the transitional period between the abolition of slavery and the Berlin Conference (i.e., roughly 1807 to 1885) may be considered as part of the colonial era, at least analytically, since this was the era in which the first lines of commercial products, namely palm oil and ground nuts, were introduced. And third, as argued by Hopkins (1973: 124), this period of legitimate commerce not only "marked an important break with the past" but also provided the economic context for the subsequent imposition of formal colonial rule.

It was wrongly presumed in the past by European colonial authorities that African indigenous conceptions of ownership must be the same as those prevailing in Europe, so that English terms such as "rent" or "lease" were employed to denote African practices which carried different meanings from those denoted by these terms in Europe. A 1921 Privy Council judgment by British colonial legal experts about the interpretation of indigenous land rights observed:

> In interpreting the native title to land, not only in Southern Nigeria but in other parts of the British Empire, much caution is essential. There is a tendency, operating at times unconsciously, to render that title conceptually in terms which are appropriate only to systems which have grown up under English law. But this tendency has to be held in check closely. As a rule, in the various systems of native jurisprudence throughout the Empire, there is no such full

> division between property and possession as English lawyers are familiar with" [cited in Meek (1968), footnote 1, p. 11].

For instance, gifts given to traditional chiefs as administrators of land were construed as "rent", and the chiefs described as "landlords", even though those chiefs were not much more than public trustees who exercised authority over land rather than possessed it (Meek, 1968). Furthermore, there has been a fairly widespread misconception about African indigenous tenure that individuals or families have no exclusive land use rights.

Contrary to such thinking and misconceptions about African indigenous land rights systems, which continue in the present time, as evident in the strong conviction with which major international financial and development institutions are promoting land privatization inspired on the capitalist property rights model, it should be noted that Africa's land tenure institutions at the time of the European contact were not only different from those existing in Europe but also highly complex. Although all indigenous systems of land tenure are adapted to certain patterns of land use and these have developed universally along similar lines all over the world (Boserup, 1965), Africa and Europe were at different *modes of production*[6] (i.e., ways of organizing production) at the time of the European expansion in the early fifteenth century, and therefore their land tenure systems were at different stages of development.

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[6] The concept of 'mode of production' is used to define the major ways in which human beings organize production. Each way of organizing production constitutes a mode of production. Marx identified a number of different modes including a slaveholding mode, peasant mode, feudal mode, an Asiatic mode, a capitalist mode, and so on. For a detailed discussion of this concept, see Wolf (1982, pp. 75-100). The latter has identified three types of modes of production: capitalist mode, tributary mode, and kin-ordered mode.

Insights from various historical and anthropological studies indicate that up to the fifteenth century most African societies were predominantly characterized by what Eric Wolf (1982) called a 'kin-ordered mode of production' in which the social relations of production that arose in the process of work were defined around the principle of family and kinship associated with communalism. Accordingly, every member of an African society had his or her position defined partly in terms of his matrilineal, patrilineal, and marriage ties. Because land (the major means of production in these societies) was owned in common by groups such as family or clan, such relationships were crucial in determining one's access to the use of land. Similarly, the recruitment of labor that worked the land was conducted on a kinship basis whereby families or households tilled their own plots of land and shared certain joint farming activities with other members of the extended family or clan (Rodney, 1974). This does not imply that African societies were static. On the contrary, such societies were in a transitional stage between the practice of agriculture, fishing, and herding based in family communities and the practice of such activities within centralized states and social systems comparable to feudalism. However, because the feudal state was still in an embryonic stage when Europe made its impact, there were only extremely few societies in Africa which eventually reached feudalism (Rodney, 1974).

In contrast, in the world in 1400, European societies were already maturely marked by what Samir Amin (1973) called a 'tributary mode of production' in its feudal form and, as pointed out by Wolf (1982), some scholars even suggest that medieval Europe was already on its way to the capitalist mode.

In the tributary mode of production, the major agricultural areas and means of production, particularly land, were controlled by highly centralized states that extracted surpluses from primary producers (i.e. the peasants) by political or military rulers. These primary producers, whether cultivators or herdsmen, were 'tied' and allowed access to the land, and tribute was extracted from them through political or military means (Wolf, 1982). The landlord class and its bureaucracy controlled the state and used its institutions for oppressing peasants, serfs, slaves, and craftsmen and merchants. While African communal societies were characterized by differences such as age-grades and those between ordinary members and religious leaders, which were not antagonistic or exploitative (in the sense of the traditional Marxian conception of class conflict), European societies were marked by clashes between the landlord, on the one hand, and the peasant and merchant classes on the other (Rodney, 1974; Wolf, 1982). And, after capitalism unfolded in Europe in the course of the eighteenth century, the principal class contradiction shifted to one between workers and the owners of capital.

It follows from the above analysis that African indigenous land tenure institutions were qualitatively different from those found in medieval Europe. In Africa the land was held as a family or communal property, on which individuals were allocated specific plots based on the principles of kinship alliances. The crops and other goods resulting from labor were distributed along similar lines. In contrast, in Europe, serfs were forced to provide their labor in order to gain access to a portion of land belonging to the landlord. For having such access the serfs had to surrender parts of their crops to the landlord in the form of tributes.

The essence of pre-colonial African land tenure institutions, as relevant particularly to West Africa, was presented in a report issued in 1912 by a committee appointed by the British Colonial Office to examine the principles characterizing indigenous systems of tenure in this sub-region. A key point stressed in the report relates to the religious and communitarian conception of land rights held by West Africans in their early history and the degree of affinity that they attached to land. In the indigenous conception, land is regarded as God-given similar to air and water, to which every living individual is entitled. It is the property of not only the living but also past and future generations (Meek, 1968). While such a conception might have been a natural reflection of the relative abundance of land during this early period, it is important to recognize that even in the present era of relative land scarcity, most rural Africans still consider this resource as a local public good. As one Nigerian chief explained to the West African Lands Committee (WALC) in 1912, land is owned by the community made up "of a vast family of which many are dead, few are living and countless members are unborn" (quoted in White and Gleave, 1971: 47). This idea that the land also belongs to the dead and the unborn is often symbolically expressed in the indigenous African say that 'no land is without an owner', which is contrary to the European view that 'unoccupied', 'vacant', or 'waste' lands belong to no one (Meek, 1968). As Feder and Noronha (1987) have noted, this difference in conceptions of property rights influenced the policy attitudes of the colonizers whereby unoccupied lands were deemed open for settler occupation, as occurred in Kenya, Zambia, and Zimbabwe, or for commercial leases by foreign

concessionaries, as happened in Cote D'Ivoire, Ghana, and other West African colonies.

Land is also extremely important in the economic, social and political life of Africans. Allan McPhee dramatized this paramount importance of land to Africans when he stated, in his classic study, *The Economic Revolution in British West Africa*, that "African peoples will remain passive while their most cherished institutions are effaced, but if their land is interfered with, they will blaze up in rebellion" (1971: 130). Hailey (1957: 686) also demonstrates this importance of land by noting that the basic standard by which Africans judged the true character of a colonial government was the extent of land alienation inflicted by that government.

It is in the above context that indigenous West African conceptions of land rights must be examined. As such conceptions are embedded in the social and political structure of indigenous society, a prior description of this structure is relevant. The basic unit in the West African social, economic, and political system was (and is) the *extended family*, which includes people who in Western European and North American societies would be regarded only as distant cousins. While there has been the suggestion that the extended family system hinders progress in a developing economy, because of the enormous financial obligations it imposes on family members, it has remained a primary unit of production in most rural areas of West Africa (White and Gleave, 1971: 46). Extended families that claim a common ancestral origin are grouped into what are called *lineages* or *clans* which constitute the local community. An aggregation of several lineages and clans forms the *tribe*, which is a larger politically and

socially coherent and autonomous unit occupying a territory (White and Gleave, 1971: 49).

McPhee (1971) explains that prior to the European contact there were three categories of land in West Africa: family land, tribal land, and stool land. The family land was land under the more or less exclusive control of the family head, whereas tribal land was land existing within the recognized borders of a tribe and under the control of the tribal political ruler (the chief) who was supposed to allocate it to members of the tribe as the need arose. Stool land was land originally belonging to the family whose head was also the tribal chief. Over time the original family land grew in size from forfeitures and from annexing all the unutilized land within the tribal boundaries as part of the stool land. In the early stage, when land was conceived as the 'Mother-Goddess', ownership was unthinkable, and everyone enjoyed it as "they would the air or water" (p. 184). Then came the time when ownership right was vested in the community in the "spirits" of the ancestors, with the tribal chief acting as the trustee on behalf of the dead, and ordinary people acting as tenants in submission to the tribal laws and customs as interpreted by the trustee. An individual cultivator in need of land would apply first to the head of his or her family, and if there was land available, he would be allotted some land. In case there was no family land to spare, he or she would be asked to apply to the chief for a portion of tribal land. Thus rights to the use of land were granted by the chief or village elders.

It has been a common tendency in the discourse on African land tenure institutions for both non-specialists and specialists to cast indigenous land tenure systems simply as 'communal' ownership and to measure their presumed

backwardness against the 'superior' performance of individualized tenure. The argument has been that indigenous custom and law have prevented the land, an essential factor of production, from coming under the influence of economic forces. While such a characterization allows for a simplified analysis, it is very misleading in that African indigenous systems of land tenure and cultivation have varied greatly even within restricted areas, ranging from land that was truly communally owned to land that was held and worked as freehold. Moreover, as Hopkins (1973: 38) has pointed out, even if it were true that most land was owned communally, it would still be incorrect to conclude that this arrangement was an obstruction to economic development. Under indigenous systems of extensive agriculture, based on shifting cultivation and rotational bush fallow, there was no conflict between 'communal' land ownership and the security of individual use rights. While an individual farmer had no permanent ownership of a specific plot, his or her general rights to cultivate land within a given family, clan or tribal area and to have a clear title to crops produced on such land were firmly secure, so long as he remained a member of the community (Noronha, 1985). Such rights tended to be heritable (Atwood, 1990). Thus, under the indigenous tenure structure, usufruct rights were more crucial than actual ownership of land in encouraging individuals to pursue agricultural activities.

Furthermore, the common criticism of African customary tenure that land transfers between individuals are forbidden by social custom is inaccurate. For instance, Atwood (1990) has argued that such transfers are indeed permitted in indigenous tenure systems, except that the transferability, use rights, heritability, and security found in them are different from the rights accorded by Western

property systems. First, they are rights informally recognized and sanctioned, often outside the formal legal system. Even when there is legal recognition of indigenous tenure claims in general, the day-to-day workings of establishing, maintaining, and enforcing one's land rights takes place almost exclusively within informal, local institutions. Second, individuals' land rights are conditioned by group rights or secondary rights which are less prevalent in contemporary Western property systems.

With respect to the role of customary tenure in enhancing agricultural technical innovations, it can be argued that although there were limited technical advances in West Africa in the use of the land to increase agricultural productivity, relative to many parts of Europe and Asia where such advances were tremendous (Goody, 1971: 30), the few techniques that emerged under the indigenous agricultural system were successful in serving the needs of society. The introduction of iron tools, notably the axe and the hoe, replacing wooden and stone implements, supported the development of new skills in agriculture and other areas of economic activity. Moreover, advanced methods, such as terracing, crop rotation, green manuring, and regulated swamp farming, were used to cope with the peculiarities of the indigenous systems of shifting agriculture (Rodney, 1974: 40-41). The historical record shows that using these limited but effective technical innovations, West Africans in the pre-colonial era were self-sufficient at least in the production of their basic food and other material needs. McPhee (1971) illustrates this self-sufficiency and the challenge it posed to colonial authorities in their effort to reorient the indigenous economy from the production of subsistence crops to the cultivation of exchange crops:

> The West Africans, if left to themselves, rely on the products of their own fields and woods, excepting for such articles as salt and iron. They can feed themselves with their yams and millet and rice and ground nuts. They can clothe themselves with home-grown and home-manufactured cotton, with grass or with skins. . . . European traders arriving amongst natives with such a self-sufficing life had no easy task in creating wants. (p. 9).

From the above discussion, it is arguably implied that insofar as land was the primary factor of production during the early history of West Africa, which was abundant but less productive (Goody, 1971: 30), then the reasonable level of agricultural production and self-sustenance obtained by Africans in the pre-colonial period could not be completely independent of the quality of customary land tenure relations prevailing in this era. Hence, the persistent argument that customary tenure institutions constrain African agricultural production and development needs to be at least qualified.

2.3 Impact of Agricultural Commerce and Colonization on Land Tenure in West Africa

It was important to provide the above comparative-historical account of developments in Europe and Africa in order to illuminate and put into proper perspective the European influence on West African indigenous land tenure systems during the period from the early 1800s to the end of colonial rule. As previously argued, although colonial rule was formally imposed in 1885, in so far as the European impact on West African land tenure can be linked to the expansion of commercialization, the transitional period between the abolition of slavery and formal colonial rule (i.e., the so-called "Proto-colonial" or "Traders' Empire" period) should be included in the analysis. Therefore, the primary task in this section is to describe the structure of economic production prevailing in

both the transitional and colonial eras and to describe the implications of such structure for the evolution of land use and property rights in West Africa.

An underlying objective of the European colonization of Africa and other regions of the world was to acquire new territories that would be forced or motivated to become producers of specialized commodities (i.e. raw materials, food crops, and stimulants) aimed at satisfying the growing demand for such products created by industrial growth in Europe. McPhee (1971: 36-37) has argued, for instance, that the development of the European export trade in palm oil and ground nuts with West Africa during the nineteenth century was a "reflex action of the Industrial Revolution", a consequence of the growing demand for oils and fats of all kinds in Europe linked to this event. Palm oil was used in the production of lubricants needed to oil the new machinery, especially the railways; it was also used in the production of soap required for cleansing the population in the expanding urban centers. The palm kernel, the inner seed of the real palm fruit, furnished oil for the manufacture of margarine and cattle feed (Hopkins, 1973: 129). In a related analysis, Wolf (1982) has explained that a driving force behind colonization was the crisis in European capitalism and agricultural production in the late nineteenth century, particularly the Great Depression of 1873, which engendered increasing costs of production and declining rates of profit in several European capitalist economies. Ever-rising real wages in Europe, as a result of falling agricultural prices, and increasing costs of raw materials in other parts of the world meant that the overall costs of production rose and profit rates fell in the European states. This prompted fierce competition among these

states for control of regions that could provide cheap raw materials and labor to produce certain food crops and non-food crops, such as coffee, cocoa, and tea.

The slave trade with Africa had, for many centuries, provided a great part of the capital that allowed England and other emerging European capitalist states to take off into the industrial revolution (Williams, 1944; Rodney, 1974: 75-91). Now with the gradual abolition of this trade in the nineteenth century the "legitimate" commodities that took the place of slaves were those for which there was also a thriving European market. Prominent among these were palm products (palm oil and palm kernels), groundnuts, and cocoa and coffee. It is worth noting that some of these products had already been traded and consumed as foodstuffs in West Africa, and many others, such as gum from Senegal, gold from the Gold Coast (now Ghana), timber, ivory, cotton and dye-woods, had been shipped abroad from the region long before the industrial revolution and the abolition of slavery. Some historians, such as Chamberlin (1979: 420-421), have therefore cautioned that the use of the term "legitimate trade" to describe West African non-slave exports in the nineteenth century should not imply that Africans had not engaged in such commerce before this period. McPhee's argument may thus be rephrased to suggest not that the West African trade in palm products and ground nuts was a consequence of European industrial growth and the abolition of slavery, but that these events increased the scale of West African commerce and furnished it with a principal dynamic element.

Palm oil was the pioneer export early in the nineteenth century, and was joined by palm kernels and groundnuts in the second half of the century. Together, these three products became the staples of West African export trade

with Europe during the 1800s. Cocoa and coffee began to be exported in substantial quantities only in the early to mid-twentieth century, following a depression in the palm produce and ground nuts commerce (Amin, 1973: 42; Hopkins, 1973: 133).

The impact of agricultural commercialization on the evolution of land use and tenure relations in West Africa can be gauged from the sheer volume and value of overseas trade in these commodities in the nineteenth century. In 1808, the first year after the abolition of the slave trade by Great Britain, British imports of palm oil from West Africa were only 200 tons. They reached 1,000 tons in 1810; 4,700 tons in 1827; 10,000 tons in 1830; 14,000 tons in 1834; and over 20,000 in 1842. During the 1850's trade in palm oil averaged 40,000 tons a year (Hopkins, 1973: 128). In the second half of the century, and following the imposition of formal colonial rule in 1885, there was an even more dramatic rise in West Africa's overseas trade, as ground nuts and palm kernels joined the trade on a larger scale, and cocoa and coffee became major commodities from Ghana and the Ivory Coast in the early to mid-1900s. The cultivation of peanuts for export started along The Gambia in the early 1830s, expanded to southern Guinea and northern Sierra Leone in the late 1830s, and to Senegal and Portuguese Guinea in the early 1840s (Brooks, 1975: 29). Exports of ground nuts from Senegal rose from almost nothing in the 1840s to an average of 29,000 tons a year during the period 1886-1890, while exports of palm kernels from Lagos, Nigeria, reached an average of 37,000 tons in the same period (Hopkins, 1973: 128). In terms of the value of trade, Newbury (1969: 76-79) has estimated that in the early 1850s the total value (in nominal prices) of West Africa's overseas

commerce in legitimate goods amounted to at least 3.5 million pounds a year, and during 1901-1905 it amounted to about 15 million pounds per year.

The expansion of commercial crops on well-developed lineage-based land tenure institutions in West Africa produced relatively rapid tenure change by increasing and stabilizing individual claims over use of specific plots. This is because some of the new crops cultivated, such as cocoa and coffee, were tree crops that occupied land relatively permanently, thus strengthening individual ownership rights over the cultivated land (Bruce, 1988). The pace and magnitude of change varied depending on other factors such as population density. For instance, in areas of land abundance, where population densities were very low and thus shifting agriculture based on long forest-fallow cultivation was practiced, the effects of commercialization on tenure change were gradual. However, in fertile, costal areas and major river basins, where population densities were high, change came faster. With the expansion of cash cropping the practice of communal land use gave way relatively quickly to one in which the cultivator maintained his rights in the land even while it lied fallow. Over time, an embryonic land market developed as the indigenous system evolved under the combined weight of commercialization and population pressure to embrace the lending and mortgaging of land (White and Gleave, 1971).

Almost all of the 16 countries that form what is now described geographically as West Africa were created as either French or British colonies in the late nineteenth century, with the exception of Liberia which experienced not a typical colonial situation but American-settler colonization. The country was founded in the first half of the nineteenth century by the American Colonization

Society (ACS), an alliance of former Southern slaveholders and conservative Abolitionists determined to find a new home for repatriation to Africa of freed black American slaves. Although the country was never colonized in the classic sense of the term, its experience is widely described as 'settler colonialism' (Liebenow, 1969; Akpan, 1973; and Sisay, 1985). Thus one approach taken by students of African politics has been the comparative study of the divergent impacts of French and British colonial institutions on indigenous West African societies. A contrast is often drawn between French and British governing philosophies and institutions, and how such differences led to divergent development outcomes in the colonized countries: Whereas the British adhered to a philosophy of indirect rule, working through indigenous rulers and preserving traditional institutions, the French espoused a philosophy of direct rule, destroying indigenous institutions and implanting French beliefs and institutions outright (Crowder, 1968). Firmin-Sellers (2000: 253) has pointed out, however, that the ultimate impact of colonial rule was contingent not only upon the implanted colonial institutions but the interaction between these institutions and the preexisting indigenous systems. Where colonial administrators encountered hierarchical governing structures, for instance, they worked through the indigenous ruling elite using institutions of indirect rule. Where they found more decentralized structures and no effective elite collaborators, administrators imposed institutions of direct rule (Firmin-Sellers, 2000: 254).

Some argued that the British policy of indirect rule resulted in the strengthening of local institutions and customary tenure institutions in particular

in the former colonies. The British insisted on communal land tenure and the trusteeship and control of local chiefs over land. In some cases, where there were no chiefs, colonial authorities appointed them; and where the power of chiefs was being threatened, authorities also propped them up (Feder and Noronha, 1987). Proponents of land privatization contend that such indirect rule policy stifled the development of individual land rights in the countries colonized by the British, while in contrast, French direct rule weakened indigenous tenure institutions and strengthened individual ownership rights to land.

Both types of colonial policies produced certain common effects, however. One such impact, which is currently being reinforced by neo-liberal pro-market policies, is the development of a tenurial dualism that produced a broad correspondence between privatized and customary land tenure institutions on the one hand, and commercially-oriented and "traditional" family-based farming systems on the other (Bruce, 1988: 31). In many West African countries, for instance, a large-scale commercial farming sector, dominated by private, export-oriented companies with large inputs of capital and market integration, has developed and operates under privatized land tenure, while a family farming sector that straddles the line between subsistence and market-oriented production using labour contributions from family members prevails under customary tenure (Bélières *et al.*, 2002; Toulmin and Guèye, 2003). Within the large-scale commercial sector access to land and farm assets is acquired through formal market exchanges, whereas in the family farming sector land and farm assets tend to be acquired through inheritance or other social and informal arrangements (Toulmin and Guèye, 2003).

In this dualism the World Bank has taken side with the large commercial sector. In a 2001 Report, *African Poverty at the Millennium*, the Bank argued that "Africa's agricultural future is almost certainly bound up with accelerated commercialisation and development of larger farms, with greater use of modern know-how and lower unit costs" (World Bank, 2001, p. 44), even though such an assumed link between lower unit costs and large commercial farms has not been well observed and documented in the African context. This vision of land concentration is not accepted by everyone as inevitable. In Senegal, for instance, there has been a lively debate between those favouring agri-businesses and those arguing for a broader vision for agriculture and the rural sector, at the heart of which lies the future of the family farm. Equally, the farmer's union in the Office du Niger, Mali, is arguing for proper provision to be made for smallholders in land allocations within the new irrigated land extension zone. At the same time they are seeking formal rights of ownership over their irrigated fields on the grounds that if government is anxious to grant titles to large farming enterprises, they should accord the same security of tenure to small farmers.

2.4 Land Tenure Reforms after Independence

The current changes in West African customary tenure systems have roots in the region's past history and are a continuity from history. However, most tenure reforms have occurred after independence, first under state nationalization policies from the late 1960s to the late 1970s, and then under global economic restructuring and structural adjustment policies spearheaded by the major International Financial Institutions (IFIs) since the 1980s. During the 1960s and 70s, a number of independent African states implemented rigorous land reform

policies geared to transferring ownership from traditional landholders to the state through nationalization. Feder and Noronha (1987) categorize these reform approaches into three classifications: (a) countries that allow acquisition of individual title, for instance, Cote d'Ivoire which require no restrictions on the power of the title holder; (b) countries that recognize different types of tenure, for example, Senegal which allow individual title and nationalization of non-titled land; and Ghana, Liberia, Mali, and Sierra Leone (individual title, indigenous systems, and public lands); and (c) countries that vest title to land in the state, so that individuals have rights only of use and occupancy (e.g. Mauritania and Nigeria).

Newly independent governments decided to assume a stronger role regarding land ownership and allocation in order to (a) free land from the customary sector, and thereby allow it to be used by more efficient, market-oriented actors; (b) acquire certain lands for public development project purposes, such as irrigation schemes, road building, and urban growth; and (c) protect local people from the adverse impacts of speculation in land, through what was assumed to be the benevolent surveillance of land transactions by government officials (Guèye et al., 2001). A less explicit rationale for many newly independent governments was their desire to break the power of traditional chiefs by removing their prerogatives regarding land allocation and the settlement of rural disputes. The hope of governments was to have these customary chiefs replaced with more pliable local institutions tied more closely to central government authority. This has resulted in the development over the last thirty years of various rural institutional arrangements in a number of West

African countries, such as the elected District Assemblies and *Communes Rurales,* which have a wide range of functions regarding land rights and natural resource management (Guèye et al., 2001).

While state-sponsored reforms promised to transfer landownership to the public interest, most of them have ended up concentrating ownership in private hands (Klopp, 2000). Now, the aim of new land legislations in many West African countries has been to facilitate the development of a private land market. This policy shift to land privatization has been partly a consequence of the desire of many West African countries to generate economic growth through inducement of agricultural investments from national and foreign investors. As explained earlier, a commonly held view among policy makers and the business sector is that private land titles are a precondition for agricultural investments, and therefore those who need such investments must encourage private land titles. It should be noted, however, that while these titling and registration programs have been conceived as formalizing tenure rights of households to the land already held under customary tenure, rural families with little education and knowledge of these programs often find themselves displaced from the land to which the titling programs were designed to secure their rights (Goheen, 1988).

The shift in policy thinking is also a result of IMF and World Bank-sponsored macroeconomic and structural adjustment policies, requiring African governments to intensify land privatization through the state granting private property titles to heads of family households and to private agribusinesses and other commercial interests. In the last thirty years, the World Bank's own thinking on the land question has undergone a series of changes. Initially, in the

early 1970s, the Bank's interest in land reforms was driven simply by concerns that small farmers, the engines of agricultural growth in sub-Saharan Africa, lacked sufficient access to land, and therefore policies should be put in place to increase their access to and control over land (World Bank, 1974, 1975, 1989; and Deininger & Binswanger, 1999).

In the late 1980s, however, its interest in land issues became centered on private land titling and registration as an integral part of its broader program of structural adjustment and agricultural market liberalization (Platteau, 1992, cited by Yngstrom, 2002, p. 23). For instance, in the Bank's 1989 document, *Sub-Saharan Africa: From Crisis to Sustainable Growth* (World Bank, 1989), it argued essentially that African customary landholding systems are static and inflexible: Under pressure of population growth and land scarcity "long fallow periods can no longer be relied on to maintain land fertility, and the transitory nature of land use rights fails to provide incentives for individuals to improve their land" (World Bank, 1989, p. 104, cited in Yngstrom, p. 23). Based on this diagnosis, the Bank recommended that farmers should be provided with the incentives to cultivate land permanently by having the right to bequeath or sell it (World Bank, 1989). Since the 1990s, this growing interest of the Bank in land privatization has become clothed in its concerns with poverty reduction, as evident in the efforts being urged to have land issues represented in the Poverty Reduction Strategy Papers (PRSPs) of African countries.

In conclusion, this chapter has offered a historical review of the development of West African land tenure institutions from their indigenous customary state in pre-colonial times, toward the current efforts aimed at

formally privatizing them. What has emerged out of this review is that before the European contact in the fifteenth century African land tenure institutions were qualitatively different from those found in medieval Europe. Contrary to the prevailing thought that these institutions constrain African agricultural development, they proved relatively effective in allowing pre-colonial Africans to obtain a sufficient level of agricultural production and self-sustenance. And although the expansion of commercialization on these well-developed lineage-based land tenure systems, during the so-called "Proto-colonial" and colonial eras, produced a relatively rapid change, most land privatization reforms have occurred only after independence as a result of African state nationalization policies and internationally funded structural adjustment programs.

3 THE POSSIBILITIES OF AN ALTERNATIVE EVOLUTION OF WEST AFRICAN CUSTOMARY TENURE INSTITUTIONS

3.1 Introduction

One of the main questions posed by this dissertation is whether privatized land tenure is an inevitable evolutionary path for West African (WA) customary tenure institutions, and whether it is the most desirable institutional change in terms of encouraging farm investments and capital formation. As already pointed out in Chapter 1, the importance of this question for development policy in WA countries cannot be overemphasized in that the mechanism of individual land titling or registration being applied to accomplish tenure privatization entails huge resource cost. In the African context, land titling means legally sanctioning primary land claims which are already recognized informally by the local community; taking these claims out of the realm of informal lineage and making them formally legal and individualized; measuring precisely the boundaries of each claim; recording claims in a formal, state-administered land records system; and providing a state guarantee to the claim that appears in the land records system (Atwood, 1990: 659). All of these activities are bound to have an enormous opportunity cost in terms of other development benefits forgone. It is therefore imperative that government policy makers and international donors are sufficiently confident that the investment, productivity, and other benefits ascribed to land privatization are substantial enough to cover these opportunity

costs. If these claims used to justify privatized tenure are invalid, and privatization is not an inevitable path in the evolution of customary tenure institutions, then current African government and international support for land registration may be judged either premature or inappropriate (Atwood, 1990: 660).

The objective of this chapter is to critically assess this privatization inevitability argument and explore the possibilities of an alternative outcome in the evolution of customary tenure institutions in West Africa. Here, a serious effort will be made to answer the above question of whether it is possible to identify an alternative land tenure and management system in the evolution of WA customary tenure, which is different from outright privatization of land rights but has reasonable investment and other desirable properties. In a sense this chapter is a critical evaluation of the so-called "evolutionary theory of land rights" (Platteau, 1996), henceforth denoted ETLRs, which claims that under the combined pressure of population growth and increasing commercialization customary tenure institutions are bound to evolve towards privatized tenure, and that such privatization is also more desirable in terms of inducing farm investments and capital accumulation.

For a systematic treatment of this question, the chapter is organized in two major sections. In the first section, immediately following this introduction, the central themes of the ETLRs are presented by synthesizing its main theoretical building blocks: (a) the so-called Boserupian thesis, an evolutionary model of farming systems developed by Ester Boserup (1965), which forms the centerpiece of the ETLRs; (b) the theory of induced innovation developed in Hayami and

Ruttan (1985) and Hayami (2001); and (c) the theory of property rights offered by Demsetz (1967), Alchian and Demsetz (1973), and Coase (1960). It should be noted that both the Boserupian evolutionary model and the theories of induced innovation and property rights are overlapping in terms of their constituent ideas; in fact, as Quisumbing *et al.* (2001) point out, the Boserupian model and the theory of property rights can be considered as applications of the induced innovation theory. For this reason, one effective way of presenting the evolutionary theory of land rights will be to first sketch out the ideas of the induced innovation theory and then follow this with the Boserupian model and property rights discussion. Also, in the first section, the main propositions and predictions of the ETLRs are explained and critically evaluated in light of the empirical evidence available for a number of West African countries.

In the second section of the chapter, the possibilities of an alternative path for West African customary land tenure evolution are explored. A model of cooperative resource management is proposed, showing how under certain social, political, and institutional conditions collective decisions over rural land can prevent overexploitation of the natural resource base and, in the process, also encourage greater investments in land improvement. The model is then empirically illustrated using data from a World Bank's Living Standards Measurement Study (LSMS) for Côte d'Ivoire (the Ivory Coast).

3.2 Agricultural Intensification and Induced Innovations: The Evolutionary Theory of Land Rights

The central proposition of the ETLRs is that under the combined impact of increasing population pressure, commercialization and market integration,

customary tenure institutions are bound to spontaneously evolve towards formally privatized land rights, and that such privatization is also more desirable in terms of encouraging farm investment, the building of agricultural capital, and the efficient use of land. Jean-Philippe Platteau (1992, 1996, 2000) outlines the basic logic of the ETLRs in terms of the following set of positive statements which can in principle be either falsified or confirmed by empirical analysis – which is the objective of the current chapter: As population growth and increasing commercialization raise the relative scarcity value of land and, as a result, land holders feel more uncertain about their customary rights, disputes over land ownership, inheritance, and boundaries tend to intensify in the countryside. Faced with such uncertainty, existing land holders assert increasingly individualized use rights and claims to specific plots. This eventually intensifies conflicts over land, which become more and more difficult to resolve and entail increasing litigation costs. Although such litigation costs combined with the possible under-utilization of land resources create significant efficiency losses in the rural economy, the expected gain from establishing formal private land rights is sufficient to compensate for these losses and therefore justifies the transaction costs of establishing private rights. At this juncture, the state has an important role to play in the evolutionary process. As the situation caused by the growing scarcity of land becomes untenable in the countryside, the great majority of land claimants eventually begin to demand the creation of formalized private land rights. To this the state will be compelled and have an incentive to respond by providing an institutional innovation in the form of private land titling. Sooner or later, such land titling reforms take hold and, as a consequence, all conflicts will

be resolved, and "social peace and political stability will follow" (Platteau, 1996: 34-36).

The above discussion summarizes the basic *modus operandi* of the ETLRs. Before proceeding with further analysis, it is important to first distinguish between two different versions of the evolutionary theory which are frequently discussed in the literature. The first of these, which has been summarized above, views private land titling as a means of providing security to emerging or established individualized rights in land. Popularized in a series of World Bank-funded studies conducted in the early 1990s, which were produced in the volume *Searching for Land Tenure Security in Africa* (Bruce and Migot-Adholla, 1994), this model views the role of the state as critically important in the evolutionary process to the extent that it promotes private land titling. This is consistent with the evolutionary thesis in that customary landholding systems are viewed as evolving spontaneously in response to new market and demographic conditions (Bruce, 1993; Deininger and Binswanger, 1999; Migot-Adholla *et al.*, 1991). The later process, however, requires the intervention of the state at some point. Thus this view may be labeled as the "market-state" view, since new market conditions (increasing commercialization in particular) and population growth are said to drive customary tenure systems towards increasing privatization, a process which also requires state-sponsored land titling.

The second evolutionary model, which has been gaining ground since the mid-1990s, is that proposed by Jean-Philippe Platteau (1992, 1996, and 2000). As explained by Yngstrom (2002), according to the Platteau version, state-sponsored titling interrupts the spontaneous evolution of land rights towards

individualization and should therefore be completely abandoned. The suggestion is that when state titling is ruled out from the evolutionary sequence, the transformations that take place in customary tenure institutions are "geared towards increased individualization of tenure rights and increased transferability of land" (Platteau, 1996: 74). Thus, as in the market-state view, in this version of the evolutionary theory, customary tenure institutions are also seen as evolving towards increasing individualization of land rights. The only difference is that, in the latter view, tenure individualization can occur without state-sponsored titling and protection of private land rights. In place of state-sponsored titling, bottom-up community-based customary, or modified customary, solutions to tenure insecurities are suggested (Whitehead and Tsikata, 2001). Hence, this version may be labeled as the "market-customs" view in the sense that indigenous customs and kinship institutions are deemed crucial to the evolution of land rights towards individualization.

As proposed in the Introduction, an original contribution of this dissertation consists of showing whether there is an alternative evolutionary path for customary tenure institutions in West Africa, which avoids outright privatization of land rights. In this vein, the approach adopted here has more in common with the "market-customs" model than the "market-state" model. It shares the argument of the former model, which is against *formalized* privatization of land rights (sponsored by either domestic state or international actors). However, it does not support the view that the state should be ruled out completely from the tenure evolutionary process. Depending on the quality of the state's local institutions-building strategies, it can contribute to strengthening

local capacity for a successful co-operative land property regulation in West Africa.

3.2.1 Induced Innovation Theory and the Boserupian Evolutionary Model of Farming Systems

The logic of the ETLRs, as summarized above, is underpinned by the Boserupian evolutionary model of farming systems and the theory of property rights, both of which can be considered as applications of the theory of induced technological and institutional innovation, itself a derivative of a standard economic theory originally proposed by John R. Hicks (1932). In this subsection the central ideas of the induced innovation theory and the Boserupian model are synthesized. The key premise of induced innovation theory is that changes in the relative abundance and scarcity of resource endowments induce changes in technology which in turn induce or require institutions to change. Assuming a competitive market within the framework of neoclassical economics, in which relative abundance and scarcity of factors are reflected in relative factor prices used as data by entrepreneurs in making production decisions, the Hicksian theory explains how as the endowment of one factor (e.g. labour) becomes more abundant relative to another factor (e.g. land), a change in production technology is induced toward a labor-using and land-saving technology. Such a shift in technology occurs because profit-seeking entrepreneurs make an effort to reduce production costs by substituting the relatively more abundant (hence cheaper) resource for the scarcer (hence dearer) resource (Hayami, 2001: 16-17).

The above idea constitutes the foundation stone of the induced innovation theory and the Boserupian evolutionary model of farming systems, as formulated

in a large body of pioneering works.[7] These works applied the basic Hicksian proposition in creating a framework that seeks to explain the process by which an initially relatively land-abundant economy practicing long-fallow shifting cultivation makes a transition to a modern agricultural economy, practicing intensive farming systems, as labour becomes relatively abundant due to population growth. Their central argument is that as land becomes relatively scarce and thus more expensive, traditional farmers who had relied on extensive systems of land use (i.e. long-fallow shifting cultivation methods), are induced by the possibility of costs saving to shift toward intensive systems of land use (i.e. short-fallow or annual cropping methods) based on the application of more labor input.

Figure A3.1 in the Appendix offers a diagrammatic representation of the above argument. The upper quadrant R-L of the Figure represents a space of unit isoquants showing the substitution between land and labour in the production of one unit of output (e.g. $1.00 worth of food crops) by a farmer. And, as explained below, because population expansion and the resulting intensive use of land necessitate an increase in land-improving investments and farm capital accumulation, a lower quadrant K-L is also constructed to capture the complementarity between capital and labour in their substitution for land. Each isoquant in the upper quadrant corresponds to an 'innovation possibility' defined as a possible production technology or farming system that can be developed with

[7] For original and contemporary formulations and illustrations of the induced innovation theory, see Kikuchi and Hayami (1980), Hayami and Kikuchi (1981), North (1981), Ruttan and Hayami (1984), Hayami and Ruttan (1985), and Hayami (2001). For important works on the evolutionary model of farming systems, see Boserup (1965), Ruthenberg (1980), and Pingali *et al.* (1987).

the knowledge and human capacity available at a particular period to produce one unit of the given output (Hayami, 2001). The typical unit isoquant, as represented by the I-curve, shifts over time towards the origin, reflecting an improvement in farming systems and the capacity of farmers to produce a unit of food with smaller input of land and labour.

The central proposition of the evolutionary model of farming systems, based on the induced innovation theory, is that there exists a positive relationship between population density and agricultural intensification. That is, an increase in population density causes a reduction in fallow periods and thus a movement to more permanent and intensive cultivation of land (Pingali *et al.*, 1987). This is illustrated in Figure A3.1. If initially population is scarce and land is abundant with vast areas of virgin forests, farmers have little incentive to make intensive use of land. Since land is abundant, it is cost-effective for farmers to practice an extensive system of land use through shifting cultivation with sufficiently long fallow periods. It is cost-effective not just because land is abundant and relatively cheaper but also the long fallow periods ensure complete restoration of soil fertility without any significant land-improving capital investments. Curve I_0I_0 in Figure A3.1 shows the unit isoquant for an individual farmer producing $1.00 worth of food by using less labour and more land under a farming system or technology based on extensive use of land in period 0. If relative factor prices are assumed to reflect relative factor scarcity, then E_0 is the optimum production point where farmers are able to minimize their costs of production, given the price ratio P_0 between land and labour. It is worth noting that using the current farming technology farmers can produce a unit of food

with only very little input of capital as may consist of such small items as a hatchet, a digging stick, and a stock of seeds. This is indicated in the Figure by the relatively small line segment oK_o.

However, as population increases and land becomes relatively scarce in period 1, the scarcity value of land relative to labour rises, which is reflected in decreases in the relative price of labour to land from P_o to P_1. Given this increasing population pressure, if farmers continue to practice the same farming system based on shifting cultivation, the optimum production point will move to E'_o where the fallow periods at this point tend to be shorter than at E_o. With shortened fallow periods, land fertility will decline and farming becomes unsustainable at point E'_o, resulting in the shift of the isoquant from I_oI_o to I_1I_1 (reflecting the fact that a unit of food can now be produced only by using a larger input of resources). Thus the optimum point moves to E_1 where production efficiency will further decline over time, as long as shifting cultivation continues to be practiced. If, however, instead of continuing using the old shifting cultivation system, a new farming system or technology were to be developed, such as that represented by the new unit isoquant I_2I_2, which allows for a more intensive use of land under population pressure, then farmers would be able to produce much more food by applying more labour and capital to limited land. It is the basic premise of the induced innovation and evolutionary model that farmers will be induced to make efforts to change from the old farming technology to the new one, in the move from point E'_o to E_2, because they expect to gain sufficiently by doing so in terms of reduction in production costs (as measured by the distance between P_1 and P'_1).

On the other hand, the movement from a land-extensive technology towards a land-saving, labour-intensive technology requires investments and capital accumulation in improving farmlands (e.g., removing roots and stones, terracing and fencing, and acquiring a greater variety of farming tools and implements). These investments are necessary to maintain land quality under the pressure of population growth and to prevent diminishing returns to labour from setting in too quickly. Thus, as intensification of land use increases through the substitution of more labour for land, it becomes necessary for the capital-labour ratio (K/L) to rise sufficiently, depending on the concavity of the oZ curve, as depicted by the change from oK_0/oL_0 to oK_1/oL_1 in Figure A3.1. A key proposition of these theories is that in order for such land-improving investments and capital accumulation to take place, property rights institutions (particularly land tenure institutions) need also to change. The reason is that these land-improving investments in the form of the construction of irrigation facilities, removing roots and stones, terracing and fencing, and acquiring a greater variety of farming tools and implements, are value-adding assets for which an adjustment in property rights is required (Hayami, 2001). It should be emphasized, however, that such adjustment in property rights can only serve as a necessary and not sufficient condition for farm capital accumulation, since it provides only the incentives to invest which may in reality be ineffective if investment resources are scarce and unavailable.

3.2.2 Private Property Rights: The Logical Consequence and Predictions of the ETLRs

The central argument of the property rights school is that as population pressure increases, in order for farmers to be induced to make the necessary land-improving investments and capital accumulation, property rights institutions must change from communal land ownership towards private ownership (Demsetz, 1967; Johnson, 1972; Alchian and Demsetz, 1973). This conclusion is based on the assumption that private ownership rights are more effective in internalizing externalities than communal rights. When land is abundant, its communal ownership and use poses such small externalities that it does not pay anyone to take them into account. The conservation of the natural resource is not jeopardized and there is no overcrowding effect by which entries of additional farmers can lead to a decline in the income levels of existing farmers. In land-abundant settings, externalities from communal ownership are so insignificant that "there is no positive value to society of creating clearly defined property rights in land" (Johnson, 1972: 271). However, as population pressure on the land intensifies, growing competition causes an increasing incidence of externalities among communal users. Competition and externalities are further increased as the potential market value of land rises due to increasing commercialization of the natural resource. In a seminal contribution to the property rights paradigm, Demsetz (1967) illustrates these effects of commercialization on externalities by showing how the development of the commercial fur trade intensified the free hunting and speedy destruction of fur-bearing animals by the Montagnes Indians of Quebec.

A key premise of the property rights argument is that private rights tend to develop to internalize externalities when the gains of internalization become larger than its cost (Demsetz, 1967: 350). An important part of such gains comes from the fact that all the external costs and so-called governance costs associated with communal or collective regulation of land resources are avoided and saved under private rights. In the context of the model discussed above, this means that the costs saved from establishing private land rights would amount to the distance between P_1 and P'_1 in Figure A3.1. External costs include those imposed on both current and future users in terms of resource depletion and degradation and the reduction in their incomes due to such degradation. The governance costs of communal resource regulation consist mostly of all those costs incurred to reach a collective agreement and to organize a community of users. Olson (1965) explained that such costs are likely to be higher when the group is larger, or when its members are more heterogeneous (Libecap, 1989; Milgrom and Roberts, 1992). In addition, diversity of objectives among users makes co-operation around resource management more difficult to achieve, as exemplified by conflicts between agriculturalists and herders in semi-arid areas, and between men and women when they have different uses of the natural resource. Governance costs are also enhanced by the opportunistic tendencies of rights-holders not only to violate or circumvent collective rules but also to eschew efforts to create collective mechanisms of decision-making and enforcement. These costs are actually dependent on the size of the user group and tend to be lower if the number of resource users is smaller (Platteau and Baland, 2001).

Thus, according to the property rights school, the advantages of private property appear all the more decisive as it enables users to internalize the above-discussed externalities without involving any governance costs. It is claimed that private rights have minimal or zero governance costs, because they establish a one-to-one relationship between individual actions and all their effects (Platteau and Baland, 2001). Unlike the owner of a communal property right who does not bear the full costs of his use of a common resource and is therefore likely to overuse the resource, the owner of a private right "acts as a broker whose wealth depends on how well he takes into account the competing claims of the present and the future" (Demsetz, 1967: 355), and who must therefore avoid imposing unnecessary inter-temporal externalities. In this context, private property rights are viewed as a self-policing and self-disciplinary device, as a result of which the transaction costs associated with it are assumed to be much less than those associated with communal ownership (Alchian and Demsetz, 1973: 24). Furthermore, the property rights paradigm suggests that whenever private ownership has become desirable, such as when there are new favorable benefit-cost possibilities under conditions of increasing population pressure, then such private rights are expected to emerge spontaneously in response to the desires of the interacting persons for adjustment to such new possibilities (Demsetz, 1967: 350). In the context of the evolutionary model of farming systems depicted in Figure A3.1, this implies that the possibility of producing much more food at a lower cost (measured by P_1 minus P'_1) would automatically induce farmers to demand private land rights to facilitate investments in the movement towards the new farming technology at I_2I_2. As noted earlier, such a possibility of lower-cost

production may not in practice be effective in inducing farmers to invest in the new technology, if investment resources are scarce or do not exist.

From the analysis thus far, and by way of summarizing, one can identify at least four broad types of predictions implied by the evolutionary theory of land rights (Platteau, 1996). First, the theory predicts that land rights privatization through registration and titling increases the security of tenure and thus reduces uncertainties, conflicts and transaction costs for most land holders. Second, it predicts that land registration and titling enhances the development and operation of a land market in which the volume of land sales will be increased and, more importantly, there will be efficiency-improving transferability of land from less to more productive cultivators. For instance, Johnson (1972) argues that with no risks and transaction costs associated with private tenure, incentives exist for a more dynamic farmer (with better access to skills, capital, labor, or technology) to purchase land from a less productive farmer. This incentive exists because there is a net gain to both parties, in the form of a more efficient resource allocation and an increase in agricultural production. The third prediction of the theory is that land rights privatization promotes smallholders' access to farm credit and thus enhances agricultural investments. Note that this prediction follows directly from the induced technological innovation hypothesis according to which increasing population pressure necessitates greater investments in land and a new farming technology. Finally, the theory predicts that growing scarcity of land due to population expansion will cause the majority of land claimants to demand more private land rights, and that the state will have the incentive to supply such private rights in the form of legally registered land titles.

The above four predictions are among the central conditions required for the evolutionary theory to be valid. For this reason, one way of assessing the privatization inevitability argument of the theory is to consider these conditions in the context of African realities. The next sub-section of this part of the chapter undertakes such an endeavor, by reviewing and offering a synthesis of the available evidence provided in the literature.

3.2.3 The Evolutionary Theory of Land Rights in the Context of West African Countries

3.2.3.1 Land Registration and Tenure Security

The first prediction of the evolutionary theory, regarding land tenure security, has been challenged in various writings and contradicted by empirical evidence from a number of African case studies. These studies show that private land titling and registration "can create rather than reduce uncertainty and conflict over land rights" (Atwood, 1990: 663), and this may therefore raise rather than lower transaction costs. There are at least two broad lines of consideration that help to explain why this may be so.

First, the claim that land registration is an adjudication procedure that accurately recognizes and records existing land rights is untrue. Even in Asian countries, where administrative capabilities are much more developed than in sub-Saharan Africa, there have been reports of inaccurate and incomplete record-keeping of changes in land ownership (Feeny, 1988). Such inaccuracies tend to reflect the high transaction costs of establishing and operating the registration system (e.g. site visits, land surveys, maps, and so on).

Transaction costs of administering the registration process are bound to be higher and more serious for African countries, given the relative fragility of their economies and administrative capacities, and thus there is a higher likelihood of inaccuracies in the process. As the experiences of Kenya and other countries that have implemented extensive land reforms indicate, while land titling and registration programs were conceived as formalizing tenure rights of households to land already held under customary tenure, some sections of the rural populations often find themselves displaced from the land to which these programs were designed to secure their rights (Goheen, 1988). Thus, even if titling reduces risk and transaction costs for some categories of people, it may simultaneously generate new uncertainties for other categories, especially those relying on customary practices and rules for securing their land claims. For instance, in some West African countries, such as Senegal and Gambia, where much rural land is actually "compound land on which many plot managers operate" (Platteau, 1996: 40), registering the land in the name of the compound head, which is often the most cost-efficient solution, involves the risk of dispossessing other plot managers of their rights (Golan, 1994).

Land privatization may also increase tenure insecurity for rural dwellers, while increasing security for international firms exploiting natural resources. With African governments granting private land titles and registrations under various investment incentive schemes, most international companies now face virtually no obstacles in gaining access to and control of land previously owned by rural dwellers under customary tenure rules. In many cases, the unscrupulous deforestation of such land leads to the disappearance of nearby towns and

villages. Reports indicate, for instance, that the Oriental Timber Corporation (OTC), a Malaysian firm, and the Royal Timber Company (RTC), owned by a Dutch businessman, which operated in Liberia during the 1990s, adopted a 'gold rush' policy against the tropical rainforests of that country, causing peasant dislocations and migrations from nearby villages (The Perspective, 2000; Global Witness, 2001).

The second consideration that helps to explain why land privatization may create insecurity of tenure and thus increase its transaction costs in West African countries is that, in a social context dominated by huge differences in education levels and access to state power and administration, there is a high likelihood that the registration process will be manipulated by the political and educated elites to their own advantage. Evidence of this has been documented for some Asian countries, such as Thailand, and Latin American and Caribbean countries. It has been documented, for instance, that powerful government officials in these countries have manipulated land records so as to allow families, friends, and private companies with high levels of political connections "to obtain ownership of land that, under the traditional system, would have been controlled by homesteading cultivators" (Thomson *et al.*, 1986: 413-14); see also Feeny, 1988: 286-7; Platteau, 1996: 43).

Evidence pertaining to sub-Saharan African countries points to a similar political manipulation of the land registration process. Faced with declining political patronage resources, as a result of increasing domestic and international pressures for political liberalization and democratic governance, powerful political actors in countries, such as Kenya, have found alternative sources in the

irregular privatization of public lands as an instrument for maintaining patrimonial control of the state (Klopp, 2000). In countries, such as Senegal and the Ivory Coast, certain well-educated and powerful individuals have expropriated parcels of land not previously theirs by registering these in their own names, while the mass of rural people were generally unaware (Berry, 1988; Atwood, 1990). There is also ample evidence, for instance in the case of Nigeria, that extensive land tracts have been granted to 'political friends', under the camouflage of national development projects, even though such acts led to the land dispossession of many villagers (Zubair, 1987). In another example of how the allocation of public lands is often politically manipulated, and the weak are marginalized in the process, the National Transitional Government of Liberia (NTGL) was recently accused of politically supporting the Belgium-based owners and management of the Liberia Agricultural Company (LAC) in their decision to evict an estimated 65,000 local residents of 75 villages from their ancestral land in Grand Bassa County (Tarr, 2005).

3.2.3.2 *Land Registration, Sales, and Economic Efficiency*

The second key prediction of the evolutionary theory of land rights is that land registration and titling activates a private land market by increasing land sale transactions, and that it promotes economic efficiency by transferring land into the hands of more productive cultivators. This latter part of the prediction is based directly on the conclusion that customary land tenure institutions, with less defined property rights, are characterized by higher risks and transaction costs than privatized tenure institutions. Such risks and costs are presumed to be absent or at least insignificant under a privatized tenure structure, and therefore

incentives exist for a more productive farmer (with better access to skills, capital, labor, or technology) to purchase land from a less productive farmer, resulting in a net gain to both parties, a more efficient resource allocation, and an increase in agricultural production. These incentives exist because the more productive farmer expects a greater return from the land than the less productive farmer, due to the differences in their productivities (Johnson, 1972).

Evidence from African countries that have implemented substantial land privatization, such as Kenya, points to the conclusion that such reforms have not raised land sale transactions (Pinckney and Kimuyu, 1994). The majority of land transfers continue to be governed by indigenous customary modes of exchange, such as through short-term lending, gifts, inheritance, and non-registered sales. A number of authors have identified the cause of this persistence of indigenous control over land transfers in the emotional and spiritual attachment of African people to their ancestral lands. For African people land represents an important source of both individual and collective identity, and therefore its value is not measured in terms of a mere input into agricultural production and enterprise. The value of land is inextricably embedded in the social structure and history of a particular community, from which it cannot be abstracted (Riddell *et* al., 1987).

In this climate of reluctance to part with ancestral land, even those who own legally titled lands do not consider that they have the right to sell such lands outside their lineages or to make permanent transfers without approval by their communities. This opposition to outright land sales is especially strong when the land might be transferred to foreign individuals outside the lineage or community. Indeed, it has been amply documented that past and recent conflicts

in some West African countries, such as Liberia and the Ivory Coast, have been motivated or at least influenced by the inappropriate alienation of land from indigenous owners (see Bassett, 1993; Chauveau, 2000).

In terms of the demand side of the land market, various authors have explained that the demand for land in many African societies is motivated more by non-economic factors, such as the need for social prestige and political power, than by pure market exchange factors. The argument is that such demand has been due more to the tendency of both urban and rural traditional elites to buy land for social and political advantages than to a legal land market via registration and titling. For instance, it is common occurrence in many West African countries for a rural traditional chief to get integrated into the urban-based national political power structure, or for an urban political or business elite to obtain appointment to a rural local council, after having acquired a significant amount of local land (Bayart, 1989; Berry, 1988; Bruce, 1988).

Regarding the 'economic efficiency' claim of the prediction being discussed, it is important to recognize that such a claim becomes unacceptable when examined from a broader concept of transaction costs, as proposed by a number of authors (see Khan, 1995 and Platteau, 1996: 55-60). These authors suggest that in evaluating the efficiency properties of a desired institution, it is insufficient to consider only the "purely cognitive costs of organizing and monitoring" the institution, which differentiate it from alternative existing institutions; the costs involved in achieving or bringing that institution into being must also be included. As explained earlier in Chapter 1, such *transition* costs are largely the political costs imposed by potential losers on the proponents and

potential beneficiaries of an institutional change. There have been violent instances of these types of *transition* costs in many African countries, in which original occupants who opposed the transfer of traditional family or communal land to strangers resorted to acts of sabotage, looting, or burning of the property and crops of the new landholders. A striking example provided in Bayart (1989) demonstrates the extent to which potential losers from an institutional change can go to impose such costs. In reaction to the conferring of private land rights upon outside investors in the fertile area of the Senegal river basin, writers of a 'Manifesto of the Oppressed Negro-Mauritanian' called on the black community of Mauritania to use any means necessary to prevent the *Beydane* elite (of the Moorish origin) from taking over their ancestral lands. In this Manifesto, black Mauritanians are summoned to "boycott, ban, kill if needed, all those who encourage the sale of land; destroy, burn the possessions of these strangers who come to develop your lands while the land should belong to our villages" (Bayart, 1989: 82; cited in Platteau, 1996: 58).

The above discussion demonstrates that land rights privatization is likely to result in significant efficiency losses, insofar as the economic efficiency of an institution may be measured in terms of its ability to control transaction costs. It is therefore unacceptable to assume that the institution of private land rights will result automatically in efficiency gains. As explained above, there are bound to be serious efficiency costs resulting from the determined resistance of local people to drastic changes in land rights. Moreover, insofar as the new private rights are threatened by resistance, there are additional costs which owners of these disputed rights must bear to protect their property.

3.2.3.3 Land Registration, Credit and Investment

Regarding the third prediction, the available evidence suggests that the impact of private land registration on smallholders' access to farm credit and investment is at best negligible, and on land-improving investment it is inconclusive. Table 3.1 outlines the major African studies conducted during the 1990s about the impact of private land rights and tenure security on investment. In the case of Kenya, a World Bank study found no relationship between the possession of land title and the use of farm credit and investment (Migot-Adholla et al., 1991). In the same World Bank study, no significant correlation was found in Ghana (a West African country) and Rwanda between private land rights, as indicated by the proportion of land held with 'complete transfer rights', and the proportion of households receiving formal or any other credit (Migot-Adholla et al., 1991: 164-6). Furthermore, the study found that in Ghana and Rwanda an increase in private land rights appeared not to have had any effect on agricultural investment and yields.

Table 3.1: African Studies Measuring the Impact of Private Land Rights and Tenure Security on Farm Investment

Study and Country:		Study Results:
Kenya	Migot-Adholla, Place, and Oluoch-Kosura, 1994	Neither land rights nor land title was related to tree crops or terracing improvements, after controlling for other possible effects. More individualized land rights were associated with greater land improvement activity in Lumakanda but had little effect elsewhere.
	Green, 1987	Titled land is not being utilized productively because of "absentee ownership".
	Migot-Adholla et al., 1991	No relationship was found between farm credit, investment and land title.
	Place and Hazell, 1993	"In Madzu, land rights are not significantly related to land improvements. In Kianjogu, preferential transfer parcels are more likely to receive drainage or limiting improvements than are limited-transfer parcels".

Study and Country:		Study Results:
	Pinckney and Kimuyu, 1994	The increase in investment is related to the disappearance of the prohibition to grow coffee rather than to the land reform. In the regions where coffee growing was allowed, farmers planted it prior to land registration, implying that indigenous tenure was secure enough.
Somalia	Roth, 1994	The effects of land title on various types of agricultural investment have all been found to be not significantly differently from zero.
Uganda	Roth, 1994	Registration appears as significantly and positively related to investment in fencing, continuous manuring and mulching, and positively but insignificantly related to all long-term investments.
Zimbabwe	Harrison, 1992	Smallholders, without having private title to their land, have achieved rapidly increasing maize yields, and their productive performance is not inferior to that of the biggest commercial farmers.
Niger	Gavian and Fafchamps, 1996	There are no significant differences in the farmer's investment behavior when he owns his land individually (which implies that he has the right to freely dispose of it) and when the land farmed is a so-called *hawjou* land which has been borrowed from a pool of community land entrusted to the village chief.
Rwanda	Migot-Adholla et al., 1991; Place and Hazell, 1993	In Butare and Gitarama, long-term improvements are positively related to land rights, but not in Ruhengeri. The ability to bequeath land rather than to transfer it freely appears to be an important determinant of investment.
Ghana	Migot-Adholla et al., 1991; Migot-Adholla et al., 1994	Land improvements were highly associated with security of tenure in Anloga, but to a lesser extend in Wassa, although not in Ejura. In Anloga, the ability to freely transfer land was positively related to investment in drainage or excavation improvements. In Wassa, tree crops were less likely to be planted on parcels on which farmers had only limited transfer rights, yet the results were not significant. In Ejura, there was no relationship between category of land rights and investment in tree crop planting or destumping.
	Besley, 1995	Tenure security has a clearly positive impact on investment in Ghana.
Burkina Faso	Saul, 1993	Investments do not vary significantly between owned and borrowed fields.
	de Zeeuw, 1997	Except for tree planting, which is considered as an act of appropriation, both borrowers and lenders are free to improve their parcels.
	Brasselle, Gaspart, et al., 2002	"The results obtained cast doubt on the existence of a systematic influence of land tenure security on investment".

Source: Adapted from Brasselle, Gaspart, et al. (2002), pp. 377-8.

The above results are partly attributable to the fact that potential lenders, especially formal creditors, are less likely to provide farm credit if a borrower's legal title to a land is not considered a secure collateral, either because the title is subject to competing customary claims, or because it is difficult to foreclose in case of a default (Barrows and Roth, 1989; Bruce, 1986; Collier, 1983). As noted earlier, in the African context, there is the persistence of indigenous control over land transfers even when land is legally registered, and this tends to reduce creditors' confidence in a registered title as reliable collateral. Moreover, potential creditors may believe that they will not be able to foreclose on a registered land in case of a default, if the judicial system is perceived to be ineffective and partial, whereby land belonging to the rich and powerful borrowers cannot be foreclosed because the system is under the influence of their political allies. All of this has converged to explain why the existence of a legal registered title is not a sufficient condition for increasing smallholders' access to farm credit and investments in the context of African countries.

3.2.3.4 The Supply of and Demand for Private Land Titling

The fourth and final prediction of the evolutionary theory of land rights is that changes in relative land scarcity and in technological possibilities due to population growth will encourage the majority of land claimants to demand more private land rights (i.e. legal registered titles) to take advantage of these possibilities, and more importantly, that the state will have the incentive to supply such rights. As argued previously, the demand for land in many African countries is influenced more by non-economic factors than by pure market exchange institutional arrangements, such as legal registered land titles. This

implies that the demand for land registration is likely to be at least socially constrained in these countries. Furthermore, even if it is the case that there exists a strong social demand for private land titling, the crucial question remains as to how much of this required institutional innovation will be supplied by the government.

From the tradition of public choice theory or the economics of politics (Downs, 1957; Buchanan and Tullock, 1962; and Breton, 1974), it can be argued that because of the 'public good' nature of the provision of private land rights the state may not be able to adequately supply such rights. Social rules, such as private property rights, have the characteristics of 'non-rivalness' and 'non-excludability' common to public goods. A good is non-rival if it can be simultaneously utilized by many, and it is non-excludable if it can be utilized by everyone including those who do not pay for the cost of its supply (Stiglitz, 2000). For instance, laws providing for the general protection of private property in a community benefit every individual regardless of whether he or she pays taxes to finance the police force. Because of this non-excludability property, and the resulting temptation for everyone to become a free-rider in the use of public goods, collective action is usually required in their provision. However, as Olson (1965) predicts, such collective action is more likely to be organized at a socially suboptimal level, because only part of its returns accrues to those who actually bear the cost of organizing the action.

Collective action needed to provide a public good is often organized by a 'political leader' or 'politician' who applies major efforts to bring people together in manipulating the coercive power of the state to provide the public good. Public

choice theory suggests that unless the returns to the political leader from organizing the collective action exceed his or her cost, he would not attempt to organize the action (Hayami, 2001). The graph in Figure A3.2 in the Appendix explains this behavior of the political organizer of collective action. Lines MR represent his decreasing marginal revenue from successfully prevailing upon the state in increasing the supply of registered land titles. Marginal revenue for the organizer is defined as the extra increase in his utility from the strengthening of his power base, which is expected from a unit increase in the provision of registered titles. This line is downward-sloping because it is reasonable to assume that the marginal social productivity of a public good tends to decrease as its supply increases, with a resulting reduction in marginal gain in political support from beneficiaries of the good (Hayami, 2001). Similarly, lines MC are the marginal cost curves facing the political organizer, which measures the marginal disutility of his time and efforts in organizing collective action. The line is upward-sloping because it is reasonable to assume that the cost of preventing 'free-riders' rises as the supply of the public good increases, since a larger number of consumers of the good will have to be organized. At any given level of the quantity of registered titles supplied, the vertical distance between the MR and MC lines determines the marginal net utility or marginal profit of the political organizer, which is maximized in the initial period (0) at the intersection A of the two lines, with the resulting optimal supply of the public good, $0Q_0$.

Suppose now that towards the next period (1) there is a population expansion causing an increase in the relative scarcity of land, thus leading to changes in technological possibilities. Assume also that, in line with the

prediction of the evolutionary theory, these new technological possibilities become profitable for a large number of producers; and as a result, the potential beneficiaries render stronger support for the political organizer who would then act to advocate for more private land titles. This would shift up the politician's marginal revenue curve from MR_0 to MR_1, resulting *potentially* in a greater supply of legal registered titles from $0Q_0$ to $0Q_1$. Thus, it appears that the mechanism of induced technological innovation can also work through its effects on the supply of public goods in the 'political market'. However, the problem with the operation of such a political market is that the increased social demands for registered land titles (i.e. the public good) may not be efficiently translated into an adequate upward shift in the political organizer's MR curve (Hayami, 2001).

There are at least two reasons why the social demand for registered land titles may not be efficiently converted into a significant upward shift in the MR curve. First, although the social benefit of registered land titling is large in the aggregate, such a benefit is often distributed thinly over a large number of private farmers; as a result, the potential benefit may not be visible enough to mobilize public political support or lobbying activities for the political organizer. Since the magnitude of the shift in the organizer's MR curve, and thus the supply of land titling, depends on the amount of political support received from potential beneficiaries of titling, there is likely to be an under-provision of this public good.

The second reason why the social demand for land titling may not be efficiently translated into an adequate supply of registered titles relates to the slope of the MC curve. As can be seen from Figure A3.2, the increase in the supply of registered titles in response to a given right-ward shift in the marginal

revenue curve from MR_0 to MR_1 is larger for a relatively flat marginal cost curve such as MC_0 than for a sharply rising curve such as MC_0'. A key determinant of the slope of the MC curve is people's value system. For instance, the marginal cost of providing private land rights would be high, and the MC curve would be steep, in a society organized around strong communal values. Similarly, conflict over land rights would sharpen the slope of the curve. If, as argued previously, there is strong opposition to tenure privatization in a community, the marginal cost of implementing such a program would rise sharply.

3.3 Efficient Agricultural Investment and Land use under Cooperative and Non-Cooperative Management

It has been argued, in the previous section of this chapter, that the propositions of the ETLRs, regarding the inevitability of privatized land tenure, are at best untenable in the context of West African countries. As explained above, one of the key points of the privatization argument is that private land rights encourage individual farmers to undertake greater investments in land improvement and to efficiently utilize the natural resource base. On the other hand, customary tenure institutions, founded largely on collective and cooperative resource management, are portrayed as being detrimental to such investment incentives and efficiency. In this second major section of the chapter, a behavioral model is presented and empirically illustrated, explaining how individual farmers in a community can decide on how much investment to undertake in agricultural land improvement under two different institutional setups: (a) communal or cooperative use and management of land resources, and (b) privatized or non-cooperative use and management of resources.

This model, which is adapted from a more comprehensive model found in McCarthy et al. (1998; 2001) and McCarthy et al. (2004), seeks to address part of a generic set of strategic decision problems in which an individual decides how much of a collective or public good he or she will appropriate, or how much he will contribute to achieving a collective objective. How much the individual appropriates from or contributes to realizing the common goal often depends upon the marginal utility of his appropriation or the benefit derived from his contribution to the collective activity. This marginal utility is in turn affected by the behavior of others who utilize the public good or contribute to the collective objective. An individual's utilization of a public good or decision to contribute to a collective activity is even more strongly dependent upon the decisions of others, if there are externalities or economies of scale associated with his or her own utilization or contribution. Because of 'non-excludability' from the benefits of a collective activity, and thus the temptation for any one to become a free-rider in their use, only part of these benefits accrues to those who shoulder the cost of the activity. This is the basic cause of a general undersupply of public goods.

3.3.1 Dual Individual-Collective Land Use Decisions in West Africa

With rapid demographic growth and increased migration flows, patterns of land use in West African agriculture have undergone enormous changes in the last 30-40 years, including the continuous expansion of cultivated areas through the clearance of uncultivated forests and woodlands that were previously under the communal ownership and protection of local villages. Thus, for example, it is estimated that in Ghana whereas cropland occupied only 14.5 percent of national space in 1961 it accounted for 25.5 percent in 1995. Equally, in Côte d'Ivoire

cropland increased from 8.5 percent to 23.5 percent over the same period. Similar rates of growth can be found in much of the region, though the paucity and quality of data does not allow one to pinpoint the exact magnitudes of these changes (Toulmin and Guèye, 2003). It can be argued, however, that in the specific context of rural West African communities, such a large-scale exploitation of community forests and woodlands reflects an outcome of strategic decision making by individual farmers facing certain resource constraints and objective economic preferences. With rapid population growth and limited farming technology, massive investment of labor in clearing communal forest land is considered as a relatively more efficient production strategy, at least in the short run, bringing higher returns to the land user than investment in intensive use of land under semi-natural vegetation (Mortimore, 2003). This is because uncultivated virgin land is considered to be more naturally fertile and thus requires less improvement than land under continuous cropping. Although land under full natural vegetation represents an important factor of production in the context of shifting cultivation, its overexploitation not only poses the long-term negative consequence of deforestation but also constitutes a disincentive for farmers to invest in building the necessary capital for intensive farming. That is, as a farmer cultivates more virgin and naturally fertile land, he or she has a less incentive to invest in land improvement for intensive cultivation.

The foregoing discussion suggests that the problem of land resource management in rural West African communities can be analyzed through a model in which individual farmers decide how much new communal forest areas they clear for cultivation, relative to land already owned under intensive

cropping. Such dual individual-collective land use decisions are constantly being faced by many rural farmers in West Africa. In the absence of the necessary land-saving agricultural inputs and technology for continuous farming of individually cultivated plots, farmers often decide to clear community forest lands both as an investment cost-reducing and a short-term output-increasing strategy (see Lopez, 1998 and Ahuja, 1998).

In the above context, the amount of communal land that each individual farmer will cultivate depends on the efficiency in the management of the land, which in turn depends on the ability of community members to cooperate in reducing the negative externalities created by individual incentives to overexploit the resource. These externalities include the negative effects that the clearing of the land by one farmer has on other farmers, through soil degradation, flooding and sliding, the reduction of fallow and forest areas as well as the decline in the availability of animals for hunting. In a study of an area in western Côte d'Ivoire, Lopez (1998) found that farmers have overexploited the natural resources (forests and natural vegetation in fallows) through excessive cultivation of communal lands, because they internalized or considered only a small portion of these externalities (about 30 percent) in their production decisions.

The objective of this model is to show that if cooperative behavior prevails, that is, if rural communities succeed in maintaining a system of incentives and controls over individual cultivators that induces socially optimal land-allocation decisions, individual farmers will decide to clear only the efficient amount of communal land and invest more in intensive cultivation of their existing individualized plots. On the other hand, if the community is unable to cooperate

in managing the common resource, that is, if there exist non-cooperative or individualized management decisions, efficiency in using communal land will be low, and individuals will overexploit it; consequently, there will be less individual incentive for investment in the intensive cultivation of existing individualized plots. Thus, contrary to the view that farm investments, agricultural capital formation and modernization are positively associated with privatized or non-cooperative land tenure, this model intends to show that such a link is indeed an inverse relationship.

3.3.2 The Theoretical Model

Consider a rural community with M members and a total amount of cultivable land R. Each member i has a privatized use right over an individual plot area s_i which he or she cultivates intensively by making continuous investment in land improvement. Thus, the total amount of cultivable land under individualized intensive farming in the community is given by $S = \sum_i^M s_i$. In addition, the community has an area CF in communal forest and fallow land which is naturally fertile and therefore requires no further fertility-increasing investments. Hence, the community's total stock of cultivable land is $R = S + CF$.

Members choose to produce a single crop, and are assumed to maximize their profits and therefore consider the relative investment costs of intensive farming on individualized plots versus extensive farming on fertile communal land, when deciding how much crops to produce. Since communal forest land requires less fertility-improving investment, each farmer decides to appropriate a portion of it, h_i, as a cost-saving strategy. That individual farmers tend to

appropriate uncultivated communal land is a reasonable description of rural farmers' behavior in West Africa. Although primary forests and uncultivated woodlands in the region are theoretically controlled by traditional authorities such as village chiefs, field observations suggest that such lands are essentially open-access resources to which all community members enjoy use rights (Feder and Noronha, 1987; Bromley, 1992; Feder and Feeny, 1993). It is only specific plots under continuous and intensive cultivation over which individual households have exclusive *usufruct* rights and which the extended family owns (Quisumbing et al., 2001).

However, different communities allow different rules for accessing communal resources. In this model, the implications of cooperative and non-cooperative land management rules for farm investment and capital formation and for efficient land use are investigated. Communal or cooperative land management implies that community members can achieve a degree of success in jointly determining the total amount of communal land that individual farmers are allowed to appropriate. Because the community has an interest in preserving some forests and woodlands, this total area for individual appropriation is desired to be less than the available amount of communal forest land (i.e. $H = \sum_{i=1}^{M} h_i < CF$). Moreover, with all members assumed to have equal constitutional cultivation rights in communal land, based on deep-rooted egalitarian principles that do not allow for differential treatment of members, the optimum amount of land that each farmer can have under cooperation is $h^* = H^* / M$ (where the * denotes optimality).

While some of the literature tend to conceptualize cooperation separately from non-cooperation, there is also a large body of empirical evidence supporting the notion that communities are unlikely to either fully cooperate or completely not cooperate (Ostrom, 1990; Platteau and Baland, 2001); instead, because achieving collective action is costly, outcomes are likely to be between the two extremes (Oakerson, 1992). Thus, as argued by McCarthy et al. (2004), outcomes are not likely to result from a binary choice between perfect cooperation and absolute non-cooperation, but rather a function of variables affecting the "successfulness" of cooperation. In other words, there are bound to be intermediate levels of cooperation along a continuum, which in turn imply the existence of intermediate levels of land use and investment outcomes.

In the present model, a movement towards the non-cooperative end of this continuum is regarded as a movement towards the private land tenure option, in the sense that once a farmer appropriates and continues to cultivate a piece of communal land, it becomes the property of the family to which that farmer belongs. Such a behavior, as argued earlier, approximates the West African reality, in that individuals do enjoy exclusive usufruct rights to specific plots under their continuous cultivation.

It is an appropriate strategy to consider the non-cooperative tenure approach as a proxy for land rights privatization. This is because, as already pointed out, the mechanism of private land titling and registration being used to accomplish tenure privatization involves taking land claims out of the realm of informal lineage and customary tenure and making them formally legal and individualized. In almost all cases, however, such shifting of land rights is never

achieved cooperatively, in that the state and international land reform actors, community representatives, and the new private land owners never together decide the new rights dispensation. In fact, as argued earlier, there is evidence in the African context that the process of private land titling has been politically manipulated, whereby certain public and customary lands are expropriated by powerful government officials, without the community's consent, under the camouflage of the privatization programs (Klopp, 2000). Thus, in the further development and operationalization of the model, a lower level of cooperative land management (alternatively, a higher level of non-cooperation) is conceived as reflecting a greater level of land privatization, and a higher level of cooperative management signals a greater communal land tenure.

As already stated, the primary objective of this model is to show that depending on the degree of success in cooperative land management, farmers will actually cultivate the jointly determined amount of communal land, and in so doing undertake an amount of investment in intensive farming on their individualized plots that is socially optimal. Complete success in cooperative management implies that, given the attendant costs of cooperation, the community can perfectly manage its common resources (in the sense that all externalities are internalized). Conversely, if there is no cooperation on the amount of communal land to be appropriated, individuals will excessively exploit the resource since each farmer is concerned only with his or her own profit maximization. In this case, individual appropriations of communal land will tend to exceed the jointly determined amount (i.e., $h_i > h^*$), thereby creating a negative externality on other community members. Moreover, given such excessive

communal land cultivation, individual farmers will have less incentive to invest in intensive farming, and therefore the aggregate level of farm investment and capital formation will tend to be lower than the social optimum.

The overall decision process regarding appropriation from communal land can be conceptualized as a principal-agent problem solvable in two stages, where in the first stage a cooperative agreement on the optimum amount of individual appropriation ($h^* = H^* / M$) and on the enforcement mechanism is reached; and in the second stage members individually choose their corresponding intensive farming investments (k_{pi}) given their communal land allocations.[8] More specifically, this may be viewed as if there were a social planner (representing the collectivity of the M community members) who acts as the agent setting the amount H (and hence h_i) in the first stage; and individual members, anticipating this behavior of the social planner in setting this amount and the enforcement mechanism, act as the principals and decide on their intensive farming investments in the second stage.

STAGE 1

In the first stage, the social planner or community members cooperatively choose the total amount of communal land appropriation H and agree on an enforcement mechanism. This enforcement mechanism is characterized by its financial costs C_i, spent on monitoring each member's actual appropriation of

[8] An *agency relationship* is characterized by an arrangement in which one person's welfare depends on the action of another person. In a principal-agent problem, the agent is the person who acts, and the principal is the party whom the action affects. A principal-agent problem arises when agents pursue their own goals rather than those of the principal. For a detailed discussion of this concept, see Pindyck and Rubinfeld (2005, pp. 627-632).

communal land, and by a fixed penalty Q imposed on members caught cheating (i.e. exceeding the jointly determined appropriation). That the enforcement of such an agreement requires an individual-specific cost C_i, rather than an overall fixed cost, is justified in the case of monitoring different individuals cultivating on large and non-contiguous communal lands.[9] The more effort the community puts into monitoring, in terms of the amount of C_i expended, the higher is the probability that any member violating the agreement will be caught. The relevant task then is to define what the community's minimum monitoring expenditure should be in order to prevent each member i from cheating. If $prob(C_i)$ is the probability of being caught if cheating, and G_i^{nc} is the gain or profit that a member obtains from not cooperating, then member i will choose not to cheat if and only if

$$prob(C_i) \times Q - (1 - prob(C_i)) \times G_i^{nc} > 0. \quad (1)$$

Note that when a member violates the agreement, this implies that he or she appropriates an extra piece of communal land over and above what the community jointly agreed upon, which is given by $h_i - (H^* / M) > 0$. Since each member's total profit from farming is partially a function of his communal land use, the additional profit he gains from appropriating the extra land will be equal to the product of his marginal profit from communal land use and the extra land cleared. That is, $G_i^{nc} = (\partial \pi / \partial h_i) \times (h_i - H / M)$, where the partial derivative $\partial \pi / \partial h_i$ is the individual farmer's marginal profit from communal land use, which is

[9] In their model, McCarthy *et al.* (2001) include also a fixed cost parameter to implicitly capture the community's ability to enforce rules and other common characteristics. In this model, a similar 'social capacity' parameter is explicitly defined to capture such characteristics.

assumed to be the same for all farmers. Using the following simple monitoring technique, the minimum monitoring expenditure that the community must incur to prevent any individual from violating the agreement can be derived from the relation:[10]

$$prob(C_i) = \frac{C_i(1+\lambda^{sp})}{1+C_i(1+\lambda^{sp})} \qquad (2)$$

where λ^{sp} is an index, bounded below by 0 and above by 1, which measures the community's *social capacity* to cooperate.

In the present context, *social capacity* refers to the ability of rural people to organize and use their social capital and other assets (such as access to state institutions and political power) to effectively enforce collective agreements. Following similar analyses in Reimer (2002a; 2002b) and Tiepoh and Reimer (2004), it is proposed here that the level of successful enforcement of collective agreements in a rural community depends on the extent to which people in that community are able to organize and use their social capital assets. Communities in which people are engaged in social structures, relations, and processes that facilitate the effective use of social capital in enforcing collective agreements are likely to enjoy higher rates of success in the enforcement of such agreements. Those in which people are involved in social relations and processes that facilitate the use of social capital less effectively in the enforcement of agreements are likely to experience lower success rates.

[10] This is a modified version of the monitoring technique used in McCarthy et al. (2001), in which the probability of catching a violator depends only on the monitoring cost: $prob(C_i) = \alpha C_i/(1+\alpha C_i)$.

The index λ^{sp} is therefore a function of the socio-economic and political characteristics of a community, such as the extent to which it contains structures of social relations (social organizations and family systems) that nurture obligations and expectations, information channels, and social norms; has a commitment to honoring social contracts; and is marked by a successful 'synergy' between local-level institutions and state developmental intervention. State-society synergy here refers to an idea propounded in certain theories of development, which suggests that active government and mobilized local communities can facilitate each other's developmental goals and programs (Heller, 1996; Evan, 1996). State intervention in local-level development is not necessarily counterproductive. Depending on whether and how the state engages with local communities (for instance, by embedding its administrative, bureaucratic-legal, and fiscal capacities within local-level institutions through decentralization), local capacity for co-operative resource governance may be strengthened. Such socio-economic and political characteristics are almost always hypothesized to have a positive effect on cooperation because they make creating and enforcing decisions less costly by overcoming informational asymmetry (Ostrom, 1990; White and Runge, 1994).

Thus the above equation simply states that the probability of catching a violator is an increasing function of the community's monitoring expenditure level and its social capacity to cooperate. It can be illustratively confirmed using actual numerical data that, as the amount of the individual monitoring cost C_i and the value of λ^{sp} rise, the probability of catching a cheating member approaches 1. More importantly, the equation shows that for any given amount of

monitoring cost, the probability rises with the level of social capacity. This suggests intuitively that communities with high levels of social capacity to cooperate are able to successfully monitor their members than those with less capacity. As illustrated below, this means that a community's monitoring and enforcement costs of cooperation can be inversely related to its social capacity to cooperate. That is, communities with high levels of social capacity are likely to spend less on monitoring and enforcement.

Substituting equation (2) into the inequality (1), and then simplifying, gives the following relation that defines the minimum cost that the community must expend in order to prevent a member from cheating:

$$C_i > \frac{G_i^{nc}}{Q(1+\lambda^{sp})}. \qquad (3)$$

This constraint implies that the minimum cost of inducing cooperation from a member depends not just on the profit incentive G_i^{nc} that he or she expects from non-cooperation and the amount of the credible penalty Q threatened, but also on the community's social capacity to cooperate. As indicated above, there is an inverse relationship between the minimum cost of cooperation and social cooperative capacity. For instance, notice that if the community has no social capacity (i.e., $\lambda^{sp}=0$), then it must spend a higher amount in monitoring cost, which is above G_i^{nc}/Q, since the only force that will restrain members from cheating is the threat of the credible penalty Q. At the other extreme, if the community has full social capacity (i.e., $\lambda^{sp}=1$), then it must spend only a lesser minimum amount, which is above $G_i^{nc}/2Q$ (i.e. exactly half compared to the case

of $\lambda^{sp} = 0$). The minimum cost will be less in this case because, with stronger positive social norms, relationships and networks (i.e., a greater social capital stock), individual community members can monitor and restrain the behavior of one another, thereby reducing the minimum financial cost of monitoring. Moreover, to the extent that the state's main developmental institutions are embedded in local institutions, this can help underwrite the political and administrative costs of cooperation.

From the foregoing analysis, the social planner's problem is to choose the total appropriation of communal land H that maximizes the community's welfare as measured by its total profit from farming, subject to the given minimum monitoring cost constraint. This gives the following constrained optimization problem:

$$Max\Pi = \sum_i pf(s_i, k_{pi}) + pF(H,K) - \sum_i C_i - \bar{c}_p \sum_i f(s_i, k_{pi}) - \bar{c}_c F(H,K)$$
$$s.t.\ C_i > G_i^{nc} / [Q(1+\lambda^{sp})]. \qquad 4)$$

In this problem, p is the market price of crop produced on either privatized intensive plots or appropriated communal plots; f is the crop production function on privatized plot for a farmer i with a land input s_i and a fixed productive asset k_{pi} (including only *current* land-improving fertilizer and labor inputs). Henceforth, in order to simplify notations, the subscript i is omitted from all expressions wherever this poses no confusion. For the rural West African communities on which this model will be empirically illustrated, production technology is highly traditional with fertilizer and labor inputs being the most significant variable inputs. Because the land is under intensive

cultivation, it has already been cleared of trees and bushes during previous farming seasons; roots and stones have been removed, and terracing and fencing have been constructed. Thus, k_p constitutes only soil fertility-improving investments, such as fertilizer and labor input (e.g. in manuring and mulching), and not fixed capital such as heavy farm machinery.

In order to simplify the mathematics of the problem, an aggregate production function F is used to *roughly* represent the total output of crops from community members as if working collectively on all appropriated communal lands H, using a combined productive asset K.[11] This stock of asset comprises all farm equipments and machinery used for clearing forest, as well as labor for preparing the land, and planting and harvesting crops. In this regard, communal land cultivation requires no soil fertility-improving investments, but only labor and farm equipment. On the other hand, intensive farming on privatized plots requires such investments. Both types of farming, however, require labor input and thus compete with each other only in the use of this fixed resource.

Thus, the first two terms on the right in the above specification give the community's total revenue from production on both existing privatized plots and newly appropriated communal land. The last three terms give its total costs of production. $\sum_i C_i$ is the total cost of monitoring all community members. If $\overline{c_p}$ denotes a constant marginal financial cost of crop production on privatized farms in the community, which is assumed to be the same for all farmers, then the term

[11] Note that differences in returns to scale between individual and collective cultivations of communal land may cause the overall output level generated by this aggregate production function to deviate from the total of outputs generated by individual production functions.

$\bar{c}_p \sum_i f(s_i, k_{pi})$ is the total variable cost of production on all privatized land. Such cost includes the costs of both labor and land-improving investments. Similarly, the term $\bar{c}_c F(H,K)$ gives the total cost of production on appropriated communal land. This latter cost largely includes the fixed cost of labor for clearing new forest. Although farmers employ stocks of farm equipment in land clearing, the costs of such equipments are not completely counted in the calculation of current profit, since these assets are often given historically, i.e., having been acquired in the past. Thus the above term includes mostly depreciation costs and some minimum amounts for new equipments.

The above specification represents an optimization problem under inequality constraints. In solving such a problem, the most common approach is to derive the relevant Kuhn-Tucker first-order conditions from which the optimal values of the decision variables of interest can be determined.[12] Using this method, the following equilibrium condition governing the community's optimal amount of communal land appropriation, H^*, is derived:

$$F_H'(p - \bar{c}_c) = \frac{1}{Q(1+\lambda^{sp})} \tag{5}$$

In this equation, the partial derivative F_H' gives the marginal productivity of communal land. In other words, it is the additional output that the community would obtain, if one extra unit of communal forest and fertile land were to be brought under cultivation. Since p and $\bar{c}_c$ are the unit price and cost of output, respectively, the expression $F_H'(p - \bar{c}_c)$ is the marginal profit from communal land

[12] For the details of this method, see Léonard and Long (1992), pp. 52-67.

appropriation. The right-hand term represents the enforcement or monitoring cost for that additional unit of land appropriation. This is an important equation, which shows that the total amount H^* that the community cooperatively agreed upon, and at which the above condition holds, is indeed the optimal or equilibrium amount which maximizes its economic welfare as defined in terms of profits. Given as constant the stock of the community's other productive assets K (labor, farm equipment, and fertilizer), any additional communal land cultivation beyond H^* causes marginal profit to fall below the unit cost of enforcement. Alternatively, beyond this level, the monitoring of communal land use becomes costly relative to profit returns, and in order for the community to prevent additional cultivation and thus minimize further losses, it would have to raise either the amount of penalty Q and/or its social capacity to cooperate λ^{sp}.

Crop yield response to inputs has traditionally been specified as polynomial functions such as the quadratic or square root forms. These functions are relatively easy to estimate, being linear in parameters, and also exhibit diminishing marginal productivity and input substitution. And although they have been criticized (Ackello-Ogutu et *al.*, 1985), they remain the most commonly used crop response functions (Llewelyn and Featherstone, 1997). Hence, for deriving the total and individual optimal levels of communal land use H^* and h^*, a quadratic response function of the following type is used:

$$F(H,K) = a_0 + a_1 H + a_2 K + a_3 H^2 + a_4 K^2 + a_5 HK \qquad (6)$$

Taking the derivative of this equation, which gives the marginal productivity F_H', and substituting this into equation (5) and simplifying the result, we have the optimal appropriations of communal land as:

$$H^* = \frac{1}{Q(1+\lambda)} \cdot \frac{1}{p - \bar{c}_c} \cdot \frac{1}{2a_3} - \left(\frac{a_1}{2a_3} + \frac{a_5}{2a_3} K \right)$$

$$h^* = H^* / M = \frac{1}{M} \left[\frac{1}{Q(1+\lambda^{sp})} \cdot \frac{1}{p - \bar{c}_c} \cdot \frac{1}{2a_3} - \left(\frac{a_1}{2a_3} + \frac{a_5}{2a_3} K \right) \right]. \quad (7)$$

These equations indicate that, in equilibrium, the total amount of communal land, and thus the individual appropriation of such land, that a community will allow for cultivation is a decreasing function of its social capacity to cooperate λ^{sp}, the amount of penalty Q it can impose on potential violators, and the number of households M in a community. A high social capacity reduces the unit financial cost of monitoring and thus facilitates a greater effort and success in monitoring, thereby preventing potential cheaters from grabbing more communal land. Similarly, the amount of penalty discourages communal land appropriation by controlling individual incentives. Finally, assuming that productive assets K (i.e. farm equipment and labour) are complementary to communal forest land in the production process, then a positive link should be observed between both.

STAGE 2

Given the optimum amount of communal land, $h^* = H^* / M$, that each farmer can cultivate, individual farmers decide on how much productive assets and land-improving investment to commit to intensive farming on their

privatized plots and to communal land farming. Let $\bar{k}_p$ be the maximum amount of land-improving investment that a farmer can make, when he or she cultivates no communal land. Also, assume that for every unit (say acre) of communal land cultivated, the amount of such investment decreases by β, since the farmer has to divert some labor input towards communal land farming. Then the actual amount of investment the farmer makes, given the communal land area h^*, may be expressed as $k_p = \bar{k}_p - \beta h^*$, where $\beta > 0$ as long as $h^* > 0$, and $k_p = \bar{k}_p$ only if $h^* = 0$. This relationship captures the proposition that the amount of investment committed to intensive farming by a farmer is negatively related to the optimal amount of communal land allocated to him or her, as explained by the fact that a greater area of communal fertile land reduces the farmer's incentive to spend on investment in intensive farming. Also, such a larger area requires that the farmer diverts more of his or her household labor to working the communal land.

Let k_c denote the amount of farm equipment and labor input that a farmer can invest in communal land farming. Then the total amount of investments and assets committed to both privatized and communal land farming, under cooperation, is specified as

$$T = k_p + k_c \tag{8}$$

where k_p is as defined above. Furthermore, as proposed earlier, suppose that the crop yield functions governing production on privatized and communal lands are represented respectively by the following quadratic forms:

$$f(s,k_p) = b_0 + b_1 s + b_2 k_p + b_3 s^2 + b_4 k_p^2 + b_5 k_p s$$

$$g(h,k_c) = a_0 + a_1 h + a_2 k_c + a_3 h^2 + a_4 k_c^2 + a_5 h k_c \qquad (9)$$

where the $a's$ and $b's$ measure the productivity effects of the various factor inputs (the subscript i is omitted to simplify notation); and $\sum g(h,k_c) \approx F(H,K)$. Then the farmer's problem is to choose the amount k_p that maximizes his or her profit, subject to the resource constraint specified in equation (8). That is:

$$Max\Pi_i = pf(s,k_p) + pg(h,k_c) - \bar{c}_p f(s,k_p) - \bar{c}_c g(h,k_c)$$

$$s.t.\ T = k_p + k_c, \text{ where } k_p = \bar{k}_p - \beta h^*, \text{ and } h^* = H^*/M. \qquad (10)$$

This is an equality-constrained optimization problem, which can be solved using the method of Lagrange. In this problem, $\bar{c}_p$ and $\bar{c}_c$ are, as defined previously, the constant marginal costs of production on privatized farms and communal land farms, respectively, which are unequal since communal land is assumed to be naturally more fertile than land under intensive cultivation.

From the first-order conditions of the above problem, using the Lagrange method, the optimal level of investment in intensive farming is given as:

$$(k_p)^* = MPKCM \times \frac{1}{2b_4} \times \left(\frac{p - \bar{c}_c}{p - \bar{c}_p} \right) - \frac{(b_2 + b_5 s)}{2b_4} \qquad (11)$$

where the * denotes optimality, and $MPKCM = a_2 + 2a_4 k_c + a_5 h^*$ is the marginal productivity of farm equipment and labor in communal land farming, since this is the partial derivative of the crop response function g for communal land, with respect to k_c. The expression $(p - \bar{c}_c)/(p - \bar{c}_p)$ is the ratio of the profits per unit of output from communal land cultivation and privatized land intensive farming,

and since the $b's$ are productivity coefficients, the terms on the right of the equation together measure the amount of land-improving investment in intensive farming. As indicated by the variables in the marginal productivity term (MPKCM), this amount of investment is a function of the optimal level of individual communal land allocation. If the hypothesis of an inverse relationship between communal land use and privatized land investment holds, then a negative sign should be observed for h^* in any econometric estimation of the above land investment equation (11). Indeed, this outcome is hinted by the theoretical restrictions imposed on the signs of the parameters a_4 and a_5 in the quadratic production function being used. Llewelyn and Featherstone (1997: 524) have argued that in order for this function to exhibit a non-zero elasticity of substitution among factors and diminishing marginal productivity, it must be that $a_4 < 0$ and $a_5 < 0$ (if factors are competitive). Thus the regression estimate of the coefficient a_5 for h^* is expected to be negative.

3.3.3 An Empirical Illustration of the Model

The key proposition underlying the present Chapter and the theoretical model presented above is that a cooperative approach to land management, based on certain political and social capacity conditions, is more likely to succeed in preventing the overexploitation of land and facilitating investments in agricultural intensification and modernization. As long as there remains some uncultivated communal forest and fallow land, a non-cooperative or individualized approach to land management will allow individual farmers to overexploit it in an attempt to save costs of investment in intensive farming.

Thus, the argument by the induced innovation and property rights schools that population growth leads to land tenure privatization which in turn promotes agricultural intensification may be qualified to suggest that such an outcome is possible only in the long-run, when population expansion reaches such a point that all communal forest and virgin land has been completely expropriated for private use. However, such a point of the complete exhaustion of communal forest/virgin land may never be reached in societies where environmental constraints might be invoked to rule out this outcome, as per national constitutional and legal provisions. Therefore, in such societies, some amount of uncultivated communal forest land is likely to be present at all times, with the implication that given a non-cooperative and individualized approach to land management rural farmers, and in some cases backed by certain powerful political actors, will always be tempted to overexploit the resource.

In an empirical assessment, therefore, one should observe a negative relationship between variables indicating cooperative management and communal land exploitation. A greater level of cooperation (or less non-cooperation) is likely to be associated with a lower level of communal land exploitation and with a higher level of investment in intensive farming. These propositions will be illustrated using the communal land use equation (7) and the intensive farming investment equation (11) which, for empirical purposes, have been re-specified as follows:

$$h_i = a_0 + a_1 \lambda_i^{sp} + a_2 Q_i + a_3 k_{ci} + \varepsilon_i \tag{12}$$

$$(k_{pi}) = \gamma_0 + \gamma_1 h_i + \gamma_2 k_{ci} + \gamma_3 s_i + \varepsilon_i \tag{13}$$

where the dependent variable h_i is a nonlinear function of the independent variables λ_i and Q_i, and a linear function of the variable k_{ci}. Similarly, k_{pi} is a linear function of the independent variables in equation (13). Notice that in transforming from equation (7) to (12), the variable M representing the number of community households is apparently missing in the latter equation, since this was used as a divisor to arrive at that equation. The effect of this variable is included and captured, however, in the α coefficients in equation (12). Moreover, the variable k_{ci} also includes the influence of M since it is loosely a household-level transformation of the community-level farm equipment stock variable K (i.e., $k_{ci} \approx K / M$).

The appropriate interpretation of the above land use equation (12) is that it gives the amount of communal land cultivation for an individual household that has a stock of communal land farm equipment and labor k_{ci}, and which is located in a community having a shared social cooperative capacity λ^{sp} and threatening a fixed penalty amount Q against violators of collective agreements. While λ^{sp} and Q measure shared community-level characteristics, and therefore equation (12) may be viewed as a function relating a household-level dependent variable to community-level independent variables, each of these two variables can be conceptualized and reinterpreted to reflect a household level measure. As defined earlier, social capacity refers to the ability of community members to effectively enforce collective agreements through the use of their social capital and political power assets. While this ability is a common trait of the community as a whole, not all individuals and households can utilize it in the same way or to

the same extent, since they are likely to use social capital and power assets to different degrees. Therefore, a household-level capacity index λ_i^{sp} which varies not only across communities but also across households within communities can be reconstructed from the variable λ^{sp}.

Following a similar argument, the variable Q could be constructed such that there is a household-level measure Q_i of enforcement penalty. Due to differences in risk aversion, for instance, the *effective* threat of an enforcement penalty is likely to be different among individuals and households within the same community. For instance, a threat of a $500 fine may be considered an insignificant deterrent by someone who enjoys taking risks than by a person who hates taking risks. In this empirical illustration, however, because of the paucity of the available data, the assumption of an identical enforcement penalty for all households in a given community is maintained. Finally, the investment equation (13) estimates the amount of intensive farm investment made by a household that cultivates a communal land area h_i, and has a privatized farm area s_i and a total stock of farm equipment and labor k_{ci} for communal land cultivation.

3.3.3.1 Data and Estimation

The above equations are estimated using cross-sectional data from the household and community surveys of the 1988 World Bank's Living Standards Measurement Study (LSMS) for Côte d'Ivoire (the Ivory Coast). The household survey collected detailed information on expenditures, income, employment, assets, basic needs and other socio-economic characteristics of 1600 households organized into 200 rural and urban communities or clusters, while the

community survey collected information on economic and demographic characteristics of these clusters to which each household belonged. This empirical illustration uses data on 759 households constituting the 55 clusters or communities classified as "rural" in the survey. Such a selection was done in order to restrict the analysis to the rural sector.

In estimating equation (12), the dependent variable h_i is proxied by whether or not the land cultivated by a household had been fallowed. In the LSMS survey each household respondent was asked whether his or her current farm land had been fallowed and had to be cleared of forests. This produces a binary dependent variable h, which equals to 1 for respondents who cultivated fallowed land and zero for those who did not cultivate such land (see Table 3.2). This is a reasonable proxy for the use of communal forest land by households in each community, since lands in long fallow (especially forest and woodlands) are usually considered as communal forest land (Quisumbing et al, 2001).

Table 3.2: Description of Variables Included in the Two Equations

Models/Variable	Proxy
Equation (12)	
Communal land use (h)	Whether or not farmland had been fallowed: (h = 1 if land had been fallowed and 0 if not)
Social capacity (λ_1)	Household membership or non-membership in a farmers' cooperative: (λ_1 = 1 if cooperative member and 0 if not)
Social capacity (λ_2)	Household use or non-use of agricultural extension services: (λ_2 = 1 if household uses extension services and 0 if it does not)
Enforcement penalty (Q)	Maximum amount of penalty as function of population size: Q_1 = 1 if POP < 1,000 (i.e. low penalty) and 0 otherwise; Q_2 = 1 if 1,000 ≤ POP < 5,000 (medium penalty) and 0 otherwise
Farm assets in communal land cultivation (k_1)	Total number of hours in felling trees, burning, and planting

Models/Variable	Proxy
Farm asset in communal Land cultivation (k_2)	Total number of axes, machetes, and cutlasses
Equation (13)	
Investment in intensive farming (k_p)	Amount of household spending on fertilizers
Communal land use (h)	Whether or not farmland had been fallowed: (h = 1 if land had been fallowed and 0 if not)
Farm assets in communal land cultivation (k_1)	Total number of hours in felling trees, burning, and planting
Farm asset in communal land cultivation (k_2)	Total number of axes, machetes, and cutlasses

On the right-hand side of the equation, the four regressor variables are proxied as follows. The social capacity variable λ_i^{sp} is indicated by two proxies: (a) whether the household respondent is a member of a farmers' cooperative in the community, and (b) whether the respondent participates in the services of an agricultural extension center in the community. Theoretically, cooperation can be defined as the actions taken to internalize externalities, and cooperative capacity as the ability to undertake those actions. While no explicit information on cooperative capacity was collected in the LSMS survey, this information can be recovered by observable indicators of cooperation in other activities. In the survey, for instance, each household respondent was asked whether individuals from the household belonged to a farmer co-operative in their communities. They were also asked whether they participated in the services of an agricultural extension center in the community. Based on responses to these questions, two dummy variables are constructed: λ_1 which equals 1 for households reporting membership in a farmers' cooperative and zero for those reporting no such membership, and λ_2 which equals 1 for households that utilize extension services and zero for those using no such services.

Membership in a farmers' co-operative is a reasonable proxy for the cooperative capacity of farmers, not only because the presence of such cooperatives provides key repositories of social capital and indicate the extent to which community members are socio-culturally homogeneous and have a commitment to honoring social contracts, but also because being a member in them offers direct access to the use of existing social capital. Similarly, to the extent that the management functions of an agricultural extension center within a community are carried out in close collaboration with local-level organizations and institutions, such an extension may serve not only as an important social structure in which farmers build and utilize social capital but also as a system through which a state economic institution and farmers exchange innovative ideas regarding land resource management.

The credible penalty variable Q is indicated by the population size of each community. An ideal measure of such a variable would be information on whether and how much stated punishments are actually enforced in each community. In the absence of such information, however, the population size of a community may be used to indirectly gauge the amount of penalty. Urban sociologists (e.g., Wirth, 1938; Simmel, 1955; Weber, 1958; and Mayhew and Levinger, 1976) have long theorized and posited a link between population growth and criminality.

At least three broad intervening causal processes by which population size promotes criminality can be distinguished. The first process, which is based on the social control perspective, emphasizes how urbanization and population growth weaken informal mechanisms of social control which, in turn, results in

more crime and delinquency (Chamlin and Cochran, 2004). This is because while a large population increases the frequency of more predatory secondary contacts, it decreases the frequency of more affective primary ones, thereby constraining the *quality* of social interactions (Wirth 1938; Simmel 1955; Shaw and McKay 1972; Kornhauser 1978).

The second intervening process, based on the structuralist perspective, focuses on how the size and distribution of population groups within geographic units delimits opportunities for social interactions (Simmel, 1950). Thus, in contrast to the social control perspective, this approach emphasizes the causal effect of population size on the *quantity* of social contacts (Mayhew and Levinger, 1976). Finally, the subcultural perspective argues that the concentration of relatively large numbers of individuals within macro-social spaces fosters a multiplicity of behavioral choices and thus the creation and expansion of deviant subcultures (Fischer 1975; 1980; Simmel 1955).

In a multivariate analysis, Chamlin and Cochran (2004) have found that while population size has no appreciable effect on violent and property crime rates, it is by far and away the single best predictor of violent and property crime rates. Statistics of crimes within the United States bear this out. The rates of robbery and property crimes show the sharpest rise with urban size, with the rates of drug-related violence being heavily concentrated in large cities (Fischer, 1980). Thus, to the extent that these theories and studies hold, it is not unreasonable to expect communities with larger populations and thus the likelihood of having higher levels of social violations to threaten and impose higher penalties than those with smaller populations in order to prevent such

violations. Framed in this fashion, the size of population becomes a reasonable proxy for gauging the level of enforcement penalty.

Thus based on the various population sizes recorded in the survey, three categories of communities have been defined, corresponding to low population and thus low enforcement penalty communities (those with population less than 1,000); medium population and enforcement penalty communities (those with population 1,000 to 4,999); and high population and penalty communities (those with population 5,000 and over). This result in two dummy variables: Q_1 which equals 1 for communities with population $POP < 1,000$ and zero for all other communities; and Q_2 which equals 1 if $1,000 \leq POP < 5,000$ and zero if POP is otherwise. Because a constant term is included in equation (12), the number of dummies defined is one less than the number of population and penalty categories. If we included both the constant term and a dummy for each category, we would be introducing perfect multicollinearity.

The variable k_{ci} measuring the stock of assets committed to communal land cultivation is proxied by two indicators: the total number of labor hours per day employed in felling big trees, burning, and planting by each household (k_1); and the total number of axes, machetes, and cutlasses owned by each household (k_2). The first is a relevant indicator of communal land farming assets since the three categories of labour activities (felling big trees, burning, and planting) are more likely to be associated with communal forest clearing than with intensive farming. The second indicator is also appropriate given the assumption that such tools are more likely to be employed in forest clearing.

In estimating the investment equation (13), the dependent variable k_{pi} is proxied by the amount spent on fertilizer in the last year, by each household. Both the communal land use and farming asset variables h_i and k_{ci} are indicated as previously described. Finally, because the available data do not offer a reasonable proxy for the intensive farm land variable s_i, the effect of this is not directly estimated. In any case, however, this variable becomes superfluous in view of the way the communal land use variable is defined and proxied. Note that h_i is indicated by whether a household farms a land that had been fallowed or it farms land that had not been fallowed. The binary nature of this indicator implies that the effects of both the communal land use and intensive land use can be captured by the same variable h_i.

3.3.3.2 *Analysis of Results and Implications*

Given the categorical nature of both the dependent and independent variables in equation (12), this equation was estimated using a logistic or probit specification based on the method of maximum likelihood.[13] However, because the dependent variable in equation (13) is continuous and the independent variables are categorical, this equation was estimated using a dummy-variable specification. In the first case, the appropriate interpretation of the estimated regression coefficients is expected to be based on an analysis of predicted probabilities, while in the second case the interpretation of coefficients is to be based on a

[13] Theoretically, a probit or logistic regression function with Y as a binary dependent variable and X_1 and X_2 as independent variables models the probability that Y = 1 given X_1 and X_2, i.e., Pr (Y = 1 | X_1, X_2) = $\Phi(B_0 + \beta_1 X_1 + \beta_2 X_2)$. Because such regressions model the probability that the dependent variable Y equals 1, the estimated predicated probability values must be between 0 and 1.

difference of means analysis rather than the conventional way of interpreting such coefficients as slopes.

The estimation results for the two equations are presented in Table 3.3. The primary objective of this exercise was to illustrate whether cooperative management of rural land leads to its efficient use and, in the process, promotes intensive farming by encouraging farmers to invest in land improvement. Because the communal land use equation (12) was estimated through a logistic regression, the appropriate way to explain the results for this equation is to compare the predicted probabilities of land use at different values of the independent variables. It can be readily concluded from these results that all the variables measuring cooperative capacity and enforcement penalty (i.e., λ and Q) are inversely related to the probability of communal land use, and these relationships are statistically significant. For instance, as apparent from the signs of the coefficients, a household which is a member of a farmers' cooperative or uses agricultural extension services has a lower probability of overexploiting communal land resources.

Table 3.3: Land Use and Investment Impacts of Cooperative versus Non-Cooperative tenure

	EQ. 12 (MLE)	EQ. 13 (OLS)
(Constant)	5.5 (2.936)	32783 (2282)
Social capacity as defined by membership in a farmers' cooperative ($\lambda_1 = 1$)	-3.537* (.904)	
Social capacity as defined by the use of agricultural extension services ($\lambda_2 = 1$)	-3.566* (.469)	
Low enforcement penalty (POP < 1,000 and $Q_1 = 1$)	3.732* (.485)	

	EQ. 12 (MLE)	EQ. 13 (OLS)
Medium enforcement penalty (1,000 ≤ POP < 5,000 and $Q_2 = 1$)	3.602* (.625)	
Farm assets in communal land cultivation: Number of hours in felling trees, burning, planting (k_1)	-.154** (.093)	
Farm assets in communal land cultivation: Number of equipments owned (k_2)	.407*** (.312)	724** (403)
Communal land use (Land cultivated had been fallowed: h = 1)		-31968* (2684)
Adj. R-square	.64 F = 45**	.16 F = 51***

Note: *Single-starred values are significant at the 1 percent level or less; double-starred values are significant at 5 percent; and triple-starred values are significant at only 10 percent.*

Similarly, households located in communities that enforce low or medium penalties against collective agreement violators are likely to have higher probabilities of overexploiting communal land. More specifically, it has been calculated and verified from the results in the first column of Table 3.3 that households with high cooperative capacity (i.e., those belonging to farmers' cooperatives and using agricultural extension services), and at the same time living in high-enforcement penalty communities, are likely to have only a 9% probability of overexploiting communal land resources. On the other hand, households that lack such capacity (i.e. not members of cooperatives and using extension services), and at the same time located in low- and medium-enforcement communities, are likely to have a 99% probability of overexploitation.[14]

[14] The probability of a household cultivating communal land, or h being equal to 1, is the sum of the estimated coefficients when each independent variable takes on the ascribed value. Thus the sum 5.5-3.537-3.566-0-0 = -1.35 gives the z-value for a cooperative household member that uses extension services and living in a high-enforcement penalty community, and the sum 5.5+0+0+3.732+3.602 = 12.834 gives the z-value for a non-cooperative member utilizing no extension services and living in low- or medium-enforcement penalty area. These two z-values give 9% and 99% respectively.

Results for the investment equation (13) show that communal land use is associated with less investment on intensive farm land improvement. As indicated by the numbers in the second column of Table 3.3, holding farm equipment and labor assets constant, households that cultivate communal land (i.e., land that had been fallowed) have an average spending on fertilizers of only 815 CFA (i.e. 32,783 CFA – 31,968 CFA), while those that do not cultivate such land have an average fertilizer spending of 32,783 CFA. This means that the appropriation of an additional unit of communal land by rural households make them to reduce their investment in intensive farmland by approximately 31,968 CFA.

Notwithstanding the paucity of the data used in this empirical illustration, the results here suggest a general conclusion that collective rights and decisions over land can promote its efficient use in rural communities, by preventing or reducing overexploitation of this resource. Such cooperative management of resources is likely to be successful, if communities have the appropriate social capital assets, state-local institutional connections, and credible enforcement mechanisms that help mitigate the cost of monitoring and enforcing such agreements. Under such conditions, cooperative management of rural land may be a more efficient system of natural resource use and conservation, as opposed to outright privatization of land. This is because cooperative management not only discourages the short-run inefficient destruction of the land and natural environment, but by reducing the overexploitation of these resources, it also compels rural farmers to commit themselves to the intensive use of their existing individualized plots through continuous increases in land-improving investment.

Thus, it may be the case that cooperative land rights are the more effective carriers of private farm investments and capital formation than the outright privatization of such rights.

In the face of difficulties in acquiring the necessary means of investing in intensive farming, farmers are likely to take the easier route of exploiting existing and remaining communal forest and virgin lands, especially under a land-tenure system based on individualism and non-cooperation. This has two undesirable consequences, at least from the perspective of society as a whole. First, farmers will make no serious effort in undertaking land-improving investment activities, since they can engage in shifting cultivation of new communal land; this will not only cause degradation of the quality of their existing plots but also undermine the long-term growth of the stock of farm capital in rural communities. Second, as already stated, the overexploitation of remaining communal land has both short- and long-term negative economic, environmental and social consequences. Thus, rather than positing private land rights as the harbinger of investment incentives, the focus should be on designing the appropriate cooperative land-management systems that structure farmers' incentives so that they practice efficient use of available uncultivated land and undertake investment in the intensive utilization of their existing plots.

4 AGRICULTURAL GLOBALIZATION, LAND PRIVATIZATION, AND FOOD SUFFICIENCY IN WEST AFRICA

4.1 Introduction

The second research objective of this dissertation is to investigate the extent to which current policies of agricultural market liberalization and globalization have veered farm land use and investment patterns in West African economies towards cash crop production, and the implications of this for food security in the sub-region. Such an investigation can be pursued at two levels. At the first level, the task is to explain how private multinational corporate control over crucial agricultural research and technologies and input markets, resulting from these policies, has increased and accentuated the commercialization of agriculture in the form of export cash crop production, and how the latter in turn influences land tenure and use.

A key objective at this level of analysis is to show how the production of cash crops is inextricably linked to land privatization. Privatized land tenure and commercial agriculture are linked by the usual property rights argument that in order for the private multinational firms being encouraged under market liberalization to actually invest in commercial agriculture and for farmers to engage in such production, they must be assured of the returns from their productive investments and activities. Since this assurance is assumed to be possible only when investors and farmers have well-defined private land rights,

then it follows that cash crop production requires land tenure privatization, to the same extent that the latter supports the former. On the other hand, subsistence-oriented or food crop production is often associated with customary tenure, and thus investments undertaken in customary-tenure land are those geared towards subsistence agriculture. Drawing upon the available theoretical and empirical literature, the present chapter discusses this interconnection between commercial agriculture and land privatization.

At the second level of analysis, the relationship between subsistence or food production and cash crop production is investigated. There are at least two main schools of thought in the debate about this relationship: (a) those who emphasize that cash crop production need not jeopardize food security, either at the national or household level, and may in fact provide complementary benefits for the development of the food sector (World Bank, 1981; Von Braun et al., 1990; Govereh and Jayne, 1999; Poulton *et al*, 2001), and (b) those who argue that despite such complementarity and providing higher returns to land and labour, cash crop production may be economically unviable, especially in an environment of higher food-marketing costs to rural areas (Jayne, 1994).

4.2 Privatization of African Agricultural Research and Input Markets

Many theorists and observers of globalization see a world system that is rapidly becoming interconnected, and in which "no natural, cultural, and technological resources are only local resources any longer" (Cleveland and Murray, 1997:477). Some point to a "vision of the world and its resources as a globally organized and managed free world/free enterprise economy" (McMichael, 1996:300).

Moreover, others even see a world that is already "borderless", in which economic resources move freely across nation-states (Omae, 1990). Overall, the vast literature on the globalization thesis speaks of a world that has already achieved, or is in the process of fast achieving, a truly globalized economy in which the nation-state has lost all regulatory ability and should therefore allow global markets and institutions to decide domestic economic and social outcomes. The argument is that global market and institutional forces have become so omnipotent and efficient in managing world economic resources that it is not only useless but counterproductive for any nation-state to try to interfere with such forces.

Contrary to the above perceptions, however, others have presented a skeptical view of globalization. Robert Wade (1996) argues, for instance, that most production and other economic activities continue to be intimately wedded to a national base, as evidenced by the fact that about 90 percent of production in industrialized economies has been directed toward the domestic market, while 90 percent of consumption has also been largely satisfied domestically. Hirst and Thompson (1996) contend that if economic globalization means an increased geographical coverage and a footloose movement of foreign capital across nation-states, then the world economy is still far from being truly globalized because, in the last half of the twentieth century, the cross-border flow and distribution of foreign capital remained largely concentrated in North America, Western Europe and East Asia. In a similar perspective, Saskia Sassen (2000) argues that while in recent years the state has found it difficult to regulate certain new transnational economic processes, such as foreign exchange and 'derivative' markets, the

notion that globalization is creating a territorial space economy that is beyond the regulatory capacity of nation-states is false. Transnational production and financial industries and firms continue to be deeply embedded in certain strategic sites located in their home national territories.

Overall, these globalization skeptics see a phenomenon that is not as globally harmonious, integrative, equal and uncontrollable as its proponents may have us believe. Indeed, some view it as a deliberate ideological and policy project designed by a dominant global political and economic elite to increase its control of the world's national resources (McMichael, 1996). Specifically, the skeptics point to the basic contradiction in "globalizing" national economic markets and resources in a world based on fierce *private* competition and expropriation of such resources, and in the fact that the developed countries, while persuading developing nations to liberalize (i.e. open up) their economic (particularly agricultural) markets, have been protecting theirs through heavy subsidization. Under the Common Agricultural Policy (CAP) of the European Community (EC), for instance, agricultural subsidies have been severely high, accounting for 60-70 percent of the common fund of the EC. In the mid-1990s the United States government provided farm subsidy to the tune of US$32 billion per annum, while the corresponding figures were US$53 billion for the EC and US$33 billion for Japan (Hillman, 1994). In recent years, Northern governments have increased their agricultural subsidies, instead of cutting them, to a total of US$350 billion a year (Oxfam International, 2001).

Despite these paradoxes and contradictions of globalization, it has been more vigorously pursued over the last quarter century. The key policy

instruments used to accomplish globalization has been the liberalization or opening up of domestic economic markets to external agents and the privatization of such markets through lowering trade restrictions, raising interest rates, devaluing domestic currencies, privatizing public enterprises, eliminating subsidies, and reducing government expending, even though the enforcement of these policy instruments has not been equal across countries. Since the 1980s no sector in sub-Saharan African economies has been more vigorously subjected to such market reforms than agriculture. Under pressure of the major international financial institutions such as the World Bank and the International Monetary Fund (IMF), African countries, like many other developing countries, have implemented significant changes in agricultural policy as well as broader macroeconomic policy reforms aimed at liberalizing agricultural markets. This has meant that government must cease or minimize its control of markets by ending marketing board price regulation and agricultural research and input subsidies and credit programs (Fasano-Filho, 1996; Lopez and Hathie, 2000). In place of government intervention, the role of the private sector in agricultural research, input provision, and marketing activities has been promoted.

This rise in the significance of the role of the private sector in agriculture has been evident in the increasing private corporate control over agricultural research through the monopolization of patents on crucial biotechnological innovations, and over most agricultural input markets. The "Green Revolution" of the 1960s grew from an international public research system that started with support from the Rockefeller Foundation and expanded to include several publicly funded research centers around the world, including the International

Rice Research Institute (IRRI) in the Philippines and the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) – the corn and wheat research center in Mexico. Through the Consultative Group on International Agricultural Research (CGIAR), a consortium of donors including foundations, national governments, UN institutions, and the World Bank, these centers collaborated in developing new crop seeds and varieties, sometimes on their own and sometimes in cooperation with national agricultural research institutions in developing countries (Barton and Berger, 2001). The centers evolved without any restrictions of intellectual property rights, and hence seeds and breeding procedures were freely distributed to all seed and farming groups throughout the developing world, including African countries. As a result, rice yields increased in these countries by more than 80 percent (Barton and Berger, 2001). And during the peak years of the Green Revolution, world food production per capita rose by 11 percent, even though this achievement was tainted by the fact that the number of people living in hunger also rose by 11 percent (Mittal and Rosset, 2001).

However, in the current age of agricultural globalization, it is private multinational corporations that are being encouraged to play the predominant role in global and regional agricultural research and technological innovations. Under the economic adjustment programs of the IMF and World Bank, the role of national governments in agricultural research and innovations has been axed, while that of the private sector was promoted and expected to fill in the gap. Thus, while research and development (R&D) expenditures on agricultural biotechnology by a single corporation increased to at least $1 billion per year in

1998, by contrast total spending in the entire CGIAR system was only $345 million (Arends-Kuenning and Makundi, 2000).

In the case of sub-Saharan Africa (SSA), the decline in public agricultural research investment has been significant. Immediately following independence in the early 1960s, the colonial research institutional structure was reorganized along national lines and considerable expenditures were made, with support from international donors, in building up national agricultural research services (NARS). Thus during the 1960s and 1970s, several major international agricultural research centres (IARCs) were also established in Africa, and the NARS and IARCs developed close ties. However, in recent years, especially since the 1980s, public expenditures on agricultural R&D have dropped considerably. With the exception of South Africa, agricultural research expenditures in Sub-Saharan Africa (SSA) as a percentage of gross domestic product declined from 0.76% for the years 1981-1985 to 0.58% in 1991 (Beyan *et al.*, 1998; Kuyek, 2002). A report by the International Food Policy Research Institute (IFPRI) reveals that, whereas during the 1960s real (inflation-adjusted) public agricultural research and development spending in SSA countries grew by an annual average of 6.8 percent, during 1971–2000, such spending for a sample of 27 countries grew more slowly, at an average annual rate of only 1.4 percent (Beintema and Stads, 2000).

Regrettably, however, this decline and gap in public agricultural research investment has not been filled by an adequate and appropriate increase in required private sector spending. Private investments in African agricultural R&D have remained relatively small, with firms in a sample of 27 SSA countries

investing only $26 million in 2000, representing a mere 2 percent of total public and private research investments that year (Beintema and Stads, 2000). The most important increase in the private sector role has been in investments geared towards biotechnology and the development of genetically modified (GMO) seeds and crops. As will be later argued, these types of investments, which are undertaken mainly by transnational corporations (TNCs) based in industrialized countries, have tended to increase private corporate control and concentration over the use of Africa's crop genetic resources, especially its seeds markets, through the imposition of restrictive intellectual property rights (IPRs) and patenting requirements that also discourage public research into the crucial area of African food security. As part of their plans to expand markets in Africa, the seed TNCs have made it clear that they demand monopoly rights over their GMO seeds, and will not operate in any country that does not allow intellectual property rights (Kuyek, 2002).

Evidence of this increased corporate control has been the rapid growth in the number of patents offered to private companies worldwide since the 1980s on many agricultural products, biotechnology techniques, and gene sequences. For example, up to 1995 U.S. patents on rice seeds remained well below 100 per year. But in 1999 and 2000, more than 600 patents were issued annually (Thomas, 1999). A survey in *Nature* by Thomas (1999) found that about 75 percent of plant DNA patents were in the hands of private firms, with nearly half of that held by only 14 multinational companies. No such patents existed before 1985 (Barton and Berger, 2001). Since the enactment in 1995 of the agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS) under the World Trade

Organization (WTO), the number of African countries adopting *plant variety protection* (PVP) legislations has substantially increased, with fifteen francophone member states of the African Organisation of Intellectual Property (OAPI) adopting such rules in 1999 (RAFI, 1999; Masood, 1999). Under these legislations, breeders get exclusive commercial control over the reproductive material of their varieties and the right to enforce licenses; however, farmers planting PVP-protected varieties are prohibited from saving seeds for replanting except under highly restrictive conditions (Kuyek, 2002).

Moreover, there has been an enormous concentration of the biotechnology industry in the last decade. More than 75 percent of global biotechnology investment is now in the private sector, with only six large multinationals (Aventis, Dow Chemical, Dupont, Monsanto, Novartis, and Syngenta) controlling most of it (Arends-Kuenning and Makundi, 2000). These corporations have been buying smaller biotechnology companies in order to acquire their technologies, merged with chemical and pharmaceutical companies, and have also acquired various seed firms around the world. For example, in the 1990s, Monsanto spent over $8.5 billion in acquiring various seed and biotech companies; in the early 2000s, DuPont spent over $9.4 billion to acquire Pioneer Hi-Bred, the world's largest seed company (Mittal and Rosset, 2001). In Africa, just ten companies account for 88 percent of the agrochemical market. Four of the biggest pesticide companies (Novartis, AstraZeneca, Monsanto, and DuPont) dominate the African market in genetically engineered seeds, and are also increasing their role in the local marketing of seeds (Dinham, 1999).

Some of these biotech corporations have acquired patents that are so restrictive that they threaten the livelihoods of farming communities in both the developed and developing countries. One such patent is discussed here to illustrate the argument, and also because of its potential destructive impact on African food security and the controversy it has raised. In March 1998, the Mississippi-based seed company, Delta & Pine Land, and the US Department of Agriculture announced that they had received a US patent on a new biotechnology designed to prevent unauthorized seed saving by farmers. Dubbed as the "Terminator" by the Canadian-based international non-governmental organization, Action Group on Erosion, Technology and Concentration (ETC Group), this technology enables a seed company to genetically modify any seeds of all species, including both transgenic and conventionally-bred seeds, so that plants that grow from them are automatically sterile. In other words, seeds from such plants could not germinate if a farmer replanted them in the following farming season.

The primary objective of the developers of the technology is to destroy the age-old traditional livelihood strategy of millions of poor farmers around world, whereby they save seeds for future planting seasons. The vast majority of African farmers are smallholders relying almost entirely on themselves and their communities for their seed needs. Even in North America, most wheat farmers, including almost all of the farmers on the Canadian prairies, rely on farm-saved seeds (Shand and Mooney, 1998). According to some estimates, 20 to 30 percent of all soybean farms in the US Midwest are planted with farmer-saved seeds. Thus a successful global application of this technology, which prevents farmers

from saving seeds, would allow the commercial seed industry to enter entirely new sectors of the seed market in both developed and developing countries, especially in seeds such as wheat, rice, cotton, soybeans, oats and sorghum. With the top ten multinational seed companies controlling approximately 50 percent of the world's commercial seed market, coupled with the continuing decline in public sector breeding, this new technology would accentuate farmers' vulnerability in the market place and reinforce corporate control over the global seed industry.

When first announced in 1998, the news of the "suicide seeds" triggered an avalanche of public opposition, forcing Monsanto to abandon the technology and prompting the UN Convention on Biological Diversity (CBD) to impose a *de facto* moratorium on its further development. Despite this widespread opposition, however, the US Department of Agriculture announced in August 2001 that it had concluded negotiations to license the Terminator to Delta & Pine Land (RAFI, 2001). Fortunately, in March of 2006, in spite of efforts by Canada, the US, Australia, and New Zealand to overturn the de facto moratorium, it was unanimously upheld by governments within the UN system (ETC Group, 2006).

4.3 Implications of Private Corporate Control over African Agricultural Research and Input Markets: Cash Crop Production and Land Privatization

The minimization of the role of government and consequent rise in the influence of private multinational corporations in African agricultural research and input markets, as described above, have serious implications and consequences for land rights and the type of crops produced on the land. Three such implications

can be identified. The first is the extent to which such increased private multinational corporate control tends to exclude the African food security needs from agricultural research, and how agricultural production in the region has been veered towards export cash crops. Despite increasing agricultural market liberalization and globalization in the last twenty five years, the majority of the populations in African and other developing countries live in rural areas, where they largely depend on subsistence agriculture based on the production of vital food crops such as rice, cassava, cowpeas, lentils, millet, and sweet potatoes (Arends-Kuenning and Makundi, 2000). These crops play an important role in poor people's diets in different parts of the developing world. For example, cassava accounts for up to 60 percent of the dietary calorie intake in sub-Saharan Africa (Bokanga, 1992). However, despite their obvious social benefits, these crops have been excluded from private agricultural research, since they are not profitable, and the primary aim of the corporate sector is to increase returns on stockholders' investments and accumulate profit. Research done on them has come almost entirely from the public sector and has been generally under-funded.

The essence of the IMF/World Bank-sponsored agricultural restructuring in developing countries, which started in the early 1980s, was to replace "inefficient" public sector agricultural research institutions with an efficient market-driven private sector participation. However, this has not happened. The private multinational companies, which dominate the agricultural processes of many African countries due to the ongoing globalization of the sector, have not filled in the gap created by the decline in public agricultural and food research.

This is illustrated by the experience of the Sasakawa-Global 2000 (SG 2000) Agricultural Program in Ghana (Puplampu and Tettey, 2000).[15] Using existing technology developed by the Crops Research Institute, with assistance from the Canadian and German Governments, the International Maize and Wheat Improvement Centre, and the World Bank, SG 2000 repackaged the technology and used extension officers from Ghana's Ministry of Food and Agriculture to transfer it to rural farmers (SG 2000, 1993). The result was a 40 percent increase in maize production in Ghana. SG 2000 obtained similar success in the Sudan, where wheat production increased on average by 50 percent (Dowsell, 1993:68). These successful efforts, spearheaded by SG 2000, illustrate the importance of international and domestic public agricultural research participation in raising local food production. However, since there was no deep internal public-sector commitment to local food crop production in Ghana (thanks to the IMF/World Bank structural adjustment policies), and since the private sector was, and is, not interested in producing local food needs, efforts of organizations such as SG 2000 could not be sustained in the long run. On the other hand, the Ghanaian Agricultural Research System has heavily concentrated on export and agro-based industry crops such as cocoa and oil palm, as evident in the fact that in 1986/1987, cocoa alone received about 45 percent of national research funds, even though it contributed only 17 percent to agricultural gross domestic product (CSIR/ISNAR, 1991; Puplampu and Tettey, 2000).

[15] The SG 2000 program was a partnership of two NGOs: the Sasakawa Africa Association, whose President is Norman Borlaug, and the Global 2000 program of the Carter Center.

Agricultural research is an expensive undertaking, and the private sector would not engage in research activities just because they provide social benefits for society as a whole. In general, private sector involvement in agricultural research depends on a host of factors, including whether there is already an existing basic research platform on which to build; the cost implications of the particular form of research; and whether foreign markets exist to confer expected economic and financial results. Thus, research and development by transnational corporations in developing countries increasingly concentrates on those agricultural activities, such as plantation agriculture, plant breeding, pesticides and food processing, on which there are the possibilities of securing patents (Pray and Umali-Deininger, 1998).

More importantly, transnational corporate research has been primarily focused on intensifying the globalization of agriculture which involves the internationalization of agricultural production, creating what are called the 'New Agricultural Countries' or NACs (Friedman, 1993: 45-47), where the land and other resources are used in producing and exporting the so-called non-traditional cash crops: off-season exotic fruits (bananas, pineapples), vegetables (tomatoes, cucumbers), agro-based industrial inputs (oil palm) and fresh-cut flowers (roses, lilies) (Puplampu and Tettey, 2000). Even though such crops are not part of the customary diet of the local population, they are being produced primarily for their high cash values and export potentials. In the case of Africa, this new non-traditional export sector has evolved mainly because of the reluctance of most African governments to give up their role in the marketing of the traditional cash crops, such as cocoa and coffee, as demanded under the diversification

component of structural adjustment (Puplampu and Tettey, 2000). Consequently, private sector initiatives in the production and export of agricultural crops have concentrated on the non-traditional exports. According to the available information, South Africa, Côte d'Ivoire, and Kenya are the leading African countries from which these crops are exported, while in recent years Zambia and Zimbabwe have achieved rapid growth in the sector (Singh, 2002). As of 1999, Côte d'Ivoire was the main exporter in West Africa, exporting US$ 140 million of fruits and vegetable in 1999. This placed the country at approximately the same level as Kenya and second only to South Africa among sub-Saharan African countries (FAOSTAT, 2002).

Most of these crops are produced for export to the European market, as evident in the fact that during the 1990s imports of fresh fruits and vegetables by European Union (EU) countries exceeded all other categories of agricultural products (Little and Watts, 1994). Also, the sector has been growing over the years. For instance, export from sub-Saharan Africa of fresh vegetables, such as avocado, mango, passion fruit, pineapple, asparagus, snow peas, baby carrots, baby corn, hard-shell garden peas, Brussels sprouts, broccoli, and chilies, rose by 150 percent between 1989 and 1997 (Eurostat, 1998). In 1994 alone, African nations supplied 92 percent of EU imports of green beans from non-EU countries. Kenya was the largest supplier, accounting for 29 percent of these imports, followed by Egypt (24 percent), Morocco (13 percent), Senegal (7 percent), Burkina Faso (7 percent), and Ethiopia (5 percent) (Tropical Produce Marketing News, 1996).

In light of the fluctuations in the world market for traditional exports, the argument for the non-traditional crops has been that they can help African and other developing economies to withstand pressures in the unstable traditional markets. The crops grown under the diversification programme (bananas, pineapples, tomatoes, cucumbers, oil palm, etc) are the high-end crops of interest to transnational agro-biotech companies which, because of their enormous financial resources, are able to set up infrastructure (for example, storage facilities at national airports) for the speedy export of these fresh horticultural crops to overseas markets (Little and Watts, 1994; Friedland, 1994). Thus, as stated earlier, although these new types of export crops are not the main source of food for most people in Africa, they continue to attract a disproportionate amount of agricultural research resources (Deo and Swanson, 1991: 1992).

A critical component of this new non-traditional cash crop production system is contract farming, defined as a production arrangement in which farmers are placed under contract mainly by private transnational agro-based corporations, and some times by their own national governments, to produce certain cash crops. While in the literature such private- and public sector-managed contract schemes are commonly discussed under the common term 'contract farming', Glover and Kusterer (1990) has drawn the following distinction: 'contract farming' for privately managed schemes and 'outgrower' schemes for those involving public enterprises or parastatals. Under both types of contractual schemes, which arguably resemble the historical plantation system in colonial Africa (Puplampu and Tettey, 2000), farmers enter a contract to grow crops for a central processing or export company. Typically, the grower is

supplied with the requisite inputs, such as seeds, fertilizers, and insecticides on credit by the export firm or managing institution to grow the desired export crops. In Africa, transnational agro-based corporations, such as British American Tobacco and Del Monte (in Kenya) and Unilever in Ghana have been at the helm of the contract farming scheme (Little and Watts, 1994).

The foregoing discussion suggests a second and related implication of increased private corporate control over African agricultural research and input markets, which is the extent to which the production of cash crops, associated with such control, has tended to accentuate privatization of land rights and the shifting of land use patterns away from subsistence agriculture. As noted earlier, agricultural commercialization and cash cropping in particular are associated with land rights privatization through the traditional property rights argument that in order to be assured of their returns from such production, individual farmers must have such rights as a source of tenure security. And even though much of the available empirical evidence does not clearly link private land rights to tenure security *per se* (Brasselle et al., 2002), proponents of the privatization movement, and particularly external donors and creditors, have been using private land ownership as the measure of a farmer's tenure security and thus the basis for providing him/her support for cash crop production. As a result, there appears to be a growing trend towards the use of outright privately purchased lands for cash crop production in Africa, although lineage and communal lands also continue to be used for producing such crops. For instance, a study of the responses of a sample of rural households in Ghana, regarding their chief source of land for non-food crop production, reveals this trend: Among 122 cocoa-

producing households studied, 43 percent utilized lineage or communal land, while 46 percent used privately purchased land. Among 39 oil-palm-producing households, 33 percent utilized lineage land, while 49 percent used land purchased outright (Dei, 1987). A similar study found that while in 1982-83 about 74 percent of households depended on lineage land, and only 17 percent depended on outright land purchase, in 1989-90 about 64 percent utilized lineage land, and 26 percent used land purchased outright (Dei, 1992).

Another indicator of the extent to which cash crop production accentuates land privatization and diverts land use from subsistence agriculture is the type and size of farms on which these crops are increasingly grown. In contrast to small farms which are usually carried out on family and communal land, large commercial farms are almost always cultivated on privatized land. Thus an increase in the proportion of cash crops cultivated on large commercial farms relative to the proportion cultivated on small farms should be a reasonable indication that such crops are increasingly grown on privatized land. In the early stages of the non-traditional crop export boom from Africa, when European demand was only seasonal, most of the crops were grown on small family farms. However, as Europeans expanded their procurement year-round and increased the variety of fruits and vegetables purchased, the volume requirement skyrocketed and thus drew large commercial farms and export firms into cultivation of fruits and vegetables (Singh, 2002). For instance, in 1992, approximately 75 percent of fruits and vegetables for export from Kenya were produced by small holders (Harris 1992). By 1998, four of the largest exporters in Kenya were sourcing only 18 percent of their produce from small farms, while 42

percent came from large commercial farms (Dolan *et al.*, 1999). Thus, in terms of the farm-type indicator, it appears that cash crops are grown increasingly on privatized land, since a greater proportion of them is now being produced on large industrial estates (Minot and Ngigi, 2004).

4.4 Impact of Cash Crop Production on Food Security in West African Countries

Although the linkage between cash crop production and land rights privatization is important, it is not the mere production of such crops on privatized land *per se*, which is the crucial issue here. What is more relevant is how the deployment of land and other resources in the production of these crops may impact the achievement of a society's other desired economic objectives, such as food sufficiency and security. If cash crop production impinges upon the ability of a country to achieve food sufficiency, then the fact that such production requires or is supported by private land rights becomes a serious policy issue which must be addressed. Should privatization of land rights be encouraged and formally institutionalized, even if it is found to support a form of production that is counterproductive to a country's objective of obtaining a sufficient food supply? This is where the main connection lies between the research question addressed in Chapter 3 and the one now being considered.

As the analysis in that Chapter has shown, under a non-cooperative or privatized land management system, small rural farmers with little or no means of investing in intensive farming are likely to avoid such farming and resort instead to shifting cultivation and the overexploitation of remaining communal forest land. Even where the production of cash crops is undertaken on large

commercial farms practicing intensive cultivation, there is still the question as to how the large-scale deployment of a country's scarce land resource in cash crops may affect its food production. Thus, to the extent that cash crop production conflicts with a country's objective of food security and, at the same time, is being carried out under a privatized land management system that is less supportive of sustainable natural resource use, then both processes may constitute a source of two mutually reinforcing negative effects. This section of the present Chapter examines the question of how cash crop production influences the level of a country's food supply, using data on West African countries from various institutional sources to empirically illustrate the possible effects. In the next subsection, the key issues underlying the cash crop versus food crop debate are defined. This is followed by another subsection in which an empirical framework is formulated that addresses the question of the possible impact of cash crop production on domestic food production.

4.4.1 The Cash Crop versus Food Crop Debate

4.4.1.1 Definitional Issues

Broadly speaking, the literature supplies at least four definitions of "cash crops", which cover (in approximately decreasing order of generality): (i) all marketed agricultural surplus, (ii) non-staple agriculture, (iii) non-food agriculture, and (iv) export agriculture (Maxwell and Fernando, 1989). Underlying these broad definitions is the common-sense definition that characterizes a cash crop as any crop that is sold for cash or money income. At the household level, this would refer to all crop surpluses of the household that are marketed domestically for money, while at the national level it would refer to all crops sold abroad. Such a

common-sense definition implies that there exists no intrinsic distinction between "cash crops" and "food crops", since it is the commercial orientation of the crop that identifies it as either a cash crop or food crop (von Braun and Kennedy, 1986). In other words, a particular crop may be both a cash crop and food crop, depending on how it is used by producers and not what it is intrinsically. In this context, an export crop is a particular type of cash crop that is ultimately exported from a country.

Thus, for the purpose of the present analysis, cash crops are defined as crops that are intended entirely or primarily for market, whereas food crops are those intended entirely or primarily for home consumption (Poulton *et al.*, 2001). According to this definition, which clearly conforms to the common-sense view stated above, a crop is a cash crop if it is produced by a household or country *primarily* for money-income generation; and it is a food crop if it is produced *primarily* for satisfying the domestic food needs of the household or country. Operationally, as will be later explained, this suggests that a measure of cash crop commercialization can be derived at either the household or national level, which indicates how much the total agricultural crop produce of a household or country is geared towards market sale relative to immediate food use.

4.4.1.2 Complementarity or Substitutability of Cash and Food Crops

One of the major issues in the cash crop versus food crop debate has been about the possible effects of cash crop production on the ability of households or countries to sufficiently supply their food needs.[16] The relevant views and

[16] Maxwell and Fernando (1989) provides an earlier review of the debate.

arguments in this debate can be represented broadly by two schools of thought: (i) those who support the view that cash cropping has a complementary and positive impact on achieving food sufficiency through both its direct contribution to the growth of farm incomes and indirect effects on the productivity of other household activities, such as food crop cultivation (Govereh and Jayne, 1999; von Braun and Kennedy, 1994; Govereh *et al.*, 1999), and (ii) those who argue that the relationship between both types of crops is largely mutually exclusive since these crops compete for the same productive resources and are therefore likely to be substitutes in production, at least in the short run (Lamb, 2000).

According to the 'complementarity' argument, cash crop production has the potential to directly increase household (and national) food security by enabling rural farmers to earn higher incomes and thus obtain more food than could have been produced if the same household resources were devoted to food crop production. The essential argument here is that through cash cropping farm households will be able to generate the adequate level of incomes to purchase more food than they could obtain from their own food production. At the national level, it means that for countries with a limited manufacturing base, export crops are needed to earn sufficient foreign exchange with which to finance direct food imports and to purchase production inputs needed to support domestic food production. Cash crops are said to generate greater incomes than food crops, because they are produced for the market and thus have a higher value than those consumed for food within the household (Phororo, 2001; Poulton *et al.*, 2001). Also, cash cropping contributes to rural income growth, because it is facilitated by a degree of specialization in production that raises the overall level of

efficiency of resource use (Poulton *et al.*, 2001). In the international context, cash cropping promotes national income growth because it may attract foreign factors of production (capital, skill, and labor) to speed up the domestic growth process (Myint, 1984; Gillis et *al.*, 1983; Maxwell and Fernando, 1989).

In addition to the above potential direct income effects, other proponents of the complementarity view stress a relatively neglected area of research that concerns the effects that cash crop production can have on the productivity of other household activities, including food crop production. For instance, in their study on Zimbabwe, Govereh and Jayne (1999) have identified two potential channels through which cash cropping may affect the productivity of food crops: (1) *household-level synergies* (which occur when the household's participation in a commercialized cash crop scheme enables it to acquire resources not otherwise available for use on other enterprises in the crop mix), and (2) *regional spillover effects* (which occur when a commercialization scheme attracts certain kinds of investments to a region which create spillover benefits to farmers engaged in other crops).

Two pathways of the first type are given as follows. First, it is argued that under credit and input market constraints, rural households' ability to increase food production may depend on their participation in cash crop schemes, as these constraints necessitate non-separabilities between farmers' participation in crop commercialization programs and inputs used in food production (Govereh and Jayne, 1999). For instance, a number of researchers have found that under credit and input market failures in various African countries, participation in cotton and sugarcane contract farming schemes was the only means of acquiring cash

inputs for use on food production (Strasberg, 1997; Chimedza, 1994). A second pathway of household-level synergy between cash cropping and food production is through the role of private input marketing firms in promoting cash crop production. Private fertilizer and pesticide marketing firms often invest in training farmers who are involved in commercial and export crop production. It is argued that such training and knowledge does not only improve farmers' cash crop management skills but also has a positive externality effect on their food crop productivity (Mariga, 1994).

Regional spillover effects occur when a crop commercialization scheme stimulates the demand for certain inputs or attracts certain kinds of investments to a region, such as in market and transport infrastructure and human capital development, which also provide positive externalities to other agricultural activities, such as food production, within the region. In their study on Zimbabwe mentioned earlier, Govereh and Jayne (1999) cited a similar study conducted by Dione (1989), in which the latter found that the introduction of cotton to Southern Mali increased the demand for fertilizer in that region of the country, which subsequently stimulated private investment from input manufacturers, distributors, and retailers. Such increased private investments made fertilizer and other inputs more available to the region not only for use on cotton but also for farmers who only cultivated grain and other staple food crops (Dione 1989).

The case against the complementarity arguments linking cash crop production and domestic food sufficiency can be summarized in terms of two interrelated issues. First, the argument that income generated from cash crop cultivation will be sufficient to finance a household's or country's deficit of food

supply ignores the crucial roles that the quality of agricultural marketing institutions, transport infrastructure, storage and processing technology, and macroeconomic policy factors play in most African and other developing countries in misaligning producer and consumer prices. Research evidence suggests that the majority of farm households in most sub-Saharan African countries do not produce enough grain to feed themselves despite devoting the bulk of their land and labour resources to food production (see Weber *et al.*, 1988; Pinstrup-Anderson, 1989; Jayne, 1994). Such grain-deficit households must therefore purchase the required balances of their food needs from the domestic market, using income earned from cash cropping and more generally from non-farm activities.

Evidence shows, however, that because of high food-marketing costs due to Africa's weak rural transport infrastructure and relatively low population density, the farm gate or producer price received by farmers is often substantially below what they pay for food grains in the market. In many African countries, for instance, the cost of transporting and marketing food grains can be up to 70 percent of product values, far more than elsewhere, even in developing countries (Ahmed and Rustagi, 1987; Kherallah *et al.*, 2002). This implies that insofar as the marketing margins between producer and consumer food prices are large in favor of the latter, *ceteris paribus*, cash crop production may be an economically unviable strategy for achieving rural food security, since the opportunity cost of such production (which is the cost of acquiring the grains forgone by cultivating cash crops) exceeds the producer price or income obtained (Jayne, 1994).

Furthermore, the price and income that cash crop producers expect to receive is likely to be further influenced by certain changes in the macroeconomic policy environment, such as changes in the exchange rate of the domestic currency. Despite intensive efforts at structural adjustment in the last several years, aimed at promoting market privatization and liberalization, in many sub-Saharan African countries, rural farmers still sell their export crops to state-owned agricultural marketing boards, which in turn sell them in international markets at the given world price. Under such arrangements, the maximum price that a marketing board could pay the farmer (P_d), disregarding transportation and marketing costs and explicit taxes on agriculture, depends on the board's estimate of the world market price (P_w) of the crop and the exchange rate (ER), i.e., $P_d = P_w/ER$ (Lamb, 2000).[17] This relation implies that the higher the exchange rate ER the lower is the price in domestic currency P_d that the marketing board would be willing to pay the farmer. Thus, in addition to the marketing margins imposed by high transport costs, an overvalued currency also drives a wedge between the price that farmers are paid for their crops and the price at which the crops are sold on international markets, thereby reducing rural farmers' income from cash crop production. Such unfavorable returns suggest that farmers may not earn enough income from cash crops to buy back the needed food grains for feeding their families, contrary to the view that cash cropping is complementary to food production though its income effect.

[17] In this context, the exchange rate, ER, is defined as the foreign currency price of the domestic currency.

Until the imposition of structural adjustment policies in the early 1980s, there was a prevalence of overvalued exchange rates in African economies, which tended to reduce the price that marketing boards paid to rural farmers.[18] It is worth noting, however, that during this pre-adjustment era, African governments were also heavily involved in agricultural marketing and distribution through increasing transport and input subsidies which helped keep the margin between official buying and selling prices below total marketing costs (Kherallah *et al.*, 2002). World Bank/IMF-supported adjustment and liberalization policies, which increased the role of private corporations and discouraged that of national governments in agriculture, were supposedly intended to liberate smallholder rural farmers from an undue state market interference by establishing the "right price" incentives for them to increase agricultural and food production. A crucial part of this price correction strategy was the devaluation of African currencies. The state in Africa and other developing areas was accused of poor pricing policies which taxed the producer and provided no incentives for increased production. However, as explained below, these policies, while benefiting transnational agribusinesses, have ironically produced the perverse effect of undermining small-scale rural farmers.

The removal of government agricultural transport and input subsidies and guaranteed producer prices in many African countries, has turned the consumption and production terms of trade against the bulk of small-scale

[18] Even as inflation rose in countries such as Ghana, Sudan, Tanzania, Uganda, Zaire, and Zambia, many African countries maintained overvalued exchange rates during the 1970s. The result was that by 1982 the real exchange rate index (1965=100) exceeded 200 in more than six African countries (see Garbrah-Aidoo and Osuji, 1997; Körner, P. *et al.*, 1986).

farmers by increasing the prices that these farmers pay for inputs and basic food and other consumption needs, relative to what they receive from the sale of their products (Raikes, 2000). The monopolistic position of the multinational companies, which dominate the fertilizer and seed input markets of African and other developing countries, has enabled them to impose higher prices on farmers with impunity. At the same time, the adjustment policy of devaluation (i.e. the reduction of the value of ER in the relation $P_d = P_w/ER$), which was intended to raise the domestic currency price paid to farmers, thereby increasing their cash crop incomes and inciting them to expand their marketed volumes, has had two kinds of unfavorable effects on the ability of rural farmers to achieve food sufficiency. First, currency devaluation makes a country's imports more expensive, and thus to the extent that after devaluation food continued to be imported in African countries, its domestic currency price rose.

Second, research evidence shows that even if devaluation raised the domestic currency price paid to cash crop farmers, thus inciting them to invest more resources in cash crop production, such a shifting of resources away from food crops lowered food crop production as well as aggregate agricultural output at least *in the short run.* A number of studies of African agricultural supply response to price and exchange rate movements, notably Binswanger (1989) and Lamb (2000), have found statistically significant negative cross-price elasticities for food and export supply functions, suggesting that food crops and export cash crops are substitutes in production in the short run. A possible explanation for this is that increases in export crop price, caused perhaps by devaluation, lead farmers to shift resources into the production of export crops and out of food

crops. Moreover, such a resource diversion lowers total agricultural output, because while it may take several years for export crops to respond to higher input levels, given the lags in production of many African export crops, the negative impact on food production is immediate (Lamb, 2002).

4.4.2 An Empirical Assessment of the Relationship Between Cash Crop Production and Food Supply in West African Countries

4.4.2.1 Empirical Formulations

The various arguments outlined above question whether or not the intensity of cash crop production influences the production and sufficiency of food crops for a country or household. This subsection develops and estimates a model of the relationship between cash crop production and food production in the fifteen countries that make up the Economic Community of West African States (ECOWAS): Benin, Burkina Faso, Cameroon, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.[19] The objective of this model is to measure the effect of increasing crop commercialization on national food crop production in the ECOWAS sub-region. The model is developed and the analysis conducted at the national rather than household or community level because of the nature of the available data used.

The question of whether cash crop production complements or competes with food crop production in West African countries can be empirically formulated in at least two possible ways. One approach would be to use a

[19] The Economic Community of West African States (ECOWAS) is a regional organization of 15 West African countries formed in 1975. Its original objective was to achieve economic integration and share development. In later years, in view of increasing regional political instability, the scope of the organization's objective was expanded to include socio-political interactions and mutual development in related spheres.

nonlinear regression model of the general form $\ln(Q_i^F) = a_0 + a_1 \ln(P_i^C) + u_i$ in order to estimate the cross-price elasticity of food crop supply. Economists use the cross-price elasticity of supply to measure how the quantity produced and supplied of one good changes as the price of another good changes. In the above nonlinear function, this means that the regression estimate of the coefficient a_1 would measure how much in percentage terms the quantity of food crops supplied Q^F changes in response to a percentage change in the producer price P_i^C of cash crops in country *i*. The algebraic sign of the estimated coefficient would then indicate whether the two types of crops are substitutes or complements in production. According to the theory, a statistically significant positive estimate of a_1 would imply that cash crops and food crops are complements and non-competitive in production, whereas a negative estimate would mean that they are substitutes and competitive. This is so because in the first case, a rise in cash crop producer prices which encourages farmers to produce more cash crops also stimulates the production of more food crops, whereas in the latter case the price rise encourages cash crop production but discourages food production, since farmers must shift resources away from food crops.

The second approach by which the question may be empirically formulated is to construct a national food crop supply function of the form $Q_i^F = b_0 + b_1 C_i + u_i$, that relates a country's level of food crop production Q^F directly to its involvement in cash crop production C_i. In such a formulation, the variable C_i may be defined as a measure of a country's involvement in agricultural crop commercialization. The task then would be to estimate such a function to

determine how much crop commercialization affects a country's food crop supply. This is an appropriate way to formulate the problem, because if, as proposed above, cash crop production complements or assists food crop production through certain household-level synergies and regional spillover effects, then a high level of food crop supply should be associated with a high level of cash crop commercialization, and thus the b_1 regression estimate would be positive. If, on the other hand, as maintained by the substitutability argument, food crops and cash crops are substitutes in production, then a lower food crop supply should be associated with a higher crop commercialization level, and thus the b_1 estimate would be negative.

The key proposition underlying all of the discussion so far is that cash crop production influences the level of food crop supply in a country. To the extent that decisions to produce cash crops and food crops are made within the same growing season both types of production processes are likely to be endogenously determined. Therefore an instrumental variables (i.e., two-stage least squares) estimation approach, which incorporates the two methods discussed above, is used to correct for the possible endogeneity of cash crop to food crop production.[20] Given the available data, which are later described, this approach is defined by the following system of simultaneous equations representing the

[20] In the study on Zimbabwe, mentioned above, Govereh and Jayne (1999) applied a similar formulation, except that in their approach the variable C_i is defined as an index measuring the ratio of cash crop output to total crop production.

empirical framework of the determinants of crop commercialization and their effects on food crop production:[21]

$$\ln(C_i) = \alpha_0 + \alpha_1 \ln(ER_i) + \alpha_2 \ln(FR_i) + \alpha_3 \ln(AG_i) + u_i \quad (1)$$

$$\ln(Q_i^F) = \beta_0 + \beta_1 \ln(C_i) + \beta_2 \ln(FR_i) + \beta_3 \ln(AG_i) + \varepsilon_i \quad (2)$$

where C_i, as already defined, is a variable measuring country i's involvement in crop commercialization; ER_i is the exchange rate of each country's currency; FR_i is a variable measuring the quantity of non-labor inputs used in agricultural production; AG_i is the part of each country's labour force actively engaged in agriculture; and Q_i^F is the total quantity of food crops produced in the country. Both C_i and Q_i^F represent the two variables to be estimated endogenously, while FR_i and AG_i are the exogenous variables in the model measuring the influence of agricultural labor and non-labor inputs on cash crop production as well as on food crop production in each country. Finally, the α's and β's are the parameters of interest to be estimated in each corresponding equation. Equation (1) is the reduced-form or first-stage equation to be estimated in the model.

It should be noted that the variable ER_i is used here as an instrumental variable designed to identify the effect of a country's involvement in crop commercialization on its food crop supply. The exchange rate is a relevant instrument for identifying such an effect, since, as explained earlier, it is expected to be correlated with cash crop production. A higher exchange rate reduces the domestic currency price paid to farmers and is thus expected to discourage them from increasing their involvement in export-oriented cash crop production.

[21] A comparable formulation that directly includes the role of factor and output prices is sketched in Exhibit A4.1 in the Appendix.

Moreover, the exchange rate also fulfills the exogeneity condition, which requires that in order for a variable to serve as an instrument it should be correlated with only the variable being identified but exogenous to and uncorrelated with the other endogenous variables in the model (i.e. the food crop supply variable in the present case) (Stock and Watson, 2003: 331-372). In other words, the exchange rate is a proper instrumental variable because it affects food crop production only indirectly through its impact on a country's involvement in cash crop production. It is assumed that food crops are produced generally for domestic consumption and not for international trade, and therefore changes in the exchange rate do not directly influence their production. However, exchange rate changes will influence food crop supply only indirectly, as farmers shift more resources towards or away from cash crop production in response to such changes.

The above model can be consistently estimated given that each of the structural equations satisfies both the order and rank conditions of identification. It can be verified that the total number of variables k (endogenous, exogenous, and instrumental) missing from each equation is equal to the number of endogenous variables g in the system less than one (i.e., $k = g - 1$), which implies that each equation is *exactly* identified, according to the order condition for identification (Goldberger, 1964; Maddala, 1988; Stock and Watson, 2003). It can also be verified, from the matrix in Table 4.1, that the sub-matrix associated with each equation has g-1 rows and columns that are not all zeros, where g is the number of endogenous variables in the system, which is the rank condition for identification (Maddala, 1988).

Table 4.1: Rank Condition Matrix

Equation	C	ER	FR	AG	Q^F
1	1	1	1	1	0
2	1	0	1	1	1

Note: *C = crop commercialization level; ER = US dollar exchange rate of domestic currency; FR = non-labour inputs in agriculture; AG = agricultural labour force; and Q^F = quantity of food crop supplied. A 1 indicates that the variable is present in the equation, and 0 indicates that the variable is absent.*

4.4.2.2 Data and Estimation

The model formulated above is estimated using data on national agricultural crop exports, domestic food crop supply, and agricultural input use obtained from the Food and Agriculture Organization (FAO) Statistical Databases (FAOSTAT)[22], as well as data on currency exchange rates taken from various issues of the International Monetary Fund's (IMF) *International Financial Statistics*. Given the primary interest in determining the extent to which the involvement of countries in cash crop production influences their food crop production, the model is estimated at two levels. It will be estimated first for each individual ECOWAS country using a time series covering 24 years (1980 – 2003), and second as a panel data model using either a pooled or fixed effects regression method. The structure of the available data allows this latter type of analysis, since there are 12 countries[23] each of which is observed annually for 24 years, thus providing 288 observation counts.

[22] The FAO Statistical Databases (FAOSTAT) is an on-line and multilingual database presently containing over 3 million time-series records covering international statistics in various areas of agricultural and food production, fisheries, producer prices, etc. (See FAOSTAT Data, 2005).
[23] Three of the 15 ECOWAS countries (Guinea, Guinea-Bissau, and Liberia) have been excluded from the estimation, due to incompleteness of their relevant data.

Estimating the model first on each individual country provides the opportunity for testing whether or not there are significant differences among the various countries, in terms of the 'equilibrium' or intercept values of the dependent variables in question, and in terms of the effects or regression coefficients associated with the given independent variables. If, for instance, results from this initial estimation show no such statistically significant differences, a strong case would prevail for running a pooled cross-sectional regression. If, however, the results show countries to have significantly different equilibrium values (i.e. different intercept coefficients), there would be a case for implementing a fixed effects regression analysis.

In estimating the first-stage equation (1), the dependent variable C_i is proxied by the aggregated quantity in metric tons of cocoa, coffee, cotton, palm kernel, and peanuts produce exported by each country. This is an appropriate way of constructing the crop commercialization indicator for two reasons. First, because the analysis is being conducted at the national rather than household or community level, the relevant measure of crop commercialization is the extent of crop exports abroad rather than the quantity of crops sold domestically. Second, the five types of cash crops used (i.e. cocoa, coffee, cotton, palm kernel, and peanuts) are the main export crops of the fifteen ECOWAS countries, and therefore the total quantity of them exported represents a reasonable measure of national crop commercialization.

Table 4.2 gives the ratios of the quantity of cash crop exports to total crop output (expressed in percentages) for each country, with the last row in the Table presenting the annual averages of the percentages. It can be seen from these

numbers that the annual average commercialization index is greater than 3 percent for only four of the 12 countries, with its highest value being 7.9 percent for la Cote d'Ivoire, thus confirming what has already been established in the literature that this country is one of the most primary crop exports-oriented countries in the whole of sub-Saharan Africa (FAOSTAT, 2002). Thus, even at such a low value of 3 percent as the benchmark, only four countries can be classified as engaging in commercial agriculture. This, of course, does not imply that the rest of the countries are food crop-producing countries, since many of them also produce other types of crops that are neither exported nor used for domestic food consumption.

Table 4.2: Agricultural Crop Commercialization Indices for 12 Countries in the Economic Community of West African States (ECOWAS)[24]

Year	Benin	Burkina	Cameroon	Cote d'ivore	Gambia	Ghana	Mali	Niger	Nigeria	Senegal	Sierra Leone	Togo
1980	.70	1.40	2.97	5.55	.60	2.82	4.50	.02	.56	.33	1.51	2.95
1981	.57	.99	2.79	7.31	.77	2.70	2.92	.00	.60	.14	1.58	4.00
1982	.37	.91	2.32	6.22	.01	3.62	3.51	.00	.46	.37	1.71	3.30
1983	.87	1.06	2.74	5.63	.00	2.33	2.88	.00	.65	.63	1.61	2.88
1984	1.74	1.36	3.00	6.62	.18	1.75	3.12	.01	.39	.38	1.77	2.26
1985	1.89	.90	2.46	6.61	.41	2.08	2.26	.01	.27	.49	2.08	2.20
1986	2.42	1.41	2.54	7.69	.23	2.22	2.78	.01	.43	.24	1.21	4.29
1987	3.85	2.83	2.89	6.73	.16	2.20	3.21	.09	.36	.19	1.01	6.09
1988	1.55	1.85	2.98	6.02	.17	2.13	2.30	.02	.52	.55	1.19	3.43
1989	2.67	1.35	3.89	8.33	.35	2.45	3.25	.15	.32	.40	.89	3.13
1990	3.10	2.14	3.42	8.45	.60	3.08	3.30	.21	.24	.56	.87	3.02
1991	3.02	1.60	2.56	8.01	.68	1.73	3.26	.01	.21	1.04	1.26	2.74
1992	4.28	1.52	2.42	7.24	.47	1.70	3.84	.02	.13	.71	.59	4.04
1993	3.51	1.92	2.49	8.96	.55	1.78	4.11	.03	.17	.73	.50	3.11

[24] Note that based on the data used, there are differences among these twelve countries in the degree to which their crop commercialization indices fluctuate annually during the period under study.

Year	Benin	Burkina	Cameroon	Cote d'ivore	Gambia	Ghana	Mali	Niger	Nigeria	Senegal	Sierra Leone	Togo
1994	4.88	1.41	2.07	7.25	.47	1.80	2.50	.01	.17	.76	.47	2.86
1995	5.00	.55	2.31	7.36	.27	1.52	3.07	.39	.16	.34	.54	3.41
1996	5.56	.06	2.66	8.93	.31	2.48	3.83	.06	.22	.50	.37	3.14
1997	4.59	.13	2.05	9.42	.11	1.45	4.11	.07	.18	.56	.37	2.99
1998	5.10	3.18	1.54	8.75	.13	1.64	4.09	.03	.14	.73	.37	3.51
1999	4.87	1.60	2.32	9.61	.05	1.57	3.25	.07	.22	.50	.35	3.36
2000	4.24	2.17	2.07	10.90	.02	1.93	4.73	.10	.25	.37	.31	2.71
2001	2.69	2.19	2.29	9.96	.02	1.66	4.91	.02	.18	.30	.29	3.94
2002	3.23	2.81	2.32	9.58	.09	1.37	4.88	.01	.19	.71	.41	2.79
2003	2.52	4.31	2.25	9.68	.06	1.53	6.00	.00	.24	.65	.45	3.55
	3.1	1.7	2.6	7.9	.3	2.1	3.6	.1	.3	.5	.9	3.3

On the right-hand side of the equation, the variable ER_i is indicated by the IMF's end-of-year exchange rate, defined as the number of US dollars per unit of national currency. The Fund's real effective exchange rate, which is measured by the trade-weighted exchange rate between the country and its major trading partners, adjusted for the relative rates of inflation in each country, would have been a better indicator; but it is not available for most of the countries and the years being considered. Furthermore, for some of the countries the available end-of-year rate is the *official rate*, as determined by national monetary authorities, while for others the available rate is the *market rate*, describing an exchange rate determined largely by market forces. In spite of these differences, the end-of-year rate represents a very good and uniform indicator, especially since all country rates have been converted into the same US dollar per national currency unit measure. The variable FR_i is proxied by the FAO's estimate of total quantity in metric tons of nitrogenous, phosphate, and potash fertilizers consumed in

agriculture by each country. The variable AG_i is indicated also by the FAO's measure of the proportion of the national labor force employed in or seeking work in agriculture. And finally, the variable Q_i^F is indicated by the FAO food production index which measures and includes all crops that are considered edible and contain nutrients.

4.4.2.3 Preliminary Results and Analysis

Results from the estimation of Equation (1) and (2) for each individual country are presented in Table 4.3. The underlying hypothesis of this model was that depending on the direction of movements in the exchange rate of a country's currency, there would be corresponding changes in price incentives for farm households in the country to increase or decrease their involvement in cash crop production. Such changes in farmers' involvement in crop commercialization would in turn influence their ability to produce food crops for domestic consumption, as resources possibly shift between the production of food and cash crops. According to the *complementarity* versus *substitutability* arguments presented earlier, a depreciation or devaluation of the national currency was expected to increase farm gate prices and thus encourage farmers to involve more in crop commercialization; to the extent that the complementarity proposition holds, then such a price-induced increase in cash crop production would also be associated with a higher level of food crop production. If, on the other hand, the substitutability argument held, then the price-induced increase in cash crop production would be associated with a lower food crop production.

These possible reactions imply that in the estimation of the first-stage equation (1), the algebraic sign of the regression coefficient on the natural log of

the US dollar exchange rate variable (ER) was expected to be negative and at least statistically significant, if the theory of the relationship between exchange rate changes and price-induced crop commercialization holds. More importantly, in estimating equation (2), which is the principal equation measuring the link between cash crop commercialization and food crop supply, the algebraic sign of the regression coefficient on the log of the crop commercialization variable (C) would be positive, and the coefficient statistically significant, if the complementarity proposition holds; and it would be negative, if the substitutability argument holds. Notice that in each column cell of Table 4.3, the regression coefficients are reported on top without parenthesis. Numbers reported in parenthesis are the standard errors.

Table 4.3: Determinants of Crop Commercialization and Their Effects on Food Crop Production in West African Countries

		(1) Constant	(2) Log of cash crop exports (C)	(3) Log of US dollar exchange rate (ER)	(4) Log of fertilizer consump -tion (FR)	(5) Log of agricultural labor force (AG)	(6) Adjusted R Square
Benin	EQ. 1	-46.526* (7.202)		-.595* (.273)	.304* (.119)	8.148* (1.156)	.89 (F = 69)
	EQ. 2	-34.064* (7.607)	-.262* (.148)		.001 (.054)	5.722* (1.272)	.90 (F = 74)
Burkina Faso	EQ. 1	-13.767 (11.952)		-1.258** (.928)	-.351** (.198)	4.221* (1.743)	.22 (F = 3)
	EQ. 2	-12.054* (1.295)	-.088* (.047)		.026 (.035)	1.808* (.213)	.89 (F = 62)
Cameroon	EQ. 1	2.962 (4.528)		-.241** (.163)	.126 (.164)	1.177* (.513)	.14 (F = 2)
	EQ. 2	-5.968 (3.824)	-.485* (.235)		.089 (.064)	1.901* (.311)	.80 (F = 32)
Cote d'Ivoire	EQ. 1	-5.337* (2.179)		-.074** (.048)	.198* (.090)	2.077* (.312)	.84 (F = 41)
	EQ. 2	-3.317 (10.297)	-1.302* (.716)		-.149 (.417)	-1.094 (3.722)	.71 (F = 20)

		(1) Constant	(2) Log of cash crop exports (C)	(3) Log of US dollar exchange rate (ER)	(4) Log of fertilizer consump -tion (FR)	(5) Log of agricultural labor force (AG)	(6) Adjusted R Square
The Gambia	EQ. 1	42.274* (16.358)		.728 (.618)	-.758** (.390)	-5.362** (2.769)	.18 (F = 3)
	EQ. 2	-1.486 (10.505)	.105 (.347)		.187 (.286)	.626 (1.100)	-.10 (F = .31)
Ghana	EQ. 1	-15.102* (7.115)		-.170* (.062)	-.046 (.081)	3.455* (.956)	.75 (F = 24)
	EQ. 2	-12.845* (1.127)	-.499** (.325)		-.050 (.053)	1.345* (.402)	.92 (F = 91)
Mali	EQ. 1	-20.269* (2.782)		-.300* (.123)	.036 (.101)	4.022* (.421)	.91 (F = 68)
	EQ. 2	-13.125* (3.511)	-.207* (.117)		-.096* (.038)	2.520* (.689)	.91 (F = 74)
Niger	EQ. 1	-27.523 (16.276)		-1.356 (1.015)	.040 (.411)	5.161** (2.617)	.08 (F = 2)
	EQ. 2	-3.322 (3.474)	.084 (.176)		.018 (.061)	.852 (.549)	.47 (F = 7)
Nigeria	EQ. 1	220.090* (66.442)		.279* (.076)	-.399* (.137)	-21.205* (6.861)	.33 (F = 5)
	EQ. 2	-183.051* (5.971)	.098* (.044)		.197* (.040)	19.123* (.582)	.98 (F=379)
Senegal	EQ. 1	-9.860** (5.404)		-.340** (.232)	-.332 (.374)	3.148* (.856)	.37 (F=6)
	EQ. 2	-.631 (5.678)	.352 (.767)		.144 (.408)	.016 (1.972)	.14 (F = 2)
Sierra Leone	EQ. 1	-28.722* (12.239)		-.307* (.033)	.105* (.042)	5.620* (1.785)	.86 (F = 47)
	EQ. 2	-.685 (2.002)	.032 (.036)		.032* (.011)	.709* (.264)	.31 (F = 5)
Togo	EQ. 1	-1.817 (3.545)		-.223** (.161)	-.079 (.139)	2.181* (.747)	.51 (F = 9)
	EQ. 2	-5.664* (1.277)	-.172* (.058)		-.049 (.056)	1.804* (.555)	.85 (F = 44)

Note: *All single-starred coefficients are statistically significant at the 5 percent level, while double-starred coefficients are significant only at the 10 percent level. All F-test statistics in column (6) are significant at the 5 percent level, with the exception of those corresponding to Equation 2 for The Gambia, Equation 1 for Niger, and Equation 2 for Senegal, which have been found to be insignificant. Moreover, the significance levels identified in columns (2) and (3) are from a One-Tail test, while those in columns (4) and (5) are from a Two-tailed test.*

As shown by the regression results for equation (1), not only have the coefficients on the exchange rate variable been found to be statistically significant for most countries (significant at the five percent level for 5 out of 12 countries and at the ten percent level for 5 countries), but the algebraic sign on these coefficients is also negative and significant for ten of the twelve countries, as predicted by the theory. Only the signs on the coefficients for The Gambia and Nigeria are positive (see results in column (3) of the Table). In the case of Nigeria, the positive coefficient is also significant at the five percent level. Since these significance levels are based on a one-tailed test, the results here appear to confirm the existing theory and evidence that a higher exchange rate (i.e. an appreciation of the domestic currency) may discourage farmers from cash crop production and commercialization, through its dampening impact on producer or farm gate prices. In a similar research, using a pooled regression model and data on 16 sub-Saharan African countries to estimate the impact of exchange rate changes on export performance, Balassa (1990) found that in most cases the coefficient on the exchange rate had the expected sign. Also, Jaeger (1992) considered the response of agricultural exports to changes in the exchange rate, and found that agricultural exports did indeed respond positively to depreciation of the domestic currency and negatively to its appreciation.

In the special case of Nigeria, noted above, where the appreciation of the local currency appeared to boost rather than discourage cash crop exports, part of the explanation may be found in that country's relative economic size and strength. With a population of over 130 million people (more than a quarter of Africa's population), Nigeria is also one of the world's largest oil exporters. Before

the imposition of structural adjustment policies in the 1980s, African countries like Nigeria, with the requisite revenues from other sources, subsidized their agricultural sectors in order to protect domestic markets and ensure guaranteed producer prices. And even at present, although economic restructuring conditions imposed by the IMF, the WTO, and other international financial and economic institutions restrict government spending on such subsidies, certain crop sectors still receive support in some African countries. For example, in an attempt to counteract the negative impact of huge US and European farm subsidies on their cotton sectors, West and Central African countries spend an estimated $60 million annually on subsidies (Mutume, 2003). It may be the case that Nigeria's relative economic and financial strength has enabled it to provide its export crop sectors the sufficient support, so that even as the domestic currency appreciates Nigeria exports remained externally competitive relative to other poorer West African countries.

The regression results for the food crop supply function (i.e. Equation 2) show a similar outcome. Not only have the coefficients on the crop commercialization variable been found to be statistically significant for most of the countries, but the sign on these coefficients is also negative for seven of the twelve countries. Only the signs on the coefficients for The Gambia, Niger, Nigeria, Senegal and Sierra Leone are positive (see results in column (2) of the Table). Given that the significance levels here are derived from a one-tailed test, these results suggest a supportive evidence for the substitutability argument, at least for the seven countries, that cash crops and food crops are substitutes in production, because a higher level of cash crop production and

commercialization may require that land and labor resources and agricultural equipment be shifted away from food crop production.

A revealing pattern observed in these results, which further supports the substitutability view, is depicted below in Table 4.4. Here, the twelve countries are listed in a descending order of their annual average crop commercialization indices, as were previously presented in the last row of Table 4.2. In the third column of this Table 4.4 are the regression coefficients on the crop commercialization variable corresponding to each country, transferred from column (2) of Table 4.3. What is obvious in Table 4.4 is that all countries with a crop commercialization index greater than one percent have a negative regression coefficient on its commercialization variable, while those with the index less than one percent have a positive coefficient. As noted earlier, even a three percent index, needless to mention a one percent index, is too low a benchmark for crop commercialization. However, the fact that higher values of commercialization indexes appear to be associated with negative and statistically significant coefficient estimates is insightful.

Table 4.4: Annual Average Crop Commercialization Indices and Corresponding Regression Coefficients for West African Countries

Country	Annual average crop commercialization index	Regression coefficient on Commercialization Index
Cote d'Ivoire	7.9	-1.302
Mali	3.6	-0.207
Togo	3.3	-0.172
Benin	3.1	-0.262
Cameroon	2.6	-0.485
Ghana	2.1	-0.499
Burkina Faso	1.7	-0.088

Country	Annual average crop commercialization index	Regression coefficient on Commercialization Index
Sierra Leone	0.9	0.032
Senegal	0.5	0.352
Gambia	0.3	0.105
Nigeria	0.3	0.098
Niger	0.1	0.084

A possible interpretation of this pattern, which seems to support the substitutability proposition, is that countries that are more involved in cash crop production and commercialization may be employing more of their resources in such production so that there are fewer resources left for food production, and countries that are less involved in crop commercialization have more resources for food production. On the other hand, if the complementarity argument were supported, the pattern observed in Table 4.4 would be the reverse. That is, countries with a greater crop commercialization index would have a positive regression coefficient on their commercialization variables, and those with a lower index would have a negative coefficient. In this case, the interpretation would be that greater participation in cash crop production by countries allows them to acquire more cash crop-specific kinds of resources and investments that also create the necessary household-level synergies and regional spillover benefits for farmers involved in food crop production; and countries that participate less in cash crop production do not have more of such resources and investments to allow them to enjoy these household-level and regional spillover effects in food crop cultivation.

In order to provide a rough sense of the magnitude of the estimated effect of crop commercialization on food crop supply in each of the seven countries with negative coefficients, the average of these regression coefficients is computed, giving an average of -0.431. For all twelve countries, including those with positive coefficients, the average is -0.176. Since all variables in the equations of the model were logarithmic transformations, these coefficients mean roughly that on average a 1 percent increase in cash crop exports (i.e. crop commercialization) is estimated to correspond to a 0.43 percent decrease in food crop production for seven ECOWAS countries and 0.18 percent decrease for most countries. While such effects suggest an inelastic food crop supply response to crop commercialization, since a 1 percent rise in cash crop output is associated with less than a percent reduction in food production, these are still significant effects given the widely reported precariousness of the food situation in the ECOWAS sub-region.

4.4.2.4 Testing for Cross-Country Differences with Panel Data: Results and Analysis

In addition to determining the effects of cash crop production on food production in each country, there is also the related question of whether or not such effects are different across the various countries. For instance, does involvement in cash crop production have the same or similar food crop supply effects in Benin and Côte d'Ivoire as in Mali, Nigeria, and Togo? Second, in the absence of crop commercialization (i.e. without any effects of cash crop production), would the levels of food crop supply in these countries be the same or significantly different? Answering these questions is important for both policy

and analytical reasons. In terms of policy, if all effects are similar across the twelve countries, a crucial implication will be that countries in the ECOWAS sub-region can adopt a regional-based policy approach to issues of agricultural commercialization and food production. Analytically, it would mean that a single equation can be estimated for the data set obtained from pooling the twelve panel data sets. On the other hand, if these effects are significantly different across countries, then an individual-country policy approach would be appropriate, and in that case an analytical approach that incorporates such cross-country differences would be required.

In terms of the model given by equations (1) and (2), this would require a determination of whether or not the parameters α_0, α_1, α_2, and α_3 and β_0, β_1, β_2, and β_3, corresponding to the populations that generated the twelve country data sets, are statistically constant or stable across these countries. To perform a significance test of such a hypothesis of parameter constancy (or stability), an F test resembling the following structure is often used:[25]

$$F = \frac{(RRSS - URSS)/[(n-1)(k+1)]}{URSS/[N - n(k+1)]} \tag{3}$$

where RRSS is the restricted residual sum of squares obtained from the regression with the pooled data; URSS is the unrestricted residual sum of squares obtained by combining all of the residual sums of squares from estimating the regression model separately for each of the twelve country data sets; N is the total number of observations in the pooled data; n is the number of country data sets;

[25] For detailed explanation of this test, see G. S. Maddala (1988), pp. 130 – 136.

and k is the number of regressors in each model. Thus the F static has a distribution with degrees of freedom (n-1)(k+1) and N – n(k+1).

The relevant values for all of these statistics have been computed and are presented below in Table 4.5. From these values, it can be seen that the computed F statistic for equation 1 is 41.5 which, even at the 1 percent level, is highly significant since this value is far greater than the critical F value of 1.70. Similarly, the computed F statistic for equation 2 is 45.6 which is also highly significant, even at the 1 percent level.

Table 4.5: Computing the F-Statistic to Test for Cross-Country Differences among West African Countries

	RSS from Equation 1	Degrees of Freedom	RSS from Equation 2	Degrees of Freedom
Benin	2.309	20	.256	20
Burkina Faso	16.833	20	.154	20
Cameroon	.440	20	.424	20
Cote d'Ivoire	.355	20	1.583	20
The Gambia	17.385	20	.234	20
Ghana	.415	20	.067	20
Mali	.417	20	.884	20
Niger	38.281	20	.062	20
Nigeria	.845	20	1.319	20
Senegal	3.075	20	.058	20
Sierra Leone	1.297	20	.144	20
Togo	.867	20	.280	20
Unrestricted Sum of Squares (URSS: total of RSS)	82.519	240	5.466	240
Restricted Residual Sum of Squares from the pooled data (RRSS)	711.311	284	51.567	284
(RRSS – URSS)	628.792	44	46.101	44
F statistic	41.5 (Critical value at 1% = 1.70)		45.6 (Critical value at 1% = 1.70)	

These results show that the hypothesis of parameter constancy is rejected, and therefore there is no valid case for arguing that the sample countries being considered face identical cash crop and food crop production effects. While it is true that these countries share similar economic, political, and social structures, by virtue of their relatively common economic and political histories, they do have certain conditions that are largely country-specific, which are likely to influence their individual economic performances such as food production.

For instance, as mentioned earlier, Nigeria is the only oil-producing country among these twelve nations. Five of the countries (Burkina Faso, The Gambia, Mali, Niger and Senegal) belong to the Sahel sub-region which comprises countries that often suffer severe drought, soil erosion and environmental degradation due to their proximity to an expanding desert. Drought is the main threat in the Sahel sub-region, often resulting in food insecurity. Transport and communication infrastructure in West Africa is more developed in some countries than others. Furthermore, some West African countries have suffered from prolonged or intermittent civil conflicts, while others have experienced relatively stable governments and political regimes. Two of the twelve sample countries, Senegal and Cote d'Ivoire, have managed to escape direct military rule, although the latter was eventually overcome by civil war in 2002. With English, French and Portuguese being the lingua franca of the ECOWAS countries according to who their former colonizers were, these countries are also marked by a significant 'language divide'. Moreover, to the extent that cash cropping does affect the level of food crop production, and that the former is linked to private land titling, then differences in land titling

provisions among these countries, possibly due to differences in the formal legal structures inherited from their colonizers, are also likely to influence their individual food production performances. Finally, while all of these countries have huge external debts, the magnitude of such debts varies among them.

Thus in order to incorporate in the model such country-specific variables which might partly explain the cross-country differences observed in cash crop and food crop supply effects, a fixed effects regression is required. This involves pooling the twelve country data sets to include a number of binary (dummy) variables that gauge the effects of the unobserved omitted country-specific conditions. This analysis is conducted, however, for only the food crop supply equation (2) of the model, since this is the equation of primary interest. That equation is therefore modified to include eleven[26] binary variables named DBUR which equals 1 for Burkina Faso and zero for all other countries; DCAM = 1 for Cameroon and zero for all other countries; DCOT = 1 for Cote d'Ivoire and zero for all other countries; DGAM = 1 for The Gambia and zero for all other countries; DGHA =1 for Ghana and zero for all other countries, and so forth. In this type of fixed effects regression, where the binary variables represent unobserved conditions or characteristics that vary from one country to the next but are constant within each country over time, the population regression model is interpreted as having many different intercepts (or 'equilibrium' values of the dependent variable), one for each country, but a common regression coefficient. This implies that such a model is estimated under the assumption that the effects

[26] The required number of binary variables is one less than the number of countries, because with a common intercept if every country had a binary variable, the regressors would be perfectly multicollinear. Thus one of the twelve binary variables is omitted.

of all explanatory variables are invariant between countries, and that the only source of variation is their unobserved specific differences.

The estimation results for the new fixed effects regression are presented below in Table 4.6. Some key aspects of these results require interpretation and discussion. First, the coefficients on the three explanatory variables (crop commercialization, fertilizer consumption, and agricultural labor force use) are all highly significant, even at the one percent significance level, which again suggests a supportive evidence for the substitutability argument found earlier, since the crop commercialization coefficient is negative. More importantly, it should be noticed that this latter coefficient, -.187, is almost equal to the rough estimate, -.176, that was found in the preliminary results for the effect of crop commercialization (see p. 160). Fertilizer and labor force use in agriculture are found to be positively related to food crop production, thus largely supporting the previous results in Table 4.3. Second, notice that in line with the logic of a fixed effects regression model, these three coefficients are the same for all countries; but the estimated intercepts, as presented in column (2) of the Table 4.6, vary from one country to the next. Such an outcome was expected, but it has a very important and practical interpretation and implication.

The interpretation is that even in the very unlikely situation where the food supply effects of crop commercialization, fertilizer use, and agricultural labor inputs were identical in all countries, there would still be significant differences among them in their levels of food supplies. The results reported in column (2) of the Table indicate the magnitudes of such differences. These measure the differences in the countries' levels of food supply, which are due to

the unobserved specific variables that vary among them but are constant within each country over time.

Table 4.6: Effects of Country-Specific Variables on Food Production in West African Countries

Country	(2) Country-specific effects	(3) Log of cash crop exports (C)	(4) Log of fertilizer consumption (FR)	(5) Log of agricultural labor force (AG)
Benin	-5.942 (.560)	-.187 (.016)	.068 (.013)	1.285 (.082)
Burkina Faso	-11.327 (.672)	-.187 (.016)	.068 (.013)	1.285 (.082)
Cameroon	-6.912 (.647)	-.187 (.016)	.068 (.013)	1.285 (.082)
Cote d'Ivoire	-4.912 (.640)	-.187 (.016)	.068 (.013)	1.285 (.082)
The Gambia	-13.038 (.680)	-.187 (.016)	.068 (.013)	1.285 (.082)
Ghana	-7.494 (.666)	-.187 (.016)	.068 (.013)	1.285 (.082)
Mali	-12.15 (.661)	-.187 (.016)	.068 (.013)	1.285 (.082)
Niger	-15.768 (.694)	-.187 (.016)	.068 (.013)	1.285 (.082)
Nigeria	-3.197 (.759)	-.187 (.016)	.068 (.013)	1.285 (.082)
Senegal	-6.635 (.646)	-.187 (.016)	.068 (.013)	1.285 (.082)
Sierra Leone	-9.781 (.631)	-.187 (.016)	.068 (.013)	1.285 (.082)
Togo	-5.285 (.619)	-.187 (.016)	.068 (.013)	1.285 (.082)
Total F = 36.78 Adjusted R square = 64		-.187	.068	1.285

A key observation from these results is that all unobserved country-specific effects are negative and statistically significant. This is highly consistent with the nature of agricultural production in most African and other developing

countries, where labor, fertilizers and other land-improving investments are the primary and most important farm inputs, without which the level of food production in these countries would therefore likely to be negative. Thus these negative values may be interpreted as the quantity of food that each country would import, if that country had no access to labor, fertilizers, capital, and other conventional productive farm inputs. Another related observation is that while all countries face negative 'equilibrium' levels of food supplies, the extent of this deficit appears to vary significantly among them. For instance, for four of the five Sahelian group countries described earlier (Burkina Faso, The Gambia, Mali, and Niger), the value of their country-specific effects is below -10. Only one Sahelian country, Senegal, has its specific effect above -10. Notably, some of these countries shown in Table 4.6, with large negative intercepts, also have little in the way of cash crop production, as can be seen from Table 4.4. On the other hand, all non-Sahelian countries have their country-specific effects above -10. Nigeria and Cote D'Ivoire, for instance, have the largest country-specific effects (i.e., -3.197 and -4.912, respectively).

As explained earlier, these differences may also be interpreted as reflecting variations in the extent to which these countries are endowed with other enabling or disenabling political, economic, social, and geographic conditions. Countries with large negative specific effect values, such as the Sahelian group countries, may be those less endowed with specific enabling conditions, while countries with smaller negative specific effects, such as Nigeria and Cote d'Ivoire, may be those that are more endowed with specific enabling environments. In other words, these variations in country-specific effects show the extent to which

countries are different in their capacities to cope with the lack or inadequacy of agricultural labor, fertilizer and other land-improving investments. As an example, it is known that due to poor nutrient fixation and a shortage of minerals that contain nutrients, soils in the Sahelian region have a low natural yield potential and a low natural fertility and water-retaining capacity (Leisinger and Schmitt, 1995). Thus Sahelian countries are likely to suffer more from the lack or reduction of fertilizer use than countries that are endowed with more favorable geographic conditions.

The key lesson to be derived from the above analysis is that while West African countries may share similar political, economic, and social structures, they do have certain country-specific characteristics that influence their individual economic performances, particularly agricultural and food production. And although this dissertation has not identified such specific characteristics, it reaffirms the value of more research investigations in identifying these country-specific conditions, and cautions those policies that do not give particular attention to the special circumstances of these countries. The successful identification and consideration of such specific characteristics as the basis in formulating regional cooperation and integration policies within the ECOWAS framework will be crucial to achieving the long-term development goals of the sub-region.

Although the lack of appropriate data did not allow for a direct assessment and quantification of the degree of land and other resource substitutability between cash crops and food crops, the foregoing analysis has made a reasonable case for the argument that cash crop production may impinge upon the ability of

West African countries to achieve food sufficiency. Thus, as argued previously, to the extent that this type of production is inextricably linked to and supported by privatized land tenure, a crucial question is raised as to whether such privatization should be encouraged and formally institutionalized, even as it supports a form of production that conflicts with a country's objective of food sufficiency. This chapter has argued and empirically demonstrated that current policies of agricultural market globalization which have veered farm land use and investment patterns in West African economies towards cash crop production, may be inconsistent with the region's objective of achieving food sufficiency and security. The analysis further suggests that while these economies share certain common institutional structures, their long-term performances may be significantly dependent on their own specific characteristics. There is a need for research investigations into the nature of these country-specific conditions.

5 CONCLUSIONS

The primary research objectives of this dissertation were motivated by the growing concerns about the agrarian and food production crisis facing sub-Saharan Africa, and the relatively more recent realization that in order to mitigate this problem the agricultural investment incentives and productive capacity of the region's overwhelming farming population (i.e. the low-resource farmers) must be improved through transformation of their institutional contexts, particularly the terms on which they hold and utilize land. Such recognition of the importance of land tenure institutional change in agricultural development has over the last quarter century intensified a debate about the relative efficacies of African indigenous customary tenure institutions and outright privatization of land tenure confirming to the capitalist property rights model.

A review of the literature on this debate has revealed two sides of the arguments being made: those who advocate for the outright replacement of African customary tenure institutions with formally privatized tenure regimes, and those who support the need to identify certain appropriate conditions and policies that facilitate the adaptation of these customary institutions. The essential argument of the replacement paradigm, as based in the Boserupian evolutionary model of farming systems, and the theories of induced innovation and property rights, claims that under the combined pressure of population growth and increasing commercialization the evolution of indigenous customary tenure institutions is inevitably towards the path of privatization, and that this latter outcome is also more desirable in terms of inducing agricultural

investments, farm capital formation, and sustaining the natural resource base. Such an argument is challenged, however, by the view that customary tenure institutions have proven to be capable of adapting to the new realities of increasing agricultural commercialization, population pressure, and technological change, and of spontaneously evolving from institutions of outright communal control towards more decentralized but co-operative management systems; and therefore rather than replacing these institutions with full-fledged formal private rights, their process of adaptation should be encouraged and facilitated.

The question of whether or not privatized land tenure is an inevitable evolutionary path for customary tenure institutions, and the most desirable institutional change in terms of encouraging farm investments and agricultural modernization, carries very important policy implications for West African countries. This is true not only because the mechanism of individual land titling or registration being applied to accomplish tenure privatization entails enormous opportunity costs in terms of other development benefits forgone, but also because private land titling is now regarded as an integral part of the broader programs of structural adjustment and agricultural market liberalization which West African countries are demanded to implement.

A key element of such programs is the opening up of domestic agricultural input and financial markets to increased private corporate participation. However, since one of the major effects of the World Bank/IMF-sponsored structural adjustment programs during the 1980s and 90s was to reduce public sector investments and participation in agriculture in these countries, and the

domestic private sector there has been relatively weak, much of the private investments in fertilizers, seeds, and other inputs encouraged by liberalization has come mainly from foreign private and non-governmental (NGO) sources. This has created the tendency on the part of these private multinational companies and the for-profit or Big International NGOs (BINGOs) to orient and tailor agricultural production in these countries to the specific needs of the global markets, thus requiring that land and other input resources be deployed not in the production of domestic food crops but that of cash crops. In this context, land rights privatization is being considered by these private companies and the major international financial institutions as well as many African governments as a necessary precondition for promoting agricultural investments and production in Africa.

The main contribution of this dissertation is (a) to have critically assessed the land rights privatization inevitability argument and empirically demonstrated that West African customary tenure institutions can evolve alternatively, and (b) to have shown that agricultural commercialization, particularly cash crop production, which also requires private land rights, may be imposing an adverse influence on the supply and sufficiency of food in these countries.

In terms of the first contribution, the dissertation has argued that the key predictions of the evolutionary theory of land rights (ETLRs), regarding the inevitability of privatized land tenure, are at best untenable in the context of West African countries. This is because such formal private registration of land rights is likely to result in greater rather than less tenure insecurity due to its high transaction and transition costs as well as the possible manipulation of the

process by more powerful political actors in these countries. Land registration is also not likely to result in more private land sales and economic efficiency, because of the persistence and resilience of indigenous customary control over land transfers due to the emotional and spiritual attachment of West African people to their ancestral lands. In this climate of reluctance to part with ancestral land, the presumed economic efficiency of land privatization may also become unattainable, as potential losers from such privatization impose huge *transition* or political costs on the proponents and potential beneficiaries of the process. Moreover, it has been argued that even if the demand for land in many African countries were determined purely by formal market exchange institutional arrangements, such as legally registered land titles, which in fact is not the case, the ability of African governments to supply such institutional innovation, as predicted by the ETLRs, would still be highly circumscribed by a lack of public political support for and the strengthening of community-based opposition to the initiative.

An important part of this contribution is to have identified a behavioral model of cooperative land use and management versus privatized or non-cooperative management, through which the influence of social capital and state-local institutional connections on rural cooperative resource governance capacity was analyzed. At the broad conceptual level, the analysis has demonstrated that a cooperative approach to land management, given certain socioeconomic and political characteristics of a community, such as the extent to which the community has effective social capital and access to state developmental institutions, is more likely to succeed in preventing the overexploitation of land

and promoting investments in agricultural intensification and modernization. A non-cooperative or individualized approach is likely to lead to land overexploitation and lower levels of agricultural investments and modernization.

Results from an empirical illustration of this model, using some limited cross-sectional data from a 1988 World Bank's Living Standards Measurement Survey (LSMS) for Côte d'Ivoire (the Ivory Coast), suggests the conclusion that collective rights and decisions over land can promote its efficient use in rural communities and facilitate farm investments and capital formation, if those communities have the appropriate social capital assets, state-local institutional connections, and credible enforcement mechanisms that help mitigate the cost of monitoring and enforcing collective agreements. Conversely, non-cooperative or outright privatization of land rights has been found to contribute to the inefficient use of land and less farm investments.

More specifically, the results show that households with high cooperative capacity (i.e., those with the appropriate levels of social capital and state-institutional connections in the form of membership in farmers' cooperatives and using state agricultural extension services), and at the same time living in high-enforcement penalty communities, are likely to have only a 9 percent probability of overexploiting communal forest land. On the other hand, households that lack such capacity (i.e. not members of cooperatives and using extension services), and at the same time located in low- or medium-enforcement communities, are likely to have a 99 percent probability of overexploitation. Furthermore, the results show that households that make efficient use of communal forest land, due to their high cooperative capacity, have an average fertilizer investment

spending of 32,783 CFA, while those that overexploit such land due to their lack of cooperative capacity have an average investment spending of only 815 CFA.

With respect to the second contribution, the thesis has investigated the extent to which current policies of agricultural market liberalization and globalization have tended to veer African agricultural research and input markets towards cash crop production, and has provided an illustrative empirical evidence of the possible impact of this on the level of domestic food production in West African countries. On the conceptual level, the analysis has shown that by marginalizing the role of the public sector and raising private multinational corporate control over agricultural research activities and input provision, these policies have not only intensified crop commercialization but also impeded national food sufficiency and at least indirectly facilitated land privatization.

An empirical framework represented by a system of simultaneous equations was specified to estimate the determinants of crop commercialization and their effects on food crop production in twelve member countries of the Economic Community of West African States (ECOWAS). Results from the empirical illustration, using a set of panel data covering 24 years and 12 ECOWAS countries from the FAO Statistical Databases (FAOSTAT) and the IMF's *International Financial Statistics*, appear to support the argument that cash crops and food crops are substitutes in production, implying that a higher level of cash crop production and commercialization requires that land, labor, and other agricultural inputs be shifted away from food crop production. Specifically, the results indicate that on average a 1 percent increase in crop commercialization is associated with a 0.18 percent decrease in food crop production for most

ECOWAS countries. They also reveal that certain characteristics peculiar to these countries may be significant in conditioning their individual capacities to produce food.

In a sense, these results further provide an indirect evidence of the linkage between cash crop production and land rights privatization, because to the extent that crop commercialization draws land resources away from food crops, and such commercially used land must be owned privately as an incentive to cash crop producers, then land privatization and crop commercialization are effectively linked. By approaching the two research questions in this way, the dissertation has made a humble but distinguished contribution to both the academic and policy discourses on African land tenure and agricultural and rural development. A review of the literature has outlined the need for more inclusive and interdisciplinary models to understand the relationship between private land rights and agricultural investments and production, and between indigenous customary tenure and these development outcomes in African societies. For instance, many authors have alluded in their analyses to the possible roles of social, political, and state-institutional variables in understanding the possible effects of land tenure change on agricultural investment and production outcomes (Brasselle et al., 2002; Platteau, 1996; Platteau and Baland, 2001; McCarthy et al., 2001; and McCarthy et al., 2004). Furthermore, the question of the linkage between agricultural commercialization and food security has long been the subject of debate (Maxwell and Fernando, 1989).

None of these works have, however, linked the two research questions. This dissertation has therefore made a significant contribution by providing

analyses and illustrative evidences that integrate both questions. This was accomplished by demonstrating in Chapter 3 that small rural farmers producing under a non-cooperative or privatized land management system will have the incentive to engage in shifting cultivation and overexploit any available communal forest land, thereby avoiding undertaking significant investments in intensive farming; and by showing in Chapter 4 that the production of cash crops on mainly privatized land is competitive to food production. Thus, although the first empirical illustration in Chapter 3 was conducted with limited data on a single country, and therefore its conclusion can only be cautiously considered, the thesis has demonstrated that insofar as cash crop production conflicts with a country's objective of food security and, at the same time, such production is being supported by a privatized land tenure system which also conflicts with farmers' investment incentives, then both processes constitute a source of two mutually reinforcing negative effects.

The knowledge gained from this dissertation may therefore be significantly useful for guiding future research into West African agricultural and rural development policy. Given that the present work has demonstrated that customary land tenure institutions, combined with the appropriate social capital assets and state-local institutional connections, can evolve in ways other than privatization that enhance farm investments, and that land privatization itself may not be supportive of national food security, perhaps West African governments, policy makers, and international institutions may need to focus attention on identifying those policies that facilitate the building of the necessary rural social capital and state-local institutions. Furthermore, as this research has

demonstrated that the economic development performances of individual countries within the Economic Community of West African States (ECOWAS) may also be dependent upon their own specific economic, political, geographic, social, and institutional conditions, policies and programs should be designed to promote research investigations into the nature of these conditions.

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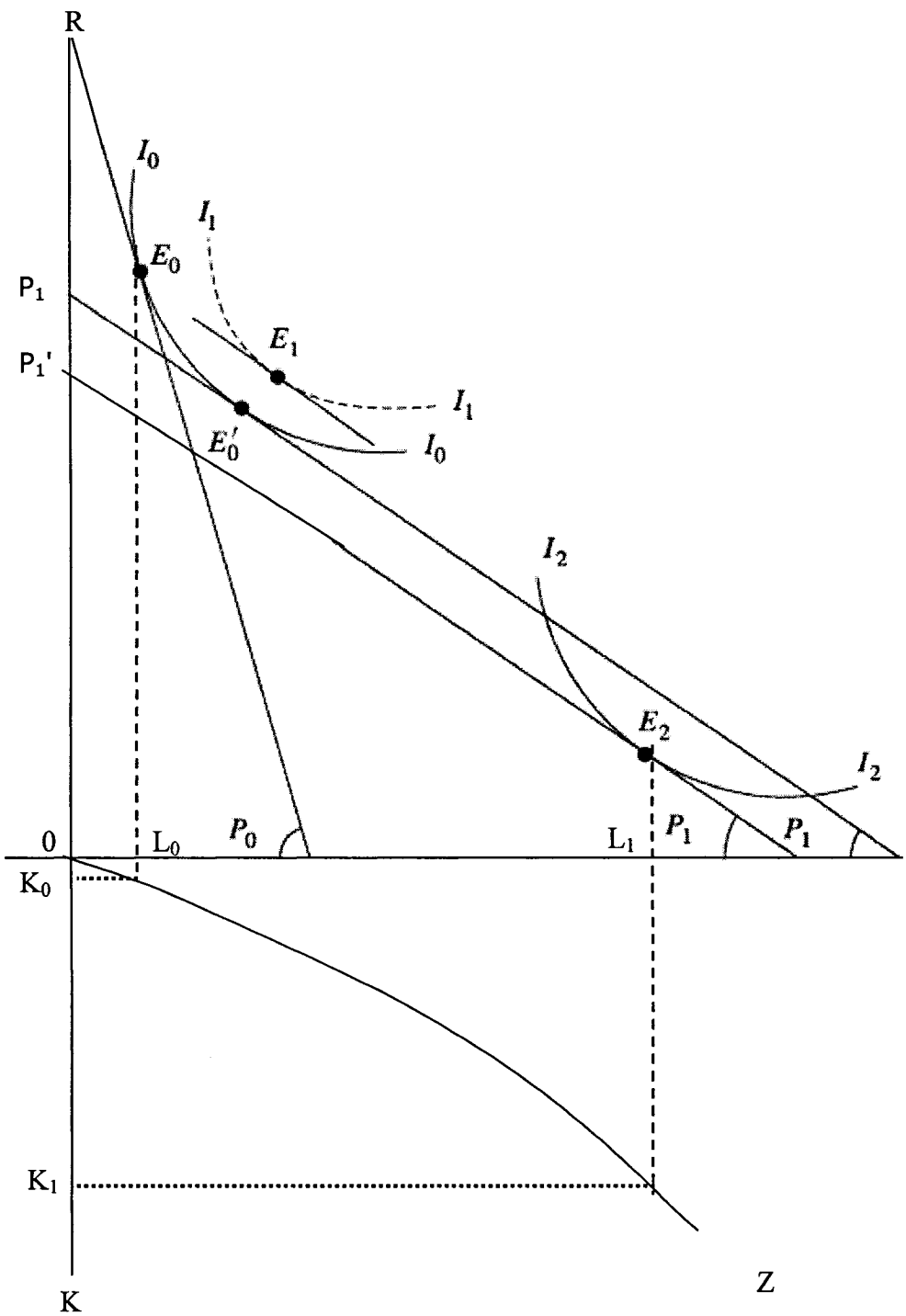
Appendix: Figure A3.1

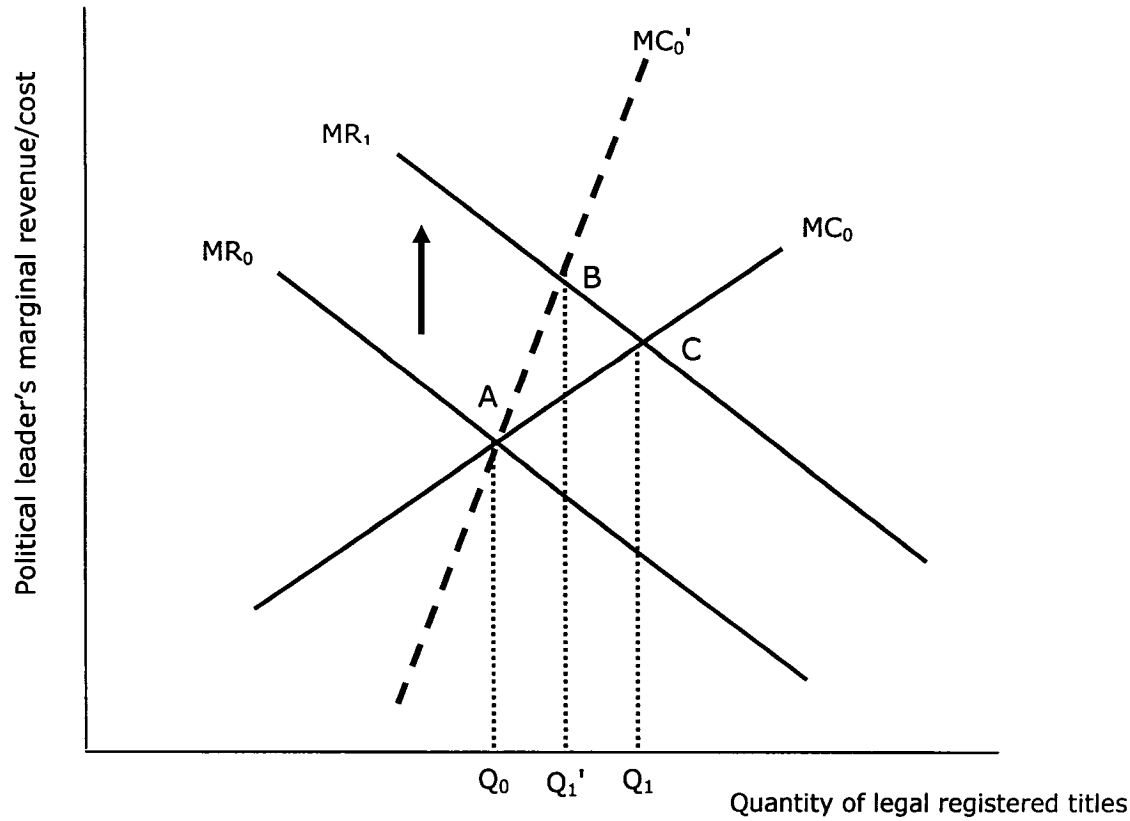
Figure A3.1: A Model of Induced Innovation



Source: Derived and modified from Hayami (2001), p. 18.

Appendix: Figure A3.2

Figure A3.2: Graph of a Political Market for Land Titling



Source: Derived and modified from Hayami (2001), p. 23.

Appendix: Exhibit A4.1

Exhibit A4.1: A Possible Sketch of an Analytical Model Substantiating the Cash Crop Versus Food Crop Supply Model Described by Equations (1) and (2), p. 147.

1. Below a model is given describing land allocation (T) between food (F) and cash crop (C) production:

$$T = T_F + T_C \quad (1)$$

2. Farm output Choice: Maximize profit by choosing input levels of land and labor (fertilizer can be added with additional algebra):

$$\text{Profit} = \Pi = \Pi_F + \Pi_C \quad (2)$$

Production functions are given by:

$$Q_F = Q_F(T_F, L_F) \quad (3a)$$
$$Q_C = Q_C(T_C, L_C) \quad (3b)$$

Market prices for the crops are given as P_F and P_C, and it is assumed that labor market is competitive: W = wage rate.

3. The profit function is given by:

$$\Pi = P_F Q_F(T_F, L_F) + P_C Q_C(T-T_F, L_C) - WL_F - WL_C \quad (4)$$

4. The first-order conditions (FOC) are:

$$\partial \Pi/T_F = P_F \partial Q_F/\partial T_F - P_C \partial Q_C/\partial T_C = 0 \quad (5a)$$
$$\partial \Pi/L_F = P_F \partial Q_F/\partial L_F - W = 0 \quad (5b)$$
$$\partial \Pi/L_C = P_F \partial Q_C/\partial L_C - W = 0 \quad (5c))$$

Rewriting the FOCs:

$$P_F \partial Q_F/\partial T_F = P_C \partial Q_C/\partial T_C \quad (6a)$$
$$P_F \partial Q_F/\partial L_F = W = P_F \partial Q_C/\partial L_C \quad (6b)$$

5. Solving the above three equations (6a), (6b), and (1), we obtain the demand for <u>all</u> inputs as functions of <u>all</u> relevant prices:

$$T_F = T_F(P_F, P_C, W) \quad (7a)$$
$$T_C = T_C(P_F, P_C, W) \quad (7b)$$
$$L_F = L_F(P_F, P_C, W) \quad (7c)$$
$$L_C = L_C(P_F, P_C, W) \quad (7d)$$

6. Substituting the above demand functions (7a) – (7b) in the crop production functions (3a) and (3b) yields the market quantities of Q_F and Q_C (written as Q^F and C) on page 147, as functions of all prices, i.e:

$$Q^F = Q^F (P_F, P_C, W) \qquad (8a)$$
$$C = C (P_F, P_C, W) \qquad (8b)$$

7. Reduced Form: If domestic production of food and cash crops are at constant costs (i.e. averages costs = marginal costs), resource shifts between sectors would not affect the relative prices of food and cash crops, and this would rationalize the focus on EQ 1 (exclusively) in the empirical model.