Land Tenure and Food Security: Exploring Dynamic Linkages

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ABSTRACT

Land tenure and food security have each been the subject of extensive — but generally separate — research in the past. Links between the two issues are now receiving increased attention, yet critical links between them remain unexplored. After a brief review of the two concepts, this article combines both issues within a dynamic framework that recognizes not just the conventional link between access to land and access to food in the short run, but also the recursive link between access to food and the ability to maintain sufficient resources to meet long-run needs. Such a framework makes explicit the trade-offs that poor households may face in bad years between consumption and investment in non-labour assets. Perhaps less intuitively, it also suggests that the need for self-insurance may force poor households to choose less efficient crops or production strategies than wealthier households even in good years. The article concludes with a discussion of the implications of these results for equity, efficiency, research, and policy.

INTRODUCTION

Land tenure is the system of rights and institutions that govern access to and use of land and other resources. *Food security* is the state of having secure and sustainable access to sufficient food for an active and healthy life. Research on these two topics has generally proceeded along separate but related tracks — the former focusing on the links between land tenure, resource use, agricultural production and income generation; the latter tracing links from income generation to food consumption and nutritional status. Briefly touched on by Sen (1981), recent significant works in the fields of food security research (Davies, 1996; Swift, 1993) and land tenure research (Thiesenhusen, 1995) have noted important linkages between these two fields, and research and policy initiatives have recently begun to explore some of the direct links between land tenure and food security (Bruce, 1995; Devereux, 1996; Fine, 1997; Guyer, 1995; Shipton, 1995; Stanbury, 1995). However, many of these links remain unexplored, and those that have been investigated are often referred to only implicitly, with their implications not fully spelled out. With increasing recognition of the importance of property

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rights and food security as both development objectives and policy variables, it is timely to consider these links between land tenure and food security more carefully.

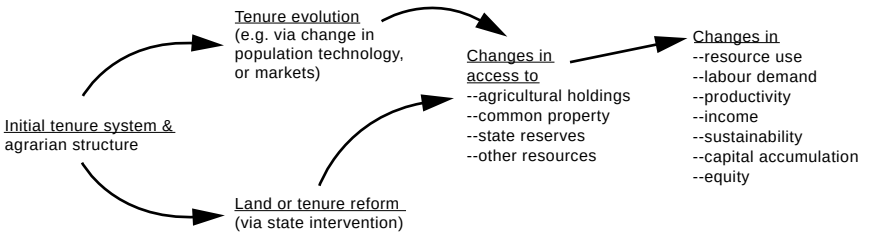
The problem which this article attempts to address, therefore, is not just the separation of these bodies of research, but also the presumed links between them. Its objective is to review existing literature to sketch out links that are suggested, but only partially explored. Briefly stated, the tendency in the food security literature has been to treat both natural resources and the tenure institutions that govern access to natural resources as exogenous determinants of food access, while the tenure literature has simply presumed that increased food production has an impact on food security. Thus the 'conventional' view is that the link moves from access to land to food security, and both natural resources and the tenure institutions that govern them are treated as exogenous factors. We will argue that links move both ways, and that both tenure and food security are endogenous factors. We will briefly review the separate literatures, and then consider the conventional link just noted, including a brief review of supporting literature. We will suggest an alternative, dynamic link, and review literature that implicitly supports such a linkage. The article closes with a discussion of the implications of a dynamic linkage for research and policy.

Land Tenure

Land tenure consists of the social relations and institutions governing access to and the use of land and natural resources. Tenure is often described in terms of 'bundles of rights' to do certain things with land or other property (Bruce, 1993). These rights derive from statutory and customary law, as well as from institutions of marriage, of power and control, and of inheritance. Whether customary or statutory, tenure regimes are rarely static, and the evolution of customary tenure as well as the impact of directed land reform constitute two major strands of land tenure research. This research traditionally focuses on three types of natural resources: agricultural holdings (including individually managed plots); common property resources (usually grazing and forest land); and state-reserved land (usually for preservation of forest or wildlife resources).

Land tenure institutions have long been the subject of agricultural and economic development policy measures, but the content of 'land reform' has varied widely (Barraclough, 1991). In the classic Latin American cases, land reform involved a change in the scale of landholdings, through the break-up of big estates and the redistribution of land resources among the rural population, in the hopes of serving both equity and efficiency through increased labour intensity per unit of land (Berry and Cline, 1979). In the classic East Asian cases, land reform meant 'land to the tiller' or the break-up

Figure 1. Conventional Characterizations of Tenure's Impact on Production and Income



of landlord/tenant relations, and the granting of title to those who actually produced from the land. Again, these reforms sought both equity and efficiency goals. In Africa, land reform — more properly labelled land *tenure* reform — typically refers to evolutionary or legal changes in the form of land tenure — nudging customary tenure systems in the direction of private property regimes — rather than in the distribution of land itself. Such changes are intended primarily to serve efficiency goals, by enhancing tenure security and thereby (at least theoretically) improving both conservation and productivity. However, preserving the equity elements of customary land tenure systems has now become an important consideration in Africa as well (Barraclough, 1991; Platteau, 1992).

Summarizing the general impacts of land reform, Thiesenhusen (1995) notes a number of outcomes that potentially affect food security, including clearer production incentives, increased investment, increased employment, poverty reduction, and equity (see Figure 1). In land tenure research in general, the assumption is that greater equity, productivity and other outcomes resulting from changes in tenure will have beneficial impacts, though the direct impact on access to food has rarely been outlined in detail, and even more rarely actually measured.

Most of this review of land tenure has focused on the agricultural holdings of individuals and households. With increased recognition of the impact of tenure on resource conservation, recent research emphasizes the importance of other types of land as well, specifically common property resources and reserved state land, where customary and statutory tenure institutions — and thus patterns of resource use and implications for livelihood strategies — are quite different (Bromley, 1992b; Devereux, 1996; Ostrom, 1992). Recent research also demonstrates that livelihood strategies are not necessarily tied to a single type of land, but notes that more subtle 'tenure niches' may overlap these categories and vary by resource and season (Bruce, Fortmann and Nhira, 1993; Rocheleau and Edmunds, 1995). For example, rights in trees may not coincide with rights in the land on which trees grow (Bruce and Fortmann, 1989; Chambers and Leach, 1989).

Food Security

The term food security has been defined and used in a multitude of ways over the past two decades, but most definitions today describe food security in terms of food availability, access, and utilization (for example, USAID, 1992). The World Bank highlights the importance of access in its widely repeated definition of food security: 'access by all people at all times to sufficient food for an active, healthy life' (World Bank, 1986). This definition can be applied at many levels, but it is used most commonly with reference to the household. We follow this convention here, since the household (despite conceptual difficulties and myriad forms) is the institution through which most people gain access to both land and food.

Access to food derives from opportunities to produce food directly or to exchange other commodities or services for food. These opportunities, described by Sen (1981) in terms of entitlements, are based in turn on access to resources, production technologies, environmental and market conditions, non-market food transfers, and accumulated food reserves (Chavas, 1995). Two features of the World Bank's definition help sharpen our focus on access to food. First, access must be *sufficient* for activity and health. Sufficiency is usually measured in terms of caloric intake relative to physiological requirements for a specified period of time. Second, access to food must be sufficient *at all times*. This requirement can itself be interpreted in at least two important ways.

On the one hand, access must be sufficient over the long term, that is, it must be *sustainable*. A household can hardly be considered food secure if it is able to meet its current nutritional requirements only by depleting or selling its endowment of resources — yet this is what an uncritical focus on access and sufficiency alone implies (Wiebe, 1994). On the other hand, access to food must also be sufficient under all possible circumstances within any particular period of time, which raises the notion of *vulnerability*. By vulnerability we mean the risk of exposure to shocks and the ability to cope with shocks (Chambers, 1995). Vulnerability arises from the fact that all sources of access to food are subject to variation. Food production varies with weather and other environmental factors, for example, while access to food via exchange depends on market factors such as wages and food prices. Vulnerability may be transitory and predictable (for instance, an annual 'hungry' season), unpredictable (as in drought or militarized conflict), or chronic (such as for landless households with insufficient employment).

A household is therefore truly food secure over a particular period of time only if it enjoys an acceptable likelihood that it will have sustainable access to sufficient food during that period. Most discussions of food security by now touch (at least casually) on each of these elements. By contrast, food *insecurity* is still generally defined simply as a lack of access to sufficient food (World Bank, 1986), disregarding the notions of sustainability and vulnerability altogether. In more complete terms, a household is food insecure not

if it lacks access to sufficient food but rather if it lacks food security — that is, if it does not enjoy an acceptable likelihood that it will have sustainable access to sufficient food during a particular period of time. Recognizing this, recent work has developed an 'extended entitlements'[1] approach to analysing food security (Davies, 1996; Swift, 1993). Davies (1996) takes into consideration both the *sources of* and *calls on* entitlement. Sources of entitlement include production, exchange, and assets, as well as coping and adaptive strategies. Calls on entitlement include consumption, various other claims such as indebtedness, and future livelihood protection. These changes in the conceptualization of food security are well captured by Maxwell (1996): first, a switch from a relatively narrow focus on food security to a broader emphasis on livelihoods; second, more *emic* or subjective perceptions of food security rather than the emphasis on bio-medical definitions; and third, more emphasis on the household rather than the nation or region as the appropriate unit of analysis.

CONVENTIONAL LINKS BETWEEN LAND TENURE AND FOOD SECURITY

Land tenure and food security have not traditionally been the subject of integrated research, in part because land tenure is defined primarily in legal and institutional terms, while food security is generally defined in terms of food consumption and bio-medical criteria. Even when both are addressed from an economic perspective, land tenure has usually been viewed as a 'supply-side' issue, while food security has been considered a 'demand-side' issue. Researchers who have written separately on both land tenure and food security or famines have not generally developed specific links between the two (Platteau, 1992; Rahmato, 1991, 1993; Sen, 1981, 1985; Shipton, 1990, 1994), and recent empirical research on direct tenure–productivity links in Africa is, at best, tenuous (Bruce and Migot-Adholla, 1994; Carter, Wiebe, and Blarel, 1994; Migot-Adholla et al., 1991).

Where land and food are explicitly conceptualized together, they generally fall within a linear framework that begins with access to resources and proceeds causally through production, income generation, and consumption to nutritional status. This conventional framework is depicted in Figure 2.

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1. The language of 'entitlements' derives from Sen (1981). While recognizing the analytical usefulness of this terminology — which describes the set of all commodities to which an individual or household has access through production, exchange, or transfer — we decided not to use this language in this article, because of the potential to confuse the terminology used by Sen, Swift, Davies and others with terminology defining benefits to which eligible individuals are entitled under public assistance programmes such as the social security system in the United States. This makes for some more cumbersome language, but greater clarity, in this article.

Figure 2. Conventional Conceptual Links between Land and Food

Resources —(1)⟶ Production —(2)→ Income —(3)→ Consumption —(4)→ Nutritional status

Although most analyses recognize the complexity of each of the elements and links illustrated in Figure 2, this framework nevertheless raises important questions — particularly about the two ends of the linear characterization. Are land resources really as exogenous as this conceptualization implies? How do individuals and households gain access to resources such as land in the first place? Does food security status play any role in access to resources? Does tenure only affect production decisions, or does it affect consumption decisions as well?

Much existing research falls short of addressing these questions fully because it focuses on just two of the above links. Research on land tenure suggests that the most significant *qualitative* link between tenure and food security is that enhanced security of tenure in productive resources enables more efficient, profitable, and sustainable agricultural production, and hence greater income and access to food (for example, Bruce and Migot-Adholla, 1994; Feder et al., 1988; Platteau, 1992). There is also ample evidence of a *quantitative* link between access to land and access to food in an agrarian economy (Barraclough, 1991; Drèze and Sen, 1989; Rahmato, 1993; Shipton, 1990). Virtually all attempts to monitor food security in famine-prone areas recognize access to productive land as one of the most important factors in determining household or individual food security (for example, Davies, 1996; Frankenberger and Coyle, 1993). Yet analysis of these relationships in the context of a linear framework such as that depicted in Figure 2 leaves out important considerations that are essential to a more complete understanding of both land tenure and food security. We will return to these considerations after a brief review of the literature generally supporting this 'conventional' linkage.

Supporting Literature for the Conventional Linkage

Four different sets of literature generally support the 'conventional' linkage outlined above. These include bodies of work on tenure security and agricultural productivity, farm size and productivity, agricultural commercialization, and natural resources conservation.

Tenure Security and Productivity

The 'property rights' school of institutional economics has long viewed security of tenure as necessary to internalize costs and benefits and to capture the future income streams resulting from investment. Private ownership of

land is viewed as the most efficient way to accomplish this (Bromley, 1989; Coase, 1960; Demsetz, 1967; Platteau, 1992). Donor agencies and governments have been strongly influenced by these arguments when formulating land tenure policy (Atwood, 1990; Bruce and Migot-Adholla, 1994; Platteau, 1992).

The most compelling evidence of a link between tenure security and agricultural productivity comes from Feder et al. (1988) in Thailand. They suggest both supply and demand impacts of secure tenure (defined in this case as holding a registered deed). First, greater tenure security increases farmers' demand for land improvements by increasing their confidence that they will benefit from such improvements over the long term. Second, tenure security increases the supply of formal credit through the creation of tradable collateral. Both effects result in greater short-term investment in inputs and greater long-term investment in productive and land-conserving technology, leading to higher sustainable production (Feder and Noronha, 1987).

Other empirical evidence on the relationship between tenure security and agricultural productivity — particularly where security of tenure is defined as holding a registered deed or title — remains mixed. In sub-Saharan Africa, where land under customary tenure is usually neither registered nor accepted as tradable collateral, research has been inconclusive. In a study that included Ghana, Kenya and Rwanda, Migot-Adholla et al. (1991: 172) found 'no relationship between cross-sectional variations in land rights and productivity'. In much of Africa, land titling is not sufficient to increase access to formal sources of credit, and though they may hold title, farmers are reluctant to mortgage their land (Barrows and Roth, 1990; Migot-Adholla et al., 1991; Shipton, 1994). In general, links drawn between tenure security and productivity must be interpreted cautiously when title acquisition is itself an endogenous process, for example when the benefits of title acquisition are related to household access to input and output markets — in other words, when sustainable increases in productivity (and less food insecurity) create increased demand for tenure security (Roth et al., 1989). We will explore these possibilities further below.

Farm Size and Productivity

The empirical evidence of an inverse relationship between farm size and productivity (in terms of output per unit of land) is well established (Berry and Cline, 1979; Kumar, 1994; Sen, 1966), suggesting that redistributive land reforms may improve both equity and efficiency. Berry and Cline (1979) offer the most exhaustive quantitative analysis of the relationship, examining cases from Latin America and from South and Southeast Asia. The inverse relationship is generally attributed to differential access to input and output markets. Platteau (1992), for example, points out that when off-farm employment opportunities are limited, family labour is applied more

intensively to on-farm production. Furthermore, family labour requires less intensive supervision, lowering transaction costs. Small farms may thus generate higher yields per acre.

However, it is the very issue of labour intensity that raises concerns about the inverse farm size/productivity relationship: small farms may be more 'efficient' (at least in terms of output per unit of land) because small farmers have few livelihood alternatives — short of asset depletion or disposition — but to exploit their own labour and that of their families (Dyer, 1991; Patnaik, 1991). Complicating a simple inverse relationship is the fact that when markets do not function well, large farms, besides having superior access to land, may have superior access to credit, extension services, new technology, irrigation water, and output markets. These benefits may lead to higher yields per acre on large farms. In fact, both of these conditions (productive labour-intensive small farms and productive capital-intensive large farms) may exist side by side. In Kenya, for example, Carter and Wiebe (1990) found such a case, with less productive medium-sized farms in between, resulting in a more complex U-shaped relationship between farm size and productivity. The implications of this kind of relationship between holding size and productivity pose serious complications for blanket recommendations in both tenure policy *and* food policy under smallholder production systems.

Commercialization

The commercialization of subsistence agriculture has long been one of the mainstays of orthodox economic development policy (von Braun and Kennedy, 1994; Mellor, 1976). However, questions have persisted about the impact of specialization and commercialization on food consumption and nutritional status — the result hypothesized by some being increased market vulnerability and food insecurity (Dewey, 1980; Eicher and Baker, 1982; Fleuret and Fleuret, 1980). Research by the International Food Policy Research Institute (von Braun and Kennedy, 1994) has largely refuted this hypothesis, concluding that increased production, employment, income, food consumption, and improved nutrition are all associated with the commercialization of agriculture, although questions about causality remain. Yet they also note, as do others (such as Chambers, 1988; Wiebe, 1992), that when markets function poorly (both for food and for cash crops), concern for food security remains a strong rationale for some amount of subsistence production.

The implication for examining the links between land tenure and food security is that, under some circumstances, it may sometimes be optimal for food-insecure households to diversify away from specialized production, rather than specializing towards a theoretical comparative advantage. Yet tenure policies currently being advocated rely heavily on assumptions about

expected comparative advantage and specialization of production. In general, however, the optimal combination of income-generating activities depends not just on the means of returns to alternative livelihood strategies, but also on their variances. Even some of the commercialization literature recognizes that diversification of production strategies may increase food security in some situations (Niemeijer and Hoorweg, 1994), and some analysts of the low adoption rates for cash crops or specialized agricultural production technologies have suggested that food security concerns are a major reason (Carter and Wiebe, 1990; Richards, 1985; Wiebe, 1992). Food policies promoting agricultural commercialization linked to tenure policy promoting the privatization and individualization of holdings have foundered over precisely this issue (Dewey, 1980; Fleuret, 1988).

Resource Conservation and Degradation

Degradation of natural resources, from tropical forests to arid rangelands, is a major concern of international donors, national governments, and resource-dependent communities themselves. At least since the time of the well-known but inaccurately labelled 'tragedy of the commons' argument (Hardin, 1968), tenure rights in land and natural resources have figured prominently in the debate over conservation. The conventional argument is that resources will be conserved only when privately owned. However, Hardin confused 'common property' with 'open-access resources' (which are characterized by unrestricted access and use) and failed to recognize the institutional arrangements that govern management of true common-property resources.[2] Recent advances in the understanding of these arrangements challenge the belief that resources held under common ownership are doomed to degradation (Bromley, 1989, 1992a; Devereux, 1996; Lawry, 1990; Ostrom, 1994).

In fact, Perrings (1989, 1998) argues that unsustainable resource allocation and consumption patterns, while tragic, may be optimal for poor households in some circumstances, reflecting the severe constraints on the opportunities they face. The most severe constraint is often access to food. Larson and Bromley (1990) argue that resulting resource degradation may be optimal under a wide range of property regimes, including private property.

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2. Even when open access resources and common property are distinguished in the literature, open access is often thought of as characteristic of a deteriorating common property system or other customary tenure regime. In general, however, open access is characterized by the absence of *any* well-defined and enforced tenure system, and could just as well be seen as a consequence of an imperfect system of private property rights, or an imperfect system of state tenure.

REFORMULATING THE LINKS

Although the previous section suggests a one-way relationship between land tenure and food security, some feedback loops are already implicit in the literature on resource conservation, particularly regarding re-investment in resources and the role tenure plays in influencing investment decisions that permit sustainable income generation over time. Other parallel feedback loops are evident in the food security literature. In particular, incorporation of the fact that nutritional status affects the quality of a household's labour resources (Kennedy and Bouis, 1993) — and that income not consumed can be invested in non-labour resources — adds a dynamic perspective to the relationships between production, consumption, and savings, and between assets and income. These relationships are more usefully explained by the growing literature on livelihoods — which also derives from Sen's (1981) work on entitlements — and by more in-depth consideration of the organization of households.

Chambers and Conway (1992: 6–7) define livelihood in terms of 'the capabilities, assets (stores, resources, claims on access) and activities required for [earning a] means of living. A livelihood is sustainable which can cope with and recover from shocks, maintain or enhance its capabilities and assets, and provide ... opportunities for the next generation'. Household livelihood security is defined by Frankenberger (1996) in terms of outcomes, particularly food, health and shelter. Because it specifically recognizes the trade-offs inherent in household decision making, livelihood security has come to be a more all-embracing analytical framework than food security. In particular, it recognizes that in risky environments, decision making by food-insecure households often involves direct trade-offs between current consumption and future income-generating opportunities, or, stated more baldly, the forced choice between current consumption and future access to food and other basic needs (Corbett, 1988; Frankenberger, 1996; Rahmato, 1991; de Waal, 1989). Households and individuals facing such crises generally plan for, cope with, and adapt to the crises through a sequential and gradually escalating series of responses (Davies, 1996; Frankenberger and Lynham, 1993; Watts, 1983). The question of relevance to this discussion is whether (and if so, how) tenure institutions shape these responses?

Under circumstances of transitory (and often predictable) food insecurity, a major concern is often to preserve productive assets in order to facilitate eventual recovery and to maintain future access to food (Sen, 1981).[3] Davies (1996), building on the work of Sen (1981) and Swift (1993), refers to this process in terms of 'sensitivity' (the exposure to intense change as a result of a 'shock'), and 'resilience' (the ability to bounce back quickly). The ability to

3. Although it is mentioned only fleetingly, in footnote number 11 on page 50, the importance of this observation cannot be overstated.

manage assets is critical to both. Evidence from India indicates the reluctance of poor households to sell capital assets in order to smooth consumption when incomes fluctuate; households prefer to adjust crop inventories and deplete reserves of cash to the extent possible (Townsend, 1995). Corbett (1988: 1108) notes that if necessary, 'reduction of current food consumption is undertaken in order to avoid having to dispose of key productive assets or take other actions which will impair the household's long term income generating capacity', suggesting indeed that the primary objective may be to avoid destitution rather than hunger or starvation. During the Sudanese famines of the mid-1980s, de Waal (1989) reported that adults mixed sand with seed stock to prevent children from eating the seed. Davies (1996) extends these notions with many examples from the Malian Sahel.

Under circumstances of severe food crisis, individuals and households may be forced to dispose of assets, including productive assets. If a tenure system permits the outright alienation of land, a severe shock can result in the permanent loss of livelihood through the sale of land — land that is usually sold at prices below market value under distress circumstances, to the benefit of wealthier members of the community who have money even in bad times (Mamdani, 1987; Watts, 1983). In fact, even in contexts where land can be sold, land markets are often inactive except for distress sales, meaning that land losses may be irreversible (Basu, 1986). The implication, therefore, is that tenure systems not only play an important role in determining short-term production decisions and longer-term decisions about resource conservation, but that tenure is also a critical determinant of the impact of short-term vulnerability to food insecurity on longer-term livelihood security. In a general sense, we argue this is true for vulnerable households even in the absence of a pronounced food security crisis, although the small literature that exists has tended to explore this question under circumstances of crisis.

One of the final stages of severe food crisis is destitution and migration in search of assistance. Where land tenure is insecure, however, the opportunity costs of migrating in search of either food aid or casual employment may be so high (in terms of the risk of losing their land rights) as to cause people to virtually starve themselves to death before leaving their land in search of assistance. Rahmato (1991) notes that insecure tenure on peasants' holdings after the 1975 Ethiopian land reform resulted in extreme reluctance to migrate in search of food assistance, probably increasing the death toll. Even if deliberate food deprivation succeeds in averting distress sale of non-labour assets, however, it may have short- or even long-term consequences for the quality of the household's labour power and thus its income-generating capacity (Dasgupta and Ray, 1986, 1987). The forced trade-off between current and future consumption (that is, regarding the composition and quality of the household's labour and non-labour resources in the subsequent period) underlines the dynamic link between land tenure and food security.

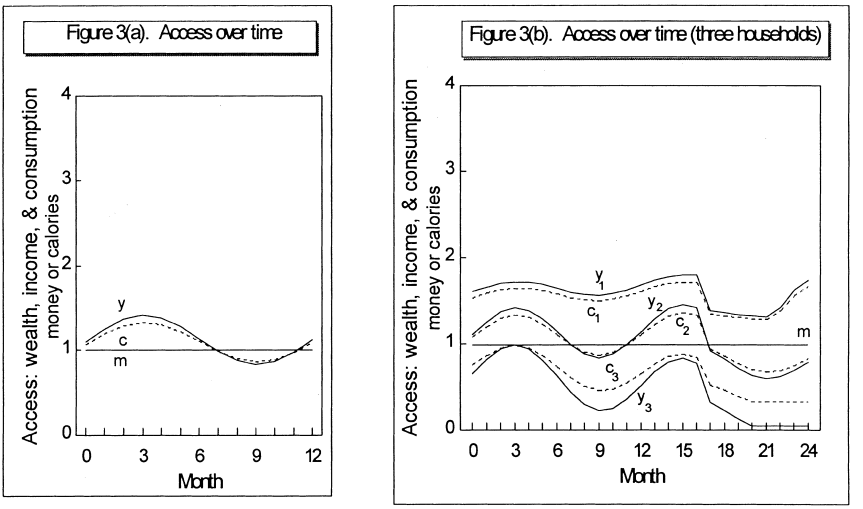
Although contending perspectives suggest alternative interpretations of the household (Becker, 1981; Dwyer and Bruce, 1988; Folbre, 1986; Guyer

and Peters, 1987; Haddad et al., 1995; Quisumbing et al., 1995; Tinker, 1990), two critical points about households and gender need to be understood with regard to links between land tenure and food security. First, the position of women with regard to access to and control over land is generally inferior to that of men within the same household, and the position of female-headed households is generally inferior to that of male-headed households (Agarwal, 1988; Carney, 1988; Carney and Watts, 1991; Davison, 1988; Joekes and Pointing, 1991; Lastarria-Cornhiel, 1995; Okali, 1983; Schroeder, 1993). Second, almost without exception, women are the guardians of household food security. Not only are women usually responsible for food preparation and allocation, land under the control of women is more likely to be used for food crop cultivation than is land under the control of men, and income under the control of women is more likely to be devoted to food and care (Agarwal, 1994; Frankenberger and Coyle, 1993; Haddad, 1992, 1994; Kennedy and Peters, 1992; Smith, 1998). An expanded notion of the links between land tenure and food security must therefore be considered not simply for households as cohesive units but in terms of questions about who within the household makes decisions, and what the implications of differentiated authority within food security and land tenure spheres are for both the productivity and the welfare of individual members of the household.

This brief review of households and livelihoods leads to a rather different construction of the relationship between tenure, resources, production and consumption. Consider a hypothetical household over a twelve-month cycle, as depicted in Figure 3. The household's income **y** varies over the year, for example due to seasonality of agricultural production and/or employment opportunities. Consumption **c** varies as well, but less than income, and for most of the year exceeds the minimum level **m** required for activity and health. Consumption varies less than income because the household adjusts wealth by the amount **y**–**c** each month, saving whenever $\mathbf{y} > \mathbf{c}$ and depleting its reserves whenever $\mathbf{y} < \mathbf{c}$. Here access to food is a function of income and wealth, sufficiency is defined in terms of the threshold consumption level **m**, sustainability is defined in terms of the long-term trend in income, and vulnerability is illustrated by the seasonal fluctuation in income. The household depicted in Figure 3(a) experiences only transitory food insecurity.[4] Figure 3(b) compares three hypothetical households that differ in the level and variability of their income over a twenty-four month period. The high-income household (household 1) is food secure. Over most of the period, household 1 experiences moderate fluctuations in income **y1**, and enjoys consumption levels **c1** that always exceed minimum requirements. Accordingly it can afford to save each month. Household 2 is the same

4. For purposes of simplicity, this discussion presumes no internal divisions within households.

Figure 3. Access to Food over Time



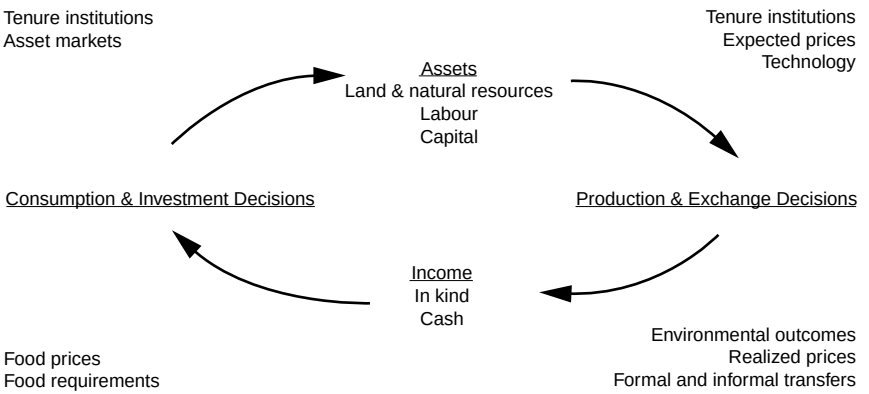
(a) (b)

household that was depicted in Figure 3(a), and experiences transitory food insecurity. The low-income household (household 3) is chronically food insecure. It experiences sharper fluctuations in income and never earns enough to consume minimum requirements for activity and health. Accordingly it must draw on its reserves of wealth each period — a strategy that is clearly unsustainable over the long term. All three households in Figure 3(b) experience a major shock — for example, a drought or a period of military conflict, lasting between months 16 and 21. The high-income household is still able to consume above minimum requirements. It is also able to recover to pre-shock income levels relatively quickly. Household 2 falls below minimum consumption requirements, but is able to recover, albeit more slowly. Household 3 suffers an almost complete loss of income, and, owing to prior depletion of its reserves of wealth, is unable to recover.

Accumulation and depletion of assets or reserves of wealth over time — including property rights in land and natural resources — thus play a critical role not only in income generation but also in a household's ability to cope with and respond to a loss in income and access to food. Explicit recognition of the role of wealth is thus critical to a more complete understanding both of food security and of the dynamics of tenure and access to land.

These observations can be summarized as follows. First, income can be derived from both production and exchange. Second, consumption and investment expenditures can be drawn from both income and wealth. Third, consumption represents investment in the maintenance of household labour resources. Fourth, income and wealth can also be invested in non-labour

Figure 4. Land Tenure and Food Security: Reformulating the Links

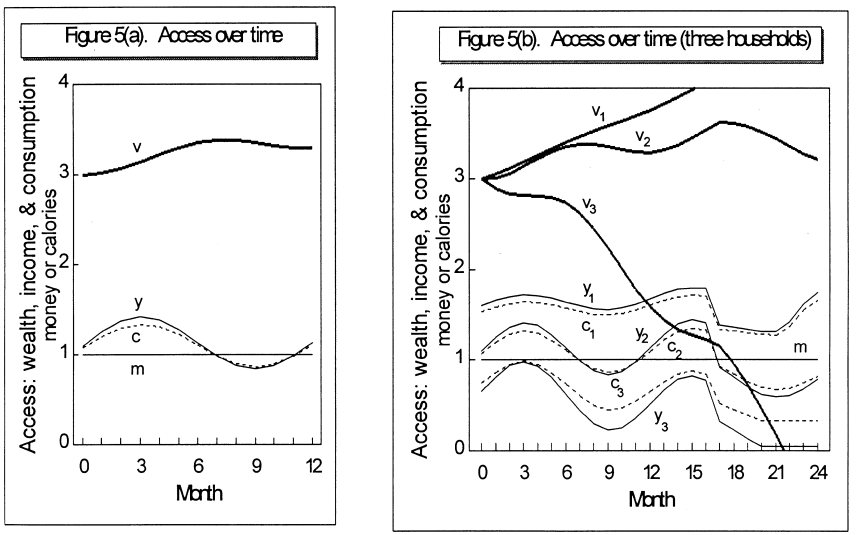


resources. Based on these observations, the linear relationships depicted in Figure 2 can be redrawn in cyclical fashion as in Figure 4. Figure 4 depicts two sets of household choices — production and exchange decisions as well as consumption and investment decisions; and two endogenous outcomes — assets and income (both in kind and in cash).[5] Exogenous parameters relevant to various stages of the cycle are listed in the outer corners. Starting at the top centre of the figure, consider a household with an initial endowment of resources which may include labour, land, and capital. Moving clockwise around the figure, this initial resource endowment — along with current and expected market conditions, technical constraints, and property rights — drives resource allocation decisions that may include agricultural production, exchange, and off-farm employment. These decisions, along with market and environmental outcomes, generate household access to food and other commodities, including both cash and in-kind components of income and wealth (Sen, 1981). The right side of Figure 4 thus depicts the conventional focus of research on land tenure. Note that while agricultural production follows a seasonal cycle, the various events depicted in Figure 4 generally occur continuously and simultaneously, and thus cannot strictly be separated into distinct chronological periods.

Income determines the level of consumption (food and other basic needs) that the household can afford to consume, as well as levels of savings and investment in non-labour resources. The lower half of Figure 4 thus represents the traditional domain of food security research. As noted above, however, tenure institutions are a major factor in the decision to invest in non-labour natural resource assets — both in acquisition and in improvements. Rather than simply representing a point along a linear relationship as

5. In Sen's terminology, assets and income would be referred to as 'endowments' and 'entitlements' respectively.

Figure 5. Access to Food over Time, Incorporating Wealth



(a) (b)

depicted in Figure 2, however, decisions regarding consumption and investment are a critical determinant of the composition of the household's resources in the subsequent cycle. These decisions thus deserve close attention. Investment in land or capital assets clearly enhances the ability to generate income in the next period. But consumption itself is also a form of investment — investment in the health of the household's labour assets. Members of a household that do not have sustainable access to sufficient food face a crisis, and are *forced to choose* between consuming sufficient food (i.e. maintaining their health and thereby their ability to work) and maintaining their non-labour assets.

This consequence can be illustrated by examining the changes in wealth that result from the saving and dissaving strategies of the hypothetical households depicted earlier in Figure 3. In Figure 5(a), the wealth **v** of the household depicted in Figure 3(a) is seen to rise as the household saves in months 1 through 7; **v** then falls as the household draws on its wealth to supplement income in meeting consumption needs. In Figure 5(b) three households are compared. Even with identical consumption thresholds and levels of initial wealth, the differences in income patterns lead to different saving and dissaving strategies over time. Household 1 accumulates wealth over the entire period, even after the shock. Household 2's wealth moves up and down, but trends gradually upwards over time. Household 3's wealth is drawn down in each period to supplement income, and quickly falls to zero following the shock in month 16. Figures 4 and 5 illustrate two critical implications of the dynamic link between land tenure and food security. The

first is the trade-off between consumption and investment in the household's non-labour assets, with important implications for household survival over time. A second result also has important implications for resource use and conservation, for structural change, and for resource tenure. The second result derives from the notion of vulnerability and the need poor households may have to forego more profitable crops in order to seek food security first (which was discussed earlier).

Other Supporting Literature for a Dynamic Link

The two results of the dynamic link between land tenure and food security have important consequences for structural change and the distribution of control over resources over time. The first result — that income shortfalls force a trade-off between consumption and investment in non-labour assets — suggests that in bad years, poor households may be forced to sell or otherwise deplete assets in order to assure access to sufficient food. If bad years are frequent enough and good years are unable to restore depleted assets, such a strategy would not be sustainable in the long run, and such households would clearly be food insecure. As a result, whereas neo-classical and institutional theory suggests that it will be the most inefficient farmers who are forced out of agriculture by an active land market, this perspective suggests that it will be the least endowed — and therefore the least food-secure — farmers that will be forced to deplete their assets or even sell their land in bad times, even though such farmers may sometimes be more efficient in terms of output per unit of land area. At the same time, food-secure households are in a position to acquire those assets in exchange for the cash or food that poor households need. Empirical evidence from Basu (1986), Mamdani (1987) and Watts (1983) has already been cited in support of this conclusion.

The second result, that anticipation of possible trade-offs in the future affects resource allocation in the present, suggests that even in average or good years, poorly endowed food-insecure household may be forced to invest more in 'self-insurance' (that is, via maintenance of substantial food reserves or allocation of land to low-risk, low-return crops such as cassava) rather than invest in the productivity of their agricultural holdings, cultivate more profitable but riskier crops, or purchase land in an active land market (Carter and Barham, 1996; Carter and Wiebe, 1990). For example, by outbidding poorer households for agricultural land that becomes available on the market, wealthier households may gain since their initial position of food security allows them to allocate resources in riskier, more productive ways.

Together, these two results indicate that when markets function poorly, the dynamic link between land tenure and food security may have important structural consequences over time, particularly if distress asset sales are irreversible (Basu, 1986; Rahmato, 1991). The process depicted in the upper

left quadrant of Figure 4 suggests that this pattern of distress sales and productivity sacrifices may result in systematic distortions in the market for land. In Kenya, such a pattern has resulted in the emergence of a bimodal structure of small and larger farms, with labour being squeezed gradually off medium-sized holdings to seek employment in urban and other non-agricultural settings (Carter and Wiebe, 1990). Carter, Barham and Mesbah (1994) make a similar argument with respect to the production of non-traditional agricultural exports in Chile, Guatemala, and Paraguay, even under circumstances that cannot generally be categorized as food-insecure (and certainly not famine-prone). Under such circumstances, land concentration resulted in a net decrease in rural employment, with implications for rural livelihood and food security: a net decrease in both direct and exchange-based access to food.

In addition to the above quantitative links between food security and access to land, there are also qualitative links to consider. We noted above that a positive association between title-holding, investment, and productivity must be interpreted cautiously when title acquisition is itself an endogenous process. In Kenya, Carter, Wiebe and Blarel (1994) note a correlation between titled land ownership and productivity, but conclude that it is driven by pre-titling differences in access to input and output markets. Specifically, the potentially beneficial effects of title on productivity are available only to farmers already well-positioned in relation to market opportunities. For the Kenya sample as a whole, these potential effects are overwhelmed by differences in cropping patterns and technology choice due to differential access to land, labour, capital, and insurance (as characterized by Figure 4). The authors argue that differences in levels of food security across households are a more significant constraint on productivity than is tenure security, and indeed that tenure security, in the form of title-holding, is itself an endogenous function of food security. This is because it is only those farmers that are already well-placed with regard to input and output markets that are in a position to benefit from the acquisition of formal land titles, and because access to markets is closely related to the magnitude of a farmer's existing endowment of assets. As a result, they argue, efforts to enhance smallholder productivity via land tenure reform alone are unlikely to be successful.

Studies of evolutionary change in land tenure institutions note that the commercialization of agriculture constitutes one of the major driving forces behind the privatization and individualization of rights in land (Barrows and Roth, 1990; Boserup, 1981). However, directed tenure interventions that seek to induce this process in other contexts may fail to serve either growth or equity purposes when diversification, rather than specialization, is an imperative for food security. Maxwell (1995) notes that where agricultural production is a secondary strategy to achieve food security via income diversification, it often relies on informal or even illegal access to land. Under these circumstances, tenure reforms aimed at privatizing and formalizing

land ownership would strengthen the property rights of a small, food-secure élite, but would have a negative effect on the food security of the low income group who had gained some informal access to land, and would have no beneficial effect on the landless or unemployed.

IMPLICATIONS FOR RESEARCH AND POLICY

The implications of this dynamic linkage for land policy and food policy are significant. The theoretical benefits of private property continue to exert a strong influence on land policy among donors and African governments (Platteau, 1992; World Bank, 1993), but superimposing private property rights over a customary tenure system through land registration and titling has often not had the intended impact. For example, tenure reform in Kenya sought not only to introduce private property but also to consolidate fragmented land holdings in order to permit economies of scale in agricultural investment. Yet subsequent research showed that the fragmentation of holdings had developed as part of a food security strategy to diversify the micro-environments in which families farmed, to minimize the risk of crop failure. Hence the *de jure* consolidation of holdings under such circumstances undercut an environmentally sound livelihood strategy, and in fact the holding and cultivation of fragmented and dispersed fields continues despite the land reform (Fleuret, 1988; Haugerud, 1983), raising questions about the broad applicability of private property rights. Barrows and Roth (1990: 297) argue that 'registration is best viewed as a policy to assist in the evolution of land tenure institutions already under way rather than a policy to stimulate fundamental change in economic behavior', while Bruce et al. (1994) suggest that the introduction of private property rights through titling programmes is inappropriate in much of Africa. Such programmes tend both to underestimate the mechanisms in customary tenure that enhance food security and to overestimate the efficiency effects of private property in economic environments characterized by multiple remaining market imperfections (Atwood, 1990; Bruce, 1993; Migot-Adholla et al., 1991; Okoth-Ogendo, 1982).

It is important to understand how rights in resources shape opportunities to meet short-term consumption needs and maintain holdings of assets over the longer term, as well as to consider how individuals and households balance these objectives when they conflict. This analysis has suggested that access to land and natural resource assets is not exogenous, and tenure is not static. Likewise in studying the impact of directed and undirected tenure reforms, it is important to fully recognize household incentives to acquire and exchange resources as part of a broader livelihood strategy based on food security concerns.

Reconsideration of these individual and household decisions leads in turn to revised inferences about efficiency and thus about structural change. If it is the well-endowed rather than the entrepreneurial who are disproportionately

able and willing to invest in greater tenure security, to innovate, and to commercialize, productivity differences will be systematically and directly related to pre-existing holdings of resources. This suggests that unfettered markets in resources such as land will tend to reinforce or exacerbate existing disparities in the distribution of wealth, especially in chronically vulnerable areas.

A better understanding of food and livelihood security imperatives can expand the range and improve the quality of land policy interventions (for example, by helping governments better anticipate the consequences of activating a market in land), while improved understanding of the impact of both evolutionary and statutory changes in tenure will inform food policy (for instance, by helping policy makers better anticipate when and for whom food security crises might emerge). For example, the benefits associated with commercialization (or with innovation in general) could be made more widely accessible not just via the traditional means of subsidized inputs and extension, but also via improved access to markets for food and for credit as consumption insurance. Food security is a necessary prerequisite for full participation in a market economy, allowing poorer households and individuals to participate in higher-return income-generating activities previously restricted to wealthier households that are better able to withstand the associated risks. Likewise recognition of title acquisition and other formal and informal means of enhancing tenure security as endogenous processes diminishes the urgency of direct measures to formalize title acquisition and redirects the focus of policy attention to more fundamental problems in intra household inequities and distortions in the markets for working capital and other productive inputs.

In general, policies designed to bolster food security will improve the integration of poorly endowed households within emerging market economies. Such integration offers alternative ways of insuring against and coping with crises — ways that do not threaten sustainability or increase future vulnerability. While an improved conceptual framework expands the set of tools available to policy makers in seeking such integration, these tools must still be wielded cautiously, for few issues are more politically sensitive in smallholder economies than land and food. Numerous studies have recognized that vulnerability — regardless of proximate market or weather conditions — is fundamentally a political problem (Patnaik, 1991; Sen, 1981; Watts and Bohle, 1993). In brief, what appear to be good policies for production and conservation in the short to medium term may contain the seeds of bad policy for food security or poverty reduction in the long term, with attendant consequences for long-term productivity and conservation of the resource base.

Whether in response to acute crises or chronic ones, however, Pinstrup-Andersen (1993) notes a common government preference for symptom-oriented intervention at the level of consumption (such as food transfers) rather than systemic interventions at the level of livelihood or production,

which would require more fundamental redistribution of wealth and thus power. Analysis of specific rights to land and access to food is a necessary first step towards improved policy, but attention must ultimately be directed at the political context within which these rights and access are defined. As Watts and Bohle (1993: 119–29) note:

> property rights ensure access to land and other assets, but political rights are also central to the process by which claims can be made over public resources as a basis for food security, and to defend [food] entitlements … Political economy, in other words, privileges the historical and the structural, attempting to account for how and why particular patterns of entitlement and empowerment are produced and reproduced within society.

Improved understanding of the cyclical and dynamic relationship between land tenure and food security, as well as of the political and household contexts within which production and consumption take place, will enhance research and better inform policy in both these critical areas.

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