

No. 129

January 1998

Land Tenure and Food Security: A Review of Concepts, Evidence, and Methods

Daniel Maxwell and Keith Wiebe



Land Tenure Center

AN INSTITUTE
FOR RESEARCH AND EDUCATION
ON SOCIAL STRUCTURE,
RURAL INSTITUTIONS,
RESOURCE USE,
AND DEVELOPMENT

LAND TENURE AND FOOD SECURITY:

A REVIEW OF CONCEPTS, EVIDENCE, AND METHODS

by

Daniel Maxwell and Keith Wiebe

All views, interpretations, recommendations, and conclusions expressed in this paper are those of the authors and not necessarily those of the supporting or cooperating institutions.

LTC RESEARCH PAPER 129

**LAND TENURE CENTER
UNIVERSITY OF WISCONSIN–MADISON**

JANUARY 1998

Copyright © 1998 by Daniel Maxwell. All rights reserved.

Readers may make verbatim copies of this document for noncommercial purposes by any means, provided that this copyright notice appears on all such copies.

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
1.1 Purpose	1
1.2 Background	1
1.3 Outline	3
2. CONCEPTUAL REVIEW: LAND TENURE AND FOOD SECURITY	3
2.1 Conventional linkages	3
2.2 Land tenure	4
2.3 Food security	7
2.4 Reformulating the linkages	10
3. EMPIRICAL ISSUES ARISING	12
3.1 Security of livelihood strategies	14
3.2 Land tenure and resource conservation	18
3.3 Small-farm bias: Agrarian structure and agricultural productivity	19
3.4 Tenure security and credit access, investment, and productivity	21
3.5 Gender, land, and food security: Intrahousehold conflict and cooperation	22
4. IMPLICATIONS FOR RESEARCH AND POLICY	24
4.1 Research implications: Synthesis of complex and dynamic conceptual domains	24
4.2 Policy implications: Land and food	25
4.3 Political economy of land and food	26
APPENDIX: PROBLEMS WITH METHODS	27
A.1 Methods of land tenure research	27
A.2 Methods of measuring food security	29
5. REFERENCES	30

FIGURES

Figure 1	Conventional conceptual links between land and food	3
Figure 2.	Conventional characterizations of tenure's impact on production and income	5
Figure 3.	Access to food over time	9
Figure 4.	Land tenure and food security: Reformulating the links	11
Figure 5.	Access to food over time (incorporating wealth)	13

LAND TENURE AND FOOD SECURITY: A Review of Concepts, Evidence, and Methods

by

Daniel Maxwell and Keith Wiebe^{*}

1. INTRODUCTION

1.1 PURPOSE

Land tenure is the system of rights and institutions that governs 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 both topics has generally proceeded along separate but related tracks—the former focusing on the links between access to land, resource use, and income generation; the latter tracing links from income generation to food consumption and nutritional status. Recently,¹ property rights (the “building blocks” of land tenure) have received increased attention as policy instruments that affect access to food, yet the links suggested by such instruments have been the subject of little empirical research.

In this paper we attempt to build on a conceptual analysis of both land tenure and food security to set these various links in a dynamic framework that captures both the effects of access to resources on food security *and* the effects of food security on access to and use of resources. We then use this framework to examine a range of issues arising in empirical research and to discuss their implications for future research related to land policy and food policy.

1.2 BACKGROUND

Part of the reason that these topics have not been the subject of integrated research is that they fall into very different domains. While both concepts describe social processes, land tenure is defined primarily in legal and institutional terms, and is often incomprehensible to nonspecialists, while food security is generally defined in terms of food consumption, and is thus subject to biomedical definitions and considerations. Within economics, land tenure has usually been viewed as a “supply-side” issue, while

^{*} International Food Policy Research Institute (IFPRI), Accra, Ghana [formerly at the Land Tenure Center (LTC), University of Wisconsin–Madison]; and Economic Research Service (ERS), U.S. Department of Agriculture (USDA), Washington, D.C.

The views expressed herein are the authors’ and may not be attributed to IFPRI, LTC, ERS, or USDA.

¹ Including at the World Food Summit, in Rome, in November 1996.

food security has been considered a “demand-side” issue. Thus both the disciplinary boundaries and the tendency toward intradisciplinary specialization have served to divorce analysis of these two topics, which at one level are so clearly intertwined: 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 (e.g., CARE 1994; Frankenberger and Coyle 1993). Various research and policy initiatives have recently sought to understand the linkages more clearly.²

Both quantitative and qualitative linkages between land tenure and food security have been suggested. The food security and famine literature presents solid evidence of a negative quantitative link—that is, a reduction in or outright loss of access to land in an agrarian society leads directly to a reduction in income and access to food (Shipton 1990; Rahmato 1993; Barraclough 1991; Drèze and Sen 1989). A positive quantitative linkage resulting from increased access to land can also be posited from this literature. Research on land tenure suggests that the most apparent qualitative linkage is one of changes in tenure security: that increased security of tenure in productive resources enables more efficient and profitable agricultural production and hence greater access to food via both own production and trade (e.g., Platteau 1992). Secondary linkages include access to common property resources for livestock production and nonagricultural livelihoods, fuelwood and other forest products, and wild food (Davies and Leach 1991; Chambers 1988; Falconer and Arnold 1991).

The debate on the linkage between tenure security and productivity has focused mainly on Africa, where land has been perceived as a relatively abundant factor of production. Much of this debate is specifically around the question of whether customary land tenure systems offer sufficient security of tenure (Bruce and Migot-Adholla 1994). In Asia and Latin America, where land is a much scarcer resource (or is tied up in large estates), greater focus in land tenure research has been on equitable access and the more classical types of redistributive land reform (Dorner 1972; Thiesenhusen 1995), though Feder et al. (1988) have also examined the issue of tenure security in Thailand. More recently, and on a more global scale, land tenure research has focused on environmental conservation and the sustainability of resource utilization (Bruce and Fortmann 1989; Lawry 1990; Thiesenhusen 1991; Dorner and Thiesenhusen 1992; Bromley 1992b; Ostrom 1992; Talbott 1993; Freudenberger and Freudenberger 1993; Place 1995).

In much of this literature, the assumption has been that enhancing access to land, security of tenure, or sustainability of land resource use will ultimately enhance welfare, including food security. However, a linkage is rarely empirically demonstrated. Few of the conceptual frameworks suggested in either the land tenure or the food security literature capture anything more than the most static elements of a relationship between the two—yet both are clearly dynamic phenomena, subject to serious methodological limitations in cross-sectional research designs.

The positive quantitative and qualitative links suggested above have rarely been investigated empirically. Numerous researchers who have written separately on both land tenure and food security or famines have not specifically outlined direct positive linkages beyond the suggestion that improved access to land or increased security of tenure leads to enhanced agricultural productivity (Sen 1981 and 1985; Rahmato 1991 and 1993; Shipton 1990 and 1994; Platteau 1988 and 1992; Guyer 1995). And even this tenure security/productivity link is, at best, tenuous in much of the recent empirical research carried out in Africa (Migot-Adholla et al. 1991; Carter et al. 1994; Bruce and Migot-Adholla 1994). The implications of the negative linkage between land tenure and food security are clear enough. The implied policy question at the root of the land tenure/food security nexus concerns the

² These include work by the International Food Policy Research Institute on property rights and collective action as well as property rights and gender; efforts by the Land Tenure Center and USAID (Stanbury 1995; Bruce 1995); and several panels on property rights and hunger at the Brown University's Hunger Research Briefing and Exchange (Shipton 1995; Guyer 1995).

positive linkage, that is, the extent to which increased access to land or tenure security will lead to increased access to food and increased food security.

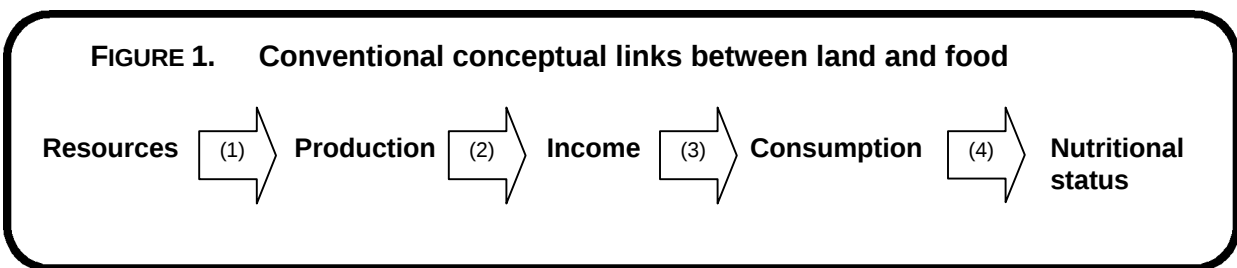
1.3 OUTLINE

In order to examine the linkages between land tenure and food security and the policy implications of such linkages, this paper will first review the conceptual literature on both land tenure and food security and suggest a new conceptual framework that incorporates the dynamic linkages between the two. Second, it will review the existing empirical literature to raise for discussion a number of issues that mediate suggested linkages and briefly examine a limited number of cases of empirical research in which such linkages have been (at least tangentially) investigated. Finally, the paper will discuss the implication of findings presented here for both land and food policy and for future empirical research. Methodological problems which result from seeking to examine empirical linkages between two very dynamic and fluid conceptual domains will be considered in an appendix.

2. CONCEPTUAL REVIEW: LAND TENURE AND FOOD SECURITY

2.1 CONVENTIONAL LINKAGES

From a research perspective primarily concerned with food security or nutrition, land is often conceptualized as a static resource endowment to be allocated to agricultural production and income generation (e.g., von Braun and Kennedy 1994). From a research perspective primarily concerned with land tenure, an increase in agricultural yields is often suggested to be a sufficient outcome to generate improved welfare, including, presumably, food security and nutrition (Feder et al. 1988; Thiesenhusen 1995). Where links between land and food are conceptualized explicitly together, they generally fall within a linear framework that begins with access to resources and proceeds causally through production, income generation (e.g., via trade), and consumption decisions to nutritional status. A stylized characterization of these conventional links is illustrated in figure 1.



While figure 1 is admittedly a caricature of even the simplest analytical frameworks suggested in the literature on either land tenure or food security, it does summarize the extent of the perceived or assumed connection between the two. While the picture can be made much more complex, its basic feature is a causal logic that flows from left to right, suggesting direct land policy opportunities to improve food security—an appealing notion in places where food security is a recurrent problem and tenure institutions are experiencing rapid transition.

Although most analyses recognize the complexity of each of the elements and links illustrated in figure 1, this framework nevertheless raises important questions. How do individuals and households gain access to resources such as land? How do different forms of access to resources, or changes in tenure and property rights, affect opportunities to generate income or access to food? Do the terms “resources” and “production” adequately capture the complexities of tenure institutions? Do the terms “food consumption” and “nutritional status” adequately capture the complex notion of food security? Does the causal logic suggested in figure 1 adequately capture the relationship between access to land and access to food, or do linkages operate in the opposite direction as well?

Much existing research on land tenure and food security falls short of addressing these questions fully because it focuses only on one or two of the above links to the exclusion of the others. Land tenure research typically focuses on links (1) and (2), while food security research focuses on links (3), (4), and sometimes (2). Both areas of research leave out important features that enrich the existing links as well as add new links to the conceptual framework. In particular, incorporation of the fact that nutritional status affects the quality of a household’s labor resources (Kennedy and Bouis 1993)—and that income not consumed can be invested in nonlabor resources—adds a dynamic perspective to the relationship between land tenure and food security which deserves closer attention. We will develop a framework that incorporates this dynamic perspective after we take a closer look at both land tenure and food security separately.

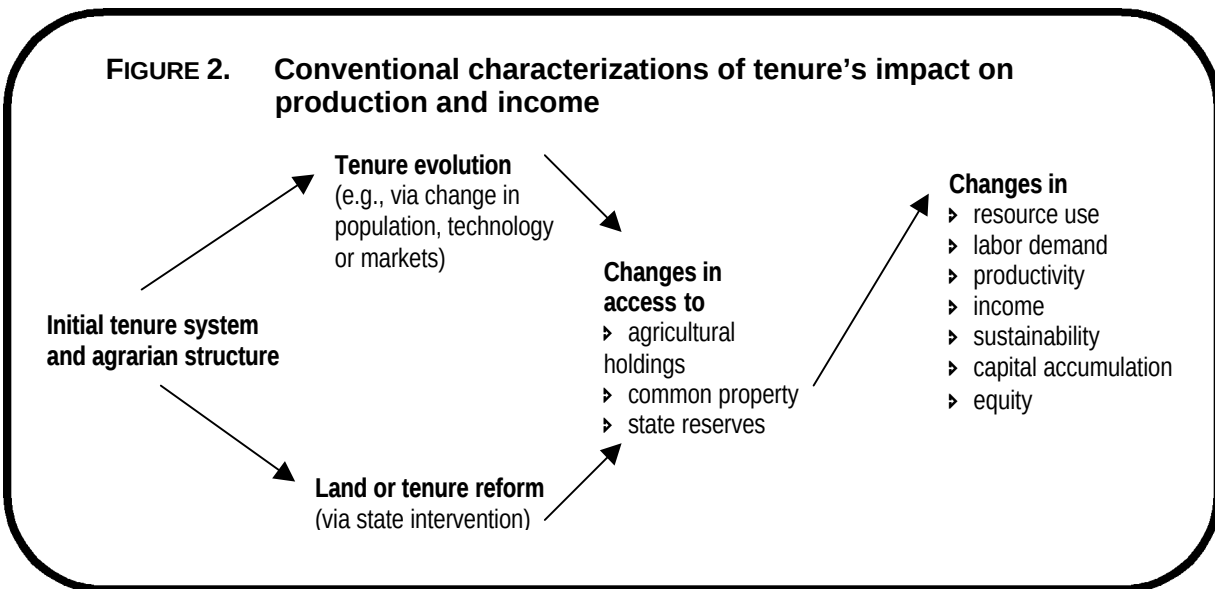
2.2 LAND TENURE

Land tenure consists of the social relations and institutions governing access to and ownership of land and natural resources. It is usually defined in terms of a “bundle of rights”—specific rights to do certain things with land or property (Bruce 1993). In brief, tenure determines who can use what land and how (Lastarria-Cornhiel 1995). Land tenure derives from both statutory and customary law regarding not only property rights and ownership, but also institutions of marriage, of power and control, and of inheritance. Tenure regimes, both customary and statutory, are rarely static. The evolution of customary tenure and the impact of land reform constitute two major strands of land tenure research. Tenure research, especially the research that would be important to a consideration of food security, has tended to separate land into three categories: the agricultural holdings of a household (including individually managed plots); common land or common property resources (usually grazing and forest land); and state-reserved land (usually gazetted reserves for preservation of forest or wildlife resources). Recent research has suggested a more complex view of overlapping rights both spatially and temporally (Bruce et al. 1993; Rocheleau and Edmunds 1995)

Land tenure institutions have long been the subject of agricultural and economic development policy measures, but the content of “land reform” has varied widely by geographic region. In the classic Latin American cases, land reform implied a change in the scale of landholdings through redistribution of land resources among the rural population and the breaking up of big estates. In the classic East Asian cases, land reform meant “land to the tiller,” or the breaking up of landlord/tenant relations, and granting title to those who actually produced from the land. In Africa, land reform, or more properly 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—intended to enhance security of tenure and thereby improve productivity and encourage better land conservation practices.

Summarizing the general impacts of land reform, Thiesenhusen (1995) notes a number of outcomes that potentially affect food security: reductions in social polarity, increased investment, more transparent production incentives, poverty reduction, increased employment, and equity. In brief, research on land tenure has tended to emphasize either evolutionary changes or institutional reforms that lead to either greater equity in access or greater productivity and better conservation practices, as depicted in figure 2. With regard to food security, the presumption is that greater equity, productivity,

and other outcomes resulting from changes in tenure will have beneficial impacts, though the direct impacts have rarely been outlined in detail and even more rarely actually measured.



In analyzing the impact of land access and agrarian reform on food security, Barraclough (1991) outlines three different agrarian systems and traces the impact of tenure change on each. The three systems he outlines are bimodal systems of land distribution, which characterize much of Latin America; landlord/tenant small cultivator systems, which characterize much of South and East Asia; and customary “communal” systems, which characterize much of Africa.³

Bimodal agrarian systems. The impact of tenure change or agrarian reform on food access is most obvious when the majority of land resources are held by a few large landowners, the most well-known cases occurring in Latin America. Such reforms have served an obvious equity purpose—the redistribution of access to land to those with little or no access of their own. Political pressure for this kind of reform comes both from landless or near-landless peasants and from an urban entrepreneurial middle class anxious to wrest political power from the landed aristocracy by breaking up the big estates. In some cases, a bimodal agrarian structure has been linked with a racial bar on landownership by indigenous populations; in such cases, land reform is a significant component of political change.

Barraclough (1991) argues that these reforms also served an efficiency purpose, enhancing productivity by altering the farm-size-to-output ratio. It has long been noted that smaller farms produced more per unit area than large estates, partly because land was simply left idle on larger estates and partly because of greater labor inputs on small farms. Hence, redistributing land and making farms smaller both enhanced equitable access and increased overall output (Berry and Cline 1979).

Landlord/tenant relations. Patron-client relations between landowners and cultivators have undergone a variety of reforms, from the widely touted success stories of the “land-to-the-tiller”

³ It should be noted, however, that customary tenure systems are not always communal.

reforms of Korea and Taiwan to the collectivized reform in the People's Republic of China. In these cases, land reform led to a significant reduction in rural poverty and to increased entrepreneurship in nonagricultural sectors. In other countries, either land reform has not been implemented or there is such a significant population of landless rural laborers that "land-to-the-tiller" reforms have had only marginal impacts on rural livelihoods (Barraclough 1991).

Changes in customary tenure. In much of Africa, the concern with land tenure has involved not redistributive reforms or the breaking of landlord/tenant relationships,⁴ but rather changes in tenure intended to induce higher productivity and better land conservation practices. Under some circumstances, conditions have changed slowly and endogenously, resulting in the gradual individualization of land rights under tenure systems that were previously communal or in the increased ability of individuals to buy and sell land in a tenure system that previously prohibited land alienation. Increased population density, increased commercialization of agriculture, and changes in the production technology of agriculture have all led to changes in land rights (Boserup 1981). While such changes have not resulted in full private property without the intervention of the state through registration and titling programs, they have resulted in considerable alteration in the way land is held and distributed in rural economies.

Theory in land economics has long suggested that increased tenure security—classically defined in terms of private freehold ownership recognized and protected by the state—will lead to increased productivity by stimulating greater access to and demand for credit and investment, reducing conflicts over ownership, and permitting the most efficient farmers to outbid less efficient farmers in the land market (Barrows and Roth 1990). Such theoretical implications have had a major impact on land policy in Africa, even though the suggested linkages remain, at best, only partially verified (Platteau 1992; Bruce and Migot-Adholla 1994; Troutt 1994). Even if such tenure changes do have the predicted impact on agricultural productivity, the broader implications for food security are far from clear, since some amount of land concentration could be expected to result in increased landlessness by some groups. Barraclough (1991, p. 128) notes:

The central land reform issue in most African countries is now to conserve the social advantages of customary tenure systems while at the same time facilitating their evolution so that they can better meet the new demands placed on peasant farmers resulting from their incorporation into national and international markets....

Despite the technical arguments on grounds of equity and efficiency, the impetus for all types of land tenure change is highly political in nature; rarely have any of these forms of land tenure change been introduced or implemented solely on technical grounds (Thiesenhusen 1995; Dickerman 1987).

Virtually all this discussion has concerned tenure institutions on the first of the three general categories of land, the agricultural holdings of individuals and households. With increased concern for the impact of tenure on resource conservation, recent research has emphasized the importance of other categories of land as well—specifically, common property resources and reserved state land—where both customary and statutory tenure institutions are quite different and where the implications of tenure for livelihoods are different (Bromley 1992b; Ostrom 1992). More recent research has indicated that livelihood strategies are not necessarily tied to a specific category of land and uses the term "tenure niche" to explore rights to resources that may be variable across time and space—that is, seasonal rights, or rights to certain resources on a parcel of land but not other resources on the same parcel (Bruce, Fortmann, and Nhira 1993).

⁴ These are elements of land reform in some African countries. Redistributive reforms are important political issues in former white settler colonies in Southern Africa (notably Zimbabwe and Namibia) and in post-apartheid South Africa. Breaking landlords' grip over rural economies was an important element of the Ethiopian revolution in the mid-1970s.

2.3 FOOD SECURITY

The term “food security” has been defined and used in a multitude of ways over the past two decades.⁵ Through the 1970s, food security was used with reference to aggregate food production or food availability, often at the national or global level. The work of Sen (1981) drew attention to the critical importance of access to food, particularly at the individual and household level, as distinct from food availability. Later a further crucial component was recognized: individuals’ ability to utilize the food to which they had access. Hence food availability, access, and utilization are the three general components usually mentioned in definitions of food security today.

In this paper we are concerned with a sharper focus on the second of these general components, access to food. 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). Despite its global scope, the World Bank’s definition can be applied to other levels as well—national, regional, household, or individual—but 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 have access to both land and food. In fact, an improved understanding of the household, based on differential intrahousehold access to resources and food, is a potential result of closer examination of the links between land tenure and food security.

More recently, food security has come to be seen as a subset of “livelihood security,” which recognized the importance of other basic needs in addition to food (Chambers 1988; Frankenberger and Coyle 1993). A secure livelihood is a necessary and often sufficient condition for food security (Maxwell 1994).

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 entitlement, are based in turn on access to resources, production technologies, environmental conditions such as weather, and market conditions such as prices. Other sources include access to nonmarket food transfers through customary kinship networks or programmatic transfers through governments or NGOs as well as access to food reserves accumulated from previous food production, purchase, or transfers (Chavas 1995).

The World Bank’s definition of food security contains two features that help us sharpen our focus on access to food. First, it requires that access 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.⁶ Requirements vary with individual characteristics such as age, sex, and level of physical activity and with environmental characteristics such as climate and quality of water and health to which the household has access. A complete notion of sufficiency must also recognize factors such as cultural acceptability as well as the subjective criteria by which poor individuals and households are sometimes forced to weigh the tradeoff between reduced consumption—with its attendant health risks—and depletion of the household’s nonlabor resource base.

The World Bank’s definition of food security also requires that access to food be sufficient *at all times*. This requirement can be interpreted in at least two important ways. First, 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.

⁵ See Maxwell and Frankenberger (1992) for an extensive review.

⁶ Many empirical analyses of food security simply use the cut-off point of 2,000 kilocalories/day (roughly 80% of the caloric requirements of an average sized adult engaging in average activity) as the measure not only of sufficiency but also of food security itself. See section 4.

Sustainability involves the ability of households and individuals to “generate access to sufficient food while maintaining their endowments of resources over an extended period of time” (Wiebe 1994, p. 56).

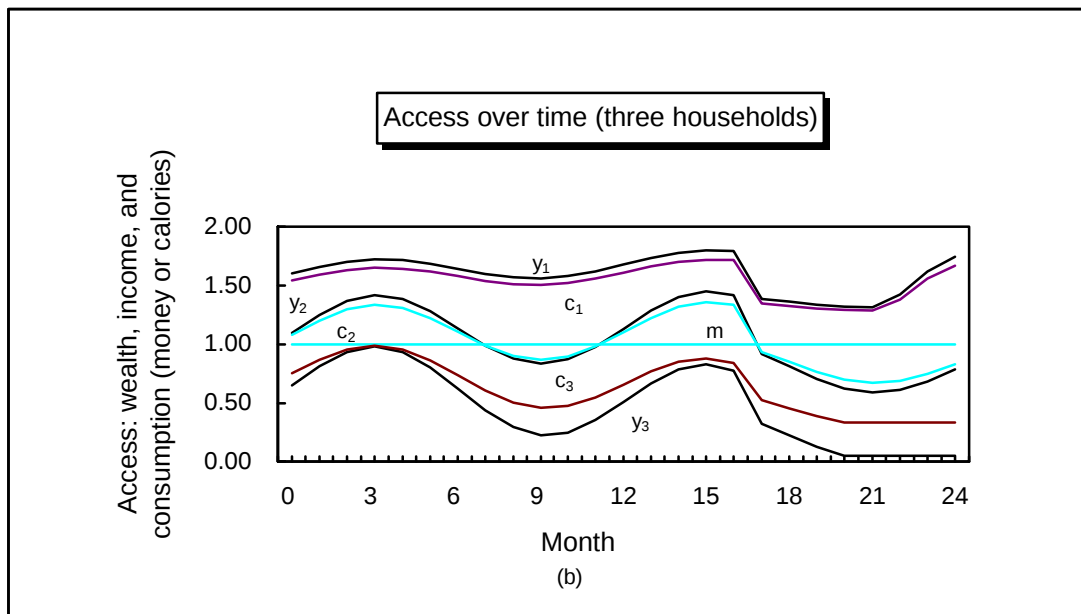
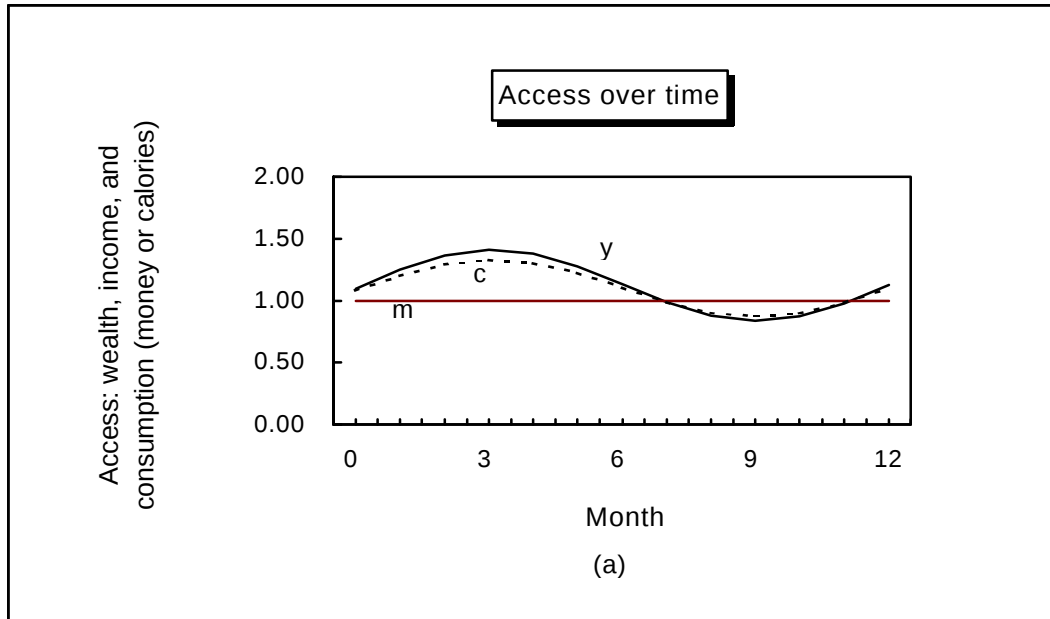
The other way in which sufficient access “at all times” can be interpreted is that access to food be sufficient under all possible circumstances within any particular period of time, which brings us to the notion of *vulnerability*. Vulnerability is defined as the risk of exposure to shock—shock to food access or shock to livelihood—and as the ability to cope with such shocks (Chambers 1995). Vulnerability may be transitory and predictable (the typical example being the “hungry” season that many poor households experience each year in rain-fed agricultural livelihood systems with unimodal rainfall); it may be chronic (as in the case of landlessness with insufficient wage labor employment); or it may be caused by unpredictable shocks (the typical case being drought or, increasingly, militarized conflict). 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. Variability need not involve uncertainty: households or individuals may well know that they will experience seasonal fluctuations in their access to food. Access to resources may itself be uncertain if tenure systems are not stable and transparent.

A complete definition of food security must incorporate all three of these dimensions of access to food: sufficiency, sustainability, and vulnerability. A household is 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. While such a definition begins to sound cumbersome, it is essential to articulate each of the elements involved. Most discussions of food security by now touch (at least casually) on each of these elements. By contrast, food *insecurity* is still generally defined (when it is defined at all) simply as a lack of access to sufficient food (e.g., World Bank 1986), disregarding the notions of sustainability and vulnerability altogether. In more complete terms, a household is food insecure if it does not enjoy an acceptable likelihood that it will have sustainable access to sufficient food during a particular period of time.

These concepts are illustrated in figure 3. Figure 3(a) depicts a single hypothetical household (or consumption unit) over a 12-month cycle. 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 $y > c$ and depleting its reserves whenever $y < c$. Here access to food is a function of income, 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.

Figure 3(b) compares three hypothetical households that differ in the level and variability of their income over a 24-month period. The high-income household (household 1) is food secure. Over most of the period, household 1 experiences moderate fluctuations in income (y_1) and enjoys consumption levels (c_1) that always exceed minimum requirements. Accordingly it can afford to save each month. Household 2 is the same household that was depicted in figure 3(a). 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, say a drought or an episode of military conflict, lasting between months 16 to 21. The high-income household is still able to consume above minimum requirements. It is also able to recover to preshock income levels relatively quickly.

FIGURE 3. Access to food over time

Household 2 falls below minimum consumption requirements but is able to recover 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.

Figure 3 suggests how the food security notions of access, sufficiency, sustainability, and vulnerability can combine to complicate conventional research on land tenure and food security. We will explore this possibility in greater detail in the next section.

2.4 REFORMULATING THE LINKAGES

Much of the literature on food security deals with land only as a “resource” to be allocated; much of the land tenure literature is silent about the impact on food security—or livelihood security more generally—beyond indicating links to greater equity, production, or conservation of land resources. Tenure institutions directly affect food access at the household level in a primarily agrarian society by governing access to resources and indirectly affect food security at the regional or national level through overall food availability (and, hence, food prices). But the linkage between land tenure and food security goes well beyond simple, direct production. We argued in section 2.2 that access to resources is an essential determinant of access to food. We argued in section 2.3 that food security is a function of food availability, access, and utilization and, furthermore, that access to food has three important dimensions which have received inadequate attention thus far: sufficiency, sustainability, and vulnerability. In this section we suggest ways in which land tenure and food security are linked together to comprise a dynamic system in which decisions about production, marketing, consumption, and investment generate—and are in turn driven by—structural changes over time in the distribution of resources within and among households.⁷

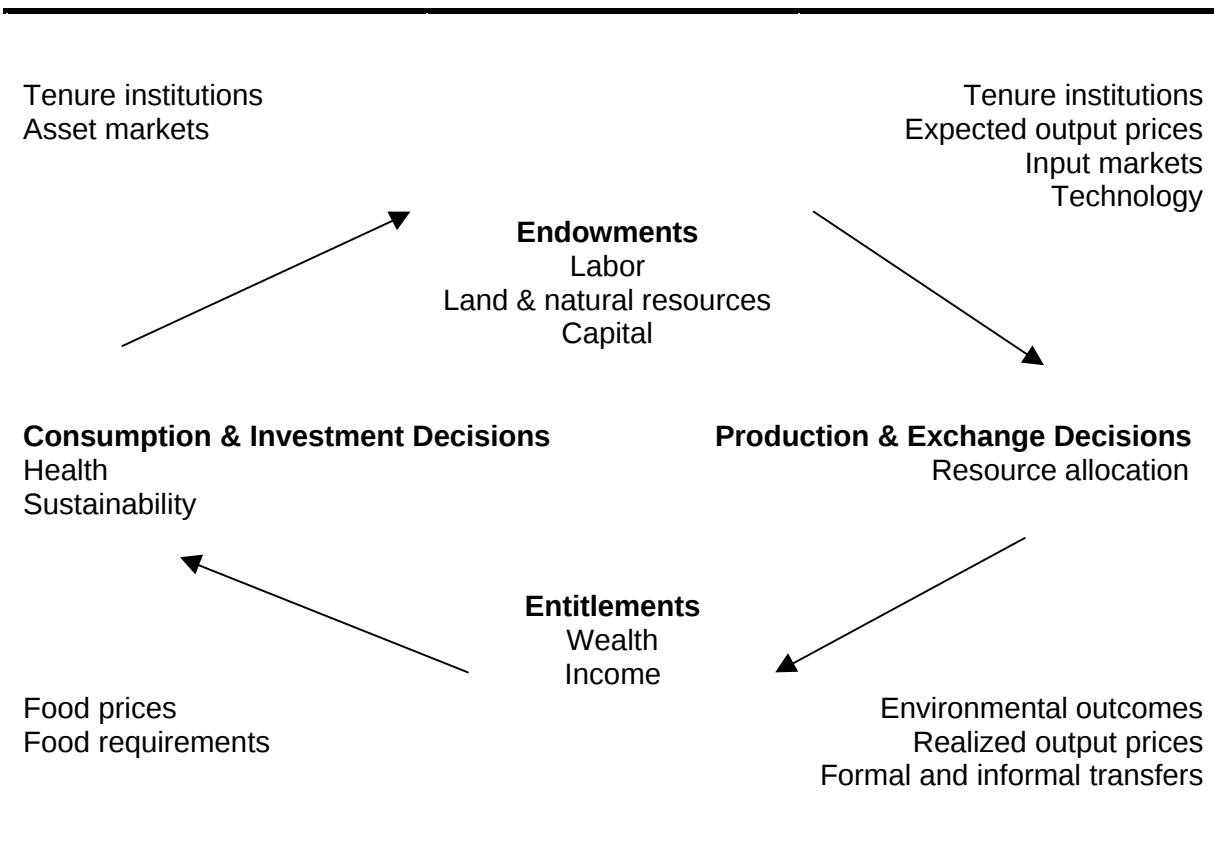
This dynamic system is depicted in figure 4. Starting at the top center of the figure, consider a household (or unit of production and consumption) with an initial endowment of resources which may include land, capital, and labor as well as access to technology and markets. Moving clockwise around the figure, this initial resource endowment, along with market and environmental conditions, drives resource allocation decisions which may include agricultural production and off-farm employment. These decisions, along with market and environmental outcomes, generate household access to food and other commodities in the form of what Sen (1981) describes as the household’s overall entitlement, which may include both cash and in-kind components. (The upper-right and lower-right quadrants of figure 4 thus depict the conventional focus of research on land tenure.)

The entitlement is basically a budget or choice set and describes the set of commodities and services that members of the household can afford to hold or purchase for consumption and/or investment. (The lower-right and lower-left quadrants of figure 4 thus depict the conventional focus of research on food security.) Rather than simply representing a point along a linear relationship as depicted in figure 1, however, decisions regarding consumption and investment are a critical determinant of the composition of the household’s endowment of 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 is a (sometimes overlooked) form of investment as well—investment in the health of the household’s endowment of labor. This is where the notions of sufficiency and sustainability enter the system. A household whose members have secure access to sufficient food is one that can afford to consume enough food for activity and health without drawing unsustainably on its reserves of wealth, thereby maintaining its endowment of both

⁷ The use of the term “household” masks much intrahousehold variability in access to and control over both land and food. The process of access is often one of contention, even conflict. The terms “household” and “individual” are used here to denote both intrahousehold and interhousehold competition for resources. We discuss this issue in greater detail in section 3.5.

labor and nonlabor resources over the longer term (presuming reasonably equitable intrahousehold distribution of food, which is not always the case).

FIGURE 4. Land tenure and food security: Reformulating the links



Members of a household that do not have sustainable access to sufficient food, on the other hand, face a crisis and are *forced to choose* (as distinct from Friedman’s notion of being “*free to choose*”—Friedman 1980) between consuming sufficient food—that is, maintaining its health and thereby its labor endowment—and maintaining its nonlabor endowment. Members of a household in such a position might choose to eat today at the expense of destitution tomorrow, or they might choose to risk malnutrition and disease this season in the hopes of surviving through the next season with their assets intact. This critical choice is the first important implication of a “dynamic link” between land tenure and food security as depicted in figure 4. (This linkage is depicted in the upper-left quadrant of figure 4.)

A second important implication of such a link derives from the notion of vulnerability, which derives in turn from variability in both access to food and sufficiency requirements. Recognizing that production and exchange decisions early in the cycle will have different means and variances of returns later in the cycle, differing endowments may drive different resource allocation strategies—even if there are no differences in levels of risk or risk aversion. For example, a resource-poor, food-

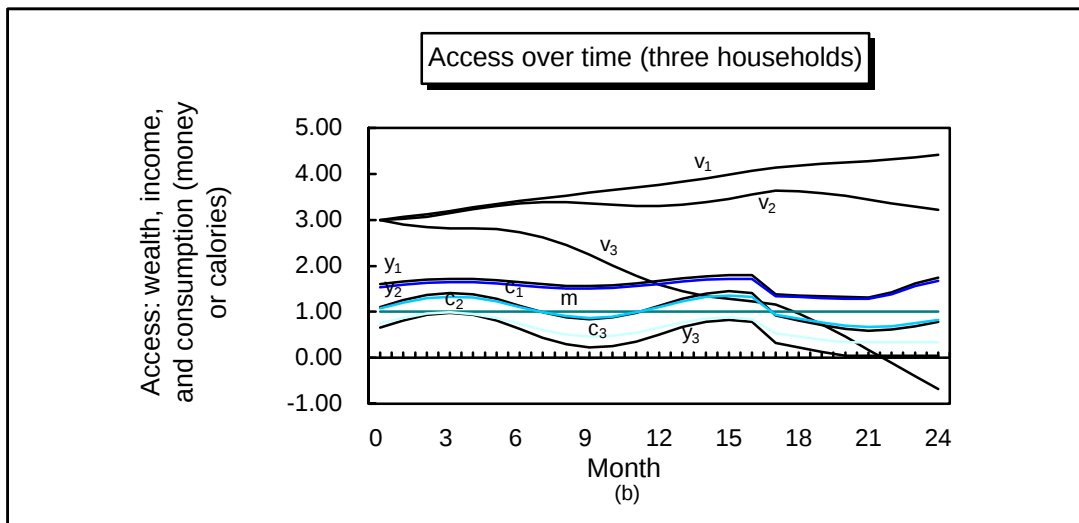
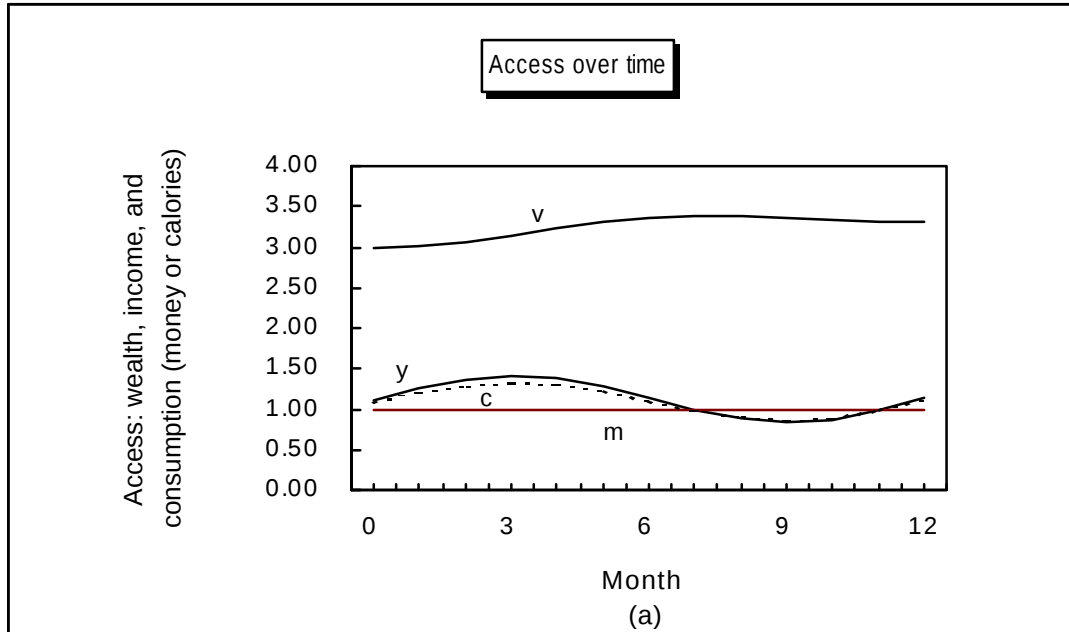
insecure household with limited access to credit (for both production capital *ex ante* and for consumption insurance *ex post*) may choose to produce a crop with low expected returns if that crop also has a variance sufficiently low that the household is assured of sustainable access to sufficient food. A wealthier, food-secure household, on the other hand, may be able to afford the risk of a crop with greater expected profitability but also greater risk of failure, since it knows it can dip into reserves or borrow if necessary without threatening its long-term viability. In other words, expectations about potential long-term tradeoffs between sufficient consumption and investment in nonlabor resources affect resource allocation decisions in the short term. This is the second important implication of a cyclical link between land tenure and food security. (This linkage relies on the cyclical nature of figure 4.)

These two results each have important consequences for the distribution of control over resources over time. The first result suggests that in bad years, poor households may be forced to sell assets for food 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 is not sustainable in the long run, and thus such households are clearly not food secure.) 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. The second result suggests that even in average or good years, wealthier households may gain relative to poorer households since their initial position of food security allowed them to allocate resources in riskier, more productive ways. Together, these two results indicate that when markets do not function well, the dynamic link between land tenure and food security may have important distributional consequences over time.

These consequences can be illustrated by examining the changes in wealth that result from the saving and dissaving strategies of the hypothetical households depicted 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 during months 8 through 11. In figure 5(b), three households are compared. Even with identical levels of initial wealth, the differences in income patterns lead to different saving and dissaving strategies over time. Household 1, enjoying the highest income, accumulates wealth over the entire period, even after the shock in month 16. Household 2's wealth moves up and down, but trends gradually upward over time. Household 3's wealth, on the other hand, is drawn down in each period to supplement income and quickly falls to zero following the shock in month 16. While these examples are purely hypothetical, they serve to illustrate the importance of considering both wealth and income when examining household access to food and food security as well as to illustrate the potential structural consequences of differences in food security over time.

3. EMPIRICAL ISSUES ARISING

Some of the empirical issues arising in research that links land tenure and food security tend to fall into one or another of the quadrants in figure 4. Others cut across quadrants or are defined by the cyclical nature of figure 4. In this section, we briefly review these different categories of literature and suggest how they fit the conceptual framework of figure 4. The areas of the literature covered include links between farm size and agricultural productivity, links between tenure security and productivity, the relationship between resource tenure and resource conservation (thus sustainability), analysis of livelihood strategies linking production and consumption, and gender and intrahousehold control over resources.

FIGURE 5. Access to food over time (incorporating wealth)

3.1 SECURITY OF LIVELIHOOD STRATEGIES

Recent conceptual and empirical works note that food security is a subset of livelihood security—the latter is a necessary and often sufficient condition of the former.⁸ Livelihood is defined as “adequate stocks and flows of food and cash to meet basic needs” (Chambers 1988, p. 1). Security of livelihood includes access to the means to produce the food or generate the income to meet those needs (Frankenberger 1995; Chambers 1995). Livelihood strategies are the ways in which assets or resources are used to generate access to food. Hence, the horizontal axis in figure 4—essentially, decision making about production and consumption—defines the domain of livelihood strategy analysis. The risk of livelihood failure largely determines the vulnerability component of food insecurity. Indeed, much of the livelihood security literature notes that under circumstances of risky environments, and especially transitory or chronic food insecurity, livelihood decision making often involves direct tradeoffs between current consumption and future production (Corbett 1988; de Waal 1989; Rahmato 1991; Frankenberger 1995). In any rural or agrarian economy, access to and rights in land and natural resources are central to an analysis of livelihood strategies and livelihood security.

Yet the analyses of livelihood strategies to date, and the policy recommendations accompanying those analyses, vary widely. Much of the literature that stresses the importance of livelihood security consists of empirical studies from climatically risky and famine-prone areas, particularly in South Asia and sub-Saharan Africa, analyzing the way in which people organize production and consumption under those circumstances. The more orthodox economic development literature tends to be focused on the commercialization of agriculture in more productive and less risky areas. Recommendations for policy on both land and food differ widely across the range of contexts between these two geographic focuses. In this section, we briefly review both areas of this literature.

The commercialization of subsistence agriculture has long been one of the mainstays of orthodox economic development policy (Mellor 1976). Underlying this policy is the theory of the comparative advantage of specialization. Studies of evolutionary change in land tenure institutions note that commercialization of agriculture constitutes one of the major driving forces behind privatization and individualization of rights in land (Boserup 1981; Barrows and Roth 1990; Troutt 1994). However, while the link between land tenure and commercialization of agriculture was widely accepted, questions arose about the impact of commercialization on food consumption and nutritional status, particularly in the wake of the introduction of green revolution technology. In particular, the so-called “cash-crop hypothesis” suggested a negative link between commercialization of agriculture and nutritional status—the link being an increase in cash income but a decline in subsistence food at the household level and hence increased market vulnerability and food insecurity (Dewey 1980; Fleuret and Fleuret 1980; Eicher and Baker 1982).

A recent study, reflecting over a decade’s research on this question in a variety of locations, has largely refuted this hypothesis (von Braun and Kennedy 1994). That study concludes that “integration of traditional smallholder agriculture into the exchange economy is part of a successful development strategy,” and suggests that “the developing world cannot afford the inefficiencies of resource allocation, especially of human and land resources, that subsistence agriculture entails...” (ibid., pp. 365, 366). The study concludes that while there is some variation in the specific crops that are commercially produced, increased production, employment, income, food consumption, and nutrition are, in general, all associated with the commercialization of agriculture. Yet the study also notes, as do

⁸ The emphasis on livelihoods as an organizing concept is fairly new in academia and comes more from the applied work of nongovernmental organizations (NGOs) and other agencies, for example, Oxfam (Chambers 1995) and CARE (Frankenberger 1995). Much of the original academic work on livelihoods was carried out at the Institute of Development Studies, University of Sussex, and the Office of Arid Lands Studies, University of Arizona.

other studies (e.g., Wiebe 1992), that when markets function poorly, concerns for food security remain a strong rationale for some amount of subsistence production and hence, according to the conclusion just quoted, may be responsible for misallocation of land and other resources. The overall policy recommendation of von Braun and Kennedy (1994) is that the commercialization of agriculture—specialization toward comparative advantage at the farm or household level—should be supported, and that land policy, particularly land tenure, is one of the crucial elements of support to agricultural commercialization, provided that the tenure systems grant land rights to women (a perhaps unrealistic caveat, see section 3.5).

Von Braun and Kennedy (1994) do not specifically advocate privatization of landholdings as the preferred strategy. One of the case studies included in their research in fact notes that, under certain circumstances, the introduction of cash cropping increased landlessness (Bouis and Haddad 1990). However, the World Bank makes it clear that the combination of commercialized production, the liberalization of markets, and the privatization of land rights are the three primary pillars of its agricultural development policies in the 1990s [e.g., World Bank (1994), for a general statement; World Bank (1993), for a specific example; see also Platteau (1992)]. While analysis of the commercialization of subsistence agriculture is usually not a topic of research in much of the rest of the livelihood security literature, it is certainly one of the livelihood options that has received a great deal of attention from economic planners and, together with policies aimed at the privatization of land holdings, can be characterized as the most common livelihood strategy that links land tenure to improved welfare, greater food security included.

On the other hand, most of the literature on livelihood security does not even consider agricultural commercialization as a particularly viable option for the rural poor and is skeptical about the privatization of property. Chambers (1988, p. 2) notes:

the crisis of livelihoods [is] generated by increasing rural populations, and by social and political trends *such as concentration of ownership*. Poor people respond to this through intensification of agriculture, and diversification of remunerative activities, through greater exploitation of remaining common property resources, and through migration.⁹

A major contribution of this literature has been the emphasis on the way in which households and individuals cope with circumstances when they do not have sufficient income or food to meet all their needs. The terms “livelihood strategies” and “coping strategies” have been defined in many different ways, but recent conceptual work helps to categorize these usages. Davies (1993) notes the difference between coping strategies (dealing with short-term insufficiency) and adaptive strategies (adjusting to longer-term changes in the physical or economic environment through changes in production or income generation). Frankenberger and Lynham (1993) note the difference between risk-minimizing strategies and loss-management strategies.

Corbett’s (1988) review of famine-coping strategies emphasizes the crisis faced by households and individuals experiencing an imminent shortfall in access to food: the forced choice between current consumption and future access to food. Under circumstances of transitory (usually predictable) food insecurity, as captured by the cyclical process depicted in figure 4 and the cyclical nature of income in figure 2(a), resources are allocated in such a way as to provide the greatest assurance of surviving the food-insecure periods (often either the traditional “hungry season” or the periodic but not severe drought). These involve changes in production strategies, the dispersal of livestock, interhousehold reciprocal exchanges, diversification of income sources (including nonfarm income), and managing food stocks (rationing consumption).

⁹ Our emphasis.

Under circumstances of more severe food insecurity [severe drought or production disruption, severe inflation, or militarized conflict, as depicted in figure 2(b)], a common strategy is increased reliance on credit and the disposal of assets, including productive assets, as described by the upper left quadrant in figure 4. Empirical results from India are indicative of the reluctance of poor households to sell capital assets in order to smoothen consumption when incomes fluctuate; households prefer to adjust crop inventories and reserves of cash to the extent possible (Townsend 1995).

The final stage of severe food insecurity is destitution. Migration in search of assistance may precede or follow destitution. Various authors have attempted to rank these strategies in terms of their severity or the order in which people resort to them under increasingly severe circumstances (Devereux 1992; Maxwell and Frankenberger 1992; Watts 1983), but the sequences involved depend on local circumstances. The implications for land tenure and land policy, however, are critical, and the tradeoff between current consumption and future production cuts to the heart of the linkages implied in the upper left quadrant of figure 4—the linkage not often made between access to productive resources and access to food.

First, under circumstances of extreme food insecurity (e.g., famine), a major concern is often to preserve productive assets in order to facilitate eventual recovery and to maintain future security. Corbett (1988, p. 1108) notes “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.” De Waal (1989) noted, for example, that in the Sudanese famines of the mid-1980s, adults were mixing sand with seed stock to prevent children from eating the seed. Where land tenure is insecure, the opportunity costs of migrating in search of either food aid or casual employment may be so high as to cause people virtually to starve themselves to death before leaving their land in search of assistance. Rahmato (1991) notes that insecure tenure on peasants’ holdings resulted in extreme reluctance to migrate in search of food assistance—a (perhaps unintended) consequence of the 1975 Ethiopian land reform. Even if deliberate food deprivation succeeds in averting distress sale of nonlabor assets, it may have short- or even long-term consequences for the quality of the household’s labor power and thus its wage-earning and income-generating capacity (Dasgupta and Ray 1986 and 1987).

Second, the deliberate disposal of assets, including land in a worst-case scenario, is one means to which some people are eventually forced to resort in order to survive. If a tenure system permits the outright alienation of land, one 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 (Watts 1983; Mamdani 1987). 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).

Third, and following directly from this, whereas neoclassical and institutional theory suggests that it will be the most inefficient farmers who are forced out of agriculture by an active land market, this literature suggests that it will be the poorest, the least endowed, and therefore the most food-insecure farmers who will be forced to sell their land in bad times, even though, if the farm size/productivity data are to be believed (section 3.3), such small farmers may sometimes be more efficient in terms of output per unit of land area. Even under circumstances less severe than famine, poorly endowed food-insecure households, irrespective of output per unit area of land, may be forced to invest more in “self-insurance” (such as 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 or purchase land via an active land market (Carter and Wiebe 1990; Wiebe 1992).

Carter, Barham, and Mesbah (1994) use data on the increased production of nontraditional agricultural exports in Chile, Guatemala, and Paraguay to argue such a case under circumstances that cannot generally be categorized as food-insecure and certainly not famine-prone. Their data on the

introduction of nontraditional agricultural exports show a significant loss of land over time by small and middle-sized producers and the concentration of land in the hands of large growers, especially in Chile and Paraguay. And in Guatemala, the requirement of “self insurance”—that is, providing a measure of food security in subsistence production—prevented significant adoption of export crop production by smallholders. At the same time, their data show that the level of labor absorbed per unit area of land drops as the size of the estate grows, implying that displaced smallholders were not necessarily able to find employment on large farms. In other words, land concentration resulted in a net decrease in rural employment, with resulting implications for rural livelihood and food security: a net decrease in both direct and exchange entitlements to food.

Other implications could be cited of a tenure policy that fails to account for risk-minimization or loss-management strategies. The Kenyan land reform sought to introduce private, individual property, but it also was an attempt to consolidate land holdings to permit economies of scale in agricultural investment and reverse the fragmentation of holdings that had developed because of inheritance rules and heavy population pressure. Yet subsequent research showed that the fragmentation of holdings developed along with the risk-minimization strategy of diversifying the microenvironments in which a single family farmed. Hence the *de jure* consolidation of holdings under such circumstances undercut an environmentally sound diversification strategy, and in fact farming fragmented and dispersed fields continued despite the land reform (Haugerud 1983; Fleuret 1988).

At the household level, the implication of most of the livelihood security literature is the opposite of the agricultural commercialization literature: rather than specializing toward a comparative advantage at the level of an individual production unit, it may be safer to diversify *away from* specialized production to either an alternative source of food or income with as little covariance as possible with the established pattern of agricultural production (i.e., one which produces income during the traditional hungry season) or, preferably, no variance at all. In theory, the optimal combination depends on the means, variances, and covariances of alternative livelihood strategies. Even some of the agricultural commercialization literature demonstrates that diversification of production strategies permits greater food security (e.g., Niemeijer and Hoorweg 1994), and some analysts of the low rates of adoption of cash crops or specialized agricultural production technologies have suggested that food security concerns are a major reason (e.g., Wiebe 1992; Richards 1985).

Tenure policy that is based on the assumptions of a commercializing agriculture and the growth of a private commercial sector outside of agriculture may fail to serve either growth or equity purposes under economic circumstances where diversification, rather than specialization, is an economic imperative. Maxwell (1995) notes that the growth in subsistence agricultural production in urban and peri-urban areas in Uganda is largely a strategy of low-income women to protect food security for their households under circumstances where two decades of hyperinflation have rendered wage incomes, even of the middle class, totally inadequate to provide for basic needs. Yet much of this agricultural production is on land that is informally or illegally accessed, and cultivators have little *de jure* security of tenure. Under these circumstances, a proposed land tenure reform advocated by international donors, aimed at privatizing and formalizing land ownership, would have the effect of strengthening the property rights of a small, food-secure elite, 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. In other words, at least in the short term, such a reform would have direct negative consequences for food and livelihood security.

At face value, there is a wide divergence in perspectives presented here, but they are perhaps better viewed as complementary rather than competing perspectives. Specialization may be necessary for economic growth under certain circumstances; diversification may be necessary for economic survival under other circumstances. The literature on sustainable livelihood security is not intended as a diatribe against private property, but it does suggest that, from a food-security perspective, the calls for unified, nationwide freehold tenure systems are unrealistic, especially under circumstances of

extreme diversity in climate, environment, and agricultural potential. But in fact, this conclusion has been reached by other analysts not working in a food- or livelihood-security framework at all: Bruce and Migot-Adholla (1994) conclude that customary systems of tenure in Africa should be permitted to evolve or “adapt” rather than being “replaced” by freehold (or other Western) systems. Barrows and Roth (1990) advocate land privatization and titling only under circumstances where tenure is already evolving toward individualized holdings. Maxwell and Elbow (forthcoming) note that there is a valid rationale for permitting dual (private freehold/customary) tenure systems to continue to exist, since they serve different purposes under different circumstances. All of these works are multicountry reviews, and none of them was undertaken from a food-security perspective.

The flexibility of indigenous livelihood strategies has always been one of the means of survival in harsh physical and economic environments; the flexibility of the tenure regimes that accompanied these strategies long permitted sustainable resource usage. Given that natural resource extraction or resource degradation may be the only option for income generation in many areas, the implications for tenure policy are, again, critical (see section 3.2). Population growth, migration, and commercialization have all undermined the institutional viability of some of these tenure practices, but where given the opportunity, these institutions have demonstrated remarkable ability to adapt to population changes.

3.2 LAND TENURE AND RESOURCE CONSERVATION

Degradation of natural resources, from tropical forests to arid rangelands, is a major concern of international donors, national governments, and resource-dependent communities themselves. The short-term tradeoff between consumption and resource conservation that figure 4 implies for poor households often pits them against others who claim a stake in natural resources, for example, the state, migrants, commercial interests, and international donors. Unsustainable extraction or degradation of natural resources is often a result of the efforts of impoverished people to earn a livelihood and to give themselves some measure of short-term food security. This is a consequence of the linkages discussed in section 2.4, whereby some households and individuals may be forced to choose between short-term consumption and the long-term protection of productive, nonlabor resources such as land.

At least since the time of the famous but inaccurately labeled “tragedy of the commons” argument (Hardin 1968), tenure rights in land and natural resources have figured prominently in the debate over conservation. The standard argument is that land and natural resources will be conserved only when the land is privately owned and the security of tenure of the owner is protected by the state. On the one hand, this argument has been used to justify the privatization of land holdings and the enclosure and adjudication of common rangeland—practices which, in some cases, have led to land grabbing and resource devastation (Bruce and Tanner 1992). On the other hand, this argument has been used more strictly to enforce exclusion of human populations from forest and game reserves, resulting in the further impoverishment of resource-dependent groups, migration, and the needless destruction of local institutions that may be vital to both community survival and resource conservation in the long term (Ostrom 1994).

The other side of this question is the presumed negative impact of common property ownership on the management and conservation of natural resources. Here, recent advances in theory and in understanding of the management of common property resources challenge the long-held belief that natural resources held under common ownership are doomed to degradation (Bromley 1992a and 1989; Ostrom 1992; Lawry 1990). Hardin (1968) suggested that incentives to maximize individual gain from common resources would inevitably result in the overuse and degradation of such resources and suggested that only by privatizing the commons could such a “tragedy” be averted. Hardin (and his many followers) failed to recognize the institutional arrangements governing management of true common property resources, mistaking “common property” for “open access resources.” Even when

“open access” 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. In fact, the breakdown of any tenure system, whether state, private, or customary, can lead to a situation in which essentially no property rights are asserted over natural resources or in which multiple conflicting rights are asserted but none is legitimately held. The challenge for resource conservation policy, then, is not simply the imposition of private property but the understanding and protection of genuine common property institutions and the development of institutions “that are conducive to the emergence of coordinated, rather than independent, actions by the individual users of a common pool resource” (Ostrom 1992, p. 297).

While tenure policy often distinguishes only the categories of agricultural holdings, the commons, and the reserves (section 2.2), recent research notes that in fact, “tenure niches” may overlap these categories over time and may vary according to the resource—for example, rights in trees may not coincide with rights in the land on which the trees grow (Bruce and Fortmann 1989; Chambers and Leach 1989; Bruce, Fortmann, and Nhira 1993). While much of the policy toward resource tenure has been theory driven, a more site-specific approach to conservation policy would seek first to understand the livelihood strategies of local people in terms of rationale and constraints. This calls for broad approaches that deliberately incorporate and measure food- and livelihood-security outcomes along with conservation outcomes. Indeed, as figure 4 suggests, true food or livelihood security requires conservation (in order to be sustainable)—though the reverse is not generally true. To date, “food security” in tenure research has most commonly been associated with agricultural holdings, but food security is also a function of access to commons rangeland as well as forestland and other commons or reserved resources that provide firewood and wild foods, including game (Falconer and Arnold 1991).

While conservationists may fear that explicitly embracing the concerns of poverty or food security in resource-dependent communities will undermine the necessary political will for conservation, conservation policy is doomed in the long run if it does not address these concerns. Incorporating food security into policy on conservation would serve several purposes. First, understanding the range of livelihood strategies may suggest possibilities that serve both consumption and conservation objectives—for example, agroforestry. The relationships depicted in figure 4 also illustrate how alternative sources of food security, such as access to consumption credit or migrant remittances, can alleviate pressure on natural resources. Second, the consultative and participatory incorporation of the local communities’ interests in food and livelihood security into conservation efforts is necessary for the successful integration of conservation and development objectives in areas buffering game parks or forest reserves (Bloch 1994). Third, only by understanding distinct local variations of “tenure niches” in land and natural resources can policy on tenure and access be a useful tool in promoting conservation and sustainable resource utilization (Rocheleau and Edmunds 1995).

3.3 SMALL-FARM BIAS: AGRARIAN STRUCTURE AND AGRICULTURAL PRODUCTIVITY

Is there a relationship between farm size (acreage) and productivity (yields per acre)? If so, is it a direct relationship perhaps due to economies of scale in adoption of new technologies? Or is the relationship between farm size and productivity an inverse one due to differential access to input and output markets? The nature of the relationship may vary from region to region with market and other conditions. For example, when markets do not function well, large farms, besides having superior access to land, may have superior access to credit, extension services, new technology and seed varieties, irrigation water, and output markets; these conditions may lead to higher yields per acre on large farms. In other situations, small farms may have superior access to labor, possibly leading to higher yields per acre. In fact, both of these conditions may exist in the same area at the same time.

The structural consequences of such a pattern depend on the size thresholds at which small farms no longer enjoy superior access to labor and at which large farms no longer enjoy superior access to capital and other markets. For example, say the first threshold occurs at x acres and the second threshold occurs at y acres. If $x < y$, a productive small-farm sector, generating high yields through family, labor-intensive production, might endure alongside a productive, capital-intensive, large-farm sector, with a less productive middle-sized farm sector squeezed between the two, resulting in a bimodal distribution of farm sizes. If $x > y$, a middle-sized farm sector would enjoy superior access to both land and labor and would eventually squeeze out both larger and smaller farms, resulting in a unimodal distribution of farm sizes. If markets functioned perfectly, by contrast, neither threshold would exist, farms of all sizes would be equally competitive, and one would expect a uniform distribution of farm sizes.

The empirical evidence of an inverse relationship between size of agricultural holding and the productivity per unit of land area has long been noted (Sen 1966; Lipton 1974; Berry and Cline 1979; Kumar 1994). Berry and Cline (1979) offer the most exhaustive quantitative analysis of the relationship, examining cases from both Latin America and South and Southeast Asia. The policy implication of this relationship is clearly that not only do redistributive and “land to the tiller” reforms serve an equity purpose, they also serve an important efficiency purpose:

Agricultural strategies focusing on small farms start with a major advantage: the demonstrated capacity to achieve high productivity of what is usually the scarcest resource, land (especially in Asia), largely through greater application of the abundant resource, labor.¹⁰

Platteau (1992) notes that the relationship under examination is between output and a single input (land) without holding other inputs constant. He suggests two major explanations for the relationship, both involving the labor input. First, the intensity of labor is higher on smaller farms because it is likely to be mostly family labor. Second, such labor requires less intensive supervision, making the transactions costs of labor lower. However, it is the very issue of labor intensity that gives rise to the critique of the farm size/productivity argument and particularly its policy recommendations: the reason that small farms are more “efficient” is because small farmers have few livelihood alternatives but to exploit their own labor and that of their families (Dyer 1991). The consequences of theoretical interpretations of the inverse relationship between farm size and productivity are thus central to understanding linkages between agrarian structure and food security.

In section 2.4, we argued that land tenure and food security considerations combine to shed light on household decisions about production, exchange, consumption, and investment. Research by Carter and Wiebe (1990) illustrates these linkages in a setting characterized by a broad distribution of farm sizes resulting from the subdivision of colonial and postcolonial estates in Kenya’s Rift Valley Province. Based on differential access to imperfect input and output markets, small farms (1–5 acres) were found to choose significantly different resource-allocation strategies than did medium-sized (5–15 acres) and larger farms (15 acres and above). While all farms produced maize (the staple food), only larger farms produced wheat (the principal cash crop), even though wheat generated higher net returns per acre. The difference was attributed to a universal reluctance to rely on unstable markets for access to food (despite government efforts to control the market for maize) combined with food security concerns on the part of the smaller farms. These concerns relate to the cyclical nature of figure 4, in which credit market failures and the threat of asset losses drive farmers to self-insure their access to food through direct food production.

Based on resulting differences in expected returns to additional acreage, larger farms were expected to outbid medium-sized and smaller farms for any land that might become available as a result of land market activation in the region. Nevertheless, given labor market imperfections, small

¹⁰ Berry and Cline (1979, p. 128).

farms enjoy superior access to family labor and dominate medium-sized farms in terms of yields. (The role of labor market imperfections is critical here. If family members are unable to find off-farm employment at the market wage, they apply more labor to on-farm production. If family labor were valued at market wages, however, medium-sized farms would earn higher net returns per acre than would small farms.) Over the long term, through the process depicted in the upper-left quadrant of figure 4, this pattern of resource allocation and returns suggests the emergence of a bimodal structure of small and larger farms, with labor being gradually squeezed (or attracted) off small and medium-sized holdings to seek employment in urban and other nonagricultural settings.

3.4 TENURE SECURITY AND CREDIT ACCESS, INVESTMENT, AND PRODUCTIVITY

A major theme in land tenure research is the relationship between the security of land tenure and agricultural productivity. The suggested linkage is mediated by access to credit and increased investment. The “property rights” school of thought in institutional economics has long viewed security of tenure as necessary to internalize external costs and benefits and capture the future income streams resulting from investment. Private ownership of land is viewed as the most efficient way to accomplish this (Coase 1960; Demsetz 1967; Bromley 1989; Platteau 1992). The resulting policy implication is that privatization of property rights is a desirable policy objective. Contemporary economic theory virtually presumes the “institutional progression towards thoroughgoing private property” (Bromley 1989, p. 13). Land tenure policy, especially as influenced by international donors in Africa, has been strongly influenced by these theoretical linkages (Atwood 1990; Platteau 1992; Bruce and Migot-Adholla 1994).

Empirical evidence on the relationship between tenure security, particularly in the form of holding a registered deed or title, and agricultural productivity remains scattered. The most compelling case for a linkage between private property rights and agricultural productivity or land resource conservation comes from Feder et al. (1988) in Thailand. They suggest both supply and demand impacts of secure ownership of land (defined in this case as owning a registered deed): first, greater security of ownership to the farmer or landowner increases demand for improvements; second, security of ownership increases the supply of credit through provision of tradable collateral. Both result in greater long-term investment in productive and land-conserving technology as well as short-term investment in inputs leading to higher sustainable production. Thus, greater security of tenure leads to higher productivity through increased incentives for investment on the part of the landowner (Feder and Noronha 1987). Feder et al. (1988) found, for example, that though titleholders made up only half of their stratified sample, more than 90 percent of medium- and long-term loans were received by this group. Such results must be interpreted cautiously when title acquisition is itself an endogenous process, for example, when the benefits of title acquisition are related to access to input and output markets (Roth et al. 1989; Carter, Wiebe, and Blarel 1994).

In sub-Saharan Africa, where land under customary tenure is usually neither registered nor tradable, research results have been inconclusive. In a study that included Ghana, Kenya, and Rwanda, Migot-Adholla et al. (1991, p. 172) noted that “regression analysis indicates no relationship between cross-sectional variations in land rights and productivity.” Unlike Thailand, in much of Africa, land titling is not sufficient to increase access to formal sources of credit, and though they hold title to their land, farmers are reluctant to mortgage (Migot-Adholla et al. 1991; Barrows and Roth 1990; Shipton 1994).

In another study in Kenya, Carter, Wiebe, and Blarel (1994) noted a correlation between titled landownership and productivity, but suggested it is a spurious relationship driven by pretitling differences in access to input and output markets. Specifically, the potential beneficial effects of title on productivity, depicted in the upper-right quadrant of figure 4, were available only to farmers already well positioned in relation to market opportunities. For the sample as a whole, these potential effects were overwhelmed by differences in cropping patterns and technology choice due to

differential access to land, labor, capital, and insurance. Outright lack of access to credit and other markets was a more important constraint on productivity than was tenure security.

Summarizing the impact of private property rights and land titling programs in sub-Saharan Africa, Shipton (1994, pp. 364–65) notes:

The concept of secure tenure in individual titles is treacherously misleading. Untitled lands are by no means necessarily insecure, and such titling more often than not seems to heighten insecurity of tenure.... In land titling programs, market logic never simply shuts out political or cultural reason.

Despite whatever theoretical benefits might be suggested, superimposing private property rights over a customary tenure system through land registration and titling has often not had the intended impact. Barrows and Roth (1990, p. 297) note, “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.” Bruce, Migot-Adholla, and Atherton (1994) call for the “adaptation” rather than the “replacement” of customary tenure and suggest that the introduction of private property rights through titling programs is inappropriate or damaging in much of Africa. First, such programs overlook the possibility that there may be incentives in customary tenure that serve the same purpose and have similar positive effects; and, second, privatization of land rights through state intervention has both failed to achieve some of its intended benefits and produced unintended consequences (Bruce 1993; Migot-Adholla et al. 1991; Atwood 1990; Okoth-Ogendo 1982). Nevertheless, the theoretical benefits of private property continue to have a profound influence on land policy among donors and African governments (World Bank 1993; Uganda 1993; Platteau 1992).

3.5 GENDER, LAND, AND FOOD SECURITY: INTRAHOUSEHOLD CONFLICT AND COOPERATION

The access of individuals to both land and food is most often mediated through the household (Bentley and Pelto 1991). Contending perspectives on the structure and the methodological and policy implications of “the household” have been prominent in the research literature for the past decade (Becker 1981; Folbre 1986; Dwyer and Bruce 1988; Guyer and Peters 1987; Tinker 1990; Sen 1990; Haddad 1994; Haddad et al. 1995). This debate has centered on the issue of whether households can be viewed as unitary entities (a notion captured in the discourse of economics as the assumption of a unified household utility function) or should be viewed as entities made up of cooperation, conflict, bargaining, and negotiation. The debate has included elements of both production or work strategies and the welfare of individuals within households.

Research on women’s rights in land and natural resources has paralleled mostly the production element of the household and gender literature and notes the generally inferior position of women with regard to access to and control over land. Although both customary law and statutory law vary greatly in different parts of the world, women’s individual rights in land and natural resources are generally weak or nonexistent. Women often traditionally gained access to land only through their husbands or through their male kin. Where traditional or customary modes of access are breaking down and are being replaced by market mechanisms, a variety of legal, administrative, and social norms block increased access to or control over land by women. Even where women are specifically intended to benefit from land registration and titling programs, their actual control over land resources, in many cases, remains weak (Okali 1983; Davison 1988; Agarwal 1988; Carney 1988; Carney and Watts 1991; Joeke and Pointing 1991; Schroeder 1993; Lastarria-Cornhiel 1995).

Research on gender and food security has paralleled the welfare element of the household literature and underlines the virtually universal role of women as the guardians of household food security. With few exceptions, women are most often the persons within the household whose

responsibility it is to ensure that food is procured, prepared, and provided for the family or household. Other members of the household may be involved in food production, or in income generation to enable the purchase of food, but actually putting food on the table, seeing to it that members of the household are fed, and seeing to it that the household food stock or budget is stretched to meet the needs and demands of the family or household are almost always the responsibility of women. In a wide range of cultural and economic circumstances, income under the control of women is more likely to be allocated to food and health care than is income under the control of men, and land under the control of women is more likely to be used for food-crop cultivation (Kennedy and Peters 1992; Haddad 1992; Frankenberger and Coyle 1993; Haddad 1994; Quisumbing et al. 1995).

The literature on gender and households notes that the two primary areas of intrahousehold conflict consist of access to and control over resources (including land and labor) and control over income (Sen 1990; Folbre 1986, Dwyer and Bruce 1988). The vertical axis of the circular diagram in figure 4 therefore is the primary content of intrahousehold processes linking land tenure and food security, but a truly gendered analysis would pose, at each of the nodes suggested in figure 4, questions about who within the household makes decisions and what the implications are for both the productivity and the welfare of individual members of the household. The decision-making nodes in figure 4 (the horizontal axis) define the primary content of livelihood strategies. The literature on sustainable livelihoods usually recognizes the issue of gender but only rarely presents a gendered analysis.

Women's rights to land under customary tenure systems varied widely but were most often derived rights, through their husbands in patrilineal societies in Asia and Africa or through other male kin in matrilineal societies. In matrilineal societies, while land inheritance passes along a female line, it is men who inherit rights to land (Okali 1983; Jiggins 1988). Customary land tenure systems are evolving rapidly. Lastarria-Cornhiel (1995) notes that where customary tenure systems are able to ensure that every household in a community has sufficient land for its needs, women usually have access to enough land to provide for their needs and those of their families or households. However, under the pressure of population increase, land scarcity, and commercialization of agriculture, customary systems in many parts of the world are no longer able to guarantee access to everyone. Under these circumstances, women's rights are rapidly changing and, in many cases, deteriorating. Concurrently, the proportion of female-headed households is increasing in many parts of Africa, Asia, and Latin America.

The literature on the linkages between privatization of land rights and agricultural productivity presents few examples of gendered analysis. Pala-Okeyo (1980) drew attention to the observation that the privatization of land in Kenya—the most sweeping in sub-Saharan Africa—had resulted in fewer rights in land for women, and generally in decreased access, largely because family land was being registered in the name of the (male) head of household. Summarizing the literature with regard to all of Africa, Lastarria-Cornhiel (1995) draws the same conclusion with regard to the evolution of both customary tenure systems toward individual land rights and statutory reform aimed at privatizing landownership. The literature on agrarian structure and agricultural productivity likewise offers few examples of gendered analysis despite women's farms being smaller, both in absolute terms and in relation to household size (Quisumbing et al. 1995). Lastarria-Cornhiel (1988) notes that land reform efforts in El Salvador allocated significantly smaller areas of land to female-headed than to male-headed households. The gender differences in linkages between both agrarian structure and agricultural productivity and land privatization and agricultural productivity suggest significantly underinvestigated topics.

Even where statutory or programmatic interventions in land tenure reform are intended to serve equity or environmental objectives, this marginalization of women's rights in land continues. Carney (1988) and Carney and Watts (1991) outline the struggle for control over both land and labor in the Jahaly-Pacharr rice irrigation scheme in the Gambia. Donor agencies supporting the project

deliberately sought to register land in the names of the women who had traditionally cultivated swamp rice in the area and on whose labor, therefore, the success of the large-scale irrigation project would depend. However, subtle distinctions in the way land was categorized (either as an individual's land, or as a household's land), rather than the name on the title, turned out to be the crucial factor in who actually asserted control. Under the scheme men succeeded in having land designated as "household" land, even when it was their wives whose names were on the titles. Because men are traditionally the custodians of household land, they were thus able to reassert their claims not only over the land but also over the fruits of women's labor on the land—in a project deliberately intended to benefit women and strengthen their rights in land. Farther west along the Gambia River, Schroeder (1993) outlines a similar case in which men were able to reassert their control over land used by women for market gardening through an environmental stabilization project promoting reforestation. The planting of trees eventually undermined the usufruct rights of the gardeners and allowed men to regain control of both the land and the labor of women who had been farming it.

Several recent studies have underlined the linkages between production and welfare, though not necessarily directly between land tenure and food security. Kennedy and Bouis (1993) outline a conceptual framework linking agriculture and nutrition, underlining the centrality of women to both. While they do not specifically discuss land rights, their conceptual framework notes that income can be allocated to either consumption or investment, including investment in land or in labor, paralleling the upper-left quadrant of figure 4—one of the few references in the conceptual literature to this linkage. While they make references to the sustainability of agriculture, their primary concern is with nutrition as an input to agricultural labor, not with food security constraints on investment in land. Quisumbing et al. (1995) note the importance to food security of women's rights in agricultural landholdings as well as women's access to common property resources.

Agarwal (1994) notes the implications of gender and property rights and specifically argues the case for women's independent rights in land. While she is speaking only with regard to South Asia, her conclusions bear broader examination. First, she notes the welfare argument, summarizing most of the argument made here with regard to the centrality of women as guardians of food security. Second, she notes an efficiency argument, indeed citing the farm size/productivity relationship as a defense against the argument that permitting female inheritance rights to land would lead to further fragmentation of holdings and therefore decreased agricultural productivity. She also notes equality and empowerment arguments, noting that most of the welfare and efficiency arguments are the practical arguments while the equality and empowerment arguments are strategic arguments for women's independent rights in land. All of Agarwal's arguments are relevant to the linkages under discussion here. Unlike some of the empirical issues we have discussed, gender does not fit within any particular quadrant or section of figure 4—it pervades all aspects of it. Yet there are relatively few examples of gendered analysis in most of the other areas of literature discussed above—in most cases, if gender is even mentioned, it is an add-on category, not a central perspective.

4. IMPLICATIONS FOR RESEARCH AND POLICY

4.1 RESEARCH IMPLICATIONS: SYNTHESIS OF COMPLEX AND DYNAMIC CONCEPTUAL DOMAINS

We have argued throughout this paper that both land tenure and food security are complex concepts encompassing multiple domains of investigation, and we have suggested that appropriate indicators or proxy measures for both concepts are not straightforward to select or process. Each concept incorporates elements that may be virtually hidden to research focusing on the other, and both incorporate elements that are important but extremely difficult to measure. We have suggested that access to both land and food is often mediated through the social unit of the household but then

suggested that a household-level analysis masks much of the complexity of land rights and food and decision making about production and consumption. And we have suggested that while both are subject to change, changes in food security and changes in access to land at the individual or household level can be rapid, but change in tenure systems tends to be slower. We might appear to have been arguing that, while we think the two subjects are closely related conceptually, they are too complex and too fluid to investigate simultaneously with success.

And yet this is not the case. We would argue that future studies must take into account both sides of the relationship we have examined in this paper. The consequences of relying purely on conceptual analysis to derive important policy implications can be significant. The difference in outcome between conceptual and empirical analysis is well illustrated by the tenure security/productivity argument in Africa: a conceptual analysis suggested that privatizing land rights would inevitably result in higher productivity; empirical studies have suggested that there is no such relationship and have enumerated the reasons why there is not. We would argue that the same kind of empirical tests are necessary for the kinds of linkages we have tried to outline in this paper, summarized in figure 4.

Clearly, even with adequate indicators on both domains—no simple task in itself—straightforward cross-sectional analysis is insufficient to capture the relationship between tenure rights and food security. Most contemporary research on food security involves repeated rounds of survey over time to measure differences in access and in outcomes such as consumption or nutritional status. Yet the frequency of repeated measures required for an analysis—often every two to four months—is much too high to capture slower-moving changes in tenure and property rights. One possible way to bridge this gap is through historical reconstruction of tenure changes through qualitative methodology at the community level and reconstruction of selected case-study changes at the household level. However, if loss of land rights has already forced the out-migration of some proportion of the population, no amount of survey work will capture this element of tenure change.

Corresponding roughly to the cycle of relationships depicted in figure 4, at least six questions can be suggested to guide empirical research on these linkages:

- 1) To what resources do households have access, and how are rights to these resources distributed across and within households?
- 2) What are the livelihood strategies that link access to resources with access to food, and how is access to food distributed across and within households?
- 3) How do changes in tenure rights affect livelihood strategies and access to food?
- 4) What are the tradeoffs between consumption and maintenance of productive resources, including both labor and land, and how do these tradeoffs differ across households?
- 5) What are the long-term implications of consumption and investment choices for resource conservation and food security?
- 6) What are the long-term implications of resource use and food security for the resource tenure institutions and for the distribution of resources across households?

4.2 POLICY IMPLICATIONS: LAND AND FOOD

At a minimum, the policy implications of incorporating both tenure rights and food security into the same analysis are that policy in both areas should grant greater recognition of the other. That is to say, policy toward tenure should not be based on the presumption that increased production of food (however laudable an objective) will necessarily lead to increased access to food. Food policy, particularly in predominantly agrarian economies, should not be based on the presumption that land is

simply a static endowment, a resource to be allocated. Land and natural resources are gained, lost, and fought over, and tenure rules define much of the battleground on which such conflicts occur.

But the policy implications go much beyond mere addition of another variable for policymakers to consider. A better understanding of food and livelihood security imperatives can improve the quality of land policy analysis. For example, one of the major concerns of tenure policy currently is natural resource conservation. A good understanding of livelihood objectives and strategies in a community within or adjacent to land or natural resources reserved for conservation purposes will inform policymakers of possible alternatives for protecting and preserving resources *with* local populations, not *from* local populations. Similar understanding can help in the design of policies to reduce the degradation of privately owned agricultural lands as well. As Chambers (1988, p. 3) notes:

Secure tenure and rights to resources and adequate livelihoods are prerequisites for good husbandry and sustainable management. Moreover, sustainable livelihood security is a precondition for a stable human population in the long term; for only when livelihoods are secure does it become rational for poor people to limit family size. Enabling poor people to gain secure and sustainable livelihoods in resource-poor and forest areas is, thus, the surest protection for the environment. The poor are not the problem, they are the solution.

In a similar way, improved understanding of the impact of both evolutionary and statutory changes in tenure rules governing control over and access to land and natural resources will inform food policy. For example, understanding of those households and individuals who may periodically be forced to choose between reduced consumption and asset depletion or degradation, as well as of the circumstances in which they are forced to make such a choice, may help policymakers anticipate and thus mitigate food security crises before they emerge. Understanding of the dynamic interaction between access to land and access to food may also provide food policymakers with a wider menu of tools with which to address food-related problems. First, improved access to credit markets, both for production capital as well as for consumption smoothing, offers the potential to allow poorer households and individuals to participate in higher-return income-generating activities previously restricted to wealthier households which are better able to withstand the associated risks. Second, access to credit in distress situations would also offer food-insecure households a way out of the choice between reduced consumption and asset depletion. Third, tenure policy may be adapted to fit more optimally with dominant livelihood strategies in risky environments.

4.3 POLITICAL ECONOMY OF LAND AND FOOD

Much of the research on both land tenure and food security has been focused at the micro or household level, relying primarily on household surveys as the methodology of choice. Insofar as we have argued that access to both land and food is often gained through the social unit of the household, this is perhaps to be expected. Yet few issues, particularly in agrarian societies, are more politically explosive than land and food. While the implications of understanding what goes on within the household have become clearer, the political context beyond the household has perhaps, at least sometimes, been overlooked. Bruce (1995) has recently suggested that tenure, resource management policy, and conflict resolution mechanisms are relevant to food security concerns and cites, among other examples, ethnic conflict in the Rift Valley Province of Kenya preceding and following the 1992 elections. The immediate issue was control over local political representation at the national level, and the immediate repercussion of political violence was the creation of large groups of displaced people who were not indigenous to the Rift Valley. But the long-term repercussion is decreased livelihood security and decreased production. The underlying motivation for the political struggle was the fear among indigenous people that they were about to become a minority in their own home areas, and the mechanism permitting this to occur was—and still is—a free land market. The complex role of civil and militarized conflict in the linkage between land access and food security is controversial and only poorly understood (Tschirley and Weber 1994; Myers 1993).

In a recent review, Pinstup-Andersen (1993) reaches similar conclusions about food security and nutrition policies. Noting the preference for governmental intervention at the level of consumption rather than livelihood or production, he warns against ignoring the long-term political and macroeconomic consequences of symptom-oriented intervention (food transfers or feeding programs). The incorporation of livelihood strategies and the linkages between production and consumption into food policy analysis should help to address the problem Pinstup-Andersen is calling to our attention.

One of the most important concepts in both land research and food research—and one of the most difficult to define and measure—is vulnerability. Several recent studies that included elements of both land and food have suggested that vulnerability is a political, not a technical, concept (Patnaik 1991; Watts and Bohle 1993). That is, rather than analyzing specific entitlements to food or specific rights in land, the emphasis should be on the political context that defines entitlements and rights and how these rights are contested and won. Watts and Bohle (1993, pp. 119, 120) 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.

It is our contention that studying the cyclical and dynamic relationship between land tenure and food security as well as the macro-political and household contexts within which production and consumption takes place will enable research to better inform policy in both these critical areas.

APPENDIX: PROBLEMS WITH METHODS

Methods of researching both land tenure and food security have varied, but the main instrument of investigation in both domains has tended to be the household survey. Yet, as the empirical review has noted, a focus on the household may not be sufficiently disaggregated to capture some of the subtle issues related to both land tenure and food security. Land tenure and food security are both conceptually complex topics, not given to simple or straightforward measurement. Research in both domains therefore relies heavily on the use of indicators.

In recent work, the attempt has been to refine methods to get more valid and reliable results from empirical research. This includes efforts to refine or reinvent indicators used, efforts to improve survey methods, efforts to rely on qualitative research methods including rapid or participatory rural appraisal, and efforts to incorporate both survey and qualitative methods concurrently or recurrently into the same research design. Despite new innovations, much work remains to be done in terms of bridging the gaps between these two areas of study. This section provides an overview of some of these recent innovations and suggests some ways to bridge those gaps.

A.1 METHODS OF LAND TENURE RESEARCH

Some areas of tenure research are more given to problems with methods than are others. For instance, the farm size/productivity relationship has been well studied at least in part because land areas and yields are relatively straightforward to measure (though the interpretation of empirically demonstrated relationships is still a debated question). Much more difficult are the issues of the quality and extent of rights in land and natural resources and the issue of tenure security. An overview of innovations in quantitative survey approaches to tenure research is provided by Place, Roth, and Hazell (1994) and supplemented by various other recent work (e.g., Roth 1995). Place, Roth, and Hazell (1994) consider the applicability of methods to a variety of potential research questions, including tenure security,

investment and agricultural productivity, rural land markets, land disputes, and the distributional impacts of tenure change. They suggest three categories of qualities in property rights that merit measurement—breadth (“robustness”) of rights, duration of rights, and assurance of rights—and suggest both legal and economic dimensions to all three. Assurance is the most difficult to measure, but they suggest that lack of assurance of rights (insecurity of tenure) can result from “(1) an inadequate number of absolute rights, (2) inadequate duration in one or more rights, (3) lack of assurance in exerting rights, or (4) high costs of enforcing rights” (ibid., p. 21).

They suggest a lexicographic ordering of rights to measure breadth, listing transfer rights, exclusion rights, and use rights as well as mode of acquisition. To actually measure these rights, Roth (1995) lists a number of land practices and asked respondents if they could engage in these activities: planting trees, constructing a wall or fence, constructing a permanent structure or house, bequeathing the plot, renting out the plot, selling the plot, and making improvements in water retention structures. This list suggests a hierarchy of rights—if one can sell the land, one usually has rights to rent or bequeath the land, and so forth—hence the lexicographic ordering. Answers to these questions can be yes, or no, or a qualified yes. In all, Roth estimates that about 20 such questions are necessary to completely define rights in a single plot of land (personal communication).

This raises another set of measurement issues. The first deals with units of analysis. The household has typically been the social unit of analysis, and the land parcel has typically been the area unit of analysis. Yet there may be several households within one compound in some African settings, and the compound, not the individual household, may be the locus of landownership or control. Within the household, different individuals may be responsible for managing different parcels or plots of land and often have differing rights in land. A parcel is a contiguous piece of land, all of which usually was acquired at the same time through the same manner; a plot may be a subdivided portion of a parcel and is usually managed by an individual; a field is a distinct area of land use—a single crop, intercrop, pasture, and the like. A farm or holding is the aggregate of all parcels held by family members within a household or compound. For a disaggregated analysis of rights in land, the operative units are the plot and the individual plot manager. A second measurement issue deals with overlapping rights in a single parcel or plot of land. Rights may overlap temporally (for example, rights to seasonal grazing on stubble after a crop has been harvested but not the rest of the season) or spatially (for example, rights in trees growing on a parcel of land but no rights to the land itself). A third measurement issue has to do with the nature of land tenure change processes—whether evolutionary or statutory and, if statutory, whether compulsory and systematic or voluntary and sporadic (Roth 1995; Place, Roth, and Hazell 1994).

A particular difficulty of survey research, especially when the land parcel or plot is the unit of measure, is capturing the phenomenon of landlessness. Even when households are the unit of measurement, landlessness and the processes leading to it are difficult to capture with cross-sectional methods, because landless households in a rural economy may have few livelihood options but to migrate in search of employment. The fact that they do not turn up in a survey sample does not necessarily mean that landlessness is not a problem (Troutt 1994).

This listing of issues indicates at least some of the problems in the empirical measurement of land tenure questions by survey methods. An alternative approach that has received increased attention in recent research involves the use of rapid appraisal methods, including RRA and PRA (Freudenberger and Freudenberger 1993; Frankenberger and Coyle 1993; Chambers 1994). While quantitative hypothesis testing is not possible with purely qualitative approaches, these approaches have been used successfully to capture tenure and resource management changes over time, adaptations to change, intrahousehold differences, and the subjective perspectives of individual land users. Processes leading to landlessness can also be explored with rapid appraisal and other qualitative methods. Where time is not a constraint, more traditional methods of qualitative research—especially ethnographic interviewing and participant observation—are widely used.

A.2 METHODS OF MEASURING FOOD SECURITY

Food security is also such a complex notion that it is virtually impossible to measure directly, and a variety of proxy measures have been suggested. Most measure something related to, but distinct from, food security as defined here. The most frequently used measures include consumption and expenditure, nutritional status, coping strategies, and resource-related correlates.

One standard measure is to consider households that are able to meet 80 percent or more of daily caloric requirements as food secure for the period of time being measured (Haddad, Kennedy, and Sullivan 1994; Reardon and Matlon 1989). A cut-off point of 2,000 kilocalories/adult equivalent/day is frequently used. Several methods have been used to measure food consumption. The first method is to estimate both total household production and purchases over a period of time and growth or depletion of food stocks held over that period of time. Food entering the household's possession and disappearing is presumed to have been consumed. The second method is to undertake 24-hour recalls of food consumption for individual members of a household and analyze each type of food mentioned for caloric content (Bouis 1993). But these are really measures of the caloric value of dietary intake, not food security per se. A third proxy for consumption is to measure food expenditures. Other, partial measures of consumption have been suggested, relying on frequency or variety of intake (Staatz, D'Agostino, and Sundberg 1990).

Anthropometric measures of nutritional status are sometimes used as food security indicators. However, because various factors in addition to food security are determinants of nutritional status, its use as a food security indicator requires that these other factors be taken into consideration, including health, intrahousehold distribution of food, and maternal care and time allocation.

Several measures have been suggested on the basis of strategies for coping with food insufficiency. Human beings are not passive "victims" of food insecurity. When people do not have access to sufficient food, various mechanisms can be relied on to increase the amount of food they can get, to limit the impact of insufficient access, or in some other way to cope with food insufficiency. In the words of one researcher, hunger is a "managed process" (Radimer et al. 1992). If these processes can be recognized and understood in a given social and cultural context, measuring "coping strategies" can be an effective proxy for food security (Maxwell 1996; Maxwell and Frankenberger 1992; Campbell 1991; Corbett 1988). A variety of other indicators, usually related to household resources, can be used as predictors for food security, including household income, number of income sources, asset ownership, access to land and natural resources, household size, and dependency ratio (Haddad, Kennedy, and Sullivan 1994).

Some of these indicators change according to immediate circumstances (consumption or coping strategy indicators, for example); some are relatively static, at least in the short term (dependency ratio, for example). Therefore, some are better measures of access and sufficiency while others are better measures of vulnerability. As with the component of "assurance" with regard to land rights, the component of vulnerability is the most difficult to capture empirically with food security. Access to food is determined by food entitlements (Sen 1981), commonly either through income and purchase, through direct production, or through some kind of transfer. Monitoring household means of access to food and shifts in the mode of access is an important indicator of food security. Indicators that quantify coping strategies indirectly measure food sufficiency—that is, they measure the frequency and severity of strategies to manage or "cope with" insufficiency. The vulnerability of means of access to food is a measure of security; for example, households with multiple means of access to food (wage income, trade, direct production) are generally less vulnerable and thus more food secure than those that rely on only one means of access. Various measures of production processes are indicators of temporal sustainability, as is the effect of short-term food insecurity on longer-term capacity.

Most of the measures discussed here were developed for quantitative survey research, but, as with tenure research, there have been innovations in methods of qualitative investigation of food security

questions, including rapid appraisal methods (Frankenberger 1992). There is likewise the question of intrahousehold distribution of food, an issue that has been well investigated in its own right but not always adequately incorporated into studies where the household is the unit of analysis.

5. REFERENCES

- Agarwal, Bina. 1994. "Gender and Command over Property: A Critical Gap in Economic Analysis and Policy in South Asia." *World Development* 22(10): 1455–1478.
- . 1988. "Who Sows? Who Reaps? Women and Land Rights in India." *Journal of Peasant Studies* 15(4): 531–581.
- Atwood, David. 1990. "Land Registration in Africa: The Impact on Agricultural Production." *World Development* 18(5): 659–671.
- Barracrough, Solon. 1991. *An End to Hunger? The Social Origins of Food Strategies*. London: Zed Books.
- Barrows, Richard, and Michael Roth. 1990. "Land Tenure and Investment in African Agriculture: Theory and Evidence." *Journal of Modern African Studies* 28(2): 265–297.
- Bassett, Thomas J., and Donald E. Crummey. 1993. *Land in African Agrarian Systems*. Madison: University of Wisconsin Press.
- Basu, Kaushik. 1986. "The Market for Land: An Analysis of Interim Transactions." *Journal of Development Economics* 20(1): 163–177.
- Becker, Gary. 1981. *A Treatise on the Family*. Cambridge, Mass.: Harvard University Press.
- Bentley, Margaret, and Gretel Pelto. 1991. "The Household Production of Nutrition." *Social Science and Medicine* 33(10): 1101–1102.
- Berry, R. Albert, and William Cline. 1979. *Agrarian Structure and Productivity in Developing Countries*. Baltimore: Johns Hopkins University Press.
- Bloch, Peter. 1994. "Wishful Thinking in Combining Conservation and Development." Madison: Land Tenure Center, University of Wisconsin.
- Boserup, Ester. 1981. *Population and Technological Change: A Study of Long-Term Trends*. Chicago: University of Chicago Press.
- . 1970. *Women's Role in Economic Development*. London: Allen and Unwin.
- Bouis, Howarth. 1993. "Food Consumption Surveys: How Random are Measurement Errors?" In *Data Needs for Food Policy in Developing Countries*, edited by J. von Braun and D. Puetz. Washington, D.C.: International Food Policy Research Institute.
- Bouis, Howarth, and Lawrence Haddad. 1990. "Effects of Agricultural Commercialization on Land Tenure, Household Resource Allocation and Nutrition in the Philippines." IFPRI Research Report, no. 79. Washington, D.C.: International Food Policy Research Institute.
- Bromley, Daniel. 1992a. *Making the Commons Work: Theory, Practice, and Policy*. San Francisco: ICS Press.
- . 1992b. "Property Rights as Authority Systems: The Role of Rules in Resource Management." In *Emerging Issues in Forest Policy*, edited by Peter N. Nemetz. Vancouver: University of British Columbia Press.

- . 1989. *Economic Interests and Institutions*. Oxford: Basil Blackwell.
- Bruce, John. 1995. "Food Security and Conflict over Resources: Challenges for Land Policy on the Greater Horn of Africa." Research Proposal. Madison: Land Tenure Center, University of Wisconsin.
- . 1993. "Do Indigenous Tenure Systems Constrain Agricultural Development?" In *Land in African Agrarian Systems*, edited by T. Bassett and D. Crummey. Madison: University of Wisconsin Press.
- Bruce, John, and Christopher Tanner. 1992. "Structural Adjustment, Land Concentration and Common Property: The Case of Guinea Bissau." Madison: Land Tenure Center, University of Wisconsin.
- Bruce, John, and Louise Fortmann. 1989. "Agroforestry: Tenure and Incentives." LTC Paper, no. 135. Madison: Land Tenure Center, University of Wisconsin.
- Bruce, John, Shem Migot-Adholla, and Joan Atherton. 1994. "The Findings and Their Policy Implications: Institutional Adaptation or Replacement?" In *Searching for Land Tenure Security in Africa*, edited by Bruce and Migot-Adholla. Dubuque, Ia.: Kendall/Hunt Publishers.
- Bruce, John, Louise Fortmann, and Calvin Nhira. 1993. "Tenures in Transition, Tenures in Conflict; Examples from the Zimbabwe Social Forest." *Rural Sociology* 58(4): 626–642.
- Bruce, John, and Shem Migot-Adholla, eds. 1994. *Searching for Land Tenure Security in Africa*. Dubuque, Ia.: Kendall/Hunt Publishers.
- Campbell, Cathy. 1991. "Food Insecurity: A Nutritional Outcome or a Predictor Variable?" *Journal of Nutrition* 121: 408–415.
- CARE. 1994. "Food Needs Assessment Study for Huila and Cunene Provinces in Southwestern Angola." Tucson, Ariz.: Bureau of Applied Research in Anthropology.
- Carney, Judith. 1988. "Struggles over Land and Crops in an Irrigated Rice Scheme: The Gambia." In *Agriculture, Women, and Land*, edited by J. Davison. Boulder, Colo.: Westview Press.
- Carney, Judith, and Michael Watts. 1991. "Disciplining Women? Rice, Mechanization, and the Evolution of Mandinka Gender Relations in Senegambia." *Journal of Women in Culture and Society* 16(4): 651–681.
- Carroll, Ronald. 1980. *Agroecology*. New York: McGraw-Hill.
- Carter, Michael R., and Keith D. Wiebe. 1990. "Access to Capital and Its Impact on Agrarian Structure and Productivity in Kenya." *American Journal of Agricultural Economics*. December.
- Carter, Michael, Bradford Barham, and Dina Mesbah. 1994. "Agro-Export Booms and the Rural Resource Poor in Chile, Guatemala and Paraguay." Working Paper. Madison: Department of Agricultural Economics, University of Wisconsin.
- Carter, Michael R., Keith D. Wiebe, and Benoit Blarel. 1994. "Tenure Security for Whom? Differential Effects of Land Policy in Kenya." In *Searching for Land Tenure Security in Africa*, edited by John W. Bruce and Shem E. Migot-Adholla. Dubuque, Ia.: Kendall/Hunt Publishers.
- Chambers, Robert. 1995. "Poverty and Livelihoods: Whose Reality Counts?" *Environment and Urbanization* 7(1): 173–206.
- . 1994. "The Origins and Practice of Participatory Rural Appraisal." *World Development* 22(7): 953–969.

- . 1988. "Sustainable Rural Livelihoods: A Key Strategy for People, Environment and Development." In *The Greening of Aid*, edited by C. Conroy and M. Litvinoff. London: Earthscan.
- Chambers, Robert, and Melissa Leach. 1989. "Trees and Savings and Security for the Rural Poor." *World Development* 17(3): 329–342.
- Chavas, Jean-Paul. 1995. "The Micro-economics of Food Security." Working Paper. Madison: Department of Agricultural Economics, University of Wisconsin.
- Coase, Ronald. 1960. "The Problem of Social Cost." *Journal of Law and Economics* 3: 1–44.
- Conroy, Czech, and Miles Litvinoff. 1988. *The Greening of Aid*. London: Earthscan.
- Corbett, Jane. 1988. "Famine and Household Coping Strategies." *World Development* 16(9): 1099–1112.
- Dasgupta, Partha, and Debraj Ray. 1987. "Inequality as a Determinant of Malnutrition and Unemployment: Policy." *Economic Journal*, 97.
- . 1986. "Inequality as a Determinant of Malnutrition and Unemployment: Theory." *Economic Journal*, 96.
- Davies, Susanna. 1993. "Are Coping Strategies a Cop Out?" *IDS Bulletin*, vol. 24(4), pp. 60–72.
- Davison, Jean. 1988. *Agriculture, Women, and Land*. Boulder, Colo.: Westview Press.
- Demsetz, H. 1967. "Towards a Theory of Property Rights." *American Economic Review* 57(2): 347–359.
- Devereux, Stephen. 1992. "Goats Before Ploughs: Dilemmas of Household Response During Food Shortages." *IDS Bulletin*, vol. 24(4), pp. 52–59.
- De Waal, Alex. 1989. *Famine that Kills: Darfur, Sudan, 1984–85*. Oxford: Clarendon Press.
- Dewey, Kathryn. 1980. "Nutrition and Agricultural Change." In *Agroecology*, edited by R. Carroll. New York: McGraw-Hill.
- Dickerman, Carol. 1987. "Security of Tenure and Land Registration in Africa." LTC Paper, no. 137. Madison: Land Tenure Center, University of Wisconsin.
- Dorner, Peter. 1972. *Land Tenure and Economic Development*. Harmondsworth, Eng.: Penguin Books.
- Dorner, Peter, and William Thiesenhusen. 1992. "Land Reform and Deforestation: Interactions and Environmental Implications." UNRISD Discussion Paper, no. 34. Geneva: United Nations Research Institute for Social Development.
- Downs, R.E., and S.P. Reyna. 1988. *Land and Society in Contemporary Africa*. Hanover, N.H.: University Press of New England.
- Drèze, Jean, and Amartya Sen. 1989. *Hunger and Public Action*. Oxford: Clarendon Press.
- Dwyer, Daisy, and Judith Bruce. 1988. *Home Divided*. Boulder, Colo.: Westview Press.
- Dyer, Graham. 1991. "The Farm Size/Farm Productivity Relationship Re-examined: Evidence from Rural Egypt." *Journal of Peasant Studies* 19(1): 59–92.
- Eicher, Carl, and Doyle Baker. 1982. "Research on Agricultural Development in sub-Saharan Africa: A Critical Survey." MSU International Development Paper, no. 1. East Lansing: Michigan State University.

- Falconer, Julia, and J.E. Arnold. 1991. "Forests, Trees and Household Food Security." In *Developing World Agriculture*, pp. 194–206. London: Grosvenor Press International.
- Feder, Gershon, and Raymond Noronha. 1987. "Land Rights Systems and Agricultural Development in sub-Saharan Africa." *World Bank Research Observer*, 2(2), pp. 143–169.
- Feder, Gershon, T. Onchan, Y. Chalamwong, and C. Hongladaron. 1988. *Land Policies and Farm Productivity in Thailand*. Baltimore: Johns Hopkins University Press.
- Fleuret, Anne. 1988. "Some Consequences of Tenure and Agrarian Reform in Taita, Kenya." In *Land and Society in Contemporary Africa*, edited by R.E. Downs and S.P. Reyna. Hanover, N.H.: University Press of New England.
- Fleuret, Patrick, and Anne Fleuret. 1980. "Nutrition, Consumption and Agricultural Change." *Human Organization*, 39(3): 250–260.
- Folbre, Nancy. 1986. "Cleaning House: New Perspectives on Households and Economic Development." *Journal of Development Economics* 22(1): 5–40.
- Frankenberger, Timothy. 1995. "Developing Sustainable Livelihoods: A Proposed CARE Development Programming Strategy." Mimeographed. Atlanta, Ga.: CARE.
- . 1992. "Rapid Food Security Assessment." Famine Mitigation Strategy Paper. Washington, D.C.: U.S. Office Foreign Disaster Assistance.
- Frankenberger, Timothy, and P.E. Coyle. 1993. "Integrating Household Food Security into Farming Systems Research/Extension." *Journal for Farming Systems Research/Extension* 4(1): 35–65.
- Frankenberger, Timothy, and Mark Lynham. 1993. "Household Food Security and Coping Strategies along the Senegal River Valley." In *Risk and Tenure in Arid Lands*, edited by T. Park, pp. 51–86. Tucson: University of Arizona Press.
- Freudenberger, Mark, and Karen Schoonmaker Freudenberger. 1993. "Fields, Fallow and Flexibility: Natural Resource Management in Ndam Mor Fadamba, Senegal." London: International Institute for Environment and Development.
- Friedman, Milton and Rose. 1980. *Free to Choose: A Personal Statement*. New York: Harcourt Brace Jovanovich.
- Guyer, Jane. 1995. "Land Rights and Food Security." Verbal presentation to Eighth Annual Hunger Research Briefing and Exchange, Brown University, Providence, R.I., 5–7 April 1995.
- Guyer, Jane, and Pauline Peters. 1987. "Introduction: Conceptualizing the Household." *Development and Change* 18: 197–214.
- Haddad, Lawrence. 1994. "Strengthening Food Policy Analysis through Intra-Household Analysis." *Food Policy* 19(4): 347–356.
- . 1992. "The Impact of Women's Employment Status on Household Food Security at Different Income Levels in Ghana." *Food and Nutrition Bulletin*, vol. 14(4), pp. 341–344.
- Haddad, Lawrence, Christine Peña, Agnes Quisumbing, and Alison Slack. 1995. *Poverty and Nutrition within Households: Review and New Evidence*. Washington, D.C.: International Food Policy Research Institute.
- Haddad, Lawrence, Eileen Kennedy, and Joan Sullivan. 1994. "Choices of Indicators for Food Security and Nutrition Monitoring." *Food Policy* 19(3): 329–343.
- Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science*, vol. 162, pp. 1243–1248.

- Haugerud, Angelique. 1983. "The Consequences of Land Reform among Smallholders in the Kenya Highlands." *Rural Africana*, vol. 15/16, pp. 65–90.
- Jiggins, Janice. 1988. "Women's Access to Land in sub-Saharan Africa: Issues for Discussion." Paper prepared for ILO Regional Workshop on Women's Access to Land. Geneva: International Labour Organization.
- Joekes, Susan, and Judy Pointing. 1991. "Women in Pastoral Societies in East and West Africa." London: International Institute for Environment and Development, Dryland Network Programme.
- Katz, Elizabeth. 1992. "Intra-Household Resource Allocation in the Guatemala Central Highlands: The Impact of Non-Traditional Agriculture Exports." Ph.D. dissertation, University of Wisconsin-Madison.
- Kennedy, Eileen, and Howarth Bouis. 1993. *Linkages between Agriculture and Nutrition: Implications for Policy and Research*. Washington, D.C.: International Food Policy Research Institute.
- Kennedy, Eileen, and Pauline Peters. 1992. "Household Food Security and Child Nutrition: The Interaction of Income and Gender of Household Head." *World Development* 20(8): 1077–1085.
- Kumar, Shubh. 1994. "Adoption of Hybrid Maize in Zambia: Effects on Gender Roles in Agriculture, Food Consumption and Nutrition." IFPRI Research Report, no. 100. Washington, D.C.: International Food Policy Research Institute.
- Lastarria-Cornhiel, Susana. 1995. "Impact of Privatization on Gender and Property Rights in Africa." Paper prepared for GENDER-PROP Conference, IFPRI and CGIAR Gender Program. Washington, D.C: IFPRI.
- . 1988. "Female Farmers and Agricultural Production in El Salvador." *Development and Change* 19(4): 585–615.
- Lawry, Steven. 1990. "Tenure Policy Toward Common Property Natural Resources in sub-Saharan Africa." *Natural Resources Journal* 30(2): 403–422.
- Mamdani, Mahmood. 1987. "Extreme But Not Exceptional: Towards an Analysis of the Agrarian Question in Uganda." *Journal of Peasant Studies* 14(2): 191–225.
- Maxwell, Daniel. 1995. "Alternative Food Security Strategy: A Household Analysis of Urban Agriculture in Kampala." *World Development* 23(10): 1669–1681.
- Maxwell, Daniel. 1996. "Measuring Food Insecurity: The Frequency and Severity of 'Coping Strategies.'" *Food Policy* 21(3): 291–303.
- Maxwell, Daniel, and Kent Elbow. Forthcoming. "A Comparative and Multidimensional Analysis of Private and Communal Land Tenure in Africa." Madison: Land Tenure Center, University of Wisconsin.
- Maxwell, Simon. 1994. "Food Security: A Post-Modern Perspective." IDS Working Paper, no. 9. Brighton: University of Sussex, Institute of Development Studies.
- Maxwell, Simon, and Timothy Frankenberger. 1992. *Household Food Security: Concepts, Indicators, Measurements: A Technical Review*. New York and Rome: UNICEF and IFAD.
- Mellor, John. 1976. *The New Economics of Growth: A Strategy for India and the Developing World*. Ithaca, N.Y.: Cornell University Press.
- Migot-Adholla, Shem, Peter Hazell, Benoit Blarel, and Frank Place. 1991. "Indigenous Land Rights Systems in sub-Saharan Africa: A Constraint on Productivity?" *World Bank Economic Review*, vol. 5(1), pp. 155–175.

- Myers, Gregory. 1993. "Confusion, Contradiction, and Conflict: Land Access in Mozambique in the Post-Peace Period." LTC research paper. Madison: Land Tenure Center, University of Wisconsin.
- Niemeijer, Rudo, and Jan Hoorweg. 1994. "Commercialization of Rice and Nutrition: A Case from West Kenya." In *Agricultural Commercialization, Economic Development, and Nutrition*, edited by Joachim von Braun and Eileen Kennedy. Baltimore: Johns Hopkins University Press.
- Okali, Christine. 1983. *Cocoa and Kinship in Ghana: The Matrilineal Akan of Ghana*. London: Kegan Paul International.
- Okoth-Ogendo, H. 1982. "The Perils of Land Tenure Reform: The Case of Kenya." Paper presented to Workshop on Land Policy and Agricultural Production in Eastern and Southern African Countries, Gaborone, Botswana.
- Ostrom, Elinor. 1994. "Neither Market Nor State: Governance of Common-Pool Resources in the Twenty-First Century." International Food Policy Research Institute, Lecture Series, no. 2. Washington, D.C.: IFPRI.
- . 1992. "The Rudiments of a Theory of the Origins, Survival and Performance of Common-Property Institutions." In *Making the Commons Work*, edited by D. Bromley. San Francisco: ICS Press.
- Pala-Okeyo, Achola. 1980. "The Joluo Equation: Land Reform = Lower Status for Women." *Ceres*. May-June 1980, pp. 37–42.
- Park, Thomas. 1993. *Risk and Tenure in Arid Lands*. Tucson: University of Arizona Press.
- Patnaik, Utsa. 1991. "Food Availability and Famine: A Longer View." *Journal of Peasant Studies* 19(1): 1–25.
- Pinstrup-Andersen, Per. 1993. *The Political Economy of Food and Nutrition Policies*. Baltimore: Johns Hopkins University Press.
- Place, Frank. 1995. "The Role of Land and Tree Tenure on the Adoption of Agroforestry Technologies in Zambia, Burundi, Uganda and Malawi: A Summary and Synthesis." Madison: Land Tenure Center, University of Wisconsin.
- Place, Frank, Michael Roth, and Peter Hazell. 1994. "Land Tenure Security and Agricultural Performance in Africa: Overview of Methodology." In *Searching for Land Tenure Security in Africa*, edited by John Bruce and Shem Migot-Adholla. Dubuque, Ia.: Kendall/Hunt Publishers.
- Platteau, Jean-Philippe. 1992. *Land Reform and Structural Adjustment in Sub-Saharan Africa*. Rome: Food and Agricultural Organization.
- . 1988. "The Food Crisis in Africa: A Comparative Structural Analysis." Helsinki: U.N. University.
- Quinn, Victoria, and Eileen Kennedy. 1994. "Food Security and Nutrition Monitoring Systems in Africa." *Food Policy* 19(3): 234–254.
- Quisumbing, Agnes, Lynn Brown, Hilary Sims Feldstein, Lawrence Haddad, and Christine Peña. 1995. *Women: The Key to Food Security*. Washington, D.C.: International Food Policy Research Institute.
- Radimer, Kathy, Christine Olson, Jennifer Greene, Cathy Campbell, and Jean-Pierre Habicht. 1992. "Understanding Hunger and Developing Indicators to Assess it in Women and Children." *Journal of Nutritional Education*, vol. 24(supp.), pp. 36–45.
- Rahmato, Dessalegn. 1993. "Agrarian Change and Agrarian Crisis: State and Peasantry in Post-Revolution Ethiopia." *Africa* 63(1): 36–55.

- . 1991. *Famine and Survival: A Case Study from Northeast Ethiopia*. Uppsala: Scandinavian Institute of African Studies.
- Reardon, Thomas, and Peter Matlon. 1989. "Seasonal Food Insecurity and Vulnerability in Drought-Affected Regions of Burkina Faso." In *Seasonal Variation in Third World Agriculture*, edited by D. Sahn. Baltimore: Johns Hopkins University Press.
- Reardon, Thomas, Peter Matlon, and Christopher Delgado. 1988. "Coping with Household-Level Food Insecurity in Drought-Affected Areas of Burkina Faso." *World Development* 16(9): 1065–1074.
- Richards, Paul. 1985. *Indigenous Agricultural Revolution*. Boulder, Colo.: Westview Press.
- Rocheleau, Dianne, and David Edmunds. 1995. "Women, Men and Trees: Gender, Power and Property in Forest and Agrarian Landscapes." Paper prepared for GENDER-PROP Conference, IFPRI and CGIAR Gender Program. Washington, D.C.: IFPRI.
- Roth, Michael. 1995. "Land Markets and Intra-Household Access to Resources and Income Opportunities, Research Methodology: The Case of Non-Traditional Export Crops in the Gambia." Madison: Land Tenure Center, University of Wisconsin.
- Roth, Michael, Richard Barrows, Michael Carter, and Don Kanel. 1989. "Land Ownership Security and Farm Investment: Comment." *American Journal of Agricultural Economics* 71(1): 211–214.
- Roth, Michael, Keith Wiebe, and Steven Lawry. 1992. "Land Tenure and Agrarian Structure: Its Implications for Technology Adoption." Mimeographed. Madison: Land Tenure Center, University of Wisconsin–Madison.
- Sahn, David, ed. 1989. *Seasonal Variation in Third World Agriculture: The Consequences for Food Security*. Baltimore: Johns Hopkins University Press.
- Sahn, David, and Jehan Arulpragasam. 1993. "Development through Dualism: Land Tenure, Policy and Poverty in Malawi." Mimeographed. Ithaca, N.Y.: Cornell Food and Nutrition Policy Program.
- Schroeder, Richard. 1993. "Shady Practice: Gender and the Political Ecology of Resource Stabilization in Gambian Garden/Orchards." *Economic Geography* 69(4): 349–365.
- Sen, Amartya. 1990. "Gender and Cooperative Conflicts." In *Persistent Inequality: Women and World Development*, edited by Irene Tinker. New York: Oxford University Press.
- . 1985. "Property and Hunger." Research Memorandum, no. 102. Williamstown, Mass.: Center for Development Economics, Williams College.
- . 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford: Clarendon Press.
- . 1966. "Peasants and Dualism with or without Surplus Labor." *Journal of Political Economy* 74: 425–450.
- Shipton, Parker. 1995. "Land Rights and Food Security." Verbal presentation to Eighth Annual Hunger Research Briefing and Exchange, Brown University, Providence, R.I., 5–7 April 1995.
- . 1994. "Land and Culture in Tropical Africa: Soils, Symbols, and the Metaphysics of the Mundane." In *Annual Review of Anthropology*, 1994, pp. 347–377.
- . 1990. "African Famines and Food Security: Anthropological Perspectives." In *Annual Review of Anthropology*, 1990, pp. 353–394.

- Staatz, John, Victoire D'Agostino, and Shelly Sundberg. 1990. "Measuring Food Security in Africa: Conceptual, Empirical and Policy Issues." *American Journal of Agricultural Economics* 72(5): 1311–1317.
- Stanbury, Pamela. 1995. "Property Rights: Challenges for Food Security." Paper presented to Fifth Common Property Conference, Bodo, Norway, June 1995.
- Talbot, Kirk. 1993. "Central Africa's Forests: The Second Greatest Forest System on Earth." Washington, D.C.: World Resources Institute.
- Thiesenhusen, William. 1995. "Review: Land Reform Lives!" *European Journal of Development Research* 7(1): 193–209.
- . 1991. "Implications of the Rural Land Tenure System for the Environmental Debate: Three Scenarios." *Journal of Developing Areas* 26(1): 1–24.
- Tinker, Irene. 1990. *Persistent Inequality: Women and World Development*. New York: Oxford University Press.
- Townsend, Robert M. 1995. "Consumption Insurance: An Evaluation of Risk-Bearing Systems in Low-Income Economies." *Journal of Economic Perspectives* 9(3).
- Troutt, Elizabeth. 1994. "Rural African Land Markets and Access to Agricultural Land: The Central Region of Uganda." Ph.D. dissertation, University of Wisconsin–Madison.
- Tschirley, David, and Michael Weber. 1994. "Food Security Strategies under Extremely Adverse Conditions: The Determinants of Household Income and Consumption in Rural Mozambique." *World Development* 22(2): 159–173.
- Uganda. 1993. "Report of the Technical Committee on Land Tenure Law Reform." Kampala: Agricultural Policy Committee, Agricultural Secretariat.
- UNICEF. 1990. "Strategy for Improved Nutrition of Children and Women in Developing Countries." UNICEF Policy Review. New York: UNICEF.
- Von Braun, Joachim, and Eileen Kennedy. 1994. *Agricultural Commercialization, Economic Development and Nutrition*. Baltimore: Johns Hopkins University Press.
- Watts, Michael. 1983. *Silent Violence: Food, Famine and Peasantry in Northern Nigeria*. Berkeley: University of California Press.
- Watts, Michael, and Hans Bohle. 1993. "Hunger, Famine, and the Space of Vulnerability." *Geojournal* 30(2): 117–125.
- Wiebe, Keith. 1994. "Household Food Insecurity and Resource Use." In *International Agriculture and Trade Reports: Africa and the Middle East*. Washington, D.C.: Economic Research Service, U.S. Department of Agriculture.
- . 1992. "Household Food Security and Cautious Commercialization in Kenya." Ph.D. dissertation, University of Wisconsin–Madison.
- World Bank. 1994. *Adjustment in Africa: Reforms, Results and the Road Ahead*. New York: Oxford University Press.
- . 1993. "Uganda: Agriculture." Washington, D.C.: World Bank.
- . 1986. "Poverty and Hunger: Issues and Options for Food Security in Developing Countries." Washington, D.C.: World Bank.