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A Theoretical Model of
Land Ownership Security and Titling Impacts
on Resource Allocation and Capital Investment

by

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Land registration is sometimes recommended in development programs as a means for increasing individual property rights in land. Economists argue that increasing security of individual property rights raises farmers' expectations of returns from land assets, thereby shifting the derived demands for investment and credit. Increased investment in turn leads to higher agricultural productivity. Land titles if transferable may enhance collateral value of land and can influence credit terms and supply.

Critics argue that registration programs are expensive and possibly detrimental. Existing land holders may incur welfare losses as a result of titling programs due to land grabbing or land speculation prior to tenure conversion. Land statutes that restrict use rights or transfer rights, as do many of the formal land codes in Africa, can adversely affect economic efficiency. Both proponents and critics have generally assumed that individual tenure, once established, would "stick." This assumption is being undermined by evidence in Kenya that individual titles are reverting, through non-registration of successions, to a species of extended family ownership (Green, 1987).

There is little empirical research that has carefully analyzed the magnitude of titling benefits, or the conditions under which they are or are not realized. Costs of land titling programs, on the other hand, are expensive. A recently completed land registration campaign in St. Lucia, over the first 21 months of the project, cost \$214 per parcel (2.0 ha/parcel)

excluding capital purchases and startup costs of about \$2 million (Syrett, 1986, p. 134).

The high capital investment required for land registration raises four issues regarding the economic viability of titling programs. First, do the economic benefits of titling programs warrant the capital investment? Second, are there externalities that restrict land holders ability to gain access to title, or that provide disincentives to participation in titling programs? Third, how do efficiency and equity issues effect the costs and benefits of titling schemes? Fourth, what determines the durability of land titles over time?

Involuntary Versus Voluntary Land Registration

Land titling systems are not homogeneous. They differ in scope, length of time in existence, and restrictions imposed on title. Systems may lie anywhere along a continuum from fully involuntary forms of registration, where all farms or parcels are titled by the state irrespective of whether the farmer desires or seeks title, to voluntary forms, where the individual landholder is responsible for seeking title and bears the costs of the registration process.

In involuntary systems, the state or international donors (e.g., USAID) bear a large portion of the registration costs, including expenses for establishing buildings and administrative systems, land ownership determination, land dispute adjudication, and title issuance. Since all lands within a designated area are registered, initial capital investment by the state is high. Investment costs by individual landholders are generally low. Because the objectives of the registration program may require mandatory registration, the link between demand for title and title benefits

is weak and empirically untestable within the registration area. However, once the titling campaign is completed, the decision to renew titles, following land acquisition or succession, normally reverts to voluntary forms of participation.

In voluntary systems, title ownership is influenced to a greater extent by individual demand for title. Normally, the state maintains a system of land registration offices, but landholders bear the transactions cost for acquiring title. Transactions costs include application fees, time and travel to the registry offices, and unofficial gratuities. Acquisition of title may be linked with land taxation through land records, imposing higher costs on titled land. Whereas title in involuntary forms is supply determined, selected according to state criteria, title holders and specific parcels in voluntary systems are self selected based on farmer and/or parcel attributes.

This distinction is fundamental to the titling analysis. If all parcels have been recently registered, the analysis of titling impacts requires either an historical analysis, or a comparative study of title between areas with and without comprehensive titling. Historical analyses in the African context are complicated by lack of adequate time series data. Data from regional studies are exacerbated by location-specific biases.

Attempts to associate title with farmer and/or parcel attributes in recently established titling schemes may result in low levels of statistical correlation despite the fact that these attributes may be important determinants of title selection and demand in voluntary forms. Conversely, failing to properly account for farmer and/or parcel attributes in voluntary systems, may lead to biased estimates, as the effect of these influences are incorrectly attributed to the title variable.

Cost-Benefit Analysis of Titling Programs

The economic criteria for evaluating the profitability of investments in land titling programs is contained in the standard cost/benefit formula:

$$(1) \quad \Sigma \frac{[\pi_t^W - \pi_t^{WO} - C_t]}{(1+i)^t} - (I^S + I^P)_{t=0}$$

Net private titling benefits in year 't' equals net agricultural income with registration (π_t^W) less the income that would otherwise occur without land registration (π_t^{WO}) less the recurrent costs of operating the land registry system (C_t). The investment payoff depends on the discount rate (i) and the present value of discounted net benefits from land registration, over 'n' future periods, relative to the investment cost borne in the initial time period. Investment costs for establishing the registry system are borne by the state (I^S). Costs of issuing titles are shared between individual landholders (I^P) and the state.

The economic profitability of a titling program depends crucially on: (a) the aggregate benefits ($\pi_t^W - \pi_t^{WO}$) from holding land title; and (b) how variation in cost sharing between individuals and the state influence the outcome of title coverage, either in terms of number of titles issued or area of land titled. This paper focuses primarily on the first issue of economic benefits to holding land title. While issues related to optimal cost sharing arrangements are important, they are beyond the scope of this paper.

Benefits to Land Title

Although there is no single "African" tenure system, a common characteristic of most systems is usufructuary rights based on descent group

membership. Researchers sometimes confuse these traditional tenure arrangements with "communal" systems characterized by free and unlimited access to land resources. Economists using the property rights paradigm argue that traditional African land tenure systems induce inefficient allocation of resources because property rights are not clearly defined, costs and rewards are not internalized, and contracts are not legal or enforceable.

Clear Definition of Rights. Johnson (1972) argues that a clear definition of property rights requires that rights be established and allocated to specific individuals or groups, that rights be easy to identify and verify, and that rights have legal and tenure certainty. The greater the ambiguity in property rights, the higher the transaction costs in discovering the owner, and the higher the residual uncertainty remaining after any given expenditure to identify ownership. Transactions costs drive a wedge between the value of marginal product in the owner's use and the value of marginal product if the land were held by the most productive alternative user. Costs for establishing ownership reduce the value of a fixed investment by decreasing the land holder's expectation of the flow of income from that investment. Residual uncertainty increases the discount rate for future returns, reduces investment, and biases investment toward short-term projects.

Costs and Rewards Internalized. Johnson (1972) further argues that under traditional land tenure arrangements, costs and benefits of individual action do not accrue to the decision making unit, so that social cost and benefit do not equal private cost and benefit. On the assumption that grazing rights are strictly communal, Johnson maintains that the individual captures the economic benefits of his/her decision to increase herd size, but others bear

the cost of range degradation. Or, the benefits of soil and water conservation are not captured by the individual because rights in land are either "communal" so that the benefit is consumed by all, or rights are uncertain so that the individual has no incentive to incur private costs to produce social benefit. Johnson's conclusion is that "...land consumption, that is, leaving...land less productive than one found it, will be rampant" (Johnson, p. 271).

Contracts. If the freedom to form certain and binding land contracts is inhibited, such that rental is discouraged or land sales are restricted, then investment should decline. If individuals cannot sell land, then the value of an investment is decreased because they lose the flexibility to convert the fixed asset into cash or other preferred assets. As the value of the investment declines, farmers are willing to pay less for land improvements, or for capital to make agricultural investments. At the same time the supply price of capital increases because the restrictions on land sales lowers the collateral value of land to the lender. Thus, lack of freedom to form contracts lowers the demand price for investment and increases the supply price. The outcome is less investment and less output than would be the case if land rights were individualized and land title were registered and transferable.

Formal Implications of Individualized Land Tenure

Given the above postulates, the theory of individual property rights has important implications for credit demand, credit supply, investment and land transactions:

Investment and Credit Demand. Future uncertainty over tenure security decreases land holders expectations of receiving the full benefits of an

investment over its useful life. Land holders either discount future returns from the investment more heavily, or lower their expectations of the time horizon over which benefits are obtained. An investment is profitable if the discounted value of future returns exceeds the present value of investment costs. Given the annual return to investment (R), the cost of investment (C), the discount rate (i) for time preference (cost of capital), the production function for agricultural output, $Q = Q(K, A, N)$, where K is capital, A is land and N is labor employed in the production process, and the price of output (P), the value of the investment (V) to the farmer under certainty is:

$$(2) \quad V = \left[\sum_t R_t (1+i)^{-t} \right] - C_{t=0} = \left[\sum_t \left(P \frac{\partial Q}{\partial K} \right) (1+i)^{-t} \right] - C_{t=0}$$

If land rights are uncertain, the land holder may discount the annual return to reflect the probability of losing land. The expected value of the investment under uncertainty is then:

$$(3) \quad V = \left[\sum_t \left((1 - \phi_t) P \frac{\partial Q}{\partial K} \right) (1+i)^{-t} \right] - C_{t=0}$$

where (ϕ_t) is the probability that the land holder will lose the land in year 't'. Alternatively, the income stream can be discounted for the increased risk (μ) associated with lack of specificity of land rights. In this case the value of the investment is:

$$(4) \quad V = \left[\sum_t \left(P \frac{\partial Q}{\partial K} \right) (1+i+\mu)^{-t} \right] - C_{t=0}$$

In either case, the value of the investment is lowered because of uncertainty over land rights.

Risk of losing the investment may be reduced by the land holder seeking out those with possible claims to the land and securing its use for some future period. This search incurs transactions costs (S) to locate all parties with possible claims, and to negotiate contracts to secure rights to the land. Contracts may involve payments (B) to those with competing claims. The value of the investment is reduced because of higher transactions costs, but the risk premium may also be reduced (from μ to ν):

$$(5) \quad V = \left[\frac{r}{t} \left(P \frac{\partial Q}{\partial K} \right) (1 + i + \nu)^{-t} \right] - (C + S + B)$$

Even if all uncertainty is eliminated ($\nu = 0$), the investment is less attractive than under registered title because of the higher transaction costs for eliminating competing claims.

Assuming that traditional tenure leads to less than certain property rights in land, these effects should lower demand for investments either because the net present value of the returns is reduced or the costs of reducing uncertainty is higher than if land rights were individualized and title registered. Changing from traditional to individualized tenure should theoretically lower costs, increase expectations of net present value of the investment and increase investment demand.

Supply of Credit. Neoclassical theory can also be used to demonstrate the relationship between individualization of tenure and the supply of credit. Assume that principal (P) is scheduled to be payed back by the borrower over 't' equal annual payments (\bar{p}) with interest (r) charged on an annual declining balance basis. For the lender, the expected return (E) from the loan equals the present value of the future stream of principal and interest repayments times the expected probability of loan repayment default ($1-\theta$)

in year 't', plus the value of collateral (C) adjusted for transactions costs (1-c) to convert collateral into financial assets, less the initial principal outlay (P) to the borrower. Land is not suitable as collateral since under traditional tenure land cannot be alienated from the descent group. The probability of loan default (θ) is a function of the risk inherent in the type of investment and the credit-worthiness of the borrower. The expected gross value of the loan to the lender is:

$$(6) \quad E = \sum_t [(1 - \theta^t)(p_t + (P - \sum_{t=1}^t p_t)r)(1 + i)^{-t}] + \theta(1 - c)C - P$$

As the lender's expectation of loan loss (θ) increases, the expected repayment of the loan declines while the expected loss of the collateral increases. Transactions costs (c) are expressed as a proportion of collateral value. As (θ) or (c) increases the value of collateral declines. Risk of loan default (θ) would increase as property rights in land become less secure for the individual borrower. Transactions costs would tend to increase if legal statutes impede the flow of land resources among users.

The bank has three options to offset the risk on its loan portfolio: (a) increase interest rate (r) offered to the borrower; (b) increase collateral requirements (C); or (c) bias the portfolio towards borrowers with greater credit worthiness. Increasing the interest rate decreases the demand for credit by borrowers and may lead to an over emphasis of "risky" projects in the lender's portfolio. Also, interest rates in many LDCs are restricted by usury laws that impose interest ceilings. Converting collateral into financial assets may incur high transactions costs. Use of vehicles or livestock as collateral may be inherently more risky than land and incur higher transactions costs for liquidation, from a lender's perspective.

Assuming that titles are transferable, land registration theoretically increases the value of collateral acceptable to the lender. By increasing collateral and decreasing expected losses, the lender has incentive to lower the interest rate to increase the borrowers' demand for credit. Hence, with registered title, the expected value of the loan loss is reduced, the expected return to the lender is increased, the supply price of capital falls, and the demand for credit by borrowers' increases.

Transfer of Resources. Since land cannot be alienated from the descent group, some have argued that traditional systems inhibit the transfer of land to more productive uses. In traditional tenure systems, where control over access to land resources is vested in the hands of traditional authorities, the more efficient producers may be constrained in access to land. As progressive or innovative farmers are unable to expand their operations, the marginal product of land for existing land holders may be less than the marginal product for the innovators. Simply represented, the marginal product of land for the current holder (H_c) is less than for an alternative user (H_a):

$$(7) \quad \frac{\partial Q}{\partial A|H_c} < \frac{\partial Q}{\partial A|H_a}$$

The difference in marginal product of land may be due to different levels of capital investment, or to differences in managerial ability. Portfolio theory suggests that returns to all assets in the economy are reduced to the extent that investors cannot adjust their portfolio composition, including land resources.

Many of the above results are intuitively plausible, and decision-makers may mistakenly conclude that they provide clear guidance for land policy.

This is not always the case. First, the theory may ignore both equity and distributional efficiencies inherent within traditional tenure arrangements, and the high costs and sometimes (the inefficacy) of government intervention. Second, at least in the African context, models have received very little empirical testing, for either the direction or magnitude of the effects of tenure individualization. Third, the models themselves are fairly simplistic and fail to take account of the market imperfections that are pervasive in Africa.

This research seeks to gain a deeper understanding of the causality between registered title and production, investment, land transfers, and distributional impacts resulting from registration and related processes. Two models are presented in the remainder of this paper. The first model uses the conventional "probability of eviction" to study labor and variable input allocations between titled and untitled land. The second model, redefines tenure security in terms of farmer perceptions and parcel attributes to examine impacts of land title through title security on income and investment.

A Simple Household Economy Model of Land Titling Impacts

Assume that the household is the unit of analysis, and that parcels of land held by members of the household are the unit of primary data collection. Each household consists of multiple parcels of land, each of which may or may not be titled. Assume further that the household head has full authority for all production and investment decisions relating to all parcels within the household. By aggregating area of parcels according to title status, two land types can be defined: titled land (A^r) and untitled land (A^u). Total farm size ($A^r + A^u$) is assumed fixed and non-transferable, to remove the possibility of land sales as a choice variable.

The household consists of CE consumer equivalents and AW adult worker equivalents, capable of working N total hours per crop season. Labor may be allocated to farm activities on titled land (N^F), untitled land (N^U), or to off-farm employment (N^O). Suppose that the household has a two period planning horizon. Decisions regarding resource allocation are made in period one, based on expected prices (P), and on certain knowledge of the farm's technical production function on titled land ($Q^F(\cdot)$) and untitled land ($Q^U(\cdot)$) in period two. Since the time horizon covers only one crop season, fixed capital (K^F and K^U) is included only as a technology shifter in the production function, rather than as a choice variable, to control for capital differences.

Let (ϕ) initially represent the probability of losing untitled land and all the returns from labor and capital investments made in the land before harvest. Land title is assumed to offer full tenure security so that the probability of losing titled land is negligible. Assuming maximization of net household income as producer utility, the household head's optimization problem can be written as:

$$(8) \quad \max E(\Pi) = P(Q^F + (1-\phi)Q^U) + \bar{w} N^O - \omega(Z^F + Z^U) - rD$$

subject to

$$(9) \quad Q^F = Q^F(A^F, N^F, Z^F, TQ^F, K^F, \text{MGMT})$$

$$(10) \quad Q^U = Q^U(A^U, N^U, Z^U, TQ^U, K^U, \text{MGMT})$$

$$(11) \quad A^F + A^U = A$$

$$(12) \quad N^F + N^U + N^O = N$$

$$(13) \quad \omega(Z^F + Z^U) \leq F + D$$

The head of household maximizes net household income in equation (8) subject to the farm's production function on titled land (9), the production function on untitled land (10), land constraint (11), household labor supply constraint (12), and financial resources constraint (13). Expected net household income is defined as expected farm revenue ($P(Q^R + (1-\phi)Q^U)$) from farming plus off-farm earnings ($\bar{w}N^O$), less outlays for short term input ($w(Z^R + Z^U)$) and interest.¹ The household head's expected returns from untitled land equals his/her expected probability $(1 - \phi)$ of harvesting output from the land times output, determined by the function $Q^U(\cdot)$. Functions $Q^R(\cdot)$ and $Q^U(\cdot)$ define the households technological possibilities between inputs and output on titled and untitled land, respectively.

Output is a function of family labor devoted to farming (N^R and N^U), area of land (A^R or A^U), variable cash inputs (Z^R and Z^U), an index of soil quality (TQ^R and TQ^U), capital (K^R and K^U), and managerial capabilities of the farmer (MGMT), measured by either years of education, experience as a farmer, or the community's subjective ranking of a farmer's managerial skills (Hill, 1972). The soil quality index (TQ) is an aggregate measure of soil fertility, structure, access to water, and topography, based on farmers classifications of soil characteristics distinguishing good soils from poor soils.

Equation (11) is an identity ensuring that any land registered must be taken from the pool of unregistered land, and sum to the farm's fixed land endowment (\bar{A}). Labor may be devoted to either farm or off-farm activities, but equation (12) says that total labor demands (N^F , N^U and N^O) cannot exceed total labor supply (\bar{N}).

The household's financial constraint on the purchase of modern inputs,

represented by equation 13. states that expenditures on variable cash inputs ($\omega(Z^r + Z^u)$) cannot exceed financial holdings, consisting of cash reserves (F) and credit (D). The supply of credit is exogeneous, but determined in reality by interest rate (r) and the household head's endowment of capital assets for collateral.

From profit maximization and setting first order derivatives of the Lagrangian to zero, one can obtain the following relations:

$$(14) \quad P(1-\phi) \frac{\partial Q^u}{\partial N} = \frac{P \partial Q^r}{\partial N} = \bar{w}$$

$$(15) \quad P(1-\phi) \frac{\partial Q^u}{\partial Z} = \frac{P \partial Q^r}{\partial Z} = \omega + \nu$$

Equation (14) equates the expected marginal value product of labor on untitled land and the marginal value product (MVP) of labor on titled land with the off farm wage (\bar{w}). Assuming diminishing returns to the production function ($\partial Q/\partial N < 0$; $\partial Q/\partial Z < 0$), labor use on untitled plots is inversely related to eviction. As the probability of losing land (ϕ) increases, less labor would be allocated to untitled land, and more to off-farm employment which by assumption offers certain wages over a perfectly elastic household labor supply schedule up to \bar{N} . Conversely, decreasing the probability of losing land increases labor allocated to untitled land and away from off-farm employment. Labor on titled land remains unchanged, as neither the opportunity cost of labor in off-farm agriculture (\bar{w}), or the marginal value product of labor on titled land changes.

The same conclusions can be drawn from relation (15) for variable input utilization. The MVPs for variable inputs are equal to the input price of fertilizer (ω) plus the marginal cost associated with the financial

constraint (ν), which is positive when the constraint is binding. As the probability of losing land increases, variable input use on untitled land would decline, but not disappear due to the curvature of the production function. Conversely, if the probability of losing land were reduced to zero, then no difference in variable input use would be expected between titled and untitled land, unless the supply of credit in equation (13) is linked with land as collateral as in the equation:

$$(16) \quad D = D(r, A^R, C, I); \quad \partial D / \partial A^R > 0$$

where credit supply is a function of interest rate (r), ownership of titled land (A^R), and other collateral (C). In this event, the supply of credit to the landholder would increase with title ownership, unless land legislation or institutional rigidities (I) forbid, or impose high transactions costs on land mortgages or transfers that impede banks from foreclosing on land in the case of loan default.

There are two shortcomings with this model from both an empirical and theoretical perspective:

1. Title ownership is not synonymous with tenure security. The landholder's perception of title insecurity may decline with title ownership, but not disappear entirely. Conversely, absence of title does not automatically confer insecurity, or necessarily result in a higher (ϕ) for untitled land.
2. The probability of losing untitled land (ϕ) at some time in the future, is unobservable. Proxy variables such as the incidence of past land disputes or past evictions, that have been used in some studies (Feder et al., 1987) are infrequent in occurrence, and ignore the tenure insecurity imposed on neighbors or households affected by disputes in the community. They also ignore current economic forces, including rising population pressures and economic development, that affect current perceptions of tenure security.

Title Versus Tenure Security

The distinction between "ownership security" and "land title ownership" is critical to the analysis of title and investment. Tenure insecurity, narrowly defined, is the landholder's perception of the probability of losing land within some time period. It can also be defined more broadly as the landholder's perception of the likelihood of losing a specific right in land such as the right to cultivate, graze, fallow, transfer, or mortgage. Formal titling systems cannot be viewed as homogeneous instruments conferring equivalent rules and security of ownership rights from one country to the next. Title may permit or restrict transactions in land, or may grant or prohibit specific use rights. The security associated with each of these rights may vary.

High levels of tenure security can exist without legal possession of title. For example, customary allocation of land by traditional authorities (e.g., chiefs or elders) in parts of Africa provides individuals with tenure security to such rights as grazing and cultivation, without any legal title definition, registration or government enforcement. Conversely, high levels of tenure insecurity may exist even with legal title. If the land code is ambiguous in its definition of rights, or the government lacks the will or the means to enforce those rights, landholders may not perceive greater security with title. Legal title to land increases security only to the extent that the government's definition and enforcement of property rights provides a more secure set of ownership rights and enforcement than that provided by existing tenure systems.

In the Somalia case, government legislation has promoted leaseholds for state farms, banana plantations, cooperative farms, and resettlement of landless farmers. Government policies have increased ownership insecurity

in traditional tenure systems, but even titled land holders are less than perfectly secure since the government retains the right to repossess and reallocate leasehold land. At the same time, tight government budgets have forced individual landholders to share a high portion of the registration costs. Unofficial gratuities sharply increase the cost of title to landholders. Land holders without leasehold title do not have legal rights to the land according to the 1975 Land Law. Hence, landless farmers or others are able to claim unregistered land, from farmers with long term use rights, using the leasehold system to gain access to land.

A Household Economy Model Measuring Tenure Security Impacts and Title Selection

As with the previous model, assume that the household is the unit of analysis, and that parcels of land held by members of the household are the unit of primary data collection. Each household consists of multiple parcels of land, each of which may or may not be titled. Let Q represent output of $q_1 \dots q_n$ commodities aggregated from parcel data. Assume further that the household head has full authority for all production and investment decisions relating to all parcels within the household. Total farm size (A) is assumed fixed and non-transferable, to remove the possibility of land sales as a choice variable.

The household consists of CE consumer equivalents and AW adult worker equivalents, capable of working N total hours per crop season. Labor may be allocated to farm activities (N^f), or to off-farm employment (N^o) at the fixed wage (\bar{w}). Output (Q) is a function of labor worked on farm activities (N^f), area cultivated (A), soil quality characteristics (TQ), management skills of the household head ($MGMT$), and capital.

Three types of capital investment are possible: (a) Variable Cash Inputs

(e.g., fertilizer, pesticides, herbicides, hired labor, hired mechanized services), denoted by matrix Z at cost ω , whose benefits have a low probability of being lost as a result of land being taken, because of the seasonal time horizon; (b) Mobile capital (mechanized equipment, tools, draft animals, or machinery), denoted by matrix M. While these inputs are long term investments, they are not tied to land and can be sold or shifted to other enterprises in the event that the parcel is lost. These inputs are eliminated from the model because of their low usage in the survey area; and (c) Semi-permanent land improvements and structures (ground levelling, irrigation canals, wells, fencing, bunding, or buildings), denoted by capital K. These inputs enhance the physical qualities of the parcel, and involve high risk of being lost in the event that land is taken.

Let us redefine (ϕ) as the household head's perceived tenure insecurity. Assuming maximization of net household income as the household head's utility the optimization problem can be written as:

$$(9) \quad \Pi = (PQ + \omega N^0 - \omega Z - kK - rD)$$

$$(10) \quad Q = Q(N^f, Z, TQ, MGMT, K)$$

$$(11) \quad N^f = N^f(P, \bar{w}, \phi)$$

$$(12) \quad N^0 = N - N^f$$

$$(13) \quad Z = Z(P, \omega, D, \phi)$$

$$(14) \quad K = K(P, k, D, \phi)$$

$$(15) \quad D = D(r, A^r, WLTH)$$

$$(16) \quad \phi = \phi(\frac{A^r}{A}, TI, T/AW, HC, PI, TQ, MA, Q/CE)$$

Two notable differences distinguish this model from the earlier version: (a) tenure insecurity is dependent on farmer and parcel attributes; and, (b) the farm's technological possibilities are contained in one production function, $Q(\cdot)$, without distinguishing between title status. Normally (ϕ) would be defined for each parcel held within the household and the household would allocate inputs between titled and untitled parcels as in the previous model. However, specifying production functions and input demands for two types of land greatly complicates the econometric problem. Moreover, the empirical demands on trying to obtain parcel level measurements of tenure insecurity, as opposed to one household index, is exceedingly more difficult to obtain, particularly for households with many parcels.

This problem does not severely damage the analysis as long as the variance in parcel level characteristics within the household remains small, and the household has either all titled or all untitled parcels. If this condition holds, all the effects of tenure insecurity can be picked up from the cross-sectional analysis of households. However, it is important to recognize that by aggregating from the parcel to the farm level, there is risk in losing variance in parcel characteristics that influence title selection. Final decisions over whether to disaggregate the production function awaits the field data.

Tenure insecurity (ϕ) is an index derived from three sets of factors (a) the household's history of past land disputes and evictions; (b) the household head's perceptions of the incidence and importance of current land grabbing and disputes in the community; and (c) the household head's perceptions of the likelihood that farmers in the community will lose land in the future. Questions referring to the farmers past history of disputes are directed to the farmer himself. Questions referring to the incidence and

importance of land grabbing in the area, both presently and in the future, are asked in the second person. Ideally, researchers would like to ask the farmer for his/her estimate of ϕ directly. However, in a practical setting this was impossible because of farmers' suspicions that interviewers might be trying to steal their land. Hence, questions were asked in the second person with the intent that farmers' responses would reflect their own self perceptions. The index might be derived via principal components or discriminant analysis, using cross-sectional attitudinal data.

The index of tenure insecurity (ϕ) is theoretically a function of eight sets of factors: (a) Title: the proportion of land area that is titled; (b) Population density, measured either by total land area to adult equivalent workers (T/AW), or total land area to adult consumer equivalents (T/CE); (c) Household characteristics (HC), including the land holder's age, sex, years lived in the area, years parcel has been held by the family; years of education; (d) Political influence (PI): including official position held, or the individual's or household's standing in the social or political hierarchy of the village or local government; (e) Wealth (WLTH): total current and fixed assets including value of farm land, livestock, and capital investments off-farm; (f) Soil Quality: physical characteristics of the parcel (TQ) or some measure of productivity; (g) Market Access (MKT), measured by access to marketing centers in a regional study, or to roads, or walking distance to fields in a village study; and (h) Food Security: reliance on food production for subsistence requirements, measured by Q/CE. Theoretically, tenure insecurity (ϕ) should increase with population density, soil quality or productivity, market access, and food security requirements, and decline with land holder's age or years farming in the area, political influence, wealth and possession of title.

When studying the impacts of title at the farm level, the proportion of farm area that is titled (A^f/A) is the relevant dependent variable in equation (16). The household head's response to such questions as the probability of losing land, will be answered with respect to the significance of titled land to farm size, not area titled. Conversely, if observations on tenure insecurity (ϕ) could be obtained at the parcel level, then size of parcel, either titled or untitled, would be appropriate.

By substituting demand equations for labor (11), variable inputs (13), and capital (14) into the farm's production function (10), one can obtain a relationship between title and agricultural productivity. Let (RT) equal the proportion of farm area that is titled (A^f/A). Taking the partial differential of output with respect to title yields the expression:

$$(17) \quad \frac{\partial \Pi}{\partial RT} = \frac{[\frac{\partial Q}{\partial N^f} \frac{\partial N^f}{\partial \phi}]}{[\frac{\partial N^f}{\partial \phi} \frac{\partial \phi}{\partial RT}]} + \frac{\partial Q}{\partial Z} \frac{\partial Z}{\partial \phi} + \frac{\partial Q}{\partial Z} \frac{\partial Z}{\partial \phi} \frac{\partial \phi}{\partial RT}$$

$$+ \frac{[\frac{\partial Q}{\partial Z} \frac{\partial Z}{\partial D}]}{[\frac{\partial Z}{\partial D} \frac{\partial D}{\partial RT}]} + \frac{\partial Q}{\partial K} \frac{\partial K}{\partial D} \frac{\partial D}{\partial RT}$$

Title does not alter the physical characteristics of the parcel or affect output directly. Rather, it can indirectly affect production on the parcel in two ways. First, as a result of increased tenure security (assuming $\partial \phi / \partial RT < 0$), the household head may have higher expectations of economic returns and may increase the allocations of labor (N^f), variable inputs (Z) and fixed capital (K) on the farm. Second, title may increase the land holder's access to credit (e.g., $\partial D / \partial RT > 0$) by increasing land's value as collateral.

However, if title has no effect on tenure insecurity (e.g., $\partial \phi / \partial RT = 0$), due perhaps to the vagaries of land legislation or lack of enforcement,

then the first effect is eliminated. If title has no effect on credit (e.g., $\partial D/\partial RT = 0$), due perhaps to restrictions on mortgaging land in land statutes, then the second effect would be eliminated as well. As a result, title would have no effect on agricultural output.

Even if both the first and second effects are positive, then there is still the issue whether farmers can take advantage of the increased security, so that expressions $\partial Q/\partial N^f$, $\partial Q/\partial Z$, and $\partial Q/\partial K$ are positive. Market imperfections may restrict the supply of variable inputs (Z) and fixed capital (K) to farmers, or lack of technology may limit the magnitude of the production response.

In many LDCs, the supply of institutional credit is severely constrained by imperfections in capital markets. Foreign exchange shortages and government budget deficits may constrain the supply of inputs and extension services by government monopolies. There may be limited opportunities for land investment, either because appropriate technologies do not exist, are not widely disseminated, or are not considered to be economically profitable by farmers. Even without credit or capital inputs, increased title security can affect productivity and land investment through the reallocation of labor from non-farm to farm activities. In the general case where credit, capital inputs and capital-intensive technologies are limited, labor adjustments ($\partial N^f/\partial \phi$) may be the only possible response to increased tenure security.

In the general case, there are six conditions that must be satisfied in order for title to increase land investment and output: (1) the existing tenure system must provide less security than formal title; (2) there are profitable technological options for land investment; (3) farmers have good information about these technologies; (4) untitled farmers have insufficient

cash reserves or sources of credit for financing investments; (5) a functioning credit market exists; and (6) the supply of capital inputs are not constrained by market imperfections.

The question of how to empirically estimate the model, represented by equations (9) to (16) depends on the empirical data. There are two directions that might be taken. First, the model might be estimated econometrically using some simultaneous equations approach if tenure insecurity (ϕ) is endogeneous, or OLS estimation and separate regressions if (ϕ) is exogeneous. However, if lack of technology or market imperfections are limiting the supply of variable inputs or capital, then statistical analyses will show no relationship between title and output, not because there is no demand effect, but because there is no supply. The second technique, mathematical programming, is more amenable to taking market imperfections into account. But additional information sources will have to be tapped to obtain for example experiment station data on the technical yield response curve to inputs. The analysis could estimate title's impact in the case that all market imperfections are removed, but the technique requires a more profound understanding of the structure of the household economy.

Research Design

Somalia Agricultural Land Law and Land Title

The Agricultural Land Law of 1975 and subsequent decrees are the statutes that govern formal land tenure relations in Somalia today. According to this Law, all land resources are owned by the state. Responsibilities for management of land resources and the authority to allocate land are under the direct jurisdiction and control of the Minister of Agriculture. The Minister

may issue concessions (leaseholds) on land for agricultural purposes to cooperative societies, state farms, autonomous agencies, local government bodies and private individuals or companies. Since all land is owned by the state, individuals with registered leaseholds are tenants of the state with certain rights and restrictions.

Land registration is compulsory. Any person who did not register his or her land within 6 months of the law's enactment theoretically lost the right to use the land. All land holders, excluding cooperatives and state farms, must voluntarily apply for a variable term lease that is 50 years in duration, and renewable. An individual or family may obtain only one lease per household. Total land holdings are restricted to ceilings of 30 hectares of irrigated land and 60 hectares of non-irrigated land. Ceilings for banana plantations are raised to 100 hectares, and waived entirely for cooperatives, state farms, private companies and autonomous agencies. Registered leaseholds cannot be bought, sold, leased, rented, or mortgaged, although rights may be transferred if the lessee is incapacitated or dies. The government may repossess land that exceeds size restrictions, is used for non-agricultural purposes, is not used productively, is unnecessarily fragmented, or is not farmed for a successive two year period.

The supply of leasehold titles contains elements of both voluntary and involuntary forms of land registration. Government programs to promote development of state farms, banana plantations, cooperative farms, and resettlement of landless farmers involve the repossession or transfer of unregistered land to these organizations as registered leaseholds. At the same time, the State maintains a system of district and regional land registration offices to service farmers seeking individual title for their parcels.

Research Site

LTC began research in the area in January 1987 as part of a USAID funded project design effort for the Shabelli Water Management Project. The interim results presented here are based on a land tenure profile of the area, and a pilot study of 56 smallholders. The research methodology included a formal questionnaire to elicit responses from a randomly selected sample of small farmers, and key-informant interviews. Detailed findings from this research are reported in Roth et al. (1987).

LTC researchers returned to Somalia in May 1987 to begin a second phase of research in the Shalambood area. While the January research examined a broad range of land and water issues in conjunction with the project design activities of USAID/Mogadishu, the current research is focusing primarily on title security and land registration issues that are of central interest to USAID/Washington. LTC resident researcher (Jon Unruh) is responsible for the in-country administration of the Shabelli portion of the project, and for supervising the field research.

The Shalambood research site (SRS) consists of a rectangular 8,500 hectare area on the lower Shabelli river at the heart of Somalia's most important food and export crop producing region. The Genale dam, constructed by the Italians in 1926, rests at one corner of the scheme. The town of Shalambood, with a population of 22,240, is located on the opposite corner. Enclosed within these boundaries are 63 formerly Italian-owned *aziendas*. Since the departure of the Italians, landholdings have been transferred to small holders, state owned farms, state cooperatives, or large private farms. Irrigation water for the scheme comes from the Genale barrage. Water is distributed by gravity flow through a web of primary, secondary, and tertiary canals. The district/regional land registry office is located in Genale.

Land distribution in the SRS is skewed towards large state, cooperative and private farms. Independent smallholders control 20 percent of land resources, agricultural cooperatives control 14 percent, large group cooperatives make up 14 percent, CRASH program farms (a program for temporarily allocating land to government employees and students from agricultural training colleges) represent 26 percent, state farms control 10 percent, and large private farms (in excess of 30 hectares) make up 16 percent. Large private farms range in size from 30 to 300 hectares, with average land holdings of 96 hectares/farm. Group cooperatives average 240 hectares, and state farms, 218 hectares. Small farmer holdings average 2.2 hectares.

Despite the Land Law's restrictions of one parcel per household, multiple parcel ownership is common. Twenty-five percent of farm respondents hold 2 parcels of land, while 7 percent hold 3 or more parcels. Multiple parcel ownership can be attributed to three factors: 1) land fragmentation has reduced land holdings to below subsistence needs, requiring land acquisition; 2) farmers have 2 or more parcels along several canals, as part of a risk management strategy to ensure access to scarce water supplies; and 3) land inheritance.

Land disputes appear to be on the rise. While only 9 percent of farmers in the sample reported ever having had any form of land dispute, 25 percent of all farmers perceive that land disputes are becoming more common in the SRS. Unregistered land is more often involved in disputes than registered land, and disputes over ownership rights are more preponderant than boundary disputes.

Land disputes normally originate from three sources. One, disputes frequently arise from rental arrangements in which a renter refuses to hand

back unregistered land to the rightful landholder at the end of the rental term. Since idle land is perceived to be unproductive and/or not needed by the landholder, the provision in the Land Law that bans both land transactions and leaving land idle increases the risk of renting-out land. Two, disputes arise as a result of legal provisions declaring that land left unused for 2 years is considered abandoned. A third class of disputes involves official documents issued in Mogadishu that either assign leaseholds directly to individuals, or serve as directives to regional officials to locate unregistered land for someone. Long term land holders are being displaced from their lands by urban land speculators acting individually or as part of a group cooperative. Local small farmer representatives rank land grabbing the most serious problem small farmers face.

Tenure insecurity is a more serious concern on more productive lands, usually those with better access to irrigation water. In a scheme where all lands are reached by irrigation canals, 11 percent of respondents received no irrigations, 46 percent received one irrigation, 35 percent received two or more irrigations, while 9 percent did not cultivate in the 1987 Gu (heavy rains) season. Substantial disparities in yields exist between parcels with good and poor access to irrigation water. Maize yields on land receiving 2 or more irrigations during the 1985 Gu season averaged 13.6 quintals/ha., compared with 7.0 quintals/ha. on land with one irrigation or less.

The largest farms, usually registered, have land closest to the primary canal with the best access to water. Since water is free by Islamic custom, these farms use as much as they wish, operating near or at the top of the yield response function to water. Small land holders with farms on the periphery, with poor access to irrigation water, often express no insecurity because land value is too low. Farmers with the least secure land holdings

tend to be those located in areas with moderate access to water and with the largest potential production response if irrigation capacity is improved.

Despite the appearance of high tenure insecurity, few independent farmers have obtained formal leasehold status. Of farmers in the LTC sample, 29 percent had land registered under an agricultural cooperative. Sixteen percent claimed to have individual title to their primary parcels. Upon closer inspection, fewer than 5 percent of farmers actually held leases. Farmers claimed that land was registered on the basis of paid land tax receipts, or court summaries of land disputes decided in their favor. An additional 7 percent were in the process of registering their land.

Research Design

The research approach involves both formal and informal interviews with a stratified random sample of smallholders residing in Shalambood on the lower Shabelli river. Smallholders refer to those residents living in Shalambood, who cultivate land on the scheme, but who are not primarily engaged in commercial export crop (e.g., bananas) production. There is no restriction on land size imposed on the selection of farmers for the random sample, although farms range between 0 - 20 hectares in size. The sample includes 3 strata of farms: (a) smallholders with official leasehold title; (b) smallholders without official title but having tenure security; (c) smallholders without official title who perceive their tenure to be insecure. Each stratum contains approximately 35 farms. Assignment of unregistered farms for stratum (b) and (c) is determined on the basis of attitudinal questions assessing tenure security in formal questionnaires, and the use of discriminant analysis to calculate a security index.

A multiple purpose, three-round questionnaire is being administered to

each household/compound in each stratum, giving a total sample size of 105 farms (refer to Annex 1). Formal questionnaires are being administered to the household head, and any family member having managerial control over a parcel of land within the compound. Informal interviews are also being held with government officials, local authorities and other key informants knowledgeable about land tenure.

The field research has been underway since August 1987. Round one of the questionnaire, dealing with parcel level attributes and farmers perceptions about tenure security has been completed. Round II of the questionnaire, dealing with input/output characteristics for the 1987 Gu season, title information by parcel, productivity indicators and investment is nearly completed. Round III dealing with production in the 1987 Deyr season, income, and asset accumulation, began in February 1988. Data analysis will take place at the University of Wisconsin, starting around August 1988. Detailed results of the data analysis, and write-up of results are not expected until 1989.

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ANNEX 1

**Questionnaires: Shabelli Land Titling and
Tenure Security Study, Somalia**

Round I Questionnaire
Title Security and Land Registration

We are researchers from the University of Wisconsin in the USA and from the Faculty of Agriculture in Afgoi. We have been asked by USAID to study the system of land registration in the Genale area and land and water allocation land use on the scheme. We would like to see what the situation is like now to help inform USAID of local farming conditions and to help improve land and water policies under the Shalambood Rehabilitation Project. Many countries in Africa do not have land registration systems or even irrigation schemes, but are considering investing in such programs. The information you provide about the Shalambood area can help USAID better assist farmers with land and water problems in these other African settings.

We would like to have your cooperation in helping us with this study. We know that farmers on this scheme have been interviewed many times before. But we want you know that what you tell us is important and may help improve the situation in this area. We also want to stress that the sources of information we collect will be kept strictly confidential.

Inform the respondent that the entire questionnaire is composed of three sections or rounds. Each section will take one and a half to two hours of his or her time to complete. We would like to complete the first section now or at a time that is convenient. Interviewers will return in about two months for the second round, and again about two months later for the third round. It is very important that the respondent remain the same person for all three rounds. Ask the respondent for his or her availability for the duration of the study and willingness to participate in all three rounds. Again reemphasize to the respondent the idea that all sources of information will be kept confidential. If he or she is unwilling to participate, then terminate the interview and thank them for their time.

Interviewer's Name: _____

Date: _____

Region: Shalambood

Farm Id: _____

(A1) Name of Respondent: _____
(should be the principal decision maker
for the homestead's farming activities)

(A2) Village of Residence: _____

(A3) Do you have land given by the CRASH program? Yes No

(A4) Do you have land in an Agricultural Cooperative? Yes No

(A5) Do you have land that is registered with the Government? Yes No

(A6) If A5 is 'Yes', in what year was the parcel registered? _____

(A7) Have you ever asked about registering your land from the Genale land registration office? Yes No

(A8) If A7 is 'Yes', have you ever paid for a survey or drawing of any of your parcels of land? Yes No

(A9) Do you have other documents showing proof of land ownership? Yes No

(A10) Describe the documents: _____

Questions A11 to A19 seek to clarify whether the respondent is the person primarily in charge of land allocation, investment and managerial decisions of the farm.

(A11) Who decides which household members work where on the farm?

- I do
 Someone else does

(A12) If someone else allocates land, ask

Who allocates it? _____

Where does he or she live? _____

(A13) Who decides what to grow on the farm?

- I do
 Someone else does

(A14) If someone else does, who decides? _____

(A15) Who decides how the production from the farm is used?

- I do
 Someone else does

(A16) If someone else does, who decides? _____

(A17) Who generally makes the decisions on long-term investments on the household's land, such as leveling, planting of trees, or construction of buildings?

- I do
 Someone else does

(A18) If someone else does, who decides? _____

(A19) How many years have you been making the major decisions about farming activities on this farm? _____

(A20) Who are the people in your household?

(Includes resident and non-resident family and permanent workers, if any. Be certain to ask if there are members of the family who live here part of the year but are currently living out of the household).

Name	Relation to Respondent	Age (years)	Sex		Education Level		Involved in Ag Fieldwork	
			(M)	(F)	Public (Years)	Koranic (Years)	(Yes)	(No)
1.	Respondent							
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								

etc.

Land History

(A21) How much land did you have when you started being in charge of farming operations for the household? _____

(A22) When you started making the major decisions on your farm did you own any land then that you do not own now (exclude borrowed and rented-in land)?

Yes No

(A23) If A22 is Yes, how many parcels? _____

(A24) For each parcel that you don't have now, how did you dispose of the parcel and why?

Parcel A: How? _____

Why? _____

Parcel B: How? _____

Why? _____

Parcel C: How? _____

Why? _____

Note to Interviewer: Include additional parcels on back of page.

(A25) Between the time you started farming and now did you acquire any land and later dispose of it (exclude borrowed and rented-in land)?

Yes No

(A26) If A25 is Yes, how many parcels _____

(A27) For each parcel how did you acquire it, dispose of it, and why?

Parcel X: How acquired? _____

How disposed of? _____

Why? _____

Parcel Y: How acquired? _____

How disposed of? _____

Why? _____

Parcel Z: How acquired? _____

How disposed of? _____

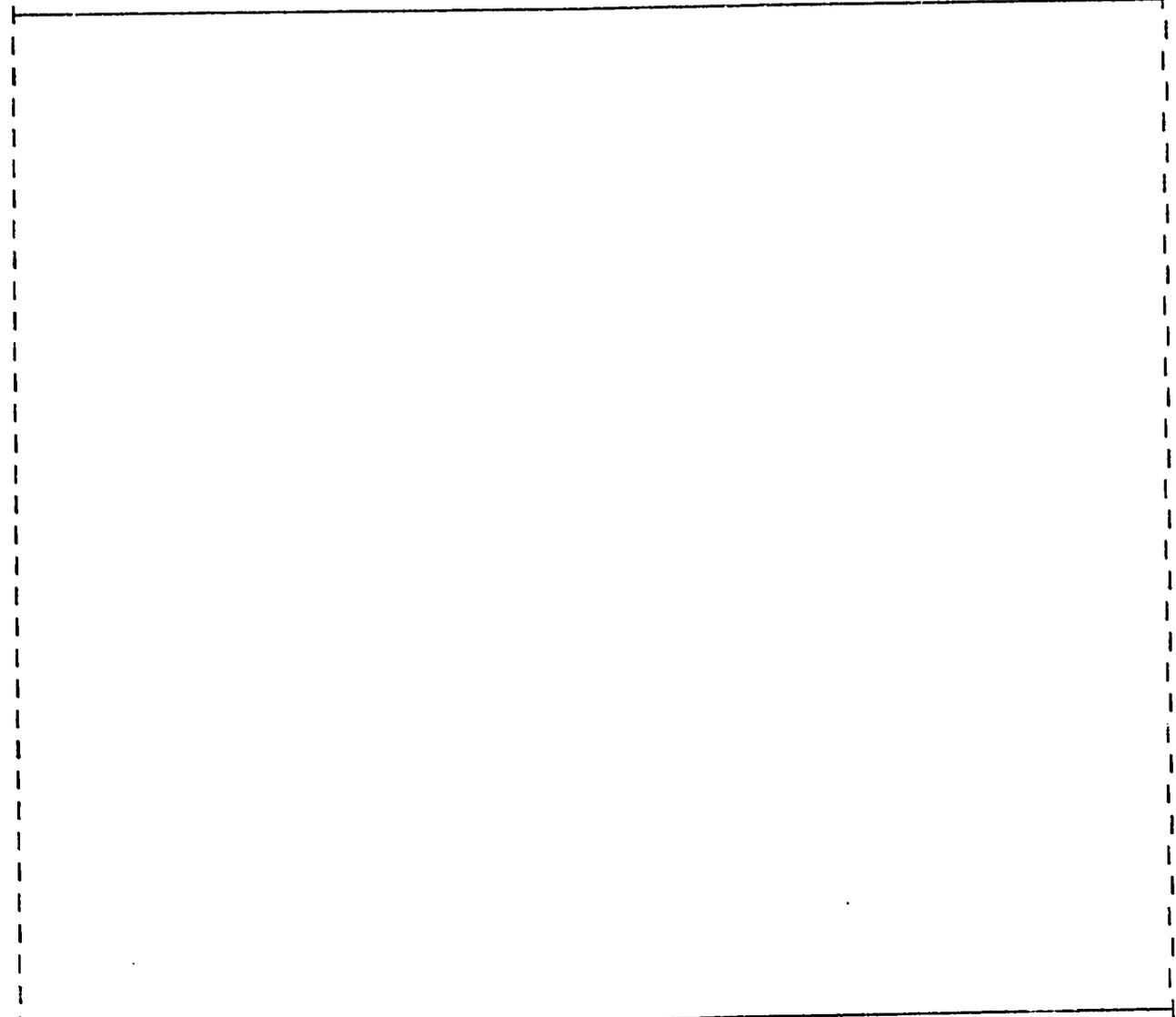
Why? _____

Note to Enumerator: Include additional parcels on back of page.

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(A28) Draw a sketch of the farm:

Draw a rough map of the Azienda(s) where the parcel(s) is located. Split the Azienda(s) into four quarters. Note the location of the parcel(s) in one of the quarters. Write the name of the Azienda where the parcel is located and names of the Azienda(s) bordering the quarter. Include all land that is owned, rented-in, borrowed, lent free, or rented-out. Be sure to include parcels of land held by other members of the household.



	Area (jibals)	Distance from Household (minutes, meters or Kms)	Who has Primary Control Over the Parcel's Use
Parcel I			
Parcel II			
Parcel III			
Parcel IV			
Parcel V			
Parcel VI			
Farm Size:			

Questions A29 to A53 should be answered for each parcel controlled within the household. Insert additional pages if more than 2 parcels are held.

(A29) Parcel Number: _____ (same number as in farm sketch)

(A30) What is the location (name of Azienda) of the parcel? _____

(A31) In what year was the parcel acquired? _____

(A32) How was the parcel acquired (check appropriate response):

Azienda was taken over by Government, then land was given to smallholders

Azienda land was given to laborers by Italian owner or forman

Inherited: From who: _____

(A33) What is the size of this parcel compared to the original parcel (circle)?
Larger
Smaller
Same Size

(A34) If A33 is larger or smaller explain why? _____

Bought (A35) What was the purchase price? _____

(A36) Why did you buy this parcel? _____

Borrowed. Relationship: _____

Rented-in

(A37) If parcel is rented-in from someone, how are you renting it?

pay cash; how much (note if free)? _____

pay in-kind; how much? _____

(estimated cash value of in-kind)? _____

sharecropped; farmers share? _____

temporary possession as collateral for loan

Are there other terms of the lease? _____

(A38) How many times in the past 5 Gu seasons have you rented-in this parcel? _____

(A39) How many times in the past 5 Deyr seasons have you rented-in this parcel? _____

Other ways parcel was acquired: _____

(A40) If the parcel was BOUGHT, why did you not borrow or rent-in land instead?

(A41) If the parcel was RENTED-IN, why did you not borrow or buy land instead?___

(A42) For land that you bought, inherited, or received as a gift, was the land already registered when you acquired it? Yes No

(A43) If A42 is 'Yes', did you reregister the land? Yes No

(A44) If not reregistered, Why? _____

(A45) What best describes current use of the parcel:

fallowed as part of a crop rotation

rented-out

cultivated

idle; why? _____

other _____

(A46) If parcel is being rented-out to someone, is it rented on a:

cash basis sharecropped given free

given as collateral for a loan

(A47) How much is rent in Cash: _____

(A48) How much in-kind payment did you receive? _____

Estimated cash value of in-kind payment _____

(A49) Your share of produce if sharecropped: _____

(A50) Other terms and conditions of Lease: _____

(A51) How many times in the past 5 Gu seasons have you rented-out this parcel? _____

(A52) How many times in the past 5 Deyr seasons have you rented-out this parcel? _____

(A53) Why do you rent-out this parcel rather than sell it? _____

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Measures of Tenure Security

(A54) Have you or any member of your household ever had a dispute about land ownership or land boundaries? Yes No

(A55) If the answer to A54 is 'Yes', who was involved and what was the dispute about: _____

(A56) If answer to A54 is 'Yes', what parcel was involved (state parcel number from A24, A27 or A28) _____

(A57) Who was involved in resolving the dispute (check any that apply)?

- | | |
|---|--|
| <input type="checkbox"/> resolved ourselves | <input type="checkbox"/> religious leader |
| <input type="checkbox"/> village chief | <input type="checkbox"/> district court |
| <input type="checkbox"/> village committee | <input type="checkbox"/> regional court |
| <input type="checkbox"/> Police | <input type="checkbox"/> Ministry of Agriculture |
| <input type="checkbox"/> Witnesses | |
| <input type="checkbox"/> Others: _____ | |

(A58) What was the decision: _____

Explain to the respondent, that the following questions pertain to the general situation of land tenure in the Shalambod area and not to his (her) specific land holdings

(A59) Disputes over land ownership are:

- a lot more serious now than in the past
- more serious now as in the past
- not as serious now as in the past
- not very serious
- not a problem

(A60) Disputes over parcel boundaries are:

- a lot more serious now than in the past
- more serious now than in the past
- not as serious now as in the past
- not very serious
- not a problem

(A61) Are outsiders coming here and taking peoples land:

- a very serious problem
- a serious problem
- not a serious problem
- not a problem

(A62) Are small farmers today losing land:

- a lot more frequently than in the past
- more frequently than in the past
- less frequently than in the past
- seldom lose land

(A63) Does the biggest threat to keeping land come from family, farmers owning adjacent land, or outsiders? _____

(A64) People that have used their land every year will

- definitely not lose it to others
- probably will not lose it to others
- can possibly lose it to others

(A65) People that have lived in the area for a long time will

- definitely not lose it to others
- probably will not lose it to others
- can possibly lose it to others

(A66) If a farmer rents-out his land for only one-year, s/he runs:

- very high risk that someone will try to claim it
- high risk that someone will try to claim it
- some risk that someone will try to claim it
- little or no risk that someone will try to claim it

(A67) If a farmer rents-out his land over a long period of time, s/he runs:

- very high risk that someone will try to claim it
- high risk that someone will try to claim it
- some risk that someone will try to claim it
- little or no risk that someone will try to claim it

If there is risk, how many years are considered risky? _____

(A68) If a farmer has registered his or her land, it

- is not possible that someone else can take it
- may be possible that someone can take it
- very possible that someone can take it

(A69) What is the most serious type of land dispute that farmers face in this area (rank if two or more types of disputes are mentioned)?

(A70) Do these disputes discourage farmers from investing labor and money in their land? Yes No

(A71) How likely is it that some of the farmers that you know will lose land in the next 10 years?

- | | |
|---|---|
| <input type="checkbox"/> Extremely likely | <input type="checkbox"/> Unlikely |
| <input type="checkbox"/> Very likely | <input type="checkbox"/> Very Unlikely |
| <input type="checkbox"/> Likely | <input type="checkbox"/> Extremely Unlikely |

(A72) How worried are farmers in this area about losing some or all of their land?

- Extremely worried
- Very worried
- Somewhat worried
- Not worried at all

(A73) What are the most likely means for gaining access to more land in this area? (Rank if multiple responses):

- | | |
|---|--|
| <input type="checkbox"/> From village chief | <input type="checkbox"/> Rent-in land |
| <input type="checkbox"/> From family or relatives | <input type="checkbox"/> Sharecropping |
| <input type="checkbox"/> Dowry payment | <input type="checkbox"/> Borrow |
| <input type="checkbox"/> Purchase | |
| <input type="checkbox"/> From government (program): _____ | |
| <input type="checkbox"/> Other: _____ | |

(A74) How easy is it to get more land in this area?

- | | |
|------------------------------------|--|
| <input type="checkbox"/> Very Easy | <input type="checkbox"/> Very Difficult |
| <input type="checkbox"/> Easy | <input type="checkbox"/> Almost Impossible |
| <input type="checkbox"/> Difficult | |

Round II Questionnaire
Title Security and Land Registration

Interviewer's Name: _____

Date: _____

Region: Shalambood

Farm Id: _____

(B1) Name of Respondent: _____

(should be the principal decision maker
for the homestead's farming activities)

Ask questions B2 through B91 for each parcel identified in the farm sketch (Question A28) in Round 1 of the Questionnaire. Since the respondent will probably have to show the location of the parcel, it may be most convenient and effective to arrange an on-site interview. The research team will have to visit each parcel to take field measurements and make observations about the parcel's physical characteristics. Depending on the time it takes to do this, interviews concerning other farm parcels may have to be arranged for a later date.

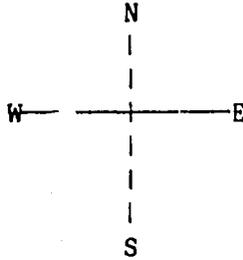
Round II of the questionnaire should be filled out for all parcels that are owned, borrowed or rented-in by the respondent or other household members. Parcels that are given-out or rented-out to someone who is not a member of the household should be excluded. Questions B2 through B92 provide space for only one parcel. Use additional forms if more than one parcel is held.

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(B2) Parcel Number: _____ (should correspond to parcel numbers in Question A28)

(B3) Parcel Sketch.

Draw a sketch of the parcel showing boundaries, parcel measurements, location of canals and other distinguishing landmarks. Draw in boundaries of sub-parcels that are managed by household members other than the respondent.



Side	Bearing	Distance	Side	Bearing	Distance
1.			6.		
2.			7.		
3.			8.		
4.			9.		
5.			10.		
Parcel Area: _____ (hectares)			Measurement Error: _____ (percent)		

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Ask Questions B4 to B10 only if the farmer registered the parcel himself and has received a registration certificate.

(B4) In what year did you receive the land certificate from the government? _____

(B5) How much time passed between the date you first wrote the letter of application to the registry office and the date you received the certificate to your land. _____

(B6) Roughly how much did it cost you to register the parcel: _____

(B7) How much did it cost for the farm sketch? _____

(B8) About how much did you pay for travel and lodging? _____

(B9) About how many trips did you make to the district and national land registration offices to register the parcel:

To Genale: _____ To Mogadishu: _____

(B10) Why did you register this parcel (rank if multiple reasons are given)?

- government encouraged me to register the parcel
- I was afraid of losing some or all the parcel to outsiders
- I was afraid of losing some or all the parcel to people in this area
- I wanted to protect investments I had already made in the land
- I wanted to make investments and wished to secure my investments
- I wanted to obtain credit from banks.

Other: _____

Answer Questions B11 to B12 below if the farmer has not registered his land.

(B11) What are the reasons why you have not registered this parcel?

- I don't know anything about land registration
- I don't understand the registration procedures
- The procedures for registering land are too complicated
- The procedures are TOO COSTLY.
- I don't want the government involved
- Registering the land would upset my family or neighbors (explain): _____

Other: _____

(B12) If response to B11 is TOO COSTLY, how much would it cost? _____

(B13) Does having land registration or would having land registration make you:

(check appropriate response)	A lot more	More	No Difference	Less	A lot Less
more or less secure about your rights to your land					
more or less disposed to rent-out or lend land					
more or less disposed to sell your land					
more or less certain the bank will lend you money					
more or less disposed to make investments in the land					

Physical Characteristics of Parcel

(B14) Is the texture of soils on this parcel mostly:

sand clay
 silt other: _____

(B15) Are the soils on this parcel mostly:

very dark in color light in color
 dark in color very light in color

(B16) Are the soils on this parcel:

very easy to till difficult to till
 easy to till very difficult to till

(B17) What is your opinion of the fertility of these soils?

very fertile infertile
 fertile very infertile

(B18) How would you describe the topography of this parcel:

all of the parcel is flat a little of the parcel is flat
 most of the parcel is flat none of the parcel is flat

45

(B19) Do any of the following factors affect this parcel's productivity?

Yes	No		If yes, how often is it a problem?				If yes, how serious is the problem?			
			1	2	3	4	1	2	3	4
_____	_____	Waterlogging/swampy	1	2	3	4	1	2	3	4
_____	_____	Flooding	1	2	3	4	1	2	3	4
_____	_____	Soil Compaction	1	2	3	4	1	2	3	4
_____	_____	Salinity	1	2	3	4	1	2	3	4
_____	_____	Drainage	1	2	3	4	1	2	3	4
_____	_____	Lack of Water	1	2	3	4	1	2	3	4
_____	_____	Other: _____	1	2	3	4	1	2	3	4
			1 = not very often				1 = not very serious			
			2 = often				2 = somewhat serious			
			3 = very often				3 = very serious			
			4 = always				4 = extremely serious			

(B20) How would you describe the quality of soils on this parcel compared with other land in the Shalambood area:

- much better in quality worse in quality
 better in quality much worse in quality
 about the same

Access to Water

(B21) Does the parcel have access to a reservoir of water that can be used when canals are dry? Yes No

(B22) If B21 is 'Yes', describe type of reservoir? _____

(B23) Does the parcel have access to water pumped from a well? Yes No

(B24) Is there any type of irrigation equipment on the parcel (i.e. pumps, pipes, sprinklers, etc.)? Yes No

(B25) If answer to B24 is 'Yes', what type? _____

(B26) Did you install the equipment or was it here when you acquired the parcel (circle)? Installed
Already here

4/6

- (B27) Did you construct yourself or help construct the canal that brings water to your farm or was it here when you acquired the parcel? _____
- (B28) Do you know the canals from this parcel back to the secondary canal? Yes No
- (B29) If B28 is Yes, is there ever leakage from those canals? Yes No
- (B30) If B29 is Yes, at times when water flows through the canal does the canal leak:
- all the time
 frequently
 occasionally
- (B31) If B29 is Yes, is the leakage: very severe
 severe
 not severe
- (B32) How does the damage occur? _____
- (B33) How many times do you and members of your household work on maintaining canals delivering water to this parcel as part of the Azienda association:
- Times during the Gu season: _____ How many days do Gu _____
 Times during the Deyr season: _____ you work each time: Deyr _____
- (B34) How much do you pay per year for maintaining irrigation canals?
- In cash? _____
- In kind? _____ Estimated cash value? _____
- (B35) How effective is your Azienda association at maintenance and upkeep of the tertiary canal
- it is very effective not very effective
 effective ineffective
- (B36) Could your waters users association do a lot better job at maintenance and upkeep of the tertiary canal? Yes No
- (B37) How would you evaluate the distribution of water within the Azienda?
- very fair and equitable benefiting a large number of farms
 somewhat fair and equitable
 unfair and inequitable benefiting only a few farms
- (B38) Given the irrigation schedule and amount of water available, could your water users association do a lot better job distributing water? Yes No

(B39) What was the quantity and quality of irrigation on this parcel in the past Gu season?

Irrigation	What was the duration of the	Was the amount you received: <u>1/</u>	Timeliness <u>2/</u>
Rainfed only	*****		*****
1st irrigation			
2nd irrigation			
3rd irrigation			
4th irrigation			

1/ Was the Quantity received: 1 = too much; 2 = more than adequate; 3 = adequate; 4 = inadequate; 5 = very inadequate

2/ According to the time plants needed water, did it arrive: 1 = very early; 2 = early; 3 = about on time; 4 = late; 5 = very late

(B40) Were the number of irrigations in the past Gu season more than usual, usual, or less than usual? _____

(B41) For the Gu season, how many times do you normally irrigate this parcel during a:

good rainfall year? _____

average rainfall year? _____

poor rainfall year? _____

Skip questions B42 through B43 if they have already been asked for another parcel belonging to this respondent.

(B42) How many years out of ten does a: good rainfall occur? _____

normal rainfall occur? _____

poor rainfall occur? _____

(B43) For the crops that you grow how many irrigations are normally needed for optimal crop production under the various rainfall conditions:

	Maize	Sesame	Vegetables
With good <u>Gu</u> season rainfall			
With average <u>Gu</u> season rainfall			
With poor <u>Gu</u> season rainfall			

Investments in Land

(B44) What long term investments could you make in this parcel that would improve its productivity?

Type of Investment	What are the reasons why you have not made this investment?
1.	
2.	
3.	

(B45) How many times in the past 5 years has manure or mulch been applied to this parcel? _____

(B46) Has manure or mulch been applied to the parcel this year? Yes No

(B47) If B46 is 'Yes', how much was applied? _____

(B48) In what year was the parcel last fallowed (note, the year in which the land was last taken out of fallow) _____

(B49) If the respondent cannot remember the exact year, was it:

- within the past 5 years
- within the past 5 to 10 years
- within the past 10 to 15 years
- within the past 15 to 20 years
- more than 20 years ago

(B50) How long was the parcel fallowed? _____

(B51) On this parcel, has there been any investment in the following?

	Levelled by hand	Levelled by machine	Wells dug	Lime	Fencing	Drainage canal	Bunding
Yes							
No							

For each YES response to question B51, enter the following information for each type of investment made. Use additional pages for three or more investments.

(B52) Describe the type of investment? _____

(B53) Did you make the investment or was it in place when you acquired the parcel (circle)?
In place
Made it myself

(B54) If the investment was made by the respondent, ask when the investment was made? _____

(B55) How much did it cost in cash? _____

(B56) How much did it cost in-kind (estimated cash value)? _____

(B57) How much time did you spend constructing it? _____

(B58) How much time do you spend each year maintaining it? _____

(B59) How much does it cost each year to maintain it? _____

(B60) Describe the type of investment? _____

(B61) Did you make the investment or was it in place when you acquired the parcel (circle)?
In place
Made it myself

(B62) If the investment was made by the respondent, ask when the investment was made? _____

(B63) How much did it cost in cash? _____

(B64) How much did it cost in-kind (estimated cash value)? _____

(B65) How much time did you spend constructing it? _____

(B66) How much time do you spend each year maintaining it? _____

(B67) How much does it cost each year to maintain it? _____

(B68) Are there fruit trees (i.e. bananas, citrus, mango or palm) or other trees with economic value on this parcel Yes No

(If answer to B68 is 'No', go to B69)

Plant Name and Number	Area planted in trees	Did he plant them?	Average Age of trees	How much did you harvest last season?
1.				
2.				
3.				

(B69) Do you plan to plant fruit trees or any other perennial crops next year or in the foreseeable future? Yes No

Explain (how many, what kind, area)? _____

(B70) Are there any buildings or structures on the land: Yes No

(If answer to B70 is 'No', go to B71)

Type and number of buildings or structures	When was Structure Built 1/	Did you build the unit	Remaining Useful life	Purchase Price or Value when Constructed
1.				
2.				

1/ If not built, how old is it? _____

(B71) Do you plan to construct any buildings on the parcel next year or in the foreseeable future? Yes No

Explain (how many, what kind)? _____

(B72) Have there been any improvements made to the land that have not been mentioned above (include date and measures of improvement): _____

(B73) If you felt more secure about your rights in the land would you invest more than what you are already doing? Yes No

Comments, if any: _____

Input/Output

Ask questions B74 to B89 for each field (area of crop cultivated, fallowed areas, idle land) held by the household. Parcels of land given-out or rented-out to someone who is not a member of the household should be excluded. Cropping activity refers to the 1987 Gu season. Space is provided for 2 fields. Use additional forms if the parcel contains 3 or more fields.

	Field 1	Field 2
B74. Which <u>member(s)</u> of the household are primarily in charge of managing activities on the field?		
B75. What <u>crop</u> is cultivated (for intercrops, state the main crop followed by secondary crops in order of importance)?		
B76. Preceding crops: 1 year ago 2 years ago		
B77. What is the <u>estimated size</u> of the field? (skip if only one field in the parcel)?		
B78. What was the <u>production</u> of the main crop on this parcel? What was the production of the main secondary crop?		
<u>B79-B83 REFER JUST TO THE MAIN CROP</u>		
B79. What production would you expect on this field in a: Good <u>Gu</u> season Average <u>Gu</u> season Poor <u>Gu</u> season		
B80. Planting date: month (1 -12) week (1 - 4)		
B81. How many <u>suus</u> did you plant?		
B82. Did you get good germination?	Yes No	Yes No
If no, did you replant?	Yes No	Yes No

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Continued: Input/Output Information on a Field basis within the parcel.

	Field 1	Field 2
B83. Crop Variety: 0 = traditional 1 = new seeds		
B84. Quantity of Chemical Fertilizer Type and Amount Paid:		
B85. Quantity of Pesticides: Type and Amount Paid:		
B86. Quantity of Herbicides: Type and Amount Paid:		
B87. How many times weeded		
B88. Mechanized services (note type of operations, hours performed and cost		
B89. How many days were spent on:		
Land Preparation:	family labor	
	hired labor	
	total wages pd.	
Planting:	family labor	
	hired labor	
	total wages pd.	
First weeding:	family labor	
	hired labor	
	total wages pd.	
Second weeding:	family labor	
	hired labor	
	total wages pd.	
Harvest:	family labor	
	hired labor	
	total wages pd.	

(B90) Is there any other factor not mentioned that has influenced

yields? _____

Value of Land

(B91) What would be the price of this parcel today based on prices that other farmers in this area have received for parcels of land with comparable characteristics? _____

If respondent is unable to state price, ask in terms of the following ranges (expand ranges if necessary):

<input type="checkbox"/>	< 5000	<input type="checkbox"/>	35000 - 39999	<input type="checkbox"/>	65000 - 69999
<input type="checkbox"/>	5000 - 9999	<input type="checkbox"/>	40000 - 44999	<input type="checkbox"/>	70000 - 74999
<input type="checkbox"/>	10000 - 14999	<input type="checkbox"/>	45000 - 49999	<input type="checkbox"/>	75000 - 79999
<input type="checkbox"/>	15000 - 19999	<input type="checkbox"/>	50000 - 54999	<input type="checkbox"/>	80000 - 84999
<input type="checkbox"/>	20000 - 24999	<input type="checkbox"/>	55000 - 59999	<input type="checkbox"/>	85000 - 89999
<input type="checkbox"/>	25000 - 29999	<input type="checkbox"/>	60000 - 64999	<input type="checkbox"/>	90000 - 94999
<input type="checkbox"/>	30000 - 34999				

Fill in range if greater than 95000: _____

Round III Questionnaire
Title Security and Land Registration

Interviewer's Name: _____ Date: _____

Region: Shalamhood Farm Id: _____

(C1) Name of Respondent: _____
(should be the principal decision maker
for the homestead's farming activities)

(C2) Have you always lived in the village where you are now
living? Yes No

(C3) If No, when did you come to this area? _____

(C4) If No, what village and district did you come from? _____

(C5) Have you always been a farmer? Yes No

(C6) If No, what was your occupation before farming? _____

(C7) What official positions are you holding now or have previously held
(state years held and name of position)

() Within the Community: _____

() Government: _____

() Religious (e.g., sheik or imam): _____

() Associations/Committees: _____

() Other: _____

() None

(C8) Do you have a close family member that holds an important
official position? Yes No

(C9) If Yes, state the nature of the position. _____

(C10) Do you ever seek advice on improving your farming methods? Yes No

(C11) If Yes, do you seek advice: () frequently () occasionally
() rarely

(C12) When you want advice on improving your farming methods who do you normally go to (Rank in order of importance):

- () family () agricultural extension agents
 () relatives () large farms
 () friends and neighbors () farm input suppliers
 () other: _____

(C13) How easy or difficult is it to obtain the following agricultural inputs in this district, given that you have the money to do so?

	No Problem	A little Difficult	Difficult	Very Difficult	Impossible
Fertilizers					
Pesticides					
New seed varieties					
Improved hand tools (incl. axes, shovels, hoes, etc)					
Wheel barrows					
Equipment (incl. carts, pumps, irrigation equip)					

Comments: _____

(C14) Have you sought the advice of an agricultural extension agent anytime since the beginning of the last Gu season? Yes No

(C15) If Yes, for what specific problem did you ask his advice?: _____

(C16) What solution did he propose? _____

(C17) Did you find his recommendation to be feasible? Yes No

If No, why not? _____

(C18) Did you find his recommendation to be profitable? Yes No

If No, why not? _____

Jo

Ask Questions C26 to C30 in reference to the time when the respondent first started making the major decisions for his/her farm (refer to A19)

(C26) At the time you FIRST TOOK primary responsibility for farming operations for the household, did you have any of the following equipment?

	Number	Value in S.Sh.
<u>Yes</u> <u>No</u>		
() () Tractor and Equipment: _____		
() () Farm Tools (hoes, machetes, yambo, axe)	*****	
() () Diesel Pump		
() () Donkey and cart		

(C27) Did you have any camels, cattle, donkeys, sheep or goats?

<u>Yes</u> <u>No</u>	<u>Number of Males</u>	<u>Number of Females</u>
() () Camels	_____	_____
() () Cattle	_____	_____
() () Sheep and Goats	_____	_____
() () Donkeys	_____	_____

(C28) Did you own a home and/or rental properties? Yes No

If Yes, describe: _____

What was the approximate value of the buildings at the time? _____

(C29) Did you have full or part share in the ownership of any stores, shops, or businesses? Yes No

If Yes, describe the type and number: _____

What was the approximate value of your share of the business at the time? _____

(C30) Did you have any of the following consumer durables?

<u>Yes</u> <u>No</u>	<u>Number</u>	<u>Yes</u> <u>No</u>	<u>Number</u>
() () Bicycle		() () Television	
() () Automobile		() () Generator	
() () Radio		() () Electrical Wires	
() () Well at home		in home	

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Ask Questions C31 to C35 in reference to the present day ownership.

(C31) AT THE PRESENT TIME, do you have any of the following equipment?

		Year Acquired	Number and Value in S.Sh.
<u>Yes</u>	<u>No</u>		
()	()		Tractor and Equipment: _____
()	()		Farm Tools (hoes, machetes, yambo, axe) *****
()	()		Water Pump
()	()		Donkey and cart

(C32) How many camels, cattle, donkeys, sheep or goats do you own?

<u>Yes</u>	<u>No</u>		<u>Number of Males</u>	<u>Number of Females</u>
()	()	Camels	_____	_____
()	()	Cattle	_____	_____
()	()	Sheep and Goats	_____	_____
()	()	Donkeys	_____	_____

(C33) Do you own a home and/or rental properties? Yes No

If Yes, describe: _____

What is the approximate value of the buildings? _____

(C34) Do you currently own any of the following consumer durables?

<u>Yes</u>	<u>No</u>	<u>Number</u>	<u>Yes</u>	<u>No</u>	<u>Number</u>
()	()	Bicycle	()	()	Television
()	()	Automobile	()	()	Generator
()	()	Radio	()	()	Electrical Wires
()	()	Well at home			in home

(C35) Do you currently have full or part share in the ownership of any stores, shops, or businesses? Yes No

If Yes, describe the type and number: _____

What is the approximate value of your share of the business? _____

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(C36) During the past year, did you earn income from any of your stores, shops or businesses? Yes No

If Yes, explain: _____

If Yes, what income did you earn from these businesses in the last year? _____

(C37) How many animals did you or any member of your household buy or sell since the end of the Jilaal, 1987?

	Animals Bought			Animals Sold		
	Number	Sex	Total Cost	Number	Sex	Total Sales
Camels						
Cattle						
Sheep and Goats						
Donkeys						

(C38) How many animals did you slaughter for home consumption since the end of the last Jilaal, 1987? _____

(C39) Did you or any members of your household receive money from the sale of livestock products (milk, meat, hides, ghee)? Yes No

If Yes, Explain nature of sales, remuneration and frequency? _____

(C40) Do you get any money from family or nonfamily members living away from the household? Yes No

If Yes, from whom, where, amount and frequency of money received: _____

(C41) Did you or any member of your family earn a salary, wages or any other money from activities other than from your farm, since the beginning of the 1987 Gu? Yes No

If Yes, ask the respondent the following questions for all adults in the family who earned income (Exclude earnings from children).

Family Member	Brief Description of Work	Total Time Worked (No. Days, Weeks)	Total Earnings
1.			
2.			
3.			
4.			
5.			
6.			

Credit

(C42) How much debt did you have outstanding from all sources at the end of the last Jilaal?

From banks or cooperatives? _____

From moneylenders, traders, or neighbors _____

From family or friends _____

(C43) Did you take out any new loans between the end of the last Jilaal and the present? Yes No

(C44) If C43 is Yes, ask the following questions for the largest loan?

Loan Number: I Loan Type: () cash () in kind

How much did you borrow? _____

Did you borrow from a bank, cooperative, moneylender, trader, neighbor, family or a friend? _____

What did you have to use as collateral? _____

What was the duration of the loan (months), and what did you have to pay back? _____

For what use did you borrow the money? _____

(C45) If C43 is Yes, ask the following questions for the next largest loan?

Loan Number: II Loan Type: () cash () in kind

How much did you borrow? _____

Did you borrow from a bank, cooperative, moneylender, trader, neighbor, family or a friend? _____

What did you have to use as collateral? _____

What was the duration of the loan (months), and what did you have to pay back? _____

For what use did you borrow the money? _____

(C46) If the respondent has no loans why did he not borrow money? _____

(C47) For those respondents who previously said they had bought one or more of the existing parcels they own, ask the following questions:

What was the source of funds used to buy the land? _____

If the money was borrowed, what was the collateral and terms of the loan? _____

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(C48) If you could get a loan for SoSh 30,000, what would you do with it?
(Rank if multiple responses)?

- save it as cash
- consumer goods (food, house repairs, radios, automobile)
- buy fertilizers, pesticides, or other farm inputs
- buy additional land
- make land improvements on existing farms
- buy livestock
- buy gold
- other: _____

(C49) If you had surplus money from any of your current farming operations, or other business, what would you do with it at the present time (rank if multiple responses)?

- save it as cash
- consumer goods (food, house repairs, radios, automobiles)
- buy fertilizers, pesticides, or other farm inputs
- buy additional land
- make improvements to existing farms
- buy livestock
- buy gold
- other: _____

(C50) If the Tsetse fly were eradicated from the area, would you increase the number of livestock you own? Yes No

(C51) In a GOOD rainfall year, where would you graze and water your animals in the Gu, Deyr and Jilaal seasons?

	Grazing	Watering
<u>Gu</u>		
<u>Deyr</u>		
<u>Jilaal</u>		

(C52) In a POOR rainfall year, where would you graze and water your animals in the Gu, Deyr and Jilaal seasons?

	Grazing	Watering
<u>Gu</u>		
<u>Deyr</u>		
<u>Jilaal</u>		

(C53) In a poor rainfall year do livestock come into this area earlier than in a good rainfall year? Yes No

If Yes, how many weeks or months earlier? _____

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(C54) In the Gu season, what percentage of the livestock in this area are owned by residents living in this area?

- none to one quarter one half to three quarters
 quarter to one half three quarters to all

(C55) In the Jilaal season, what percentage of the livestock in this area are owned by residents living in this area?

- none to one quarter one half to three quarters
 quarter to one half three quarters to all

(C56) Did you buy fodder or grazing rights to land, any time since the end of the last Jilaal? Yes No

If Yes, how much fodder was bought, for how many animals, and what was the price paid? _____

If Yes, how much land was grazed, how many animals were grazed, for how long, and what was the price paid). _____

(C57) Do you allow free grazing on your parcel during the Jilaal? Yes No

(C58) Did you sell fodder or grazing rights to land, any time since the end of the last Jilaal? Yes No

If Yes, how much fodder was sold and what was the price paid). _____

If Yes, how much land was leased for grazing, for how long, and what the rental price? _____

(C59) If you do not sell or give away fodder or grazing rights, what do you do with the fodder on the land? _____

(C60) Do you have problems with bad grass on your parcel(s)? Yes No

If Yes, What are the names of the grasses? _____
How do you get rid of the bad grasses? _____

Questions C61 to C66 on tenure security, attempt to quantify the degree to which the respondent is or is not worried about losing his/her land or any benefits from land. These questions were originally asked in Round I, with mixed results. Ask them again here, then give your personal assessment of the respondent's perception of his/her security of land tenure in C66.

(C61) Disputes over land ownership are:

- | | |
|--|---|
| <input type="checkbox"/> a lot more serious now than in the past | <input type="checkbox"/> not very serious |
| <input type="checkbox"/> more serious now than in the past | <input type="checkbox"/> not a problem |
| <input type="checkbox"/> not as serious now than in the past | |

(C62) Are small farmers today losing land:

- a lot more frequently than in the past
 more frequently than in the past
 less frequently than in the past
 seldom lose land

(C63) How worried are farmers in this area about losing land?

- | | |
|--|---|
| <input type="checkbox"/> Extremely worried | <input type="checkbox"/> Somewhat worried |
| <input type="checkbox"/> Very worried | <input type="checkbox"/> Not worried at all |

(C64) How likely is it that some of the farmers that you know will lose land in the next 10 years?

- | | |
|---|---|
| <input type="checkbox"/> Extremely likely | <input type="checkbox"/> Unlikely |
| <input type="checkbox"/> Very likely | <input type="checkbox"/> Very Unlikely |
| <input type="checkbox"/> Likely | <input type="checkbox"/> Extremely Unlikely |

(C65) The Ministry of Agriculture is currently planning a land registration campaign for this area to register all small farmers' lands. How worried are you at present about losing any of your land in this area to outsiders?

- | | |
|--|---|
| <input type="checkbox"/> Extremely worried | <input type="checkbox"/> Somewhat worried |
| <input type="checkbox"/> Very worried | <input type="checkbox"/> Not worried at all |

(C66) FOR THE ENUMERATOR ONLY: In your opinion, how secure does the respondent really feel about his/her ability to keep the land they are now farming.

- | | |
|--------------------------------------|--|
| <input type="checkbox"/> Very Secure | <input type="checkbox"/> Insecure |
| <input type="checkbox"/> Secure | <input type="checkbox"/> Very Insecure |

Ask questions C67 through C86 only for each parcel cultivated in the Deyr season. This includes all parcels that are owned, borrowed or rented-in by the respondent or other household members. Parcels that are given-out or rented-out to someone who is not a member of the household should be excluded. Questions C61 through C86 provide space for only one parcel. Use additional forms if more than one parcel is held.

Agricultural Crop Production: 1987 Deyr Season

(C67) What was the quantity and quality of irrigation on this parcel in the past Deyr season?

Irrigation	What was the duration of the	Was the amount you received: <u>1/</u>	Timeliness <u>2/</u>
Rained only	*****		*****
1st irrigation			
2nd irrigation			
3rd irrigation			

1/ Was the Quantity received: 1 = too much; 2 = more than adequate; 3 = adequate; 4 = inadequate; 5 = very inadequate

2/ According to the time plants needed water; did it arrive: 1 = very early; 2 = early; 3 = about on time; 4 = late; 5 = very late

(C68) Were the number of irrigations in the past Deyr season more than usual, usual, or less than usual? _____

(C69) For the Deyr season, how many times do you normally irrigate this parcel during a:

good rainfall year? _____

average rainfall year? _____

poor rainfall year? _____

Skip question C70 if it has already been asked for another parcel.

(C70) How many years out of ten is there: good Deyr rainfall? _____

normal Deyr rainfall? _____

poor Deyr rainfall? _____

Input/Output

Ask questions C71 to C86 for each field (area of crop cultivated, fallowed areas, idle land) held by the household. Parcels of land given-out or rented-out to someone who is not a member of the household should be excluded. Cropping activity refers to the 1987 Deyr season. Space is provided for 2 fields. Use additional forms if the parcel contains 3 or more fields.

	Field 1	Field 2
C71. Which <u>member(s)</u> of the household are primarily in charge of managing activities on the field?		
C72. What <u>crop</u> is cultivated (for intercrops, state the main crop followed by secondary crops in order of importance)?		
C73. Preceding crops: 1 year ago 2 years ago		
C74. What is the <u>estimated size</u> of the field? (skip if only one field in the parcel)?		
C75. What was the <u>production</u> of the main crop on this parcel? What was the production of the main secondary crop?		
<u>C76-C80 REFER JUST TO THE MAIN CROP</u>		
C76. What production would you expect on this field in a: Good <u>Deyr</u> season Average <u>Deyr</u> season Poor <u>Deyr</u> season		
C77. Planting date: month (1 -12) week (1 - 4)		
C78. How many <u>suus</u> did you plant?		
C79. Did you get good germination?	Yes No	Yes No
If no, did you replant?	Yes No	Yes No

Continued: Input/Output Information on a Field basis within the parcel.

	Field 1	Field 2
C80. Crop Variety: 0 = traditional 1 = new seeds		
C81. Quantity of Chemical Fertilizer Type and Amount Paid:		
C82. Quantity of Pesticides: Type and Amount Paid:		
C83. Quantity of Herbicides: Type and Amount Paid:		
C84. How many times weeded		
C85. Mechanized services (note type of operations, hours performed and cost		
C86. How many days were spent on:		
Land Preparation:		
family labor		
hired labor		
total wages pd.		
Planting:		
family labor		
hired labor		
total wages pd.		
First weeding:		
family labor		
hired labor		
total wages pd.		
Second weeding:		
family labor		
hired labor		
total wages pd.		
Harvest:		
family labor		
hired labor		
total wages pd.		

The following questions ask different members of the research team their feelings on the managerial capabilities of the respondent, and grade how cooperative each respondent was in the survey. The intent is two fold: to help analysts weed out questionnaires that are likely to have false or misleading information; and to give analysts a feeling for the respondents qualities as a farm manager.

Enumerators:			
(D1) Would you rate the respondent's managerial skills as a farmer to be:			
Excellent			
Above Average			
Average			
Below Average			
Poor			
(D2) Would you rate the cooperation of the respondent as			
Excellent			
Above Average			
Average			
Below Average			
Poor			
(D3) Would you rate the quality of information given by the respondent in the questionnaires to be:			
Very Reliable			
More or Less Reliable			
Somewhat unreliable			
Very Unreliable			

(D4) If time permits, have Adan Nuur, Head of the Shalambood Small Farmers Association independently rank each respondent's skills as a farm manager compared with other farmers in the community. Ask him to rate whether each respondents managerial skills are:

- Excellent
- Above average
- Average
- Below Average
- Poor