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Land Access and Associated Factors in Densely and Sparsely Populated Areas: Mvomero District, Tanzania

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Abstract

Ensuring secure access to land among rural inhabitants for ending the vicious cycle of poverty and natural resources degradation is a global challenge. Two important measures of secure land access include the ability to acquire tenure rights and benefits gained from the land, yet available studies have given them little attention to date. This study drew data from 267 households in Morogoro region of Tanzania using a questionnaire. In addition, focus group discussions and key informants were employed to explore the means and processes through which farmers in densely and sparsely populated areas—Mgeta division and Mlali division, respectively—derive a living from land. The study employed a cross-sectional research design to collect qualitative and quantitative data, the latter of which was analyzed using SPSS, whereby descriptive and inferential statistics were determined. Results showed that most of the households acquire farmland through inheritance and purchase. Nonetheless, more than one third of the households in both sites were without secure access to land. We found that access to arable land in Mgeta was constrained by soil erosion and repeated fragmentation, compelling farmers to excessively apply fertilizers, to expand farms through seasonal migration, and to trek up to 6 hours to reach their farms. In addition, lack of irrigation water discouraged many from settling in land-abundant areas, since, in Mgeta, water was readily available from nearby catchments. Access to land in Mlali, in contrast, was found to be limited by land grabbing perpetuated by weak tenure security, monetary poverty and non-compliance to land laws. Consequently, land-constrained households cope by borrowing farmland and by trekking up to 12 hours to reach their farmland. Binary logistic regression results showed that while high-income levels and productive assets influenced access to land positively, location had a negative significant influence ($p < 0.05$). In conclusion, lack of formal land titles and irrigation water in land aboundant villages, monetary poverty and soil erosion as well as non compliance to the land law together contributed to limit secure access to land in the study area. Tanzanian government is advised to encourage land-constrained households from land scarce areas to settle in land abundant areas, through investing in irrigation infrastructure. It additionally could speed up formalization of land titles and create awareness on tenure security, also invest in soil fertility, and projects that

can increase household income and asset portfolios. The government may probably enforce compliance to land law.

Key terms; Land access, densely populated, sparsely populated areas, Mvomero, Tanzania

Introduction

Among the 1.1 billion globally impoverished people (defined by a daily income of less than US$ 1.25) (Rulli *et al.,* 2013), 25% are landless and about 20% lack adequate land for well-being. A significant portion of the global rural poor's income, however, comes from farming (Godfray *et al.,* 2010; Smith *et al.,* 2013). In the case of Tanzania, the majority (74%) of rural dwellers are engaged in subsistence agriculture (URT, 2011). Hence, democratizing access and ownership of arable land is necessary for reducing poverty. Secure access to productive land ensures food security and reduces general vulnerability to poverty for millions of impoverished rural dwellers that depend on agriculture, livestock, and/or forests for their livelihood. Land access also influences their investment capacity, particularly in activities related to production and in sustainable resource management (Vermeulen & Cotula, 2010; Deininger, 2011). For the very poor rural households who are the target of this study, access to arable land remains the main determinant of their food security and livelihoods.

The land available for cultivation has become scarcer in recent years due to increasing global demand for arable land. The global situation thus calls for more efficient land use allocation and innovation in agriculture (Deininger, 2011). Factors like the food price crisis of 2007, the internationally competitive land market, conservation policies, and high population growth have imposed a scarcity of arable land in rural Africa, even in countries with abundant land (Correll *et al.,* 2009; Nombo, 2010). Likewise, arable land scarcity among smallholder farmers in Tanzania is a recent phenomenon (Lugoe, 2008; 2010), demonstrated by the statistic that the proportion of arable land per person has decreased from 0.3 hectares in 2005 to 0.2 hectares in 2010 (Byamugisha, 2013).

Tanzania's population is unevenly dispersed, varying from 1 person per square kilometer in arid regions to 51 people per square kilometer in well-watered regions. In some highly fertile areas such as those adjacent to natural reserves, population density increases above 230 people per square kilometer (URT, 1997; WWF *et al.,* 2007). For this reason, arable land scarcity is an outstanding issue in villages bordering natural reserves (Kusiluka *et al.,* 2011; Mustalahti *et al.,* 2012; Augustino *et al.,* 2013; Nyenza *et al.,* 2013). The government initiatives to offset the situation – encouraging settlement of population from the land scarcity to areas of abundant land – have not been successful thus far (Kabanza *et al.,* 2013).

In light of ongoing development agendas that impinge on the rural poor's access to land, international and regional development stakeholders have published policy papers and guidelines on land access, tenure security and land reform (FAO, 2007; Union, 2009; Robertson & Pinstrup, 2010). In response to these guidelines, the International Fund for Agricultural Development (IFAD) proposed the following models to enhance rural poor's access to land in 2008: (i) strengthening land tenure security and land rights, (ii) increasing the amount of land that an individual has access to, and (iii) improving the productivity of land and the processes of benefiting from land. However, the effective focusing of the models requires information on land tenure security, land parcel patterns (size, number of plots, distance to farms), the methods used to gain land, and processes through which rural inhabitants earn a living from it.

In line with the proposed models above, Ponte (2001) reported that Tanzanian farmers in hilly villages adjacent to nature reserves cope with land scarcity by expanding their farms to the neighborhood plain villages. There are elements that are still unknown, however, such as the methods that farmers use to reach those areas, their ability to protect the claimed land, and the robustness of the possessed land rights (the capacity to which the land title can act as collateral or as valuable assets for sale). Moreover, studies on the security of land tenure and general patterns of use for these land parcels are not readily available in Tanzania. Such studies are available in Asia and in some African countries such as Ethiopia, Nigeria and Rwanda (Holden *et al.*, 2001; Raghbendra et al, 2005; Kassali *et al.*, 2009; Rabirou *et al.*, 2012).

In general, the literature readily available concerning Tanzania focuses on the impact of tenure reforms and conservation projects on local communities (Paavola, 2008; Below *et al.*, 2012; Augustino *et al.*, 2013; Mustalahti *et al.*, 2012; Nyenza *et al.*, 2013;). For example, Mustalahti *et al.* (2012) found that projects related to the reduction of emissions from deforestation and forest degradation in the Angai Villages Land Forest Reserve (AVLFR) in the Liwale District of Lindi Region attracted immigrants who reduced the land available to local residents. Moreover, Augustino et al. (2013) have reported that conservation measures, in general, lead to eviction of farmers from their former agricultural lands. Nyenza *et al.* (2013) have reported comparable findings, whereby in 2008 inhabitants on the slopes of the Uluguru Mountains were evicted to pave way for the establishment of the Uluguru Nature Reserve.

These studies, however, do not explain the methods and means through which their subjects derive a living from land. This information is vital to guide focused interventions aimed at enhancing rural poor's access to land relative to the proposed models. This paper, therefore, is aimed to address this need by answering the broad question: "How do households

in rural densely and sparsely populated areas of Tanzania access farmland?" More specifically, the paper (1) identifies the methods through which households acquire farmland, and the types of possessed land title; (2) determines levels of household land access based on size, number of plots, and distance to the land; and (3) analyzes the factors that influence household's secure access to land.

The Theory of Access and Analysis of Land Access

In general, the right to property is considered fundamental to one's access to resources. According to property theorists, 'property' refers to the rights of ownership or title as defined by law, custom or convention (Bromley & Cernea, 1989; Bell, 1998). Property generally requires some kind of socially acknowledged and supported claims or rights, whether that acknowledgment is by law, custom, or convention. Access theorists, on the other hand, go beyond the notion of property, defining "access" as the ability to benefit from something (Ribot & Peluso, 2003). By focusing on *ability*, rather than on *rights* as in property theory, the access theory brings attention to a wider range of socio-economic relationships that can constrain or enable people to benefit from resources, without focusing on property relations alone. This contrast is supported by literature on common property and resource tenure (Feeny *et al.*, 1990; Suryanata, 1994; Colfer, 1995; Zhang & Aboagye, 2007). These authors point out that law (whether written or oral, formal or customary) can never completely delineate all the modes and pathways of resource access along the complex and overlapping webs of power and relationships.

The theory of access provides three main mechanisms of access: right-, structural-, and relational-based access. Right-based access includes legal access (when the ability to benefit from something derives from rights attributed by law, custom, or convention) and illegal or right-denied access (when violence and theft is applied). Right to village land according to the 1999 Tanzania land and Village land Acts is confirmed by possession of a certificate of customary right of occupancy (URT, 1999a; 1999b). Structural- and relational-based mechanisms of access refer to opportunities and constraints that mediate the ability to benefit from resources. In the current study the opportunities and constrains as pointed out by previous studies include acquiring farms on seasonal bases outside the home villages, and farming on differently located plots (Ponte, 2001).

Relations also include powers that constitute the patterns of material, cultural and political-economic frames within which access to resources is sought. Such factors, according to relevant literature, include the demographic characteristics of individuals or households that enhance or hinder access, including age, educational attainment, and period of residency, sex, and marital status (Bebbington, 1999; Barrett *et al.*, 2001; Brown *et al.*, 2006; Guardiola *et al.*, 2013). The aforementioned authors

point out that in most African cultures, women are disadvantaged in resource access and control. For this reason, the female-headed households of widowed and divorced women are the poorest of households. Unlike the widowed and divorced, married women can access resources through their husbands. Compounding these factors, Urassa (2010) argues that high educational attainment is associated with well-paid jobs and economic knowledge, enabling increased purchases of expensive resources. Furthermore, a long stay in a locality increases the probability that an individual may acquire resources through inheritance and common regime.

This framework guided our analysis of land access to generate information on tenure security, land parcel patterns, and processes of gaining land, as well as other associated factors in view of informing strategies aiming at (1) improving security of tenure; (2) increasing the size of land accessed by households; and (3) improving the physical means of benefitting from farms. When we employed this access framework to analyze land access, variables related to land rights and land tenure security, such as possession of land title and types of land title, fit appropriately under the right-based mechanisms of access. Land policies, statutes, rules and regulations fit under the structural-based mechanisms of access. Furthermore, land parcel pattern variables and variables related to processes of benefiting from land – including the size of land accessed, the number of plots, the distance from home, and the methods used to acquire land and household demographic characteristics–fit under the relational-based mechanisms of access.

Conceptual Framework

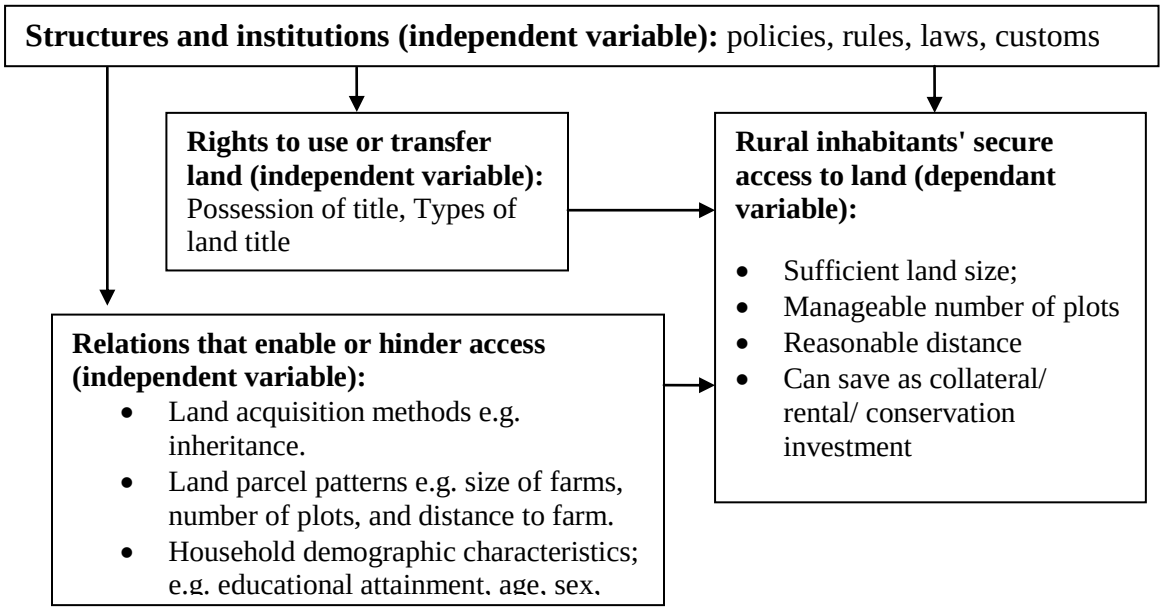

FIGURE 1: Conceptual Framework for Analysing Land Access

In view of the theoretical framework above, the study considered land access as a multidimensional concept encompassing three measures, namely: (1) Structures and institutions (land tenure system including policies, rules, regulations, and statutes); (2) relations that shape how people profit from land (land parcel patterns such as size, number of plots, and distance to as well as socio-economic characteristics of households); and (3) rights to use and transfer land (procession of land titles, types of possessed land titles, and robustness of land titles) as indicated in Figure 1. Analysis of structural factors is beyond the scope of this study.

Methods

Description of the Study Area

The study was conducted in Mvomero District, Morogoro Region, Tanzania, specifically in the Mlali and Mgeta divisions. The Mgeta Division represents a densely populated area because most of its villages are located on steep land within the Eastern Arc Mountains (the Uluguru Mountains), with several reserved forests surrounding the area. The climatic conditions are favorable for many crops, attracting many farmers and leading to a high population density. The population density in Mgeta was above 240 people per square kilometer in the year 2009 (Lopa & Mwanyoka, 2010). The reported density is above the average of 31 persons per square kilometer in other parts of Morogoro region (URT, 2013, p.6).

According to the National Bureau of Statistics (NBS), the population density of up to 51 persons per square kilometer is considered sparse (URT, 2013, p.6). In this regard, Mlali Division, with a population density of 31 people per square kilometer, represents a system of relatively sparsely populated, plain land and area of high agricultural potential (Below *et al.*, 2012; URT, 2013, p.6). The two areas and the associated factors were intentionally selected to allow comparisons of land access between sparsely and densely populated rural areas. There is a possibility that the study's results will be applicable to other rural areas of Tanzania where households face land scarcity.

Research Design

The study adopted a cross sectional research design whereby qualitative and quantitative data were each collected once. The design allows collection of data at a single point in a time, while allowing one to estimate the prevalence of outcome of interest (land access for this case) as samples are always taken from the whole population (Kothari, 2004). In addition, this design is cost-effective, and takes little time while assuring appropriate quality of data.

Sampling Technique and Sample Size

The study adopted a multistage sampling procedure. Mgeta and Mlali Divisions were selected to allow the comparison of land access between densely and relatively sparsely populated areas. Two Wards (subdivided areas within a Division comprised of several villages) from each Division, specifically Tchenzema and Nyandira from Mgeta Division and Mlali and Mzumbe from Mlali Division, were intentionally selected based on their remoteness and their availability of sloping and plain farmland for Mgeta and Mlali respectively. Two villages were randomly selected from each Ward: Tchenzema and Kibuko from Tchenzema, Mwarazi and Kibagala from Nyadira, Mlali and Manza from Mlali, and Changarawe and Sangasanga from Mzumbe. Thereafter, 34 households from each village forming a total of 272 households from the eight villages were randomly selected to participate in the household survey. However, the study's final sample size was 267 because 5 questionnaires were not properly filled. The sample size of 34 households per village is supported by Bailey (1998) and Kimia (2008) who argue that regardless of the population size, the minimum sample or sub-sample of 30 cases is appropriate for a research in which statistical data analysis is to be done. In complement of this Kothari (2004) argues that the sampling error can be reduced by increasing the sample size.

In addition 8-12 people from each village were randomly selected to participate in focus group discussions for effective participation and good quality of data as advised by Masadeh (2012). In forming the groups, efforts were made to ensure representation of different age and gender groups in order to capture land access constraints that are age and sex-specific. In addition, one representative from the Village Land Councils for each of the participating villages was targeted for as a key informant. Selection of the key informants (KI) was based on age and experience. The aim was to get the oldest member, with the longest experience on land issues in respective villages, who could provide realistic information on trends of land issues.

Data Collection

Quantitative data from selected households were collected using a pre-structured questionnaire. In addition, qualitative information was collected through focus group discussions (FGDs) and key informant (KI) interviews. The FGDs and KI interviews were guided by a checklist of items. Use of FGDs and KI interviews aimed at expanding insights on opportunities and constraints related to land access and associated factors. The interview also aimed at gaining a deeper understanding on the dimensions of land access including; possession of land rights, their robustness and ability to protect landowners (Creswell & Clark, 2007; Tashakkori & Teddlie, 2010; Bryman, 2012).

Measurement of Variables

In this study the dependent variable was land access (1 = secure, 0 = insecure) and was measured by a combination of three variables: (1) household's per capita land size (hectares); (2) the number of plots; and (3) distance to main plot (trekking hours). These variables were combined based on the established secure land access line to form a land access variable. The independent variables considered to be the factors influencing land access include: methods used to gain farms (e.g. inheritance, purchase); location (1 = Mgeta, 0 = Mlali); the sex of household head (0= female, 1 = male); the age of the household head (years); the income of the household head (Tshs); the number of years in school of household head; the period of residence in the locality (years); and the number of adult members in the household.

Data Analysis

Quantitative data was analyzed using SPSS, whereby descriptive and inferential statistics were determined. Frequency, percentages, and means were determined to identify dominant land acquisition methods, types of land rights, and the household's level of land access. Binary logistic regression was used to determine the factors influencing land access. Qualitative data collected through key informant interviews and FGDs was analyzed through content analysis. Information was arranged under four themes: (1) land acquisition methods; (2) possession of land titles types of possessed land titles, and reasons for not possessing land titles; (3) nature of land parcel patterns and the associated opportunities and constrains; and (4) the factors influencing land access.

In order to determine land access, the study developed a land access index using three variables of land access: land size, distance to farm in hours, and number of plots. This index was based on the views and opinions of the FGDs participants and supported by literature. According to the FGDs participants, walking for more than half an hour was tedious and caused wastage of working hours. They further pointed out that working on more than 2 plots per household imposes extra production costs and is not feasible for households who cannot afford hiring laborers. These two arguments are supported by literature on resource use and profitability (Rahman & Rahman, 2009; Di Falco *et al*., 2010). With respect to land size, the FGDs participants argued that a farm size of 0.2 ha per person was needed for a household to be food self-sufficient throughout the year and remain with surplus to sell and to obtain cash to meet other household needs. This is similar to the current average per capita farm size in Tanzania as reported by the World Bank (Deininger, 2011).

For these reasons, the study set three land access cutoffs: at 0.2 ha per person, 2 separate plots per household, and 30 minutes walking distance to main plot. Households that fell below these cutoffs were scored 1 and were considered unsecured, while those falling above all three cutoffs were scored 2 and were categorized as secured in terms of land access. The maximum total score for secured households was 6 for secured households and 3 for unsecured households. Based on this index, the study formed a land access variable by grouping the households into two categories, secured (those scoring 4 – 6) and unsecured (those scoring 0 - 3). Based on the nature of the dependent variable a (dichotomous) binary logistic regression model was used to predict the likelihood for a household to have secure land access. According to Pallant (2010) and Field (2013) this model is appropriate to predict dichotomous categorical outcomes. The model is presented below:

Logit (p_i) = log (p_i/1-p_i) = $b_0 + b_1x_1 + b_2x_2 + \ldots + b_kx_k$ (Agresti and Finlay, 2009), where:
Logit (pi) = natural log of the odds of an event occurring (dependant variable) i.e. the probability of households to have secure access to land, (0 = insecure, 1 = secure).
p_i = prob (event), that is the probability that the event will occur
1-p_i = prob (non-event), that is the probability that the event will not occur
b_0 = constant of the equation
b_1 to b_k = coefficients of the independent (predictor, response) variables
k = number of independent variables
x_1 to x_i = independent variables entered in the model, which were:
X_1 = Income of household head (Tshs), X_2 = Number of adult members (number) , X_3 = Period of residence (Years), X_4 = Value of assets (Tshs), X_5 = location(0 = Mlali, 1= Mgeta), X_6 = Inherited farm (0 = no, 1= yes), X_7 = Purchased farm (0 = no, 1= yes), X_8 = Age of household head (years), X_9 = Sex of household head (0=F, 1=M), X_{10} = Marital status of household head (0= not, 1= in relationship).

Results and Discussion

Part I of this section presents levels of smallholders' access to land based on acquisition methods, tenure security, and fragmentation. Part II follows with a discussion of factors that may influence households' land access.

Part I

Prevailing Land Acquisition Methods

Study results on the main methods through which households obtain farms are presented in Table 1. The results show that 50.4% and 39% of Mgeta and Mlali households, respectively, obtained farms through inheritance. Additionally, 45.8% and 29.4% of Mgeta and Mlali households, respectively, purchased farmlands. 20% of households in Mlali Division were hiring farms while 12% obtained farms through

village government allocation. Few (3.8%) Mgeta households hired farmland (Table 2).

Division	Method	Frequency	Percent
Mgeta (n = 131)	Inheritance	66	50.4
	Purchase	60	45.8
	Hire/ borrow	5	3.8
Mlali (n = 136)	Inheritance	53	39.0
	Purchase	40	29.4
	GVT allocation	16	11.8
	Hire/ borrow	27	19.8

TABLE 1: Results of Descriptive Analysis on Methods used Acquire Arable Land (n = 267).

In addition, the FGD participants reported that they follow matrilineal norms, where women inherit land from their maternal uncles upon marriage, and receive more land as they give birth to more children (Alesina & Giuliano, 2013). While most men depend on the farmlands that belong to their wives, a few men with money have purchased land.

Existing Land Tenure Security

Land tenure security was measured through consideration of criteria such as possession of land titles, types of land titles, and the capacity of those titles to protect the owners against abnormal loss of land, as well as to act as collateral, rental or as a valuable asset in the land market. According to Tanzania's National Land Policy and associated acts (Land and Village Land Acts of 1999), the customary right of occupancy is the dominating form of village land tenure security in Tanzania. Customary rights of occupancy can be confirmed by a certificate of customary right of occupancy (CCRO), issued by the village Council and registered at the corresponding District Land Registry (URT 1997; 1999a; 1999b; 2004).

Characteristic	**Variable**	**Mgeta (n=132)**		**Mlali (n=136)**	
		F	%	F	%
Household possesses land certificates	No	33	25.2	61	44.9
	Yes	98	74.8	75	55.1
Type of certificates	Local unregistered	97	74.0	71	52.2
	Customary	1	.8	4	3.2
Reasons for not having land titles	Lack of knowledge	22	18.3	39	28.7
	Tenure costs and procedures	9	6.9	22	16.2

TABLE 2: Results of Descriptive Analysis on the Possession and Types of Land Title (n= 267).

The study results as presented in Table 2 show that about 25% and 45% households in Mgeta and Mlali, respectively, did not have any land certificates. A large portion—74% and 52% for Mgeta and Mlali, respectively—of the households possessed informal sale agreements and customary inheritance.

As these types of land rights are not recognized by the statute, they could neither be used to obtain credits from financial institutions as collateral nor to protect landowners against loss through grabbing. FGD participants from Mgeta, however, pointed out that in their division, inheritance rights were controlled by clan uncles and land sales were confined to sales within clan members only. This practice protected clan land from grabbing, ensuring that the original owners maintained possession of their ancestral land (Lugoe, 2010). In contrast, Mlali regulations awarded land rights to individual landowners, thereby allowing sale to be freely decided between any individuals. As a result, people in Mlali sold land at marginal prices just high enough to meet their immediate needs, and were left only with small farms. These occurrences were shared among Mlali residents, as attested by FGD participants from the area who claimed: "…we sold the land which was allocated to us during villagization to meet financial needs… Today we do not have farms" (FGDs participant from Changarawe village in Mlali, May 2012).This claim indicates that monetary poverty at the household level may be a cause, as well as a consequence, of insecure land access.

According to the results, other reasons for lacking land rights included owners' unfamiliarity with legal procedures, along with institutional barriers of the land tenure framework. 18.3% and 29% of Mgeta and Mlali households, respectively, claimed that they did not know the appropriate procedures to follow in order to obtain certificates, did not understand the importance of certificates at all, or mistakenly perceived that clan land was under the control of clan leaders, not individuals. 6.9% and 16% of Mgeta and Mlali households, respectively, stated that they were unable to claim land titles for institutional-related reasons, such as long and bureaucratic procedures and the high costs involved in the process to obtain land rights. These responses suggest that a lack of awareness and knowledge of institutional procedures, along with the associated costs of the process, may contribute to the shortage of land tenure security among rural people as also pointed out by the Access theory (Ribot and Peluso, 2003).

The results also showed that only 4% of interviewed households had certificates of customary rights of occupancy (Table 2), implying that 96% of them had no assurance of sustainable access to their current land. Such situations can reduce farmers' competitiveness by discouraging land-related investments such as the production of perennial crops. In other words, because these farmers expect and fear eviction from land, they are

more hesitant to make long-term investments, even if such investments may be more profitable to them in the future. In accordance, the World Bank noted in 2008 that if farmers lack secure rights to land, they have less incentive to exert effort to use it productively and sustainably or to carry out land-related investments. Furthermore, lack of secure land rights renders land users unable to benefit from the opportunities that are created by agricultural commercialization, such as credit and land rental.

These findings compare well with what was reported by the United Republic of Tanzania (URT) in 2012: the proportion of rural households who own their land through official certificates dropped from 7.1% in 2003 to 5.8% in 2008. This change is critical because ownership rights are essential for sustainable land access, improving the investment climate, creating capital, accessing credits, and improving revenues (Bending, 2010). In response, the Tanzanian government is currently working to strengthen property rights through the Property and Business Formalization Programme (TBFP). Its intention is to change the mode of land ownership in Tanzania from the traditional custom of informal ownership to more formal, private, and individual mode of ownership. Although approximately 7000 villages out of 10,000 villages have been surveyed, issuance of formal certificates of occupancy on surveyed village land has been slow (Byamugisha, 2013).

Levels of Land Access

Table 3 presents the distribution of households by land size in each Division, the associated number of plots, and the walking or travel time to the main plot.

Descriptive Variable		**Mgeta n= 131**		**Mlali n = 136**	
		Frequency	**Percent**	**Frequency**	**Percent**
Land size in Hectares	0.00 (no land)	15	11.5	19	14.0
	0.01 – 0.2 (insecure)	65	49.6	64	47.1
	0.21 and above (secure)	51	38.9	53	39
Number of plots	1 – 2 plots (secure)	79	58	65	47.8
	Above 2 (insecure)	51	38.9	53	39
Walking/ Travel hours	Less or 0.50 hours (secure)	55	42.0	40	29.4
	Above 0.5 hours (insecure)	62	47.3	69	50.7
Total Access based on all 3 attributes	Insecure	70	53.4	54	39.7
	Secure	61	46.6	82	60.3

TABLE 3: Results of Descriptive Statistics on Levels of Land Access (n= 267). Note: mean household land size = 0.4 ha, per capita land size = 0.2 ha, mean number of plots 3 and 2 for Mgeta and Mlali households respectively, mean trekking hours 1.2 and 1.3 for Mgeta and Mlali respectively and maximum trekking hours was 6 and 12 for Mgeta and Mlali respectively.

The results show that in both sites, the mean household land holding was 0.4 hectares and per capita farm size was 0.2 hectares. The size of land possessed by 61% of households was between 0 and 0.2 hectares. Considering the fact that the average per capita land size is equivalent to the national level, this data shows that the majority of households are insecure in terms of land size. As shown by a previous study in Nigeria (Tanko & Jirgi, 2008), land size—along with the amount of capital inputs—is a major factor that determines relative outputs of arable crops.
The proportion of households that possessed 0 – 0.2 ha was similar in both Mgeta and Mlali (61%). These results however, show a dramatic decline when compared to the finding by another study conducted in 2008 (Hess *et al.*, 2008), which reported that the average household land holding on the slopes of Uluguru Mountains was 1 ha. KI's and FGD participants revealed that the decline in household farm holding from 1 ha in 2008 to 0.2 ha in 2011 can be attributed to factors that vary between the two Divisions. FGD participants from Mlali villages presented possible reasons for household farm size shrinkage in Mlali:

> *…About 80 percent of village land was allocated to a hoarder who lives in Morogoro Municipality by former Village Land Council leaders. It is under court stop order since year 2000. This is the very productive valley on which we used to cultivate rice… We claimed our land… The case is still in High court.* (FGD participants from Manza village in Mlali, May 2012)

Participants of FGDs from Changarawe village, also in Mlali Division, pointed out a similar land issue associated to the sharp decline of household land holdings:

> *…Our former village leaders allocated the fertile valley (about 100 acres) on which we used to cultivate rice to an Arab who stays in Morogoro Municipality contrary to our consent…he has a 200 years certificate of use. We temporarily depend on Mzumbe University farm… Mzumbe University however is expecting to start construction on the land soon.* (FGDs participants from Changarawe village in Mlali, May 2012)

These findings suggest that the common regime and village land committees in Mlali were unable to protect the interests of dwellers on their land. According to Tanzania's National Land Policy (NLP), allocation of village land to external investors should safeguard the interests of local people: such a right of occupancy should not exceed 99 years, and land hoarding is prohibited (URT, 1997). In addition, the 1999 Land Act and Village Land Act (VLA) and its amendment specify that any transfer of village land shall be in consultation with the villagers (URT 1999a, 1999b; 2004). Therefore, the allocation of village common land to a hoarder without the consent of local people – and the granted right of occupancy of more than 99 years affirmed in the testimony above – goes against the NLP, the VLA, and the land Act Amendment. The observation suggests that there is weak land governance manifesting through illegal sale of common land and delayed court settlement of the matter.

Unlike Mlali, Mgeta FGD participants testified that Mgeta households possess small indivisible farms due to repeated fragmentation caused by high population growth. Results in Table 3 show that Mlali comprised of relatively more landless households (14%) than Mgeta (11.5%)—an expected result given that FGD participants in Changarawe and Manza villages emphasized that most of their village land is illegally occupied by land hoarders and that monetary poverty forced them to sell their farms.

According to the testimonies of FGD participants from Mgeta, the major ways through which households cope with the shortage of land are to farm very far from villages (over 10kms) or on scattered plots. In both Divisions, 39% of the households farm on more than two plots. Data showed that 47% of Mgeta households were trekking for more than half an hour to the nearest plots with a maximum trekking time of 6 hours, while 52% of Mlali households were trekking for more than half an hour to the nearest plots, with a maximum trekking time of 12 hours. These results indicate that about half of households either practice seasonal migration or expend a lot of time and energy in trekking to distant lands rather than productively farming. The maximum number of plots per household was 8 for Mgeta and 6 for Mlali, suggesting that households in Mgeta are more constrained by land ownership pattern than those in Mlali.

Part II

Factors Influencing Household Land Access

Binary regression was performed to assess the influence of hypothesized factors on the likelihood for households to access land. The model contained nine independent variables: income of household, age of household head, sex of household head, education level of household head, value of household assets, period of residence, value of assets, and number of adults in the households. The results of the model combining data from Mgeta and Mlali are presented in Table 4.

The full model was statistically significant, indicating that it was able to distinguish households with secure access to land from those with insecure access. The model as a whole explained between 21% (Cox and Snell R square) and 24% (Nagelkerke R square) of the variance in the levels of households land access and correctly classified 75% of the cases.

Only three variables—income of household head, value of assets and location—influenced the likelihood of households accessing land with statistical significance, at $p < 0.05$ (Table 4). Both income of household head and value of assets recorded an odds ratio of 1 and a positive B value of 0. The results signify that for every unit of increase in income or assets value, households' probability in accessing land was increased by a factor of 1.

Variable						Odds	95.0% C.I. for Odds Ratio	
	B	S.E.	Wald	df	p	Ratio	Lower	Upper
Education	-0.109	0.059	3.346	1	0.067	0.897	0.798	1.008
Income	0.000	0.000	5.487	1	0.019	1.000	1.000	1.000
Inheritance	0.000	0.000	3.398	1	0.065	1.000	1.000	1.000
Value of assets	0.000	0.000	4.004	1	0.045*	1.000	1.000	1.000
Sex	-0.534	0.309	2.985	1	0.084	0.587	0.320	1.074
Location	-0.808	0.292	7.631	1	0.006**	0.446	0.251	0.791
Purchase	-0.011	0.285	0.002	1	0.0969	0.989	0.565	1.730
Period of res	-0.002	0.008	0.089	1	0.765	0.998	0.982	1.013
No. Adults	-0.010	0.063	0.025	1	0.875	0.990	0.874	1.121
Constant	1.562	0.605	6.671	1	0.010**	4.769		

Note: χ^2 (9, N = 247) = 24.61, P < 0.01. * Significant at 0.05, ** significant at 0.01

TABLE 4: Logistic Regression Results Showing Factors Associated With Land Access (n=267).

Since purchase is one of the two main methods through which households can acquire land, it is understandable that households with high income would invest excess money on land purchase. Additionally, these households also owned valuable productive assets such as water pumps and milling machines that boosted their income and contributed to their ability to purchase land.

The variable measuring location (Mgeta = 1, Mlali = 0) resulted in an odd ratio of 0.45, indicating that the odds of accessing land for households located in Mgeta were 0.45 times less than those located in Mlali. This outcome shows that Mgeta households are more constrained by land ownership patterns and overall have lower access to land than Mlali households.

Conclusions and Recommendations

The study has identified opportunities and constraints associated with the means and processes through which Mgeta and Mlali households access land. The study concludes that the main methods of acquiring farms in both densely (Mgeta) and sparsely (Mlali) populated sites were inheritance and purchase. More than one third of households in both sites were land insecure. Access to arable land in Mgeta was constrained by soil erosion and shrunken land as a result of over fragmentation. These factors compelled Mgeta farmers to excessively apply fertilizers and to expand farms through seasonal migration to distant plots, resulting in up to six wasted working-hours per day and double the normal living and production costs. Access to land in Mlali was limited for different reasons, such as land grabbing perpetuated by weak tenure security, monetary poverty, and non-compliance to laws. Farmers coped through borrowing farms and by trekking up to 12 hours. Binary logistic regression showed

that while high income and productive assets positively influenced access to land, location exerted a negative influence ($p < 0.05$). It is concluded that the security of tenure in the area is weak as households lack registered land titles; also the majority obtain land outside their villages the situation which creates hardships in production. Lack of irrigation water in villages of seasonal migrants' destinations prevents them to settle there. However, the hardships are minimum among those households earning high income, or having productive assets and those located far away from the Uluguru Nature. Tanzanian government is advised to encourage land-constrained households from land scarce areas to settle in land abundant areas. Nonetheless, this will only work if irrigation infrastructure is put in place to remove households' overdependence on rain-fed agriculture. There is also a need for the government to focus on strategies aimed at ensuring secure access to land in the study areas as well as in various similar regions through Tanzania. These strategies may include formalization of land titles, creation of awareness on tenure security, investment in soil fertility, and up scaling of household income and asset portfolio.

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