

## LAND ACCESS AND LIVELIHOOD STRATEGIES IN MVOMERO DISTRICT TANZANIA

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### Abstract

Land is a key asset for rural livelihoods. The general objective of this paper is to determine the relationship between land access and livelihood strategies (LS) in the context of land scarcity. A good understanding of the above relationship is of great importance to policy makers and all those interested in improving the well-being of those living in such areas. Moreover, the above could offer guidance for focused poverty interventions aiming at promoting diversity of LS. The paper is based on a study that was carried out in Mvomero District, Tanzania. The study adopted a cross-sectional research design and both qualitative and quantitative data were collected through a pre-structured questionnaire, focus group discussions and key informant interviews. A total of 267 respondents were involved in the household surveys that aimed to explore the portfolio of household's livelihood strategies, the availability of assets requisite for smooth diversification, challenges associated with LS and the effects of land access on LS. The quantitative data collected was analyzed using the SPSS software: descriptive and multinomial logistic regression were performed to identify dominant LS, determine assets portfolios and the influence of land access and selected household socio-economic characteristics on choices of LS. Qualitative data were analysed using the content analysis method and used to supplement the quantitative information. The results show that, farming was the dominant household LS. However, a significant proportion of households cope with land shortage by engaging in survival off-farm LS due to lack of labour skills, savings and capital necessary for undertaking high paying LS. A household's location and its distance to the farm was positively related to its engagement in survival off-farm LS. Moreover, ownership of land without formal land titles negatively influenced a household's diversification of its LS ( $p < 0.05$ ). It is concluded that regardless of land scarcity in the study area, majority of households are still confined in farming. However, insecure access to land coupled with lack of capital for engaging in high paying LS has forced a significant proportion of households to venture in survival LS. Tanzania government is therefore advised to support the studied communities and those with similar context to diversify livelihood strategies in a meaningful manner through provision of education and labour skills as well as improvement of their access to credits. In addition, the studied community is advised to strive to have savings and obtain labour skills.

**Key terms:** Land access, livelihood strategies, Tanzania.

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## 1.0 Introduction

Land carries the natural resource stock from which flow of resources and services useful for livelihoods are derived. Worldwide, about 275 million people are landless and almost 200 million do not have sufficient land for well-being (IFAD, 2012). However, secure access to productive land is critical to rural dwellers especially those relying on farming or forests for their livelihoods (Borras *et al.*, 2011). Land access is the basis through which rural people can acquire inputs and services (Lugoe, 2008). It enhances access to financial capital and capacity to take advantage of markets for better livelihood options (IFAD, 2008). When alternative employment is not available, lack of arable land automatically denotes a disadvantage for rural households (Ellis, 2000). In this view, agricultural land continues to determine diverse livelihoods for the very poor and food insecure rural people. Secure access to productive land among rural households in Tanzania is crucial because a majority of the poor are engaged in subsistence agriculture. Tanzania's agricultural sector employs about 74% of the country's labour force producing 95% of the country's food (URT, 2011).

Globally, average farm sizes have declined and landlessness has been increasing across countries for the past 30 years (IFAD, 2008; Bending, 2010; Dewees *et al.*, 2010). While land remains a fixed resource, the projections show that the rural population in Sub-Saharan Africa (SSA) will continue to grow until 2045 (IFAD, 2012). In addition to the above-mentioned, other factors responsible for the decline in land access among rural households in SSA Tanzania inclusive are speculative land markets, conservation policies and increased global need for massive land to produce food and bio-fuel (Fischer *et al.*, 2010; Fischer and Nachtergaele, 2011; Fischer and Edmeades, 2011). In Tanzania the proportion of arable land per person has decreased from 0.3 in 2005 to 0.2 hectares in 2010 (World Bank, 2011).

Shortages of arable land among the smallholders living adjacent to the natural resource reserves is critical and access to meaningful employment is a challenge (World Bank, 2010; Kusiluka *et al.*, 2011; Nyenza *et al.*, 2013; Lyatuu and Urassa, 2014). Yet, farming employs 90% of the total labour force in the area (WWF *et al.*, 2007; Hess *et al.*, 2008; Balama *et al.*, 2013). According to Lyatuu and Urassa (2014), about 13% of studied households were landless and 48% households were nearly landless (owning less than 0.2 ha). Furthermore, about 45% of the households were

highly constrained by negative land parcel pattern attributes such as; tiny farms (Below 0.2 ha), long trekking distances (up to 12 hours) and cultivating up to 8 plots. These factors together hinder household's ability to benefit from land.

The Tanzanian government has been addressing this problem through her Land Policy by encouraging resettlement of population from the land scarce to areas of low population density without success (URT, 1997; 2013). Reporting on land scarcity around the Uluguru Mountains, Ponte (2001) and Hess *et al.* (2008), point out that households practice off- farm livelihood strategies to supplement a living earned from harsh farming environment. Although livelihood diversification has potential to improve livelihoods, LS born out of necessities are likely to induce coping strategies (Ellis, 2000; Barrett and Reardon, 2000; Morris *et al.*, 2003). Moreover, Morris *et al.* (2003) argue that persistent coping strategies may lead to survival strategies such as reduction of consumption, erosion of assets and degradation of natural resources. This situation is likely to happen in rural Tanzania if the problem of land scarcity is not adequately addressed.

The importance of land access and tenure security for secure rural livelihood options is highly recognized by international and regional stakeholders including; United Nations, World Bank, International Land Coalition and African Union (AUC *et al.*, 2009; World Bank, 2010). In addressing the problem of rural land scarcity, the mentioned stakeholders have published policy papers and guidelines on land access, tenure security and land reform (Robertson & Pinstrup, 2010). In response to the guidelines IFAD (2008) proposed promotion of LS diversification. In support of the above proposed strategy, studies on rural livelihoods have established that non-farm activities contribute up to 50% income of rural Tanzanian household (Hess *et al.*, 2008; URT, 2011). In light of the significance of the contribution of off-farm activities on rural household's income IFAD (2008) suggests that strategies to address rural poverty in the context of arable land scarcity should be holistic combining measures to enhance land access and those promoting off-farm activities. However, for such strategies to be successful, they have to be guided by empirical evidence on dynamics of opportunities and constraints faced by rural poor in particular economic contexts including on and off-farm activities.

Relative to the above proposed strategy, livelihood studies in Tanzania have reported that, various development projects have reduced land size from local people leaving them unable to organize meaningful LS (Deweese *et al.*, 2010; Kusiluka *et al.*, 2011; Mustalahti *et al.*, 2012; Balama *et al.*, 2013; Nyenza, 2013). These studies however, do not explain specific challenges faced by the survivors of arable land scarcity in their particular economic context including on-farm and non-farm activities to guide the focus of relevant interventions. This paper addresses this information gap by answering the broad question; how do rural households earn a living in the context of arable land scarcity? Specifically, it answers the questions; what are the main household livelihood strategies? Do households have assets necessary for independent livelihood diversification? What is the influence of household land access and other socio-economic variables on choice of LS? The paper tests the hypothesis that the types of livelihood strategies adopted by households did not vary with the variation of access to land.

### ***1.1 Sustainable Livelihoods Framework and Livelihood Strategies***

This paper is guided by DFID's sustainable livelihood framework (SLF). The SLF was created in response to the recognition that conventional definitions of poverty based on income and consumption functional in developed countries were inadequate for lower income economies such as Tanzania (Chambers & Conway, 1991; Ellis, 2000; Allison & Ellis, 2001; Sen, 2003). The SLF considers the portfolio of livelihood assets that households can access (human, social, financial, physical, and natural capital); the impact of these assets on household livelihood strategies (LS) and how household assets and LS under the influence of policies, institutions and structures affect a variety of outcomes.

Based on the SLF, a livelihood activity is defined as any direct income-generating activity (for example production of cash crops) or any activity that might not directly bring in income but, increases the consumption and/or well-being of an individual such as collection of fuel-wood (Savath *et al.*, 2014). A household's livelihood strategy, in turn, is the combination of livelihood

activities in which its members engage. The SLF identifies three broad clusters of LS (1) on-farm (animal and or crop farming, aquaculture and forestry) (2) off-farm (non-farm activities) such as brick making, carpentry, shop business) and (3) migration (moving away temporarily or permanently seeking livelihoods). Normally, rural households pursue a combination of on and off-farm LS together or in sequence (Bebbington, 1999; Mahmud, *et al.*, 2009).

The ability of a household to pursue a meaningful diversity of LS depends on its assets endowment and its ability (in terms of socio-economic characteristics) to combine them (Small, 2007; Borrás Jr, *et al.*, 2011). Household socio-economic characteristics such as educational attainment, size of labour force, geographical location, sex, age and marital status of household head may influence its access to assets and choice of LS (Barrett *et al.*, 2001; Brown *et al.*, 2006). The above mentioned authors point out that, higher educational attainment enhances meaningful off-farm LS diversification through developing labour skills. Additionally, Urassa (2010) points out that, households with large sized labour force may be more likely to pursue meaningful diversity of LS easily using the abundant labour available.

According to Brown *et al.* (2006), geographic location has an important bearing on access to land and ultimately access to key assets for meaningful off-farm diversification. Households located in areas where population density is reasonably normal and arable land is abundant are expected to be land secured. Using land as collateral/rental or commodity such households may secure financial and social capital necessary for meaningful diversification of LS.

Further to the above-mentioned, the growing literature on livelihoods diversification highlights on the existence of a relationship between the sex and marital status of a household's head and its choices of LS (Allison & Ellis, 2001; Urassa, 2010). According to Urassa (2010) many women in Sub-Saharan Africa are deprived from land access and livelihood diversification opportunities. Married women however, may access land through their husbands and hence, may invest income from land in higher paying off-farm activities. In this view, female headed households (FHH) are constrained when it comes to engagement in high paying off-farm activities due to a lack of natural capital base on which resources and services necessary for livelihood activities are derived.

### *1.2 Land as a livelihood Asset*

Although the SLF does not rank assets in terms of importance, it describes two important types of relationships between assets: (1) sequencing, or the degree to which the acquisition of one asset enables the acquisition of another, and (2) substitution, or the degree to which particular assets can be substituted for others. Land is a key asset for rural livelihoods because of its primacy in asset sequencing. Land secured households may be more likely to invest in conservation projects, use it as collateral to access financial capital and thereafter use the financial capital to enhance their human capital through investing in their children's education. Furthermore, through owning land the household's social status is dignified enabling it to benefit from greater social capital (Worku & Mekonnen, 2012)

This paper considered arable land as a natural resource base and a dominant asset in sequencing other assets (Scoones, 1998). Land was therefore assumed to have a high influence on rural household's access to livelihoods assets and consequently the ability to pursue a diversity of LS. Using DFID's SLF as a key reference, the analysis modified the assets-LS relationship, and centered on the relationship between land access and selected household socio-economic characteristics (in place of assets in the SLF)-LS relationship, however, the analysis of policies and institutions is beyond the scope of this paper.

### *1.3 Conceptual framework*

Based on the above framing the study conceptualized that, rural households' livelihood options are influenced by access to land, rights over land, and socio-economic characteristics. Access to land in this study is defined by size of possessed land, distance from home to the farm, and number of plots in separate locations. Possession of a reasonably large size of arable land allows a household to invest in diverse LS (on and off-farm). This is because, large land can be divided into reasonable portions on which diverse investments such as, subsistence farming, conservation projects and land rental can be done. Furthermore, land ownership and possession of legal land titles can enable a household to use land as a collateral/rental/commodity and obtain sound financial capital. Using the obtained funds a household can invest in high paying business or in human resource through education and training and in turn be able to secure high paying jobs.

Long distance from home to farm and possession of many plots than a household's capacity to handle can encourage a household to concentrate on off-farm activities as a way of avoiding risks and costs associated with transportation, guarding, and caring of double homes in times of seasonal migration. Furthermore, hilly topographical locations offer small arable land sizes to dwellers and therefore are likely to fuel diversification of LS. Male headed households and households with much labour force can easily engage in a diversity of LS by using the endowed abundant labour. Attainment of high education level and training enhances engagement in high paying business and employment by using the acquired labour skills. Considering land as a key asset for rural people, crop and animal farming in this study is regarded as the principal LS and livelihoods diversification deemed as engagement in activities other than crop and animal farming or the combination.

## 2.0 Methodology

### 2.1 Description of Study Area

The study was conducted in Mlali and Mgeta Divisions of Mvomero District, Morogoro Region. Mvomero District is located between longitudes  $37^{\circ} 10'$  and  $38^{\circ} 31'E$  and Latitudes  $5^{\circ} 50'$  and  $7^{\circ} 4' S$  with Uluguru Mountains rising at their highest parts to more than 2600 meters above sea level. Annual rainfall is between 600mm and 2000mm being lowest at the foothill and highest between 400m to 2000m altitude above sea level. The temperature in the District ranges from 18 – 30 degrees Centigrade (Mvomero District Office, 2011).

The above explained weather characteristics attract many farmers hence, more than 150,000 people live on the slopes of the Uluguru Mountains with slopping topography creating shortage of arable land (Lopa *et al.*, 2012). The district also comprise of survivors of the resent eviction from farms to give way for the development of the Uluguru Nature Reserve (Nyenza *et al.*, 2013). In that view, it was expected that the District could offer appropriate results on land access and livelihood strategies in land scarce areas with a possibility of results being applicable to other rural areas of Tanzania with similar context.

### 2.2 Sampling Procedure

The study employed a multistage sampling procedure; first, two Divisions Mgeta and Mlali were purposely selected to participate in the study. Mgeta was selected to represent areas of high population density of above 240 people per square kilometer and Mlali represented areas of low population density of 31 people per square kilometer (URT, 2013). Additionally, Mgeta division is composed of mountains that create a shortage of arable land but its weather favour cultivation of numerous crops a situation that generates high pressure on the small available land (WWF *et al.*, 2007; Lopa *et al.*, 2012). Contrary to this, Mlali is composed of lowland hence availability of ample flat arable land (Below *et al.*, 2012), though facing scarcity of land because large size of common land is illegally occupied by land hoarders (Lyatuu and Urassa, 2014). In view of the above facts the two Divisions equally face scarcity of arable land.

Second, 4 villages from each of the above mentioned Divisions and 34 households from each village were selected. The sample size per village was based on the fact 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 (Kothari, 2004; Kimia, 2008). In addition, 8 - 12 individuals from each village were randomly selected to participate in focus groups discussions for effective participation and good quality of data as advised by (Masadeh, 2012). The selection of FGD participants was based on gender and age representation to capture age and gender specific views such that male and female members from youths (18-35 years age), adults (36 – 55 years old) and aged people (above 55 years of age) were involved. Finally, one member from each of the village land committees with long experience was selected to be interviewed. The selection of key informants (KI) was based on age and experience. The aim was to get the oldest member with long experience on land issues in the respective villages.

### **2.3 Data collection**

Quantitative data were collected from households by using structured questionnaire. Qualitative data were collected from focus group discussions (FGDs) and from key informants (KIs) using two different checklists of items to guide the discussions and interviews respectively. Issues of confidentiality were clearly explained to each participant and individual willingness to participate in discussion was sought. Moreover, participants were free to participate and withdraw at any time as the discussions continued.



#### *2.4 Measurements of Variables*

In this study the dependent variable was livelihood strategies (LS) with three non ordinal categories ((1) on-farm, (2) off-farm and (3) on-farm and off-farm). The independent variables were secure land access and six household socio economic characteristics. Secure land access was measured using four variables (1) household (hh) land size (hectares), (2) number of plots (number), (3) distance to farm (time in hours) and (4) possession of land title (0 = No, 1= Yes). Four households socio-economic characteristics hypothesized to influence choices of LS based on the literature as explained under section 1.2 include (1) educational attainment of hh head (number of years in school), (2) sex of hh head (0= female, 1= male), (3) size of hh labour force (number), and (4) location of the household (1= Mgeta, 0 = Mlali).

#### *2.5 Data Analysis*

Quantitative data obtained through the questionnaires were analyzed using SPSS. Descriptive statistics (means and frequencies) were determined to identify prominent livelihood strategies and the challenges associated with them. Qualitative data were analysed through content analysis method. Views, testimonies and narratives from the FGDs participants and key informants were outlined under the following themes; main sources of income and food, and challenges in relation to pursued LS. Triangulation of information was then done to answer the study's questions.

To assess the influence of land access and household socio-economic characteristics on household's LS, the study drew upon qualitative and quantitative data to elicit a comprehensive list of livelihood activities observed in the study area, and to determine their prevalence. Second, as proposed by the SLF (Sustainable livelihood framework), a study of household behaviour must consider that households can and often do engage in more than one livelihood activity and the combination of their activities is their LS. The study categorized the observed livelihood activities into three distinct groups of LS (1) on-farm (2) off-farm (3) on and off-farm activities based on the nature of activities (Scoones, 1998). In light of Pallant (2007) and Field (2009)'s assertion that multinomial logistic regression is the appropriate procedure to predict non ordinal

several categorical outcomes, the model was employed to analyse the influence of land access and household socio-economic variables on choices of LS.

Since the aim was to understand conditions under which households diversify their livelihoods, the category “on-farm” LS represented failure meaning that the household was not diversifying livelihoods. The other two categories of livelihood strategies (1) off-farm and (2) on and off-farm activities represented some form of success. In this case it makes most sense to use the category “on-farm” as a base for comparison. Preliminary analyses were conducted to ensure no violation of the assumptions of sample size, multicollinearity and outliers as advised by Pallant (2007) and Field (2009). The model is presented below:

$$P(y) = \frac{e^{\alpha + \beta_1 x_1 + \dots + \beta_k x_k}}{1 + e^{\alpha + \beta_1 x_1 + \dots + \beta_k x_k}} \text{ (Agresti and Finlay, 2009), Where:}$$

$P(y)$  = the probability of the success alternative occurring (for the purpose of this study a success is LS: 1 = On-farm, 2 = off-farm; 3= on and off-farm)

$e$ = the natural log,  $\alpha$ = the intercept of the equation,  $\beta_1$  to  $\beta_k$ = coefficients of the predictor variables and  $x_1$  to  $x_k$ = predictor variables entered in the regression model including land access variables and selected household socio-economic characteristics as presented in section 2.4.

Interpretation of the output from the model focused on  $\beta$ -coefficients for determining whether the direction of the predictor variable was positive or negative (positive values connoted a positive direction meaning that the variable increase the probability of the household to engage in high paying livelihood strategies; wald statistics for measuring the contribution or importance of each of the predictor variables on the predictive ability of the model (the bigger the value the greater the contribution of the respective variable); sig. (p-values < 0.05) for measuring the significance of the contribution of each of the predictor variable on the predictive ability of the model and the odds ratio (Exp(B) values) for explaining the chances for a household to gain secure access to land subject to a predictor variable or when a predictor variable is increased by one.

### 3.0 Results and Discussions

#### 3.1 Portfolio of Livelihood Strategies

The study examined the types of activities undertaken by each household member and the types of crops grown. The crops that were mainly grown for sale were grouped as cash crops and those grown for home consumption were grouped as food crops. Moreover, the observed livelihood activities were grouped into three livelihood strategies (1) on-farm (2) off-farm and (3) both on and off-farm activities. The study results on the various livelihood strategies practiced by household members in the study area and the types of crops grown are presented in Table 1. Some households were combining on-farm and off-farm activities 12% and 32% for Mgeta and Mlali respectively. The off-farm activities as mentioned by the FGD participants include local beer brewing, charcoal making, brick making, small scale carpentry, sale of crops and weaving. Other off-farm activities include small shops/ kiosks, food vending and motor bike transportation. Most of the mentioned off-farm activities are natural resource based indicating that land as a natural resource base is the key resource for the livelihoods of these people. In support of this, literature show that rural Tanzanians, derive more than 50% of their income from farming (URT, 2011; 2013).

**Table 1: Results of Descriptive Analysis Showing Portfolio of Studied Household's LS (n = 267)**

Livelihood Strategies (LS)		Mgeta n= 131		Mlali n= 136	
		Number	Percent	Number	Percent
<b>Types of activities</b>	On- farm	97	74.0	85	62.5
	Off- farm	19	14.5	6	4.4
	On and off-farm	15	11.5	43	31.6
<b>Types of crops</b>	Food	105	77.2	65	47.8
	Cash	5	3.7	9	6.6
	Food and cash	26	19.1	62	45.6

Relatively few households in Mlali (4%) compared to 15% of Mgeta households were not involved in farming activities. This can be attributed to a number of land access constrains as raised by the FGD participants and key informants. According to participants and key informants involvement in crop farming does not provide adequate income due to loss of soil fertility resulting from frequent soil erosions. They further pointed out that farm sizes have also shrunk due to repeated fragmentations to satisfy inheritance needs of the heirs. The study results further, show that households cultivate either food crops only (77% Mgeta, 48% Mlali) or both food and

cash crops (19% Mgeta and 46% Mlali). The main cash crops as mentioned by the FGD participants are tomatoes, cabbage, onions pulses and green vegetables. However, Mlali households also cultivate sunflower. According to Mgeta FGD participants the vegetables are grown on slopping plots where they are sure of getting irrigation water throughout the year. The findings on portfolio of LS suggest that 85.5% and 94% of Mgeta and Mlali households respectively depend on arable land and other natural resources for their livelihood.

### 3.2 Portfolio of Key Assets for Livelihood Diversification

The findings on the status of households' education attainment, skills and savings as well as access to credit are presented in Table 2. The study aimed at understanding the available assets at household level especially those necessary for livelihood diversification. Assets such as savings, land, education, labour skills and credit are necessary in enabling rural households and individuals to diversify their livelihoods meaningfully (Ellis 2000; Barrett *et al.*, 2001; Niehof, 2004; Simtowe, 2010). As shown in Table 2 more than 90% of the household heads in both sites had attained basic education only, indicating low capability for securing high paid jobs or engaging in high skilled business.

**Table 2: Results of Descriptive Statistics Showing Portfolio of Key Assets for LS Diversification (n = 267)**

Household Characteristics		Mgeta n = 131		Mlali n = 136	
		Number	Percent	Number	Percent
<b>Education level of household head</b>	Informal	8	6.1	25	18.4
	Primary	119	90.9	99	72.8
	Secondary	4	3.1	10	7.4
	Post sec training	-	-	2	1.4
<b>Have savings</b>	Yes	6	4.6	18	13.2
	No	125	95.4	118	86.8
<b>Reasons for not saving</b>	No surplus cash	113	86.3	116	85.3
	No bank nearby	13	9.9	2	1.5
<b>Access to credit</b>	Yes	8	6.1	31	22.8
	No	123	93.9	105	77.2
<b>Reasons for not accessing credits</b>	No facilities	10	7.6	12	8.8
	Cannot meet conditions	114	87.1	95	69.8

The results further show that, 86% and 85% of Mgeta and Mlali households do not earn enough to save implying that they cannot expand their livelihood options using own financial capital. Additionally, 87% and 70% of Mgeta and Mlali households could not meet conditions for securing credit necessary for expanding livelihood options. These findings suggest that the

capacity of surveyed households to diversify livelihoods independently was very low. This might be the reason for households to engage in LS just for survival (see findings on main LS under section 3.1). Probably if these households possessed labour skills, savings and access to credit they would have used them to engage in high paying LS. In support of this, Ellis (2006) and Niehof (2004) argue that assets such as labour skills (acquired through education and trainings), savings and access to credit are necessary in enabling rural households and individuals to diversify their livelihoods in a meaningful way. There is a need therefore, to enhance household's access to the above-mentioned assets through investing in education, training, savings and credit provision projects.

### ***3.3 Land Access Opportunities and Challenges in Relation to Pursued Livelihood Strategies***

Having observed that most households derive livelihoods solely from arable land, the study sought to understand opportunities and challenges related to land access in pursuit of LS. Reporting on challenges, Mgeta FGDs participants and key informants pointed out that arable land size and soil fertility were major constraints. As a consequence farmers have to find new land/farms far from their homes even outside Morogoro region (minimum distance was 10 km). This practice according to them presents a number of problems (feeding two homes, guarding, and transport of crops) as indicated in the following quotes;

*....There is not enough land in the neighborhood of many local communities...We are farming in Mikese; Gairo, Chalinze, even as far as Bagamoyo where we get virgin flat and large portions of land. Some people have started new homes but most of us stay out for the whole farming period.....We come back because here we are sure of getting water for irrigation of vegetables and domestic use. (FGD participants from Mgeta, May 2012).*

The arguments in the above quotes suggest that migrants and long distance trekkers are willing to settle in their destination villages if availability of irrigation and domestic water will be guaranteed. Seasonal land ownership/use can fuel land conflicts because owning land temporarily may lead to double land users who do not recognise each other. This is because although the Land Act number 4 and Village Land Act number 5 of 1999 require that each village to have a clear land use plan, most village governments are yet to implement this (LRRRI, 2009). Arguing on land conflict, Kombe (2010) point out that land conflicts at the local level can take a political dimension that may in turn hinder the socio-economic sustainability especially of the poor and can generally threaten peace and stability. The above mentioned

threats emanating from seasonal migration call for enhancement of tenure security through formalization of land titles.

Low soil fertility resulting from frequent erosion on sloping farms and consistent cultivation was according to the Mgeta FGDs participants a major cause of decreased yields. Additionally, the FGDs participants pointed out that soil infertility is compelling farmers to apply industrial fertilizer, which to them is very expensive as shown in the following quotes;

*... The top soil of our vegetable farms is always washed away by rain. Hence, unless we apply planting and growth boosting fertilizers, harvesting is not guaranteed.... The fertilizer is too expensive for us to afford ...*, (Mgeta FGD participants, May 2012).

The above argument indicates that the main source of cash for Mgeta households is constrained by high production costs suggesting the possibility of low or negative returns. Further, it was also pointed out by FGD participants that the main sources of domestic water are open water springs/streams. It is obvious that the eroded soil on which much of industrial fertilizers are applied is deposited in domestic water sources. This may lead to health hazards to the users of water.

### **3.4 Effects of Land Access (LA) and Household (hh) Socio-economic Variables on LS**

The multinomial logistic regression results on the influence of land access and household socio-economic variables on the choice of livelihood strategies are presented in Table 3. The model as a whole was statistically significant ( $p < 0.01$ ) and was able to explain 36% Nagelkerke R square of the variability in choices of livelihood strategies among the studied households. As shown in Table 3, unlike the hypothesis three variables namely location, land ownership and distance to farm statistically influenced households' diversification of LS ( $p < 0.05$ ). Location (1=Mgeta, 0=Mlali) positively influenced household to engage in off-farm activities ( $p = 0.02$ ). The change in odds of Mgeta households to diversify from on-farm to no-farm activities was 4.6. These findings suggest that, Mgeta households were about 5 times more likely to diversify from on-farm to off-farm activities. The results conform with the findings on the livelihood portfolio under section 3.1 showing that 15% of Mgeta households diversify livelihoods compared to 4% of Mlali households. Mgeta households presumably diversify livelihoods to avoid the risks associated with high costs of fertilizers and seasonal migration as pointed out under section 3.2.

Arguing on the same line Niehof (2004) and Ellis (2006) point out that risk management is a factor to diversification.

**Table 3: Results of Multinomial Regression on the Influence of LA and hh Socio-economic Variables on LS**

	B	Std Error	Wald	df	P value	Odds ratio	95% confidence Interval	
							Lower bound	Upper Bound
<b>Off-farm Vs On-farm</b>								
Intercept	-4.153	4.927	0.710	1	0.399			
Education level of household head	-0.049	0.133	0.135	1	0.714	0.952	0.733	1.237
Sex of household head	-0.104	1.011	0.011	1	0.918	0.902	0.120	6.540
Size of labour force	0.020	0.133	0.135	1	0.714	0.021	0.976	1.068
Location	1.700	0.768	4.894	1	0.027*	4.583	0.041	0.824
Distance	1.280	0.612	4.378	1	0.036*	3.595	1.084	11.922
Own land	-1.903	1.099	3.001	1	0.033*	0.149	0.017	1.284
Land size	-0.563	0.405	1.926	1	0.165	0.570	0.257	1.261
<b>On and off-farm Vs On-farm</b>								
Intercept	-2.515	2.817	0.797	1	0.372			
Education level of household head	-0.034	0.023	2.087	1	0.149	0.967	0.924	1.012
Sex of household head	-0.051	0.088	0.342	1	0.559	0.950	0.800	1.128
Size of labour force	0.021	0.409	0.003	1	0.959	1.021	0.458	2.275
Location	0.839	0.529	2.519	1	0.112	2.314	0.821	6.520
Distance	0.749	0.458	2.676	1	0.102	2.115	0.862	5.191
Own land	0.993	0.674	2.168	1	0.141	2.699	0.720	10.122
Land size	-0.846	0.621	1.854	1	0.173	0.429	0.127	1.450

Note:  $X^2 = 54.6$  (30,  $p = 0.004$ ) Cox and Snell 31% Nagelkerke 36%. \* significant at  $p=0.05$

Similarly, unlike the hypothesis, the distance from home to farm was positively and significantly ( $p = 0.04$ ) associated with households diversification to off-farm activities. The B value of 1.3 and Wald 4.37 tell us that as the distance to the farm increases so does the household's probability to diversify LS. The change in the odds of choosing off-farm than on-farm activities was 3.6 indicating that for each additional trekking hour, the probability for a household to diversify its LS is increased by a factor of 3.6. The explanation of this is that, households possessing distant farms diversify LS to avoid additional costs resulting from transportation, guarding and seasonal migration. Arguing on distant farming Kassali *et al.* (2009) point out that the hours and energy lost through trekking to distance farms could be properly invested in production. In support of this Morris *et al.* (2003) reported that some households diversify livelihoods in order to manage risks.

Unlike the hypothesis, ownership of land negatively influenced ( $p = 0.03$ ) the household's probability to diversify LS. The odds of households owning land to diversify LS was 0.45 indicating that, land owners were about 0.5 times less likely to engage in off-farm than on-farm activities. This can be attributed to the fact that land owners lack formal land titles of which they could use as collateral to access credit for starting up of high paying business. Formal land titles could also save to secure high price for land rentals or sell and the obtained funds could be invested in development of household labour skills through education and trainings. As a result even the land owners exhibited lack of necessary assets for rational diversification. For this reason the immediate LS option for households owning land is farming using endowed land.

The influence of location, and distance notwithstanding, the proportion of households found to have been diversifying livelihoods (19%) was smaller compared to the portion of households (68%) which did not have secure access to land (Lyatuu and Urassa, 2014). Moreover, households are diversifying livelihoods from farming to survival LS due to lack of necessary capital such as savings, education and training and credit for meaningful livelihoods diversification as pointed out under sections 3.1 and 3.2. In line with this argument Barrett *et al.* (2001) suggest that building of assets is necessary for independent diversification. The above-mentioned authors also argue that labour skills and education enhance individuals' ability to secure a well paid job while savings are necessary for rational migration and well paying businesses. Probably due to land insufficiency the studied households are forced to the observed survival activities as noted by Ellis (2006) that diversification can be undertaken as a coping strategy to the loss of capital assets needed for on-farm production such as decreased availability of arable land.

Additionally, land owners lacked formal land titles which could serve as collaterals, secure high price in land market (rentals/sells) to secure higher funds for expanding livelihood strategies or acquisition of skills and education appropriate for paying jobs and businesses (Bekele & Mekonnen 2010; Petracco & Pender, 2014). These findings by uncovering the constrains faced by households relative to meaningful adoption of livelihood strategies underscores the usefulness of sustainable livelihoods framework in analysing rural livelihoods for effective focus of poverty



interventions. The revealed weaknesses include lack of; registered land titles, capital for engaging in high paying non-farm livelihood strategies.

#### 4.0 *Conclusion and Recommendations*

The study examined the households' livelihood strategies portfolio, the availability of assets requisite for smooth diversification, challenges associated with the pursued livelihood strategies (LS) and the effects of land access on a household's choice of LS. Based on the study's observation it can generally be concluded that, farming remains the dominant household LS in the study areas. Nonetheless, households are facing some constraints in their farming activities namely shortage of arable land and loss of soil fertility. As a consequence, a significant proportion of households are coping with land shortage by diversifying to off-farm LS just for survival due to lack of formal land titles, labour skills, savings and capital for undertaking high paying LS. It is also concluded that those household located closer to the Uluguru Nature Reserve and those possessing distant farms are the most engaged in survival livelihood strategies as a means to avoid the risks of distant farming. Based on the above conclusions the government of Tanzania through its Ministry of Labour and Employment is advised to promote diversification of LS in the study area and those with similar context. Nonetheless, investment in education and labour skills training is crucial for a meaningful diversification of LS. In addition, households should be encouraged to save and their access to credit should be improved.

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