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IMPACT OF LIVELIHOOD STRATEGIES ON HOUSEHOLD WELLBEING IN LAND SHORTAGE VILLAGES OF MVOMERO DISTRICT, TANZANIA

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ABSTRACT
This paper examines a household's wellbeing status (HWBS) and its relationship with Livelihood Strategies (LS) and demographic characteristics (DC) in the land shortage villages of Mvomero District, Tanzania. Through a cross-sectional research design, a structured questionnaire was administered to 267 randomly selected households. The findings show that 95.3% of households were unwell expressly in Mgeta villages; only 6.7% formed a well-off category. Unlike the hypothesis, a combination of on and off-farm LS confirmed to have a positive significant influence ($p < 0.05$) on the likelihood for a household to be well-off, whilst sole farming demonstrated a negative influence. Likewise, unlike the hypothesis, location of a household and sex of its head verified to have a negative influence ($p < 0.05$) on the likelihood for a household to be well-off. It is concluded that the majority of households are not well and only a combination of on and off-farm LS enhance wellbeing except for female headed households and those located within shrunken arable land areas. Tanzania's Development agencies are advised to encourage LS diversification, relocation to land abundant area while paying special attention to female headed households.

Key terms: *Arable land, diversification, livelihood strategies, household Well-Being, farming*
Paper type: *Research paper*
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1.0 INTRODUCTION

The concept of wellbeing is currently used in defining people's welfare encompassing objective measures of achievement and as views of concerned individuals (Chambers *et al.,* 1997; Camfield et *al.,* 2010 Urassa, 2010). Consequently, Guardiola *et al.* (2013) suggest that effective poverty interventions should focus on how the poor conceptualize poverty and how they struggle to attain their Well-Being. Effective focus of poverty interventions is critical because worldwide, 1.4 billion people still live on less than USD 1. 25 a day and about 1 billion people are suffering from hunger (IFAD, 2012). According to IFAD (2012) the poorest rely on farming meaning that access to land is critical for their wellbeing.

Globally, factors such as need for bulk arable land for production of food and bio-fuels, conservation policies and high population growth have contributed to reduce access to arable land among the rural people (Robertson and Pinstrup,

2010; Smith *et al.,* 2013). High population pressure on arable land among villages bordering Tanzanian's nature reserves is a major issue (Kusiluka *et al.,* 2011; Mustalahti *et al.,* 2012; Nyenza *et al.,* 2013). Nevertheless, 90% of the inhabitants are employed in farming (Lopa *et al.,* 2012). In addition, other factors responsible for critical land scarcity in these villages are (a) the eviction of farmers from their former farms to give way for the establishment of reserves and (b) the farmer's preference of favourable weather for most crops and guaranteed water sources in Uluguru catchments. The sustainability of the reserve however, is uncertain because the bordering farms have shrunken hence, farmers are likely to encroach and degrade the reserve especially if the undertaken livelihood strategies do not ensure their wellbeing.

Consequently, this might negatively affect the supply of water to more than 4 million people and the general ecosystem (URT, 2013; Lopa *et al.,* 2012). This is because the economic activities through which studied households supplement farm income are linked to land and forest resources. Such activities include weaving, charcoal making, sell of fuel wood, brick making and carpentry (Lyatuu and Urassa, 2015). In that view when these people do not get satisfactory resources from own land the immediate source remain to be the adjacent reserves. These people therefore, in their efforts to meet daily needs or attain desired wellbeing may be forced to derive required resources from the reserves at any cost including flouting conservation restrictions. The wellbeing of the dwellers in villages adjacent to the reserve is therefore very important if the reserve is to remain sustainable (Naylor, 2011). Tanzania's National Land Policy of 1997 and the Land Act of 1999 have together been facilitating relocation from land scarce to areas of low population density without success (Lugoe, 2010). Despite the government efforts to encourage relocation, farmers in villages bordering Uluguru mountains are expanding farms through seasonal migration, trekking long distances and engaging in off-farm LS to cope with arable land shortage and complement the declining farm income (Lopa *et al.,* 2010). However, households lack labour skills, savings and credits necessary for engaging in high paying off-farm livelihoods strategies (Lyatuu and Urassa, 2015). This raises the query on whether the responses of households to land scarcity enable them to attainment wellbeing.

Further to the above, recent studies on rural livelihoods in Tanzania have reported that as a result of eviction from the Uluguru productive lands, farmers were unable to reorganize their livelihood strategies (Kusiluka *et al.,* 2011; Augustino *et al.,* 2013; Nyenza *et al.,* 2013). Moreover, Augustino *et al.* found that people were migrating and diversifying livelihoods to cope with the shortage of arable land. None of these studies however, has explained the link between the opted LS and household's wellbeing in land scarce areas. However, such information is necessary to inform the focus of poverty interventions in the land scarce areas. Moreover, other studies elsewhere (Barrett *et al.,* 2001; Urassa, 2010) have noted that household socio-demographic characteristics (HDC) such as a household head's age, sex and marital status as well as its location have significant influence on its wellbeing. In this view, it was important to critically analyse the link between pursued LS, HDC and WBS. This paper addresses the above-mentioned information gap by exploring the influence of LS and HDC on HWB in land scarce areas. Broadly, the paper answers the question; to what extent do households' responses to land scarcity facilitate the attainment of wellbeing? Specifically, the paper addresses the following questions; how do local people conceptualize their wellbeing? What is the status of household wellbeing? What is the influence of pursued LS and HDC on wellbeing? To answer the last question the paper tests the hypothesis that the odds of attaining wellbeing were the same among households venturing in different livelihood strategies.

1.1 Conceptualization of the Study

The conceptualization of this study was informed by the sustainable livelihood framework (SLF) and empirical literature. The sustainable rural livelihoods framework as outlined by Scoones (1998: 3) suggests that, any analysis of sustainable livelihoods should ask the following question:

> *Given a particular context (of policy setting, politics, history, agro-ecology and socio-economic conditions), what combination of livelihood resources (different types of 'capital') result in the ability to follow what combination of livelihood*

strategies (on farm, off-farm and migration) with what outcomes (including risk reduction, higher income, food security, environmental conservations and total wellbeing)?

The question depicts that any livelihood analysis intending to inform rural poverty interventions should focus on the link between livelihood assets, livelihood strategies and livelihood outcomes. Such an analysis leads to an appreciation of any strengths/ opportunities/ weaknesses/threats attached to the pursued LS. That kind of understanding may guide appropriate poverty interventions aiming at either promoting positive or discouraging negative aspects of LS for enhancing attainment of people's priorities (Ashley and Carney, 1999).

The literature further show that a household's socio-demographic characteristics such as educational attainment, dependency ratio, geographical location, sex and marital status of the household head have an influence on attainment of its Wellbeing(Barrett *et al.,* 2001; Urassa, 2010). For instance, Urassa (2010) point out that, higher educational attainment enhances attainment of Wellbeing because by using the attained skills and knowledge household members may engage in high paying LS thus, obtain reasonable income to improve its living standard. The geographic location has an important bearing on access to the key assets for engaging in high paying LS and ultimately attainment of livelihood goals (Urassa, 2010). Generally, households located in areas where population density is reasonably normal (51 persons per square Kilometers in Tanzania) and arable land is abundant are expected to be land secured. Using land as a collateral/rental or commodity such as households may secure financial and social capital useful for realising its livelihood goals.

Literature on livelihoods also point out the existence of a relationship between sex and marital status of a household's head and its attainment of wellbeing (Ellis and Biggs, 2001; Ellis, 2006; Urassa, 2010; Howe *et al.*, 2012). According to Urassa and Howe *et al.* women in Sub-Saharan Africa including Tanzania are deprived from socio-political participation, and economic opportunities. In that view the majority of female headed households (FHHs) are disadvantaged in terms of livelihood resources, information and technology necessary for attainment of wellbeing (Godfray *et al.,* 2010). Married women however, may gain access to resources through their husbands. In addition, literature (Ellis and Freeman 2004; Barrett *et al.,* 2001) also point out that, households with high dependency ratio face difficulties in attaining Wellbeing as they use most of their earnings in care and development of their large sized dependants.

Based on the framing of the SLF and the literature on the influence of household socio-demographic characteristics on its wellbeing, the study conceptualized that the type of a livelihood strategy undertaken by a household depends on its resource endowment and it can influence its attainment of desired wellbeing. Back to the context of arable land scarcity among farmers; it was conceptualized that farm households are less likely to attain desired levels of wellbeing because they are not land secured. Those households located within highly shrunken arable land such as Mgeta and those coping with land scarcity through venturing in exclusive off-farm LS were expected to lag below the well-off line because they lack land, a base resource for capital and services necessary for high paying off-farm LS. Moreover, households combining on and off-farm LS were expected to be well-off because they complement farm income with income from non-farm LS. Furthermore, female headed households were expected to be less well-off because they are deprived from access and control of social, political and economic resources. Moreover, households with high dependency ratios were expected to be less well-off compared to their counterparts because of their need to care and invest in their extra human resource.

1.2 Description of the Study Area

The study was conducted in Mlali and Mgeta Divisions of Mvomero District, Morogoro Region (Figure 1). The District is located between longitudes 37^0 10′ and 38^0 31′E and Latitudes 5^0 50′ and 70^0 4′ S with Uluguru Mountains rising at their highest parts to more than 2600 meters above sea level. Annual rainfall ranges 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). Such characteristics of weather attract many farmers hence, more than 150,000 people live on the slopes of the Uluguru Mountains and have their farms up to the nature reserve boundary (Lopa *et al.,* 2012). These farmers however, engage in seasonal migration to gain more land, they also diversify LS to complement farm income (Lyatuu and Urassa, 2015). In that view, it was considered that the study could offer appropriate results on the influence of LS on a household's Wellbeingin land scarce areas and with a possibility for results being applicable to other rural areas of Tanzania with similar context.

1.3 Study Design and Sampling Procedure

The study adopted a cross-sectional research design whereby qualitative and quantitative data were collected once from each village. This design was appropriate because it allows collection of data at a single point in a time, while enabling estimation of the prevalence of outcome of interest (household wellbeing in 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. Selection of respondents employed a multi-stage sampling procedure. First, two Divisions of Mgeta and Mlali were purposely selected because they both face arable land scarcity as reported by Kusiluka *et al.,* 2011). Second, 4 villages from each Division and thirty-four households from each village were randomly selected because they equally face land scarcity. The sample size of 34 cases per village is supported by Bailey (1998) and Kimia (2008) who argued 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 addition, Kothari (2004) point out that the sampling error can be reduced by increasing the sample size. In that view, 34 cases were expected to provide appropriate statistical analysis while minimizing sample errors such as lost or incorrectly filled questionnaires. Furthermore, 8-12 participants from each village were randomly selected to participate in focus groups discussions (FGD) 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 allow representation of views and opinions of males and female members from youths (18-35 years age), adults (36 – 55 years old) and the elderly (above 55 years of age).

1.4 Data Collection

Both quantitative and qualitative data were collected in order to allow the two methods to complement each other because each method has its strength and weakness (Tashakkori and Teddlie, 2010). Quantitative data on HWB indicators performance, HDC and types of LS undertaken by households were collected from 267 households using a structured questionnaire. Qualitative data on the conceptualization of a household's Well-Being, and challenges related to the pursued LS were collected through focus group discussions (FGDs) from each village using a checklist of items to guide the discussions.

1.5 Measurement of Variables

In this study the independent variables were LS and HDC (dummies of; on-farm LS, off-farm LS, and a combination of on and off-farm LS, sex of household head, location; 1= Mlali, 0 = Mgeta and number of dependants). The dependent variable was HWBS categorised into; (1) not well (2) moderately well-off and (3) well-off. A household's Wellbeingwas measured using six indicators as conceptualized in the study area and conforming to the Tanzania Rural Development Policy (URT, 2001). The selected indicators include; (1) extent of household's food self-provisioning defined as a household's ability to meet its annual food needs from self-production and receipts in kind either from labour transactions or claims (2) household's resilience ability defined as a household's ability to overcome risks while maintaining its assets (3) possession of sanitation facility defined as household's possession and use of modern toilet i.e. the one with a minimum depth of six feet, has pit lid, walled and roofed. The local toilet according to FGD participants and URT (2001) lack some of the qualities of modern toilet (4) possession of a decent housing condition i.e. a house made of concrete or burnt brick walls, corrugated iron sheet roof and cement floor (5) possession of durable assets such as water pump, milling machine, television set, solar panels, motorbike, and car (6) possession of semi-durable assets such as a bicycle, mobile phone and radio.

1.6 Data Analysis

Quantitative data obtained through the structured questionnaire were analysed using the statistical package for social sciences (SPSS) software. Descriptive statistics such as frequencies and percentages were determined to establish the performance of household wellbeing status (HWBS) indicators and the general HWBS. In determining HWBS, the study adopted the methods of constructing socio-economic status (SES) indices using data on household characteristics and asset ownership. This method employs data of household's assets such as durable and semi-durable goods to describe household welfare instead of using household's income or expenditure data (Kolenikov and Angeles, 2009; Howe *et al.*, 2012). The choice of the above method is based on the evidence that money metric measure is too narrow for defining a household's welfare and that the SES index is most likely to be consistent with the financial means (Vyas and Kumaranayake, 2006). In addition, the index requires less data intensive which result in smaller measurement. The method was appropriate for the current study because it uses household characteristics and asset ownership variables to estimate a household's welfare, the same variables are used to measure a household's wellbeing in the study.

Wellbeing indices were constructed using the set of indicators presented under section 2.4. Since data on household characteristics and asset ownership comprised multidimensional variables, Principal Component Analysis (PCA) was employed to organize and reduce dimensionality of variables with a minimal loss of information in the total variation explained (Vyas and Kumaranayake, 2006; Howe *et al.*, 2010). Basically, the PCA created weights, standard deviations and means for each variable. The outputs of PCA were two tables; the first table presented the means and standard deviations while the second table presented eight weights/component scores for each variable (Appendix 1). According to Vyas and Kumaranayake (2006) the first principal component for each variable is the measure of wealth. Following Vyas and Kumaranayake, this paper considered the first principal component for each variable to be the weighted measures of Well-Being. The obtained weights, means and standard deviations for each variable were substituted to Filmer and Pritchett (2001)'s asset index formula to construct a Wellbeingindex score for each household. The employed asset index formula is presented below:

Aj = f1 (a j1-a1) / (si) +…+ fn (ajn - an)/ (Sn) (Filmer and Pritchett, 2001; Howe *et al.*, 2010).

Aj = $\sum_{i=1}^{n} fi(aji - ai)/si$ where

A_j = Wellbeingindex for each household (j =1,……., n)

f_i = the weight for each Wellbeingindicator of a household (i =1,……,n)

a_{ji} = the i^{th} indicator of j^{th} household (i ,j =1,……,n)

ai = the mean of i^{th} indicator of household (i =1,……,n)

si = the standard deviation of i^{th} Wellbeingindicator of a household (i =1,…,n)

The assessment of the relationship between livelihood strategies, selected demographic characteristics and household-wellbeing followed two steps. First, households were categorised into three groups in order of; low - the not well or ailing households, middle – moderately well-off household and high comprising the well-off households based on the computed wellbeing index. The constructed household wellbeing index could be included as a continuous independent variable in a regression model; however, the estimated coefficient would be hard to interpret. To address the problem of interpreting estimates from the huge continuous indices, other studies have used cut-off points to differentiate households into broad socio-economic (SES) categories (Montgomery, *et al.* 2000; Filmer & Pritchett 2001; Houweling, *et al.*, 2003). Generally, a variable with a positive factor score is associated with higher SES, and conversely a variable with a negative factor score is associated with lower SES (Vyas & Kumaranayake, 2006). In view of the above fact, the paper considers households with a positive wellbeing index to be well- off, and those scoring negative to be not well.

The categorization of households into broad wellbeing categories in this paper employed visual binning procedure available under the transform option of SPSS menu. The calculated households' wellbeing indices ranged from -2 to 0.46. The distribution of households within the indices dictated only two cut-off points (-1. and 0.1) beginning at -2. Households were therefore, classified into three categories. The lower category comprised ailing households scoring from -2 to -1(52.8%), the middle group consist moderately well-off households scored between -1 and 0.1 (40.4%) and the third group encompassed the well-off households that scored 0.1 and above (6.7%). Second, a multinomial logistic regression was employed to assess the influence of pursued livelihood strategies and its socio- demographic characteristics on the likelihood for a household to be well-off. According to Pallant (2010) and Field (2013) multinomial logistic regression is the appropriate model to predict categorical outcomes with more than two categories such as the dependent variable in the current study. The model used is shown below:

$$P(y) = \frac{e^{\alpha + \beta 1x1 + \ldots \beta kxk \quad k}}{1 + e^{\alpha + \beta 1x1 + \ldots \beta kxk}}$$ (Agresti and Finlay, 2009).

Where:

P (y) = household's Well-Being, e= the natural log, α= the intercept of the equation, β_1 to β_k= coefficients of the predictor variables and x_1-x_k= predictor variables presented under section 2.4.

Qualitative data from the FGDs were analysed using content analysis and the obtained information was used to complement information obtained from analysis of quantitative data in answering the pre-determined research questions.

2.0 FINDINGS

2.1 Conceptualization of Wellbeing in the Study Area

The study determined the level of household wellbeing building on local people perspectives on the indicators of household wellbeing (HWB) complementing those highlighted in the Tanzania rural Development Strategy. Table 1 provides detailed description of the wellbeing indicators as conceptualized in the study area. According to FGDs participants both in Mgeta and Mlali a well- off household in the study area is the one which is food self-sufficient throughout the year, can use own savings to overcome shocks, can afford children education up to secondary level, possesses high valued assets or durable assets (car, milling machines, television set, solar panel), and modern house (roofed with iron sheets, walls made of concrete or burnt bricks and concrete floor). Further, they consider a household to be moderately well-of when it possesses moderate valued assets (bicycle, mobile phone, and radio) and can afford primary education for children.

2.2 Households Wellbeing Status as per Selected Indicators

The study assessed household's wellbeing status (HWBS) based on the developed HWBS index. The results on indicator performance and the general wellbeing status of individual households are presented in Table 2 and Figure 2 respectively. As indicated in Table 2, it was encouraging that though, 76% and 69% of Mgeta and Mlali households respectively possess local toilets at least 21.4% and 30.1% of them respectively possess improved toilets implying that they were at less risk of communicable diseases such as cholera and dysentery. The findings also show that 93% and 86% of Mgeta and Mlali households respectively were food self- provisioning throughout 2011 implying that they were secured in terms of food availability. However, the processes through which Mgeta households cultivate food involve wastage of extra production time through travelling to distant farms as reported by Lyatuu and Urassa (2014). This implies that the extra time spent on trekking to farms could have been properly invested on production hence; enhance realization of other livelihood priorities. Therefore, any strategy to reduce time spent on travelling to farms could contribute to improve progress in their realization of Well-Being.

Moreover, although the findings show that 100% of the surveyed houses were roofed with iron sheet, 58% and 54% of Mgeta and Mlali houses respectively were made of mud floor implying that more than half of the studied households

were not well-off in terms of housing condition. Table 2 also shows a high inequality in asset possession. The distribution of durable assets among Mgeta households was concentrated to 11.5% of households ranging from lack of car and solar panel to only 7% possessing television sets. In addition, durable assets were evenly distributed among 13% of Mlali households with 0.7% possessing water pumps and 2.9% possessing solar panels and motor cycles. Furthermore, findings shown in Figure 2 reveal that 36% of households in both sites were not well. Parallel to this, Table 2 shows that 57% and 81% of Mgeta and Mlali households respectively dispose assets in order to cope with risks meaning that they lack ability to overcome risks and shocks (resilience). The main disposed asset as mentioned by respondents was land, and was mostly done by Mlali households because they had larger portions of land relative to Mgeta. This finding predicts the high probability for many households becoming landless in future if their resilience is not enhanced.

Figure 2 show that Mgeta comprised a larger proportion (69%) of ailing households relative to Mlali households (36%). The higher incidence of ailing households in Mgeta than Mlali can be attributed to the arguments presented by the FGDs participants that, Mgeta households are forced to divide their labour seasonally following the need for men to gain additional farms through migration. According to the FGDs' participants, migration has led to many female headed households as some of the migrated men decided to re-marry and remain in villages of destination. Literature also shows that the divided household labour reduces productivity (Bebbington, 1999; Di Falco *et al.,* 2010).
Additionally, the FGD participants also pointed out that households located in Mgeta incur guarding and transportation costs for crops cultivated outside the resident villages. The FGDs participants also reported that, farmers are compelled to apply industrial fertilizer excessively on farms located in terrain slopping to improve fertility of the frequently eroded soil. The divided labour might be contributing to low productivity; likewise, the above-mentioned extra costs of production such as guarding and transportation costs might be reducing profitability hence, hindering the attainment of Well-Being. The findings on assets portfolio and general wellbeing connote that households' wellbeing attainment was insignificant; hence, predicting possibilities for households to encroach and degrade the neighbourhood reserve in their efforts to meet their daily needs.

2.3 The Influence of Livelihood Strategies on a Household's Well-Being

Multinomial logistic regression was used to test the hypothesis that the odds of households attaining wellbeing were the same among households venturing in different livelihood strategies under different socio-demographic background. Results of multinomial logistic regression are presented in Table 3. The model was statistically significant, χ^2 (10, n = 267) = 38.361, p = 0.000 indicating that it was able to distinguish between well-off, moderately well-off and not well households (Field, 2013). The model as a whole explained 32% (Nagelkerke R squared) of the variance in households' wellbeing. Unlike the hypothesis, the findings (Table 3) show that six variables as clarified in the following paragraph demonstrated to have a significant influence ($p < 0.05$) on the likelihood for a household to be well-off.

The B values and odds ratios for the variables measuring the influence of LS (farming, non-farm and combination of farming and non-farm LS) tell us that households engaged in diversity of LS (combination of farm and no-farm LS) were 3 times more likely to be well-off than being not well (Table 3). The values and ratios also show that those households engaged in on-farm LS alone were 3 times less likely to be well-off than being not well. These findings are explained by the arguments raised by FGD participants that households undertake multiple LS because farming alone does not offer sufficient earnings for meeting household's basic needs. FGD participants further reported that households use income from non-farm activities to purchase farm inputs and implements. It is therefore, very possible that those households engaged on farming solely remain unable to complement farm income and also to diversify risks related to farming, i.e. when crops and animals fail due to natural disasters, the suvivours remain unable to cultivate in the following season as they lack other sources of income. Therefore, such households fall into destitution. In line with the above argument, literature shows that livelihood diversification contributes about 30%-50% of rural Tanzanian household income (URT, 2011). The findings underscore the relevance of sustainable livelihoods framework especially its emphasis on

understanding the link between livelihood strategies and livelihood priorities for informed effective focus of poverty interventions. For instance, for this case it is evidently indicated by study findings that although the majority of households, venture on exclusive farming, only the combination of farm and non-farm LS has potential to enhance wellbeing in the study area. Consequently, the findings on the general household wellbeing show that majority of households were ailing whereby, only 6.7% of them had a positive index score and yet the scores were below 0.5 ranging from 0 - 0.46 meaning that they can fall in ill-being any time.

Furthermore, the odds ratios and B values for a variable measuring the influence of a household's location as presented in table 3 show that households located in Mlali demonstrated to be 2 times more likely to be well-off than being not well relative to those located in Mgeta. These findings agree with the findings on households' general wellbeing status (Figure 2) which indicated that Mgeta has greater proportion of ailing household than Mlali. The explanation for these findings can be attributed to the occurrence of higher costs of production among households located in Mgeta compared to the counterpart households located in Mlali. The production costs in Mgeta are inflated by demands for seasonal migration and frequent incidence of soil erosion. Seasonal migration compels households to incur double costs of family care; households also incur costs of guarding crops in fields and transporting the produce back home.

Seasonal Migration also leads to divided households' labour force as men work outside the resident villages; these obviously reduce the returns. A study on land access and livelihood strategies in Mvomero District reported that lack of irrigation water prevent migrants to settle in their destinations. In Mgeta they get irrigation water from nearby catchments which they use to irrigate vegetables; their cash crops (Lyatuu and Urassa, 2015). Moreover, soil erosion compels high demand for of industrial fertilizers which again the FGDs participants posed a concern that most of households do not afford hence, they obviously get little harvests. This finding implies that extra costs of production resulting from seasonal migration and high demand for industrial fertilizers contribute towards reducing Mgeta household's ability to attain wellbeing.

Similarly, the B value and odds ratio for a variable measuring the influence of a household head's sex verified that male headed households were 2.8 more likely to be moderately well-off and 3.5 times more likely to be well-off than being not well as compared to female headed households (FHHs). This can be attributed to the processes through which women become household heads in the study area. According to FGDs participants, women become de-facto heads due to death of male partner, divorce, abandonment/separation and male migration. In addition, though the studied community is matrilineal, ownership and control of resources particularly land is under the custodian of male relatives. Under such circumstance (FHHs) are also subjected to gender discrimination on resource ownership and control. In that view they also lack economic and social support from male partner/parent and remain vulnerable to social and economic exclusions. For example FGDs participants pointed out that it is very hard for a woman to access irrigation water because the management is always done during the nights when women are unable to move alone. However, the main source of cash income for farm households in the area as explained by FGD participants is sale of vegetables. The cultivation of vegetables according to FGDs participants depends solely on irrigation water implying that those FHHs which also do not have any adult male member are disadvantaged in getting income from cash crops because they fail to access irrigation water. This finding underscores the contribution of demographic characteristics especially the household head's sex on household's ability to attain wellbeing in the study area whereby, FHHs are disadvantaged.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the study's findings, it is concluded that in the study area wellbeing of a household is defined by its socio-economic characteristics including ownership of assets, housing condition, resilience and food self-provisioning ability. It is also concluded that generally, majority of households are not well as they lack most of qualities which to them are determinants of wellbeing. The paper also concludes that, neither sole farming nor exclusive non-farm livelihood

strategies (LS) enhance the attainment of wellbeing. Nonetheless, the combination of farming and non-farm LS (LS diversification) has a significant contribution on the attainment of wellbeing. However, the contribution of LS diversification on wellbeing is low because the players lack necessary capital such as labour skills, funds, and education for engaging in higher paying LS. In addition, female headed households (FHHs) and those located in highly shrunken arable land are disadvantaged in attaining wellbeing. There is a need therefore, to enhance the attainment of wellbeing in the area through improving LS, supporting FHHs to overcome social exclusion and helping households located in villages where land has been highly shrunken and soil has been exhausted to reduce the costs of transportation, guarding property and industrial fertilizers. Tanzania government and other development agencies are advised to promote diversification of LS in land scarce areas. A further analysis of gender specific constrains faced by FHHs towards attainment of wellbeing is necessary to inform specific interventions for enhancing their realization of Well-Being. However, for such strategies to be successful there need to be consideration for support of rational relocation from areas where land has highly shrunken (such as Mgeta) to areas with abundant land.

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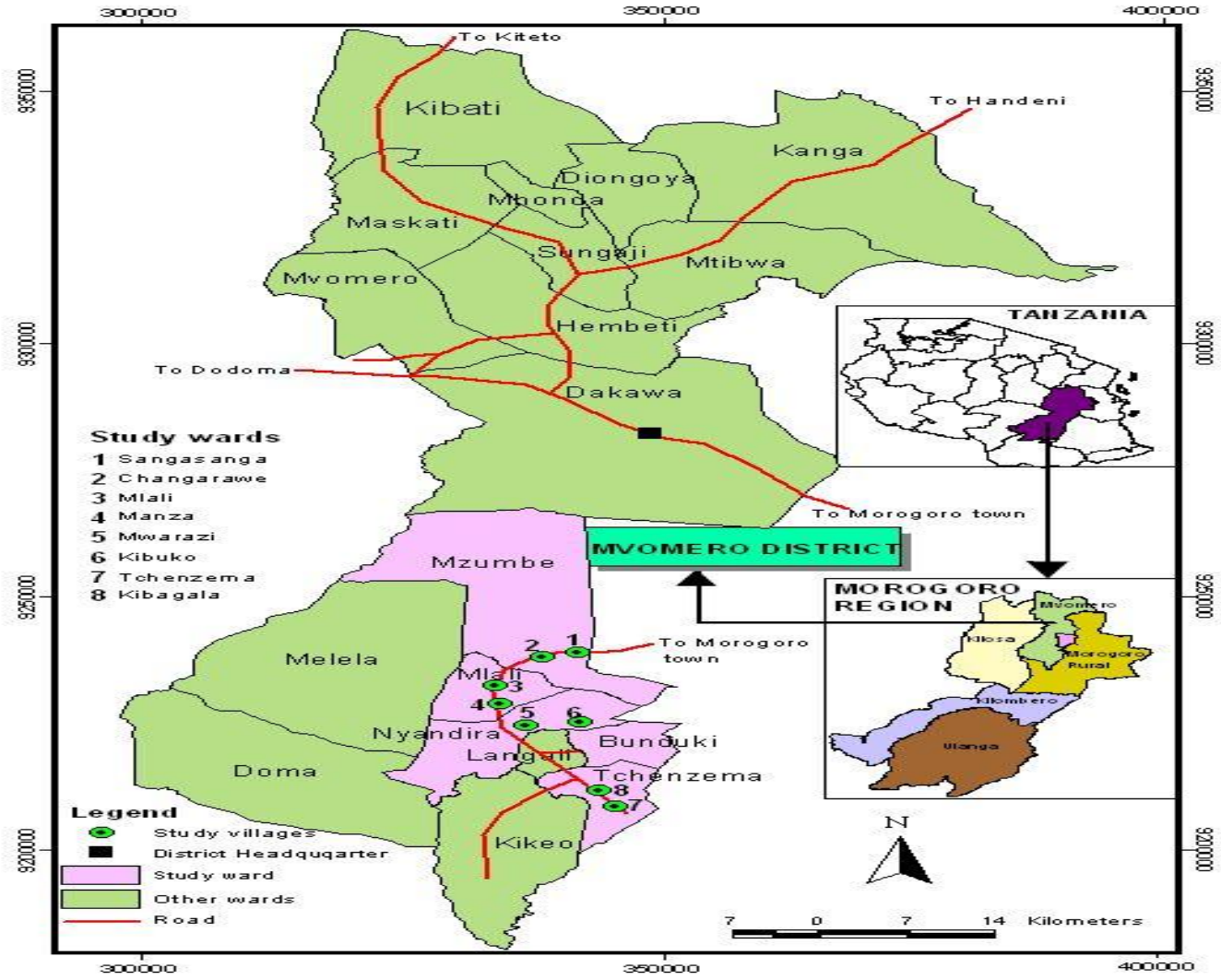
APPENDICES

Figure 1: Map of Mvomero District Showing Studied Villages



Source: Sketched by an expert at Sokoine University of Agriculture during field work

Table 1: Household's Wellbeing Status as Conceptualized in the Study Area

Indicator	Well-off Households	Moderately Well-off Households	Non well-off Households
Household's food provision	Self-provisioning	Receive food aids between harvest	Reduce consumption between harvest
Resilience ability	Use savings to overcome risks	Receive aids in time of risks	Sell assets to cope with risks
Type of toilet possessed	Modern toilet	Local toilets	Do not possess toilet
Housing wall material	concrete or burnt bricks	Walls made of mud bricks	poles and mud
Housing floor material	Floor is made of cement	Floor made of animal residue	Earth floor
Housing roof material	Roof is made of iron sheets	Roof made of animal residue	Thatch roofing
Portfolio of assets	Possess durable assets	Possess semi-durable assets	Lack semi and durable assets

Figure 2: Results of descriptive Analysis on Households' Wellbeing Status

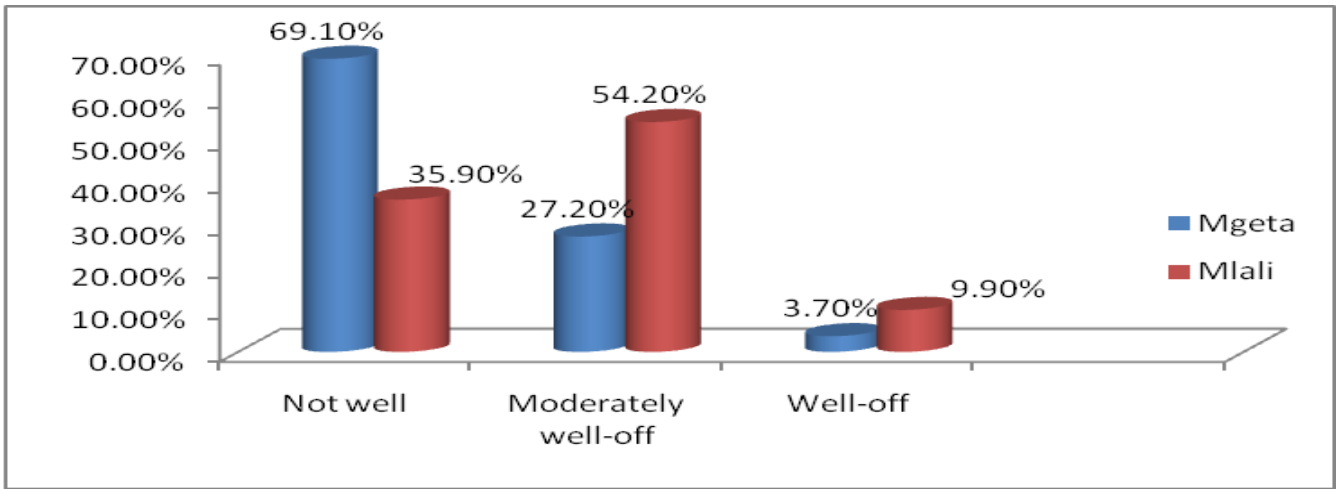


Table 2: Results on Households' Wellbeing Indicator Performance (n= 267)

Indicator	Variable	Mean	Std. Deviation	Component Score	Mgeta n = 131	Mlali n = 136
					Percent	Percent
Type of toilet	Improved toilet	0.2584	0.43859	0.557	21.4	30.1
	Local toilet	0.7266	0.44655	-0.620	76.3	69.1
	No toilet	0.0150	0.12171	-0.014	2.3	0.9
Resilience ability	Use own savings	0.1353	0.34208	0.007	19.8	7.4
	Receive aid	0.1729	0.37819	0.012	22.9	11.8
	Erode assets	0.6917	0.46178	-0.024	56.5	80.9
Housing condition	Burnt/concrete brick walls	0.6704	0.47095	0.046	50.4	83.1
	Mud brick walls	0.2547	0.43650	0.086	42	9.5
	Poles and mud walls	0.0749	0.26373	-0.026	7.6	7.4
	Cement floor	0.4419	0.49755	0.154	42	46.3
	Mud floor	0.5581	0.49755	-0.154	58	53.7
	Iron sheet roofing	0.000	0.0000	0.002	100	136
Possession of durable assets	Car	0.0075	0.08639	0.005	0	1.5
	Generator	0.0225	0.14849	0.000	1.5	2.9
	Water pump	0.0150	0.12171	0.002	2.3	0.7
	Solar panel	0.0150	0.12171	0.002	0	2.9
	Motor bike	0.0451	0.20755	0.002	0.8	2.9
	Television set	0.0451	0.20755	0.010	6.9	2.2
Possession of semi-durable assets	Bicycle	0.0377	0.19020	-0.033	6.9	0.7
	Radio	0.5581	0.49755	-0.056	59.5	52.2
	Mobile phone	0.4195	0.51671	-0.022	41.2	38.2
Food self -provisioning	Own source	0.8951	0.30696	0.003	93.1	86
	Receive food aid	0.0337	0.18082	0.023	2.3	4.4
	Reduce consumption	0.0712	0.25758	-0.080	4.6	9.6

Table 3: Results of Regression on the Influence of LS and HDC on WB

Household Wellbeing Status	Variable	B	Std. Error	Wald	df	Sig.	Odds Ratio	95% Confidence Interval for Odds Ratio	
								Lower Bound	Upper Bound
Moderate Vs not well	Intercept	0.466	0.562	0.686	1	0.407			
	Number of dependents	-0.194	0.106	3.344	1	0.067	0.823	0.669	1.014
	On-farm	0.046	0.517	0.008	1	0.928	1.048	0.380	2.887
	Off-farm	0.722	1.184	0.371	1	0.542	2.058	0.202	20.975
	On and off-farm	1.111	0.167	10.906	1	0.034	3.037	0.308	9.908
	Sex of hh head	1.036	0.359	8.329	1	0.004	2.818	1.394	5.695
	Location	0.729	0.368	3.926	1	0.048	2.073	1.008	4.264
Well Vs Not well	Intercept	0.605	0.561	1.163	1	0.281			
	Dependent	-0.123	0.115	1.140	1	0.286	0.884	0.706	1.108
	On-farm	-1.148	0.511	5.055	1	0.025	0.317	0.117	0.863
	Off-farm	0.657	1.165	0.318	1	0.573	1.928	0.197	18.919
	On and off-farm	1.100	1.144	4.925	1	0.036	3.003	0.319	8.252
	Sex of hh head	1.240	0.402	9.525	1	0.002	3.455	1.572	7.591
	Location	0.696	0.401	3.008	1	0.038	2.005	0.913	4.400

Appendix 1: Outputs of Principle Component Analysis for weighting the Indicators of Well-Being

Table 4: Descriptive Statistics of Principal Component Analysis

Wellbeing Indicator	Mean	Std. Deviation	Analysis N[a]	Missing N
Possess improved toilet	0.2584	0.43859	267	0
Possess local toilet	0.7266	0.44655	267	0
No toilet	0.015	0.12171	267	0
Use own savings	0.1353	0.34208	267	1
Receive aids	0.1729	0.37819	267	1
Erode assets	0.6917	0.46178	267	1
Burnt or concrete bricks	0.6704	0.47095	267	0
Un-burnt bricks	0.2547	0.4365	267	0
Poles and mud walls	0.0749	0.26373	267	0
Concrete floor	0.4419	0.49755	267	0
Mud floor	0.5581	0.49755	267	0
Animal dung floor	0	0	267	0
Possess car	0.0375	0.19023	267	0
Possess generator	0.0225	0.14849	267	0
Possess water pump	0.0599	0.23779	267	0
Possess solar panel	0.0599	0.23779	267	0
Possess motor cycle	0.0824	0.27548	267	0
Possess tv	0.0861	0.2811	267	0
Possess bicycle	0.1504	0.35744	267	1
Possess radio	0.5451	0.49796	267	1
Possess mobile phone	0.4307	0.50363	267	0
Is food self sufficient	0.8951	0.30696	267	0
Receive food aid	0.0337	0.18082	267	0
Reduce consumption	0.0712	0.25758	267	0
Own land	0.8614	0.34615	267	0
a. For each variable, missing values are replaced with the variable mean.				

Source: Analysis of field data

Table 5: Component Score Coefficient Matrix

	Component							
	1	2	3	4	5	6	7	8
Possess improved toilet	.557	.160	.009	.054	-.027	-.014	-.038	-.012
Possess local toilet	-.620	-.201	.009	-.083	.000	.013	-.002	.048
No toilet	-.014	.010	-.005	.008	.007	.000	.011	-.010
Use own savings	.007	-.008	.011	-.039	-.196	-.067	-.665	.020
Receive aids	.012	.015	.015	.001	.615	.021	.350	-.025
Erode assets	-.024	-.006	-.033	.051	-.487	.065	.471	.003
burnt or concrete bricks	.046	.100	.034	-.613	.064	.023	-.046	.049
Un-burnt bricks	-.086	-.082	-.003	.531	.002	-.065	.044	.031
Poles and mud walls	-.026	-.006	-.017	.022	-.037	.026	.000	-.046
Concrete floor	.154	-.609	-.009	.097	.006	.032	-.004	-.002
mud floor	.154	.609	.009	-.097	-.006	-.032	.004	.002
possess car	.002	.000	.000	-.001	.001	.007	.001	-.004
possess generator	.005	.000	-.005	-.003	-.003	.029	.004	-.008
possess water pump	.000	.000	.007	.001	-.003	.004	.002	.006
possess solar panel	.002	-.002	-.001	.000	-.006	.017	-.002	-.002
possess motor bike	.002	-.006	.006	.014	-.004	.041	.018	.017
possess television set	.002	-.005	-.016	-.004	.025	.055	.026	-.019
possess bicycle	-.010	-.019	.005	.022	.001	.028	.021	.015
possess radio	-.033	-.003	-.076	-.080	.027	-.133	-.033	1.027
possess mobile phone	-.056	-.096	.123	.045	-.075	.979	-.190	-.175
Is food self sufficient	.022	.010	-.618	-.012	-.013	.025	.064	-.069
Receive food aid	-.003	.001	.089	-.009	.009	.012	-.004	-.015
Reduce consumption	-.023	-.010	.392	.022	-.002	-.039	-.048	.080

Source: Analysis of field data