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Land Access, Livelihood Strategies and Rural Household Well-being in Mvomero District, Tanzania

Patricia Mwesiga Lyatuu [a]* and Justin Kalisti Urassa [b]

[a] Development Studies Institute, Sokoine University of Agriculture, Morogoro, Tanzania

[b] Development Studies Institute, Sokoine University of Agriculture, Morogoro, Tanzania.

* Corresponding author: mwesiga.patricia@gmail.com

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Abstract

Understanding the influence of specific livelihood variables on a household's well-being provides a crucial basis for effective focus of poverty intervention, and consequently wiser resource allocation. This paper analyses the influence of land access, livelihood strategies (LS) and selected demographic characteristics on household well-being status (HWBS) in Mvomero District, Tanzania. The study adopted a cross-sectional research design whereby quantitative data were collected once from 267 randomly selected households in 8 villages. Data analysis was done using SPSS. Unlike the hypothesis, multinomial logistic regression results demonstrated that per capita land size and location have a positive significant influence ($p < 0.05$) on HWBS. Likewise, unlike the hypothesis, three more variables including exclusive farming, number of dependents and distance to farms were confirmed to have a negative significant influence ($p < 0.05$) on well-being. It is concluded that though per capita land size has a positive influence on HWBS, expanding farms through adding plots and distant farming hinders the attainment of well-being. Moreover, households with many dependents and those working in exclusive farming are disadvantaged in the attainment of well-being. There is therefore room to enhance progress in attainment of well-being through reducing the distance to farms and promoting diversification of livelihood strategies. The Tanzania government is advised to support distant farmers with settlements in their destinations. The government and other development agencies are also advised to enhance the capacity of the studied communities and dwellers of other rural land scarce areas in Tanzania for a meaningful diversification of livelihood strategies. This can be through supporting them to gain education and labor skills and also to engage in saving and credits projects. To be inclusive the strategies may pay special attention to households with a large number of dependents.

1. Background information

The concept of well-being is used widely to describe people's welfare, including their achievements as per their own opinions and the established objective measures (Tinkler and Hicks **[1]**, OECD, **[2]**). According to Tinkler and Hicks **[1]**, people's well-being encompasses satisfaction of basic human needs and rights as being a crucial pre-requisite before people can flourish and live well. As pointed out by Smith et al. **[3]**, land provides humankind with a multitude of goods and services necessary for their well-being. Godfray et al. **[4]** and Smith et al. **[3]** reported that worldwide it is projected that, as we move towards a global population of 9–10 billion people by 2050, land availability becomes an ever more critical issue. Generally, studies such as Lotze et al. **[5]** and Naylor **[6]** have reported on the widespread existence of competing demands for land for provision of food, water, timber, energy, settlements, infrastructure, recreation and biodiversity.

Although Tanzania is blessed with abundant land, the 2012 national census (URT **[7]**) shows that distribution of its population, especially in rural areas, varies with levels of rainfall and land fertility. According to Sulle and Nelson **[8]**, the country has extensive areas of land with low levels of rainfall and/or poor soil fertility which consequently supports relatively low human population densities. Such areas display low intensity land uses such as nomadic pastoralism and shifting cultivation. For example, as demonstrated by **[7]**, while the current average of the national population density is 51 persons per square kilometer, it rises above 240 people per square kilometer in the rural water-rich highlands, thus creating shortages of arable land. Along with the above scenario, the 2011/2012National Household Budget Survey **[9]** reported that Tanzania has been challenged with chronic basic needs and food poverty for decades ranging from 34.4% in 2007 to 28.2% in 2012. In addition, 74% of the poor dwell in rural areas depending on subsistence farming as their mainstay and producing 90% of the country's food **[7]**.

According to Kabanza et al. **[10]**, high population density generally creates pressure on land leading to degradation and depletion of nature and hence impoverishment of humanity. Based on the above fact, the projected high population growth and general high dependency on subsistence agriculture for food and income predicts high demand for agricultural land. The fact that land is a limited resource which does not expand substantiates a possibility for overexploitation leading to land degradation and hence further impoverishment of the users. Bending **[11]** shows that in their efforts to overcome this adversity, development stakeholders have been implementing conservation initiatives with a high sense of ensuring secure access to land among the rural poor. However, as argued by Mattee et al. **[12]**, environmental conservation concerns may not receive farmers' immediate attention because of the lack of alternative ways of ensuring immediate well-being as a result of shrunken arable land. The success of conservation strategies therefore depends highly on the responses of the adjacent farmers which also depend on their ability to attain the desired well-being status through easy access to arable land and natural resources.

For the purpose of this paper the desired well-being status in the study area is defined by the following six indicators; a household's ability to (1) satisfy itself with food throughout the year, (2) bounce back from shock without depleting assets; (3) educate children above basic education, as well as (4) possession of durable assets such as a car, motorbike, generator, water pump machine and solar panels, (5) possession of a house roofed with iron sheets, walled with solid bricks, and floor made of cement, (6) a modern toilet with a 6 feet (1.83 meters) deep pit, a pit lead, roofed and walled. Furthermore the paper adopts the definition of access from Ribot and Peluso **[13]**; wherein access refers to the rights, structures and relations governing the ability to benefit from a resource. In this paper therefore, land access refers to various mechanisms through which the users gain, control and maintain arable land, including policies, institutions, type of land title possessed, patterns of land plots possessed such as size of land possessed, time taken to reach the farm and number of plots the household possess. The paper focuses on land plot patterns such as size and distance to farm as well as the number of separate plots a household possesses in defining secure access to land. Right-based mechanisms such as land titles are omitted because, as reported by Lyatuu and Urassa **[14]**, in the study area households lack formal land titles. Furthermore, the analysis of structures is beyond the scope of this paper.

Access to arable land among the dwellers of villages adjacent to Tanzania's nature reserves especially the Uluguru Nature Reserve (UNR) is a major issue (Kusiluka et al. **[15]**, Nyenzaet al. **[16]**).However, 90% of inhabitants are employed in agriculture and therefore land is their key production resource (Gereau et al. **[17]**). Despite the widespread empirical evidence on the high dependency of rural dwellers on arable land, their prolonged poverty and the various livelihood hardships resulting from the shrunken access to the resource, as pointed out by some scholars such as Robertson and Pinstrup **[18]**; Coulthard et al. **[19]**; Taheripour*et al.* **[20]** and Rulliet al. **[21]**, empirical evidence on the direct influence of land access on the well-being of the users is not readily available. For example, Kusiluka et al. **[15]** and Nyenza et al. **[16]** reported that dwellers of the aforementioned villages could not organize alternative livelihood strategies after eviction from former farms to allow the development of the UNR. As demonstrated by Lyatuu and Urassa **[22]**, these people do not attain the desired well-being status.

According to Lyatuu and Urassa **[22]**, the most ailing households are those employed in sole farming and exclusive non-farm LS. Lyatuu and Urassa **[22]** also reported that the majority of households remain in exclusive farming and/or survival livelihood strategies because they lack capital such as labor skills, savings and credits for meaningful diversification of livelihood strategies. The variation of ways through which rural poor access the land might be contributing to their chronic poverty regardless of the pursued LS. The above observation poses a question on the extent to which access to land and ability to diversify livelihood strategies contribute to the realization of well-being among these communities. The answer for the above questions

could guide the appropriate focus of poverty interventions for wiser allocation of resources, as suggested by Farrington et al. **[23]** in the DFID's sustainable livelihoods framework. It was therefore important to isolate the predictive ability of land access and that of livelihood strategies to build an appropriate model for enhancing progress in attainment of well-being among the studied communities and the dwellers of other rural areas of Tanzania with similar contexts.

In addition to the above, few studies into the link between land access variables such as land size, fragmentation, distance to farms and the consequent livelihood outcomes are available in Asia and in a few African countries such as Nigeria and Rwanda, including Rabirou et al.2012 **[24]** and Deininger **[25]**. Rabirou et al. **[24]** found that distance to farm negatively influenced productivity of farmers in Nigeria, and concluded that a provision of motorized transportation to farmers could improve production and the consequent livelihood outcomes. Relationships between the aforementioned variables however, are context specific, as shown by Greene and Merrick **[26]**.Hence, an analysis that involves contextual variables could generate the most appropriate empirical evidence for use in poverty interventions.

This paper therefore addresses the aforementioned concerns. Focusing on Mvomero District, Tanzania, the paper analyses the influence of land access, livelihood strategies and some selected household demographic characteristics on HWBS. By doing so the paper exposes the most influential factors between land access and the pursued livelihood strategies, thus enhancing prioritization of resources for poverty reduction in the area and any area with a similar context. The paper tests the hypothesis that, the odds of attaining well-being were the same among households accessing land in different ways and undertaking varied livelihood strategies.

1.2 A Theoretical Conceptualization of Land Access and Household Well-being

Two strands of literature on land and rural household well-being informed the conceptualization of this paper. The first one promotes equitable distribution of land as a means of tackling rural poverty (Tollens **[27]**; Griffin et al. **[28]**; Akram **[29]**; Lee et al. **[30]**; Robertson and Pinstrup 2010 **[18]**; Vermeulen and Cotula **[31]**, Rulli et al. **[21]**). According to Lee et al. **[30]** and Griffin et al. **[28]**, a pro-poor land policy is likely to raise yields and agricultural output, leading to higher total factor productivity, raised average incomes, reduced inequalities and, hence reduced poverty. In support of the above, Breman and Wiradi **[32]** and Byres **[33]** argue that access to land is linked to access to capital; access to capital determines the types of non-farm activities that households can become involved in, and therefore the likely returns (well-being or ailing).

The above perspective, however, has been highly criticized by the promoters of industrialization and urbanization (Bebbington **[34]**; Rigg **[35]**; Xu **[36]**; Krausmann et al. **[37]**). The argument pursued by these scholars is that access to land does not offer a solution to rural poverty, because the nature and direction of growth is progressively eroding the central role of land in rural livelihoods, whereby there is rapid diversification of rural livelihoods, high mobility, and an increase in non-farming opportunities. Using evidence from the economic revolution in China, HyVan and Unger **[38]** point out that remaining in farming may lead to a stagnation or decline in livelihoods. According to HyVan and Unger **[38]**, the living standards of Chinese households that remained in agriculture stagnated and in many cases they declined with sole farmers very noticeably hurt. Arguing in that same direction, Kabeer et al. **[39]** note that the ability of household members to diversify out of farming determines their level of well-being. These scholars emphasize that policies should be aimed at assisting agricultural transformation, whereby small scale farmers are replaced by large scale farmers.

This paper argues that the promotion of industrialization and urbanization is only likely to succeed in improving rural livelihoods in circumstances where there is a vibrant industrial sector able to absorb rural workers. Such a condition is currently not available in Tanzania (Lugoe **[40]**; Coulson **[41]**). In addition, the World Bank **[42]** and Coulson **[41]** emphasize that small-scale farmers are the agents for bringing about more production. Moreover, Lugoe points out that the concentration of land in the hands of the dominant class may worsen the livelihood of the majority small-scale farmers. In support of the above fact, Magongo and Da Corta **[43]** offer empirical evidence on how large-scale farmers got control of land in Newala District, and turned small farmers into wage laborers who could no longer make a sufficient living. Based on the above facts, the argument pursued by this paper is that increasing size of land holdings and decreasing distance to land holdings coupled with gradual promotion of non-farm activities may be the best poverty reduction policy option.

In line with the above, the literature shows that the patterns of land plots possessed and used by a household have a significant bearing on its earnings and ultimately general well-being. For example, Akram**[1][29]**and Ali and Pernia **[44]** reported that the incidence of rural poverty in rural Asia was inversely related to the size of landholdings, decreasing from landless to sub-marginal, marginal to small, then to large farmers. Comparative to the above, Boughton et al. **[45]** pointed out that earnings increase at a sharp rate as one moves into the upper end of land distribution in Mozambique. In Addition, evidence from Madagascar lead Cadot et al. [46] to conclude that private asset accumulation especially land is a prerequisite for smallholders to escape from poverty, and Rabirou et al.**[24]** added that accumulation of land may be a prerequisite for smallholders to escape from subsistence production.

Further to the above, Hau and Von **[47]**; Carlos **[48]**; and Kassali et al. **[49]** point to the existence of a relationship between distance to farms and livelihood outcomes. For example, Hau and Von **[47]** reported that a reduction in distance by 1%through resource reallocation led to an increase in productivity of 0.94% in Thailand. In support of the above, Carlos **[48]** reported that a farmer's productive performance was negatively related to distance and, therefore, concluded that reduced distance improves farmers' integration into the market. Moreover, Lyatuu and Urassa **[22]** in the study on livelihood strategies and household well-being in Mvomero District

found that the number of dependents in a household, its location and sex of its head have a significant influence on its well-being. It was therefore assumed that, the isolation of the impact of each of the above identified variables on household well-being in the study area could better guide poverty interventions, leading to wiser allocation of scarce resources.

2. Methodology

2.1 Description of Study Area

The study was conducted within the villages bordering the Uluguru nature reserve in Mgeta and Mlali Divisions of Mvomero District, Morogoro Region, Tanzania (**Figure 1**). Mvomero District lies 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 the highest parts to more than 2600 meters above sea level (Mitinje et al. **[50]**.The Uluguru Mountains form an important biodiversity area as they constitute the Uluguru Nature Reserve (UNR). The dwellers of villages that border the reserve as reported by Kusiluka et al. **[15]** and Lopa et al. **[51]** are faced with a shortage of arable land and their access to meaningful employments uncertain. Based on the above characteristics of the study area, it was assumed that the district could offer reasonable results on the influence of land access and livelihood strategies on household well-being in the context of land scarcity with a possibility of being applicable to other rural areas of Tanzania with a similar context.

2.2 Sampling Procedure

The study employed a multi-stage sampling procedure. Firstly, in the Morogoro region, Mvomero District, two divisions, Mgeta and Mlali, were purposely selected due to the existence of shortage of arable land among farmers (Lopa et al. **[51]**; Gereau et al. **[17]**). Secondly, two Wards from each division Nyandira and Tchenzema (Mgeta) and Mlali and Mzumbe (Mlali) and two villages from each Ward were selected at random. Villages fromMgeta division include Mwarazi, Kibuko, Tchenzema and Kibagala, while those from Mlali division were Mlali, Manza, Changarawe and Sangasanga. A total of 34 households from each village were selected based on the fact that, regardless of the population size, the minimum sample or sub-sample size of 30 cases is appropriate for research in which statistical data analysis is to be done (Vaus **[52]**; Kothari **[53]**; Kimia **[54]**). The plan was to have a total sample size of 272 but the actual sample was 267 because five questionnaires were not completed correctly.

2.3 Data Collection

A structured questionnaire was used to collect quantitative data on household composition, ownership of land, types of land titles, size of possessed farm, number of separately located plots for the possessed farms, and time taken to trek from home to the farms. Other collected data include possession of durable and semi-durable assets, state of housing condition, type of toilet, food self-provisioning, and types of shocks encountered as well as the ways through which households address these shocks.

2.4 Measurements of Variables

The dependent variable, household well-being status (HWBS), was measured in three categories (i) not-well (ii) moderate (iii) well-off. The independent variables were: (1) access to land (per capita land size in ha, time to farm in hours and number of plots), (2) sex of hh head (0= female, 1= male), (3) number of dependents (number) and (4) location of household (0= Mgeta, 1 = Mlali), (5) livelihood strategies (LS) including (i) on-farm LS, (ii) off-farm LS and (iii) combination of on and off farm LS.

2.5 Data Analysis

Analysis of the collected data was done using SPSS, whereby descriptive statistics such as frequencies, percentages and means were obtained to explain the selected household demographic characteristics assumed to influence the attainment of well-being. Further inferential statistics were obtained to assess the impact of land access and livelihood strategies on each household's well-being. The paper adopted the variables of well-being and livelihood strategies from Lyatuu and Urassa **[22]**. The authors grouped livelihood activities into three categories based on the nature of activities. The categories are (i) On farm LS, (ii) off-farm or non-farm LS and (iii) the combination of on and non-farm LS. Further, Lyatuu and Urassa **[22]** estimated the well-being of households in the study area based on the data on which this paper is also based. Using the methods of constructing socio-economic status (SES) indices, Lyatuu and Urassa **[22]** developed a well-being index for each household. Thereafter the well-being indices were used to group households into the following categories (1) not well, (2) moderately well-off and (3) well-off.

Based on the nature of the adopted dependent variable (three categories of household well-being status), multinomial logistic regression was used to determine the influence of land access, livelihood strategies and selected household demographic characteristics on HWBS. According to Field **[55]**, the model is appropriate for assessing the outcome with more than two categories such as the case of the dependent variable under study (well-being) as it constitutes three categories. The model used is presented below.

$$P(y) = \frac{0e^{\alpha + \beta 1x1 + \ldots \beta kxk \quad k}}{1 + e^{\alpha + \beta 1x1 + \ldots \beta kxk}}$$ Agresti and Finlay, 2009 **[56]**

Where: P (y) = the probability of a household to be well-off, e= the natural log, α= the intercept of the equation, β_1 to β_k= coefficients of the predictor variables and x_1 to x_k= predictor variables entered in the regression model as presented under section 2.4.

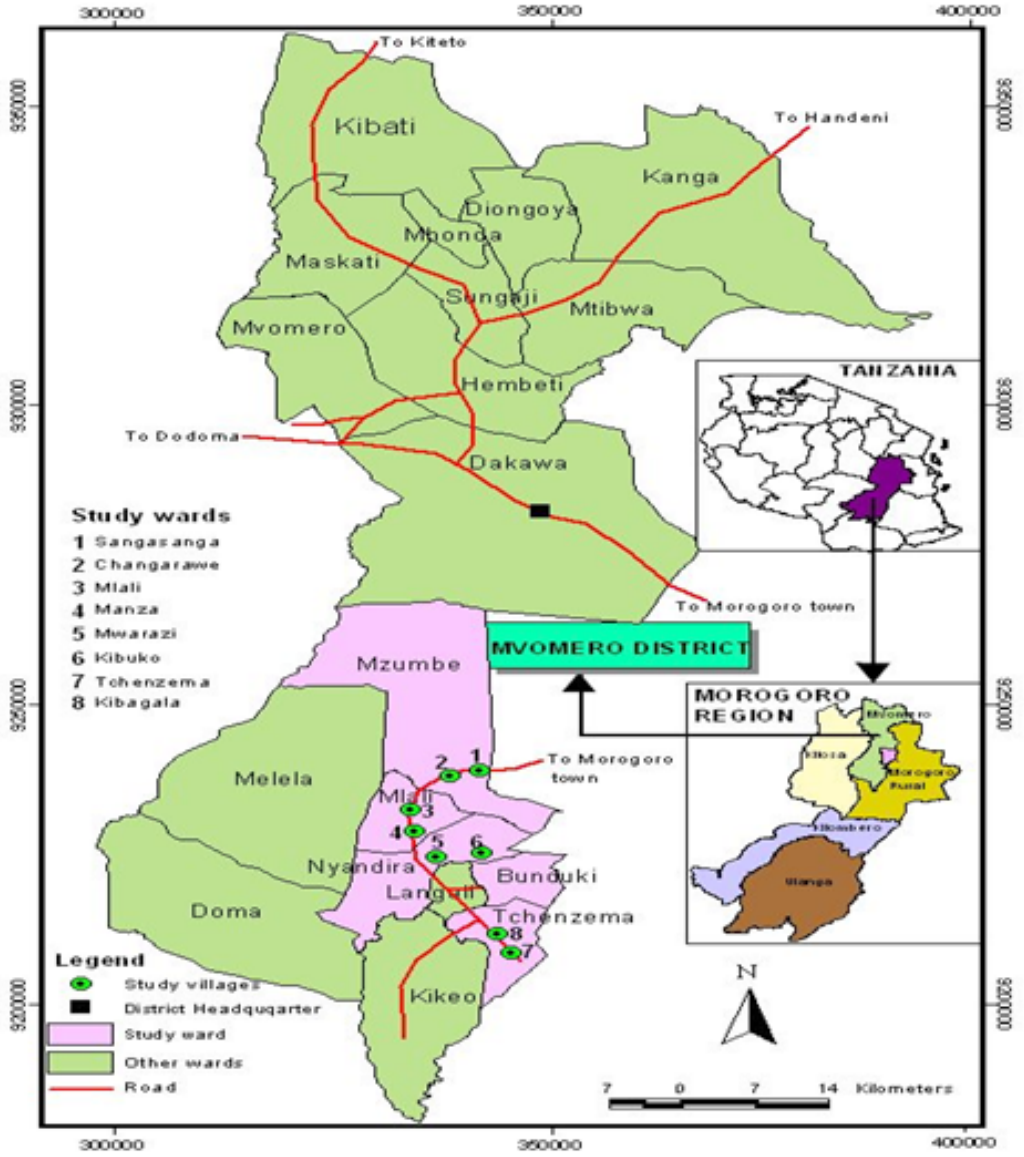

Figure 1: Map of Mvomero District Showing Studied Villages

3. Results and Discussions

3.1 Selected Households Demographic Characteristics (HDC)

Results on the distribution of socio-demographic characteristics assumed to have influence on the attainment of the studied households' well-being are presented in **Table 1**.

Table 1 shows that 81% of the studied households' heads were aged between 22-60 years meaning that they are energetic and active, and hence able to work hard and provide for their families. However, the table also shows that the proportion of female headed households (32%) was above the national proportion of 25% as reported by NBS **[9]**.The explanation for this, according to Lyatuu and Urassa **[22]**, is that a significant proportion of men from Mgeta villages had migrated to gain more land in land-abundant villages and abandoned their families. This implies that such households face some kind of social exclusion and are therefore limited in their capacity to provide for their dependents, as pointed out under section 1.2. Moreover, Table 2 shows that 94 percent of household heads were illiterate, informally educated, or attained a maximum of basic education implying that they lack education and skills necessary for engaging in higher paying livelihood strategies as pointed out by Brown et al. **[57]**. Although the results show that the mean per capita land size was 0.2 ha, they also show high concentration of land ownership whereby, 55.5% of households fell below the mean (**Table 1**), meaning that the majority lack a reasonable amount of arable land.

Table 1: Results of Descriptive Statistics Showing the Distribution of Selected Household Socio-demographic Characteristics within the Studied Households

Character	Groups	Frequency	Percent
Age of household head	22 - 35	64	23.8
	36 - 60	154	57.4
	Above 60	49	18.2
Sex of household head	Female	87	32.6
	Male	180	67.4
Education level of household head	Illiterate	25	9.4
	Informal	8	2.9
	Basic	49	16.8
	Above basic	16	6
Number of dependents	1 - 4	191	71.5
	above	21	7.8
Per capita land size	0	43	16.1
	0.04 - 0.39	105	39.3
	0.6 - 1	73	27.2
	1.08 - 2	36	13.6
	2.5 - 4	10	3.7

Note: the mean forhousehold head's age was 22; mean number of years in school of household heads was 3 years, mean number of dependents was 4 and that of per capita land size was 0.2 ha.

3.2 The Influence of Land Access, LS and Selected HDC on Well-being

Results on the influence of land access, livelihood strategies and selected household socio-demographic characteristics are presented in **Table 2**. The model was significant at p = 0.000 and explained up to 58.6% Nagelkerke, implying that it was able to differentiate between well-off and un-well households (Field **[55]**). Unlike the hypothesis, six variables were verified to have an influence on the likelihood for a household to be well-off at p < 0.05. Per capita land size was confirmed to have contributed the highest impact, followed by location (dummy of Mlali). The odds ratios for the two variables tell us that an increase of a unit size of land leads to an increase in the odds of a household being well-off by a factor of 34.2 for well-off and by a factor of 29.4 for moderately well-off households.

Moreover, households located in Mlali were 18.1 times more likely to be well-off and 8 times more likely to be moderately well-off than being not well, compared to those located in Mgeta. The results can be explained by the fact that Mgeta villages border the Uluguru Nature Reserves; hence their farm lands have been shrunken due to eviction to give way to the establishment of the reserve, as reported by Nyenza et al. **[16]**.Furthermore, the topography of Mgeta villages is hilly and thus it does not favor possession of larger farms unlike the plains of the Mlali villages. As a result of the above factors, Mgeta farmers possess smaller farms as compared to Mlali farmers, as pointed out by Lyatuu and Urassa **[14]**. These findings underscore the positive contribution of land size on HWBS. In line with the above results, Ali & Pernia **[44]** reported that the incidence of India's rural poverty was inversely related to the size of landholdings. The above findings and the fact that 55.5% of households possess less than the mean per capita land size in the area (**Table 1**) confirm that insecure access to land is the major factor behind the majority of households' failure to attain well-being, as reported by Lyatuu and Urassa **[58]**.

The variable measuring sole farming demonstrated a significant influence (p < 0.05) on household well-being. According to the respective B value and odds ratio, households undertaking exclusive farming are more than six times less likely to be well-off and more than 4 times less likely to be moderately well-off than being ailing. These findings can be attributed to the fact that those households depending solely on farming lack other sources of income to diversify the risks which are associated with farming. As a result such households fall into poverty even when they are exposed to simple risks which they could manage independently. This result emphasizes the importance of LS diversification in land-scarce areas to complement any reductions in farm income. Consequently, Ellis and Freeman 2004 **[59]** and Gereau et al. **[17]** point out that diversification contributes 30%-50% of rural households' income.

Likewise, as hypothesized, the variable measuring number of dependents demonstrated a significant influence (p < 0.05) on HWBS. The odds ratio of 0.73 and a negative B value demonstrate that with each additional dependent, the odds of an increase in HWBS decline by a factor of 0.27. This can be explained by the fact that a household with a larger number of dependents is obliged to invest most of its income on the maintenance and development of its extra human resource. As a result when other factors remain constant, such households invest less in other aspects of well-being. Ellis and Freeman **[59]** and Urassa **[60]** also reported similar findings. These findings call for poverty interventions with a special focus on households with more than 4 dependents; the average number of dependents in the area (**Table 1**).

Similarly, unlike the hypothesis, the combination of farm and non-farm livelihood strategies was confirmed to have a significant (p < 0.05) impact on HWBS. The respective B and odds ratios show that households venturing in diversity of LS were 1.1 times more likely to be well-off. The explanation for the above finding is that the respective households take advantage of complementary income from various LS to overcome some livelihood risks. Lyatuu and Urassa **[22]** also reported that on-farm and non-farm LS in the study area depend on each other, whereby income from one type of LS is reinvested in the other. Similarly, unlike the hypothesis, the distance to farm demonstrated a significant negative influence (p < 0.05) on the likelihood for a household to be well-off. The respective B value and odds ratio show that for each extra trekking hour a household's probability to attain well-being is reduced by a factor of 1. This result emphasizes the importance of secure access to land for rural household's well-being, whereby in this case one dimension of insecure access to land, the long distance to the farm, was seen to have a negative influence on well-being. The result implies that those households wasting much of their productive time in farming were not attaining well-being.

Table 2: Results of Descriptive Statistics Showing the Distribution of Selected Household Socio-demographic Characteristics within the Studied Households

HWBS	B	Std. Error	Wald	df	Sig.	Odds ratio	95% Confidence Interval for odds ratio	
							Lower Bound	Upper Bound
Well-off Vs Not-well								
Well-off Intercept	-6.189	1.638	14.276	1	0.000			
Household head's age	-0.003	0.016	0.040	1	0.841	0.997	0.966	1.029
Household head's	0.107	0.097	1.232	1	0.267	1.113	0.921	1.346
Number of dependents	-0.310	0.136	5.186	1	0.023	0.734	0.562	0.958
Sole farming	-1.844	0.731	6.355	1	0.012	6.320	1.507	26.502
Sole non-farm activities	1.770	1.134	2.435	1	0.119	5.870	0.636	54.197
Diversity of LS	0.000	0.000	0.000		0.000	0.000	0.000	0.00
Household's location	-2.897	0.530	29.815	1	0.000	18.114	6.404	51.235
Time to farm	0.236	0.130	4.275	1	0.050	1.266	0.981	1.634
Number of plots	-0.369	0.148	0.202	1	0.613	0.691	0.517	1.924
Per capita land size in ha	3.532	0.579	37.218	1	0.000	34.205	10.996	106.402
Moderate Vs Not-well								
Intercept	-6.864	1.837	13.971	1	0.000			
Household head's age	-0.002	0.019	0.009	1	0.926	0.998	0.962	1.036
Household head's	0.121	0.114	1.130	1	0.288	1.129	0.903	1.412
Number of dependents	-0.162	0.157	1.058	1	.0.044	0.651	0.625	1.158
Sole farming	-1.436	0.789	3.311	1	.0.43	4.205	0.895	19.757
Sole non-farm activities	0.650	1.337	.236	1	0.627	1.916	0.139	26.350
Diversity of LS	0.000	0.000	0.000		0.000	0.000	0.000	0.00
Household's location	-2.073	0.604	11.799	1	0.001	7.951	2.436	25.952
Time to farm	0.275	0.141	3.826	1	0.050	1.317	0.999	1.736
Number of plots	-0.268	0.168	2.549	1	0.110	0.765	0.551	1.063
Per capita land size in ha	3.381	0.590	32.871	1	0.000	29.413	9.258	93.446

$\chi 2$ (20, n = 267) = 187.519, p = 0.000, Cox and Snell 50.5%; Nagelkerke 58.6%

4. Conclusions and Recommendations

The aim of this paper was to assess the impact of land access and livelihood strategies on household well-being in the context of land scarcity. The paper tests the hypothesis that the odds of attaining well-being were the same among households accessing land in different ways and undertaking varied livelihood strategies. Based on the empirical evidence presented under sections 3.0-3.2, it is concluded that per capita land size of a household makes a significant contribution to its well-being. Additionally, though households expand farms through farming on distant and separate plots the practice limits their ability to realize well-being meaning that it is the land which is located within their residence that enhances their well-being. Moreover, having a larger number of dependents and working in exclusive farming hinders the attainment of well-being in the study area. It is also concluded that households lack capital such as education, skills, savings and credits for engagement in meaningful non-farm activities. The Tanzania government, through the Ministry of Land and Human Settlement and the National Commission for Economic Empowerment, is advised to improve the attainment of well-being in the area through increasing the size of land holdings and up-scaling the capacity for meaningful diversification of livelihood strategies. Interventions may focus on supporting settlements in villages with distant farmer destinations. To be effective, the above strategy should be combined with promoting diversification of livelihood strategies through supporting households to gain education, skills, and also engage in savings and credits projects. Special attention on households that have a large number of dependents is recommended for strategies to be inclusive.

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6. References

[1] L. Tinkler and S. Hicks, "Measuring subjective well-being," in Social Indicators Research vol. 114, no.1, pp 73-86. Aug. 2013. Doi: http://dx.doi.org/10.1007/s11205-013-0384-x.

[2] M. OECD, *OECD Guidelines on Measuring Subjective Well-being*. OECD, pp 139-178. Mar. 2013. Doi: http://dx.doi.org/10.1787/9789264191655-7-en .

[3] B. W. Smith, J. Dalen, K. Wiggins, E. Tooley, P. Christopher, and J. Bernard, "The brief resilience scale: assessing the ability to bounce back," *Int. J. Behav. Med.*, vol. 15, no. 3, pp 194–200, Sep. 2008. Doi: http://dx.doi.org/10.1080/10705500802222972

[4] H. C. J. Godfray, J. R. Beddington, I. R. Crute, L. Haddad, D. Lawrence, J. F. Muir, J. Pretty, S. Robinson, S. M. Thomas, and C. Toulmin, "Food security: the challenge of feeding 9 billion people," *science*, vol. 327, no. 5967, pp. 812–818 Jan. 2010. Doi: http://dx.doi.org/10.1126/science.1185383

[5] H. Lotze-Campen, A. Popp, T. Beringer, C. Müller, A. Bondeau, S. Rost, and W. Lucht, "Scenarios of global bioenergy production: the trade-offs between agricultural expansion, intensification and trade," *Ecol. Model.*, vol. 221, no. 18, pp. 2188–2196, Sep. 2010. Doi: http://dx.doi.org/10.1016/j.ecolmodel.2009.10.002

[6] R. Naylor, "Expanding the boundaries of agricultural development," *Food Secur.*, vol. 3, no. 2, pp. 233–251, Apr. 2011. Doi: http://dx.doi.org/10.1007/s12571-011-0123-6

[7] URT-United Republic of Tanzania.*2012 Population and Housing Census.*National Bureau of Statistics Ministry of Finance Dar es Salaam and Office of Chief Government Statistician President's Office, Finance, Economy and Development Planning Zanzibar: 264 pp, 2013. Available: http://www.meac.go.tz/content/2012-population-and-housing-census

[8] E. Sulle and F. Nelson, *Biofuels, land access and rural livelihoods in Tanzania*. IIED, 2009. 85 pp. Available: http://pubs.iied.org/pdfs/12560IIED.pdf

[9] National Bureau of Statistics (NBS) (Tanzania). Tanzania Household Budget Survey 2011/12. Dar es Salaam, Tanzania: 201pp, 2014. http://www.nbs.go.tz.

[10] A. Kabanza, S. Dondeyne, J. Tenga, D. Kimaro, J. Poesen, E. Kafiriti, and J. Deckers, "More people, more trees in South Eastern Tanzania: local and global drivers of land-use/cover changes," *Afr. Geogr. Rev.*, vol. 32, no. 1, pp. 44–58, Jun. 2013. Doi: http://dx.doi.org/10.1080/19376812.2012.746093

[11] T. Bending, "Monitoring Secure Access to Land: Progress and Prospects," *Land Monit. Handb. ILC Rome*, 2010. Available: http://www.landcoalition.org/sites/default/files/documents/resources/monitoring_secure_access_to_land_final.pdf

[12] A. Z. Mattee, C. P. I., Mahonge, J. V. Nsenga, and H. Kayeye, "Linking Livelihood Improvement and Environmental Conservation: Case of East Uluguru Mountains in Tanzania," 2013.IJESMER, Vol. 2 no.3. pp. 106-116, Jul. – Aug., 2013. http://www.ijesmer.com

[13] J. C. Ribot and N. L. Peluso, "A Theory of Access*," *Rural Sociol.*, vol. 68, no. 2, pp. 153–181, Jun. 2003. Doi: http://dx.doi.org/10.1111/j.1549-0831.2003.tb00133.x

[14] P. M. Lyatuu and J. K. Urassa, "Land Access and Associated Factors in Densely and Sparsely Populated Areas: Mvomero District Tanzania," *Intersect Stanf. J. Sci. Technol. Soc.*, vol. 8, no. 1, Nov. 2014. Available: http://ojs.stanford.edu/ojs/index.php/intersect/article/view/633

[15] M. M. Kusiluka, S. Kongela, M. A. Kusiluka, E. D. Karimuribo, and L. J. Kusiluka, "The negative impact of land acquisition on indigenous communities' livelihood and environment in Tanzania," *Habitat Int.*, vol. 35, no. 1, pp. 66–73, Jan. 2011. Doi: http://dx.doi.org/10.1016/j.habitatint.2010.03.001

[16] O. M. Nyenza, E. F. Nzunda, and J. Z. Katani, "Socio-ecological resilience of people evicted for establishment of Uluguru Nature Reserve in Morogoro Region, Tanzania," Forests, Trees and Livelihoods, vol. 22, no. 3, pp. 190–203, Sep. 2013, Doi: http://dx.doi.org/10.1080/14728028.2013.810405.

[17] R. E. Gereau, M. Kariuki, P. Muoria, P. K. Ndang'ang'a, and C. Werema, "Biodiversity status and trends in the Eastern Arc Mountains and coastal forests of Kenya and Tanzania region, 2008-2013 /," 2014, Monograph, Bor.Lif.Int. Doi: http://dx.doi.org/10.5962/bhl.title.96053

[18] B. Robertson and P. Pinstrup-Andersen, "Global land acquisition: neo-colonialism or development opportunity?" Food Sec., vol. 2, no. 3, pp. 271–283, Jul. 2010.Doi: http://dx.doi.org/10.1007/s12571-010-0068-1

[19] S. Coulthard, D. Johnson, and J. A. McGregor, "Poverty, sustainability and human wellbeing: A social wellbeing approach to the global fisheries crisis," *Glob. Environ. Change*, vol. 21, no. 2, pp. 453–463, May 2011. Doi: http://dx.doi.org/10.1016/j.gloenvcha.2011.01.003

[20] F. Taheripour, T. W. Hertel, and J. Liu, "The role of irrigation in determining the global land use impacts of biofuels," *Energy Sustain. Soc.*, vol. 3, no. 1, pp. 1–18,2013.Doi: http://dx.doi.org/10.1186/2192-0567-3-4

[21] M. C. Rulli, A. Saviori, and P. D'Odorico, "Global land and water grabbing," *Proc. Natl. Acad. Sci.*, vol. 110, no. 3, pp. 892–897, Jan 2013. Doi: http://dx.doi.org/10.1073/pnas.1213163110

[22] P. M.Lyatuu, and J.K. Urassa, "Land Access and Livelihood Strategies in Mvomero District, Tanzania". International Journal of Physical and Social Sciences (5): 3. 257-276, Apr 2015. Available: https://www.academia.edu/11688346

[23] J. Farrington, D. Carney, C. Ashley, and C. Turton, *Sustainable livelihhods in practice: early applications of concepts in rural areas*. Nat. Res. Pers. vol. 42. ODI.Jun.1999. Available: https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2877.pdf

[24] K. Rabirou, A. B. Ayanwale, E. O. Idowu, and S. B. Williams, "Effect of rural transportation system on agricultural productivity in Oyo State, Nigeria," *J. Agric. Rural Dev. Trop. Subtrop. JARTS*, vol. 113, no. 1, pp. 13–19, 2012. ISSN: 1612-9830 Available: http://www.jarts.info/index.php/jarts/article/view/2012061541307

[25] K. W. Deininger Challenges Posed by the new wave of Farmland Investment." *The Journal of Peasant Studies* 38 (2): 217–47, Mar 2011. Doi: http://dx.doi.org/10.1080/03066150.2011.559007

[26] M. E. Greene and T. Merrick, "Poverty reduction: does reproductive health matter?" HNP, the WB. Jul 2005, 107pp. Available: http://hdl.handle.net/10986/13722

[27] E. Tollens, "The challenges of poverty reduction with particular reference to rural poverty and agriculture in Sub-Saharan Africa," in *Keynote address presented at the Seminar on Rural Poverty Reduction "Harvesting the IFAD-BSF Synergies Sep 17, 2002", IFAD, Brussels*, Work.Pap. 67, 2002.38pp. http://ageconsearch.umn.edu.

[28] K. Griffin, A. R. Khan, and A. Ickowitz, "Poverty and the Distribution of Land," *J. Agrar. Change*, vol. 2, no. 3, pp. 279–330.Jul 2002. Doi: http://dx.doi.org/10.1111/1471-0366.00036

[29] A. H. Akram-Lodhi, " (Re)imagining Agrarian Relations? The World Development Report 2008: Agriculture for Development ," Development and Change, vol. 39, no. 6, pp. 1145–1161, Nov. 2008. Doi: http://dx.doi.org/10.1111/j.1467-7660.2008.00511.x

[30] D. Lee, B. Neves, K. Wiebe, L. Lipper, M. Zurek, and others, "Rural poverty and natural resources: Improving access and sustainable management," *ESA Work. Pap.*, no. 09–03, 2009. Available: https://www.ifad.org/documents/10180/122db54c-27d1-4cd7-9d57-f4b3e607c263

[31] S. Vermeulen and L. Cotula, "Over the heads of local people: consultation, consent, and recompense in large-scale land deals for biofuels projects in Africa," *J. Peasant Stud.*, vol. 37, no. 4, pp. 899–916. Oct 2010. Doi: http://dx.doi.org/10.1080/03066

150.2010.512463

[32] J. K. R. Breman and G. Wiradi, Good Times and Bad Times in Rural Java: Case Study of Socio-Economic Dynamics in Two Villages towards the End of the Twentieth Century," Economic Development and Cultural Change, vol. 53, no. 3, pp. 760–762, Apr. 2005. Doi: http://dx.doi.org/10.1086/426417

[33] T. J. Byres, "Introduction: Contextualizing and Interrogating the GKI Case for Redistributive Land Reform," Journal of Agrarian Change, vol. 4, no. 1–2, pp. 1–16, Jan. 2004. Doi: http://dx.doi.org/10.1111/j.1471-0366.2004.00070.x

[34] A. Bebbington, "Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty," World Development, vol. 27, no. 12, pp. 2021–2044, Dec. 1999. Doi: http://dx.doi.org/10.1016/s0305-750x(99)00104-7

[35] J. Rigg, "Land, farming, livelihoods, and poverty: Rethinking the links in the Rural South," World Development, vol. 34, no. 1, pp. 180–202, Jan. 2006. Doi: http://dx.doi.org/10.1016/j.worlddev.2005.07.015

[36] C. Xu, *The evolution of Chinese entrepreneurial firms: Township-village enterprises revisited*, IFPRI vol. 854, Disc. Pap. 00854. Intl Food Policy Res Inst, Apr 2009, 67pp. Available: http://www.ifpri.org./sites/default/files/publications/ifpridp00854.pdf

[37] F. Krausmann, K.-H. Erb, S. Gingrich, H. Haberl, A. Bondeau, V. Gaube, C. Lauk, C. Plutzar, and T. D. Searchinger, "Global human appropriation of net primary production doubled in the 20th century," *Proc. Natl. Acad. Sci.*, vol. 110, no. 25, pp. 10324–10329, Jun. 2013. Doi: http://dx.doi.org/10.1073/pnas.1211349110.

[38] L. HyVan & J. Unger, "Wealth, power, and poverty in the transition to market economies: the process of socio-economic differentiation in rural China and northern Vietnam". *The China Jour.No.* 40, pp 61–93, Jul. 1998. Doi: http://dx.doi.org/10.2307/2667454

[39] N. Kabeer, "Agency, Well-being & Inequality: Reflections on the Gender Dimensions of Poverty," *IDS Bull.*, vol. 27, no. 1, pp. 11–21, Jan. 1996. Doi: http://dx.doi.org/10.1111/j.1759-5436.1996.mp27001002.x

[40] F. N. Lugoe, "Land–Pillar No. 5 of Kilimo Kwanza," *Ocas. Pap. DILAPS.* Sep. 2010, pp 1 – 13. http://www.dilaps.or.tz/downloadfiles/3/Pillar%205%20of%20KILIMO%20KWANZA.pdf

[41] A. Coulson, *Kilimo Kwanza: A new start for agriculture in Tanzania*. Pol. Br. IGC. Apr 2012. pp 1 - 6.

[42] W. Bank, *World development report 2008.*Oct. 2007, pp 1 – 386. Doi: http://dx.doi.org/10.1596/978-0-8213-6807-7

[43] J. Magongo and L. da Corta, "Evolution of Gender and Poverty Dynamics in Tanzania," SSRN Electronic Journal. Doi: http://dx.doi.org/10.2139/ssrn.1896143

[44] I. Ali, and E.M. Penia, Infrastructure and poverty reduction – what is the connection? ERD Policy Brief No. 13, Ec. & Res. Dep. Manila, Philippines: A. D. B.2003, 292 pp.

[45] D. Boughton, D. Mather, C. B. Barrett, R. Benfica, D. Abdula, D. Tschirley, and B. Cunguara, "Market participation by rural households in a low-income country: An asset-based approach applied to Mozambique," *Faith Econ.*, vol. 50, no. 1, pp. 64–101, 2007.

[46] O. Cadot, M. Olarreaga, and L. Dutoit, "How Costly Is It For Poor Farmers To Lift Themselves Out Of Poverty?," Policy Research Working Papers, Apr. 2006. Doi: http://dx.doi.org/10.1596/1813-9450-3881

[47] A.M Hau, and M. Von, "Rural Market structures and the Impact of Market Access on Agricultural Productivity" in Doi Inthanon Villages. International Symposium Sustaining Food Security and Managing Natural Resources in Southeast Asia-Challenges for the 21st Century – Jan. 2002, Chiang Mai, Thailand.11p.

[48] M. A. Carlos Andrés Alpízar, "Risk coping strategies and rural household production efficiency: Quasi-experimental evidence from El-salvador," *Ph Diss. Present. Grad. Sch. Ohio State Univ.*, 2007, 296 pp. Available: https://etd.ohiolink.edu/rws_etd/document/get/osu1180206697/inline

[49] R. Kassali, A. B. Ayanwale, S. B. Williams, and others, "Farm location and determinants of Agricultural productivity in the Oke-Ogun Area of Oyo State, Nigeria," *J. Sustain. Dev. Afr.*, vol. 11, no. 2, pp. 1–19, 2009. Available: http://www.academia.edu/9481057/FARM_LOCATION_AND_DETERMINANTS_OF_AGRICULTURAL_PRODUCTIVITY_IN_THE_OKE-OGUN_AREA_OF_OYO_STATE_NIGERIA

[50] E. Mitinje, J. F. Kessy, and F. Mombo, "Socio-Economic Factors Influencing Deforestation on the Uluguru Mountains, Morogoro, Tanzania. *Discov. and Innov,* vol.19, no. 1-2, Jul. 2007. Doi: http://dx.doi.org/10.4314/dai.v19i1-2.15780

[51] D. Lopa, I. Mwanyoka, G. Jambiya, T. Massoud, P. Harrison, M. Ellis-Jones, T. Blomley, B. Leimona, M. van Noordwijk, and N. D. Burgess, "Towards operational payments for water ecosystem services in Tanzania: a case study from the Uluguru Mountains," *Oryx*, vol. 46, no. 01, Jan. 2012.Pp. 34–44. Doi: http://dx.doi.org/10.1017/S0030605311001335

[52] D. A. de Vaus, "Research Design," Encyclopedia of Social Science Research Methods, 2004. Doi: http://dx.doi.org/10.4135/9781412950589.n854.

[53] C. Kothari, "Research Methodology; Methods and Techniques, 2nd ed. New Delhi, India.New Age Int. 2004, 401pp. ISBN (13): 978-81-224-2488-1. Available: http://www.suza.ac.tz/saris/download/132376585119680689-Research-MethodologyMethods-and-Techniques-by-CR-Kothari.pdf%202.pdf

[54] M. Kimia. "*Research Methodology; Guidance to Researchers in Colleges and Universities with Some Review Questions"*. Prompt, Arusha, 2008. 100pp

[55] A. Field, *Discovering statistics using IBM SPSS statistics*, 3rded.Sage, 2013, pp 952.

[56] A. Agresti and B. Finlay, "Statistical methods for the social sciences: With SPSS from A to Z: A brief step-by-step manual, 2009, 609 pp.

[57] D. R. Brown, E. C. Stephens, J. O. Ouma, F. M. Murithi, and C. B. Barrett, *Livelihood strategies in the rural Kenyan highlands*. Cornell University, 2006.

[58] P. M. Lyatuu and J. K. Urassa. "Livelihood Strategies and Household's Well-Being in Land Scarce Areas: Evidence from Mvomero District, Tanzania"Submitted to Ufahamu: A Journal of African Studies. Apr. 2015, 21pp.

[59] F. Ellis and H. A. Freeman, "Rural Livelihoods and Poverty Reduction Strategies in Four African Countries," *J. Dev. Stud.*, vol. 40, no. 4, pp. 1–30, Apr. 2004. Doi: http://dx.doi.org/10.1080/00220380410001673175

[60] J. K. Urassa, "Rural household livelihoods, crop production and well-being after a period of trade reforms: a case study of Rukwa, Tanzania," University of Sussex, 2010, 247pp Available: http://sro.sussex.ac.uk/2484/