

Does Land Matters for Poverty Reduction? Empirical Evidence from Land Access and Entitlement in Tanzania

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Abstract: Despite that land is an important factor of production and an asset to both firms and households, its contribution to poverty reduction in LDCs is still controversial. One factor that significantly influence the value of land is marketability and land use alternatives which is still limited in developing countries like Tanzania. This study aims at empirically analyzing how land is important for poverty reduction by investigating the effect of land entitlement and access to the household consumption. Specifically, the study employs Tobit regression model to examine the relationship between land ownership and household consumption. Moreover, the study employs logit model to analyze the probability of the household being non-poor given land ownership and/or access status. In this case households are grouped as poor if their per capita weekly food consumption is lower than a given threshold value according to the national official level of consumption that is required to meet a given level of calories per adult. The study used national panel survey data wave 4 (2014/2015) which is nationally representative to examine the relationship between land ownership and poverty reduction in Tanzania. The results show that owning land does not necessarily improves household level of consumption since the size of land owned by the household does not significantly affect the level of per capita household consumption. Specifically, compared to households with no land, households with land had lower per capita consumption. On contrary having a land entitlement certificate significantly improves household per capita consumption. The study found that among those households owning land, household with land ownership certificate have significantly higher per capita consumption compared to those with no land certificate. The findings imply that land tenure policy in developing countries and particularly Tanzania should therefore focus on improving legal land ownership among households for welfare and economic improvement.

Key words: Household Consumption; Household Welfare; Land Tenure, Poverty, Tobit Regression.

JEL Classification: I31, I32, P46, Q15, R14.

I. INTRODUCTION

Land, a place where people inhabit and produce is so fundamental to the livelihood of human beings. From an economic perspective, land is a factor

of production necessary for any other factor to work and produce. A worker cannot spend his time and other resources on air and yet expect to deliver tangible product. As a result, land and land policies are so fundamental to sustainable economic growth/development and economic opportunities of the people (Klaus Deininger, 2003).

Meinzen-dick (2009) and Meinzen-Dick, Quisumbing, Doss, & Theis (2019) documents that land is a critical asset for both rural and urban poor and having protected land rights matters in poverty reduction. It dictates people's livelihood through production and sales of commodities (crops and other agricultural produce), thus, land access and ownership are amidst the most notable determinants of society's well-being. In the same vein, K. Deininger, Jin, & Nagarajan, (2009) acknowledge that land provides not only a framework for undertaking various social and economic activities but also it is a basis for well-functioning of both markets and non-market institutions. For instance, (Klaus Deininger, 2003) show that agriculture and land are important in the social and economic development in Africa. In view of this, owing to the utility importance of land access and ownership, K. Deininger *et al.*, (2009) proposes proper land policies as being crucial and vital to sustainable societal wellbeing, especially to rural and urban poor.

The link between poverty reduction and property rights (rights to ownership of properties) is discussed in vast literature. Studies show that poverty is not only related with lack of current income but also lack of appropriate assets necessary to generate income. It is also acknowledged in some literatures that though most of rural and urban poor live in informal dwellings due to lack of access to land, yet, in case they have access to, their rights to the land may not be formally known. In such situations, studies show land titling as an intervention towards ensuring rights to land ownership hence force reducing poverty, (Meinzen-dick, 2009). Evidence from socioeconomic studies show that land rights gives a room for disadvantaged groups to own and make proper use of the land and such access and/or ownership can increase productivity, especially in agriculture and thereby reduce poverty. Therefore, land as an asset can increase people's income, generate employment opportunities and dictate food prices (Schneider & Gugerty, 2011).

Cotula *et al.* (2006) document the interlink age between land access, ownership and poverty reduction in Africa, Asia and Latin America. The study considers land to be an important asset to most rural residents in almost all developing countries in the world, and that poverty in rural areas is mostly linked with poor access to land. In the context of their study, poor

access to land can be in the form of "landlessness" or because of "insecure and contested land rights". Then again, the author puts clear the meaning of land access which is reasonably adopted in this study as:

The processes by which people, individually or collectively, gain rights and opportunities to occupy and use land (primarily for productive purposes but also other economic and social purposes), whether on a temporary or permanent basis.

Besides, agricultural economics literature confirms an intimate relationship between access to land and land ownership rights with poverty reduction as involvement in agricultural production makes among others, availability of food for consumption and reduction of prices which on the hand addresses issues regarding food security. In most developing countries where agriculture is the dominant and most productive sector of the economy, land is the most valuable asset, and to the poor, it is the sole fundamental means where they can gain their earnings (income) either by direct involvement in the production process or by renting, (Klaus Deininger, 2003).

Nevertheless, despite the existing linkage between land and land ownership rights with poverty reduction, the discussion of how land is accessible or entitled to people and whether it contributes to people's welfare is yet inconclusive, (Adhikari & Bjørndal, 2009; Kimaro & Hieronimo, 2014; Meinzen-dick, 2009; Schneider & Gugerty, 2011). Scholars argue that secure tenure to land can improve the welfare of the poor, in particular, by enhancing the asset base of those, such as women, whose land rights are often neglected but also promote investment, (Klaus Deininger, 2003). Moreover, land tenure can act as a means necessary to secure capital for production and household use. In addition, apart from secured land tenure, people or investors with capitals can sometimes access productive land and related assets like building through renting for production and improve their welfare.

Through the reviewed literature, it is vivid that there is a strong belief and perception that, access to and/or ownership of land have a great impact on poverty reduction due its productivity importance and possibility of having financial liquidity for investment. However, the benefits of owning land in terms of credit access depends on a number of factors including the existence of markets, financial institutions, legal and administration framework. Land and human livelihoods are much connected from theoretical perspective. Land provide habitats, food for subsistence and other resources to human beings necessary for flourishing of their well-being, (Lyatuu & Urassa, 2016). Population worldwide is projected to increase to 9 billion by 2050 which increases pressure on the land demand. However, circumstances are not the same worldwide with sub-Saharan

Africa remain as a special case where major part of arable land is underutilization with low population pressure, (Henley, 2013). Therefore, land in sub-Saharan Africa could be expected to be moving to optimal production and use with combined technology improvement and rising opportunities of investment.

More importantly, the use of land has evolved overtime in which more production, investment and financial access has been the main potentials of owning land currently. Several studies, for instance Lyatuu & Urassa (2016); Henley (2013) and Meinzen-Dick *et al.* (2019) have demonstrated that secured land rights promote investment, credit access and household welfare. However, not constrained to secured land rights, land access in terms of ownership, rent out and lease have a potential impact to household income through rent earning and/or income generating activities. Land is considered as a capital asset which offers economic and social opportunities to escape poverty (Cotula *et al.*, 2006).

In the united republic of Tanzania, with regard to land entitlement and access in relation to poverty reduction, we find that the question of who benefits more between owners and renters of land remains empirically folded. There are a lot of documented impact of land access to poverty reduction including income gains, food security through production, investment effects and others, (Cotula *et al.*, 2006; Lyatuu & Urassa, 2016; Henley, 2013). However, most empirical literature linking land access to poverty reduction has focused on secured land rights, women access to land and pro-poor land distribution (Henley, 2013; Locke & Henley, 2016 & Meinzen-Dick *et al.*, 2019). Empirical evidence connecting impact of land access in broad perspective (entitlement, rent out and alike) to poverty reduction are lacking (Meinzen-Dick *et al.*, 2019). What is to be promoted by policy makers, in terms of smooth land access or ownership or both still remains to be supported by empirics. For instance, to date, some questions yet to be empirically addressed include but are not limited to: To what extent, Tanzanian households have access and entitlement to land? If the household owns land, is such ownership has any significant impact to household welfare? Could there be any differential in importance between land access and entitlement to household welfare? We find unfolding and disintegrating the importance of land access and land entitlement on household welfare of crucial importance particularly in publicizing and creating awareness to the public, policy formulation, planning and resource allocation. Thus, this forms the relevance and basis for this study.

Therefore, this study contributes to the literature by analyzing the impact of land access in broad perspective and inter-linkage to poverty reduction.

Specifically, the study focuses on land ownership, land rent, land transfer or any form of land access to poverty reduction considering household welfare as per capita consumption, access to household durable assets and credit access. To achieve this, the current study employs Tobit regression model to capture the relationship that exists in terms of magnitude and size between household income and consumption on land ownership. Tobit regression as recommended, among others by Dikgang & Muchapondwa (2013) and Wooldridge (2013), is appropriate in modelling survey data that by its nature, are likely to be censored. On the other hand, we introduce a dummy variable (1 for urban households and 0 for Rural Households) to capture location effects that may be attributable to welfare and consumption. Also, in our knowledge, having an educated household member (not necessarily the head of household) may have an impact on proper land use. Therefore, we introduce a categorical variable for the highest education level prevailing in the household to control and measure education effect on land use and access in order to observe the repercussion effect of having an educated member within the household.

As noted by various researchers and academicians, unobserved confounders which affects both dependent and independent variables may result to biased estimated coefficients and hence model do not estimate true effect, (Bascle, 2008; Greene, 2012). Among others, the possible solution to this problem is the use of instrumental variable which are valid and correct, (Wooldridge, 2002, 2013). In our case, the instruments would have to be the variables which are so correlated with land access, but with regard to our data set (the NPS data set), we found many variables that determines access to land affecting household welfare too. We learn from, amidst, Owen, (2002) and Hill, Griffiths, & Lim, (2011) that instrumental variable regression is inconsistent when weak instruments are used. Among others, it results into large standard errors, as a consequence, biased estimate. Thus, the method was inappropriate for the current study. However, we give special attention some confounders which seems important in determining the access to land and profitability of land access. Owing the fact that, household welfare is likely to be affected by other income generating activities (non-farm income), households' characteristics including household size, marital status, occupation of household head, age of the household bread feeder and access to credit. We include these confounders to control mitigating effects of excluded variables.

The study shows evidence for variability in consumption levels across sexes and household locations indicating both rural and urban households with land certificate to have higher consumption levels than those without. Correspondingly, we also establish the impact of land certificate on welfare

indicators and we find, among others, the impact varies across location and gender of the household head with major impact being on urban households and female headed households. We further confirm that land tenure is an important asset for household welfare, and that it does matter how much land does a household have, more important, while just owing land have negative effect to the household welfare, having a plot certificate significantly improves household welfare.

Furthermore, we reveal the influence of land tenure on household poverty status. Using an average per capita consumption of 6521.375Tsh per week, we give evidence that owning a plot is significant in influencing a household movement from non-poor to poor status. Moreover, we show that non-farm income is significant in determining household poverty status. Likewise, our paper finds evidence in favor of classical explanation of having more mouth to feed, we find household size significantly deteriorating household poverty status and further that education and access to credit are likely to shift a household from being poor to being non-poor.

The rest of the paper is organized as follows: Section 2 gives overview of poverty status in the united republic of Tanzania, section 3 provides the Conceptual framework that guides our study conceptualization, Section 4 dwells on the methodological framework of the study and estimation procedures. Empirical results and the discussion of the findings are presented in section 5 and section 6 presents conclusions and policy implications.

II. OVERVIEW OF POVERTY STATUS IN THE UNITED REPUBLIC OF TANZANIA

Since attaining her independence, Tanzania has been enacting and implementing various policies, strategies and initiatives in order to scale up the living standard of its people. For instance, tracing back from the year 2000, while building on the Millennium Development goals, (United Nations, 2015a), the 2030 agenda for sustainable development (United Nations, 2015b), the 2063 African we want, (African Union Commission, 2015) and the 2025 development vision, (URT, 1999), there has been a number of policies and initiatives taken in addressing poverty related matters in the country so as to bring the figures down as documented in various poverty reduction papers, (URT, 2005, 2010) and in the national five year development plans, (URT, 2011, 2016).

Within these initiatives taken, measures and strategies to ensure land become productive, profitable, an investment and benefits as well reduced

poverty among Tanzanians have been proposed. Among the strategies proposed and implemented are ensuring land tenure among people is secured and smooth. For instance, Tanzania Five Years Development Plan II(2016-2021) together with promoting conducive environment for investment, it emphasize that the government should allocate the land for investment, it emphasize the land use planning and management are key for potential land productivity. One of the renewed initiatives in this plan is to facilitate land formalization of land ownership. This recognizes the importance of formal land ownership not only in access to credit but also the productive use of land.

However, despite the efforts taken to reduce poverty incidences, evidence from the National Bureau of Statistics (NBS) show that poverty has continued to be an upsetting concern. We see for instance, as of 2017-2018 Household Budget Survey (HBS) statistics, the population of individuals below food poverty (Figure 1) was 8% (a decline of 2% from 10% in 2011-2012 and 4% from 12% in 2007) while those with basic needs poor were averaging up to 26%, a decline of 2% from 28% in 2011-2012 and 8% from 2007. In addition, it is documented in URT, (2018) that extreme food poverty is more recorded in rural areas (9.7%) as compared to 4.4% for urban population. Furthermore, disaggregation of the basic needs' poor, statistics show that the problem being more dominant in rural areas (31.3%) as compared to urban population, where only 16% of urban dwellers are basic needs poor. Nevertheless, despite showing a recommendable trend in reducing poverty incidences (country-wise), evidence show that there are some regions with extremely higher poverty incident rates. For instance, the incidence of poverty for Rukwa region is (45.0% basic needs poor and 19.8% food poor), Simiyu region (39.2% basic needs poor and 7.5% food poor), Lindi region (38.0% basic needs poor and 15.3% food poor) Geita region (37.5% basic needs poor and 14.5% food poor) and Kigoma region (34.5% basic needs poor and 14.2% food poor).

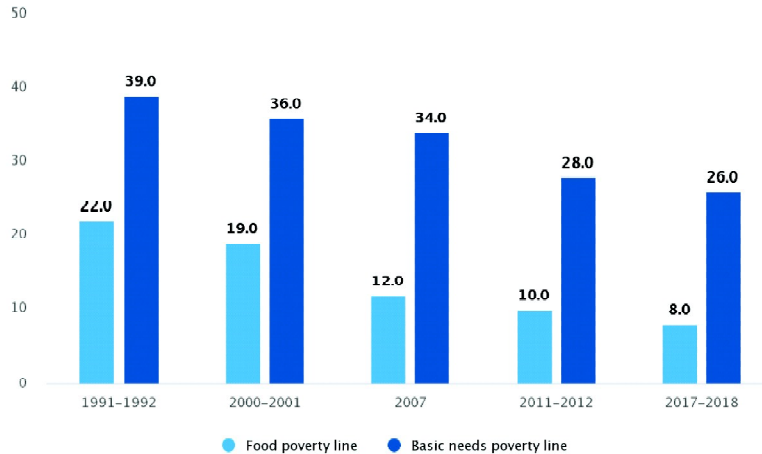
It is important also to note that, poverty is a multidimensional phenomenon and its reduction includes integration of many elements in the long-term process. However, the basic question in this paper remains, does land matter in poverty reduction, and does formal land ownership has any significant impact in poverty reduction compared bare access of land? The current study aim at answering this basic question.

As documented amongst by Klaus Deininger, (2003);

“Land is a key asset for the rural and urban poor. It provides a foundation for economic activity and the functioning of market (for example, credit) and nonmarket institutions.

... For most of the poor in developing countries, land is the primary means for generating a livelihood and a main vehicle for investing, accumulating wealth, and transferring it between generations. Land is also a key element of household wealth”

Figure 1: Percentage of Population below Food and Basic Needs Poverty Lines



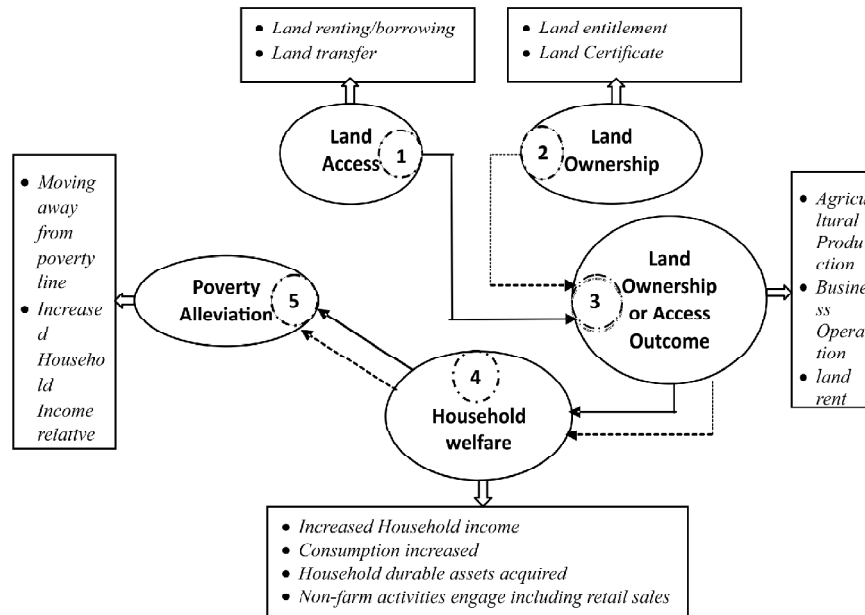
Source: Adopted from the National Bureau of Statistics, 2020.

III. CONCEPTUAL FRAMEWORK

Figure 2 depicts a framework that guides the conceptualization of the linkage that exists between land accesses in different forms to household welfare. In this conceptual framework, access to land in terms of entitlement/ownership, renting or being transferred to have an impact on household outcomes. Such outcomes could be production of various goods (products) by household(s), doing business like operating a store, retail shop, livestock rearing for profit or rented out. Consequently, some changes in household welfare might be observed including acquiring of durable assets like cars, motorcycles, bicycles, radio, television, houses or any other assets, increased incomes, engaging in non-farm activities due to increased income(capital) and/or consumption. As a result, household poverty is reduced or alleviated and hence contribution of land access to poverty reduction.

In this study, we focus on analyzing the impact of access to land (in various forms) to household welfare. In this case, household welfare, the particular attention will be given to per capita consumption. Moreover, a unique analysis will be devoted to analyze household probability of being non-poor given access to land.

Figure 2: Land access and poverty reduction conceptual framework



Source: Author's construction.

IV. MATERIALS AND METHODS

Data

The data used in this study are sourced from the National Bureau of Statistics (NBS) in Tanzania. We make use of the secondary data, the 2014/2015 wave four National Panel Survey data (NPS 4) and published in 2017. We find reasonable to make use of the NPS data set as it nationally representative covering all regions in Tanzania with vast of demographic, social, economic and social-economic indicators. Detailed discussion of sampling techniques and data collection procedures, is documented by the National Bureau of Statistics, basic information document for NPS wave 4, URT. (2018).

Variables Measurements and Description

In this study, there are two important variables in which the discussion of how are they measured is important. The first variable is our dependent variable which is household welfare. Theoretically household welfare is a broad term which include a generalization of how a household is well off and can feed its members. A particular focus is given to household consumption since it is more related to how each member of household

benefits from the income or assets generated by the household. However, we focus on per capita consumption to moderate the variability across the households and take into account household size. We also take both household food to reflect the ability of the household to feed its members. The second variable is land tenure. This variable is measured in three ways. The first is a dummy variable taking 1 if a household had access to a plot and zero otherwise, the second way is the size of the plot accessed by the household while the third way is the whether a household had a plot ownership certificate or not.

Estimation procedures and Models

The study uses Tobit and logistic regression models to analyze the impact of land access to household welfare. While Tobit regression model is used in modelling the relationship that exists in terms of magnitude and size between household consumption on land ownership, Logistic regression model is used in capturing the impact of access land on poverty status, we use logistic regression model.

Borrowing from Dikgang & Muchapondwa, (2013) and Meinzen-Dick *et al.*, (2019), we find the use of Tobit model is appropriate since survey data are likely to be truncated/censored with zero non-missing values, thus, using truncation/censoring models becomes imperative since the use of Ordinary Least Square (OLS) may produce biased results. Therefore, we model household welfare as a function of land tenure (L) and other controlling confounders. Our empirical analysis model can be specified as follows;

$$Hw = f(L, X) \quad (1)$$

Where, Hwishousehold's welfare measured as household gross food weekly consumption, L represents tenure status. Being more specific, we estimate three models which represent different land tenure. The first model represents land tenure as *land ownership* which simply imply the household had access to land (owned a plot last cultivation season), the second model estimates an equation where land tenure is *size of the plot* owned and the third model estimates an equation where land tenure is *certificate of ownership*, that is having a certificate of land ownership. Our structural models can then be specified as shown in equations (2) to (4).

$$Hw = \delta_{01} + \delta_{11} L_{11} + \delta_{21} X \quad (2)$$

$$Hw = \delta_{02} + \delta_{12} L_{12} + \delta_{22} X \quad (3)$$

$$Hw = \delta_{03} + \delta_{13} L_{13} + \delta_{23} X \quad (4)$$

where; δ_{01} , δ_{02} and δ_{03} are constant terms for three models, δ_{11} , δ_{12} and δ_{13} are regression coefficients for land ownership status, size of land accessed and certificate of landownership by the household and δ_{21} , δ_{22} and δ_{23} are vectors of coefficients of all other controlling confounders for the three models respectively.

Confounders are a number of characteristics related to household and household members. However, special interests are given to some confounders which seems important in determining the access to land and profitability of land access. Regarding that, household consumption as a function of land ownership may be subject to location of households (Rural or Urban), we introduce a dummy variable that capture location effects, coding this variable 1 for urban households and 0 for rural households. The highest education level prevailing in the household is also introduced to control and measure education effect on land use and access. We focus on highest education in the household to observe the repercussion effect of having an educated member within the household. Moreover, household welfare is likely to be affected by other income generating activities (non-farm income), households characteristics including household size, marital status, occupation of household head, age of the household bread feeder and access to credit. We include these confounders to control mitigating effects of excluded variables.

Moreover, in estimating the effect of land access in terms of size of the land cultivated in the previous season, our analysis uses a sample of households which have accessed land; therefore, land is conditional on being greater than Zero (that is $L > 0$) and hence censored. In addition, regarding the variable household welfare, it is likely not to be reported for all households and therefore we can only observe a sample which has reported welfare being greater or equal to zero (that is $Hw \geq 0$). This, therefore, imply that our sample is censored for both dependent variable and independent variable of interest. Thus, as discussed in the preceding paragraphs, OLS will produce biased results. In this case, Tobit model use a latent variable to specify dependent variable since it is not observable for all confounders, (Wooldridge, 2013). We therefore have:

$$Hw^* = \begin{cases} 0, & \text{if } Hw \text{ is not observed} \\ Hw, & \text{if } Hw \text{ is observe} \end{cases} \quad (5)$$

And

$$L^* = \begin{cases} 0, & \text{if } L \text{ is not observed} \\ L, & \text{if } L \text{ is observed} \end{cases} \quad (6)$$

And therefore, likelihood and log likelihood specification function take into account unequal sampling probability, see Verbeek, (2004) and Greene, (2012).

On the other hand, to model the impact of land access on poverty status, we use logistic regression model. In this case a household is categorized into two categories based on household food consumption, where, a household is considered poor if per capita consumption is less than 6521.375Tsh and non-poor otherwise and we estimate the effect of land access to the probability of a household being poor. Thus, the logit model for our study takes the form:

$$\log it(g_{ci}) = \log\left(\frac{g_{ci}}{1-g_{ci}}\right) = X_i\beta \quad (7)$$

Where

$$g_{ci} = Pr(Y_i = y_c | x_i) \quad (8)$$

It is also important to note that, during estimation, we employed estimations procedures that takes into account complicated survey procedures. Specifically, NPS data are collected from a multi-stage sampling procedure in which each sampling unit has a different probability of being selected and thus different sampling weights. Estimations that disregards complicated sampling procedures might lead to wrong/inaccurate estimates and their standard errors (Williams, 2019).

V. RESULTS AND DISCUSSIONS

Descriptive Statistics

Table 1 depicts summary statistics of key variables. As indicated, out of 1641 agricultural households, only 23 per cent had a plot certificate of some kind which proves the family ownership to the referred plot while the rest do not. Out of these, approximately 56 per cent acquired the plot they cultivate through traditional channels including squatting/clearing bushes, inheritance and alike while only 36 per cent acquired the plot through formal means. We also observe that, the highest form of land tenure is customary land rights and certificate of occupancy. Out of sampled households, only 8 per cent had this type of land tenure while 79 percent had no legal documentation. From this discussion, it is vivid that land tenure among agricultural households in Tanzania Mainland is still a problem.

On the other hand, considering other household welfare indicators, we find that variation is overwhelming. For instance, total household food

consumption per week (both outside the and in the household consumption) monetarily is very variable across households. While some households consume as much as 559200Tsh per week, some consumes as low as 63Tsh per week with average weekly consumption being 40,839.64Tsh. Literally, this is to say, some households have nothing to consume at all since nothing to be considered as food can be bought by 63Tsh. The same variation across the households can be observed when considering net non-farm income. While some households earn through business venture per week the income barely above 75000Tsh on average, some do earn up to approximately 3,500,000Tsh. This is the indication of how welfare various across the household. The same phenomenon is vivid on value of harvest by the households as indicated in Table 1.

Speaking of household characteristics, the study mainly focused on age, marital status and occupation of the household head and household location whether urban or rural. In addition, the study also examined some characteristics of any household member that might affect welfare of the entire household both directly and indirectly including highest level of education in the household, access to loan and access to extension services. Table 1 summarizes these variables.

As shown in Table 1, welfare indicators and other household's characteristics vary across households. One of explanation however could be due to variation in land tenure across households. Table 2 shows descriptive statistics as well as t-test for the comparison of means of the variables of interest between households with land ownership certificate and those without. As depicted, (in Table 2), results indicate that variability of most of the variables across the households is higher. Regarding the t-tests for comparison of means, the study tests the null hypothesis of no difference (in the indicator variable of interest) for households with land certificates and those without. At 0.1 percent level of significance, we find evidence for significant difference in *household total week food consumption* and Household total weekly non-farm income for households with land certificate and those without.

Data Visualization

Figure 3 and Figure 4 reports welfare variation by land ownership status, location and sex for both farm and non-farm income groups. As depicted, boxplots reveal the difference in consumption levels across sexes and household locations showing that for both rural and urban, households with land certificate have higher consumption levels than those without, however those residing at urban have higher land certificate impact than

Table 1
Descriptive statistics of Key Variables

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Household total food consumption per week	3345	40,839.64	39,622.00	63	559,200.
Net week Non-farm Income	1629	75,073.81	178,333.20	0	3,460,500.
Household head Age	3352	44.42	14.99	16	100
Household size	3352	4.86	2.85	1	33
Household value of Total Harvest per acre	1889	198,037.40	314,556.10	536	7,000,000.
Plot Area by GPS Measurement (All plots owned by Household Members)	1680	5.56	12.11	0	187.39
Household Plot ownership status (Plot Tenure)					
Have legal certificate	1641	0.23	0.42	0	1
Have no legal certificate	1641	0.77	0.42	0	1
Means used by Households to Access Land					
Formal ownership channel	2090	0.36	0.48	0	1
Traditional land ownership channel	2090	0.56	0.50	0	1
Rented/borrowed	2090	0.08	0.27	0	1
Other Legal documents owned by Households					
Village-government-witnessed purchase	1546	0.08	0.28	0	1
Local-court-certified purchase agreement	1546	0.01	0.09	0	1
Inheritance letter	1546	0.02	0.15	0	1
Letter of allocation from village gov't	1546	0.07	0.26	0	1
Other government document	1546	0.01	0.11	0	1
Official correspondence	1546	0.01	0.07	0	1
Utility or other bill	1546	0.01	0.08	0	1
No documentation	1546	0.79	0.41	0	1

contd. table 1

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Household head marital status					
Monogamous	3350	0.49	0.50	0	1
Polygamous	3350	0.10	0.30	0	1
Living together	3350	0.11	0.32	0	1
Separated	3350	0.07	0.25	0	1
Divorced	3350	0.04	0.20	0	1
Never married	3350	0.07	0.25	0	1
Widower	3350	0.12	0.33	0	1
Maximum education level in the household					
No education	2997	0.21	0.41	0	1
Completed primary education	2997	0.57	0.50	0	1
Completed ordinary secondary education	2997	0.17	0.37	0	1
Completed advanced secondary education	2997	0.01	0.09	0	1
University and Above	2997	0.04	0.20	0	1
Household location					
Rural	3352	0.74	0.44	0	1
Urban	3352	0.26	0.44	0	1
Household loan access					
No	3352	0.87	0.34	0	1
Yes	3352	0.13	0.34	0	1
Access to extension services					
No	2092	0.87	0.34	0	1
Yes	2092	0.13	0.34	0	1

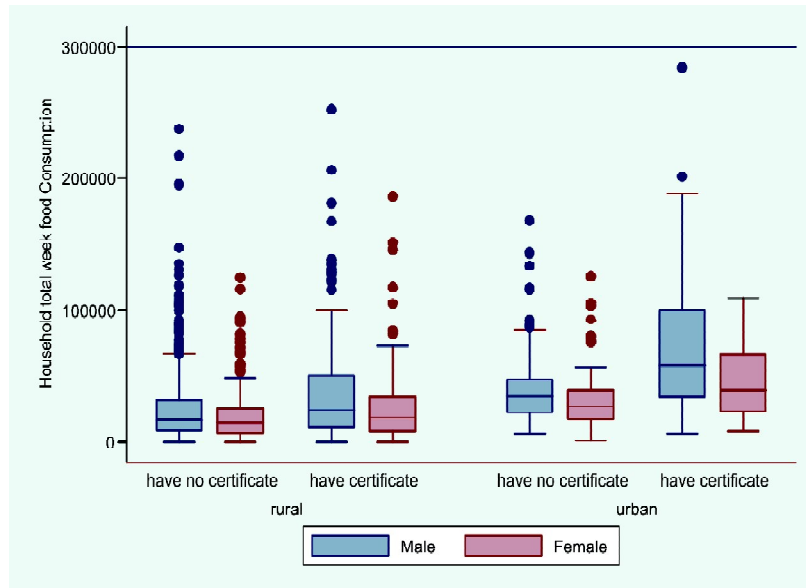
Table 2
Summary Statistics of key variables by Legal Land Ownership status

	Overall			Have Land Certificate			Have no Land Certificate			Difference		
	Mean	Std. Deviation/se		Mean	Std. Deviation		Mean	Std. Deviation		Mean	Std. Deviation	
Household total week food Consumption	40839.64	39622		41495.8	42215.7		25479.94	25338.82		-16015.86***	1765.602	
Household harvest Value per acre	198037.4	314556.1		205653.1	308753		184089.7	232515.9		-21563.37	15785.29	
Household total weekly non-farm income	75073.81	178333.2		114295.5	250485.5		40905.61	78414.88		-73389.85***	12422.15	
Household Size	4.858294	2.848596		5.672872	3.191139		5.379447	3.159257		-.2934257	.1859968	
Age of household head	44.41527	14.98667		46.25532	13.71884		47.89802	15.27361		1.642705	.8770776	
Observations	3352			376			1265			1641		

Source: Author Computation from NPS (2014/2015) Data

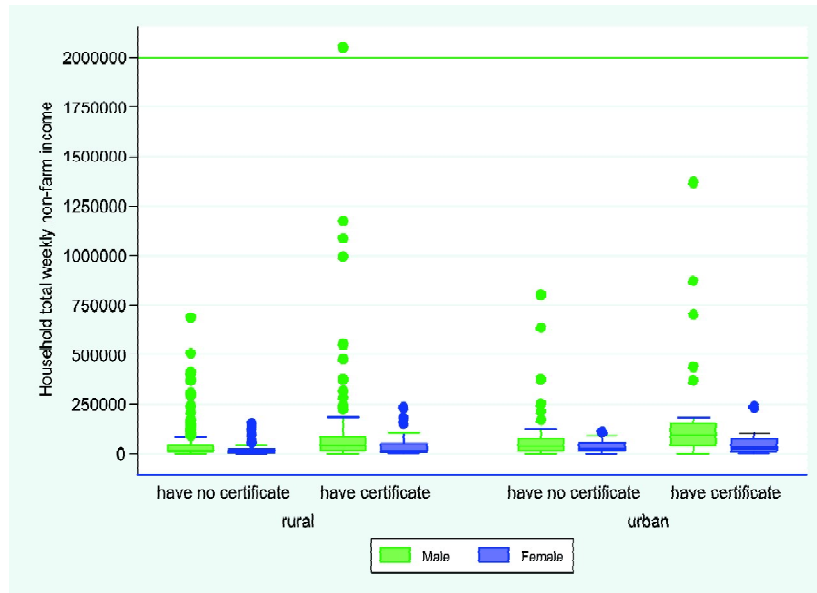
*p < 0.05, **p < 0.01, ***p < 0.001

Figure 3: Welfare variation by Land ownership status, location and Sex (Farm Income)



Source: Author's Construction using 2014/2015 National Panel Survey Dataset

Figure 4: Welfare variation by Land ownership status, location and Sex (Non-Farm Income)



Source: Author's Construction using 2014/2015 National Panel Survey Dataset

rural dwellers not only on average but also uniformity. This means that when land certificate is issued to urban dwellers, household tends to be more equal especially for female headed households shown by less widespread box plot with no outliers. Another important observation is that, impact of land certificate to rural households is more uncertain compared to urban counterparts since the box plot indicate than variability of consumption levels for rural households with land certificate is more widespread compared to those without for both sexes. The same phenomenon can be observed when non-farm income is considered.

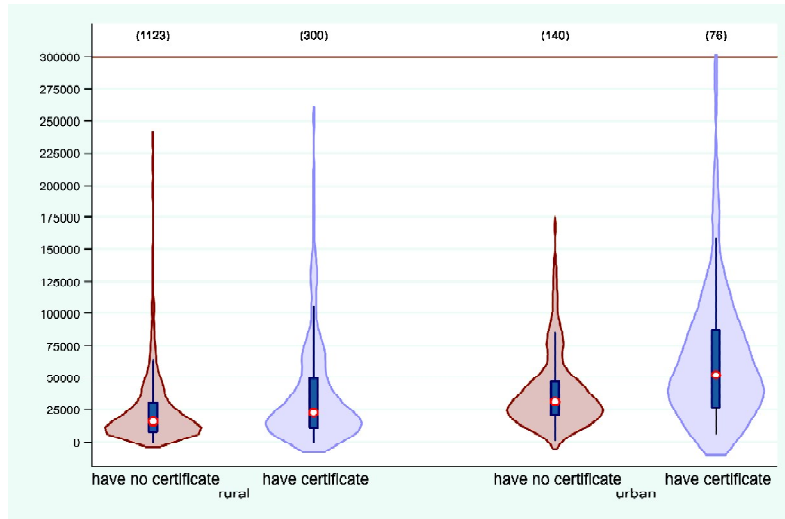
The figures above do not only demonstrate the impact of land certificate on welfare indicators but also demonstrate that the impact varies across location and gender of the household head with major impact on urban households and female headed households. In conformity with Klaus Deininger, (2003), the result support the hypothesis that legal land tenure increases farmers confidence and certainty of the status of the asset but also marketability of the asset for liquidity purpose which is different between urban and rural areas. For instance, the literature document that land rights are precondition for different kinds of investment conditioned on the rights being transferred, however market imperfections are likely to affect rural land transactions compared to urban areas where other markets such as credit and labor markets are likely to be functioning well. Additionally, however landmarkets in developed countries are not liberalized the situation is worse in rural areas and thus legal land tenure have higher impact to urban dwellers.

Additionally, a more informative violin plot (in Figure 5) further illustrates that effect of legal land rights, having land certificate on welfare is much larger in urban areas compared to rural areas. The figure depicts that, the distribution of households with higher income among those with land certificate between urban and rural households increases in urban areas marked by the more thicker violin plot compared to rural counterparts.

Tobit Regression results

To further confirm and illustrate the impact of land tenure on household welfare Tobit regression model was estimated. Specifically, three variables (as shown in Table 3) were considered that illustrate different situation of land tenure. In the first estimation, land tenure is dummy variable taking 1 if the household owned a plot and zero otherwise, second estimation the variable is continuous measuring the size of the plot owned and the third estimation takes land tenure as having certificate of land or not. The dependent variable is household total food weekly consumption.

Figure 5: Distribution of Household Week Consumption by Land Ownership Status and Location



Source: Author's Construction using 2014/2015 National Panel Survey Dataset

**Table 3
Tobit Regression Model for Different Measures of Land Tenure**

	First Estimation Plot Ownership	Second estimation Area Owned	Third Estimation Have Certificate of Land
Owned a Plot (1=Yes)	-0.262*** (-3.94)		
Household legal land ownership status (1=Have a certificate)			0.183** (2.87)
Marital Status			
Polygamous married	-0.123 (-1.25)	-0.0789 (-0.63)	-0.0545 (-0.52)
Living together	-0.171** (-3.04)	-0.157 (-1.73)	-0.184* (-2.19)
Separated	-0.321*** (-3.67)	-0.193 (-1.11)	-0.0784 (-0.75)
Divorced	-0.247* (-2.03)	-0.0459 (-0.20)	-0.213 (-1.10)
Never married	-0.125 (-1.53)	0.164 (1.08)	0.0764 (0.64)
Widower	-0.0928 (-1.25)	-0.0448 (-0.38)	-0.0465 (-0.45)

contd. table 3

	<i>First Estimation Plot Ownership</i>	<i>Second estimation Area Owned</i>	<i>Third Estimation Have Certificate of Land</i>
Occupation of the household head			
Fishing	0.265 (1.55)	0.0823 (0.20)	-0.0372 (-0.11)
Mining	-0.0115 (-0.08)	0.0123 (0.10)	0.398 (1.59)
Tourism	0.274* (1.97)	0.0889 (0.40)	0.135 (0.82)
Government	0.410*** (3.33)	0.203 (0.88)	0.648*** (4.61)
Parastatal	0.784*** (4.01)	0.772*** (3.56)	0.799*** (4.76)
Private sector	0.345** (3.29)	0.344* (2.11)	0.582*** (4.14)
Ngo/religious	0.148 (1.19)	0.187 (1.08)	0.267 (1.95)
With employees	0.410*** (3.77)	0.268 (1.58)	0.361* (2.34)
Without employees	0.214* (2.22)	0.0992 (0.60)	0.240* (2.11)
Unpaid family work	0.732*** (4.62)	1.152*** (4.95)	1.141*** (6.07)
Student	0.785*** (4.25)		0.291** (3.26)
Disabled	0.125 (0.63)	0.323 (1.83)	0.234 (1.62)
No job	0.0578 (0.29)	-0.374 (-1.39)	-0.256 (-0.91)
Household agriculture occupation status (1=Yes)	-0.229* (-2.27)	-0.263 (-1.72)	-0.104 (-0.88)
Square of logarithm of net week non form income	0.00936*** (11.07)	0.0105*** (7.71)	0.00976*** (7.82)
Maximum education level in the Household			
Primary	0.324*** (4.31)	0.361*** (3.56)	0.249** (2.92)
Ordinary Secondary	0.450*** (5.37)	0.661*** (5.28)	0.476*** (4.53)
Advanced Secondary	0.403* (2.01)	-0.616*** (-4.28)	0.140 (0.26)
University Education and Above	0.647*** (6.08)	0.614** (2.87)	0.519** (3.00)

contd. table 3

	<i>First Estimation Plot Ownership</i>	<i>Second estimation Area Owned</i>	<i>Third Estimation Have Certificate of Land</i>
Household location(1=Urban)	0.104* (2.23)	0.254* (2.34)	0.198** (2.87)
Household Size	0.0591*** (6.90)	0.0444*** (3.73)	0.0411*** (3.99)
Household access to loan, any member (1=Had access)	0.0741 (1.45)	0.0774 (0.96)	0.155 (1.94)
Age of the household head	0.00185 (0.88)	0.0000382 (0.01)	0.00300 (1.10)
Plot Area by GPS estimate		-0.00854 (-1.37)	
Constant	8.935*** (51.36)	8.660*** (29.68)	8.537*** (33.68)
sigma Constant (30.41)	0.683*** (22.80)	0.774*** (27.81)	0.712***
Observations	1440	609	640

Source: Author Computation from NPS (2015/2016) Data

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The models result indicate that land tenure is important to household welfare. From the first estimation equation, we find that the coefficient of Plot ownership is negative (-0.262) and significant at 0.1% level, implying that compared to those with no land, household total weekly consumption is significantly lower to those who own plot. Literary, this informs us that it does matter how much land does a household have, however, just owing land have negative effect to the household welfare. However, the current study contradicts with Viet Cuong, (2013) findings in rural Vietnam. Thought his study show agricultural land to reduce both the headcount of poverty, poverty-gap and poverty- severity indexes for the land holders, yet does increase inequality (Gin Index). Equally, Adhikari & Bjørndal, (2009) found land for the poor increasing consumption and income and thus reduces poverty. In our case, the findings could be surprising but realistic. Amidst, this could be from the reason that some households with agricultural land access use their land for lending out and others engage in subsistence farming. Else, unprecedented demand for agricultural land by small-scale farmers has been recorded in agricultural literatures. Despite that some

plots are not productive, the situation has however resulted into land conflicts, (Kimaro & Hieronimo, 2014). In our knowledge, among others, these instincts could justify the reasons as to why just having access to agricultural land is not necessarily a condition for improved household welfare.

On the other hand, with regard to Household legal land ownership status, study findings (from the third estimation) reveals a significant (at 1% level) and positive coefficient confirming that having a plot certificate (land titling) of any form significantly improves household welfare. This conforms to Schargrodsky & Galiani, (2011) suggestion that land titling is a substantial means for poverty reduction as it provides a room for both physical and human capital investment, which are in turn important in improving household welfare henceforth reduce poverty.

In conformity with Viet Cuong, (2013), Dikgang & Muchapondwa, (2013) and Lyatuu & Urassa, (2016), other variables found to have significant positive impact on household welfare were household size, location where urban dwellers were found to have higher consumption level compared to urban counterpart, maximum education in the household compared to not having education whereby all levels had higher welfare effects compared to those without any level of education, non-farm weekly income, occupation and marital status of the household head. It is also important to note that these variables do not have constant effects across land tenure situation. For instance, having agriculture as the main occupation in the household only affects welfare when comparing those who owned a plot and those who did not but not size of the land and certificate ownership. This is so common across different marital status. The phenomenon implies that households with some characteristics are likely to have certificate of land compared to others which remains a subject for further investigation.

Logistic Regression outputs

The study further investigated the influence of land tenure on household poverty status. In this case, household per capita consumption was recoded to reflect whether a household is poor or not. Under this study, as per the Tanzanian Household budget survey, URT, (2018) a household is considered poor if per capita consumption is less than 6521.375Tsh per week as official level of consumption considered to be sufficient to achieve required level of calories. Although some variables were further recoded to reduce the number of categories particularly education level and marital status.

Table 4
Influence of Land Tenure on Household Food Poverty Line Status

	<i>Plot Ownership</i>	<i>Area Owned</i>	<i>Have Certificate of Land</i>
Own a plot	-0.631* (-2.20)		
Household legal land ownership status (1=Have a certificate)			0.318 (1.32)
Household agriculture occupation status (1=Yes)	-1.474*** (-5.40)	-1.635*** (-4.04)	-1.728*** (-4.01)
Square of natural logarithm net week non form income	0.0290***	0.0333***	0.0290***
Literacy status (1= educated)	0.609* (2.46)	0.382 (1.28)	0.338 (1.13)
Marital status (1=living together)	0.349 (1.74)	-0.107 (-0.39)	0.0111 (0.04)
urban	0.369 (1.93)	0.576 (1.87)	0.532 (1.93)
Household Size	-0.365*** (-9.71)	-0.381*** (-7.28)	-0.369*** (-7.43)
Household access to loan, any member (1=Had access)	0.412* (2.13)	0.337 (1.34)	0.547* (2.12)
Age of the household head	0.0120 (1.96)	0.0117 (1.43)	0.0110 (1.36)
Plot Area by GPS estimate		-0.0124 (-0.62)	
Constant	-0.716 (-1.27)	-1.085 (-1.24)	-0.681 (-0.76)
Observations	1603	654	687

Source: Author Computation from NPS (2015/2016) Data

t statistics in parentheses

Dependent variable is food poverty line defined as 1 if a household weekly per capita food consumption is less than 6521.375

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results indicate that only owning a plot that is significant in influencing a household movement from non-poor to poor status. This further emphasize the observation that having access to land is not enough to be non-poor but how that land is beneficial to a particular household. Also, having a land certificate is not found to be significant in influencing the household poverty status. The results might be due to the fact that food poverty is short term measure of poverty which mainly depends on what a household produce at a particular point in time which not necessarily reflect

the beneficial gains of having a land certificate. However, non-farm income was found to be highly significant in determining household poverty status positively. Furthermore, household size was found to significantly deteriorate household poverty status which supports classical explanation of having more mouth to feed. Unsurprising households with agriculture as their main occupation are likely to be poor since the influence of agriculture as the main occupation is negative and highly significant which imply that if a household change occupation from non-agricultural activity to agricultural activities, that household is likely to shift from being non-poor to poor. Additionally, education and access to credit are likely to shift a household from being poor to being non-poor as the coefficients are positive and significant.

The margins plot (Figure 6) below further illustrate that, the influence of owning a plot regardless of having a legal certificate on the movement from poor to non-poor is negative. This imply that having no plot is increases the probability of being non-poor (movement from right to left in the figure below, confidence interval omitted). This suggest for land to be beneficial to the owners, access is not predominantly enough but rather having a legal land certificate. The figure further shows that urban household are less likely to be negatively affected by plot ownership on poverty status. On the other hand, as shown (in Figure 7), regardless of the location of the household, land certificate though not significant increases the likelihood of being non-poor. Figure 7 below illustrates.

Figure 6: Effect of Land ownership on Household poverty Status

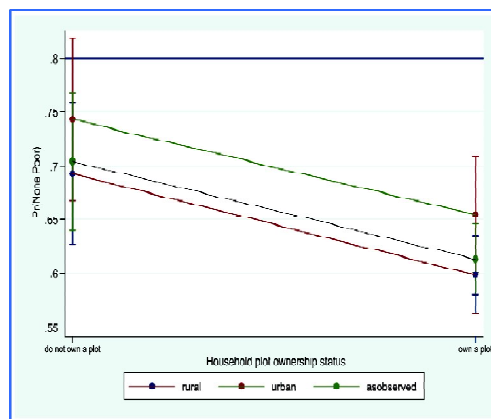
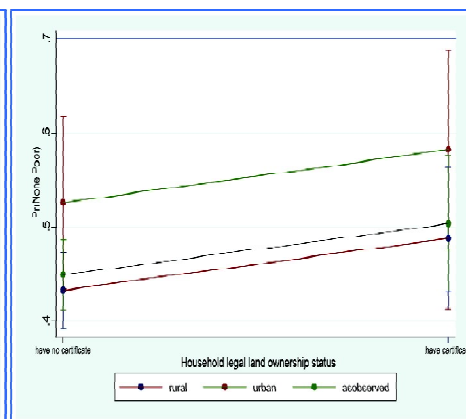


Figure 7: Effect of land legal certificate on household poverty Status



Source: Author's Construction using 2014/2015 National Panel Survey Dataset

VI. CONCLUSIONS AND POLICY RECOMMENDATIONS

Land access and/or entitlement is fundamental for people's social status and their livelihoods in abroad perspective as documented in the National Five Year Development Plan URT, (2016) and other vast academic literatures, policy advocacies and practitioners such as Meinzen-dick, (2009) and Meinzen-Dick, Quisumbing, Doss, & Theis (2019). More specifically, a wide range of literature document that access to land and/or entitlement to land significantly benefits the poor and disadvantaged groups especially the poor rural. However, controversies exist on whether land access alone, entitlement or a combination of both that is beneficial in poverty reduction and if so in which context. For instance, in contexts where factor and goods markets are efficient having access to land would significantly reduce poverty through productivity gains. Likewise, having land entitlement certificate do not only reduces poverty through productivity gains but also financial access.

Moreover, in developing countries where markets are inefficient with low land productivity, land poverty reduction benefits are still to be supported by empirics. Therefore, the current study aimed at empirically investigating the effects of land on poverty reduction. Specifically, the study investigates whether there is differential impact on poverty reduction between access to land through various means including renting and transfers and land entitlement. To achieve this the study estimated the effects of land access and land entitlement on household weekly food per capita consumption using Tobit regression model. The choice of the model was due to existence of censoring in survey data but also lack of strong instruments which could otherwise favor instrumental variable approach as impact evaluation methodology. Furthermore, the study also investigates the impact of land access and entitlement on household poverty line status using logistic regression.

The results indicate that, among Tanzanians, only 23 per cent of agricultural household's own plot entitlement certificate of some form implying that land tenure security is still lower in Tanzania. Furthermore, descriptive statistics shows that households with land certificate are likely to consume more than their counterparts particularly for urban households. The results imply that markets efficiency like in urban centers are crucial for land poverty reduction nexus. Estimations from Tobit regression model shows that land entitlement particularly plays a significant role in poverty reduction. That accessing land or owning a plot is likely to negatively affect household welfare unless the household is legally entitled to a particular plot. Thus, secured land tenure rights is the solution however not a panacea

to poverty. In regards to food poverty line status, although the results are not statistically significant, the positive coefficient of land entitlement indicate a probable benefits of land entitlement to the probability of a household being non-poor as opposed to bare access of land. Other factors found to significantly affect household welfare and poverty status includes household size which significantly deteriorate household poverty status and increase food consumption, highest education in the household and access to credit are likely to shift a household from being poor to being non-poor but also increase food per capita consumption. Moreover, agricultural and rural households are not only likely to have lower per capita consumption but also have a higher probability of being poor.

The results have several policy implications.

- The policy instruments that aim at addressing poverty through land access should therefore be aimed at promoting secured land rights through land certification. This will not only increase owner's confidence but also the likely of using the land as a collateral and as shown in this study, land certificate increases household consumption which means poverty reduction.
- Secured land rights among Tanzanians are scarce, only 23 per cent of agricultural households have a certificate of some form claiming ownership of their plot. With positive welfare effects of secured land tenure being observed, this should be a policy focus.
- The land poverty reduction nexus is likely to depend on several other factors. The notable issue is rural-urban land ownership effect on poverty reduction. The current study shows that urban households are likely to experience more land poverty reduction effects compared to rural households. This could be due to market efficiency in urban centers as compared to rural but also infrastructures and education. Therefore, when addressing poverty issues through land tenure lens, a combination of several instruments and context relevancy should be considered.
- Education is yet a key tool in addressing poverty. The study shows that households with educated members are likely to have better welfare outcomes. The important note on this is that, education repercussion effects are observed in the entire household.
- Although the country largest portion of the population depend on agriculture, households who depend on agriculture as their main occupation are likely to be poorer. This suggest that, although agriculture is a cornerstone of the economy, welfare effects to households is not impressive. The possible explanation is that,

agriculture is the main livelihood of Tanzanians because they are out of options. Few households which have taken different routes including business and professional combined are better off than agricultural households. In fact, non-farm income is shown in this study to be a positive significant determinant of not only household welfare but also poverty status. This imply a policy mix instrument that advance diversification and more opportunities should be advanced and promoted.

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