Determinants of Rural Households Livelihood Outcomes in Kilombero Valley, Tanzania

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ABSTRACT

Household's participation in an out-grower scheme and investor farm employment as well as household socio-economic characteristics has the potential of improving livelihood outcomes. However, scientific debates on the determinants of household livelihood outcomes have not been conclusive. The paper aims at examining the determinants of rural household livelihood outcomes. The study adopted a cross-sectional research design and the exploratory sequential research strategy whose data were collected from 376 respondents. In addition, data were collected from 17 key informants and focus group discussions of 6 to 8 participants. Quantitative data collected through a structured questionnaire were analysed using SPSS to determine descriptive statistics. In addition, multiple linear regression was used to examine the determinants of household's livelihood outcomes. Qualitative data were subjected to content analysis. Generally, the findings show that age, education, household size, land size, group membership, and livelihood strategies were positively and significantly ($p \leq 0.05$) associated with households' livelihood outcomes. On the other hand, participation in the sugarcane out-growers scheme was negatively and significantly ($p \leq 0.05$) associated with households' livelihood outcomes. Similarly, participation in farm wage employment was negatively associated with households' livelihood outcome but this was not statistically significant. The paper concludes that household

heads' socio-economic characteristics are more associated to households' livelihood outcomes, compared with large-scale agricultural investment factors. Therefore, it is hereby recommended that there is a need developing better modalities for sugarcane out-grower farmers to enable a win-win situation to both parties.

Keywords: *Socio-Economic, Agricultural Investment, Livelihood, Kilombero*

1. INTRODUCTION

The 21st Century is experiencing a growing interest in large-scale agricultural investment particularly in Sub-Saharan Africa (Gibbon, 2011). The phenomenon is considered as one of the development models that plays an important role in improving smallholder farmers' income and households' livelihood more generally (FAO, 2012). Such a wave is fuelled by fear from some food-importing countries of being unable to access sufficient quantities of food for their people (Matondi *et al*., 2011). The concept of large-scale agricultural investment refers to the purchase of land and user rights through lease or concessions, whether for a short or a long- period (FAO, 2012). According to Cotula (2012), the above-mentioned concept refers to the purchase or lease of vast tracts of land by wealthier, food-insecure nations and private investors mostly from poor developing countries in order to produce food crops for export. The paper considers this concept as a process whereby foreign governments, local and foreign companies are leased tracts of arable land for large-scale agriculture and the integration of the rural household in out-grower schemes and investor farm employment.

Theoretical Debate

The debate on large-scale agricultural investment shows that its impacts on households' livelihood outcomes are controversial. There are two opposing currents in the literature about the influence of large-scale agricultural investment on households' livelihood outcomes. On the one hand, the proponents of large-scale agricultural investment argue that the phenomenon has potential benefits. that is large-scale agricultural investment is imperative for economic growth at a national level, and it is critical for the creation of employment opportunities and provision of public goods and services particularly in rural and urban communities (Deininger, 2011). Thus, large-scale agricultural investment improves household income and asset stocks that largely explain household livelihood outcomes (Bellemare, 2012; Herrmann and Grote, 2015). According to Scoones (1998), livelihood outcomes refer to increased incomes and well-being, reduced vulnerability, improved food security and sustainable use of natural resources. This article considers livelihood outcomes as an increasing income and asset stocks in monetary value. Based on the proponents' line of thinking, the benefits of large-scale agricultural investment are realized through out-grower scheme and investor farm employment. For example, Amrouk *et al*. (2012) indicate that households participating in large-scale agricultural investment throughout-grower scheme generate higher yields and income and improve assets and savings because of increased use of inputs. In addition, as Barrett *et al*. (2012) argue, households integrated into out-grower schemes have access to credit, quality input, and high value output markets. However, the impacts of large-scale agricultural investment on household livelihood outcomes are context specific and dependent on the nature of contract between out-growers and investors as well as crop under the contract.

On the other hand, the critics argue that large-scale agricultural investment has unfavourable impacts especially to the rural communities. Scholars (i.e. Arndt *et al*., 2010; Baumgartner *et al*., 2015; Deininger and Byerlee, 2012; Narayanan, 2014; Oya, 2013) reported that large-scale agricultural investment negatively influence household livelihood outcomes. Consistent to this view, Davis *et al.* (2010) contend that wage employment is mainly performed by households lacking the ability of engaging in high-rewarding non-farm or on-farm activities. In most cases, wage employment is associated with simple tasks mainly unskilled labour that attracts low wages hence, making it difficult to transform household livelihood outcomes (Oya, 2013). Studies (i.e. Casaburi *et al*., 2012; Waswa *et al*., 2012) in Kenya indicate that, in many cases, the outcomes of large-scale agricultural investment vary in accordance to context, and largely households do not necessarily attain the expected livelihood outcomes. Some of the reasons include the delay of payment from investors, low sucrose level from sugarcane especially when involving sugarcane production, which reduces incomes, sugarcane remaining un-harvested and high deductions which reduce out-growers' income hence, reducing their possibility of having positive livelihood outcomes (Smalley *et al*., 2014).

Based on the two contending theoretical arguments, it can be surmised that the proponents build their arguments on grounds that large-scale agricultural investment increases agricultural productivity several times more than what smallholder farmers can do. This is because large-scale agricultural investment promotes the use of improved agricultural technologies such as inputs and therefore increases agricultural productivity that translates into increased household income and livelihood outcomes in general. The opponents build their arguments based on two major factors namely the process of

implementation of large-scale agricultural investment especially because of the delay of payments to the farm wage employees, and which seems common. Secondly, large-scale agricultural investment attracts mainly unskilled labour, particularly in rural communities, and who paid low wages because of lack of wide choices from which to support their livelihood: low wages can hardly transform livelihood outcomes.

Conceptual Framework

The study on which the paper is based was guided by the Department for International Development's (DFID's) Sustainable Livelihood Framework (SLF) in explaining factors that influence household livelihood outcomes. While the factors are diverse, the paper focuses on socio-economic characteristics of household heads. To capture the factors related to large-scale agricultural investment, the paper deals with out-grower scheme and farm wage employment. The framework is selected because it captures rural livelihood aspects such as assets and activities from which rural livelihoods are derived (Ellis, 2000). Therefore, the framework is appropriate in the context of large-scale agricultural investment in understanding livelihood assets that can have impacts on livelihood outcomes. It also considers the portfolio of livelihood assets that households can access. These include human (skills), social (farm groups), financial (income), physical and natural capital (e.g. land).

As some authors (i.e. Borras *et al*. 2011) argue, the ability of a household to improve livelihood outcomes depends on asset endowment, participation in large-scale agricultural investment throughout-grower scheme and investors' farm wage employment. Others scholars including Otsuka and Yamano (2006) add socio-economic factors such as household size, age

and gender of the household head, education, health, social capital, assets and occupation of the household head. In addition, literature (Tuyen, 2015; Jansen *et al*., 2014) shows that large household sizes and dependency ratios negatively influence livelihood outcomes. Having more dependants reduces household livelihood outcomes. Tuyen *et al*. (2014) reported on the positive and significant association between land ownership and household livelihood outcomes though not all types of land were associated with households' livelihood outcomes. The same study shows that annual and perennial cropland was positively associated with household livelihood outcomes while forestland was not; suggesting that the influence of land size on households' livelihood outcomes depends on the crop grown on the land. When examining the influence of large-scale agricultural investment based on gender of the household head, Tuyen (2015) regressed household head type with livelihood outcomes in Vietnam. The results showed that gender of the household head did not influence household livelihood outcomes. However, some studies such as Aikael (2010) have reported lower livelihood outcomes in terms of income among female-headed than among male-headed households in rural Tanzania, implying that the impact of gender is context specific.

Based on the foregoing introduction and background, it is clear that the determinants of household livelihood outcomes are complex, diverse and context specific. The analysis of livelihood outcomes in developing countries must take into account this diversity, and context to which large-scale agricultural investment operates. Therefore, context-specific studies are necessary to contribute to the debate and enhance our understanding of the determinants of large-scale agricultural investment and household socio-economic factors on households' livelihood outcomes. This is critical when

designing policy interventions to improve households' standard of living. The paper is guided by two hypotheses:

(i) Household participation in out-grower scheme has no influence on households' livelihood outcomes
(ii) Household's socio-economic characteristics and large-scale agricultural have no association with households' livelihood outcomes

2. METHODOLOGY

The study was conducted in the Kilombero Valley, Kilombero District, Tanzania. Four villages namely Msolwa Ujamaa, Sanje, Mchombe and Mngeta were purposively selected based on the presence of substantial number of out-growers and out-grower associations, and households working for wage in large-scale agricultural investments.

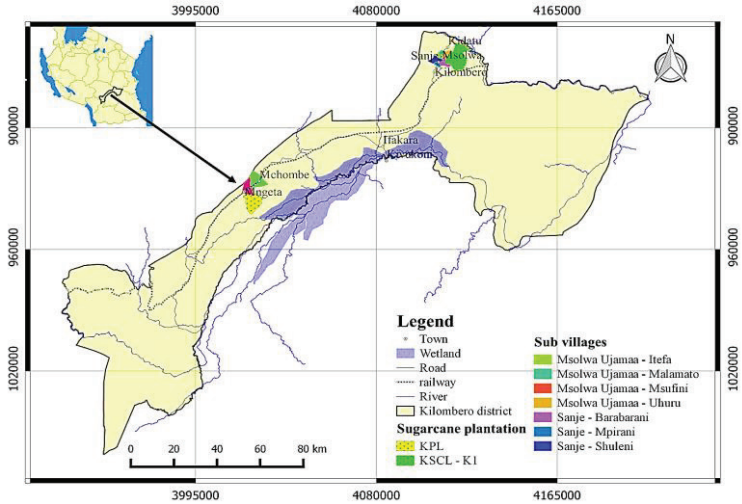

Figure 1: Map showing study sites in the Kilombero Valley

A cross-sectional research design was adopted in order to examine households' livelihood outcomes in the study area. The sampling unit was a household and exploratory sequential research strategy was adopted with two stages so as to expand the scope and improve the quality of the results. In this strategy, qualitative data collection and analysis stage one, preceded quantitative data collection and analysis (stage two). The qualitative phase involved Focus Group Discussions (FGDs) and Key Informants Interviews (KIIs) to collect information on sources of livelihood and key factors influencing households' livelihood outcomes. Seven FGDs with 50 (33 Male and 17 Female) participants were conducted as shown in Table 1.

Table 1: Participants involved in the Focus Group Discussions

Village	No. FGDs	Male	Female	MA	Min. age	Max. age
Msolwa Ujamaa	3	14	7	42	25	72
Sanje	2	10	5	44	29	61
Mchombe	1	5	3	46	31	66
Mngeta	1	4	2	48	34	70
Total	**7**	**33**	**17**	**NA**	**NA**	**NA**

NOTE: FGDs=Focus Group Discussions; NA=Not Applicable; MA=Mean age;

Group Discussions involved between six and eight participants. The FGDs participants were selected based on gender and age distribution to capture age and gender specific views. Seventeen KIIs were involved namely, two out-grower association administrative secretaries, three Ward Executive Officers (WEOs), four Village Executive Officers (VEOs), two representatives from Kilombero Plantation Limited (KPL) and Kilombero Sugar Company Limited (KSCL), one representative

from the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), one representative from Sugar Board of Tanzania and Kilombero District Agricultural, Irrigation and Cooperative Officer (DAICO). Key informant participants were selected based on age and awareness about large-scale agricultural investment. The aim was to get participants with experience on out-grower scheme and investor farm wage employment in the villages.

The quantitative phase of data collection involved household survey whereby 376 households, which is 94 percent of the sample size expected, were involved. Proportionate stratified sampling techniques using a household village register was applied to determine a sub-sample from each village. Considering 95 percent confidence level and a precision of 0.05, the required sample size was obtained using the following formula:

$$n = \frac{N}{N(e^2)+1}$$ ……. (Yamane, 1967 as cited by Israel, 2013)

Where:
n = Sample size,
N = Population of all households in study villages and
e = Level of precision.

According to the national census of 2012, 5914 households from the four villages were included in the study. Using the above formula, a sample of 400 households is obtained from all the villages. The formula, which was used to draw sample size in each village, was adopted from Kothari (2004) as follows:

$$n = \frac{N(Onevillage)xn(allvillages)}{N(Allvillages)} \quad \text{.....(Kothari, 2004)}$$

Thereafter, simple random sampling was used to select the respondents from each village. The sub-sample from each village is shown in Table 2. Qualitative data were analysed by using content analysis whereby transcribed text was organized into different themes based on the objectives of the study. Quantitative data were analysed using the Statistical Package for Social Sciences (SPSS) Statistics, version 20.

Table 2: Sample households from selected villages

Village	Hhs	MHH	FHH	Out-growers	IFW	NP	Sample
Mngeta	1286	77	10	-	38	49	87
Mchombe	650	77	12	-	42	47	89
Msolwa Ujamaa	1832	78	44	44	31	47	122
Sanje	1146	64	14	41	18	22	76
Total	**5914**	**296**	**80**	**85**	**129**	**165**	**400**

NP=Non participants; IFW=Investor farm worker

Descriptive statistics was computed to describe household socio-economic characteristics while multiple linear regression was used to determine socio-economic and large-scale agricultural investment factors associated with households' livelihood outcomes. The explanatory variables entered in the model were generated from the empirical literature (Table 3).

Table 3: Variables entered in the multiple linear regression model

Variables	Type of variable	Description of the variable	Expected influence
Livelihood Outcomes	Continuous	Summation of natural logarithm of income and asset stock	+
Age	Continuous	Age of the household head (in years)	+
Education	Continuous	Years of schooling of the household head (in years)	+
Household Size	Continuous	Number of individuals in a household	+/-
Land Size	Continuous	Household land size (in ha)	+
Group membership	Dummy	Household group membership (1 if in group membership, 0 otherwise	+
Out-grower scheme	Dummy	Household participation in out-grower scheme (1 if household participate, 0 if otherwise	+
Investor farm wage employment	Dummy	Household participation in investor farm wage employment (1 if household participate, 0 if otherwise)	_
Marital status	Dummy	Household head marital status (1 if married, 0 if single, separate, widow/widower or divorced)	+
Company adjacent	Dummy	Company adjacent to the household (1 if KSCL, 0 if KPL)	+
Household livelihood diversification	Dummy	Diversifying livelihood sources (1 if multiple livelihood sources, 0 if otherwise)	+

Multicollinearity was tested in order to detect whether there were correlations among the independent variables. According to Pallant (2011), multicollinearity problem is described by the presence of linear relationship among

explanatory variables. Testing of the model on multicollinearity was done by using tolerance and Variance Inflation Factor (VIF), which builds in the regression of each explanatory variable. As Pallant (2011) puts it, a tolerance value less than 0.10 and a VIF above 10 suggest the presence of multicollinearity. The analysis suggests the absence of multicollinearity. In addition, Durbin-Watson's tests were used to test for autocorrelations. The results (Table 7) show that the Durbin-Watson's (d) was 2.038, which falls within the rule of thumb values of $1.5 < d < 2.5$ (Kutner *et al,* 2005). Hence, there was no auto-correlation in the multiple linear regression analysis. The coefficient of determination (R^2) was 0.389 implying that the regression model explained 38.9percent of the variation in the livelihood outcomes (Table 7). The R-squared of 0.389 and adjusted R-squared of 0.372 are consistent with cross-sectional data as reported by Okurut *et al*. (2014). Therefore, the equation used in the regression analysis was:

$$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e$$

Where:
Y = Household livelihood outcomes (Outcome variable).
$\beta 1 \ldots \beta 10$ = estimation parameters
$X_1 \ldots\ldots X_{10}$ = explanatory variables defined in Table 3.
$\beta 0$ = the intercept
e **=** Regression error term

Livelihood outcomes were aggregated through the total household income and household total asset monetary value as adapted from Wendimu (2015) expressed as:

$$LO = \ln \left(\sum_{i=1}^{n} HI + \sum_{i=1}^{n} AMV \right)$$

Where,
LO = Household livelihood outcomes,
ln = denotes the natural logarithm,
HI = Total household income and
AMV = Household asset in monetary value

The Total households' income was estimated based on the annual cash earnings at the household level from farm income, off-farm income and other sources that include remittances, rental, and pension. In addition, the household total asset monetary value was computed by aggregating the market value of all assets that a household owned. The assets included were those identified by the households during pre-testing exercise as proxy indicators of wealth in the study area. These include consumer durable assets such as television, sofa sets, satellite dishes, radio, DVD player and cabinets and cell phone. Others are productive assets such as chemical sprayers, bicycle, motor cycles, hand hoes, and machetes. The values of these assets were estimated by inquiring about the quantity held and its reported monetary value in Tanzania shillings in 2016.

3. RESULTS AND DISCUSSION

Respondents' Socio-economic Characteristics

The minimum age of the household heads involved in the study was 18 years while the maximum age was 90 years, with a mean age of 42 years (Table 4). This suggests that the population from which the sample was drawn was dominated by mature household heads who can actively engage in different economic activities including participation in out-grower scheme and investor - farm wage employment.

Table 4: Household heads' socio-economic characteristics (n=376)

Variable	Minimum	Maximum	Mean
Age	18.0	90.0	42.5
Year of schooling	0.0	16.0	6.6
Land size	0.25	16.0	2.7
Household size	2.0	10.0	4.1

The mean years of schooling were seven with a minimum of zero years and a maximum of 16 years (Table 4). This implies that a larger proportion of the household heads had at least completed primary education and could access written information, which is potential for improving household well-being and development in general. Some household heads had education level above primary school. Literature shows that highly educated people in Tanzania and Africa in general tend to shun away from agriculture for white colour jobs; and they are more concerned with time value of money preferring investment in projects with quick returns. Previous studies including Bahaman *et al*. (2009) reported that out-grower scheme is among the main choices for unskilled labour. Therefore, there is a likelihood of households to use their land effectively for different economic activities including sugarcane outgrowing hence, increasing household livelihoods. Education is also associated with the production of high quality crops and greater participation in farm wage employment and other non-farm activities. Education allows diversification into other more lucrative, income-generating activities.

The mean household size was 4 members with a minimum of two and a maximum of 10 (Table 4). The URT (2012) reported that the household size in Morogoro is 4.4 members. This implies a sufficient supply of household labour for livelihood activities. Paddy and sugarcane, the main crops grown in the

Kilombero valley, are labour intensive crops. The mean for land ownership was 2.7 hectares (ha) with a minimum of 0.25ha and a maximum of 16ha (Table 4). Households with large productive land size and cultivating crops based on recommended agronomic practices are expected to have high livelihood outcomes. This is because households with large land size have the opportunity of acquiring more income due to economies of scale. This raises their wealth as opposed to their counterparts. About 65percent of the household heads were married. The rest were single, separated, divorced, or widows (Table 5). The nature of marital status and stability of a family can have either positive or negative impact on socio-economic development (Wendimu, 2015).

Table 5: Household heads' socio-economic characteristics (n=376)

Variables	Frequency	Percent
Marital Status		
Married	246	65.4
Otherwise (Single, divorced, separate and widow)	130	34.6
Member in out-grower association	169	44.6
Livelihood Strategies		
On-farming only	168	44.3
Off-farming only	44	11.6
Both farming and off-farming	164	43.3
Out-grower	85	22.6
Investor farm workers	129	34.3

When a family is stable, members can engage effectively in agriculture, on the other hand, when a family is unstable due to conflicts, members can hardly participate effectively in

agriculture leading to poor agricultural productivity. In addition, marital status has implication on land ownership because in African societies; it is mainly married members, especially men, who have the right of inheriting land (Quansah, 2009). According to Amaza *et al*. (2009), the importance of marital status on agricultural production can be explained in terms of providing family labour. Property ownership including land is under the head of the household in most cases men (Ruheza *et al*., 2012). The analysis also shows that 44.6percent were members in farmer groups (Table 5). Being a member in farmer groups was expected to support household members in accessing training, extension services, credit, and agricultural inputs thus, the possibility of increasing crop productivity and eventually their livelihood outcomes. The presence of few household members who were in groups implies that majority had difficulties in accessing credit, inputs and extension services and this can translate into poor livelihood outcome. Table 5 also shows that 44.3percent of the household heads reported farming activities as their main source of income. Additionally, 43.3peecent of the sampled households combined farming and off-farming activities (Table 5). This implies that a large proportion of households in Kilombero Valley did farming or combined farming and off-farm income generating activities. The key informants reported that large-scale agricultural investment has stimulated business and other off-farming activities such as agricultural input supplies and food vending. This can be because relying on different sources of income spread the risks and thus raises the chances of creating household wealth. According to Ruheza *et al*. (2012), rural household diversify their sources of income in order to reduce the risk associated with relying on one source of income. Households participating in out-grower scheme and investor farm wage employment were 22.6 and 34.3percent respectively (Table 5).

Determinants of Household Livelihood Outcome

The results of the Multiple Linear Regression (Table 6) show that age, livelihood strategies diversification, years of schooling, household size, group membership, participation in out-grower scheme and land size were important determinants associated with household's livelihood outcomes.

Table 6: Determinants of household livelihood outcomes

Model	U C	S C		T	Sig.		C S
	B	Std Error	Beta			Tolerance	VIF
(Constant)	14.185	0.549	0.174	25860	0.000		
Age of the household head	0.015*	0.005	0.174	3.099	0.002	0.531	1.884
Company Adjacent	0.121	0.132	0.047	0.915	0.361	0.637	1.570
Marital Status of household head	-0.158	0.122	-0.059	-1.297	0.195	0.813	1.230
Household head years of schooling	0.069*	0.022	0.156	3.221	0.001	0.714	1.401
Household Size	0.109*	0.032	0.167	3.470	0.001	0.721	1.388
Household head group membership	0.338*	0.118	-0.131	-2.868	0.004	0.805	1.242
Household participation in Out-grower scheme	-0.646*	0.169	-0.210	-3.817	0.000	0.552	1.811
Household participation in investor farm employment	-0.251	0.136	0.093	1.846	0.066	0.653	1.531
Household land Size	0.119*	0.019	0.294	6.222	0.000	0.748	1.336
Livelihood strategies diversification	0.154*	0.065	0.113	2.363	0.019	0.735	1.361

NB: R^2 = 0.389, Adjusted R^2 =0.372, t = 25860, Durbin-Watson=2.042, F=23.193 (p = 0. 000). UC=Unstandardized Coefficient; SC=Standardized Coefficient; CS=Collinearity Statistics; Dependent Variable: Household livelihood outcomes * Significance at 5% level

Participation in the sugarcane out-growers scheme significantly ($p \leq 0.05$) associated with households' livelihood outcomes (Table 6). However, the direction of the influence was negative suggesting that the higher the household participation in out-grower schemes the lower the livelihood outcomes. This is largely attributed to low sucrose level, in sugarcane, limited livelihood diversification and deductions made to out-growers that lower their incomes from sugarcane sales; therefore, negatively affecting households' livelihood outcome. This is in line with observations from the FGDs in Sanje village as shown in the quote below.

> *"Out-grower scheme does not pay at all since we experience low sucrose level and there are a lot of deductions during payments for sugarcane. We are forced to continue growing sugarcane because it is not practical to grow other crops like rice and maize that provide a nesting site for crop eating birds in addition to risk of fire" (FGD Participants, Sanje Village). 17th January 2017.*

The above quote suggests that if a households participating in the sugarcane out-growers scheme had better paying alternative crops they could either downscale the sugarcane cultivation or abandon it totally.

Moreover, during key informant interviews it was reported that some households looked for extra land in distant villages to grow maize and paddy in order to supplement the household income received from sugarcane sales. Studies by Bergius *et al*. (2017); Glove and Jones (2016); Sokchea and Culas (2015); Sulle (2017), and Wendimu (2015) reported that out-grower's livelihood outcomes are negatively influenced by large-scale agricultural investment. Smalley *et al*. (2014) also reported that households' participation in the sugarcane out-growers scheme

was negatively affected by large-scale agricultural investment due to payment delay, sugarcane remaining un harvested, low sucrose level and high deductions, which take a large proportion of out-growers income and thus reducing their livelihood outcomes.

The multiple linear regression results show that a household head's age was positively and significantly, (≤ 0.05) associated with households' livelihood outcomes (Table 6). According to the results, a one-year increase of the household head's age leads to the improvement of household's livelihood outcomes by a factor of 0.015. This suggests that the higher the age of the household head the higher the likelihood for the household to have higher livelihood outcomes. The possible explanation for this is that, the majority of older household heads own land, which if well utilized improves livelihood outcomes.

During the FGDs in Msolwa and Ujamaa village, the following was reported,

> *"Most of young household heads lack land that can be used to grow different crops and therefore they rely on wage employment which attracts low wages" (FGD Participants, Msolwa Ujamaa Village).11th January, 2017.*

The above quotation suggests that the youth are facing difficulties in securing livelihood in land related activities. The older household heads are more likely to enjoy the benefits accrued from participation in large-scale agricultural investment. Empirical evidence (Wendimu, 2015) shows further that age of the household members is ambiguous. For instance, household with younger working members are more likely to undertake non-farm jobs, which in turn can earn higher livelihood outcomes. Nevertheless, household with older

working members tend to attain more work experience, which can enable their households to earn higher livelihood outcomes (Tuyen *et al*., 2014).

Further to the above, Table 6 shows that households' membership to a group was positively and significantly ($p \leq 0.05$) associated with households' livelihood outcomes. If other factors remain constant, the likelihood of higher livelihood outcomes in favour of households with membership in-group or groups increases by 0.338. The possible explanation for the positive relationship is that households with a membership in group/groups are more likely to achieve higher livelihood outcomes. This was expected since households' participation in groups minimizes their financial constraint because of having opportunities to finance farming activities and other income generating activities. Group membership can also increase household's social capital. In addition, being a member in a social group increases bargaining power of farm household's in selling agricultural produce due to collective actions and decisions. These results are in line with observations from the FGDs as shown below.

> *"Participation in groups is helpful in terms of accessing credit schemes. Moreover, agricultural inputs like seeds and fertilizers channelled via groups by KPL in collaboration with the National Microfinance Bank (NMB)" (FGD Participants, Mngeta Village) 22nd December, 2016.*

This implies that households participating in social groups are in a position to improve agricultural production and other economic activities, which can improve their livelihood outcomes. According to Bahaman *et al*. (2008), social capital in Malaysia is an important asset in improving household

livelihood outcomes because credit is in most cases channelled through groups.

Household size was positive and significantly ($p \leq 0.05$) associated with the surveyed households' livelihood outcomes at 5 percent level of significance (Table 6). The positive sign shows that the odds ratio, in favour of livelihood outcomes, increase with an increase of household size. The odds ratio of 0.109 for household size implies that, other factors being constant, the livelihood outcomes increase by one unit as household size increases by 10.9percent. Household size has implication on family labour supply and livelihood outcomes. Large household size is an important asset in working together in household economic activities. This implies that households with large household size have enough labour that can be used in agricultural activities and other income generating activities. The study findings conform to the findings reported by Narayan (2010) for southern India that households with large size have more chances of having higher livelihood outcomes because they have more labour for farming activities. However, this only occurs when all household members participate in production (Kayunze, 2000). Nonetheless, some previous studies reported that larger households mean more mouths to feed and more family obligations thus, reducing their ability to improve livelihood outcomes. For example, a study by Okurut *et al.* (2014) in Botswana showed that the larger the household the poorer it becomes hence reducing the possibility of improving their livelihood outcomes.

Table 6 shows further that households' livelihood strategies were positively and significantly ($p \leq 0.05$) associated with their livelihood outcomes. The possible explanation for this is that households that have diverse sources of livelihood have better

chances of attaining improved livelihood outcomes. This is expected since diversification spread the risks. The above was collaborated by observations from the FGDs as shown in the quote below,

> "*Most of us combine farming with other non-farming income generating activities in order to avoid risk inherent in participating in farming only" (FGD Participants, Mchombe Village). 17th December 2016*

The study findings conform to the findings in a study by Hakizimana *et al*. (2017) in Kenya and Yaro *et al*. (2017) in Ghana. The above studies reported that households working with large-scale agricultural investment tend to diversify livelihood sources between on-farm and off-farm sources for better livelihood outcomes. According to Table 6, education was positively and significantly ($p \leq 0.05$) associated with livelihood outcomes. The possible explanation is that literate household heads have better skills, better access to information, and the ability to process information. It also implies that literate household heads are more likely to be employed in formal employment, which attracts more payment hence improving their livelihood outcomes. The results suggest further that the majority of household heads were literate enough to adopt and use out-grower scheme services from out-grower associations as well as from the investor. It is also expected that households that are more educated would be better in terms of livelihood outcomes than would be the case with those with low formal education. Low education level can lower households' efforts of improving livelihood outcomes. This is further supported by the previous studies for example, Amrouk *et al*. (2012) in Ethiopia and Tanzania and Casaburi *et al*. (2012) in western Kenya who established that education has a positive implication on households' livelihood outcomes.

Similarly, household land size owned showed positive and significant ($p \leq 0.05$) association with households' livelihood outcomes (Table 6). This implies that as land size gets larger, livelihood outcomes also increase. This has an implication on the ability of households to combine different farming systems thus, enabling them to grow a variety of crops. It also implies that households with large arable land size have the opportunity of growing large tracks of paddy or sugarcane. Large land size also implies that households can diversify into other crops and reduce the inherent risk associated with agricultural production and productivity. Previous studies have shown that given low farming technology, households' livelihood outcomes largely depend on land size cultivated (Waswa *et al*., 2012; Amrouk *et al*. (2012). However, Tuyen et al. (2014) in Vietnam warns that not all types of land can result into higher household livelihood outcomes. The livelihood outcomes according to Tuyen *et al*. (2014) depend on crop grown in the land and the use of recommended agricultural practices; similar observations can apply to the Kilombero valley.

4. CONCLUSION AND RECOMMENDATIONS

The paper concludes that the determinants of households' livelihood outcomes are diverse, ranging from socio-economic characteristics to large-scale agricultural investment factors. Households' participation in the out-grower scheme in the study area decreased livelihood outcomes. Participation in the wage employment in investor farm showed negative influence on livelihood outcomes and was not significant at 5percent level. The paper also concludes that household socio-economic characteristics such as age, education, household size, land size, group membership, and livelihood strategies have positive influence on households' livelihood outcomes. This conclusion

agrees with the theoretical underpinning adopted from SLF that some socio-economic characteristics and household participation in out-grower scheme influence livelihood outcomes. However, the conclusion is not in line with theoretical argument that gender variables such as marital status and sex have some influence on households' livelihood outcomes.

The paper recommends that out-grower associations in the study area through collaboration with Sugar Board of Tanzania (SBT) should set up strategies for improving household's livelihood outcomes through ensuring a win-win situation in the contracts between large-scale agriculture investors and out-growers. The paper also recommends that local government authorities in collaboration with community-based organizations should encourage households to join in farmer groups. There is a need for the local government authorities in collaboration with the central government to ensure that household in villages have access to land for producing sugarcane for them to cultivate other crops such as maize and paddy.

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