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FACTORS INFLUENCING HOUSEHOLD LIVELIHOOD OUTCOMES IN KILOMBERO VALLEY, TANZANIA

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Abstract— *Household's participation in 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 factors influencing household livelihood outcomes have not been conclusive. This paper aims at examining the factors influencing household livelihood outcomes. The paper adopted a cross-sectional research design whereby exploratory sequential research strategy was adopted whereby a total of 376 respondents were involved in the survey. It also used descriptive statistics and multiple linear regressions to analyze quantitative data analysis while qualitative data were subjected to the content analysis. The results show that age, education, household size, land size, group membership and livelihood strategies influenced positively and significantly household livelihood outcomes at 5% level of significance. Participation in out-grower scheme reduced ability to improve livelihood outcome at 5% level of significance. Similarly, participation in farm wage employment reduced ability to improve livelihood outcome but it was not significant. The article concludes that household heads' socio-economic characteristics influenced livelihood outcomes than large-scale agricultural investment factors. Therefore, the article recommends strategies like a win-win situation to reverse direction of the influence of large-scale agricultural investment on household livelihood outcomes.*

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

Introduction

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The 21st Century is experiencing a wave for a growing interest on 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 a fear of some food-importing countries about not being able to access sufficient quantities of food for their people (Matondi et al., 2011). The concept of large-scale agricultural investment refers to purchase of land and user rights through lease or concessions, whether for a short or a long term period (FAO, 2012). Some authors including Cotula (2012) defines it as purchase or lease of vast tracts of land by wealthier, food-insecure nations and private investors from mostly poor, developing countries in order to produce food crops for export. This article considers this concept as a process whereby foreign governments, local and foreign companies are leased tracts of arable land for large-scale agriculture and integrate the rural household in out-grower scheme and investor farm employment.

Theoretical Debate

The debate on large-scale agricultural investment shows that its impacts on households' livelihood outcomes are controversial; and there are two popular strands in the literature about the influence of large-scale agricultural investment on households' livelihood outcomes.

On one hand, the proponents of large-scale agricultural investment argue that the phenomenon

has potential benefits. While it is imperative for economic growth at a national level, it is critical for creation of employment opportunities and provision of public goods and services particularly in rural and urban communities (Deininger, 2011). Thus, it improves household income and asset stocks that largely explain household livelihood outcomes (Bellemare, 2012; Herrmann and Grote, 2015). Literature defines livelihood outcomes as an increased income and well-being, reduced vulnerability, improved food security and sustainable use of natural resources (Scoones, 1998). This article considers it 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 through out-grower scheme achieve higher yields, income, improve assets, and savings because of increased use of inputs. In addition, Barrett *et al.* (2012) argue that household integrated through out-grower scheme have access to credit, quality input, and high value output market. Even though, the impacts of large-scale agricultural investment on household livelihood outcomes are context specific and depend on the nature of contract between out-growers and investors as well as crop under the contract.

On the other hand, critics of the phenomenon argue that large-scale agricultural investment has unfavourable impacts especially to the rural communities. For instance, Arndt *et al.* (2010); Baumgartner *et al.* (2015); Deininger and Byerlee (2012); Narayanan (2014); Oya (2013) reported that the phenomenon negatively influence household livelihood outcomes. To justify this argument Davis *et al.* (2010) contend that wage employment is mainly performed by households lacking ability to engage 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, and hence difficult to transform household livelihood outcomes (Oya, 2013). Studies conducted by Casaburi *et al.* (2012) and Waswa *et al.* (2012) in Kenya reported that, in many cases, the outcomes of the phenomenon vary by context, and to a large extent households do not necessarily attain the expected livelihood outcomes. Some of the reasons include delay of payment from investors, low sucrose level from sugarcane especially when involving sugarcane production, which reduces payments, sugarcane remaining un-harvested and high deductions which reduces out-growers' income and hence reduce possibility of having positive livelihood outcomes (Smalley *et al.*, 2014).

Based on the two theoretical strands of arguments, it can be asserted that the proponents build their arguments based on the fact that large-scale agricultural investment increases agricultural productivity many times than smallholder farmers can do. The reason is that the phenomenon promotes use of improved agricultural technologies like 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 issues including the process of implementation of the phenomenon, whereby there is normally a delay of payments to the farm wage employees. Secondly, the phenomenon attracts mainly unskilled labour, particularly in rural communities, paid low wages because of having limited choices to support the living. Low wages hardly transform livelihood outcomes.

Conceptual Framework
This article adopts 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 article considers household heads' socio-economic characteristics. To capture factors related to large-scale agricultural investment, the article takes on board out-grower scheme and farm wage

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employment. The selection of the framework is based on the fact that it captures aspects of rural livelihood like assets and activities from which rural livelihood is derived (Ellis, 2000). Therefore, the framework is appropriate in understanding livelihood assets in the context of large-scale agricultural investment 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).

Some authors like Borras *et al.* (2011) argue that the ability of a household to improve livelihood outcomes depends on asset endowment, participation in large-scale agricultural investment throughout grower scheme and investor farm wage employment. Others including Otsuka and Yamano (2006) add socio-economic factors like household size, age and gender of the household head, education, health, social capital, assets and occupation of the household head. In addition, Tuyen (2015) and Jansen *et al.* (2014) show that large household size and dependency ratio negatively influence livelihood outcomes. Having more dependants reduces household livelihood outcomes. Tuyen *et al.* (2014) show positive and significant difference between land ownership and household livelihood outcomes though not all types of land were associated with household livelihood outcomes. The same study shows that annual and perennial crop land had positive influence on household livelihood outcomes while forest land was not significant. This implies that the influence of land size on household 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 affect household livelihood outcomes. However, some studies like Aikael (2010) have reported lower livelihood outcomes in terms of income among female-headed

than 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 factors influencing household livelihood outcomes are complex, diverse and context specific. An 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 influence 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. This article is guided by three hypotheses:

(i) Household participation in out-grower scheme has no influence on households' livelihood outcomes

(ii) Household participation in investor farm employment has no influence on households' livelihood outcomes

(iii) Household's socio-economic characteristics have no influence on households' livelihood outcomes

Methodology

The study was conducted in the Kilombero Valley in Kilombero District. Four villages namely MsolwaUjamaa, Sanje, Mchombe and Mngeta were purposively selected based on having substantial number of out-growers and presence of out-grower associations as well as households working for wage in large-scale agricultural investment.
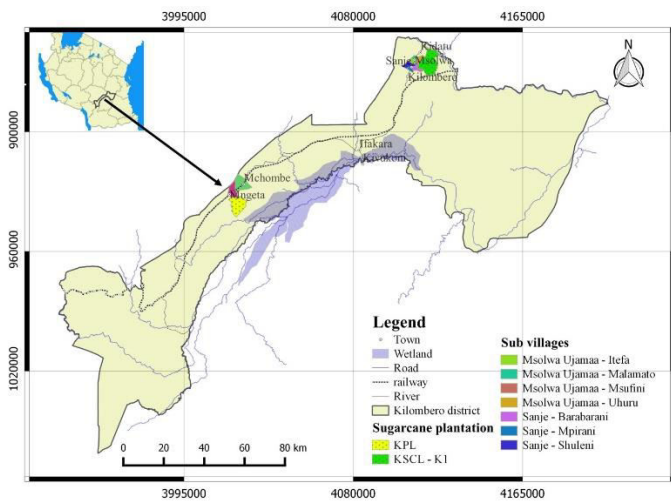
Figure 1: Map showing study sites in the Kilombero Valley

A cross-sectional research design was adopted in order to examine household 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) used to collect information on sources of livelihood and the key factors influencing households' livelihood outcomes. A total of seven FGDs with a total of 50 (33 Male and 17 Female) participants were conducted as shown in Table 1.

Table 1: Participants involved in focus group discussions

Village name	Number of FGDs conducted	Number of Male Participants	Number of Female Participants	Mean age (years)	Minimum age (years)	Maximum age (years)
MsolwaUjamaa	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

Participants ranged between six and eight. The selection of FGDs participants was based on gender and age representation to capture age and gender specific views. Seventeen KIIs were involved including 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 Southern Agricultural Growth Corridor of Tanzania (SAGCOT), one representative from Sugar Board of Tanzania and Kilombero District Agricultural, Irrigation and Cooperative Officer (DAICO). The selection of key informant participants was 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 were involved. Proportionate stratified sampling techniques using a household village register was applied to determine a sub-sample from each village. Considering 95% confidence level and a precision of 0.05, a 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, the number of households in the four villages included in the study was 5914. Using the above formula, a sample of 400 households is obtained for all villages. The

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formula used to draw sample size in each village was adopted from Kothari (2004) formulas follows:

$$n = \frac{N(One village) x n(all villages)}{N(All villages)}$$

……………….. (Kothari, 2004)

Thereafter, simple random sampling was used to select respondents from each village. The sub-sample from each village is shown in Table 2. Qualitative data were analyzed 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	House holds	M H H	F H H	Out-gro wers	Inve stor farm work er	Non-Partici pants	Selec ted sam ple size
Mngeta	1286	77	10	-	38	49	87
Mchomb e	1650	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

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

Table 3: Variables entered in the multiple linear regression model

Variables	Type of variable	Description of the variable	Expec ted influe nce
Livelihood Outcomes	Continu ous	Summation of natural logarithm of income and asset stock	+
Age	Continu ous	Age of the household head (in years)	+
Education	Continu ous	Years of schooling of the household head (in years)	+
Househol d Size	Continu ous	Number of individuals in a household	+/-
Land Size	Continu ous	Household land size (in ha)	+
Group membersh ip	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 employme nt	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)	+
Househol d livelihood diversificat ion	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 regression of each explanatory variable. Pallant (2011) puts that a tolerance value less than 0.10 and a VIF above 10 suggest presence of multicollinearity. The analysis suggests absence of multicollinearity. In addition, Durbin-Watson's tests were used to test for autocorrelations. The results 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 38.9% of the variation in the livelihood outcomes. 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
$X_1 \ldots \ldots \ldots X_{10}$ = explanatory variables defined in Table 3.
β_0 = the intercept
e = Regression error term

Livelihood outcomes were aggregated through 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

We estimated total household income based on annual cash earnings at a 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 households during pre-testing exercise as proxy indicators of wealth in the study area. These include consumer durable assets like television, sofa sets, satellite dishes, radio, DVD player and cabinets and cellphone. Others are productive assets like chemical sprayers, bicycle, motor cycles, hand hoe and machete. The values of these assets were estimated by inquiring about the quantity held and its reported monetary value Tanzania shillings in 2016.

Respondents' Socio-economic Characteristics
The minimum age of the household heads involved in the study was 18 years while 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 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 potential for improving household wellbeing and development in general. Some household heads had education level above primary school. Literature shows that the highly educated people in Tanzania and Africa in general tend to shun away agriculture for white color 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 choice for unskilled labour. Therefore, there is a likelihood of households

to effectively use their land for different economic activities including sugarcane outgrowing hence increasing household livelihoods. Education is also associated with 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 production that are the main crops grown in the Kilombero valley are labor intensive crops. The mean for land ownership was 2.7 hectares (ha) with a minimum of 0.25ha and maximum of 16ha (Table 4). Households with large productive land size grown crops by using recommended agronomic practices are expected to have high livelihood outcomes. This is due to the fact that households with large land size have an opportunity of acquiring more income due to economies of scale. This raises their wealth as opposed to their counterparts. About 65% of the household head were married. The rest were single, separated, divorced and widows (Table 5). The nature of marital status and stability of a family can have either positive or negative impact on socio-economic development.

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		
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 while when it 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 a right to inherit 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 head of the household in most cases men (Ruheza *et al.*, 2012). The analysis also shows that 44.6% 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 and thus increase crop productivity and eventually the livelihood outcome. The presence of few household members who were in groups implies that majority hard difficulties in accessing credit, inputs and extension services and this can translate into poor livelihood outcome. Table 5 also shows that household heads who reported farming activities alone as their main source of income were 44.3%. Additionally, 43.3% 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 like agricultural input supplies and food vending. This can be due to the fact that relying on different sources of income spread the risks and thus raises the chances of creating household wealth. Households participating in out-

grower scheme and investor farm wage employment were 22.6% and 34.3% respectively (Table 5).

Results and Discussion

Factors Influencing Household Livelihood Outcome

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

Table 6: Factors influencing household livelihood outcomes

Model	Unstandardized Coefficient		Standardized Coefficient	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant	14.185	0.549	0.174	258 60	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 diversification	0.154*	0.065	0.113	2.363	0.019	0.735	1.361

$R^2 = 0.389$, Adjusted $R^2 = 0.372$, t = 25860, Durbin-Watson=2.042, F=23.193 (p = 0. 000).

Dependent Variable: Household livelihood outcomes.
* Significance at 5% level

Participation in out-grower scheme showed significant influence on households' livelihood outcomes at 5% level of significance (Table 6). However, the direction of the influence was negative. This implies 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 an income accruing from selling sugarcane and therefore negatively affecting livelihood outcome. This is in line with the results from FGDs in Sanje village that:

"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"(FGDs in SanjeVillage).

The results in the quotation above imply that if household participation in out-grower scheme had alternative to sugarcane they could have shifted to another crops like maize and paddy. Some households were reported during key informant interviews to have looked for extra land in far villages to grow maize and paddy in order to supplement household income received from sugarcane selling. 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 affected by large-scale agricultural investment. Smalley *et al.* (2014) also reported that household participating in out-grower scheme are negatively affected by large-scale agricultural investment due to payment delay, sugarcane remaining un harvested, low sucrose level

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and high deductions, which take a large proportion of out-growers income and thus reduce their livelihood outcomes.

The age of the household heads showed positive significant influence on livelihood outcomes at 5% level of significance (Table 6). This is interpreted that the odds ratio in favor of livelihood outcomes increases by a factor of 0.015 when age of the household head increase by one year.This suggests that the higher the age of the household head the more the household likely to have higher livelihood outcomes. The possible explanation for this is that, majority of older household heads own land that if well utilized improves livelihood outcomes. During FGDs in MsolwaUjamaa village it was reported that:

> *"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." (FGDs in MsolwaUjamaa Village).*

The quotation suggests that youth are facing some difficulties in securing livelihood in land related activities. The older household heads are more likely to enjoy the benefits accruing from participation in large-scale agricultural investment. Empirical evidence further shows 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 a households to earn higher livelihood outcomes (Tuyen *et al.*, 2014).

In addition, the results showed that household group membership positively and significantly influence household livelihood outcomes at 5% level of significance (Table 6). If other factors remain constant, the likelihood of higher livelihood outcomes in favor 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 household participation in groups minimizes households' 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 social groups increases bargaining power of farm household's in selling agricultural produce due to collective actions and decisions. These results are in line with qualitative results quoted as follows:

> *"Participation in groups is helpful in terms of accessing credit schemes, agricultural inputs like seeds and fertilizers channeled via groups by KPL in collaboration with National Microfinance Bank (NMB)" (FGDs in Mngeta Village).*

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

Household size showed positive and significant influence on household livelihood outcomes at 5% level of significance (Table 6). The positive sign shows that the odds ratio, in favor of livelihood outcomes, increase with an increasing 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 10.9%. 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

results support findings by Narayan (2010) in southern India that households with large size have more chances of having higher livelihood outcomes because they have more labor for farming activities. However, this occurs when almost all household members participate in production (Kayunze, 2000). Even though, some previous empirical studies report that large household size implies more mouth to feed and more family obligations that reduce ability of the household to improve livelihood outcomes. For example, Okurut *et al.,* (2014) study in Botswana show that the bigger the household size the poorer it becomes hence low chances of improving their livelihood outcomes.

Likewise, livelihood strategies influenced positively and significantly livelihood outcome at 5% level of significance (Table 6). The possible explanation for this is that households that have diverse sources of livelihood have more chances of being better in terms of livelihood outcomes. This is expected since diversification spread the risks. This was in line with FGDs as shown in the following quotation:

> *"Most of us combine farming with other non-farming income generating activities in order to avoid risk inherent in participating in farming only" (FGDs in Mchombe Village).*

The information in that quotation implies that households diversified livelihood sources. Similar results were reported by Hakizimana *et al.* (2017) in Kenya and Yaro *et al.* (2017) in Ghana. Those 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. Education also showed positive and significant influence on livelihood outcome at 5% level of significance (Table 6). The possible explanation is that literate household heads have better skills, better access to information and 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 improved livelihood outcomes. The results further imply 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 more educated households would be better in terms of livelihood outcomes than those with low formal education. Low education level can lower households' efforts to improve livelihood outcomes. This is further supported by the previous studies as those by Amrouk *et al.* (2012) in Ethiopia and Tanzania and Casaburi *et al.* (2012) in western Kenya who established that education has positive implication on households' livelihood outcomes.

Similarly, household land size owned showed positive and significant influence on households' livelihood outcomes at 5% level of significance (Table 6). This implies that as land size gets larger, livelihood outcomes also increase. This has implication on ability of households to combine different farming systems and thus grow varieties of crops. It is also implying that households with large arable land size have opportunity to grow 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 with low farming technology, households' livelihood outcomes to a large extent depends 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 use of recommended agricultural practices, which can also apply in the Kilombero valley.

Conclusions and Policy Recommendations

The article concludes that factors influencing households livelihood outcomes are diverse, ranging

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from socio-economic characteristics and large-scale agricultural investment factors. Households' participation in out-grower scheme in the study area decreased livelihood outcomes. Thus, the hypothesis that households participating in out-grower scheme have no influence on households' livelihood outcomes is accepted. Such influence negatively affects livelihood outcomes. Participation in investor farm wage employment showed negative influence on livelihood outcomes and did not show significance at 5% level. The article 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. Therefore, the hypothesis that households' socio-economic characteristics have no influence on livelihood outcomes is rejected. 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 influence on households' livelihood outcomes.

The article recommends that in seeking to improve households' livelihood outcomes available 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 contract between large-scale agriculture investors and out-growers. The article also recommends that local government authorities in collaboration with community based organizations should encourage households to join in farmer groups. The local government authorities at a village and district level should promote diversification of livelihood strategies farm, on-farm and non-farm economic activities through investment in education and labour skills training to equip households with knowledge and skills to secure good livelihood outcomes. There is a need for local government authorities in collaboration with the central government to ensure access to land for household in villages producing sugarcane for them to cultivate other crops like maize and paddy.

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