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## Large Scale Agricultural Investments and Its Impact on Gender Relations and Wellbeing of Small Holder Farmers: Evidence from Kilombero Valley in Tanzania

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### ABSTRACT

*This paper explores the impact of large-scale agricultural investment on household livelihood outcomes among smallholder farmers in Kilombero Valley, Tanzania. The study used qualitative and quantitative data from a sample of 376 households. Quantitative data analysis employed independent samples t-test and multiple linear regressions. There were associations in livelihood outcomes and household headship ( $p < 0.05$ ). The age of household head, years of schooling, household size, land size, group membership, household participation in the out-grower scheme, and livelihood strategies had influence on household livelihood outcomes ( $p < 0.05$ ). Household livelihood outcomes depend on household socio-economic characteristics and household participation in LSAI. The study recommends Local Government Authorities, non-governmental organization to help farmers to diversify livelihood strategies, group strengthening, promoting gender dialogues in the community to transform gender norms that discriminate against women and female headed households, increase representation of out-growers in every decision making process that affects their livelihood outcomes.*

### Keywords:

*large-scale  
agriculture,  
household  
livelihood, gender  
dialogue, decision  
making.*

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## 1. Introduction

Large-scale agricultural investments that integrate household in out-grower scheme and investor farm employment are important in improving household livelihood outcomes (Schupbach, 2014; Hichaambwa and Matenga, 2016). According to FAO (2012), Large-scale agricultural investment refers to the purchase of land and user rights through lease or concessions, whether for a short period or a long term. This study conceptualizes large-scale agriculture investment as a process whereby foreign governments, local and foreign companies are leased tracts of arable land for large scale agriculture with out-grower scheme model or plantation scheme. Studies in developing countries have reported that large-scale agricultural investment has significantly increased household livelihood outcomes. These studies include empirical evidence in Ethiopia (Baumgartner *et al.*, 2015); Zambia (Matenga, 2016; Timor (ILO, 2017), Zimbabwe (Mutopo *et al.*, 2015), Mozambique (Knapman and Sutz, 2015), Ghana (Yaro *et al.*, 2017) and Vietnam (Saigenji, 2010). In addition, households involved in the out-grower schemes in which smallholder farmers produce cash crops on their own land, as out-growers on contract with agro-processing companies, have been more beneficial to most farmers (Matenga, 2014; Sokchea and Culas, 2015; Glover and Jones, 2016; Herrmann, 2017). Out-growers enjoy benefits such as access to agricultural inputs, credit or technical assistance, increased income and assured market for their produce (Schupbach, 2014).

On the other hand, large scale agricultural investments have been reported to contribute to the widening household income inequalities (Rocca, 2016) and have negatively affected household livelihoods (Matenga and Hichaambwa, 2017; Nolte and Ostermeier, 2017). Out-grower scheme in sugarcane production is reported to have poor contribution to household livelihood outcomes due to multiple reasons (Glover and Jones, 2016; Mwambi *et al.*, 2016; Wendimu *et al.*, 2016; Ripley, 2017). These include low sucrose level, unfair system of weighing cane and payment calculations, lack of sufficient factory space to crush cane, corruption, delay in picking cane from the out-growers and delay in farm inputs from out-grower associations (Glover and Kusterer, 1990; Cai *et al.*, 2008). Households participating in investor farm employment have also been reported to have been affected negatively as large scale agricultural investments employment is characterized by seasonal low wages with poor working conditions as well as payment deductions and lack of transparency in wage system (Hall *et al.*, 2017; Matenga and Hichaambwa, 2017) and these in turn have affected household livelihood outcomes.

Previous studies show that large-scale agricultural investments affect livelihood of different categories of households and of different socio-economic characteristics. Matenga and Hichaambwa (2017), for instance, argue that large-scale agricultural investments result in heterogeneous effects on different segments of social groups. The argument is based on the fact that large-scale agricultural investments that integrate smallholder farmers in the production of crops lead to more chances of achieving high levels of wealth. In contrast, Hall *et al.* (2017) argue that large-scale agricultural investments that adopt plantation scheme offer employment opportunities to rural communities. However, the contribution of plantation scheme through employment generation is minimal due to temporary, casual employment and low wages (Hichaambwa and Matenga, 2016). It is worth noting that households are not a homogenous group, and in that case, there is also differentiation in terms of how they are affected by large scale agricultural investments. Household headship is likely to affect the probability of participating in out-grower scheme or to engage in employment on large-scale farms due to differences in opportunities, motivation and capabilities (Schupbach, 2014). FHHs' livelihood outcomes are likely to be disadvantaged compared to MHHs. For instance, Osabuohien *et al.* (2016) reported that large-scale agricultural investments have a negative effect on the welfare of FHHs which are located in the communities with large-scale agricultural investment. Their findings reveal further that FHHs working

in the investor farm employment earned slightly lower agricultural wages than those not working in large-scale agricultural investments.

The study from which this paper is based is anchored in the Sustainable Livelihood Framework (SLF) as described by DFID and Feminist Political Economy (FPE). The SLF focus on how the resources are used as an asset to improve human wellbeing and promoting development by considering livelihood asset, process and structures, and livelihood strategies to achieve livelihood outcomes (Wendimu *et al.*, 2016). On the other hand, FPE assumes that livelihood within agrarian political economy are gendered in their organization, processes, and outcomes (Riley, 2008; Doss *et al.*, 2014). The SLF allows us to have a clear sense of the most important assets that a household owns and how these assets are affected by large-scale agricultural investments while FPE was used allow better understanding of the realities of MHHs and FHHs whose lives are impacted across different models of large-scale agricultural investments. Specifically, the study was conducted to analyse association between large-scale agricultural investments and household headship, compare livelihood outcomes between MHHs and FHHs and examine factors influencing livelihood outcomes.

## **2. Methodology**

The study was conducted in Kilombero Valley in Kilombero District, data were collected from four villages namely MsolwaUjamaa, Sanje, Mchombe and Mngeta. The selection criteria were: having substantial number of out-growers, presence of out-grower associations as well as households working for wage.

A cross-sectional research design was adopted in order to examine household livelihood outcomes in the study area. The exploratory sequential research strategy was adopted in order to integrate the results from two stages so as to expand the scope and improve the quality of the results (Courtney, 2017). In this strategy, the qualitative data preceded quantitative data collection. The qualitative phase of data collection involved Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs), which were used to collect information on, challenges and opportunities of large-scale agricultural investments, sources of livelihood and the key factors influencing household livelihood outcomes. Fourteen KIIs were interviewed 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 survey for quantitative data involved 376 households. This sample size was estimated using the Yamane (1972) formula as cited by Israel (2013). Quantitative data analysis involved descriptive statistical analysis, multiple response, multiple linear regressions which were used to estimate factors influencing households' livelihood outcomes. The Collinearity/multicollinearity diagnostics test was done in order to detect whether or not there was a correlation among the independent variables as guided by Pallant (2011),

Therefore, the multiple linier regression model was specified as:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + e$$

Where:

Y = Household livelihood outcomes (Outcome variable).

$\beta_1 \dots \beta_{11}$ = estimation parameters

$X_1 \dots X_{11}$ = explanatory variables defined in Table 1.

$\beta_0$  =the intercept

$e$  = Regression error term

**Table 1: Variables entered in the model**

Variables	Type of variable	Description of the variable	Expected sign
Livelihood Outcomes (income and asset monetary value)	Continuous	Summation of natural logarithm of income and asset stock	
Age	Continuous	Age of the household head (in years)	+
Household headship	Dummy	Household headship type ( 1 if headed by male, 0 if otherwise)	+
Marital status	Dummy	Household head marital status ( 1 if married, 0 if single, separate, widow/widower or divorced)	+
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)	+
Household livelihood strategies	Dummy	Livelihood strategies ( 1 if multiple livelihood sources, 0 if 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)	-
Company adjacent	Dummy	Company adjacent to the household ( 1 if KSCL, 0 if KPL)	+

Livelihood outcome was measured by aggregating the total household income and the household total asset value as adapted from Wendimu (2015) and expressed as:

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

Where,

LO = Household livelihood outcome, ln = denotes the natural logarithm, HI= Total Household Income and AMV= Household Assets Monetary Value

The total households' income was based on the annual cash earnings of the households from farm income, off-farm income and other sources (i.e. remittances, rental, and pension). The household total asset monetary value was computed by aggregating the market value of all the assets which households owned. The assets included those identified by the households during the qualitative phase and those added during the pre-testing exercise as proxy indicators of wealth in the study area. They included consumer durable assets such as TV, Sofa sets, satellite dishes, radio, DVD player and cabinets and cell

phones. Others were productive assets such as chemical sprayers, bicycles, motor cycles, hand hoes and machetes. The values of these assets were estimated by inquiring about the quantities held and their market monetary values in a year preceding the survey i.e. 2016.

### 3. Results and Discussion

#### 3.1 Constraints of Large-Scale Agricultural Investments

##### 3.1.1 Constraints to out-grower Scheme by household headship

The study revealed that there was no statistical significant association in terms of constraints between MHHs and FHHs that are engaged in the out-grower scheme ( $\chi^2 = 10.29$ ;  $p < 0.05$ ) (Table 2). This implies that MHHs and FHHs participating in out-grower scheme share similar constraints. All MHHs and FHHs participating in sugarcane out-grower scheme cited low sucrose level as their major constrain.

**Table 2: Constraints to out-grower scheme by household headship (n = 85)**

Constraints	MHHs Counts	FHHs Counts	Total counts	Chi-square/Sig.
Low sucrose level	57	28	85	10.289
Unfair system of weighing sugarcane and payment calculation	41	27	68	0.067
Lack of sufficient factory space	28	9	37	
Corruption	23	17	40	
Sugarcane not picked on time	36	17	53	
Exclusion of out-grower in price setting	35	19	54	
Delay in farm inputs	17	3	20	
Difficult in acquiring land	17	8	25	

The Chi-square statistic is not significant at the 0.05 level

This finding indicates that corruption in measuring sucrose level is a threat to out-growers and has implications on the income that households receive from sugar cane selling. Other studies have also reported that there is a serious lack of trust and openness in sucrose measurement as well as in weighing sugarcane deliveries and calculating the out-growers' payments (Key and Runsten, 1999; Poulton *et al.*, 2010; Smalley, 2013; Smalley, 2014; Smalley *et al.*, 2014).

##### 3.1.2 Constraints of investor farm employment by household headship

The study findings revealed that there was no statistical significant association between constraints for households participating in investor farm employment and household headship ( $\chi^2 = 9.09$ ;  $p < 0.05$ ) (Table 3).

**Table 3: Constraints of investor farm employment by household headship (n = 126)**

Constraints	MHHs Counts	FHHs Counts	Total counts	Chi-square/Sig.
Low wages	85	11	96	9.090
Seasonal condition of work	47	10	57	
Poor work condition	82	5	87	0.106
Payment deductions	22	3	25	
Lack of transparency in wage system	50	5	55	

Large portion of task	62	10	72
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The Chi-square statistic is not significant at the 0.05 level

These findings imply that both MHHs and FHHs were affected by low wages, lack of transparency in wage system and payment deduction. This can be attributed to the fact that most of the permanent employments in large scale agricultural investments require well trained personnel who, in most cases, are not available in the rural areas.

Studies by Matenga and Hichaambwa (2016) in Zambia found that wage employments which were created by large-scale agricultural investments are gendered with men securing most of the permanent employment leaving women with casual, insecure and poorly paid seasonal wage employment.

### 3.2 Livelihood Outcomes among Male and Female-Headed Households

The results from an independent samples t-test showed that there was a significant difference in livelihood outcomes by household headship ( $p < 0.05$ ) as indicated in Table 4.

**Table 4: Livelihood outcomes among MHHs and FHHs**

Variable	Household headship	N	Mean livelihood outcome	F-value	Sig.
Livelihood outcomes	MHHs	293	15.013.	0.567*	0.005
	FHHs	79	14.923		

\*Means significant at the 5% level

This can be explained by the fact that large-scale agricultural investments benefit more MHHs than FHHs. In most cases, investor farm employment opportunities tend to produce gender differentiated casual labour with MHHs securing higher wages compared to FHHs. It can also be explained by the fact that out-grower schemes tend to benefit more MHHs than FHHs. Osabuohien *et al.* (2016) and Wendimu *et al.* (2016) reported similar findings that large-scale agricultural investments result into low welfare of FHHs located in the communities with large-scale agricultural investments. Moreover, Hall *et al.* (2015) and Sulle (2017) found that large-scale agricultural investments have potential gender impacts with FHHs being affected more in terms of wages they receive from investor farm employment.

### 3.3 Household Socio-economic Characteristics

The results show that the minimum age of household head was 18 years while the maximum was 90 years, and the mean age was 42.0 years. This suggests that there was a predominance of mature and productive household heads. The mean year of schooling of the household head was 7.0 years with a minimum of zero (0) years of schooling and a maximum of 16 years of schooling. This implies that a larger percentage of the household heads had at least completed primary education. Studies by Bahaman *et al.* (2009) revealed that out-grower scheme is among the main choices for those with lower education.

The mean household size was 4.0 people with a minimum of two (2) household members and a maximum of 10 members of the household. As reported by URT (2012), the household size in Morogoro is 4.4 people. This implies a sufficient supply of household labour for livelihood activities. The minimum land size was 0.25 ha and the maximum was 16 ha with a mean of 2.7 hectares of land. About two-thirds

(65%) of the household heads were married. The rest were single, separated, divorced or widowed. The marital status and stability of the family can have either positive or negative impact on agricultural development.

The results also showed that 44.6% of households belonged to group. Group membership was expected to support household members in accessing training, extension services, credit and agricultural inputs and thus increase crop productivity and eventually livelihood outcomes. Household heads who reported farming activities as their only main source of income were 44.3%. Additionally, 43.3% of the households were combining farming and off-farming activities. This implies that a large proportion of households in Kilombero Valley did farming or combined farming and non/off-farm income generating activities.

### 3.2 Factors Influencing Household Livelihood Outcome

The results from the regression analysis showed that age, livelihood diversification strategies, years of schooling, household size, group membership, participation in out-grower scheme, and land size were the important determinants in influencing household livelihood outcomes in the study area (Table 5).

**Table 5: Factors influencing household livelihood outcome**

Model	Unstandardized	Standard	T	Sig.	Collinearity		
	Coefficients	Coefficients			Tolerance	VIF	
(Constant)	B	Std.Error	Beta				
(Constant)	14.158	0.551		25.686	0.000		
Age	0.015*	0.005	0.176	3.124	0.002	0.529	1.891
Marital status	-0.170	0.124	-0.063	-1.371	0.171	0.789	1.268
Household headship	0.079	0.142	0.025	0.556	0.578	0.823	1.215
Education	0.067*	0.022	0.151	3.051	0.002	0.687	1.455
Household size	0.107*	0.032	0.164	3.375	0.001	0.710	1.408
Group membership	0.340*	0.118	0.132	2.880	0.004	0.804	1.243
Livelihood strategies	0.158*	0.066	0.116	2.405	0.017	0.727	1.376
Land size	0.118*	0.019	0.291	6.117	0.000	0.739	1.353
Out-grower scheme	-0.655*	0.170	-0.213	-3.848	0.000	0.548	1.826
Investor farm employment adjacent	0.264	0.138	0.099	1.914	0.056	0.632	1.583
Company	0.117	0.132	0.046	0.886	0.376	0.635	1.574

R = 0.624, R<sup>2</sup> = 0.389, Adjusted R<sup>2</sup> = 0.371, t = 25.686, Durbin-Watson = 2.043, F = 21.073, (p=0.000). Dependent Variable: Livelihood outcomes. \* Significant at 5% level

The results as presented in Table 5 revealed that participation in out-grower schemes had a negative and significant influence on household livelihood outcome at 5% level of significance (Table 5). This implies that the higher the household participation in out-grower schemes the lower the livelihood outcome. This is partly attributed by low sucrose level and deductions made to out-growers which lower the income they receive from selling sugarcane hence reducing their livelihood outcome. During KIIs, some households were reported to have been looking for extra land in distant villages to grow maize

and paddy in order to supplement household income which was received from sugarcane selling. FGDs results shared similar concern of low sucrose level.

Studies by Sokchea and Culas (2015); Wendimu (2015); Glove and Jones (2016); Bergius *et al.* (2017) and Sulle (2017) and reported that out-grower livelihood outcomes are negatively affected by large-scale agricultural investments. Age of the household head showed a positive significant influence on livelihood outcomes at 5% level of significance. Keeping other factors constant, the livelihood outcomes increased by a factor of 0.015 when the age of the household head increased by one year. This suggests that the higher the age of the household head the higher the households' livelihood outcomes. During FGDs in Msolwa Ujamaa village, it was reported that young household heads lack land that can be used to grow different crops, hence, low income.

As reported by Herrmann (2017), older household heads are more likely to enjoy the benefits accrued from their participation in large-scale agricultural investments. Empirical evidence shows further that the age of the household members might be ambiguous. Households with younger working members are more likely to undertake non-farm jobs, which in turn might increase household livelihood outcomes. In addition, the results showed that household group membership positively and significantly influence household livelihood outcomes at 5% level of significance (Table 5). If other factors remain constant, the livelihood outcomes among households in groups were 0.340 times higher than those not in groups. The possible explanation for the positive coefficient 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 constraints; hence, the households will have the opportunity of financing their farming and other income generating activities. These results are in line with the qualitative results that group is important in terms of credit schemes and agricultural inputs. This finding implies that those households participating in social groups are in a position to improve their agricultural production and other economic activities which, as a result, can improve livelihood outcomes. According to Bahaman's *et al.* (2009) study results in Malaysia, social capital is a very important asset in improving household livelihood outcomes as most of the credit schemes are channelled through groups.

Household size showed positive and significant influence on the household livelihood outcome at 5% level of significance. The positive sign indicates that the livelihood outcome increases with an increase in the household size. The coefficient of 0.109 for household size implies that, other factors being constant, the livelihood outcome increases by one unit as the household size increases by 0.109. Household size has an implication on family labour supply and livelihood outcomes. These results are support by findings of Narayan's (2010) study in southern India that revealed that households with large sizes have higher chances of getting higher livelihood outcome because they have more labour for farming activities. However, this is often the case where almost all members of the household take part in production and or services provision to contribute to the economy of the household (Kayunze, 2000). Likewise, livelihood strategies influenced positively and significantly livelihood outcomes at 5% level of significance. The possible explanation for this is that households that have diverse sources of livelihood have higher chances of being better off in terms of livelihood outcomes. Similar results are reported by Hakizimana *et al.* (2017) in Kenya and Yaro *et al.* (2017) in Ghana who revealed that households in communities with large-scale agricultural investments tend to diversify livelihood sources, between on-farm and off-farm sources and this result in better livelihood outcomes.

Education showed positive and significant influence on the livelihood outcome at 5% level of significance. 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 employments which attract higher pay, and hence improving livelihood outcome. Similar results are reported by Herrmann (2017) who revealed that highly educated household members have alternative sources of income and hence are less inclined to own and/or cultivate land but instead rely on wage employment in some of large-scale agricultural investments hence high livelihood outcomes. This is further supported by the previous studies such as the one by Amrouk *et al.* (2013) in Ethiopia and Tanzania and Casaburi *et al.* (2012) in Western Kenya who established that education level has a positive implication on household livelihood outcomes.

Similarly, household land size owned showed positive and significant influence on household livelihood outcomes at 5% level of significance. This implies that as land size gets larger, the livelihood outcomes also increase. This has an implication on the ability of the households to combine different farming systems and thus grow varieties of crops. It also implies that households with large arable land sizes have the opportunity of growing large tracks of paddy or sugarcane. Previous studies have shown that owing to low farming technology, household livelihood outcomes, to a large extent has to depend on land size cultivated (Waswa *et al.*, 2012; Amrouk *et al.* (2013).

#### **4. Conclusions and Policy Recommendations**

Large-scale agricultural investments play a significant role in improving livelihood outcomes of MHHs while it affects FHHs negatively as they are more constrained. Socio-economic characteristics of the households have important implications on improving livelihood outcomes. The study recommends that Local Government Authorities and non-governmental organizations involved in promoting livelihood improvement through large-scale agricultural investments should train out-growers on the diversification of livelihood strategies, group strengthening and promoting gender dialogues in the community with a view to changing gender norms that discriminate against FHHs from participating in the out-grower schemes as well as promoting FHHs ownership of sugarcane land. Out-grower associations, in collaboration with investors, should set up plans to ensure that there is a representation of out-growers in every decision making process that affects their payments and raise household livelihood outcomes by raising the minimum wages of those working in the investor farms.

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