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Drivers of Hired Labour Use among Sugarcane Outgrowers in Kilombero Valley, Tanzania

***Anne Richard Mwakibete**
ORCiD: https://orcid.org/0009-0007-5390-2939
Department of Economics, Mzumbe University, Tanzania
Email: armwakibete@mzumbe.ac.tz

Jennifer Kasanda Sesabo, PhD
ORCiD: https://orcid.org/0000-0002-8518-9011
Department of Economics, Mzumbe University, Tanzania.
Email: jksesabo@mzumbe.ac.tz

***Corresponding Author:** armwakibete@mzumbe.ac.tz

Abstract: This study examined the drivers of hired labour use among sugarcane outgrowers in Kilombero Valley, Tanzania. The study adopted the cross-sectional survey design, encompassing the population of 8,987, with the sample size of 400 drawn from four villages within Kilosa District. The composition of the sample size was determined through a stratified sampling method, categorising outgrowers based on villages, hamlets and the gender of household heads. Data was gathered through a questionnaire. Descriptive and binary logistic regression analyses were employed, with the dependent variable measured on a dichotomous scale. The results reveal that household size, income, age, gender, land size and farm distance from home significantly influenced the utilisation of hired labour while the level of education was identified as an inconsequential contributing factor. These findings shed light on the recent development of hired labour use among outgrowers in the agro-industrial sector. Therefore, improving the functioning of rural labour markets should be considered an effective way of enhancing labour productivity for the mutual benefits of both households that hire and sell labour.

Keywords: Sugarcane out-growers scheme; contract farming; hired labour; farm characteristics; demographic attributes.

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Introduction

The use of hired labour in agriculture is becoming increasingly important in Africa, accounting for approximately 17.8 percent of the agricultural labour force (Food and Agriculture Organisation, 2020). It is particularly interesting to look at hired labour in Africa because it is asserted that family labour is becoming less abundant as a result of declining polygamy, increasing rural-urban migration and increased school attendance among children (Mensah-Bonsu et al., 2009). A report by the World Bank (2020) indicates that the use of hired labour in Africa varies widely across countries. For example, in Kenya and Tanzania, hired labourers constitute a larger share of the agricultural labour force, at 25 percent and 16 percent, respectively. However, in Uganda and Ethiopia, hired labour makes up a smaller proportion of the agricultural workforce, at around 10 percent and 5 percent, respectively.

The contract farming/out-growers scheme is a contractual partnership between growers and agribusiness firms to produce agricultural products at a predetermined price and quality (Food and Agriculture Organisation, 2020). It has been identified as a commercialised mode of production that is associated with the use of hired labour (Bellemare & Bloem, 2018). Meemken and Bellemare (2019) and Deininger and Xia (1916) argued that the effects of contract farming on the labour market in Africa seem particularly important given that employment options for the rural population are typically limited. They pointed out that contract farming contributes to the emergence of middle-class farmers, who typically rely on hired labour. Contract farming is also frequently associated with the introduction of labour-intensive crops and technologies, which may lead to an increase in the demand for hired labour. Tesfaye et al. (2013) discovered that contract farming has increased the demand for labour in the vegetable sector in Ethiopia. Nakirya and Mugonola (2019) found that in Uganda, contract farming has led to an increase in hired labour and improved working conditions for coffee farmers.

In Tanzania, the government views contract farming as an inclusive business model that is capable of reducing risk and increasing the benefits of agricultural investments. The practice of contract farming in Tanzania has been linked with the creation of wage employment in rural areas (NSGRP II, 2010–2015; SAGCOT 2012). The National Strategy for Growth and Poverty Reduction Phase Two (NSGRP II) emphasises the importance of involving more farmers in contract farming because it ensures their access to employment opportunities. In 2010, the Tanzanian government, with the assistance of international and private organisations, launched the Southern Agricultural Growth Corridor of Tanzania to promote the inclusive and commercially successful agribusinesses that will benefit the country's small-scale farmers by improving food security, reducing rural poverty and ensuring environmental sustainability. SAGCOT promotes the use of contract farming arrangements (at least for some labour-intensive crops such as rice and sugarcane) as a mechanism for improving rural wage employment in Tanzania. The sugarcane out-growers scheme in the Kilombero Valley has been identified by SAGCOT (2021) as one of the strategic areas in which sugarcane contract farming can potentially uplift households' well-being.

With 8000 outgrowers, Kilombero Valley is the largest sugarcane outgrowers' scheme in the country (KSCL, 2017). It produces 33 percent of all the sugar made in the country. Hence, it has attracted numerous studies to find out how the sugarcane outgrowers' scheme affects the well-being of local households. Among the most identified issues is the effect of contract farming on local employment. For example, a study by Makundi et al. (2016) examined contract farming and its impact on smallholder farmers in the Kilombero District and found that the sugarcane scheme has resulted in positive effects on labour hiring among smallholder farmers. A study by Mdee et al. (2018) on contract farming and rural livelihoods in Tanzania found a positive association between the scheme and labour hiring practices among rural households. Furthermore, a study by Mdoe et al. (2019) investigated contract farming and its impacts on smallholder farmers and agribusiness and found that the hiring of labour among smallholders was an outcome of the sugarcane out-growers scheme.

Further information is found in a study by a sugar company (KSCL, 2017) on the impact of the sugarcane outgrowers' scheme on local development. It was discovered that the commercialisation of contract farming following the privatisation of the sugar company in 1998 caused significant changes in the sugarcane industry, with multiplier effects on local employment. First, it led to a steady increase in sugarcane land among outgrowers, from 4,500 hectares in 1999 to approximately 16,000 hectares in 2016. Second, sugarcane production increased from 30,000 metric tonnes per year in 1999 to 158,070 metric tonnes per year in 2016. Third, the number of outgrowers has tripled from 2,400 in 1999 to 8,000 registered outgrowers farming 16,000 hectares in 2016. According to the report, these changes have increased the demand for hired labour, both by the sugar company and by outgrowers. Figure 1 provides details of the emerging types of employment generated by the outgrowers' scheme.

Figure 1 indicates four types of employments generated by the sugarcane outgrowers' scheme: direct permanent employment (by KSCL), direct non-permanent employment (by KSCL), indirect employment (by out-growers) and further indirect employment (by non-out-growers). It is also indicated that out-growers create about 36 percent of the total employment. This amount is considered high given the fact that out of 8,000 registered outgrowers, 6,320 (or 79 percent) are classified as small-scale, with less than 5 acres of land. This indicates that hiring labour is common among small-scale outgrowers in the area. However, there is a lack of understanding of the drivers behind the use of hired labour among these outgrowers in the academic literature.

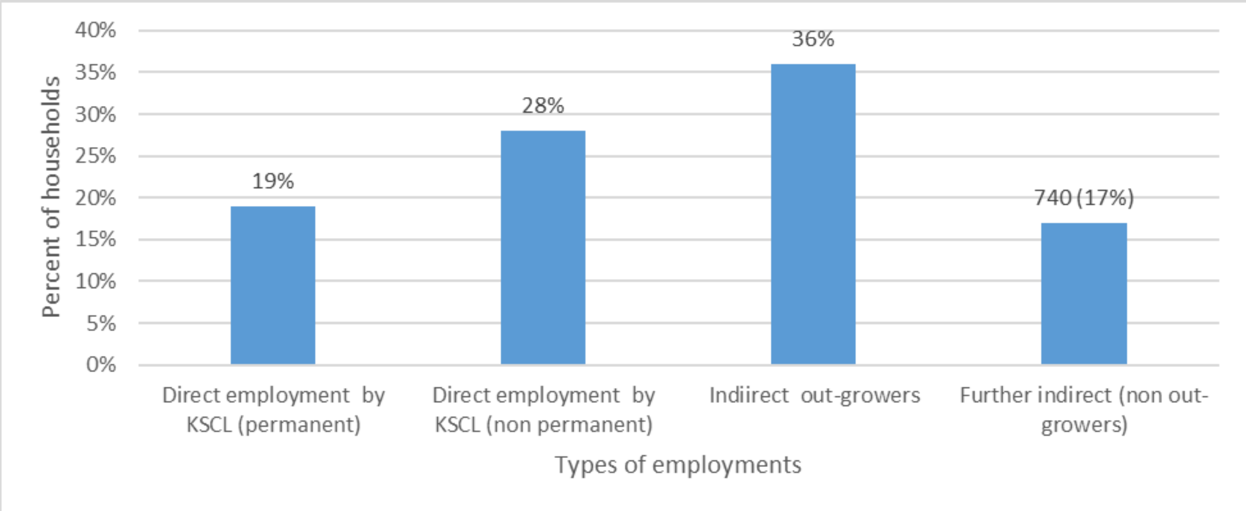

Figure1. Employment level

This paper, therefore, specifically sought to establish drivers of hired labour use among the sugarcane outgrowers in the Kilombero Valley. It focused on how farms' characteristics and the socio-economic attributes of households influence decisions about the use of hired labour.

Literature Review

Literature on agricultural practices in Africa (Mensah-Bonsu et al., 2009; Odeleye, 2015; Bedemo et al., 2013; Kuwornu and Donkoh, 2015; Masawe and Mwamfupe, 2014; and Alemu and Ejigu, 2016) highlights that farm characteristics and household socio-economic attributes are among factors that influence the use of hired labour.

Regarding farm characteristics, it is argued that more hired labour is needed on large farms and farms that are distantly located. Some studies (Mensah-Bonsu et al., 2009; Odeleye, 2015; Bedemo et al., 2013) asserted that larger farm sizes are associated with more intensive work that cannot be managed by family labour and as a result, more hired labour is needed. Furthermore, farms that are located far from farmers' homes are associated with the use of more hired labour as compared to those that are located close to farmers' homes. This is because farmers can easily allocate their family labour to close farms while attending other family activities (Mensah-Bonsu et al., 2009).

Furthermore, the economic status of farmers plays a pivotal role in their hiring decisions. Farmers with higher income levels are more likely to use hired labour than poor ones. People with high incomes are more likely to have other off-farm investments and therefore less time to work on farms (Bassey et al., 2005; Masawe and Mwamfupe, 2014). On age, it is suggested that the farmer's age has a positive impact on the use of hired labour. Bassey et al. (2005) and Bedemo et al. (2013) reported that the use of hired labour is more common in households headed by old people. Lastly, studies by Kuwornu and Donkoh (2015), Masawe and Mwamfupe (2014) and Alemu and Ejigu (2016) revealed a positive association between male-headed families and labour hiring and a negative relationship between female-headed households and labour hiring.

This study focused on the hiring of farm labour among outgrowers, which is more easily accessible to all residents. Previous research (Cramer et al., 2008; Castel-Branco, 2012) shows that the wage rate offered by out-growers is significantly lower than that offered by agribusinesses. However, according to the Food and Agriculture Organization (2020), even low-quality employment can have a positive impact on the poverty status of the most disadvantaged workers. Low-wage manual labour among smallholders is the most important source of income for the poorest rural households, serving as both a means of subsistence and an escape from poverty (ibid.).

Methodology

This section describes the study's design, population and sampling procedures, instruments used in data collection, validity and reliability, statistical treatment of data and ethical considerations.

Design

This study adopted a cross-sectional survey design with the aim of acquiring a comprehensive understanding of the various socio-economic attributes of sugarcane outgrowers and the characteristics of their farms that influenced their decision to hire labour.

Population and Sampling

The population for this study comprised 8,987 household heads from four villages in Kilombero Valley, namely Ruhembe, Kitete, Nyamvisi and Kidogobasi. The sample size, as suggested by Yamane's (1967) formula for this population was 400 households.

The composition of the sample size was determined by using the stratified random sampling technique. To have a representative number of households from each part of the village, a sample size of 100 households was divided following the village's subunits (hamlets). Households were grouped based on their landholding status (small and middle-scale farmers) and gender (male and female-headed households). After the identification of the stratum, a simple random sampling technique was conducted separately in each stratum to obtain the required number of households.

Statistical Treatment of Data

The main research question underpinning this study is: What are the drivers of hired labour use among sugarcane outgrowers in Kilombero Valley, Tanzania? The dependent variable is the use of hired labour by the household, treated as the dichotomous variable. This variable was coded as 'yes' = 1 for outgrowers employing hired labour and 'no' = 0 for those not utilising hired labour. For the categorical variables, gender was coded as 'male' = 1 and 'female' = 0, with female-headed households used as the reference group. Similarly, the education variable was categorised into five levels: primary education = 0, secondary education = 1, tertiary education = 2, other qualifications = 3 and never attended school = 4. Primary education served as the reference group. Additionally, income was coded into three categories: low income = 0, middle income = 1 and high income = 2, with low income considered the reference variable. Concerning continuous variables, household size was measured by including the number of adult household members whereby the age of the household head included their years. Furthermore, sugarcane land was measured using acres and farms' distance from home was measured using kilometres. The summary of these variables are indicated in Table 1 along with their respective values and expected signs. Analysis of data was in terms of descriptive statistics, including frequency and percent, mean, standard deviation and cross-tabulation. Subsequently, the logistic binary regression model was applied in SPSS software version 23.

Table 1. Variables Hypothesised to Influence Outgrowers' Decision on Hiring Labour

Variable	Description	Value	Expected Signs
HHSIZE	Number of adult household members	Number	-
SGNLAND	Sugarcane land	Acres	+
HHAGE	Age of the household head	Years	+
GENDER	Household head gender	1= men,	+
		0 =female	-
EDUCATION	Education level of household head	0=Primary education	-
		1=Secondary education	+
		2=Tertiary education	+
		3 = Other qualifications	+
		4= Never attended school	-
INCOME	Level of farmers' income	0= Low income	-
		1= Middle income	+
		2= High income	+
DISTANCE	Distance of the farm from home	Kilometers	+

The logistic distributions function for the outgrowers' decision on hiring labour was specified as:

Logit (P) = log (P/1-P) (1)

Let Pi = Pr (Y=1/X= xi), then the model can be written as (2)

$Pr(y=1/xi) = (exp^{a'b}/1+e^{a'b}) = \log (Pi/1-pi) = \text{Logit } Pi = \beta 0 + \beta 1xi$ (3)

Where Pi is a probability of hiring labour (dependent variable); xi's are the independent variables, β0 is the intercept and β1 is the regression coefficient.

Verifications of the Assumptions of the Binary Logistic Regression

The researchers tested seven assumptions of the binary logistic regression and found that they fit with the observed data. First, there is an appropriate outcome structure as the dependent variable has two possible outcomes: yes if households hired labour and no if they didn't hire labour. Second, there are mutually and exhaustively defined categories where the observations are independent of one another. Third, there is the linearity of independent variables and log-odds, as tested by the Box-Tidwell Test where the interaction terms are non-significant for all continuous variables. That is, land (p-value = 0.120 > 0.05); distance (p-value = 0.248 > 0.05), age (p-value = 0.334> 0.05) and HHSIZE (p-value = 0.107 > 0.05). Fourth, the variance inflation factor (VIF) test was conducted and no multicollinearity problem was observed. The VIF values, in this study, ranged from 1.011 to 1.051 and the tolerance values ranged from 0.952 to 0.989, signifying the assumption of absence of multicollinearity is met. Fifth, there is a sufficiently large sample size where each explanatory variable has 57 cases. Sixth, there was an absence of strongly influential outliers for three variables (age, household size and distance of a farm from home). Two outlier cases were detected on land; however, they were retained in the study to show variations in land ownership among outgrowers. Finally, all variables are fairly normally distributed. It is argued that if the data is not normally distributed, a non-linear transformation (e.g., a log transformation) may be needed to resolve this issue (Schreiber-Gregory et al., 2018). Thus, the issue of normality was solved when testing for the assumption of linearity of independent variables and log-odds.

Validity and Reliability

Validity is concerned with whether the instrument measures what it is intended to measure (Boateng & Abaye, 2019). To determine the validity of the model, the authors tested all assumptions of the binary logistic regression, such as linearity, normal distribution, multicollinearity, independence of error and absence of outliers and found that they all fit the model. They also conducted goodness-of-fit tests, such as the Omnibus, likelihood ratio and Hosmer-Lemeshow, all of which fit the model. To ensure generalizability beyond the current sample, they utilised a dataset of 400 households, including 57 cases for each estimator variable, surpassing the recommended threshold of 10 cases for each estimator variable, as suggested in the literature (Peduzzi, 1996).

Additionally, the study checked for reliability, defined as the consistency and repeatability of the test results. Accuracy is a function of reliability and is determined by the sensitivity and specificity of the tests (Eldridge, 2020). This study tested for sensitivity, revealing that about 82.6% of households hiring labour were correctly predicted by the model. Furthermore, the specificity test indicates that around 83.5% of households who did not hire labour were correctly predicted by the model not to hire labour. The higher proportions of both sensitivity and specificity indicate more accurate test results and, therefore, reliable outcomes.

Statistical Treatment of Data

The study employed descriptive and binary logistic regression methods in analysing the survey data. The descriptive analysis was used for exploring the distributional characteristics of households' data for hiring labour (frequency and percentage), measurement of central tendency (means) and dispersion (standard deviations) on continuous variables. Furthermore, it involved using cross-tabulation analysis to inspect the relationship between dependent and independent categorical variables.

The researchers employed a binary logistic regression analysis since the dependent variable is dichotomous. The dependent variable is the use of hired labour by the household, which is measured as yes = 1 for out growers that use hired labour and no = 0 for out growers that do not use hired labour. The logistic distributions function for the out growers' decision on hiring labour can be specified as:

$$\text{Logit}(P) = \log(P/1-P) \quad (1)$$

Let Pi = Pr (Y=1/X= xi), then the model can be written as (2)

$$\Pr(y=1/xi) = (\exp^{a'b}/1+e^{a'b}) = \log(Pi/1-pi) = \text{Logit } Pi = \beta 0 + \beta 1xi \quad (3)$$

Where Pi is a probability of hiring labour (dependent variable); xi's are the independent variables, β0 is the intercept and β1 is the regression coefficient.

Verifications of the Assumptions of the Binary Logistic Regression

The researchers tested seven assumptions of the binary logistic regression and found that they fit with the observed data. First, there is an appropriate outcome structure as the dependent variable has two outcomes: yes if households hired labour and no if they didn't hire labour. Second, there are mutually and exhaustively defined categories where the observations are independent of one another. Third, there is the linearity of independent variables and log-odds, as tested by the Box-Tidwell Test. Fourth, the variance inflation factor (VIF) test was conducted and no multicollinearity problem was observed. Fifth, there is a sufficiently large sample size where each explanatory variable has 57 cases. Sixth, there was an absence of strongly influential outliers for three variables (age, household size, and distance of a farm from home). The outlier cases were detected on land; however, they were retained in the study to show variations in land ownership among outgrowers. Finally, all variables are fairly normally distributed. It is argued that if the data is not normally distributed, a non-linear transformation (e.g., a log transformation) may be needed to resolve this issue (Schreiber & Bader, 2018). Thus, the issue of normality was solved when testing for the assumption of linearity of independent variables and log-odds.

Ethical Considerations

This study was conducted after obtaining the approval from the Kilosa District Executive Director (DED). This approval enabled the researchers to collaborate closely with the Ward Executive Officers (WEOs), Village Executive Officers (VEOs) and Hamlet chairpersons in the study area. Prior to the data collection exercise, explicit consent was obtained from all participating households. This process involved providing a clear and comprehensive explanation of the study's objectives and data collection methods. Participants were given the choice to engage voluntarily and provide their consent. Throughout the data collection exercise, the researchers protected the identities of the respondents. Data was anonymized, ensuring the privacy and anonymity of the participants.

Results and Discussion

Descriptive Statistics

To establish the proportion of the households hiring labour, the frequency analysis was conducted as indicated in Table 1.

Table 1 Distribution of the Households' Heads

Hiring labour	Frequency	Percent
No	182	45.5
Yes	218	54.5
Total	400	100.0

Table 3 Statistics on the Continuous Variables

	Household size (HHSIZE)	Age of household head HHAGE	Sugarcane land (SGN LAND)	Distance from home to a farm (DISTANCE)
Mean	5.1425	47.2000	2.9613	8.6400
Std. Deviation	1.71305	11.79163	2.87502	4.58727

N = 400, Missing = 0

The sample size is 400 household heads who appear in Table 1, divided into two groups. The first group consisted of 182 household heads not hiring labour, accounting for 45.5 per cent of all study households. The second group constituted 212 households hiring labour, accounting for 54.5 percent of all study households. According to the data distribution, labour hiring is the most common practice among households involved in the sugarcane outgrower scheme in the study area.

Table 3 presents the information on the statistical analysis, which shows the mean and the standard deviation of the continuous explanatory variables. These variables are age, land size, household size and distance to the farm from home.

Table 3 indicates that households have an average of 5.1425 family members, in line with the national average of 5.14 (TILFS, 2020/21). The average age of household heads is 47.2 years, indicating they are still within the productive age range with the energy required for agricultural production. The average size of sugarcane land is 2.9613 acres, suggesting that most households are small-scale farmers. Outgrowers typically walk an average of 8.64 kilometres to their farms.

To assess the data spread for all variables, the authors calculated the coefficient of variation (CV = standard deviation/mean). It is argued that, a CV >= 1 indicates relatively high variation while a CV < 1 is considered low (Cooksey, 2020). The coefficient of variation for household size is (1.71305/5.1425) = 0.333; for age (11.79163/47.200) = 0.250; for land (2.87502/2.9613) = 0.971; and for distance (4.58727/8.6400) = 0.531. Since all four variables have a CV lower than 1, they are considered to have low deviations.

The analysis of categorical variables is presented in Table 3, which includes gender, income, and education level.

Table 3 Statistics on the categorical variables

Variables	Categories	Hire labour		Total
		No n (%)	Yes n (%)	n (%)
Gender of the household's head	Female	69 (78.4)	19 (21.6)	88 (100.0)
	Male	113 (36.2)	199 (63.8)	312 (100.0)
Total		182 (45.5)	218 (54.5)	400 (100.0)
Income level	Low income	127 (64.5)	70 (35.5)	197 (100.0)
	Middle income	47 (33.8)	92 (66.2)	139 (100.0)
	High income	8 (12.5)	56 (87.5)	64 (100.0)
Total		182 (45.5)	218 (54.5)	400 (100.0)
Education level	Primary Education	101(42.4)	137 (57.6)	238 (100.0)
	Secondary education	22 (47.8)	24 (52.2)	46 (100.0)
	Tertiary education	3 (17.6)	14 (82.4)	17 (100.0)
	Other Qualifications	8 (42.1)	11(57.9)	19 (100.0)
	Never Attended School	48 (60.0)	32 (40.0)	80 (100.0)
Total		182 (45.5)	218 (54.5)	400 (100.0)

Table 4: Results of Variables from the Binary Logistic Regression Equation

Variable	Coefficient	Standard Error	Wald	Significance	Exp (B)
HHSIZE	-.288	.099	8.533	.003	.750
HHAGE	.029	.013	4.891	.027	1.029
SGNLAND	.845	.121	48.775	.000	2.327
DISTANCE	.118	.035	11.614	.001	1.125
GENDER (1)	1.475	.375	15.476	.000	4.370
EDUCATION			3.373	.497	
EDUCATION (1)	.359	.507	.500	.480	1.431
EDUCATION (2)	.989	.815	1.474	.225	2.690
EDUCATION (3)	.248	.724	.118	.732	1.282
EDUCATION (4)	-.344	.380	.815	.367	.709
INCOME			38.596	.000	
INCOME (1)	1.613	.326	24.515	.000	5.019
INCOME (2)	2.657	.535	24.698	.000	14.260
Constant	-4.826	.959	25.317	.000	.008

Notes: * significant at $p < 0.05$; Log likelihood = 292.577; Omnibus tests of model coefficients (chi^2 = 258.697and p = 0.000); Hosmer and Lemeshow Test (chi^2 =8.503, df =8, p= 0.386); Pseudo R^2 (Cox and Snell R^2 = 0.476; Nagelkerke R^2 = 0.637).

Table 4 reveals that labor hiring is more prevalent among male-headed households compared to female-headed households. Furthermore, households with higher income levels tend to hire more labour than those in the middle- and low-income categories. The percentage of labour hired varies across different educational levels, ranging from 40 percent for households with no education to 82.4 percent for those with tertiary education.

The fitted model using the enter method in Table 5 is given as:

$$\text{Log } [p/(1-p)] = -4.826 - 0.288_{X1} + 0.029_{X2} + 0.845_{X3} + 0.118_{X4} + 1.475_{X5} + 0.359_{X6} + 0.989_{X7} - 0.248_{X8} + 0.344_{X9} + 1.613_{X10} + 2.657_{X11}$$

Where:

X_1 is the household size; X_2 is the age of the household head; X_3 is the sugarcane land size; X_4 is the distance from home to a farm; X_5 is the gender of the household head; X_6 is the education level (1); X_7 is the education level (2); X_8 is the education level (3); X_9 is the education level (4); X_{10} is the income level (1); X_{11} is the income level (2).

Household size: the Exp (B) of household size is.750; since this is less than 1, this indicates a decrease. We can compute a percent decrease (1 -.750) 100 = 25 percent. This implies that for every additional household member, the odds of hiring labour decreased by 25 units. The variable is significant (p =.003), and therefore, we accept the hypothesis that the hiring of labour is negatively linked to families with large household sizes. This implies that households with large family sizes are less likely to hire labour compared to those with small family sizes. Having many adult family members provides an impetus to work on family farms rather than hire labour. This is especially true for families with limited income-generating activities.

For age, Exp (B) = 1.027; since this is larger than 1, we can compute a percent increase (1.027-1)100 = 2.7 percent. This implies that for every additional year of age, the odds of hiring labour increase by 2.7 units. This variable is significant (p =.027), so it can be concluded that the hiring of labour is positively associated with older age. Working in sugarcane requires energetic people who can handle the difficulties associated with production, such as fire outbreaks and delays in harvesting. Labour hiring is an important strategy for elderly households aspiring to participate in the sugarcane production business. This finding aligns with findings from Mensah-Bonsu et al. (2009) and Bedemo et al.(2013) that the older the households, the greater the demand for hired labour. The elderly are associated with less ability to work on intensive farming activities, so hired labour is needed to supplement the required workforce.

Land size: Exp (B) of land size = 2.327; since this is higher than 1, it indicates an increase. We compute a percent increase (2.355-1) 100 = 132.7 percent. This reveals that for every acre of land, the odds of hiring labour increase by 132.7 acres of land. Since this variable is significant (p =.000), we accept our hypothesis that households with large land sizes have a higher probability of hiring labour than households with small land sizes. This is consistent with findings in developing countries by Bedemo et al. (2013) and Kuwornu and Donkoh (2015), who found that large land size was an important factor in labour hiring in contract farming schemes in India and Senegal. This suggests that large farm sizes imply more farming activities, which justifies the use of more labour.

The percentage increase in distance (kilometers) is calculated as (1.121 - 1) * 100 = 12.1 percent. The percentage increase in land (acres) is calculated as (2.327 - 1) * 100 = 132.7 percent. The odds ratio represents the multiplicative change in the odds of the dependent variable for a one-unit increase in the independent variable. So, when interpreting the odds ratio for land size (2.327), it indicates a 132.7 percent increase in the odds of hiring labour for every one-unit increase in land size (acre). It's not a linear relationship, and the interpretation is based on the exponentiated coefficient. I stand ready for further correction and guidance on this issue.

In the context of gender of the household head, female is used as a reference category. The results indicate that the odds of hiring labour are 4.370 times greater for male-headed households as opposed to female-headed households. The variable is significant at p =.000; therefore, we accept the hypothesis that male-headed households are more likely to hire labour than female-headed households. This finding is not surprising, given the status of women in most rural areas of Africa. According to FAO (2010), female-headed households are categorised as marginalised and economically weak social groups in most African rural areas. International Labour Organization (2016) identified female-headed households as among the poorest families in Tanzania.

There are three levels of income categories included in the study: low, middle and high incomes. Low income is coded as 0, establishing it as the reference category for all other income levels. As such, all of the results for income levels were expressed as comparisons to low income. This study found that households with high income levels have a higher likelihood of employing labourers than households with lower incomes. The odds of hiring labour are 5.019 times greater for households with middle incomes as compared to households with low incomes and 14.260 times greater for those with high incomes. This suggests that income is important in meeting production costs, as only those with high incomes can afford to hire labour. Thus, we concur with our hypothesis that households with high income levels have a higher likelihood of employing labourers than households with lower incomes. Bedemo et al. (2013) and Oya and Pontara (2015) revealed similarly that the income of a household is positively related to the demand for hired labour.

Level of education has no influence on labour hiring. This variable is not significant at all levels, including secondary education (p =.480), tertiary education (p =.225), special qualification (p =.732) and never attending education (p =.367). Based on the result, we reject the hypothesis that more educated households are more likely to hire labour than less educated households. This is against what Bassey et al. (2005) and Bedemo et al. (2013) propounded that the level of education of household heads is positively related to the demand for hired labour.

Conclusions and Recommendations

This study investigated the determinants of hired labour usage among sugarcane outgrowers in the Kilombero Valley. All variables, except education, significantly influence households' decisions to hire labour, encompassing factors such as household size, age, land size, distance, gender and income. Larger families contributed significantly to the agricultural labour force while elderly households heavily relied on hired labour. The hiring of labour is inevitable for both large farms and those situated far from homes. Economic constraints limited labour hiring for low-income and female-headed households. When analysing demand for hired labour in agriculture, a comprehensive approach beyond education is crucial, focusing on broader socio-economic factors. Importantly, hiring labour emerges as a vital livelihood strategy for households in the study area. Enhancing the functionality of rural labour markets is imperative for optimising the productivity of labour assets and ensuring mutual benefits for both labour demand and supply.

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