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Labour Preferences Among Small-Scale Arable Crop Farmers in Akwa Ibom State, Southern Nigeria

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Human labour is critical in the survival and sustainability of the small-scale farm production system in developing countries. Following the imperfection in the rural labour market and the mounting rural poverty, labour demand among resource-poor small-scale farmers has shifted from its traditional surplus supply market pattern to a more competitive labour market. In Nigeria for instance, human labour is not readily available to farmers in most rural farming communities compared to the previous decades. Considering the fact that more than 60% of agricultural production is done by small-scale farmers in the country; there is an overwhelming need to identify ways of increasing labour utilization by the small-scale farmers in the southern region of Nigeria. Premised on these facts, the study primarily examined the prominent labour sources available to small-scale cassava-based farmers and identified determinants of their demand or adoption. The study was conducted in Akwa Ibom State in the southern region of Nigeria. A total of two hundred (200) cassava-based farmers were randomly sampled using a structured questionnaire. Descriptive and multinomial Logit models were employed to analyse the data and objectives of the study. The findings revealed hired labour, family labour and group labour as the major human labour sources for the small-scale farmers in the region. Also, farmers' age, educational attainment, farm income, farming experience, non-farm income, farm size and social capital formation were identified as factors that increase the probability of adopting hired labour relative to the family labour in the region. Similarly, farmers' age, education attainment, social capital formation, farmers' sex and non-farm income were found to increase the probability of using group labour relative to the family labour source. However, household size impacted negatively on the probability of using both hired and group labour relative to family labour. It is recommended that farmers' formal education, farm income and social capital formation should be enhanced to help them in making efficient choices on labour demand in the rural labour market.

1. INTRODUCTION

The small-scale farmers in sub-Saharan region of Africa produced the bulk of the food consumed in the region (Chiaka et al., 2022; Okou et al., 2022; Baptista et al., 2022; Akpan & Effiong, 2022). The technique of production used by these farmers in the region is far removed compared to the methods of production employed in other regions of the World (Ogunkoya et al., 2015; Baptista et al., 2022). The farm resources of these small-scale farmers are often being inefficiently utilized resulting in low outputs. In most instances, the small-scale farmers have poor resource endowments, which often affected factors-combination leading to inefficiency in resource allocation (FAO, 2017; Akpan et al., 2019a, 2022; Ariom et al., 2022). Hence, for sustainable agricultural production in the sub-Saharan Africa region, being dominated by small-scale farmers, production must be anchored on efficient farm resources management (Akpan et al., 2019a, 2022). Preset on these assertions, many government programmes on agriculture in Nigeria have been developed on the framework of small-scale production to improve farm resources management (Okuneye & Ayinde, 2011; Lokpobiri, 2011). This is necessary because previously available farm resources for small-scale farmers to utilize are becoming relatively difficult to access even in rural areas (Adebo & Falowo, 2015; Mgbenka & Mbah, 2016; Edohen & Ikelegbe, 2018).

In some parts of Africa, farm labour has become relatively difficult to access, and the farmers have to choose among the few available forms (Jean-Claude, 2011; Obasi & Kanu, 2014; Jayne et al., 2017). For instance, the scarcity of rural farm labour is a serious challenge in the south-south region of Nigeria, because family labour dominancy has been threatened due to the improvement in human capacity development of most farm households (Udoh & Akpan, 2017). Again, the progressive growth of the urban areas through urbanization and the general perceptions of the youths concerning agriculture in the rural areas as well as the risk component of the agricultural system have further changed the framework and composition of the rural labour market in the region (Akpan, 2010, Akpan et al., 2017c, 2019b; Umoren et al., 2021). As observed by Bedemo et al. (2013), farm labour is seen as a

fundamental asset for resource-poor farmers in developing societies. In Nigeria, farm labour composition for small-scale producers majorly revolved around the family labour source, hired labour and group labour sources. Group labour is one of the social capitals that involves the gathering of two or more common-minded people (common among women) with a common goal and identity bound in a formal relationship and are engaged in rotational farming among members (Francis et al., 2000; Saliu & Ojandage, 2008; Edoke et al., 2014). The use of machines and animal power as sources of labour are not widespread among small-scale or peasants' farmers in the south-south region of Nigeria. This is because small-scale farmers are resource-poor and still rely heavily on less efficient techniques of production (Udoh & Akpan, 2007, Salami et al., 2010, Akpan et al., 2017a, 2017b, 2019a; Akpan & John, 2020).

The small-scale farmers' preference for labour sources is conditioned by several factors including economic, social and cultural factors among others. Following the assertions of Ogbalubi & Wokocho (2013) and Gocowski & Oduwole (2003), scarcity of farm labour has posed a serious challenge to the efficiency of small-scale farmers during all farm operations in Nigeria. According to the report of Yeboah & Jayne (2016), human labour constitutes the main source of labour for small-scale farmers in areas of high population. In addition, Yusuf (2018) noted that small-scale farmers have resorted to the use of family labour following the presence of asymmetric information flow in the labour market. However, with the persistent change in needs and perceptions of most farm households, family labour would not provide sustainable farm power to farmers now and in future (Sakho-Jimbira & Hathie, 2020). As figured by Omotesho et al. (2014), farm households' need for a complementary labour source to family labour is awesomely important and is a prerequisite for the attainment of food security in the present and in future generation. The hired labour, which is the closest substitute to family labour among peasant farmers has its problems. As noted by Akpan (2020), the wage rate for hired labour is rising progressively in some rural farming communities in the southern region of Nigeria; while Deotti & Estruch (2016) and John (2019)

attributed the rise in wage rate to an increase in rural-urban migration and improvement in farm household human capacity development. As observed by Akpan (2020), the average rural wage rate is competitive, following inelastic demand for labour.

The choice of human labour by the peasant or small-scale farmers in the southern region of Nigeria cannot be over-emphasized. It is documented that human labour accounted for more than 80% of the total farm power and constituted between 80% to 90% of the total variable cost (TVC) of production, hence a major determinant of the gross margins and the sustainability of the small-scale farming system in the region (Udoh & Akpan, 2007, Anyiro, 2013, Nmadu & Akinola, 2015, Akpan et al., 2017a, 2017b). Hence, small-scale agricultural production in Nigeria is particularly labour-intensive in nature (Olayide, 2002; Edohen & Ikelegbe, 2018). Since the farmers' choice of human labour is guided by several categories of factors, it is absolutely important to identify these attributes, especially farmers-specific characteristics. The identification of these factors would enhance efficient resource allocation and management. The overall farm productivity of factors of production will be enhanced while an evidence-based farm labour policy framework can be efficiently enunciated and implemented. Another important justification to identify the factors that model small-scale farmers' choice of human labour stem from the fact that arable crop outputs from the region have been persistently low for years now. These have aggravated poverty, food insecurity, poor revenue and farm income diversification drives among small-scale arable crop farmers in the region. The sustainability of the small-scale arable crop production system in the southern region cannot be guaranteed if labour is not readily available.

Only a few pieces of literature have explored factors that influence farm labour choices among small-scale arable farmers. For instance, in Ethiopia, Bedemo et al. (2013) reported that the probability of farm households choosing hired labour source was significantly and positively determined by farmers' education, dependent ratio, farm size, credit availability, and farm income. Otherwise, the negative determinant was family size. In Nigeria, Bassey et al. (2014) revealed that

the probability of farm households using borrowed labour was determined by the household size and wage rate. The report also showed that the probability of farm households demanding hired labour was significantly influenced by farmers' farming experience, educational level, income and age. Moreover, the coefficient of farm size was positive and significantly related to the probability of using both borrowed and hired labour. In a similar vein, Omotesho et al. (2014) revealed that the household dependency ratio, age and years of formal education of the family head, family size and income significantly influenced the use of hired labour among farm households in Kwara State, Nigeria. In South Africa, Anim (2011) reported that farmers' experience, land size, number of farm machineries, agricultural extension services, and farm inputs positively influenced labour supply; while years of formal education of household head, household size, household members engaged in off-farm activities, real wage rate and farm exerted inverse relationship with farm labour supply. As noted by Echebiri & Mbanasor (2003), the household labour constitutes about 97.65% of the total labour source among farmers in Abia State. The findings further revealed variables such as farmer's sex, household size, household marital status, and education of the household head as factors influencing labour supply in the area. Furthermore, Nmadu & Akinola (2015) reported that family and hired labour constitutes the major sources of labour to farmers in Niger State, Nigeria. The study identified farmers' income, household size, wage rate, farm size, and sex as factor that influenced the labour utilization in the area.

The literature available on this critical issue needs to be updated and new variables tested to develop workable policies on labour market in the region. Again, the need to have sufficient, timely delivered and efficient human labour for sustainable arable crop production is inevitably given the high headcount poverty rate of 28.82%, poverty gap index of 7.25 and youth unemployment rate of 40% in the region (NBS, 2022). The region needs an urgent policy direction based on sound empirical research to develop a sustainable policy framework to tackle the prevalent issues of farm labour information asymmetric or

imbalances in the farm communities of the State and region. Anchored on these facts, the research was primarily designed to identify factors that modelled the labour choices of arable crop farmers in the southern region of Nigeria.

2. MATERIAL AND METHOD

2.1. Study Area

The research was carried out in Uyo and Etinan agricultural development programme (ADP) zones in Akwa Ibom State, the southern region of Nigeria. The Uyo ADP zone comprises Uyo, Ibesikpo Asutan, Itu, Uruan and Ibiono Ibom Local Government Areas. The Etinan Agricultural Development Programme (ADP) zone consists of Nsit Ibom, Nsit Ubium, Etinan and Nsit Atai local governments. The similarities in the climatic and soil factors as well as the presence of the large population of cassava-based farmers in these zones were the factors considered for the purposive selection of these zones out of the six zones in the State. Agricultural production is the major occupation of the inhabitants of the region. Varieties of crops and animals are being cultivated and reared respectively in the region. Common crops are cassava, waterleaf, fluted pumpkin and yam, pepper, maize, plantain, banana and cucumber. Some of the cash crops available in the region include oil palm, rubber and cocoa. The average rainfall in the zones ranges from 2000 mm to 3000 mm per annum. Two distinct seasons namely; rainy and dry seasons are noticeable while the annual average temperature and relative humidity in the region range from 26°C to 27°C and 75% to 95%, respectively (NiMet, 2023; cited in Akpan et al., 2019a).

2.2. Data Source, The Instrument for Data Collection and the Type of Respondents

Cross sectional information was sourced from the respondents using a well-designed structured questionnaire. The study also conducted interviews with selected key informants (consisting of farmers' groups and community leaders) in the selected farming communities to authenticate and compared the consistency and accuracy of information provided by the respondents. The respondents were arable crop farmers that cultivate majorly cassava crop and a

combination of other crops. The choice of respondents was based on the fact that the cassava crop is the most popular food crop in terms of cultivation and consumption in the region (FGN, 2006; Wossen et al., 2017). In the region, almost 100% of food crop farmers cultivate cassava crops either as a major or supporting crop. It is the most proficient food crop that can be used as an indicator for measuring growth in the crop-sub sector in the region.

2.3. Sample Size Selection

Using a Cochran (1963) sample size selection formula, the study derived the required sample size from a large population of cassava-based farmers (mixed crop farmers with cassava as a major crop) using the Equation (1):

$$S_x = \frac{z^2 \rho(1-\rho)}{D^2} \quad (1)$$

where S_x is the estimated representative sample population; Z connotes the 95% confidence interval (1.96); " ρ "; is the percentage of cassava-based farmers in the total population of arable food crop farmers (about 85%) in the two agricultural zones; D represents the absolute error at 5% probability level of type 1 error. The representative population for the study was obtained as shown in Equation (2):

$$S_n = \frac{(1.96)^2 0.85(1-0.85)}{(0.05)^2} = 196 \quad (2)$$

For ease of sampling, the calculated sample population was scaled up to two hundred (200) respondents.

2.4. The Sampling Procedure

The study utilized a multi-stage sampling method to pick the required population. The first process was the purposive selection of two agricultural zones in the State. That is Uyo and Etinan agricultural zones were selected because of the high number of cassava mixed crop farmers. The second process was the random selection of two local government areas with a high population of cassava farmers from each of the agricultural zones. A total of four (4) local government areas were selected for data collection. The local government areas selected were; Uyo and Itu, in Uyo ADP zone, while Etinan and Nsit Ibom were selected

from Etinan ADP zone. The third stage is based on the random selection of two (2) villages from each of the local government areas earlier selected. Hence, a total of eight (8) villages were selected for the study. The villages contain farm families that cultivate mixed crops with cassava crop as a dominant crop. The fourth stage was the random selection of twenty-five (25) farm families from each of the villages. A total of 200 cassava-based farm families were randomly sampled and used to obtain the needed information for the study.

2.5. The Conceptual Framework

From the economic theory, a rational farmer will choose a particular technology only if it maximizes utility relative to the other alternatives available. This suggests that given a set of options or technologies, a rational farmer will always prefer an option that yields higher utility among a set of options on the condition that the farmers' budget constraint is minimized. However, since the options are assumed to be latent variables, the utility gain from the options preferences is not observable but is reflected in the choice of the option adopted by the farmer. Hence, the utility can be exemplified by the probability of choosing an option with higher utility among a set of options as shown in Equation 3. According to Zegeye et al. (2022), farmers' behaviour towards multiple choices of technology could be shown also in their risk-bearing capacity or behaviour. A small-scale farmer is assumed to be rational in his farm decision and is risk averse because he is a resource-poor entrepreneur. Hence, a risk-averse farmer would always seek to maximize farm profit or output by choosing a discrete option of technology that minimizes risk and cost of production. Alternatively, such an option is tended to maximize profit or output subject to the farmers' budget constraints.

$$V_i = \begin{cases} 1 & \text{if } U_{max}(V_1) > U_{max}(V_2) > U_{max}(V_3) \\ 2 & \text{if } U_{max}(V_2) > U_{max}(V_1) > U_{max}(V_3) \\ 3 & \text{if } U_{max}(V_3) > U_{max}(V_1) > U_{max}(V_2) \end{cases} \quad (3)$$

The adoption of an option among a set of options can be represented in Equation 4. The M_i represents the latent variable or a probability which explains the farmer's behaviour in choosing different forms of labour available to him. The Z is the explanatory

variable which conditioned the farmers on the choice of alternative labour. The δ are the coefficients of the explanatory variables while the ε is the random error term or the unexplained explanatory variables.

$$\begin{cases} M_1 = \beta_1 + \delta_1 Z_1 + \varepsilon_1 \\ M_2 = \beta_2 + \delta_2 Z_2 + \varepsilon_2 \\ M_3 = \beta_3 + \delta_3 Z_3 + \varepsilon_3 \end{cases} \quad (4)$$

It is assumed that the specified explanatory variables (Z_i) are uncorrelated with the error term ε 's for each of the labour option equation. The error is assumed to be independently distributed in each of the alternatives, hence, the independence of irrelevant alternatives (IIA) hypothesis. The above structural form is the resemblance of the structure of the multinomial Logit because of the different options available to the farmer, hence the justification for selecting the multinomial Logit model.

2.6. The Determinants of Farm Labour Choices

Rural households are often confronted with different choices of labour and the use of the multinomial Logit model is appropriate in this case. The Multinomial Logit Model has error terms for each of the choice equations which are independent and identically distributed. The model is proved to produce more stable results when the Independent of Irrelevant Alternatives (IIA) assumption is fulfilled. According to Kropko (2008), the multinomial Logit model is found to provide nearly more accurate and realistic results than other models even when the Independent of Irrelevant Alternatives (IIA) assumption is severely violated. In the specified model, the family labour is considered the base category and all the other Logits are made relative to the base category. A multinomial Logit regression was used to estimate the determinants of farm labour choices of a cassava-based farmer in the study area. According to Gujarati & Porter (2009), a generalised multinomial Logit model is specified as thus in Equation 5:

$$\pi_{ij} = P_r(Y_{ij} = 1) = \frac{e^{\alpha_j + \beta_j X_i}}{\sum_{j=1}^n e^{\alpha_j + \beta_j X_i}} \quad (5)$$

The family labour is used as the base category and all the other Logits are made relative to the base category. Then the estimated multinomial Logit model is specified as follows in Equation 6:

$$\pi_{ij} = P_r(Y_{ij} = j/x) = \frac{\exp(x_i \alpha_j)}{1 + \sum_{k=1}^n \exp(x_i \alpha_k)} \text{ for } j = 1, 2, \dots, k - 1 \quad (6)$$

$$\pi_{i1} + \pi_{i2} + \pi_{i3} = 1 \quad (7)$$

$$\pi_i = \phi_0 + \phi_1 AGE + \phi_1 HHS + \phi_1 EDU + \phi_1 SOC + \phi_1 FAS + \phi_1 FIN + \phi_1 NFI + \phi_1 GEN + \phi_1 EXP + \mu_i \quad (8)$$

$Y_{ij} = 1$, If a farmer chooses alternative j ($j=1, 2$, and 3). Where $j = 1$ (family labour); $j = 2$ (hired labour); $j = 3$ (group labour). The β 's are a set of coefficients attached to each alternative; while X 's are a set of explanatory variables that determined the respective probability. The dependent variable (π_{ij}) represents the probabilities that a farmer chooses alternative 1, 2 or 3 respectively. If there are three alternatives available to a farmer, then the summation of their probability is equal to unity as exemplified in Equation 7.

For an i^{th} option, the explicit model is expressed as shown in Equation 8.

The set of explanatory (X 's) variables that defined Equation 8 are given below;

AGE: Age of a cassava-based farmer (years)

HHS: Household size of a cassava-based farmer (number)

EDU: Educational qualification of a cassava-based farmer (year)

SOC: Membership of a social organization by a cassava-based farmer (years)

FAS: Farm size of a cassava-based farmer (ha)

FIN: Farm income of a cassava-based farmer (naira)

NFI: Non-farm income of a cassava-based farmer (naira)

GEN: Sex of a cassava-based farmer (a dummy; where 1: female and 0: male)

EXP: Farming experience of a cassava-based farmer (years)

3. RESULTS AND DISCUSSION

3.1. The Social and Economic Characteristics of Cassava-Based farmers

The socio-economic features of cassava-based farmers are shown in Table 1. The findings revealed

that more than 90.00% of the farmers are in their active age with a mean age of about 43 years. This finding showed the fact that youths (aged 18-35 years) are not actively involved in cassava production in the region. Only 4.00% of the farmers are in the youthful stage. Another implication of this finding is that cassava production in the region might not be attractive enough to command the involvement of the youthful population. Since farmers are mostly resource-poor and the wage rate does not commensurate with the capacity of most youths, the region witnessed disguised unemployment among the youths. Currently, the southern region of Nigeria has a youth unemployment rate of over 40.00% (NBS, 2022).

The result on the pattern of the farmers' household distribution revealed that about 60.00% of the farmers have 4 – 6 children with an average of four (4) members. This reflects the fact that farm households in the region are yielding to the family planning programme implemented in the region by having a smaller number of household members. This has continued to have a deteriorating impact on the availability of family labour as a form of farm labour in the region and thus opens up farmers to other options for farm labour. Alternatively, the contribution of family labour is decreasing with the emphasis being shifted to alternative sources of labour.

Formal education is seen as a motivational and a change factor that can inculcate the habits of entrepreneurship and change attitudes in farmers. The finding indicated about 89.00% literacy rate with an average of 7.00 years of formal education among cassava-based farmers in the region. The social capital acquisition or socialization among small-scale cassava-based farmers in the region is very low with an average of about 1.80 years. The result has a deteriorating effect on trust and social bonding among farmers in the region. Perhaps the issues of increasing insecurity and incessant kidnappings including high poverty rates and other social vices might be responsible for the low

capital build-up among cassava-based farmers in the region. Also, the cost implication of being a member of a social group can help to explain the low capital formation among farmers in the region. The majority

of the farmers are resource-poor and cannot afford financial obligations in form of levies and charges in a social group.

Table 1. The socioeconomic feature of cassava farmers

Feature	Freq.	%	Feature	Freq.	%
Age (Year)			Household size (number)		
Less than 35	4	2.00	<4	70	35.00
36 – 50	190	95.00	4-6	120	60.00
Greater than 50	6	3.00	>6	10	5.00
Total	200	100.00	Total	200	100.00
Mean	45.12		Mean	4.00	
Educational level (year)			Membership of social organization (years)		
No schooling	22	11.00	0 – 5	186	93.00
Primary school level	128	64.00	6 – 10	10	5.00
Secondary school level	38	19.00	>10	4	2.00
Tertiary school	12	6.00	Total	200	100.00
Total	200		Mean	0.95	
Mean	7.70		Farm income (Naira) per annum		
Farm size (ha)			≤ 50,000	40	20.00
<0.50	170	70.00	50,001 – 150,000	138	69.00
>0.50	30	30.00	> 150,000	22	11.00
Total	200	100.00	Total	200	100.00
Mean	0.3125		Mean	242,865.00	
Non-farm income (Naira) per annum			Marital status (dummy)		
0.00	4	2.00	Married	184	84.0
≤25,000	144	72.00	Others	16	14.0
25,001 - 150,000	18	9.00	Total	200	
150,001 - 275,000	14	7.00	Sex composition (dummy)		
>275,000	20	10.00	Male	66	33.00
Total	200	100.00	Female	134	67.00
Mean	398,200.00		Total	200.00	
Access to credit (dummy)			Access to Agricultural extension services		
Yes	6	3.00	Yes	10	20.00
No	194	97.00	No	190	70.00
Total	200				

Note: Source: From field survey, 2021 and 2022 planting season.

The finding further revealed predominantly small size farm land owned and cultivated by cassava-based farmers in the State. A mean farm size of about 0.31ha was obtained for farmers in the region. The study area is noted for excessive land fragmentation due to the high population density. The population density of the State stood at 463 persons/m² in 2020 (NBS, 2022). The region needs to plan for land conserving or saving technology in its agricultural system in the future to guarantee food security for future generations.

An average farm income of N242, 865.00 per annum in absolute terms is reported for cassava-based farmers in the region. However, the majority of the farmers were partly commercialized. The bulk of their products was used for domestic consumption with a handful of outputs sold for household revenue. Besides, the limited and insatiable farm income earned by cassava-based farmers triggered income diversification. For instance, an average non-farm income of N398, 200.00 was recorded for cassava-based farmers in the region. The diversification drives are mostly propelled by increasing poverty and declining farm income in real terms. For instance, the country's double-digit inflation rate was reported at 21.34% in December 2022. Currently, the country is witnessing a food price increase of more than 100% with a corresponding negative effect on farm income, hence justifying the need for farm income diversification.

The finding revealed that only 2.00% of the farmers relied solely on farm income, while 98.00% were engaged in non-farm income-generating activities. The sex composition of the farmers showed that females are the dominant sex (67.00%) who are majorly married. The analyses also revealed that about 70.00% and 97.00% of the farmers do not have access to agricultural extension services and farm credit respectively. The agricultural extension delivery system is inefficient while farm credit is a major issue that needs urgent policy intervention.

3.2. The Composition of Human Labour

From the pooled information collected, the study identified three major sources of human labour available to the arable crop farmers in the southern region of Nigeria. The sources are: Family labour source, hired labour source and group labour source.

The breakdown of the result is presented in Figure 1. The finding revealed that family labour is the most available human labour accessible by small-scale farmers in the region. This source makes up about 43.00% of the total human labour available to the farmers in the region.

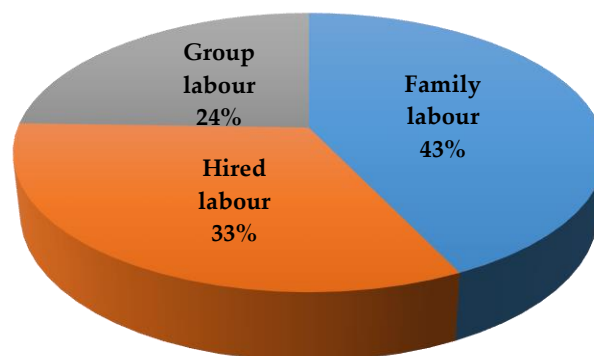


Figure 1. Share of farm labour sources (Source: From field survey, 2022)

The second most predominant human labour source is hired labour. This source constitutes about 33% of the total human labour source available to cassava-based farmers. The result connotes that the probability of a cassava-based farmer utilizing hired labour relative to family and group labour is about 0.33. Besides the group labour source is 24.00% of the total labour source.

However, the findings revealed the declining roles of family labour in farm labour contributions among small-scale arable farmers in the southern region of Nigeria. Previously family labour was contributing up to 80% to 90% of the total labour in small-scale farm production (Echebiri & Mbanasor, 2003). Following the structural changes in the rural area labour market, other alternative labour sources are gaining momentum in terms of preference or demand by the small-scale farmers (Nmadu & Akinola, 2015).

3.3. Determinants of Labour Preferences

The results in Table 2 showed the multinomial Logit coefficients for the specified labour choice equation. The Chi-square estimates revealed that the likelihood ratio is highly significant ($p < 0.0000$), indicating that the specified models have the power to explain the behaviour of the cassava-based farmers' choice of labour preference. The diagnostic statistics also

revealed the pseudo R^2 of 0.4609, suggesting that 46.09% of the variability in the probability of occurrences of the dependent variables is due to the explanatory variables. The estimated Chi-square model (413.07) is significant at 1% probability level. This implies that the effects (including the signs) of the explanatory variables in the specified models are statistically significant at a 1% level, hence justifying the reliability of the estimated model. Note, the coefficients of each explanatory variable in the multinomial Logit do not represent the marginal effect of the explanatory variable on the dependent variable (the probability of choosing any labour choice). Hence, the estimated marginal effects or the slope coefficients which represent the change in the probability due to a change in the explanatory variable were used to interpret the multinomial logit model.

3.4. Determinants of Hired and Group Labour (Using family labour as reference category)

The empirical results revealed that farmers' age has a significant positive relationship with the probability of farmers preferring hired and group labour relative

to the reference category (family labour). The finding implies that a unit increase in the farmers' age would likely result in a 1.06% and 3.33% increase in the probability of farmers preferring hired and group labour respectively relative to the base category. The findings imply that older or aged farmers would have higher possibilities of using hired and group labour relative to family labour. The finding could likely be attributed to the fact that most farm households to avert the scourge of poverty choose to invest in human capacity development thereby exposing some members to formal education and entrepreneurial skill acquisition programmes. Hence, at the old age of a farmer, household members might have acquired higher training and leave the farm household for an anticipated better job offer and opportunities elsewhere. The gap created at the farm household would force the aged members to go for alternative labour sources such as group or hired labour. The issue of rural-urban youth migration is another possible cause of the result. The result corroborates Echebiri & Mbanasor (2003), Omotesho et al. (2014) and Bassey et al. (2014).

Table 2. Estimates of the multinomial logit regression on farm labour choices (Family labour as reference category)

Variable	Hired labour			Group labour		
	Coefficient	Z-value	dy/dx	Coefficient	Z-value	dy/dx
Constant	1.4802	0.38	-	8.4626	1.71*	-
Farmers' age	0.0982	2.01**	0.0106	0.2304	1.88*	0.0333
Household size	-0.1757	-2.16**	-0.0332	-0.0071	-2.04**	-0.0127
Formal education	0.1001	3.44***	0.0219	0.0158	3.21***	0.0051
Social capital	0.0463	2.55**	0.0010	0.0117	2.11**	0.0016
Farm size	1.3345	2.82***	0.1312	0.3507	0.20	0.0431
Farm income	3.2e-05	3.59***	5.34e-06	2.6e-05	0.71	3.98e-07
Farmers' sex	-0.2869	-0.48	-0.0979	0.1309	2.19**	5.48e-07
Farming experience	0.0532	2.81***	0.0019	0.0288	1.78*	0.0009
Non-farm income	2.21e-06	2.23**	1.34e-07	1.5e-07	2.01**	2.01e-07

Note: Source: computed from field survey data, 2022 season. Note, *, **, and *** denote significance levels at 10%, 5%, and 1%, respectively; Number of observations = 200; LR Chi² (18) = 413.07; Prob. > chi² = 0.0000. Log likelihood = -100.829; Pseudo R² = 0.4609.

The slope coefficient of cassava farmers' household size is negative and significantly correlated with the probability of selecting hired and group labour, relative to the base category. A unit increase in the household size would reduce the probability of choosing hired and group labour by 3.32% and 1.27%, respectively relative to the base category. An increase in household size is an incentive to reduce the probability of using hired and group labour. Family labour is an important source of farm labour, especially in rural areas where farmers are resource-poor and youth migration is prominent. Most often rural farm households rely heavily on family labour instead of hired labour because of the mounting wage rate. However, the importance of family labour depends on many factors such as the state of development of the household and the sex composition among others. Besides, the availability of group labour depends on the size of the social capital of farm households. Most rural farm households do not belong to a social organization for reasons linked to their inability of them to keep to the financial obligations of being a member, religious reasons and other criteria. The finding agrees with the reports of Echebiri & Mbanasor (2003), Omotesho et al. (2014), Nmadu & Akinola (2015), and Anim (2011).

The slope coefficient of formal education is found to be significant and positively associated with the hired and group labour at a 1% probability level relative to the base category. A unit increase in years of formal education of cassava-based farmers would, in turn, upsurge the chances of choosing hired and group labour by 2.19% and 0.51%, respectively, relative to the base category. This means that the probability of using hired and group labour increase with an increase in the educational qualification of cassava-based farmers compared to the use of family labour. An increase in farmers' educational qualification implies that the farm household members will likely be educated as well, this will generate opportunities for farm household members to diversify to an alternative source of income. The situation may likely create a labour shortage that will prompt household heads to go for alternative labour sources. The finding is substantiated by Echebiri & Mbanasor (2003), Anim (2011); Bassey et

al., (2014) and Omotesho et al. (2014); but is contrary to the submission of Bedemo et al. (2013).

The coefficient of social capital has a positive significant relationship with the probability of cassava-based farmers preferring hired and group labour relative to the base category. This connotes that as the social capital accumulation increase among cassava-based farmers, the probability of choosing hired and group labour increases relative to the choice of family labour. A year increase in social capital will lead to 0.001 and 0.0016 increases in the probability of choosing hired and group labour respectively relative to the base category. Mounting social capital is known to stimulate farmers' information exchange, especially in areas of labour availability, prevalent wage rate, market access, farm inputs, farm management and issues related to families etc.

The farmers' farm size is positively and significantly correlated with the hired labour preference at $p < 0.01$, relative to the base category. A unit increase in farm size would increase the probability of adopting hired labour choice by 13.12% relative to the base category. The finding satisfies a priori expectation as a large farm size would attract more labour beyond those provided by the family. Bedemo et al. (2013), Anim (2011) and Nmadu & Akinola (2015) have reported a similar result.

Farm income has a positive and significant correlation with the probability of preferring hired labour relative to the base category at $p < 0.01$. Farmers with a larger farm income would have a greater capacity to pay for wage rate and this would encourage hired labour utilization relative to family labour. Bassey et al. (2014) and Nmadu & Akinola (2015) have reported a similar result.

The female composition (sex of farmers) of farmers has a positive significant relationship with the probability of group labour choice relative to the base category. This implies that female cassava-based farmers are likely attracted to the choice of group labour compared to the family labour choice. The possible reason could be the fact that female cassava-based farmers are more likely interested in social formation such as church/religious membership, age

grade and other social gatherings thereby deriving benefits in form of labour input.

The coefficients of farming experience have a positive significant correlation with the choice of hired and group labour relative to the base category. A unit increase in farming experience will lead to a 0.19% and 0.09% increase in the probability of preferring hired and group labour relative to the choice of family labour. The increase in the farming experience is very important in determining the optimal resource use and the best combination of farm inputs taking into consideration several endogenous and exogenous factors in the farm. The result aligned with the reports of Bassey et al. (2014), Bedemo et al. (2013) and Anim (2011).

The non-farm income coefficient is positively and significantly correlated with the likelihood of choosing hired and group labour sources at $p < 0.05$ respectively, relative to the base category. An increase in the non-farm income is likely to increase the probability of the farmers' choice of hired and group labour relative to the choice of family labour. An increase in non-farm income would likely upsurge the financial capacity of a farmer to pay for wages and fulfilled the requirement to utilize group labour. Anim (2011) has reported similar findings.

4. CONCLUSION

The farm environment is changing and small-scale farmers ought to prepare to change with the dynamics that engulf the current farming system. Therefore, small-scale farmers should be ready to shift from the usual traditional sources of farm labour to other alternatives conditioned by certain characteristics specific to farmers and exogenous factors alike. The study has identified three major sources of farm labour available to cassava-based farmers in the southern region of Nigeria. These are family labour, the hired and group labour. Each of these labour source options has a set of exogenous variables that influence its adoption by a small-scale cassava-based farmer in the southern region of Nigeria. The major issue the study dealt with, was to identify these exogenous factors that influence the probability of adopting each of the labour options available to the small-scale farmer in the region. The empirical results revealed that the farmer's

age, education, social capital formation, sex of a farmer, farming experience and non-farm income are significant positive determinants of the choice of hired labour relative to the family labour by the small-scale arable crop farmers in the southern region of Nigeria. Besides, household size has a negative correlation with the probability of preferring hired labour instead of family labour. Also, the farmers' age, years of formal education, social capital formation, sex and farming experience were identified as factors that influence the probability of adopting group labour source relative to the family labour source by cassava-based farmers in the region. Again, the household size negatively affected the choice of group labour relative to family labour.

Following the empirical results, it is recommended that concerted efforts should be developed to increase the formal education attainments of small-scale farmers, scale-up social capital formation, and increase non-farm income sources and farm income sources as a prerequisite to upsurge the use of hired labour among small-scale cassava-based farmers in the region. In addition, to encourage the use of group labour by smallholder farmers, emphasis should be placed on experienced women farmers. Also, efforts should focus on improving levels of education and increasing farmers' social capital formation or social interactions as well as boosting off-farm sources of income.

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COMPLIANCE WITH ETHICAL STANDARDS

Authors' Contributions

Authors contributed equally in all aspects of the paper.

Conflict of Interest

The author declares that there is no conflict of interest.

Ethical Approval

For this type of study, formal consent is not required.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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