Artigos

What drives youth participation and labor demand in agriculture? Evidence from rural Nigeria

O que impulsiona a participação dos jovens e a demanda por trabalho na agricultura? Provas da zona rural da Nigéria

Obisesan, Adekemi A.

Adekemi A. Obisesan aaobisesan@futa.edu.ng
Federal University of Technology, Akure, Níger

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Abstract: Employment creation, especially among the youth, remains a global issue. This study examines youth participation and labor demand in agriculture using the 2015/16 Living Standard Measurement Survey-Integrated Survey Agriculture (LSMS-ISA) data. The analytical tools employed in the study include descriptive statistics, Logistic and Tobit regression models. Summary statistics showed that males participate more than females in Nigerian agriculture. The farmers were small-holders. The results revealed low participation of youth in Nigerian agriculture. Farm size, access to credit and household size significantly influenced youth participation in Nigerian agriculture. Age, use of inorganic fertilizer, farm income, household size and cultivated farm size were labor enhancing. The study suggests that efforts to shape future work in Nigerian agriculture especially among youth should include among other things, access to land and provision of credit facilities.

Keywords: Agricultural labor, Youth, Rural, Nigeria.

Resumo: A criação de empregos, especialmente entre os jovens, continua sendo um problema global. Este estudo examina a participação dos jovens e a demanda de trabalho na agricultura usando os dados da Pesquisa Integrada de Avaliação de Padrões de Vida de 2015/16 (LSMS-ISA). As ferramentas analíticas utilizadas no estudo incluem estatística descritiva, modelos de regressão Logística e Tobit. As estatísticas resumidas mostraram que os homens participam mais do que as mulheres na agricultura nigeriana. Neste estudo, os agricultores eram pequenos proprietários. Os resultados revelaram baixa participação de jovens na agricultura nigeriana. O tamanho da fazenda, o acesso ao crédito e o tamanho da família influenciaram significativamente a participação dos jovens na agricultura nigeriana. Idade, uso de fertilizante inorgânico, renda agrícola, tamanho da família e tamanho da fazenda cultivada aumentavam a mão de obra. O estudo sugere que os esforços para moldar o trabalho futuro na agricultura nigeriana, especialmente entre os jovens, devem incluir, dentre outras coisas, o acesso à terra e a provisão de facilidades de crédito.

1. Introduction

The relevance of agriculture in any economy cannot be overemphasized. Agriculture contributes significantly to national food self-sufficiency by accounting for over 90% of total food consumption requirements and also helps to maintain a healthy population (AGRA, 2017). Growth in the overall economy of a nation depends on the development of agricultural sector (Gollin, 2014). The sector controls non-agricultural activities by its potential to alleviate poverty. It is interesting to note that more than fifty percent of the reduction in poverty achieved in the many countries of the world can be attributed to growth in agricultural income (OECD, 2017). Agriculture is an established way to prosperity in the sense that no region in the world has been able to develop a diverse and bouyant economy without first establishing a successful foundation in agriculture (AGRA, 2017). Moreover, efficiency of the agricultural sector has a multiplier effect on economic development. Aside self-sufficiency in food production, a vibrant agricultural sector is contributory to generation of employment, foreign exchange earnings and provision of raw materials for agro-allied industries. In Africa, agriculture accounts for over 32% of the Gross Domestic Products (GDP) and more than 70% of African population engages in agriculture. Hence, it is the best sector for addressing unemployment and much of the remaining poverty in Africa.

Furthermore, the escalating world population has driven up the demand for food. This substantiates the fact that the menace of food insecurity will become more complicated, as approximately 70 percent more food will have to be produced across the globe in order to feed an estimated 9 billion people by 2050 (FAO, 2017). Hence, this necessitates more engagement and improvement in agricultural production in order to satisfy the expected increased demand for food (FAO, 2017). The relevance of agricultural sector notwithstanding, its performance is quite below its potential in sub-Saharan Africa (SSA), However, despite the continent's huge potentials in agricultural production, it is disturbing to note that most of the African countries still depend on food importation (Salami and Arawomo, 2013). Food imports are expected to increase from thirty five billion United States dollars to above one hundred and ten billion dollars by 2025 (FAO, 2017). The wide gap between potential and current crop yields makes increased food production achievable. This points to the need for agricultural transformation in order to achieve inclusive and sustainable economic growth, employment and decent work for all.

In Africa, several factors are responsible for low agricultural productivity, this includes: insufficient knowledge of improved practices, low use of improved seed, low fertilizer use, inadequate irrigation, conflict, absence of strong institutions, ineffective policies, lack of incentives, and prevalence of diseases and pests (Asenso-Okyere et al., 2011). More importantly, agricultural labor force is growing older as rural youths are searching for better and more lucrative means of livelihoods than the traditional farming and are migrating to the urban areas in spite the insufficient jobs in the urban sector. However, agriculture remains Africa's undisputable means of growing inclusive economies and panacea for unemployment especially among the youth.

In Nigeria, prior to the advent of oil, agricultural sector was the major source of foreign exchange contributing over 60% of the gross domestic product. However, with the advent of oil, there has been a decline in the contribution of agriculture (NBS, 2014). The neglect of the sector and the negative impact of oil boom were responsible for the decline. Despite this, agriculture still plays significant role in the nation's economy by employing about two-third of total labor force and providing livelihood for over 90% of the rural population. Moreover, with the dwindling world oil price, there is need to diversify the nations revenue source, hence government has to shift attention towards the agricultural sector which remains a key driver for growth, poverty eradication and youth employment. The youth have been recognized as the greatest asset of any nation and are the highest investment for a country's development (NYPN, 2001). According to the NPC (2013), youth defined as individuals between 18 and 35 years of age constitutes approximately half of Nigerian population. It is quite alarming that youth unemployment rises, as their population grows (Akande, 2014). Unemployed youth numbered about 11.1 million in 2012. According to International Labor Organization estimates, youth unemployment rate stood at 13.41% in 2017 (ILO, 2017).

Encouraging youth active participation in agriculture will introduce new vigor and innovations into its development in Nigeria. This will however need to be enhanced by certain factors. It is against this background that this study investigates youth participation and labor demand in Nigerian agriculture. Though there are studies on youth engagement in agriculture in Africa (Okwoche et al., 2012, Nigeria; Ahaibwe et al., 2013, Uganda; Njeru and Gichimi, 2014, Kenya; Gutu, 2016, Ethiopia; Maiga, 2016, Nigeria and Uganda). However, empirical assessment of youth participation and labor demand is scanty in Nigeria. This reveals a gap in the literature that needs to be filled. The study provides answers to pertinent questions such as: are Nigerian youth actively participating in agriculture?; what are the factors influencing youth participation in agriculture?; what are the drivers of agricultural labor demand? From a policy perspective, answers to these questions will have implications for future work in agriculture and potential of agriculture to remain panacea to poverty and youth unemployment.

This paper is organized as follows: section 2 presents the literature review while section 3 presents data and analytical techniques. Section 4 entails the results and discussion. Finally, section 5 gives a brief summary of the main findings, the conclusion, and policy recommendation.

2. Literature Review

This section provides empirical review on youth participation in agriculture in Africa. Gutu (2016) investigated the trends, patterns and prospects of youth involvement in agriculture in Ethiopia, by gender. It also analyzed the determinants of youth labor supply in agriculture using household and youth sample survey data collected during 2010/11 and 2014/15 main agricultural seasons in Oromia, one of the designated high agricultural potential area of Ethiopia. Labor supply was measured as the total annual working days (in adult equivalent) of male and female youth members of the household allocated to

on-farm and off-farm work. Based on this data the marginal products (shadow wages) of youth workers of each gender and net income (shadow income) were estimated, using a structural time-allocation models. Then the estimated shadow wages and shadow income were used as regressors in a structural model of youth labor supply. The results indicated that trends and patterns of youth involvement in agriculture vary across gender and work locations, and so do their marginal products. Whilst the on-farm participation of youth is declining across time irrespective of gender, the participation in off-farm agricultural activities is increasing for both. There is statistically no significant decrease in the total agricultural labor supply of both male and female youths. Furthermore, the study found that the effect of own shadow wage on labor supply is positive for male youth members, suggesting an upward sloping labor supply. However, the effect of own marginal product of female youth labor is negative, suggesting that female youth agricultural labor supply is backward bending. The study concluded that changes in economic incentives such as shadow wages and shadow income matter for youth involvement in agriculture and off-farm agricultural employment opportunities could help to reduce youth underemployment.

Additionally, Maiga (2016) employed the Living Standards Measurement Surveys-Integrated Surveys of Agriculture (LSMS-ISA) in investigating the determinants of changes in youth and women participation in agriculture in Nigeria and Uganda. Participation in the agricultural labor force is measured using hours per week in agriculture and change in hours worked per week in agriculture between two survey waves. Ordinary Least Squares and Tobit methods are used to estimate the model. The results revealed age as a strong determinant in hours worked per week in agriculture in Nigeria but not in Uganda. Nigerian men work more hours per week in agriculture than women while the opposite is true for Uganda. The study concluded that education, gender, rural residence, and non-agricultural wage income strongly affect hours worked per week in agriculture.

Ahaibwe et al. (2013) examined youth employment dynamics across different sectors and provided insights into the determinants of youth participation in agriculture. The Uganda National Panel Survey data of 2005/6 and 2009/10 were employed in the study. The findings revealed that youthful farmers are concentrated more in agricultural production. Furthermore, a relatively lower percentage of youth use improved inputs (such as improved seeds, fertilizers, agricultural chemicals and veterinary drugs). Land tenure issues impeded many youths from engaging in agriculture, with the majority of youth using land without exclusive ownership rights. In addition, the results pointed to the fact that the youth are less likely to access credit, extension services and social capital (farmer group membership), all key factors in agricultural transformation. The results further suggested that the youth with at least secondary education, males (both married and unmarried) and those youth residing in households with a large share of adults are less likely to engage in agriculture.

3 Data and Analytical approaches

3.1 Data

The study used secondary data from the 2015/16 Living Standard Measurement Survey-Integrated Survey on Agriculture (LSMS-ISA). A multi-stage stratified sample design was used for the Panel Survey. The data comprises of 5,000 households. The study made use of the data from farming households in rural Nigeria where agriculture is predominant. However, because many did not record of their age, data for this study comprised of 1,104 households. I use the following data used for this study: age, household size, sex, credit access, farm size, crop yield, labor used, cultivation of improved seeds, farm income and self-employment income.

3.2 Analytical Techniques

Descriptive statistics such as mean, percentage and tables were used to analyze the socio-economic characteristics and youth participation. Logit regression model and Tobit regression models were used to examine the factors influencing youth participation and labor demand respectively.

3.2.1 The Logistic Regression Model

Logistic regression is useful for this kind of situation where prediction of the presence or absence of an outcome based on values of a set of predictor variables is needed. This model is similar to a linear regression model but it is suited to models where the dependent variable is dichotomous.

If Yi is the random variable (dichotomous), it can then be assumed that Yi takes on the values 0 or 1, where 0 denotes the non-occurrence of the event in question and 1 denotes the occurrence. If X_1,....., X_n are characteristics to be related to occurrence of this outcome, then the logistic model specifies that the conditional probability of event (i.e., that Y = 1) given the values of X_1,.....,X_n is as follows:

$$P(Y) = 1/[1 + \exp - (\alpha - \Sigma \beta_i X_i) \quad (1)$$

In order to linearize the right hand side a logit transformation was applied by taking logarithm of both sides, therefore we have the following equation:

$$\text{Logit } P(Y) = \alpha + \Sigma \beta_i X_i$$

(2)

Where,

$Y_i = 1$ if success i.e respondent participates.

$Y_i = 0$ if failure i.e if respondent did not participate

α = Constant term

X_i = independent variable

β = logistic coefficient for independent variable

The independent variables specified as determinants of participation are:

X_1= Household size (number), X_2= self-employment income source (1= self-employed, 0 otherwise), X_3= wage employment (1= yes, 0 otherwise), X_4= credit access (1= yes, 0 otherwise), X_5= farm size (hectares), X_6= education (years), X_7 = extension agent access (1= yes, 0 otherwise), X_8 = cultivation of improved seeds (1= yes, 0 otherwise), X_9=farm income (Naira).

3.2.2 Tobit Regression Model

Tobit regression model for the continuous variable can be expressed as:

$$AL_i^* = \beta_0 + \beta_i X_i + \mu_i$$

$$AL_i = AL_i^* \quad if \ \beta_0 + \beta_i X_i + \mu_i > 0$$

$$= 0 \quad if \ \beta_0 + \beta_i X_i + \mu_i \leq 0$$

(3)

Where,

AL_i^* = The latent variable and the solution to utility maximization problem of level labor demand subjected to a set of constraints per household

AL_i = Agriculture labor (person-days) for its farmer

X_i = Vector of factors affecting labor demand

β_i = Vector of unknown parameters

μ_i = Error term

The explanatory variables specified as determinants of agricultural labour demand are defined as follows:

X_1= Household size (number), X_2= self-employment income source (1= self-employed, 0 otherwise), X_3= wage employment (1= yes, 0 otherwise), X_4= credit access (1= yes, 0 otherwise), X_5= farm size (hectares), X_6= education (years), X_7 = extension agent access (1= yes, 0 otherwise), X_8 = cultivation of improved seeds (1= yes, 0 otherwise), farm income (Naira), X_9 = age (years), X_{10} = use of inorganic fertilizer (1= yes, 0 otherwise), X_{11} = crop yield (kg/ha), X_{12}= Sex (female=1, 0 otherwise).

4. Results and Discussion

4.1 Descriptive Analysis of the Socio-economic Characteristics of the Respondents

The descriptive analysis of the socio-economic characteristics of the respondents is presented in Table 1. From the results, the mean age of the respondents was 53 years, thus they are not in their economically active age. The majority of the respondents (89.67%) are male, with an average household size of 8 persons. This implies that crop production is dominated by male. The average farm size cultivated is 0.97ha which indicates that Nigerian farmers are smallholders. Very few of the respondents, 19.84% and 27.17% cultivated improved seeds and had access to formal credit respectively. This reveals that low adoption of improved technology and access to credit remains major constraints to agricultural production especially among small scale farmers in the country. The mean crop yield was 8.04tonnes/ha while the mean labor demand was 888.91 person-days. The respondents had poor access to extension services as shown by the small percentage (14%) of the farmers that had contact with extension agents. The average value of the respondents' farm income and total household income was #145924.80 and #395287.60 respectively.

Table 1. Definition and description of variables

Variables	**Definition**	**Mean/ Percentage**
Age	The age of the respondent in years	53.10
Sex	Dummy =1 if respondent is female	10.33
Household size	Total household size (number)	7.87
Farm size	Total farm size	0.97
Access to formal credit	Dummy=1 if respondent has access to credit	27.17
Improved seeds	Dummy=1 if respondent cultivated improved varieties	19.84
Inorganic fertilizers	Dummy=1 if respondents used inorganic fertilizer	58.05
Labor demand	Total labor days allocated farm	888.91
Crop yield	Crop yield in kg/ha	8037.6
Farm income	Farm income in Naira	145924.8
Total income	Total household income in Naira	395287.6

Source: LSMS-ISA (2015;2016)

4.2 Youth participation in agriculture

This paper defines the youth as an individual between 18-35 years of age. Using a descriptive approach, the study provides insights into extent of the youth involvement in agriculture as well as the major constraints that they

encountered. Only 9.69% of the respondents are classified as youth. This shows low engagement of Nigerian youths in agricultural production. None of the respondents classified as youth participated in agricultural wage employment. This agrees with Gutu (2016) that on-farm participation of youth is declining across time irrespective of gender. All the youthful farmers are males and operated small scale farming with average farm size of 1.49 hectares. Lack of credit access, low adoption of improved seeds and poor extension services are key constraints faced by youths. The results show that Majority (84.11%) of the youthful farmers had no access to credit while only 12.15% and 22.43% had access to extension services and adopted improved varieties respectively. Farm income was #148,867.9 while their labor demand was 716.79 person-days.

The results of the binary Logistic regression model on the factors affecting youth participation in agriculture is shown in Table 2. The results showed that access to credit, farm size and household size statistically influenced youth participation in agriculture. Access to credit has a positive and significant ($p<0.05$) influence on youth participation in agriculture. Ahaibwe et al. (2013) pointed to the fact that the youth are less likely to access credit. From the findings, access to credit facilities will increase the likelihood of participation by 0.4519. This is attributed to the fact that credit increases the farmers' economy to purchase improved seed, fertilizer and other inputs. Household size significantly ($p<0.01$) but negatively influenced youth participation in agriculture. A unit increase in the household size will reduce the likelihood of youth participation by 0.1397. Furthermore, an increase in farm size will increase the likelihood of participating in agriculture significantly at 1%. Land tenure issues impeded many youths from engaging in agriculture, with the majority of youth using land without exclusive ownership rights (Ahaibwe et al. 2013).

Table 2. Estimates of Logit Regression for the Determinants of youth participation in Agriculture

Variables	**Coefficients**	**Standard Error**	**P-value**
Household size	-0.1397	0.0259	0.000
Education	0.0026	0.0055	0.640
Credit access	0.4579	0.1591	0.005
Farm size	0.1264	0.0395	0.001
Improved varieties	0.1101	0.3203	0.731
Extension agent contact	0.1272	0.2270	0.575
Self-employment	0.1469	0.2682	0.584
Wage employment	0.2742	0.3902	0.482
Farm income	3.06 e-07	6.79e-07	0.653
Constant	0.1668	0.2302	0.469
Log likelihood	-203.24		
Prob >chi^2= 0.0000			
Pseudo R^2= 0.5176			

Source: LSMS-ISA (2015; 2016)

4.3 Determinants of agricultural labor demand

The result of the determinants of labor demand by farming households in Nigeria is shown in Table 3. The log likelihood is 5262.35 and significant at 1% level of significance. This indicates that the model has a good fit to the data. The result shows that out of the 11 explanatory variables included in the model, only five variables were found to significantly influence labor demand. These are age, household size, farm income, land area cultivated and use of inorganic fertilizer. A positive sign on a parameter indicates that the variable is labor enhancing while a negative sign implies the variable is labor displacing.

The estimated coefficient of cultivation of improved seed is negative though not statistically significant. This implies that planting of improved varieties has the tendency to displace labor. The use of inorganic fertilizer positively and significantly ($p<0.05$) enhance labor demand by 135.33 points. Age of the respondents is significant ($p<0.1$) and has a positive sign, implying that older farmers are more likely to employ more labor than their younger counterparts. From the result, a unit increase in age will enhance labor by 4.73. This is understandable as younger once are more energetic than the aged farmers. In the same vein, farm income is labor enhancing, the higher the income realized from the farm the more the labor demand. Increase in income improves farmers' economy to engage more labor in their agricultural activities. The result revealed that a unit increase in farm income will increase labor used by 0.0085 points. Furthermore, the coefficient of land cultivated is positive and significant ($p<0.01$). From the result of this study, a unit increase in land cultivated will enhance labor by 200 points. Land is perhaps the single most important resource, as it is a base for any economic activity, especially in rural and agricultural sector. This is consistent with expectation as farmers cultivating larger farm land will require more labor compared with those with small farmland.

Table 3. Estimates of the Tobit regression model of labor demand

Variables	Coefficients	Standard error	T-value
Age	4.73*	2.59	1.83
Extension agent	-83.68	103.51	-0.81
Education	-1.95	2.53	0.77
Household size	22.33**	10.58	2.11
Sex	-43.50	128.16	-0.34
Credit	-49.61	70.01	-0.71
Farm income	0.01***	0.002	5.00
Inorganic fertilizer	135.33**	60.96	2.22
Improved seed	-49.19	82.86	-0.59
Yield	0.001	0.002	0.69
Farm size	200.81***	28.21	7.12
Constant	215.26	71.66	3.00
/sigma	812.74	22.58	
Log likelihood	-5262.35		
Log chi²	133.18		
Prob>chi²(11)	0.0000		

Source: LSMS-ISA (2015; 2016)
*,**,*** represent significant at 10%, 5%, 1%

Conclusion

This study employed the 2015/16 LSMS-ISA data to investigate the determinants of youth participation and labor demand in agricultural production in rural Nigeria. Descriptive statistics, logistic and Tobit regression analysis were employed in the study. The results revealed that majority of the farmers are not in their economically active age and are smallholders. There is low engagement in agricultural production among Nigerian youth as less than 10% of the respondents are classified as youth that is between ages 18 and 35 years. The empirical model of the Logistic regression revealed access to credit, farm size and household size statistically influenced youth participation in agriculture. The cultivation of improved seeds (though not significant) tend to be labor displacing while use of inorganic fertilizer, age of the farmer, farm income, household size and cultivated farm size are labor enhancing. In conclusion, Nigerian youth participation in agricultural production is low. Hence, access to land and provision of credit facilities should be intensified in agricultural and rural development programmes. This will encourage youth participation in agriculture, reduce youth unemployment and shape future work in agriculture.

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