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Opportunity Cost of Education on Non-Farm Employment in Rural Nigeria

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ABSTRACT

Purpose: Returns on education was found to be worker, scale and allocative effects with positive higher payoff to agricultural productivity but its effects on non-farm employment among agricultural households who obtain income through non-farm activities to complement proceeds of agricultural activities are not yet known. Therefore, this study critically investigates the real cost effect of education on involvement in non-farm employment among rural households in South-western Nigeria.

Research Method: The study drew a sample of 411 rural farm households through a multi-stage sampling technique from three states in southwest Nigeria and the data obtained were analyzed using the Mincerian equation, logistic model, inverse of Herfindahl index, calculation of expected annual rural income earning and rates of return to schooling.

Findings: Results indicate that mean age and education of the rural household heads were 49.9 years and 8.8 years respectively while the household incomes were diversified up to 2.82 level and the non-farm sources contributed an average of 67% of the total income. Education is found to have considerable returns of N4706.30 (US$31.95) to gross household income and an additional year of schooling from other members of the households returns of N12519.90 (US$85) to the households' income. Education of the household heads increases the probability of farm households participating in rural non-farm employment but the probability of participation reduces with increased level of education of the household heads. Tertiary education has the highest opportunity costs of schooling (N352200.04) per annum and the lowest rate of return to schooling (0.57%) from rural non-farm employment.

Research Limitations: The study revealed the real cost of rural farm households' educational level on the type of non-farm employment and income generated through it. The study presents information on south-western zone of Nigeria.

Originality/Value: The practical value of this research is that decline rates of return to higher education reveal the rural non-farm employment being not the prime incentive for rural farm households' members in obtaining higher education in rural southwest Nigeria. Therefore, implications are drawn for an integrated approach to higher education which may yield agricultural and non-agricultural transformation in rural Nigeria.

Keywords: Mincer equation, Opportunity cost, Nonfarm-farm earning, Income diversification index, Schooling

INTRODUCTION

In recent times, many research studies revisited work on roles of education on agricultural productivity (Vollrath, 2007; Asadullah and Rahman, 2009; Reimers and Klasen, 2013) in developing and developed nations but for almost a decade now, no such review has been done on the returns of schooling on non-agricultural activities among farmers except the few research works that were done in the early 21st century (Taylor and Yunez-Naude, 2000;

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Yang and An, 2002; Jolliffe, 2004; Yang, 2004).

Foremost, in having clear understanding of the subject matter, meaning and essence of education need to be stressed. According to Schultz (1975), education is the ability of the learners to perceive new classes of problems, clarify such problems and learn ways of solving them. Nelson and Phelps (1966) stated that education enhances one's ability to receive, decode and understand information. Applying these assertions to agricultural production, education according to researchers produced higher payoff to agricultural productivity especially in a modernize agricultural environment than traditional agricultural environment, and however, such produced positive worker, scale and allocative effect values and these effects varied with farm size and level of education (Welch, 1970; Wu, 1977; Pudasaini, 1983; Huffman, 1999; Reimers and Klasen, 2013). Reimers and Klasen 2013 justified the effects of education on agricultural productivity by quoting from literature that education supposes to let the farmers become better managers via enhancing their decision making skills; good assessors of information with better givers and takers of both output and input prices; good movers of new technologies and good evaluators of implied opportunities and risks (Jamision and Lau, 1982; Asfaw and Admassie, 2004; Weir and Knight, 2004; Alene and Manyong, 2006; Asadullah and Rahman, 2009).

Despite all these positive effects of education on agricultural productivity, some studies still find that returns to education on agriculture is small or negative or even absent (Rosegrant and evenson, 1992; Adams, 1993, 1995; Huffman, 1999) due to limited technical-efficiency gains from skills provided by farmers' education (Taylor and Yunez-Naude, 2000) and or the analysis does not adequately account for the endogeneity of activity choice by the farmers (Yang and An, 2002; Jollief, 2004; Yang, 2004: Reimers and Klasen, 2013). Reimers and Klasen 2013 quoted from Taylor and Yunez-Naude (2000) that it would be beneficial for rural households to allocate parts of labour or land resources towards non-farm activities if the marginal effect of education on the net income-productivity of investment of the non-farm activities exceeded that of the agricultural activities.

Taylor and Yunez-Naude (2000) stressed the importance of selectivity and occupational choice on returns from schooling and quoted from Rosenzweig and Binswanger (1993) that the choice of activities by farm households from non-farm sector arise from two perspectives, viz, farm households reaping rewards from schooling by abandoning farm activity for high-returns schooling non-farm work, and farm households continue involving in farm work while diversifying into non-farm work in which the returns from schooling are high and incentives for diversification exist.

With all these assertions, it would be interesting to know what is happening in non-farm sector with respect to education in sub-Saharan Africa especially in Nigeria and ask some questions in relation to education on non-farm activities; does effect of schooling reflect in the total net income of rural farm households that participated in non-farm activities? Does the educational status of non-farm participating farm households affect their expected annual rural income? What is the rate of returns to education in non-farm in rural southwest Nigeria? Finding answers to these questions and contributing to the schooling-and-nonfarm production hypothesis in rural Nigeria are the main purpose of this paper.

This paper is organized as follows; first, the background information on education and its effect on both farm and non-farm sectors. Next section is the simple theoretical framework on demand for schooling in the presence of labour market segregation, followed by an econometric model estimating economic returns from schooling. The next part reports the empirical findings and the final section summarizes the conclusion.

Theoretical Framework on Returns to Schooling using Labour Market Segregation

This paper adopted, modified and followed the model used by Zhao (1997). The endogenous schooling model derived by Rosen and used by Zhao (1997) assumes that individual maximizes his lifetime earnings (E) for a given discount rate (r) by choosing the optimal schooling investment (s):

(1) $$\max E = \int_s^\infty e^{-rt} Y(s, A)dt$$

Where it is assumed that the only cost of schooling is the opportunity cost; Y(s, A) is the wage function, and A represents the individual's ability. The maximization of equation (1) with respect to the optimal level of schooling leads to the first-order condition:

(2) $$(\partial/\partial s)h\ Y(s, A) = r$$

So that individual equates the rate of return to schooling with the discount rate. Empirical studies (Zhao, 1997; Taylor and Yunez-Naude, 2000) applied a semilog to Mince-type earning function in which log earnings are function of years of schooling and age or its variants to estimate the rate of return to schooling. In-line with Zhao (1997), the above technique would underestimate returns to education in rural Nigeria because there two segregated labour markets in rural Nigeria among the farm families – farm and non-farm work[1]- and the entry to the non-farm labour market are restricted to factors like education, skill and experience (Woldehanna, *et al.,* 2000). As a result of the non-farm entry barrier, there is differential in earnings. If education plays a role in overcoming the entry barrier to non-farm labour market, then rural schooling will have an additional source of benefit that is not captured by the mincer-type regression (Zhao, 1997).

Following Zhao (1997), it is needful to assume that a rural farming household maximizes the expected lifetime earnings taking into account the probability of participating in non-farm work in order to derive a formula estimating the rates of returns to education under labour market segregation:

(3) $$\max E = \int \{p(s)U(s) + (1 - P(s))R(s, Land)\}e^{-rt}dt$$

Where U and R are annual incomes in the non-farm sector and the farm work, respectively, and P is the probability of working in the non-farm market, that is, the probability of participating in non-farm activities. Earnings in the two markets are functions of schooling (s), and farm incomes that also depend on the land area at the disposal of the household (land). The first-order condition with respect to s is to be considered in determining the optimal schooling level for a school-age child, assuming that the number of years to approach infinity (T→∞)

(4) $$\frac{1}{r}\{P_sU - PU_s - P_sR + (1-P)R_s\} = PU + (1-P)R$$

Where $P_s = \partial P(s)/\partial s$, $R_s = \partial R(s, Land)/\partial s$, and $U_s = \partial U(s)/\partial s$. Equation (4) states that the amount of schooling is determined at a point where the expected marginal benefit of schooling equals the expected marginal cost (opportunity cost).

Regrouping terms denoting marginal benefits in equation (4) gives

(5) $$\frac{1}{r}\{P_s(U-R) + (PU_s + (1-P)R_s)R_s\} = PU + (1-P)R$$

which states that the marginal benefit of schooling consists of two parts: increased expected earnings due to the probability of participating in non-farm to the higher paid market and increased earnings in both markets due to higher productivity.

Equation (5) can in turn be restated to show rates of return

(6) $$\frac{P_s(U-R)}{PU + (1-P)R} + \frac{PU_s + (1-P)R_s}{PU + (1-P)R} = r$$

The left-hand of equation (6) is the rate of return to schooling when barrier to work non-farm exists. It is evaluated according to two functions of schooling. The first term of the equation incorporates the rate of return to schooling in terms of increasing the accessibility of the higher paid occupation, while the second term

incorporates the effect of increasing incomes in both markets holding the probability of participating in non-farm constant. The amount of schooling is chosen when the combined rates of return to schooling equal the discount rate.

If participation in non-farm is free, then income differences between the two labour markets are equalized, that is, U= R, and equation (6) reduces to equation (2).

Econometric Model

Following empirical studies (Griliches, 1997; Taylor and Yunez-Naude, 2000) that used Mincerian approach in modelling returns to schooling, the model is specified as thus

(7) $Y = \alpha + X\beta_i + \varepsilon_i$

Where Y is the total gross income, X_s are the explanatory variables and while α, β, and ε are the intercept, parameter estimate and the error term of ith rural farm household. Both the linear and the semi-log (Mincerian approach as used by Mincer in 1974 and 1978) functional forms of Ordinary Least Square (OLS) regression method were used following Taylor and Yunez-Naude, 2000. The explanatory variables for the model include household head's schooling, age, age-squared, average schooling of other family members except the household head, sex of the household head and other household human and physical capital, including the land size, value of livestock owned and household size.

Following literature on agricultural household theory (Taylor and Yunez-Naude, 2000; Woldehanna and Oskam, 2001), the model used different income activities that were grouped into two, viz the farm income and the non-farm income.

Likewise, logit model was used to analyze the effects of schooling and other above mentioned variables on the probability of rural farm households participating in non-farm work. Following Maddala (1986) as used by Zhao (1997), assume that there is an underlying response variable R_i defined by the regression relationship.

(8) $R_i = \beta'Z_i + \varepsilon_i$

Where Z_i = (*Schooling, Age,*).

The value of R_i is unobservable. What is observed is the employment sector. Therefore, define

$R_i^* = 1$ if $R_i > 0$, or non-farm employment is observed

$R_i^* = 0$ otherwise.

Assuming the cumulative distribution of ε_i is logistic, and then the logit model to be estimated is

(9) $prob(nonfarm - work) = prob(\varepsilon_i > -\beta'Z_i)$

According to Dougherty (2001), in logit estimation there is a need to hypothesize that the probability of the occurrence of the event (i.e. farm household involves in non-farm employment) is determined by the function:

(10) $P_i = F(R_i) = \dfrac{1}{1 + e^{-R_i}}$

The derivative of the function with respect to R:

(11) $f(R) = \dfrac{\partial p}{\partial R} = \dfrac{e^{-R}}{\left(1 + e^{-R}\right)^2}$

The marginal effect is:

(12) $f(R) = \dfrac{\partial p}{\partial R} = \dfrac{e^{-R}}{\left(1 + e^{-R}\right)^2} \beta_i$

The estimated probability of participating in non-farm employment by the rural farm household is:

(13) $p = \dfrac{1}{1 + e^{-R}}$

A reduced-form non-farm employment probability model like Zhao (1997) was estimated. The above household head schooling variable in OLS was further categorized into different levels of education viz tertiary, secondary, primary schools and no formal education and these variables were defined as dummy variables (using "no formal education" as the reference group). Other variables used in the OLS regression were also included in

the logit model. From the results the following estimates were calculated: the probability of rural farm household participating in non-farm work, expected annual rural income earnings and rates of return to schooling.

Study Area and Data Collection

The data used to estimate the model came from cross sectional survey conducted randomly among the rural farm households in rural farming communities in the southwest region of Nigeria. Southwest region is one of the major regions in Nigeria, coverings about $114,271 km^2$ with the total human population of 28.61 million (NBS, 2006; UN, 2006). It lies within latitudes $4^o – 14^0 N$ and longitudes $3^0 – 14^0 E$ and exhibits the typical tropical climate of averagely high temperature (30°C) and high relative humidity. The distribution of rainfall varies from about 1000 mm to about 2000 mm.

Multi-stage sampling technique was employed in selecting the rural farm households. The first stage entails a simple random selection of three states out of the six states in the region. The subsequent stages involved stratified random selection of five agricultural zones from the chosen states based on probability proportionate to size. In each zone, four blocks and three cells per block were selected. Lastly, two farming communities per cell and four farming households per community were selected to make 480 rural farm households. Only, 411 of questionnaires were found useful for while 69 questionnaires were discarded because of incomplete information.

Empirical Findings

Descriptive Statistics of the Rural Farm Households

Table 01 reveals that the mean age and education of the household heads in the sample were 49.9 years and 8.8 years respectively. The average years of schooling for all other family members was 4.6 years, indicating low level of education in line with UNESCO, 2007. The percentage of household heads with no-formal, primary, secondary and tertiary education are 12.7, 34.3, 39.4 and 13.6, respectively. On average, 31% (average of 2.10 income-earner members out of mean household size of 6.78) of the farm household members contributed economically to the household income. The mean farm size per household in the sample was found to be 2.14 hectares; the flock size ownership per household was meagre (0.04), while the household incomes were diversified[2] up to 2.82 level.

Results reveal that mean annual gross incomes in the farm and non-farm sectors were ₦168, 408.84 and ₦343, 161.14, respectively, while the total farm household gross (farm and non-farm) income was ₦511, 569.98 per annum. The non-farm sources contributed an average of 67% of the total income.

The income share derived from farm activities summed up to 32.92% of the total income with arable cropping producing the largest share of 15.31%. Also, 42.1% of the income from non-farm sources (i.e. an average of 28% of total income) were derived from non-farm self-employment activities, with only 7% of the total rural farm households' income was obtained from urban-type employment (skilled labour).

Effects of Education on Farm Households' Income

Table 02 reports the estimated effects of an additional year of household head's schooling, average family schooling, and other explanatory variables on gross income from all activities. These estimates were obtained from ordinary least squares regressions for total gross rural farm household income and the log of total gross income (the Mincerian equation).

Table 01:   Summary Statistics on Rural Farm Households in Southwest Nigeria

Variables	Definitions of Variables	Mean	Std. Errors
	Incomes (in Naira ₦)		
Arainc	Income from Arable Cropping	78321.36	3543.27
Treeinc	Income from Tree Cropping	55454.19	7708.11
Liveinc	Income from Livestock production	1995.12	238.88
yNatres	Income from Natural Resource collection	5166.86	1581.29
yAgropro	Income from Agro-processing	27471.31	4508.72
Totfaminc	Income from Total Farm Activities	168408.84	11776.60
yNFULSE	Income from Non-farm Unskilled Labour	35707.58	7447.32
yNFSLE	Income from Non-farm skilled Labour	33456.68	7235.34
yNFSE	Income from Non-farm Self Employment	144467.36	6959.01
ySCS	Income from Social and Community Service	17239.91	5091.28
yNFNL	Income from Non-farm non-labour Activities	112289.61	98701.98
TotNFinc	Income from Total Non-farm Activities	343161.14	11714.17
Totincome	Total Income from all sources	511569.98	18675.58
pcInc	Per Capita Income	75452.80	3277.53
Exogenous and Other Variables			
SexHH	Sex of Household Head	0.16	0.018
AgeHH	Age of Household Head	49.91	0.545
AgeHHsq	Household Head Age squared	2638.19	55.879
EducHH	Educational level of Household Head	8.83	0.234
Fmexp	Farm Experience of Household Head	21.40	0.543
HHsize	Rural Farm Household size	6.78	0.103
WkHHmr	Number of Working Household members	2.10	0.034
Deprat	Dependency ratio	0.69	0.010
Avfaedyr	Average years of Schooling for all the family members (Excluding household head)	4.63	0.156
Fmsize	Household Farm Size in Hectares	2.14	0.095
Divindex	Income Diversification Index	2.82	0.036
trfamsz	Farm size for Tree cropping	1.15	0.071
Arfamsz	Farm size for Arable cropping	1.01	0.040
Livestoc	Livestock size per household	0.04	0.006
Noeduc	Household Head with no-formal Education (Dummy Variable)	0.13	0.016
Pryedu	Household Head with Primary Education (Dummy Variable)	0.34	0.023
Secedu	Household Head with Secondary Education (Dummy Variable)	0.39	0.024
Tertedu	Household Head with Tertiary Education (Dummy Variable)	0.14	0.017

Source: Author's computation based on data from field survey

Total returns from schooling are significant both in OLS and Mincer specifications. The estimated return from an additional year of the household head's schooling is ₦4706.30 (US$31.95 at then-prevailing exchange rate of ₦147.30 per dollar); it is 0.4% in the Mincer income equation. The estimated return from an additional year of average family schooling is ₦12,519.90 (US$85), 0.8% in the Mincer equation. Higher returns from schooling of other members of the rural farm households reflect the fact that incomes from other members of the households are fully incorporated into the households' income. Income returns from an additional household member (household size) is large and significant; expected income is ₦39484.14 (it is 2.6% in the Mincer equation) for an additional family member in the household. The income returns from land (₦33674.11 and 2.1% in the Mincer equation) and livestock (₦290998.70 and 20.9% in the Mincer equation) assets are large and statistically significant, indicating that an additional increase in land and livestock production by the rural farm households will bring the expected returns of ₦33674.11 and ₦290998.70 to rural households' gross income. Farmer's experience or age had weak income returns indicated by the negative coefficient of the variable. Incomes are not significantly affected by the sex of the household head.

Table 02: Ordinary Least Square Regression Results for Total Income

Variable	A Estimated Absolute Effect on Total Gross Income (₦)	B Estimated Effect on the Log of Total Gross Income (Mincerian Form)
EducHH	4706.30** (2104.74)	0.004** (0.0019)
HHsize	39484.14*** (9209.65)	0.026*** (0.007)
Avfaedyr	12519.90** (5951.94)	0.008* (0.004)
AgeHH	-21430.44* (11854.81)	-0.013 (0.009)
AgeHHsq	258.60** (116.57)	0.0002* (0.00009)
SexHH	9248.84 (48308.54)	0.0363 (0.0368)
Fmsize	33674.11*** (9573.72)	0.0208*** (0.0073)
Livestock	290998.70* (148787.90)	0.2094* (0.1134)
Constant	491985.40 (310178)	5.5682*** (0.2364)
Sample Size	411	411
R-Squared	0.14	0.11
R^2 Adjusted	0.12	0.09
F	8.01***	5.91***

Source: Author's computation from field survey

Effect of Schooling on Rural Farm Households' Participation in Non-farm Employment

A non-farm employment probability model was fitted following Zhao (1997) to know the effect of schooling on rural farm households' participation in non-farm employment. Table 03 shows that education played an important role in farm households' possibility of working non-farm. Compared with the farm households whose heads had no formal education, the probabilities of non-farm participation of households with their heads having primary, secondary and tertiary education were 5.1%, 4.4% and 0.8% higher respectively. The result contradicts the expectation of higher probability with higher schooling; this explains the migration of farmers or farm family members with higher education from rural area in search of urban-type employment in the cities. Likewise, the years of schooling of the farm family increase the probability of farm households' participation in non-farm activities by 0.5%.

Both the household size and farm size increase the probability of farm households' participation in non-farm activities by 0.4% and 1.4%. The negative age effect in non-farm participation shows that younger farm households' heads tend to participate more in non-farm work than older counterparts. The probability of benefitting from non-farm participation increases while the psychic cost reduces with younger age by 0.1%. Probability of participating in non-farm work by the farm households are not significantly determined by the sex of the household head and value of livestock asset.

Opportunity Cost of Education

Table 04 presents the estimated expected income[3] for rural farm households. The income is taken as the opportunity cost of schooling. The average annual non-farm income was highest for households whose heads had tertiary education follow by households whose heads had no formal education but was lowest with farm households whose heads had secondary

education, while average annual farm income decreases with higher level of education. This strengthens the earlier assertion that households whose heads had higher education reduced their involvement or totally leaves farming in search for urban-type employment or rural non-farm activities with higher returns than farming, because farming in Africa, particularly, sub-Saharan Africa is largely rain-fed and old technologically based.

The income differences between non-farm and farm activities vary and increase with the level of education expected with households whose heads had secondary education. It was ₦252299.70 (which is US$1712.83 at then-prevailing exchange rate of ₦147.30 per dollar) for tertiary education per annum. The probability of non-farm employment among farm households was highest with households whose heads had tertiary education (0.9821) and reduced as there was reduction in the educational level of the household head, except with households whose heads had no formal education (0.9808).

Table 03: Non-farm Employment Model of the Rural Farm Households

Explanatory Variables	Dependent Variable Non-farm Participation = 1 Non-farm Non Participation = 0	
	Marginal Effect	Standard Error
Pryedu	0.05096***	0.0177
Secedu	0.04391***	0.0159
Tertedu	0.00802***	2.7067×10^{-3}
Avfaedyr	0.00551***	2.1079×10^{-3}
HHsize	0.00449**	1.9176×10^{-3}
Age	-0.0014**	7.0618×10^{-4}
AgeHHsq	0.1467×10^{-4}**	7.315×10^{-6}
SexHH	0.0234	0.0145
Fmsize	0.0143***	5.0264×10^{-3}
Livestoc	-0.0249	0.0513
Constant	0.0698	0.1089
Log Likelihood function	-72.37	
Restricted log likelihood	-82.91	
LR Chi squared	21.08***	
Sample size	411	

*Note: *, **, *** :marginal effect different from zero at 10%, 5%, 1 % significance levels, respectively.*
Source: Data Analysis

Table 04: Expected Annual Rural Income Earnings across Educational Status of Household Heads

Educational Level	Average Annual Non-farm Income ₦ 1	Average Annual farm Income ₦ 2	Nonfarm-Farm Income Difference ₦ 3	Probability of Non-farm Employment 4	Expected Annual Rural Income ₦ 5 $[[(1 \times 4) - (2 \times 4)] + 2]$
Noeduc	258900.61	184183.60	74717.01	0.9808	257466.04
Pryedu	227270.50	140485.40	86785.10	0.9291	221117.43
Secedu	212161.67	131043.30	81118.37	0.9444	207651.43
Tertedu	356716.30	104416.60	252299.70	0.9821	352200.04

Source: Author's computation from field survey

Table 05:   Estimated Rates of Return to Schooling through Rural Non-farm Employment

Educational Group	Nonfarm-Farm Earnings Difference ₦ (1)	Marginal Effects of Education on Non-farm (2)	Opportunity Cost of Education ₦ (3)	Rate of Return to Education (4) $[(1) \times (2) \div (3)]$
Primary Education	86785.10	0.05096	221117.43	2.00%
Secondary Education	81118.37	0.04391	207651.43	1.72%
Tertiary Education	252299.70	0.00802	352200.04	0.57%

Source: Author's computation from field survey

The expected annual rural farm household income follows the same pattern with the average annual non-farm income. It was highest for households whose heads had tertiary education (₦352200.04; US$2391.04 equivalent), followed by households whose heads had no formal education (₦257466.04; US$1747.90 equivalent) but was lowest with farm households whose heads had secondary education (₦207651.43; US$1409.72 equivalent). The results indicated that the schooling effects on rural non-farm employment were positive and the overall reward to schooling at different levels through accessing non-farm employment was large.

Rate of Returns to Schooling from Non-farm Employment

Table 05 shows the rates of return to different educational level of the rural farm households' heads. This was calculated using results on tables 3 and 4, considering the formula given in equation (6), following Zhao (1997). It was observed that rates of return to schooling from rural non-farm employment were low across the educational status. Primary education had the highest source of economic returns (2.00%) to schooling, followed by secondary education (1.72%) and least with tertiary education (0.57%). This indicates that rural non-farm employment was not the prime incentive for rural farm households' members to get educated.

The economic returns to schooling reduce as the level of education goes higher. The cause for this may be as a result of high average annual non-farm earnings that brought about large nonfarm-farm earning differences and resulted

in higher opportunity costs of schooling across educational status.

CONCLUSION

This paper focused on the returns to education from non-farm activities in rural Nigeria. The average educational level of the household heads and that of the other members of the farm family were 8.8 and 4.6 years respectively. The estimated returns from an additional year of the household heads and that of average family schooling were ₦4706.30 (US$31.95) and ₦12,519.90 (US$85) in the OLS equation, while they were 0.4% and 0.8% in the Mincer income equation, respectively. Compared with the farm households whose heads had no formal education, the educational level of household heads (primary, secondary and tertiary education) increased the probabilities of non-farm participation of rural farm households by 5.1%, 4.4% and 0.8% in the same order; and the years of schooling of the farm family only increased the probability by 0.5%. The income differences between non-farm and farm activities were large across educational status of the farm household heads. The schooling effects on non-farm employment were positive resulting in higher opportunity costs of schooling across educational status. The rates of return to schooling from rural non-farm employment were low across the educational status with primary education having the highest economic return of 2.00% and tertiary education having the lowest economic return of 0.57% to schooling.

As the findings indicated that rural non-farm employment was not the prime incentive for rural farm households' members in obtaining higher education, thus, an integrated approach to higher education may yield agricultural and non-agricultural transformation in rural Nigeria.

ENDNOTES

1   The term non-farm work refers to all activities outside the farm, farm-based activities (i.e crops and livestock production, aquaculture, agro-processing and natural resources collection) and agricultural wage employment. It does not matter where the activity takes place, at what scale, or with what technology (Idowu *et. al.,* 2013)

2   Income diversification index of the farm households was calculated using the inverse of Herfindahl index = $D = \dfrac{1}{\sum\limits_{j=1}^{n} S_j^2}$

where D is the diversity index and S_j is the share of income source j

3   According to Zhao (1997), the expected income is the average of rural non-farm income and farm income weighted by the probability of working in each sector

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