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**CHILD LABOR IN AGRICULTURAL PRODUCTION AND
SOCIOECONOMIC VARIABLES AMONG ARABLE FARMING
HOUSEHOLDS IN NIGERIA**

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ABSTRACT

This study was conducted to determine the level of child labor involvement in arable crop farming. A multistage random sampling method was used to select the respondents. Data were collected with the use of a structured interview schedule and questionnaire. Most farming household heads were males (60.61%) and 65% had no formal education, with an average age of 42.28 years, an average household size of 11 persons, annual average income of ₦192,000.00, and average farm size of 1.13ha. The children participated in field preparation, planting, weeding, pesticide, fertilizer and herbicide application, harvesting, transportation and processing. Many (43.33%) of the children combined schooling with farming operations. The decision of the farming household heads to use child labor was influenced by socioeconomic variables such as gender, age, level of education, household size, farm income, farm size, culture, economic factors and political factors. It is recommended that extension agents should educate farming household heads on the consequences of using child labor, especially with respect to chemical application. The concerned agencies need to educate farming household heads on the danger of involving child labor in farming at the expense of school attendance; educational and input empowerment by government should be closely monitored.

The phenomenon of child labor has a visible and disturbing feature since the later part of 20th century. Child labor amounts to all forms of work done by children under the age of 18 years (International Labor Organization [ILO] Cornell University ILR School 2005). According to UNICEF (2005), a staggering 15 million children under the age of 14 are working across Nigeria. The ILO (2004) gave an estimate of 250 million children between the ages of 5 and 14 working in developing countries of the world. This is a general estimate of child labor in

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developing countries. Out of this figure, there are many children engaged in agriculture related work as child labor is mainly an agricultural issue in many developing countries. Worldwide, 60% of all child laborers in the 5 to 17 age bracket work in agriculture, including crop farming, fishing and fish farming, livestock farming and forestry. This translates to more than 129 million boys and girls, 67.5% of which are unpaid family members (ILO 2010).

About 75% of Nigerians live in rural areas and 25% in urban areas (Muhammed and Adeoye 2006). This implies that most working children are located in rural areas that have agriculture as the major occupation. Asamu (2005) states that children work in various activities in the agricultural sub-sectors, such as crop and livestock farming, fishing, agriculture and cattle herding. Agriculture involves a lot hazards that affect humans on long and short term bases. The ILO (1998) states that child labor is any work that is harmful to a child's health, any kind of work that violates children's fundamental human rights, and is dangerous to their bodies and prevents them from going to school to gain knowledge for their future development. Agricultural operations can be full of hazards, particularly in the presence of low health and safety standards and can lead to injury and consequently, death. Children are fragile since the various organs of their bodies and minds are still in the development process. They are very susceptible to hazards associated with pesticides and herbicides. According to Johnson-Michael (2013), the consequences of children's exposure to pesticides and herbicides are especially alarming as the effects are believed to induce devastating and lifelong diseases and deformities in children. He further stated that outside their major effects on the endocrine system and their role in inducing neurological problems and childhood cancers, there are other nonspecific effects of chemical ingestion related to eye, liver, kidney or spleen problems. Pesticide exposure has also been indicated for anaemia, cardiovascular, stomach and intestinal problems (Diarra 2013). The negative health consequences of children's work can last into adulthood (ILO 2010).

Apart from exposure to hazards related to herbicides and pesticides, there are other effects of abusive labor on children. These include fatigue, poor academic performance, academic wastage, class retention and high dropout rate and achievement deficits (Muhammed and Adeoye 2006). Diarra (2013) found that a village farmer's son had his stomach gored by an ox and he (the farmer) had to borrow money to pay the medical bills. Children are also victims of accidents associated with field work such as being injured by animals, cut with weeding hoes and cutlasses or intoxication by chemical inhalation.

Poverty is the major cause of child labor in agriculture, together with limited access to education, inadequate agricultural technology and traditional attitudes toward children's participation in agriculture and poor access to adult labor (ILO2014). However, participation of children in agricultural labor is not always hazardous as some farming operations are nonhazardous. Such activities have positive consequences since it enhances inter-generational transfer of technical and social skill and children's food security (ILO 2014).

The future of children is considered of paramount concern to everyone. Much attention has been given to the need to study the level and nature of children's involvement in agricultural work to determine the types of activity that place them at risk (Adeoti et al. 2013). The relationship between child labor and schooling status has been attracting much attention recently. Previous child labor studies in agriculture by Nkamleu and Kielland (2006) and Adeoti et al. (2013) indicate long hours of work, dangerous conditions in which children work, meager wages, and poor school attendance.

According to Adeoti et al. (2013), Nigeria is characterized with smallholder farmers whose farm sizes average less than 4ha. According to the International Institute of Tropical Agriculture (IITA2002), farmers rarely employ children from outside their families. In such farms, family labor—mainly that of their children who are mostly in the age range of 7–15 years—is involved in farm operations. Most times these children lose school hours to farming operations that are usually energy sapping to carry out in their tender age. Undertaking a study of this nature is therefore worthwhile, particularly in the Nigerian context, and particularly regarding the use of child labor in the membership of farming households.

OBJECTIVES

The major objective of this study was to determine the involvement of children in agricultural labor. Specifically, this study was carried out to:

- (i) determine the socioeconomic characteristics of farming household heads;
- (ii) ascertain the age of the children and labor participation in the farm;
- (iii) examine the schooling pattern of children involved in farm operations;
- (iv) identify the reasons for engaging children in child labor; and
- (v) determine the socioeconomic factors that influence child labor in agriculture.

Hypothesis:

Ho: The socioeconomic attributes of farming household heads do not influence child labor in agriculture.

METHODOLOGY

This study was carried out in the Federal Republic of Nigeria. Nigeria has an estimated population of 138,283,240 (National Population Bureau 2008) and a size of 923,768 sq. km (356,669 sq. mi). It is located between latitude 10° North and longitude 8° East. Nigeria is made up of 36 states. It has six geopolitical zones namely North East, North West, North central, South East, South West and South South Geopolitical Zones. The North East Geopolitical Zone consists of seven states; North West, four states; North Central, nine States; South East, five states; South West, five states; and South South, six states. Most of the people (about 70%) are farmers. Various arable and permanent crops are cultivated by the farmers. They also raise livestock and poultry. Many also practice fishing and aquaculture. Most of the farmers are smallholder farmers who involve members of their households in various agricultural activities in which they are engaged.

The population for the study included all arable crop farmers in Nigeria who are registered with their respective Agricultural Development Programme (ADP) offices. A multistage random sampling method was employed to select one state each from the six geopolitical zones, totaling six states. From each selected state, two rural farming communities were randomly selected to arrive at 12 farming communities. From each farming community 10% of the farmers were selected randomly from the list of registered farmers accessed from their respective ADP office resulting to a sample size of 673 respondents (Table 1), but only 480 copies of the questionnaire could be retrieved, which represents a 71.3% response rate.

Primary data used for the study were collected from the respondents using a questionnaire and structured interview schedule administered by extension agents. The test-retest method was used to test reliability of the instrument. The results of the correlation between the first and second responses showed a high level of correlation for the structured interview schedule ($r = 0.821$) and the questionnaire ($r = 0.861$).

Data for the study were analyzed with the use of descriptive statistics such as frequency counts, percentages and 4-point Likert-type scale. The influence of socioeconomic characteristics of farming household heads on child labor in agriculture was tested using a logistic regression model. Though logistic regression is similar to linear regression, it was chosen for this study for the fact that

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TABLE 1: SELECTION OF RESPONDENTS.

GEOGRAPHICAL ZONE	STATE	COMMUNITY	No.	
			REGISTERED FARMERS	10 PERCENT
North-East.	Adamawa	Michika	532	53
		Potiskum	614	61
North-West.	Kano	Wudi	421	42
		Tofa	558	56
North-Central.	Plateau	Barkin Ladi	767	77
		Langtan	853	85
South-East.	Anambra	Igbariam	431	43
		Oguleri	366	37
South-West.	Osun	Iwo	342	34
		Ilesha	525	53
South-South.	Delta	Jesse	703	70
		Abavo	621	62
Total.	6	12	531,208	673

dependent variable was dichotomous. The binary response in this study was whether the respondents engaged their children who were less than 18 years old in agriculture related labor or not (Yes or No). The logistic model was implicitly stated as:

$$\ln \left[\frac{p_i}{1 - p_i} \right] = \alpha_i + \sum_{j=i}^n \beta_j X_{ji} + \varepsilon \quad \text{Equation 1}$$

The empirical model specifying engagement of children in agriculture related labor by the i^{th} farmer is explicitly specified as:

$$\ln \left[\frac{p_i}{1 - p_i} \right] = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon \quad \text{Equation 2}$$

Where:

- Y = engagement of children in agriculture (dummy)
- α_0 = constant term
- X_1 = gender (dummy)
- X_2 = age (years)
- X_3 = level of education (no. of years of schooling)
- X_4 = household size (no. of persons)

X_5 = farm income (₦)

X_6 = farm size (hectare)

X_7 = culture (individual respondent's grand mean of cultural reasons from Likert-type scale)

X_8 = economic reasons (individual respondent's grand mean of economic reasons from Likert-type scale)

X_9 = political reason (individual respondent's grand mean of political reasons from Likert-type scale)

ε = error term

Engagement of children of less than 18 years of age in agriculture related activity was regressed against the specified demographic characteristics of the arable crop farmers.

RESULTS AND DISCUSSION

Socioeconomic Characteristics of Farm Household Head (HHs)

Most (60.61%) of the farm household heads (HHs) were males, while 39.39% were females (Table 2), with an overall average age of 42.28 years. Most (65.0%) of the HHs had no formal education. However, 25% had primary education, 8.99% had secondary and 1.04% had tertiary education. This finding is congruent with that of Audu et al. (2010). Education is a good determinant of one's behavior. Education is expected to influence the attitude of HHs toward their children in relation to their farming business and their children's education and welfare. This is because education wields great influence on the perception and understanding of individuals.

Most (45%) HHs had a household size of 6 – 10 persons. The average household size is 11 persons. This implies large household sizes and low income; parents may find it difficult to cater for the members of their households. According to Jhingan (2000), increased household population swallows up increased output. This makes the farming HHs conscript his or her children into farming operations to save money for hired labor. The average annual income of stands at ₦192, 000. This implies low income. This is related to the size of their farm holdings. The farming HHs had an average of 1.3ha of farms. This implies that they were mostly small-scale farmers and indicates low output and income. Under such circumstance, the farming HHs find it difficult to meet the basic needs of their children. This confirms the findings of Audu et al. (2010) and Adeoti et al. (2013) who established that most of the Nigerian farms are small-scale. As small as their farm sizes are, they require additional labor from their households' members to meet the time requirements

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TABLE 2. SOCIOECONOMIC CHARACTERISTICS OF HOUSEHOLD NEEDS.

Variable	Frequency	Percentage (%)	Mean
Gender:			
Male.	291	60.61	
Female.	189	39.39	
Age:			
20 – 25.	31	6.46	
26 – 30.	69	14.38	
31 – 35.	71	14.79	
36 – 40.	83	17.29	
41 – 45.	87	18.13	42.28 years
46 – 60.	60	12.50	
51 – 55.	42	8.75	
56 – 60.	22	4.58	
Above 60.	15	3.13	
Level of education:			
No formal education.	312	65.0	
Primary school.	120	25.0	
Secondary school.	43	8.99	
Tertiary school.	5	1.04	
Household size: (No. of persons)			
1 – 5.	102	21.25	
6 – 10.	216	45.0	
11 – 15.	111	23.13	11 persons
16 – 20.	51	10.63	
Annual farm income: (₦)			
10,000 – 200,000.	317	66.04	192,000
210,000 – 400,000.	120	25.0	
410,000 – 600,000.	24	5.0	
610,000 – 800,000.	12	2.50	
810,000 – 1,000,000.	7	1.46	
Farm size:			
0.5 – 1 ha.	326	67.92	
1.5 – 2 ha.	121	25.21	1.13 ha
2.5 – 3 ha.	27	5.63	
Above 6 ha.	6	1.25	

SOURCE: FIELD SURVEY, 2013; ₦160 = US \$1

needed for the many farming operations. The use of simple implements by these farmers is time consuming and energy sapping. The farmer's decision to carry out the farm operations alone may result in the farmers not meeting the labor needs of the cropping season.

Child Labor, Age and Participation in Farm Operations

Table 3 indicates that the HHs used their children as laborers at different rates by age group: 6 and 9 years (30%), 10 to 13 (32.92%) and 14 to 17 years old (37.08) in field preparation. They were also involved in planting and weeding. The children also participated in all the farm operations, but those aged between 14 to 17 years participated most compared with those in the age ranges of 6 to 9 and 10 to 13 years. This confirms the findings of Adeoti et al. (2013) on the exposure of children to sharp farm tools and implements and chemicals that are injurious. Jackson – Michael (2013) states that the consequences of herbicides and pesticides on humans are especially alarming, as their effects are believed to induce devastating and lifelong diseases and deformities in children and unborn fetuses. Children applying chemical substances are exposed to immediate physical injuries such as skin burn (Adeoti et al. 2013) and sharp objects used as tools. It is of note that children are careless to the extent of not wearing the necessary protective gear. This is more so as the necessity of such safety gadgets cannot be overlooked. Implements on the farm may easily injure children in the process of using them. Involvement of children in these activities implies child abuse by the farming HHs.

TABLE 3. CHILD LABOR, AGE, AND PARTICIPATION IN FARM OPERATIONS

OPERATIONS	AGE OF CHILDREN		
	6 – 9 yr.	10 – 13 yr.	14 – 17 yr.
Field preparation.	144 (30.00)	158 (32.92)	178 (37.08)
Planting.	79 (16.46)	113 (23.54)	288 (60.00)
Weeding.	79 (16.46)	120 (25.00)	281 (58.54)
Pesticide Application.	153 (31.88)	160 (33.33)	167 (34.79)
Herbicide Application.	141 (29.38)	158 (32.92)	181 (37.71)
Fertilizer Application.	153 (31.88)	160 (33.33)	67 (34.79)
Harvesting.	108 (22.50)	159 (33.13)	213 (44.38)
Transportation.	152 (31.67)	160 (33.33)	168 (35.00)
Processing.	99 (20.63)	112 (23.33)	269 (56.04)

SOURCE: FIELD SURVEY 2013. FIGURES IN PARENTHESES ARE PERCENTAGES.

Schooling Pattern of Children Involved in Arable Crop Farming

Table 4 indicates that 43.33% of children were attending school and working on the farm. This implies that they either join the parents after schooling or attending to operations in the farm for some days and being absent from school for the period the operations last. Some (20.21%) of them work only in the farm and do not attend schools. The implication is that these children were from extremely poor homes where farming is at the peasant level. Situations like these create a future

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poor population. Many (36.46%) children were engaged in farming during holidays only. These findings corroborate those of Audu et al. (2010) and Adeoti et al. (2013) in their different studies in the Central Region of Nigeria and South-West Nigeria, respectively. Schooling and farming or farming only deprives the children of learning opportunities at school. These activities eventually lead to poor academic performance, academic wastage, high dropout rates and achievement deficits. This point supports IITA (2002) findings. Muhammed and Adeoye (2006) found that the obvious effects of abusive labor on children include poor school performance, academic wastage, and high rate of drop out, low retention of learned experience and achievement deficits.

TABLE 4. SCHOOLING PATTERN OF CHILDREN INVOLVED IN ARABLE CROP FARMING

	AGE OF CHILDREN			Total overall %
	6 – 9 yr.	10 – 13 yr.	14 – 17 yr.	
School and work.	25 (12.01)	17 (8.17)	166 (79.81)	208 (43.33)
Work only/no school.	9 (9.28)	15 (15.46)	73 (75.26)	97 (20.21)
School but work on holiday.	35 (20.00)	31 (17.71)	109 (22.70)	175 (36.46)

SOURCE: FIELD SURVEY, 2013. FIGURES IN PARENTHESIS ARE PERCENTAGES

However, UNICEF (2006) argues that traditionally children have worked with their families, learning skills that they would need as adults. ILO (2010) stated that some participation of children in agricultural activities can be positive as it contributes to the inter-generational transfer of technical and social skills and children's food security. This is true, but that does not mean that children should be exposed to hazardous operations. Such skills can still be learned and acquired without significant consequence to their academic pursuit.

Reasons for Engaging Children in Agricultural Activities

Table 5 indicates that cultural factor such as transmission of farming skills and knowledge from generation to generation, training of children to be independent in the future, exposure of children to intricacies of life, and transmission of norms and values to children were the reasons HHS reported for engaging children in agricultural activities. The traditional attitude toward children's participation in agricultural activities and its contribution to inter-generational transfer of skills form some causes of child labor (ILO 2010). Traditionally, rural citizens in Nigeria

believe that children should be exposed to agricultural activities to learn to be independent and have a good understanding of complexities involved in livelihood. They also consider involvement of children in agricultural activities as a way of transmitting the norms and values of the various communities to younger generations so that they (norms and values) may not be obliterated.

TABLE 5. REASONS FOR ENGAGING CHILDREN IN AGRICULTURAL ACTIVITIES

REASONS	SCORE	MEAN	CAUSE OF CHILD LABOR
Culture			
Transmission of farming skills and knowledge.....	1416	2.95	Cause
Training children to be independent.	1391	2.91	Cause
Exposure of children to intricacies of life.....	1379	2.87	Cause
Transmission of norms and values.....	1358	2.83	Cause
Economic			
High cost of labor.....	1465	3.05	Cause
High cost of living.....	1444	3.01	Cause
Low income.....	1450	3.02	Cause
Political			
Lack of political will to empower farmers.....	1505	3.14	Cause
Ignorance of policies of child labor.....	1620	3.38	Cause

NOTE: CUT-OFF MEAN = 2.50 (≥ 2.50 = CAUSE; 2.50 = NOT A CAUSE)

The economic factors considered as causes of child labor were high cost of labor, cost of living, and low income. This is in consonance with the ILO (2010) that observed that poverty and limited access to adult labor were also causes of child labor in agriculture. Limited access to adult labor connotes high cost of labor as so many young adults have emigrated to urban areas in search of better income yielding jobs. Ofuoku and Chukwuji (2012) found that rural-urban migration of young adults' labor affected negatively on plantation agriculture in the Niger Delta Region of Nigeria. Low income and high cost of living are considered as causes of poverty as the cost of available adult labor cannot be afforded by rural farming HHs.

Political factors that prompted child labor in agriculture included lack of political will by leaders to empower genuine farmers educationally and technologically, ignorance of farmers on government policies against child labor, and extant “political farmers.” According to ILO (2010), the limited coverage of agriculture and family undertakings in national labor legislation, limited unionization, and the low capacity of labor inspectors to cover remote rural areas makes the problem difficult to solve. Most of the farming HHs are either not literate or have low levels of literacy. This contributes to their ignorance on child labor legislation.

The little inputs empowerments (farm inputs such as seeds, fertilizers, etc., shared to small scale farmers subsidized fee) given by government to small-scale farmers are always hijacked by politicians who are not farmers, but are *political farmers*. These inputs end up being diverted to the few large scale farmers and sold above the government approved or subsidized price. From observation, there is also the dearth of extension agents to educate these farmers on this and related issues. Agbamu (2011) states that extension agents in Nigeria operate at the ratio of 1: 1,189 farm families. This is considered therefore as one cause of child labor in agriculture in Nigeria.

Socioeconomic Factors of Arable Farming Household Heads that Influence Child Labor in Agriculture

Table 6 shows that the estimated coefficients of the logit model do not have a direct interpretation. The measures that are familiar have marginal influences. The coefficients are transformed to indicate the odds ratio of arable farming HHs’ decision to engage his or her children in farm labor. Gender, age, level of education, household size, farm income and farm size were significant factors that influence HHs decision to involve his or her children in farm labor.

The interpretation of the significant variables indicate that the odds in favor of male HHs decision to engage his children in farming operations are estimated to decrease by 58% compared with female HHs. This implies that female HHs are more prone to decide to involve her children in farm labor. For a unit (years) increase in the age of HH, the odds in favor of deciding to involve his or her children in farm labor is estimated to increase by 95%. This supports the findings of Adeoti et al. (2013). This implies that the older the arable farming HH, the higher the odds in favor of engaging children in farm labor. The odds in favor of an educated arable farming HH to engage children in farm labor are estimated to decrease by 29% than for non-educated HH. This supports the observation that one

TABLE 6. ESTIMATION OF SOCIO-ECONOMIC ATTRIBUTES OF ARABLE FARMING HEADS OF HOUSHOLDS THAT INFLUENCE CHILD LABOR. ($n = 480$)

VARIABLE	COEFFICIENT	WALD STAT	
	(β)	(χ^2)	EXP.(β)
Constant.	1.060	1.51	0.055
X ₁ (Gender).	-0.544	-2.05	0.583
X ₂ (Age).	0.690	1.12	1.957
X ₃ (Level of education).	-1.231	-3.35	0.294
X ₄ (Household size).	1.034	2.93	2.804
X ₅ (Farm income).	0.629	3.16	1.875
X ₆ (Farm size).	1.003	4.46	2.724
X ₇ (Cultural factors).	0.026	0.13	0.029
X ₈ (Economic factors).	0.058	1.43	0.046
X ₉ (Political factors).	0.037	0.59	0.013

NOTES: LR $\chi^2 = 66.56$; Prob > $\chi^2 = 0.0002$; Pseudo $R^2 = 0.4142$; Log likelihood = -86.0121

cause of child labor in agriculture is limited access to quality education by farmers (ILO 2010). Household size, farm income, farm size, culture, economic factors, and political factors were the variables that increase the odds in favor of engaging children in farm labor. The implication is that the larger the household size, farm income, farm size, and the more serious they consider the culture, the more serious economic factors and political factors, the higher the likelihood to engage children in agricultural labor by arable crop farming HHs.

CONCLUSION

This study was conducted to determine the utilization of child labor in arable farming households in Nigeria. It was found that most household heads (HHs) were males, with an average age of 42.28 years for all HHs. Most HHs had little education. Most households were of the size of 6–10 persons. The average annual income of the households was ₦192, 000 and average farm size of 4.2 ha. Most of the farmers were therefore, small-scale farmers. The HHs involved their children of the ages of 6–17 years in various farm operations such as field preparation, planting, weeding, pesticide, application, fertilizer application and herbicide application. Other operations where children were involved included harvesting, transportation and processing. These chemicals may negatively affect children in the future. Most of the children attended school and worked on the farm alternately. Many of them were engaged in farming only during holidays, while a few of them did not attend school; school attendance among them was generally poor. Thus poor attendance to school will lead to loss of human capital formation and will affect

the future of these children negatively. The socioeconomic estimation revealed that HHs' decision to engage their children in farm labor was influenced by gender, age, level of education, household size, farm income, farm size, culture, economic factors and political factors.

Based on the aforementioned, it is recommended that extension agents should educate the farming HHs on the consequences of using children as farm labor, particularly in the application of chemicals. Concerned agencies need to enlighten the farming HHs on the dangers of involving their children in farming operations at the expense of their schooling. More extension agents should be trained and employed by the public extension agencies. Educational and input empowerment should be closely supervised by the commissioners of agriculture and should not be based on political party leaning. Here, the genuine beneficiaries should be identified and registered by extension agents free of charge to solve the problem of *political farmers*.

AUTHOR BIOGRAPHIES

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