# INTERNATIONAL JOURNAL OF AGRICULTURAL ECONOMICS, MANAGEMENT AND DEVELOPMENT (IJAEMD)

ISSN: 2141-7878

VOLUME 6 N0. 1 MAY, 2016

# **PUBLISHED BY**

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION, FACULTY OF AGRICULTURE, KOGI STATE UNIVERSITY, ANYIGBA, NIGERIA International Journal Of Agricultural Economics, Management And Development (ijaemd)

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# ISSN: 2141-7878

Printed by: EUNEEKS & ASSOCIATES No. 6 Cameroun Road by Junction Road Kaduna. 08025503795, 08037720550, 08066722356

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# DETERMINANTS OF POVERTY AMONG FARMING HOUSEHOLD IN KABBA/BUNU LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA

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#### ABSTRACT

The study analyzed the determinants of poverty among farming households in Kabba-Bunu Local Government Area of Kogi State, Nigeria. Primary data were utilized using a well-structured questionnaire which was administered to one hundred and twenty (120) respondents. Data collected were analyzed using descriptive statistics, Foster Greer and Thorbecke (FGT) index and Tobit regression analysis, The results revealed that majority of the households are headed by males, formally educated, married with a mean household size of 6 persons, the households mostly rely on uncovered well and use pit toilets. The household level of average income was used in the classification of the households into poor and non-poor, A World Bank Poverty line index of \$1.25 ( $\ddagger 210$ ) per day was drawn, 59.2% of the farming households are above the poverty line, The FGT decomposition showed that 41 percent of the households were poor with a poverty gap and severity indices of 0.12 and 0.05 respectively. The Tobit regression further revealed that household size ( $\alpha$ =0.05), gender of heads ( $\alpha$ =0.01), farming experience ( $\alpha$ =0.01), level of education ( $\alpha$ =0.01) and level of income ( $\alpha$ =0.01) have significant effect on poverty status. The study however recommends that Policies and actions which can improve of farming household's welfare should be made and taken in order to reduce dependency ratio among households thereby alleviating poverty.

# INTRODUCTION

Poverty is a situation or condition in which people are unable to meet the maximum basic requirements of shelter, food, clothing and education, Any household or individual with insufficient income or expenditure to acquire the basic necessities of life is considered to be poor Nigeria the world's most populated black nation has one of the world's highest economic growth rates (average of 7.4 percent over the last decades) 2010, and plenty of natural resources such as oil, However, More than 100 million Nigerians (62%) live on less than \$1.25 a day (World Bank, 2015). Hence in Nigeria, widespread and severe poverty is a reality. This reality depicts the lack of food, clothes, education and other basic amenities. Several poor people lack the most basic necessities of life to a degree that it can be wondered how they manage to survive.

Determinants Of Poverty Among Farming Household In Kabba/bunu Local Government Area Of Kogi State, Nigeria Mohammed, A.b, Oladeinde K.b, Ayanlere A.f And Ogedengbe J.s.

The bulk of agricultural production in Nigeria takes place in the rural areas and ironically, the level and incidence of poverty is very pronounced in these areas (National Population Commission, 2004). With the recognition by the Nigerian Government of the multi-sectoral and multi-dimensional nature of poverty, a number of coordinated programmes and policies had been formulated to combat poverty in all its ramifications. Some of these measures and programmes include the National Poverty Eradication Programme (NAPEP), the National Economic Empowerment and Development Strategy (NEEDS) (National Bureau of Statistics, 2006). The procurement of 12 billion Naira worth of fertilizer between years 2000- 2003 at 25% subsidy to farmers was especially targeted at reducing poverty amongst the farming households also In 2005 the sum of N50 billion was set aside as credit to farmers at a concessionary interest rate of 8%.

The Kogi State Government also made efforts to reduce poverty in the state by procuring and distributing fertilizer and other inputs to farmers' cooperatives at highly subsided rates. Despite these efforts, Kogi state has the second highest poverty incidence ratio of 87.46% in Nigeria and it also has the highest poverty gap and poverty severity ratios of 0.5346 and 0.3619 respectively compared to Nigeria's national average poverty gap and poverty severity of 0.2101 and 0.1191 respectively JICA (2011).

The spread and severity of poverty is of great concern to many nations and the world over. Hence, the need to alleviate it arises as the measures adopted have not been able to slow down the soaring level of poverty in Nigeria. Further Reflecting on the theme of the World Vision 2020 Africa conference held in Uganda and The United Nation general assemblies' summary of the Millennium development goals, reducing extreme poverty and hunger by half by the year 2015 was the first among the eight millennium development goals to be addressed (Vincent, 2006).

This suggests that identifying the determinants of poverty and a thorough understanding of poverty, amongst farming households is crucial to formulating an effective strategy for reducing poverty and for designing social protection programs. In view of this, the need to examine the determinants of poverty among farming households in Kabba/Bunu local government area of Kogi State becomes imperative

The specific objectives are to:

- 1. describe the socio-economic characteristics of the farming households in the study area;
- 2. determine the poverty level of the farming households in the study area;
- 3. identify the determinants of poverty among farming households in the study area; and
- 4. Identify poverty coping strategies in the study area.

# (2)

# **Concepts of Poverty**

Any household or individual with insufficient income or expenditure to acquire the basic necessities of life is considered to be poor (Aigbokhan, 2008, NBS, 2012a). A person is considered poor if his or her income level falls below some minimum level necessary to meet basic needs. This minimum level is usually called the "poverty line" and it is what is necessary to satisfy basic needs which vary across time and societies. Therefore, poverty lines vary in time and place, and each country uses lines which are appropriate to its level of development, societal norms and values. The use of the income-poverty approach, or the poverty line, is strengthened by the fact that the majority of national governments and development agencies use the concept for their analyses of poverty and antipoverty policies (Lisa, 2005; Nwaobi, 2003). The World Bank now defines extreme poverty as living on less than US\$1.25 per day, hence the use of \$1.25 a day has been gained popularity as the new international benchmark for poverty measurement (Ravallion et al., 2009).

*Nsikak and Edet (2013) studied the determinants of rural poverty in Nigeria and t*he Result of Tobit regression analysis showed that increased farm income, farm size and amount of agricultural loan led to a decrease in the level of poverty and also Membership of the cooperative by household heads, ownership of certain assets, access to extension services, and modern farming inputs, increase in educational attainment and male heads of households decreased the likelihood of being poor.

Akinbode (2013) while studying the **Profiles and Determinants of Poverty among Urban Households in South-West** results revealed that majority of the households relied on water from boreholes for drinking, disposed refuse in undesignated places and patronized nearby drug stores when they are ill in place of proper diagnosis and treatment in hospitals. The FGT decomposition from the study showed that 34 percent of the households were poor with a poverty gap and severity indices of 0.11 and 0.06 respectively. The study further corroborated that educational level of heads, household size, and gender of heads, dependency ratio and access to credit exerted significant effect on household poverty status in the study area.

# METHODOLOGY

The study was conducted in Kabba/Bunu Local Government Area of Kogi State Nigeria in 2014, Kabba/Bunu LGA lies between the latitude 7°N and 31°N of the equator and longitude 5°41'E and 6°15'E. it is located in the Southern guinea savannah zone of Nigeria. It has a mean annual rainfall of 1017 mm to 1528 mm and temperature of between 25°C to 28°C but it rises to 36°C in March with relative humidity between 25% to 35% in April to July (KCA/DAC/ABU Meteorological Station, 2010) and it has an estimated population of 145,446 in which males are about 74,289 and females are 71,157 respectively (National Population Census, 2006).

The people have similar culture like the Yoruba people from the Western Nigeria and the local government shares boundaries with Okene, Ijumu, Lokoja L.G.A's of Kogi state and Omuo-Ekiti in (Ekiti state).

Majority of the inhabitants are farmers who plant yams, maize, sorghum, sweet potato, cassava, etc. and reared animals such as cow, poultry, pig, sheep, goat, etc while minority are engaged in business and civil service works (federal, state and local government).

# **Sampling Techniques**

The units of analysis in consideration were farming households irrespective of the types of farming they engaged in and crops grown. A two stage random sampling technique was adopted for the study, the first stage involve a random selection of five villages, in the second stage 24 farming households were selected from each of the villages bringing the sample size to one hundred and twenty (120) respondents.

Primary data were used for this study and were obtained through structured questionnaires.

Data collected were analyzed using descriptive statistics such as frequency, percentage and means which were used to describe the socio economics characteristics and the poverty coping strategies of farming households in the study area, Foster, Green and Thornbecke (FCT) Index was used to determine the poverty level of farming households in the study area. Tobit regression analysis was used to identify determinants of poverty in the study area.

# Method of data analysis

Frequency tables and percentages were used to describe the socio-economic characteristics of respondents, their housing and living situation, health services patronized and poverty coping strategies etc.

FGT: The FGT poverty index was used to assess the poverty situation of households within the study area. The FGT poverty index is a family of additively decomposable measure of poverty which was proposed and developed by Foster J, Greer J, and Thorbecke(1984). This is the generalized measure of poverty which measures the outfall from the poverty line and also considers inequalities among the poor. The higher the FGT statistic the more there is poverty in a society.

The headcount ratio measures the percentage of population below the poverty line while the poverty gap measures depth of poverty (Aigbokhan, 2008). The headcount ratio is express as;

H = Q/N - 1

Where:

H = Headcount ratio with values ranging from 0 to 1. The closer the ratio is to 1, the higher the proportions of people below the poverty line.

Q = Numbers of household below the poverty line

# (4)

N = Total number of household in the population.

The poverty gap is measured as follows:

 $P_a = \dots 2$ 

Where

P=Poverty gap

Z = Poverty line (\$1.25 equivalent to N210 Nigerian currency, at \$1 = N168 exchange rate)

Q = Number of household below poverty line

 $\dot{Yi} =$  Income of the  $i^{th}$  household

 $\dot{\alpha}$  = The FCT parameter with values from 0, 1, and 2

n=Total number of population studied.

# **Tobit Regressions Analysis**

The implicit form of the model is expressed as follows:  $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, U)$  Y = Household level of poverty (poor = 1, otherwise = 0)  $X_1 = Age (years)$   $X_2 = Household size (numbers)$   $X_3 = Gender (male = 0, female = 1)$   $X_4 = Farming experience (years)$   $X_5 = Educational level (years spent in formal education)X_6 = Expenditure on food (\mathfrak{H})$   $X_7 = Farm size (ha)$   $X_8 = Extension contact (no of visit)$   $X_9 = Land ownership (own = 1, otherwise = 0)$   $X_{10} = Income level (\mathfrak{H})$ 

# **RESULTS AND DISCUSSION**

# Socioeconomic characteristics

The results obtained revealed that majority (66.7%), of the household heads were male. This is usually the typical and natural household structure in traditional African setting and in most other continents of the world. Females only become the household head in the event of death of the husband, separation or outright divorce this study; this result conforms to the findings of **Akinbode**, (2013) that males dominated the agricultural labour force.

The study further revealed that the average age of the sampled farming household heads was 46years and that (91.67%) of the household heads have been married, this reflects in the average households size of 6 persons in the farming households which is fairly large and is expected to have a multiplier effect on the poverty status of the respondents. Meanwhile, over 79 percent of the respondents were young and still in their active working age.

Majority (83.3%) of the farming households heads had a form of formal schooling, and More than half (58%) of them acquired their farm lands by inheritance, and much of which (62.5%) of them cultivated between 1-2ha, with a group average of 1ha, which thus implied that they are small-scale farmers, even though they had

more access to land in the study area.

Majority (79%) of the farming household heads had been in the business of farming for over 11 years, had their sources of finance through personal savings and family friends and expectedly do not belong to a cooperative society.

The frequency, average values and percentage distribution of the socio-economic characteristics of the farmers are presented in table 1.

Variables	Frequency (N=120)	Percentage	Mean
Sex			
Male	76	63.33	
Female	44	36.67	
Age			
20 - 29	5	4.17	
30 - 39	35	29.17	
40 - 49	55	45.83	46
50 -59	20	16.67	
>60	5	4.17	
Marital Status			
Single	10	8.33	
Married	110	91.67	
Level of Education			
Non Formal Education	20	16.67	
Primary	40	33.33	
Secondary	50	41.67	
Tertiary	10	8.33	
Household Size			
1 – 5	60	50	
6 - 10	40	33.33	6
>11	2	16.67	
Farm Size			
1 - 2	75	62.50	1
2.1 - 3	25	20.83	
>3.1	20	16.67	
Farm Experience			
1 - 10	25	20.83	
11 - 20	60	50	20
21 - 30	20	16.67	
>31	15	12.5	
Membership of Cooperative			
Yes	30	25	
No	90	75	
Annual Income (₦)			
10000 - 80000	29	24.17	
81000 - 110000	67	55.83	99083.33
110000 - 140000	17	14.17	
Above 141000	7	5.83	

Table 1: Socioeconomic characteristics of the respondent in the study area

Source: Field Survey, 2014

# **Poverty Indicators**

**The study looked into the levels** of poverty indicators of the farming households in the study area and the results are presented on table 2

 Table 2: Poverty Indicators (Living Conditions)

Variables	Frequency	Percentage
Land Ownership Structure		
Inheritance	70	58.33
Purchase	20	16.67
Rent	30	25
Sources of Credit		
Family and Friends	30	25
Personal Saving	60	50
Cooperative	20	16.67
Loan from Bank	10	8.33
Type of Houses	= ^	
Face-to-face	50	41.67
Boys quarters	30	25
Flat	25	20.83
Duplex	11	9.17
Mansion	4	3.33
Ownership status		
Owner	30	25
Tenant	70	58.33
Owned by relatives (not paying)	20	16.67
Monthly rent payment		
500 - 1,000	14	11.67
1,001 - 1,500	40	33.33
1,501 – 2,000	30	25
2,001 - 2,500	20	16.67
2,501 above	16	13.33
Source of drinking water		
Uncovered well	70	58.33
Borehole	20	16.67
Pipe borne water	5	4.17
Tanker/truck supply	10	8.33
Hawked package water	15	12.5
Types of toilet use		
Modern toilet	20	16.67
Pit toilet	70	58.33
Bush open refuse dump	30	25

Source: Field survey, 2014

(7)

Result on table 2 shows that most (41.67%) of the farming households lived in multi-tenanted (face-to-face) type of houses, while others lived in boys quarters, flats, duplex and in mansions. This implies that majority of the farmers lack houses of their own in the study area. This conforms to the data from National Bureau of Statistics (NBS), (2012b) that Majority 58% of household in Kogi State live in multi-tenanted in 2008.

Expectedly More than half (58.33%) of the farming households were tenants in the study area and paid between N1,000 - N1,999 as house rent with a mean house rent of N1,600 monthly in the study area.

Uncovered well 58.33%, borehole 13.33% and package water 12.50% were the major sources of drinking water for the farming households but very few obtained water from commercial water truck and pipe borne water. This implies that access to safe and treated water is limited in the study area.

Most of (58.33%) of the respondent defecated in pit toilets, 25% used bush/open refuse dump while 16.67% used modern toilet in the study area. This also conforms to NBS (2012b) statistical reports that Most Households in 2010 residing in Kogi state used open refuse and Pit latrine, implying that environmental pollution caused by the improper disposal of faecal materials which can lead to outbreak of diseases that can cause their cost of Living to increase is imminent in the study area.

# Level of Poverty among Farming Household in the study area

The distribution of the farming households in the study area by their poverty status is shown in Table 3.

S/N	Category	Frequency	Percentage %	Estimated mean daily income
i.	Poor	49	40.8	<del>N</del> 135.73
ii.	Non Poor	71	59.2	<del>N</del> 271.46
iii.	Total (Poverty line)	120	100	<del>N</del> 210

 Table 3: Incidence of poverty among Farming Households in the Study Area

# Source: Data Analysis 2014

A Poverty line was estimated using the World Bank Poverty line index of 1.25 US Dollar (N210) per day, only 40.8% of the households in the area with mean daily income of N135.73 are below the poverty line, while 59.2% of the household are above the poverty line index with a mean daily income of N271.846. This implies that the households in the area are relatively not poor.

Table 4 provides information on the poverty incidence, depth and severity in the study area				
Poverty Measure/Statistics	Sample Value			
Headcount Index (H) (Poverty incidence)	0.41			
Poverty Gap index (P) (Poverty Depth)	0.12			
Foster-Greer-Thobecke(Pa) (Poverty Severity)	0.05			
<b>Computed from field survey ₩</b> :\$ = 168:1	Poverty line (z) = N210			

# Table 4: Incidence, Depth, and Severity of Poverty

Result of analysis shows a poverty incidence (head count) index value of 0.41 implying that 41 percent of the sampled households were poor. The poverty depth value was 0.12 implied that an average poor household in the study area has to mobilize resources up to 12 percent of the poverty line i.e. \$1.25 (N210) which translates to N25.20 (or US\$0.15) per person per day in order to escape poverty. It is therefore clear that poverty is present among the sampled households in Kabba, North Central Nigeria. The poverty severity index value of 0.05 shows the seriousness of poverty in the study area and that about 5% inequality exists among the poor farming households in the study area. The closer the value of this index to one (1) the serious the poverty in the area.

The poverty incidence, depth and severity indices of 0.41, 0.12 and 0.05 respectively computed from this study is lower, and does not conform to the poverty incidence, depth and severity indices of 0.875, 0.5346 and 0.3619 respectively which JICA, (2011) reported for Kogi State. However the computed poverty indices is closer to the poverty indices JICA (2011) reported for Ekiti state, for instance the poverty incidence index of 0.3551 shows that the percentage of households that are poor in Kabba-Bunu Local Government Area is 6% lower than that of Ekiti State, the poverty gap and poverty severity index reported for Ekiti State by JICA (2011) is 0.1181 and 0.0479 respectively and is approximately equal to 0.12 and 0.05 the (Computed poverty depth and severity respectively), and implies that the closeness of Kabba-Bunu Local Government Area to Ekiti state has an effect on the poverty status of farming households in the study.

This means that though poverty exists among the farming households in the study area there is relatively low level of poverty among farming households in Kabba/Bunu LGA.

# 4.3 Determinants of Poverty

Table 5 presents results of the determinants of poverty of the farming households in the study area.

Table 5: Tobit Regression Analysis of the Determinants of Poverty by Farmers in the Area				
Variables	Regressions Coefficient	Standard Error	t – value	
Constant	-2.82800	12212.4	-0.00	
Age	-0.1457	0.1391	-1.047	
Household Size	0.3193	0.1653	1.9309*	
Gender	-0.4277	0.1302	-3.2849***	
Farming Experience	-0.3494	0.1421	-2.4583***	
Level of Education	0.2377	0.0771	3.0797***	
Farm Size	-0.0954	0.0804	-1.1857	
Extension Contact	0.0470	0.0790	0.5945	
Land Ownership	-0.0595	0.0613	-0.9699	
Level Income	0.3954	0.1103	3.5823***	
Log Pseudo likelihood	-185.857			
Wald chi <sup>2</sup>	12.78***			
Pseudo R <sup>2</sup>	0.1346			
C	1014.			

Source: Field Survey, 2014;

\*\*\*= Significant at 1%; \*\* = Significant at 5% level and \*=significant at 10% The Tobit regression analysis reveals that Gender, farming experience, level of education, and income level are significant at 1%.

Gender is negatively significant at 1%. Gender being a dummy variable (where male headed households were score "0" and female headed households scored "one" returning a negative coefficient implies that poverty is more in male headed households compared with female headed households". This is consistent with what was obtained by Ogwumike and Abodein (2003) and Awotide (2012) that poverty incidence is high among the male headed households in Nigeria.

Farming experience has negative coefficient. This implies that a unit increase in farming experience will reduce the poverty level of the farmers and means that as farmers advance in more production yearly they are exposed to measures to increase their productivity and hence their poverty level decreases.

Expectedly Education enhances the farmer's efficiency in doing things, but the results revealed the level of education to be positively significant at 1%. This means that a unit increase in the level of education will increase the level of poverty of the farmers. However the results conform to results from (Akinbode 2013 and

Olorunsanya *et al.*, 2011) who found education level to be a significant determinant of poverty.

Also, level of income has positive coefficient this also implies that an increase in income will increase the level of poverty of farmers in the area. This result was not also expected but it can be due to other external unaudited expenses that such as adultery, drinking and increasing more wives etc. some of which can increase the household size and household expenses and hence increase the poverty status of the households and it may be as a result of the fact that the farmers did not disclose their real income for fear of taxation.

Household size is positively significant at 10% level of probability. This implies that as household size increases the probability of a farmer falling below the poverty line also increases. The coefficient value of 0.319 implies that an increase in the household size by one person increases daily per capita expenditure by \$39.91 (US\$0.23), this means that the larger the household, the greater will be the total consumption needs and thus, the higher the poverty status of the household.

#### Poverty Coping Strategies in the Study Area.

Result presented on table 6 reveals the poverty coping strategies farming households adopt in the study area, the major ones are reducing the frequency of eating per day, eating of less preferred food and purchasing of food on credit.

Coping strategies	Frequency	Percentage (%)	Rank
Reduce the frequency of eating per day	110	91.67	1
Eating of less preferred food	100	83.33	2
Purchase food on credit	90	75	3
Seeking help from friends/relatives	82	68.33	4
Consuming of stored food product meant for	80	66.67	5
planting			
Engaged in non-farming activities	78	65	6
Borrowing money from co-operative	70	58.33	7
Family planning/use of contraceptives	68	56.67	8
Withdrawing children from private to public	60	50	9
school			
Selling off farm implements/assets	50	41.67	10
Withdrawing children from school	56	46.67	11
Children hawking	40	33.33	12
Result to fasting and prayer	35	29.17	13
Source: Field survey, 2014			

#### Table 6: Poverty Coping Strategies in the study area

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This is consistent with what was obtained by **Ibrahim (2008) and JICA (2011) that farming household mostly skip meals and reduce the quantity and frequency of eating the meals.** These common practices will obviously result into a situation of hunger and malnutrition especially for the younger members of the households.

The farming households also seeking help from friends/relatives, consumption of stored products meant for planting, engaging in non-farming activities, borrowing money from co-operatives, family planning/use of inceptives, withdrawing children from private schools to public schools and withdrawing children from school, selling off farm implements/assets and allow their children to hawk to cope with poverty.

#### **CONCLUSION AND RECOMMENDATIONS**

A noticeable proportion of households in the study area reside in substandard living conditions in which germane issues such as sources of drinking water and faecal wastes disposal methods are below acceptable standard. The study has been able to reveal that farming households in the study area are relatively not poor with 59.2% of the households above the poverty line and poverty bites harder on male headed households, larger households and less experienced farming households. These findings are expected to be useful to policy makers and intervention organizations towards alleviating poverty in the area and in the country as a whole. Based on its findings this study recommends that Sensitization on the family planning methods should also be done in the study area to keep farming household sizes in check thereby reducing poverty level.

Mortgage loans should be distributed to the farmers to build their own houses, Boreholes drilling and other innovations that will increase access to quality water for consumption, should be done increase their access to quality drinking water, public toilets also should be built and farming households should be sensitized on proper hygienic conditions and reduction of environment pollution will improve the welfare status and hence reduce poverty level of the farming households.

Directional policies such as training of farmers should be tailored more towards males and Incentives such as Fertilizers, Improved Seeds, and farm inputs should be provided to farmers so that Farming households can embark on mass production of food crop so as to make the food available and affordable and live above the poverty line.

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International Journal Of Agricultural Economics, Management And Development (ijaemd)

# FARM INCOME INEQUALITY IN SMALLHOLDER IRRIGATION SYSTEM IN WETLANDS OF NORTH-EASTERN NIGERIA

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# ABSTRACT

Smallholder irrigation system in Nigeria is characterised by an integration of cash cropping and subsistence food cropping activities. In the wetlands of North-eastern Nigeria, the system is dominated by the production of cereals and vegetables. In this study, we use survey data from 182 randomly selected farmers to determine income inequality using Gini coefficient. Furthermore, the income levels were regressed on a set of explanatory variables. Results revealed that overall, income inequality is high in the study area. Further decomposition based on cropping system recorded a higher income inequality value for mixed cropping system than for sole cropping system. Farm size, farmers' age, farm investment, cropping system and household size, were found to be important determinants of farmers' income levels. The results suggested policies aimed at increasing technical and financial support to improve farmers' productivities which could be derived from improved irrigation development.

Keywords: Smallholder, irrigation, Gini coefficient, wetlands and inequality.

# INTRODUCTION

In recent years, factors like increasing population, income growth and enhanced purchasing power of people has pressured agriculture to produce more to meet food requirements (Tanwar *et al.*, 2014). This could be achieved either by putting more area under cultivation or by increasing the productivity through irrigation, cropping intensity and soil fertility enhancements (Tanwar *et al.*, 2014). Since water is a crucial input for improving agricultural productivity, and is essential for all human, animal and plant life as well as for most economic activities (Meinzen-Dick and Rosegrant, 2001), it is expected that more efficient utilization of available water resources has the potential to improve food security, especially in rural areas where majority of the food insecure population depend on rain-fed agriculture for their livelihood (Liu *et al.*, 2008).

Historically, irrigation originated as a method for improving natural

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production by increasing the productivity of available land and thereby expanding total agricultural production-especially in the arid and semi-arid regions of the world (Bhattarai et al., 2002). Irrigated agriculture is one of the critical components of world food production, which has contributed significantly to maintaining world food security and to the reduction of rural poverty (Bhattarai et al., 2002). Furthermore, irrigated agriculture significantly contributes towards generating rural employment, thereby maintaining and improving rural livelihoods. In Nigeria, smallholder agriculture, being the dominant occupation of rural communities is mainly rain fed, characterized by rudimentary technologies, vagaries of weather, poor capital formation and low productivity. Yet, Nigeria has a potential comparative advantage in irrigated agriculture, using under-ground and surface water, which are underdeveloped (World Bank, 2001). According to NINCID (2009), 39% of Nigeria's land mass is potentially suitable for agriculture and out of this, between 4.0 and 4.5 million ha (approximately 4.5 to 5.0% of the land) are judged suitable for irrigated agriculture but only 1.1 million ha can be supported fully by the water available, the remaining 3.4 million habeing Fadama. Fadamas are flood plains and lowly areas underlined by shallow aquifers and found along Nigeria's river systems (Blench and Ingawa, 2004). From an agricultural standpoint, most floodplains/wetlands have good potential for expanding and intensification of agriculture, their major advantages being water availability and relative fertility of their soils. In recognition of the importance of irrigation and Nigeria's potential, the Federal Government launched an investment program in the 1970s to support the formal irrigation sector by establishing various public irrigation schemes around the country (FAO, 2004). Unfortunately, these large irrigation schemes were short-lived and unsuccessful due to a number of factors, including the lack of a coherent irrigation subsector, development policy and strategy and inadequate funding (FAO, 2004). As a result of the failure of most formal irrigation schemes in Nigeria, it was suggested that irrigation development planners should pay more attention to the improvement of small-scale irrigation schemes, building on simple technology, low capital investments and application of proven indigenous knowledge (Baba et al., 1998). Consequently, the Nigerian government initiated 'National Fadama development Projects' in the early 1990s. The first Fadama Development Project (Fadama I) was implemented between 1993 and 1999. The project was to develop small-scale, simple, low-cost, farmer managed irrigation scheme under the World Bank financing (Dauda et al., 2009). Following the widespread adoption of the Fadama technology, farmers realized income increases of up to 65% for vegetables, 334% for wheat and 497% for rice (Adesoji et al., 2006). As a result of the overall positive impacts of the project, the Nigerian government continued to gain the support of the World Bank in implementing further "Fadama" development projects (Van koppen et al., 2005).

Globally, poverty and income inequality have been identified as major limitations to economic development and growth (Awotide et al., 2015). In Nigeria, incomes and productivity in rural areas are low (Simonyan and Omolehin, 2012), hence, poverty and income inequality appear to be a rural phenomenon. For instance, in 2006 the Gini coefficient was 0.5541 for the urban areas and 0.5187 for the rural areas, while the national Gini-coefficient was 0.4882 (NBS, 2006), indicating a high level of uneven distribution of income in the country. This finding is quite worrisome because one of the consequences of high income inequality in the opinion of Aigbokhan (2000), is that it may generate social conflict over dimensional issues that diminish the security of property rights, thereby lowering investment and economic growth. The analysis of income inequalities in agriculture usually takes place at country levels (Keeney, 2000). However, income inequality within and across regions, i.e. the spatial distribution of income inequality, is relevant for policy makers and other stakeholders (Finnie, 2001; Lynch, 2003; Mishra et al., 2009). Understanding farmers' income levels as well as income inequality and its consequences on agricultural production may provide insight in formulating agricultural and rural policies which could help improve the statuses of poverty stricken individual farmers and farming households. Governmental interventions in agriculture have a wide range of economic, social and environmental objectives (Finger and El-Benni, 2011). Among these, many countries have typically framed income objectives of agricultural policies in terms of distribution or equity (OECD, 1998; Moreddu, 2011). This is because a particular goal of agricultural policies is the support of low income groups or disadvantaged areas to reduce inequality and ensure sufficient incomes for all farmers (Finger and El-Benni, 2011). Evidence has shown that Irrigation has contributed significantly to increasing farm income, reducing income inequality and reducing poverty in irrigated agriculture in Asia (Bhattarai et al., 2002).

The Gini Coefficient is the most widely used measure of income and wealth inequalities, and several authors have studied income inequality in the context of agriculture using this technique. Bhattarai *et al.*, (2002) conducted a comprehensive study of **irrigation impacts on income inequality and poverty alleviation in Asia**. Their study revealed that on average, income inequality in irrigated agriculture is much less than in rain-fed agriculture. For more studies on income inequality, see Hemaratne *et al.* (1991); Hossain *et al.* (2000); Ogunniyi *et al.* (2011); Ayinde *et al.* (2012) and Agwu and Oteh, (2014). Against this backdrop, this study was aimed at examining the socio-economic characteristics of irrigation farmers in the study area, identifying cropping systems in the study area, and to

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determine farm income inequality including its contributing factors among smallholder irrigation farmers in the study area.

# METHODODOLOGY

#### The study area

The study was conducted in the Hadejia-Nguru wetlands located in the middle part of the Komadugu-Yobe basin in the north-eastern Sahel zone of Nigeria. Occupying an area of approximately 3,500km<sup>2</sup>, it is located between latitudes  $12^{\circ}15$ 'N to  $13^{\circ}00$ 'N and longitudes  $10^{\circ}00$ 'E to  $11^{\circ}00$ 'E (Ezra *et al.*, 1992). Rainfall in most cases starts from May and extends to September over October, with average rainfall ranging from 500mm to 700mm per annum (Okali and Bdliya, 1998). The dry season usually extends from October to April, average temperature ranges from about 45°C between April and May and about 19°C during the extreme cold season (Okali and Bdliya, 1998). Available population estimate for the wetlands based on an aerial census by Chiroma and Polet (1996) is 1,235,754 with the rural population of 873,690 constituting 71 percent of the total wetlands populations. The wetland's economy is based on crop cultivation in form of rainfed, irrigation or 'Fadama' cropping and recession farming, pastoralism and fishing. According to Hollis et al. (1993) total cultivated area in the Hadejia-Nguru floodplain is estimated at about 230,000 hectares, of which approximately 77,500 hectares occurs in the dry season.

# Source of data

Multi-stage sampling technique was adopted for this study. In the first stage, ten villages were purposively selected from the wetlands shared by Jigawa and Yobe states, Nigeria. The villages were selected based on the intensity of irrigation farming. In the second stage, a random selection of 20 irrigation farmers were selected from each of the ten communities, making a total of 200 respondents. Lists of members of irrigation farmers associations obtained from all participating villages served as the sampling frame. Primary data were collected through the administration of structured questionnaires. However, some questionnaires were discarded due to inconsistencies, so, only 182 questionnaire were considered for analyses.

# Data Analysis and Models specification

Gini Concentration ratio was used to measure income inequality. The Gini index ranges from zero to unity. The closer to zero, the more equal is the distribution of income and unity as it tends to extreme inequality. Following Dogondagi and Baba (2009), the Gini concentration ratio is specified as follows:-

 $G = 1 - \sum XY$ -----(1)

Where;

G=Gini Coefficient

X = Percentage of farm income recipients

Y = Cumulative percentage of aggregate farm income

Linear multiple regression analysis was used to identify determinants of income inequality. Linear functional form was chosen due to its simplicity and flexibility. The implicit functional form of the equation is specifies as:-

 $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e) -----(2)$ 

Where;

Y = Total farm income (N)  $X_1 = Farm size (Hectares)$   $X_2 = Age of farmer (years)$   $X_3 = Highest educational attainment$   $X_4 = Farming Experience (Years)$   $X_5 = Household size (Number of persons)$   $X_6 = Extension Contact (Number of contacts in the season)$   $X_7 = Credit Access (Dummy; Yes = 1 and No = 0)$   $X_8 = Cropping System (Dummy; Mixed system = 1 and sole system = 0)$   $X_6 = Farm Investment (N)$ 

e = Stochastic error term.

# **RESULTS AND DISCUSSION**

#### Socio-economic characteristics of smallholder irrigation farmers

A summary of socio-economic characteristics of the sampled farmers is presented in Table 1.

Table 1: Socio-economic characteristics of smallholder irrigation farmers in wetlands of North-eastern Nigeria. (N=182)

Characteristics	Mean	Mode	<b>Standard Deviation</b>
Gender	-	Male	-
Age	49.20	50	10.91
Marital Status	-	Married	-
Highest Educational attainment	-	No basic education	-
Farm Size	1.21	0.81	0.68
Household size	11.75	8	4.89
Farming Experience (yrs)	24.85	30	10.50
Cropping System	-	Sole	-

Source: Field Survey, 2009.

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The study revealed that male farmers dominated the study area, with an average age of 49 years and had spent at least 25 years cultivating 0.81 ha of farmland. Therefore, it could be assumed that most of the farmers were still in their active ages, and have the strength to carry out the laborious activities involved in agricultural production as well as having positive mindsets to make rational decisions and choices regarding their farm responsibilities. Sole cropping was the dominant system in the study area.

# Cropping systems identified in the wetlands of North-eastern Nigeria

The crops and their total areas cultivated during the 2009 irrigation season are presented in Table 2.

		-			
Sole Enterprises		ises	Mixed Enterprises		
Enterprise	Area cropped	Proportion of	Enterprise	Area cropped	Proportion of
	(ha)	Total Area		(ha)	Total Area
		cropped (%)			cropped (%)
Maize	71.30	28.5	Hp/O/P/T	10.53	10.2
Onion	5.52	2.2	Hp/M/Wm	6.07	5.9
Pepper	29.67	11.9	Hp/P/T	35.60	34.3
Rice	107.72	43.0	M/P/T	5.67	5.5
Tomato	18.07	7.2	Hp/P	7.85	7.6
Watermelon	5.84	2.3	P/T	21.41	20.6
Others	12.34	4.9	Others	16.58	15.9
Total	250.46	100.0	Total	103.71	100.0

Table 2: Distribution of cropping system by smallholder Irrigation farmers in wetlands of North-eastern Nigeria (N = 182)

Source: Field survey, 2009.

**Note:** Hp – Hot pepper, M – Maize, O – Onion, P – Pepper, T – Tomato and Wm – Watermelon.

The cropping systems identified in this study were sole cropping and mixed cropping. Crop outputs are subject to changes due to factors like pests, disease and weather. A common practice adopted by farmers in order to minimize risks and losses so as to achieve the objective of income generation and food security is mixed cropping. Mixed cropping is the practice of cultivating more than one crop on a piece of farmland at the same time. The farmers cultivated various crops under both systems, however, only predominant ones are considered, for ease of presentation. It can be observed from Table 2 that at least 6 different enterprises were identified in both systems. The predominant crops, based on their total areas cultivated, included sole Rice and Pepper-based plots for mixed system. Farmer planted as many as four different crops in a plot.

# Income distribution in smallholder irrigated system in Hadejia-Nguru Wetlands.

Table 3. Descriptive statistics of Income distribution in smallholder irrigation systems in the Hadejia-Nguru wetlands.

Overall Irrigation Syst	em (N = 182)	Mixed System ( $N = 52$ )	Sole System (N = 130)
Statistics	Income ( <del>N</del> )	Income ( <del>N</del> )	Income (N)
Mean	196373.21	267500.97	167922.11
Minimum	-65806.18	- 1636.12	-65806.18
Maximum	798463.89	674752.46	797463.89
Standard Deviation	144839.09	144149.96	135516.16
Gini Coefficient	0.60	0.66	0.58

#### Source: Field survey, 2009.

Results in table 3 reveal that smallholder irrigation farming generated a mean net farm income of N196,373.21. Highest income earned was N798,463.89. Some farmers experienced losses as revealed by the negative net farm income values. Possible reasons could be due to yield losses and inefficiency in the use of resources. These results indicate that it is quite possible, but not inevitable for irrigation farming to be unprofitable. Income inequality measured using Gini Concentration Ratio revealed that the overall income inequality was as high as 0.60, which means that income from smallholder irrigation is unequally distributed in the study area. This finding is higher than values of 0.30 and 0.52 reported by past studies (Janaiah *et al.*, 2001 and Dogondaji and Baba, 2009). A further decomposition of income inequality revealed that revenue from sole system was more equally distributed than it was for mixed system. The explanation for this result could be due to factors like types of crops cultivated, farm size and variations in efficiency of input use. These factors can result in different productivity levels

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thereby justifying reasons for the disproportionate shares of monetary benefits from irrigation. The study observed that majority of the farmers in the Hadejia part of the wetlands cultivated cereals and watermelon, mostly under sole systems, in contrast, most of the farmers in Nguru part cultivated vegetables, which are regarded as high value crops, and mostly under mixed systems. Therefore, some farmers are likely to have higher incomes than others. In addition, locations of the sampled farms might have contributed to this finding. While some farms are located close to the river and use water pumps for irrigation, others are further from the river and use tube wells to access water. Therefore, unequal water distribution could also be a factor. The findings of this study support the explanation offered by Bhattarai et al., (2000) who stated that irrigation induced inequality depends on several locally specific factors like the structure of irrigation-whether it is surface systems (canal or tank), or groundwater systems (deep tube well, or micro pump sets). Also, Sampath, (1990) in his study, stated that several studies have reported that surface flow irrigation has produced higher inequality in the distribution of benefits across farms than lift irrigation. The high income inequality in the study area can result in overall poor performance of the smallholder irrigation system.

# Factors influencing income distribution in smallholder irrigation farming system in the wetlands of North-eastern Nigeria.

Variables	Coefficients	Standard Error	T-values
Constant	171772.53	50272.70	3.42***
Farm size	104847.70	15423.92	6.80***
Age	-1197.76	1157.87	-1.03
Highest education	-8463.45	6168.05	-1.37
Farming experience	1340.95	1153.89	1.162
Household size	6.33	1485.54	0.004
Extension contacts	18400.01	18611.75	0.99
Access to credit	-44654.68	22413.26	-1.99*
Cropping system	-113760.51	19085.12	-5.96***
Farm investment	2.591	0.10	5.96***
$\mathbf{R}^2$	0.54		

Table 4: Factors determining income distribution among smallholder irrigation farmers in wetlands of North-eastern Nigeria (N = 182).

Source: Field Survey, 2009.

Note: \*\*\* = Significant at 1%.

Results of the linear multiple regression analysis are presented in table 4. Farm size and farm investment showed positive but insignificant influences on farm incomes of the respondents. Similar to Ibekwe *et al.* (2010), farm investment is positively correlated with farm income. Higher farm investments can lead to improved productivity through employment of modern farm technologies and adequate availability of farm inputs at the right time. Contrary to a priori expectation, credit accessibility was found to be negatively related to farm income. In the study area, very few of the sampled farmers had access to credit, it could be that the farmers with access to credit used the credit in other income generating activities other than irrigation farming. Overall, the independent variables entered in the model explained 54% variation in farm incomes.

#### **Conclusion and Recommendations**

In this paper, we tried to determine the income inequality in smallholder irrigation farming system and attempted to identify the determinants of income level. Income inequality was high in the study area. The implication of high income inequality in the study area is that it can result in poor performance of the smallholder irrigation system which can lead to increased poverty and food insecurity. We found that, among all the individual characteristics, farm size, age, cropping system and farm investment are the most influential factors that determined the farmers' incomes. Interestingly, cropping system had unexpected effects on the farmers' income. Analysis revealed that mixed cropping had a negative and significant influence on farm income. In line with our findings, we provide policy suggestions that could narrow and minimise this revealed income gap. The policy recommendations are related to investment in irrigation development infrastructures. First, water channels should be constructed to ensure a more reliable and equal water distribution across users. Government should provide more technical and financial supports to improve the productivities of farmers. Farm fragmentation is peculiar to rural areas where the bulk of agricultural output is produced and this presents a challenge for farm mechanisation. Therefore, farm consolidation should be encouraged so as to enable specialised crop production for cereals under mechanised agriculture.

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 Analysis of impact of Fadama II Project on beneficiary farmers income in Kaduna state: A Double Difference method approach. International Journal of Economics and Management Sciences, 1(11):01-08.
# EMPIRICAL ANALYSIS OF POVERTY AND AGRICULTURAL GROWTH IN NIGERIA

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## ABSTRACT

Poverty alleviation has been a great concern to developing countries. Agriculture was known to be a major contributor to national development, but suffering from neglect that has led the country to heart aching poverty. This study analyses the trend of Nigerian agricultural growth rate overtime, trend of Nigerian poverty rate overtime and examines the linkage and dimension of agricultural growth and poverty rate. Collected time series data were analysed with the aid of ARIMA model and Granger Causality test. Result showed that there were variation in the trend pattern of agricultural growth and poverty rate. Poverty rate has direct relationship with agricultural growth. That is, increase in poverty rate causes increase in agricultural growth. Consequently, relevant policies aiming at alleviating poverty should be focused on increasing agricultural growth.

Keywords: ARIMA model, Granger Causality test, poverty, unemployment

# INTRODUCTION

In Africa, the incidence of poverty has been increasing significantly for many years. For instance, it is documented that the number of poor increased by about two-third between 1970 and1985, and rose from 180million (47% of the population) in 1985 to 265million by the year 2000 (Aluyo,2000). Nigeria is the most populous country in Africa and the eight in the world with a population of over 140 million people by 2006 census. The recent rebasing exercise by Nigeria's National Bureau of Statistics, supervised and validated by the World Bank, International Monetary Fund, and African Development Bank, shows GDP of\$454 billion in 2012 and \$510 billion in 2013 (compared with the \$259 billion and\$270 billion that were reported previously), confirming Nigeria as the largest economy in Africa (Leke, 2014). The share of the total population living below the \$1 a day on the threshold of 46 per cent is higher today than in the 1980s and 1990s, despite significant improvements in the growth of GDP in recent years (Aiyedogbon and Ohwofasa, 2012). Although Nigeria depends largely on the oil industry for its

budgetary revenue, it is still predominantly an agrarian. As the main stay of the Nigerian economy, agriculture is the main source of food for most of the population, providing means of livelihood for over 70% of the population and a major source of raw materials for the agro-allied industries (Okumadewa 1997, World Bank 1998). The agricultural sector accounts for 47 per cent of gainful employment in 2005 with 41 per cent of theshare of GDP as against much higher figures in the 1960s and early 1970s prior to the oil boom. In term of agriculture's contribution to Gross Domestic Product (GDP), the percentage has decline tremendously from about 55% in1996 to 17% in 2004, thus leading to its decline in contributing to national development (Okuneye, 2002, World Bank, 2006). The socio-economic and production characteristics of the farmers in conjunction with unfocused government policies and poor infrastructural base, all interact in affecting production in the agricultural sector, thus resulting in low production, high prices of food items underdevelopment and concomitant poverty in the country (Okuneye, 2002). The neglect of the agricultural sector and the dependence of Nigeria on a mono-cultural, crude oil - based economy have not augured well for the well-being of the Nigeria economy.In an attempt tocorrect this trend, the civilian administration in the period 1999-2007 desired to restore the sector to its pre-oilboom era pre-eminence by anchoring its poverty alleviation programme on the revival of agriculture. Nigeria has embarked on several strategies which include National Poverty Eradication Programme (NAPEP), National Economic Empowerment and Development Strategy (NEEDS), VISION 2010, and the newlyintroduced Financial System Strategy (FSS) 20:2020 and Subsidy Reinvestment Programme (Sure-P). Yet, regardless of these strategies and despite NEEDS targeted poverty reduction at 5 per cent yearly from 2003through 2007, NBS (2011) reports showed that 93.9 per cent Nigerians are poor as the country's poverty ratestood at 69 per cent in 2010 reflecting that the figure was higher than the 54 per cent recorded in 2004. Meanwhile, the World Bank Development Report (2000/2001) opines that the Nigerian figure for the GDP share of agricultural sector is quite on the high side when compared with the average of 27 per cent for lowincomenations, or the average of 18 per cent for sub-Saharan Africa. However, according to Iwayemi (2012), there is declining wellbeing and rising poverty level as the impressive and sustained growth has failed to translate intopoverty reduction, inclusive growth and development. Essentially, the significance of this study is also based on the desire of Nigeria to effectively combat poverty with a view to lift the country from poverty. Thus, despite the various povertyalleviation strategies that have been introduced and implemented, there is need for a policy measure that will aim at improving the living standard of the people and improve the growth rate of per capita income for poverty reduction. Hence, this study does not only seek to know the linkage between the Nigerian poverty rate and agricultural growth but also to ascertain the impact of poverty rate on agricultural growth. The specific objectives of this research are to: examine the trend of poverty rate and agricultural growth in Nigeria; examine the dimension and linkage between poverty rate and agricultural growth in Nigeria.

## Methodology

The study area is Nigeria. The set of data used in this research were time series data obtained fromNational Bureau of Statistics, annual abstract of statistics of the Nigeria office of statistics (FOS), Central Bank of Nigeria, IMF publications and United Nations Publications. the collected data are on agricultural growth and poverty rate in Nigeria during the period of 1980-2011. The ARIMA model and Granger Causality test are used to analyze the data. The ARIMA model was used to analyze the trend of poverty rate and agricultural growth over years. The Granger causality test was used to determine whether one variable (say, poverty rate) causes the other (say, agricultural growth). It examines the dimension and linkage poverty rate and agricultural growth. The Granger causality with the two time series ( $y_t$ ) and ( $x_t$ ) is expressed as

 $\mathbf{Y}_{t} = \sum_{i=1}^{k} \quad \propto_{i} y_{i-1} + \sum_{i=1}^{k} \quad \beta_{i} x_{i-1} u_{t}$ 

# **Results and Discussion**

# Trend of agricultural growth in Nigeria

The trend in the share of agricultural GDP shows a substantial variation from 22.2 percent in the 1980s and 26 percent in 2000. Unstable and often inappropriate economic policies (of pricing, trade and exchange rate), the relative neglect of the sector and the negative impact of the oil boom were also important factors responsible for the decline in its contribution. In a bid to mitigate the negative growth effect of the agriculture, manufacturing and oil sectors, the government introduced Structural Adjustment Programme (SAP) in 1986. During the period 2000 to 2008, the percentage growth of the agriculture sector increased by 4.57 percent. Although there was positive growth from the sector's contribution to the GDP over the years, much which is corroborated by Suleiman and Aminu (2010);more financial effort and adequate *policies aimed at adequate financing of agricultural sector by government in order to boost its output, may result into a way forward (Aminu and Anono 2012)* 



Figure 1: Trend of agricultural growth in Nigeria (1980-2011)

#### Trend of poverty rate

This section gives the trend of poverty rate during the period considered. In Table (2), the lowest poverty rate during the year studied was recorded as 28.1% in 1980 and the highest poverty rate was experienced in 2002 with 88%. Since the mid 1980s the rate of poverty in Nigeria has been on the increase. For instance, in 1982 the rate was 35.5% and by 1996 it has risen to about 65.6%. Some of the probable reasons behind this persistent increase include among others; the effects of the global economic crisis witnessed in the early 1980s, the negative effects of Structural Adjustment Programme (SAP) introduced in 1986, political instability, bad governance, corruption, and the collapse of public infrastructures (Aikove, 1994: Faruqee, 1994).54.7% Nigerians were living in poverty in 2004 but this increased to 60.9% in 2010. The incident of poverty in Nigeria increased from 28.1% in 1980 to 88% the year 2002. This rate represents in absolute term 86million people out of an estimated population of about 116.4million people. The poverty situation in Nigeria also depicts regional variation. For example, within these periods the poverty was higher in the northern agro. climatic zone at 40%compared with the middle and southern zones at 38% and 24% respectively, (Francis et al., 1996; FOS various issues).

Similarly, Nigeria's rank in the Human Development Index in the year 2008 remained low (0.470), being the 158<sup>th</sup> among 182 countries (ADB 2010). The use of socio-economic indicators like per capital income, life expectancy at

birth(year), access to health care services, access to safe water, access to education, access to sanitation facilities, and electricity also depict the extent of poverty in Nigeria.For instance, apart from the early 1980s when the nation's per capita income witnessed an increase, the situations in the 1990's and early 2000 were pathetic. Remarkable reduction when viewed from these indicators and compared with some countriesin Africa shows thatthe rate of poverty in Nigeria has not shown any improvement

Year	Agricultural	Poverty rate
	growth(GDP)	
1980	15168.879	28.1
1982	18516.298	35.5
1984	19100.666	43.0
1986	19694.527	46.0
1988	23798.02	45.0
1990	21450.816	44.0
1992	22603.152	42.7
1994	22024.649	54.7
1996	23751.187	65.6
1998	25006.124	79.2
2000	24739.418	74.0
2002	51886.599	88.0
2004	46011.017	54.7
2006	54880.238	54.0
2008	62711.337	50.0
2010	63869.962	60.9

Table 1: Poverty rate and agricultural growth during the years 1980-2011.

Sources: NBS, CBN, FAO.

#### Figure 2: Trend of poverty rate in Nigeria from (1980-2011)



# Linear trend = 37.2861 + 1.05618 t

# **Result of unit root test**

Variables	ADF-statistics	Critical values	Order of integration
Poverty rate	-3.791513	1% level=-3.670170	Stationary at first
	0.0074	5% level=-2.963972	difference
		10% level=-2.621007	
Agricultural growth	-5.282027	1% level=-3.679322	Stationary at first
	0.0002	5% level=-2.967767	difference
		10% level=-2.622989	

# Table 1: Result of stationary test

The results of unit root are contained in table 1. The results revealed that all the variables of the model are found to be stationary at 1 percent, level at first difference (d(1)). The differencing thus depicts the change in poverty rate and agricultural growth of the present year and previous years. Differencing was required to make the series stationary, because, to use Granger causality test the two variables must be stationary (Maddala, 2001).

# Result of granger causality test

# **Pairwise Granger Causality Tests**

Date: 04/24/13 Time: 16:29 Sample: 1980 2011 Lags: 2 **Table 2: Result of granger causality test.** 

Null	Obs	<b>F</b> -statistics	Prob	Decision
Hypothesis				
∆R t₩→	29	2.61018	0.0943	Accept
$W \longrightarrow \Delta R_t$		2.19461	0.1333	Reject

 $\Delta Rt$ = change in agricultural growth, W= poverty rate; Lags = 2 and the relationship is established at 10% significant level.

The linkage result in table 2 shows that there is a unidirectional causation from poverty to agricultural growth change, thus agricultural growth in Nigeria depends on poverty during the time frame.

Poverty causes agricultural growth in the result above during the time frame. Majority of people go into farming just because they are poor and not because they really have passion for it. The unidirection causation shows that agriculture does not cause poverty. However the poverty reduction has been associated with growth in yields and in agricultural labour productivity. Then rapid growth in agriculture may open pathways out of poverty for farming households.

# Conclusion

This study analyses the agricultural growth and poverty rate in Nigeria economy. The specific objectives of this study are to evaluate the trend of poverty and agricultural growth in Nigeria, to examine the linkage and dimension of between poverty and agricultural growth in Nigeria. These objectives were achieved using ARIMA model and Granger causality test. Based on this the findings of this research, poverty in Nigeria can be alleviated in the future through agriculture. It can also be argued that continuous improvement in the agricultural sector of the economy is the surest way to break the vicious cycle of the poverty menace and on the other hand alleviate it.

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#### ECONOMIC APPRAISAL OF WOMEN ENTREPRENEURSHIP: A CASE STUDY OF THE FOOD VENDING INDUSTRY IN KWARA STATE CAPITAL, NIGERIA

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#### ABSTRACT

The food vending industry is a growing sector in Nigeria today which has continued to play decisive roles in employment generation for females and that has eased accessibility and affordability of foods by the growing urban population. Globally the rate of unemployment is alarming and women are very often affected. In Nigeria, food vending has gained popularity amongst the female folk, being a viable line of business that has been quite instrumental to the support system of family livelihood in the face of daunting unemployment challenges. The study was carried out to appraise the performance of the food vending industry in Ilorin, Nigeria. The study employed random sampling technique to select 160 food vendors in the study area from whom primary data were collected. Descriptive statistics, budgetary analysis and regression model were the main analytical tools employed for the study. The results of the budgetary analysis revealed that the net return from food vending business by the women was N74,004.80 per month indicating that the business is a profitable venture in the study area. Factors significantly influencing food sales by the women were labour, workshop attendance, source of fund and rent while the major constraints to an efficient food vending enterprise identified by the women were unstable market condition, erratic power supply, inadequate labour and capital. The study concluded that potential of the food vending enterprise as a poverty reduction strategy and for improving the food security and nutritional status of urban population in Nigeria cannot be over emphasized. It was recommended that efforts be geared towards integrating the sector into the mainstream economy in a way that would ensure sustainability of the sector and long-term economic growth.

Key words: Budgetary analysis, Enterprise, Food vending, Nutritional, Women,

#### INTRODUCTION

The food vending trade is a growing sector in Nigeria today. According to Draper (1996), expansion in the street food trade is linked with urbanization and the need of urban populations for both employment and food. Food vending enterprise is a prevailing and distinctive component of a broad informal sector. Food vending

trade is a growing urban phenomenon in Nigeria which is commonly seen in public spaces particularly in the cities and towns. (Tinker, 1997) defines food vendor as any minimally processed food sold on the street for immediate consumption. Food vendor is defined as ready-to-eat food or drink sold on a street or other public places, such as a market or fair by a hawker or vendor often from a portable stall (Artemis and Bhat, 2000). (Dardano, 2003) defines street food as food prepared on the streets and ready-to-eat, or prepared at home and consumed on the streets without further preparation. Street foods include snacks, main meals, or beverages. They often reflect traditional local cultures and exist in an endless variety (Winarno and Allain, 1991) but there are some street foods that have spread beyond their place of origin. Street foods are usually sold from pushcarts, kiosks and temporary stalls and cost less than a restaurant meal.

Food vendor businesses are usually owned and operated by individuals or families. Street food enterprises are generally small in size; require relatively simple skills, basic facilities and small amounts of capital. Marketing success of the street food vendors depends exclusively on location and word-of-mouth promotion (Winarno and Allain, 1991). There is increasing recognition that street food vending plays an important socio-economic role in terms of employment potential, providing special income particularly for women and provision of food at affordable costs to mainly the lower income groups in the cities (Chukuezi, 2010). Street food vending employs on average 37.8 percent of the labor force, and contributes about 38 percent to total gross domestic product in Africa (Charmes, 1998). Women predominate in street food business representing 53 percent of the vendors in Senegal (Winarno and Allain, 1991) and 75 percent of the vendors in Burkina Faso (WHO, 2006).

According to FAO (2007), over 2.5 billion people eat street food every day. Muzaffar *et al.*, 2009 stated that street foods provide a source of affordable nutrients to the majority of the people especially the low-income group in the developing countries. Concerns of cleanliness and freshness often discourage some people from eating street food. With the increasing pace of globalisation and tourism, the safety of street food has become one of the major concerns of public health and a focus for governments and scientists to raise public awareness (FAO, 2007; Mukhola, 2007).

#### **PROBLEM STATEMENT**

Unemployment has been a major problem of most countries across the globe. According to estimates, the women are the most affected in the struggle. The International Labour Organization (ILO) (2012) estimates that 88 million young women and men throughout the world are unemployed, accounting for 47 per cent of 186 million unemployed persons globally. Nigeria is not left out in this menace.

According to the National Bureau of Statistics (NBS) (2012) Nigeria's unemployment rate increased to 23.9 percent in 2011 compared with 21.1 percent in 2010 and 19.7 percent in 2009. The "Nigerian Unemployment Report 2011" prepared by the NBS shows that the rate is higher in the rural areas (25.6 percent) than in the urban areas (17.1 percent). Amid this high rate of unemployment, the economic watchers have noticed that there is an increasing trend of disinterest by the emerging younger generation in highly labour-intensive works such as agriculture and factory work in preference for white collar jobs, resulting in many preferring to remain in the labour market rather than take up such jobs.

In addition to this, there are major factors that constrained women from business venture; mostly gender-based discrimination, lack of shared support, limited or no access to information, not enough education & training facilities, lack of trust in one's capabilities and access to resources (Afza, Hassan and Rashid, 2010).

Despite the various constraints to women involvement in businesses and gainful employment, a niche has been carved by numerous women in food ventures. It is an undisputable fact that food will always be in demand being one of the three basic requirements of human with clothing and shelter being the other two. The fact that a lot of people are always constrained by time is a critical factor that has led to purchases of prepared foods by a sizeable portion of the population. This is evident in how quickly fast food joints are springing up in different parts of Nigeria. However, it is not surprising that there are more food vendors than fast food joints in Nigeria and with most of these food vending ventures being run by women. The high number of food vendors in existence in Nigeria may be adduced to the fact that majority of the population are low to middle income earners who due to the level of their incomes can only afford to patronize such low-end food sellers.

Mostly, food vending business is predominated by women, however, quite a large number of women remain unemployed despite the ability to see a demand in the market for such business activities. A broad survey indicated that quite a large number of people do not believe in the viability and profitability of the food vending business following the assumption that the market has been flooded by food sellers coupled with the diverse constraints facing entrepreneurial activities in Nigeria hence chances of making profits have been assumed to have seriously declined. It has therefore become pertinent to carry out this study to assess the economic importance of food vendor business as a source of income for women entrepreneurs in Kwara state and the factors that influence people (especially women) to become entrepreneurs in food vendor Enterprise. This study specifically examined the profitability of the food vendor business; evaluated the factors that determine sales; and also identified the constraints to the activities of food vendor Entrepreneurs in Kwara State Nigeria. This research provides very useful insight

into the major challenges constraining people (especially women) from engaging in food vendor entrepreneural activities hence providing relevant and meaningful information on how national employment challenges of women in Nigeria may be tackled.

#### METHODOLOGY

#### Area of Study

The study was carried out in Ilorin metropolis, Kwara State. The state is about 300km from Lagos and 500km from Federal Capital Territory, Abuja. Kwara State covers an area of 34,467.5 square kilometers and is about 300km from Lagos and 500km from Abuja, the Federal Capital of Nigeria. Ilorin is on Latitude 8° 30 and long 4° 35 of the equator. Kwara state is situated in the transition zone between the forest savanna region of Nigeria and Ilorin is the capital of Kwara State of Nigeria and had an estimated population of about 847,582 as at 2007. The city is confluence of culture populated by Yoruba, Hausa, Fulani, Nupe, Baruba, Igbo, and other Nigerian. The state has two main climate seasons, the dry and wet season with an intervening cold and harmattan period usually experienced from December to January. The natural vegetation consists broadly of rain forest and wooded and plains which are transverse by the Niger-River and its tributaries. Annual rainfall ranges from 1000mm-1500m.while maximum average temperature ranges between  $30^{\circ}$  C with this climate pattern and sizeable expanse of a able land and rich fertile soils, the vegetable which is the wooded savanna is well adapted to the cultivation of wide varieties of food crops. These include yam, cassava, maize, rice, beans, sugar-cane and vegetables.

#### **Data Sources**

The data for the study was obtained from both the primary and secondary sources. Primary data was obtained through structured questionnaires augmented with personal interview. Primary data was obtained from women entrepreneurs that engage in food vendor Enterprises in the study area. Secondary data were obtained from journals, related text-books, literature, bulletin and statistical annual reports.

#### **Sampling Techniques**

The target population for this study is female food vendors. The sampling technique involves random sampling of female food Vendors in Ilorin with a total number of 160 respondents selected.

# Method of Data Analysis

#### Descriptive and inferential Analysis

Most of the data are represented in tabular and descriptive forms. Descriptive tools like frequency distribution, percentages, average and ranking techniques were used to analyze the socio-economic characteristics of the respondents and challenges

they face in the course of marketing their food.

Budgetary analysis was used to evaluate profitability of small scale food vendor businesses in the study area. It is given as

GM = TR - TVC;  $GM = \Sigma P_i Q_i - \Sigma C_i X_i$  NM = GM - TFCRate of returns on investment (%), RRI = (NM/TC X 100) Rate of returns on variable cost (%), RRVC = (TR - TFC)/TVC X 100 Operating Ratio = TVC/TR Where: GM = Gross margin; TVC = Total variable cost; TR = Total revenue; NM = Netmargin; TFC = Total fixed cost; Pi = Price per unit of output; Ci = Unit of inputs;Qi = Quantity of output; and Xi = Quantity of input

# **Regression analysis**

Production function was used to determine the factors affecting sales output of the respondents. It is expressed implicitly as

 $Y = F(x_1, x_2, x_3, \dots, x_{11}, U)$ 

Where

Y = Sales output (N);  $x_1$  = Total energy cost(N) ;  $x_2$  = age(years);  $x_3$  = Household size;  $x_4$  = Level of education of business owners (years);  $x_5$  = Years in business/ experience(years);  $x_6$  = Rent;  $x_7$  = Labour (man-days);  $x_8$  = Nature of business ;  $x_9$  = Average customers (person/day);  $x_{10}$  = participation in hygienic workshop;  $x_{11}$  = source of fund; and U = Error term

Because economic theory does not indicate the precise mathematical form of the relationship among the variables, different functional forms of the above models including the linear, semi-logarithm, logarithm and exponential functions were fitted. However, the lead equations was chosen on the bases of economic, statistical as well as econometric criteria (Gujarati and Sangeethe, 2007; Koutsoyiannis, 2003).

#### **RESULTS AND DISCUSSION** Socio-Economic Characteristics of Food Sellers

 Table 1: Socio – economic Profile of the Respondents (Total=160)

Variables	Category	Frequency	Percentage	Mean
Gender	Female	160	160	
Marital status	C:1-	17	10.0	-
Marital status	Single	1/	10.6	-
	Widowed	115	/1.9	-
	Widowed	10	10	-
	Divorced	12	1.5	
A	25	0	5	
Age	20	0	3	-
	20 - 33	2/	10.9	-
	30-43	/1	44.4	43.44
	40-33	3/	23.1	-
	30+	1/	10.0	-
Household size	5	96	60	
Household Sile	6-8	54	33.8	
	9 - 11	5	3.1	
	12+	5	31	-
	12,	5	5.1	
Level of Education	No Formal	66	41.2	
Level of Education	Education	00	11.2	
	Adult Education	16	10	-
	Primary	15	9.4	
	Education	-		
	Secondary	22	13.8	
	Education			
	Tertiary	41	25.6	
	Education			
Experience	5.00	53	33.1	
	5.01-10.00	44	27.5	
	10.01-15.00	30	18.8	
	15.01-20.00	15	9.4	11.0091
	20.01+	18	11.3	
Cooperative	Members	28	17.5	
membership				
	Non members	132	82.5	
Nature of Business	Full time	152	95	
	Part time	8	5	
				-

*Empirical Analysis Of Poverty And Agricultural Growth In Nigeria* <sup>1</sup>*Ayinde O.E,* <sup>2</sup>*Ayinde K.,* <sup>1</sup>*falola A;* <sup>1</sup>*Babarinde O.S And* <sup>1</sup>*Ajewole, O.O.* 

## Source: Field, 2015

The socio-economic profile of the women entrepreneurs is presented in Table 1. 71.9% of the sampled women entrepreneurs were married which may imply that there was more availability of family labour engaged in preparation and sales or marketing of foods in the study area. Also many of the women were more than 40 years old, where the mean of age was 43.44. This implies that both the middle and old age people who are experienced in cooking are involved in food vending business in the study area. Household size of the respondents shows low level of dependence ratio with 60% of the household size below 5 person followed by household size between 6-8 persons which also indicates a low level of family labor availability for the business.

It can also be observed in Table 1 that 66% of the women had no formal education which is similar to the findings of Nurudeen *et al* (2014) in which it was found out that 66.4% of the street food vendors in Central state of Northern Nigeria had either primary or no education This indicates a low level of literacy which may negatively influence the marketing business as it deprives them from understanding intricacies of the markets and also prevent them from adapting and using marketing strategies (Oluyole, 2005). 95% of the respondents take the business as their primary occupation while merely 5% of the respondents were into food vending businesses on a secondary level.

33.1% of the women have five (5) or more years of experience in the food vending business while the mean number of years of experience was about 11 years. This suggests a high level of skill in minimizing source of loss in their sales activities. Majority of food vendors were not members of any cooperative society. The implication of this is that they are not likely to benefit from access to credit facilities, collective marketing, loan availability and other values attached to cooperative societies' membership.

#### Reasons for undertaking food vending business by the Respondents

Table 2: Primary reason for undertaking food vendor Enterprises

Reason for undertaking	Frequency	Percentage
Business		
Lack of Education	22	13.8
Ambition	16	10.0
Unemployment	51	31.9
I have interest in it	51	31.9
Inherited from parents	19	11.9
Any other	1	0.6
Total	160	100

Source: Field, 2015

Table 2 revealed the primary reason why the respondents were into the food vending business. From the table, it can be seen that 31.9% of the respondent ventured into the business due to lack of employment while 31.9% indicated that they had a flair for the occupation. 13.8% of the respondents stated that they would have opted for other occupational line if they were educated hence have been compelled to take up food vending business due to their lack of education while 10% of the respondents ambitiously ventured into the food vending business being a profitable venture. About 11.9% of the respondents are in the food vending business having inherited such business from their parents.

#### Sources of Business Financing for the Food Vending Enterprise

As with most businesses, the food vending business also requires some level of financing which serves as the capital for running the business. The major sources of these capitals were inquired from the respondents and the result is as indicated in Table 3. The study revealed that about 60% of the respondents finance their business through their personal savings. Ranking next to this is the category of people that finance the business through the sourcing of funds from their families and friends and this was about 19% of the respondents. It was interesting to note that only about 1.3% of the respondents stated the banks as their source of financing of their businesses while 3.8% of the respondents source funds from money lenders to whom they paid exorbitant charges and also operate at a risk of losing their businesses in the event of default in repayment. Cooperatives societies served as the funding source for about 10% of the respondents which indicates that people were either not knowledgeable about the alternatives they had or were skeptical about exploring those avenues.

Major Source of Fund for business	Frequency	Percentage
Personal Saving	96	60.1
Relatives and Friends	31	19.4
Money lenders	6	3.8
Banks	2	1.3
Cooperatives	16	10.0
Contributions	9	5.6
Total	160	100

Table 3: Major source of fund by the respondents

**Note:\* multiple responses were allowed** Source; field data 2015

Small scale business owners have the tendency to engage in other business activities other than their core businesses which usually serve as safety nets in the events of downturn in their core businesses or even to serve as a form of buffer to their income levels hence the respondents were inquired of to know if the food vending business was their main source of income.

The result shown in Table 4 revealed that about 68.1% of the respondents had the food vending business as their only source of income while the remaining 31.9% had other businesses in which they are engaged such as catering services, bead making, trading, poultry and fish farming while some also indicated their spouses and older children as their main income source.

The fact that majority of the respondents were dependent on the food vending business as their main income source calls for attention. This is because in the event of health and safety regulations or policies that boot those out of the business, this group of people will be pushed into unemployment with no other income source to fall back on.

#### Other sources of income

Tables 4: Other sources of income

Other source of income	Frequency	Percentage
No	109	68.1
Yes	51	31.9
Total	160	100

#### Source: Field, 2015

The monthly profitability and returns of a food vendor enterprise was examined and the findings are revealed in table 5 which shows that the Total variable cost and Revenue were about N 118,935.20 and N 192,940.00 respectively while the gross margin was N 74,004.80. It suggests the level of profitability of the business to be considerably good enough and this is indicative of the ability of women participating in food vendor business to as well support their homes in terms of financial obligations that are not too high.

It is however worthy of mention that majority of the food vendors are into sales of

various food types and menu combinations to their patrons. There are basically none of the respondents that are into vending of only one food type as they mentioned availability of varieties of menu as one way they are able to promote customer retention. As such, it proves challenging to be able to account for the returns to each food type they have on sale considering they carry on the trade, aggregating costs and returns to their vending of different menu. Respondents attributed this largely to the fact that most of the food types they had for sale had some common grounds in preparation and vending, in terms of menu make-up, in various ways which allows them to lump processes together in some ways. For this reason, this study had to assume the costs and returns to a food vending enterprise as an aggregate for that enterprise rather than try to find what accrued to each food type considering that this is near impracticable with the respondents since they do not keep such components of the records.

Variables cost	Amount( <del>N</del> )	
Electricity	2626.453	
Water	1835.625	
Sanitation	811.125	
Security	1086.875	
Tax	1763.044	
Rent	5271.125	
Labour	8720.625	
Firewood	3690.625	
Kerosine	957.1069	
Charcoal	6061.875	
Gas	2568.75	
Food stuff	81281.38	
Others	2260.625	
Total Variable Cost(A)	118,935.20	
Revenue(B)	192,940.00	
Gross Margin= (B – A)	74,004.80	

Profitability and Returns of a Food Vendor Enterprise per Month Table 5: Gross Margin=Total Revenue – Total Variable Cost

Source: Field, 2015

#### Benefits derived from the Enterprise by the respondents

The table 6 indicates the kind of benefits the respondents derived from getting involved or participating in food vendor business which shows that the two major benefits derived are in income generation and as being a source of employment with percentage of 95.6% and 80.6% respectively followed by taking on the business to self-challenge with 53.1% while 50.6% chose the job as a means of improvement of status and only 34.4% of the respondents see the venture as an opportunity for freedom and emancipation.

Benefits Derived from the	Frequ	ency	Percentage
Business	-	-	_
Income Generation	Yes	153	95.6
	No	7	4.4
Source of Employment	Yes	129	80.6
	No	31	19.4
			1
Improvement of social status	Yes	81	50.6
	No	79	49.4
Freedom	Yes	55	34.4
	No	104	65.6
			·
To Challenge oneself	Yes	85	53.1
	No	75	46.9

#### Table 6: Benefits Derived from the Food Vendor Enterprise

Source: Field, 2015

#### Workshop Attendance by Respondents

Table 7: Participation in workshop or hygienic training

	Yes	97	60.6
Workshop or hygiene			
training attendance of	No	63	39.4
respondents			
	Total	160	100
How often training is	Weekly	5	3.1
attended	Monthly	14	8.8
	Quarterly	26	16.3
	Yearly	29	18.1
	Seldom	22	13.8
	Total	160	100

#### Source: Field, 2015

Table 7 shows that about 60.6% of the respondents affirmed to participating in workshop or hygienic training. However, 18.1% and 16.3% of the respondents participated yearly and quarterly respectively while about 13.8% participated in workshops only seldomly. This may be due to nature of the business which does not permits the vendors to be absent from their business for long periods since the businesses is mostly about them in terms of management hence the need for their physical presence to enable them attend to their customers and also for the up-keep of their trading environment. Despite the great influences knowledge acquired from the workshop may impact on their services, about 39.4% of the respondents still have not participated in such a beneficial workshop at any point in the past. According to FAO and WHO, food vendors are required to undergo basic training in food hygiene before licensing and further training as required by the relevant authority. This is because inadequate hygiene training and/or instruction and supervision of all people involved in food related activities poses a potential threat to the safety of food and its suitability for consumption. Considering the mode of acquisition of skills for the sale of food for most of the vendors, the need for further training on food hygiene is extremely crucial due to the fact that they may not have adequate knowledge on hygienic practices with regard to their trade. It is worthy of note that majority of these food vendors are not even aware of any such licensing policy hence they operate their businesses without any feeling of being under some form of regulations or obligations that are meant to be guiding their business.

#### Sources of food stuff used by Respondents

Source of food stuff	Market	150	93.8
	Farm gate	6	3.8
	Fellow food vendors	3	1.9
	Others	1	0.6
Total		160	100

#### Table 8: Sources of food stuff

#### Source: Field, 2015

Table 8 reveals the findings on the sources of foodstuff available to the respondents for their business. While about 93.8% of the respondents gets the food stuff from the market, only 3.8% made direct purchase from farm gates which is of course expected to grant them access to the food stuff at cheaper rates. Accessibility of the market with respect to their location might have been the reason for the large proportion of respondents that make purchases from the market. On another hand, it may be the availability of varieties of foodstuff at the market compared to farm

gate that has endeared majority of respondents to the market rather than having to expend time and financial resources visiting various farms for products even though farm gate prices have been noted to be cheaper from experience. About 2% of the respondents bought their foodstuff from other larger food vendors, and some of these gave reason that they are able to access the foodstuff on credit or allowed to pay up after finishing a cycle of sale by which time they are granted access to new set of food stuff on credit hence purchase on credit for future repayment has been a determinant factor even though the cost of such food stuff is slightly higher than what they could access in the marketplace. 0.6% of the respondents said they have other means of getting their food stuff including the family farm, friends' and self farm where they pay cheaper prices than what is obtainable in the markets.

#### Factors That Affect Sales Output

In determining the factors affecting sales output of the respondents, different functional forms of the stated models including the linear, semi-logarithm, logarithm and exponential functions were fitted and the lead equation is the semi-log which was adopted and the result is presented in Table 9. The value of the coefficient of determination ( $R^2$ ) of the result is 0.749. This implies that about 74% of the sales output of respondents is explained by the explanatory variables included in the model and the F value of 52 indicates that the overall model is statistically significant at 5% level.

Variables	Coefficient	Standard error	T value	p>[t]
Constant	29508.8	33950.9	0.87	0.386
Total energy cost	0.165125	0.269395	0.61	0.541
Age	-133.022	679.0099	-0.20	0.845
Household size	1187.624	2708.532	0.44	0.662
Level of education	85.22075	999.8166	0.09	0.932
Years of experience	.6188782	.5825087	1.06	0.290
Rent	-29846.19**	14510.59	-2.06	0.041
Labour	1.147358*	.225576	5.09	0.000
Nature of business	14.27298	58.89029	0.24	0.809
Average daily	-3947.545	21031.4	-0.19	0.851
customers				
Workshop attendance	17172.1*	1950.964	8.80	0.000
Source of fund	44298.47**	20620.23	2.15	0.033

Table 9: Factors affecting sales output of the respondents

\*, \*\* & \*\*\* represent Significant level at 1%, 5% and 10% respectively Source: Data analysis, 2015

Table 9 shows that labour and workshop attendance are significant at 1% while rent

and source of fund are significant at 5%. The level of effort or commitment put into the business in terms of labour force contributes to the income of the vendor while the up-to-date information gained from the workshop attended has significant contribution towards the improving on management practices that will enhance efficiency which will in turn help the vendor to attain optimum production to maximize income. Also, different source of fund used in the business has a great impact on the income of the vendor because business financed with personal saving often brings a sense of security as a result of lack of external claim against one's business. Rent in terms of cost of shop has negative impact on the income generated in the course of business therefore, contributing a substantial claim on income.

#### Factors that Frequency(percentage) Mean Rank determine sales Strongly agree Neutral Disagree Strongly Agree disagree Location 89(55.6%) 70(43.8%) 1(0.6%) 0(0.0%)0(0.0%)4.55 1st Taste of food 88(55.0%) 65(40.6%) 7(4.4%) 0(0.0%) 0(0.0%)4.51 2nd Degree of 67(41.9%) 86(53.8%) 6(3.8%) 1(0.6%) 0(0.0%)4.37 3rd neatness of the premises Quality of food 69(43.1%) 82(51.2%) 7(4.4%) 1(0.6%) 1(0.6%) 4.36 4th Customer 67(41.9%) 14(8.8%) 4.26 72(45.0%) 5(3.1%) 2(1.3%)5th relationship 6<sup>th</sup> Price of food 56(35.0%) 86(53.8%) 15(9.4%) 3(1.9%) 0(0.0%)4.22 7<sup>th</sup> Branding 56(35.0%) 67(41.9%) 36(22.5%) 1(0.6%) 0(0.0%)4.11 8<sup>th</sup> 26(16.3%) 4.04 Packaging 42(26.3%) 87(54.4%) 5(3.1%) 0(0.0%)9<sup>th</sup> Quantity per plate 19(11.9%) 62(38.8%) 55(34.4%) 23(14.4%) 1(0.6%) 3.47 No=142 Others Yes=18 Percent=88.8 Percent=11.2

Table 10: Factors that determine sales in the food vending enterprise

**Factors Determining Sales** 

# Source: Field, 2015 Note:\* multiple responses were allowed

Table 10 shows the major factors that determine sales in the food vending enterprise of which the location of the business has the highest rank with the mean of 4.55 followed closely by the taste of the food and neatness of the premises in that order. The factor revealed as being the least significant is the quantity of food sold per plate which is contrary to a priori expectation where one would believe that people expend their scarce resources at the food seller that would give them access to the most quantity of food at the same price.

# Constraints to the activities of food vendor entrepreneurs

Constraints	Frequency	Percentage		
Unstable market condition	144	90.0		
Epileptic power supply	126	78.8		
Inadequate Labour	116	72.5		
Inadequate Capital	104	65.0		
Inadequate storage facilities	104	65.0		
Unpredictable weather condition	100	62.5		
Lack of finance	94	58.8		
Harassment from sanitation officials	93	58.1		
Competition among food vendor	91	56.9		
Increasing volume of production	91	56.9		
Political instability	91	56.9		
Lack of credit	84	52.5		
Laws and Regulation related problems	84	52.5		
Balancing work and family	70	43.8		
Inadequate skills	69	43.1		
High Tax Rate	54	33.3		
Extortion fee by Local mastans	34	21.3		

Table11. Problems faced by the food vendor enterprise

# Source: Field, 2015

#### Note:\* multiple responses were allowed

This study revealed that the commonest challenge the respondents encountered are

(52)

unstable market condition which mainly is observable in price fluctuations and epileptic power supply which results in a lot of wastage for the business owners, likewise preventing them from taking advantage of economies of scale in purchase since they do not have the means of preserving these products. About 90% and 78.8% of the respondents identified these two constraints respectively as having the most effect on their businesses. Inadequate labour and inadequate capital were also identified by 72.5% and 65% of the respondents respectively as affecting their businesses. This may be attributed to the fact that majority of the households of the respondents do not have too large family size which reduces the availability of family labour available for their use. Likewise, majority of the food vendors interviewed rely on personal savings to fund their businesses which is a limiting factor to capital availability.

#### **CONCLUSION AND RECOMMENDATIONS**

The street food vendors play an important role in Ilorin Metropolis. At root, it creates numerous jobs and absorbs a rising proportion of the unemployed workers among women. Recognition of this sector and proper assistance would significantly improve their performance in the business. This research has revealed that sales return in food vending business is profitable.

Street foods are an important but unexplored facet of Ilorin Metropolis economy, food and nutrition. Although this food vending enterprise are illegal and unrecognised, it significantly help to reduce unemployment (among women especially), increase incomes of vendors, provide strong economic linkages in the economy and provide urban dwellers with inexpensive, varied and nutritious indigenous meals. However, quality, hygiene and safety problems, encroachment on roadsides and pavements, possible contribution to the deterioration of law and order and disturbances in the lives of other citizens are major setbacks which give cause for concerns. These have often justified harassment of food vendors by the local authority for which reason some vendors have been forced to relocate to obscure locations where they also get harassed by miscreants and thugs.

In order not to overshadow the significant role played by food vending enterprise, there is need to regulate/control food from these venture to ensure safety and thus reduce the occurrence of food borne diseases. The business of street food vending needs to be addressed carefully in order to explore the maximum benefits obtainable from the sector towards the entire economy. Generally, there is need to integrate the food vending enterprise economy into the mainstream economy in a way that would ensure sustainability of the sector and long-term economic growth. The potential of the food vendors for improving the food security and nutritional status of urban populations cannot be over emphasized. Foods vendor are promising vehicles for micronutrient fortification as the wide variety of foods

available leave the populace with wide ranges of choice to select their meals from which makes food more affordable and accessible to the consumers rather than when they have to go through the preparation process by themselves in their homes. The data available on the consumption of food from this vendors show that they are inexpensive and available foods, which in many developing countries, Nigeria inclusive, form an integral part of the diet, and that they are consumed with regularity and consistency across all income groups, but particularly by the urban poor and, in some countries, children.

Based on the findings of the study, there is need to encourage the women in this Enterprise to form groups and join cooperative societies as this will make them benefit from economies of scale in tackling their common problems and also help them to have access to credit facilities as groups rather than the limited personal funds which they invest in the business as access to more and cheaper funds will lead to an improvement in their marketing efficiency and profitability in the food vending enterprise.

Regular enlightenment should be given by skilled workers to encourage these women, sharpen their culinary and management skills, produce on commercial scale and also improve on their general approach of running their enterprise.

Government should put in place the necessary infrastructures such as power supply in order to reduce storage losses and wastages and essentially, good roads to ensure effective transportation of market produce as this will help to minimize the cost of marketing operations that leads to unstable market conditions.

Government should also provide sponsored marketing unit, providing facilitating services for marketing channels such as provision of infrastructure, marketing information and documentation supports.

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International Journal Of Agricultural Economics, Management And Development (ijaemd)

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#### INFORMATION-SEEKING BEHAVIOR OF AGRICULTURE LECTURERS IN SOUTHERN NIGERIAN UNIVERSITIES 'IFEANYI-OBI, C.C, 'ETUK, U.R AND 'ADESOPE, O.M 'Department of Agricultural Economics and Extension, Faculty of Agriculture, University of Port Harcourt.

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#### ABSTRACT

The study examined the information need and information-seeking behaviour of agriculture lecturers in Southern Nigerian universities. Multistage sampling technique was employed to select sample for the study. Data was collected with the aid of structured questionnaire and focused group discussion. Analysis of the data was done using descriptive statistics namely frequency counts, means and percentages. Also factor analysis was used to analyse the constraint encountered by lecturers in searching for agricultural information. Results show that 58% of the agriculture lectures interviewed were males, 81% married and 75% between the ages of 30 - 50 years. Also, mean years of working experience was 11 years, 55% had doctorate degree, 99% had attended national professional meeting in the past five while only 32% had attended international conference in the past five years. Concerning their agricultural information need, 95% mostly need scientific/technical information, source of information was mainly through electronic (96%) media while journals (97%) were the most consulted publication. The pooled mean for level of effort made by lecturers in accessing agricultural information was 2.7 showing that agriculture lecturers made much effort in accessing agriculture information. The varimax rotated factor analysis identified eight major constraints encountered by lecturers in accessing agricultural information namely; financial incapacity and cost constraint (Factor 1), poor quality of research materials and personnel constraint (factor 2), poor access to information and electricity constraint (factor 3), unfavorable administrative policies and poor infrastructure (factor 4), time factor (factor 5), unfavorable attitude of colleague and peer distraction (factor 6), poor knowledge of and access to ICT/library facility (factor 7) and psychological problem (factor 8). Based on the result of the study, it was recommended that sponsorship to professional meetings should be made available to lecturers through their institutions and funding agencies, also journal outfits should device means of standardizing the content of journal papers published. This they could achieve more readily by coming together as a regulatory body overseeing journal publication activities in the country. Lecturers through seminars and workshops should be meant to understand more the importance of team work.

**Keywords:** Information-seeking, Behavior, Agriculture lecturers, Southern Nigerian Universities, Constraints.

#### **INTRODUCTION**

Information is an indispensable resource in the development of any sector of the economy. Aina (1995) defined information as the data for decision making. Similarly, Kaniki (1995) defined information as ideas, facts imaginative works of the mind and data of value potentially useful in decision making, question answering and problem solving. This definition highlights more conspicuously the importance of information in the improvement of any sector. Agricultural information also is defined as all published or unpublished knowledge on all aspect of agriculture (Aina 1995). He further categorizes agricultural information into four major types namely; Technical/Scientific information, Commercial information, Social/Cultural information and Legal information. Scientific information is the type of information that arises from research and development work carried out in various agricultural research institutions including universities. It is aimed at increasing agricultural production by providing high yielding seedlings, control of major pests and diseases. Social/Cultural information includes traditional information on agricultural practices, local cultures, background information on farming communities' and labour availability. This type of information will be useful to policy makers and planners, extension staff and farmers themselves. Commercial information includes all type of information on market prices and situation as well as sales of agricultural produce. Legal information includes all legislations that affect agriculture such as land tenure, the production, distribution and sales of agricultural produce. Oladeji and Olowu (2003) stated that for our agricultural sector to attain the nation's objective of substantial increase in food production, appropriate and relevant information must be disseminated to all users of agricultural information. This brings to light in more clear terms the importance of efficient information flow in developing the Agricultural sector. Agricultural lecturers are one of the major key players in the agricultural information user population. The training and development of future agricultural specialists lie mainly in their hands. Also most of the research activities done in the agricultural sector are carried out by them. Acquiring and disseminating relevant and useful information by the agricultural lecturers is a very important factor in the development of the agricultural sector. Information-seeking behaviour according to Wilson (2000) is defined as the complete range of human behaviour as it relates to the search for information in a purposeful way to meet an information gap. Similarly, Kakai, et al., (2004) have defined information-seeking behavior as an individual's way and manner of gathering and sourcing for information for personal use, knowledge updating, and development. Majid and Kassim (2000) on the other hand defined information seeking behavior as a broad term, which

involves a set of actions that an individual takes to express information needs, seek information, evaluate and select information, and finally uses this information to satisfy his/her information needs. Pettigrew (1996) identified factors that affect information seeking behaviour to include personal reasons for seeking information, the kinds of information being sought, and the ways and sources with which needed information is being sought. This agrees with the findings of Macevieiute (2006) and Bigdeli (2007) which reveals that information needs vary according to area of specialization. Other factors that determine the information seeking behaviour of individuals include the purpose for which information is being required, the environment in which the user operates, users' skills in identifying the information, and sources preferred for acquiring the needed information.

Knowledge about the information need, information-seeking behaviour and information use of individuals is crucial for effectively meeting their information needs. Pezeshki-Rad and Zamani (2005) noted that knowledge of informationseeking behaviour of individuals may lead to the discovery of novel information behaviour and user profile that can be used to enhance existing information models or even develop new ones. Similarly, Ford et.al., (2001) stated that understanding differences in the number and type of information sources and the frequency of their usage is of vital importance to information providers because this is critical in developing appropriate educational and informational strategies to respond to different search strategies. In Nigeria, a lot of policies and practices have been put in place to improve accessibility to useful and relevant information among agricultural lecturers. Unfortunately, some of these programme could not impact meaningfully on the target group (lecturers) mainly because, their information need and information-seeking behaviour was not properly identified before formulating such programmes. This paper opined that information-seeking behaviour and information sources could have impact on the quality of information obtained and the effectiveness of policies developed from such information. It is against this background that this study assessed the information need and information-seeking behaviour of agricultural lecturers in Southern Nigerian universities. This will serve as a guide to the government and stakeholders in education to formulate effective policies that will meet the information need of agricultural lecturers in the country. In addition, knowing the barriers that prevent individuals from seeking and getting information are also of great importance in understanding the information-seeking behaviour of individuals and organisations. Hence this study further identifies the constraints encountered by agricultural lecturers in searching for information. This will also help to put in measures that will equip them overcome the barriers thereby enhancing their knowledge and skill capacity.

#### **Objectives of the study**

The broad objective of this study was to examine the information-seeking behavior

of agricultural lecturers in Southern Nigerian universities. Specifically, the study

- Described the demographic characteristics of agricultural lecturers in Southern Nigerian universities.
- Identified the agricultural information need of Agriculture lecturers in Southern Nigerian Universities.
- Identified agriculture lecturer's source of information in the study area.
- Determined the effort made by Agriculture lecturers in seeking for agricultural information in the study area and
- Identified the constraints encountered by Agriculture lecturers in acquiring agricultural information.

## Methodology;

This study was conducted in southeast and south south geo political zone of Nigeria. Multistage sampling technique was employed to select sample for the study. From each geo political zone studied, two states were randomly selected giving a total of four states (namely; Imo, Abia, Rivers and Akwa-Ibom). Each of these states has one federal university which was used for the study. Twenty lecturers were randomly selected from the list of agricultural lecturers in the faculty of agriculture in each of the school giving a total of 80 lecturers for the study. Effort made by agriculture lecturers in acquiring agricultural information was captured using a 15- item statement rated on a four-point likert type scale with values of very much = 4, much = 3, not much = 2 and not at all = 1. A midpoint of 2.50 was obtained and based on this, decision rule was that any mean score greater than or equal to 2.50 implies that agricultural lecturers put in much effort in using that source of information and any mean score less than 2.50 implies that not much effort is put in using that source of information. Data was collected with aid of structured questionnaire and focused group discussion. Analysis of the data was done using descriptive statistics namely frequency counts, means and percentages. Also factor analysis was used to analyse the constraint encountered by lecturers in searching for agricultural information.

# **Results and discussion**

#### **Demographic Characteristics**

Result in Table 1 show that majority (75%) of the lecturers examined were between the ages of 30 and 50years, males (58%) and married (81%). The working experience was mainly below ten years. This reveals that most of the lecturers examined were mainly in their early and mid-career stage. More than half (55%) of the lecturers used for the study already have their Doctorate degree , 36% had at least their master's degree and the remaining 9% had only a bachelor's degree. The result further shows that 98.8% of the lecturers have attended national professional meetings (example conferences, workshops, seminars, symposium etc) in the past five years. Only 32% have attended international professional meetings in the past five years. Out of the 26 persons that have attended international professional meetings in the past five years, 77% have attended between only once or twice, 15% attended between 3 and 4 times while only 8% have attended more than five times. Through further questioning during the focused group discussion, it was gathered that lack of fund and funding opportunities were the major reason for not attending international professional meetings. This is a serious limitation on the side of the lecturers in expanding their research networking and collaboration activities beyond the boundaries of their nation. Bearing the importance of networking and collaboration in mind, this calls for urgent attention of the federal government of Nigeria.

Variable	Frequency	Percentage	Mean	
Age (years)			43	
<u>&lt;</u> 30	9	11		
31 - 40	31	39		
41 - 50	29	36		
<u>&gt; 50</u>	11	14		
Gender				
Male	47	59		
Female	33	41		
Marital status				
Single	15	19		
Married	65	81		
Working experience			11	
<u>&lt;10</u>	47	59		
11 - 20	25	31		
21 - 30	8	10		
Highest degree obtained				
B.Sc	7	9		
M.Sc	29	36		
Ph.D	44	55		
Those that have attended				
national professional meetings				
in the past five years				
Yes	79	98.8		
No	1	1.2		
Those that have attended				
international professional				
meetings in the past five years				
Yes	26	32.5		
No	54	67.5		
Frequency of attendance to				
international professional				
meeting				
1-2	20	77		
3-4	4	15		
5 and above	2	8		
C				

Table 1: Demographic characteristics of agricultural lecturers in the study area.

Source: Field survey data 2013

(61)

# Agricultural information need of agriculture lecturers

Table 2 shows that majority (95%) of the agriculture lecturers mostly need Scientific/technical information with a negligible number (5%) needing information on commercial, social/cultural or legal issues. This may not be surprising since lecturers whose major duties lies among teaching, research and community development are expected to acquire sufficient scientific information to enable them effectively discharge their duties. This finding tallies with earlier research findings which reported that lecturers in Nigerian Universities seek information that is relevant to their area of work specifically to teaching, research and publication (Singh (1981); Ehikhamenor (1990) and Ajidahum 1990). Recent survey on information needs (Odusanya and Amusa (2003); Baker (2004); Bruce (2005); Macevieiute (2006; Bigdeli (2007) and Igwe (2013) also agrees with the result of this study. Only very few lecturers need legal, social/cultural and commercial information. This may be due to low participation of lecturers in areas that require such information.

Agriculture information	Frequency	Percentage
Scientific/Technical	76	95
Commercial	2	2.6
Social/cultural	1	1.2
Legal	1	1.2
Total	80	100

Table 2: Agricultural information need of agriculture lecturers

Source: Field survey data 2013

#### Information source of agricultural lecturers

The lecturers as shown in Table 3 indicated the use of the five information sources used in the study with electronic media recording the highest percentage (96%) while mobile phone had the least percentage (31%). This collaborates with earlier finding of researchers for instance, Gboyega (2012) reported that internet is the major source of information for agriculture students. Professional meetings (85%), other colleagues (79%) and the library (73%) were also major information sources for the agriculture lecturers in the study area. Similarly, Urquhart and Crane (1994) reported that scientists, technologists, and health professionals make extensive use of oral and allied information sources while Bozimo (1983), Goldberg (1991) and Nnadozie (2008) agreed that the library is the major source of information for academic staff.

Concerning publications consulted, result shows that journals (97%) and textbooks/monographs (87%) were the major materials consulted by agriculture lecturers in seeking information. Newsletters (43.8%) and newspapers (43.8%) recorded low percentage implying that they are rarely consulted. The lecturers through the focused group discussion further disclosed that newspapers and newsletters cover very little agricultural information hence not a good source of information. This is confirmed by the findings of Ifeanyi-obi (2008) and Agumagu (1988) which discovered that agricultural news was under published in Nigerian newspapers.

Information source	Frequency	Percentage
Electronic and Internet media		
Yes	77	96.2
No	3	3.8
Library		
Yes	58	72.5
No	22	27.5
Colleagues		
Yes	63	78.8
No	17	21.2
Professional meetings		
Yes	68	85.0
No	12	15.0
Mobile phones		
Yes	25	31.2
No	55	68.8

# Table 3: Information source of agriculture lecturers

#### Source: Field survey data 2013

Information source	Frequency	Percentage
Textbooks/monographs		
Yes	70	87.5
No	10	12.5
Journals		
Yes	78	97.5
No	2	2.5
Newspapers/magazines		
Yes	35	43.8
No	45	56.2
Reference materials		
Yes	41	51.2
No	39	48.8
Conference proceedings		
Yes	54	67.5
No	26	32.5
Newsletters/pamphlets		
Yes	35	43.8
No	45	56.2
Theses/dissertations		
Yes	55	68.8
No	25	31.2

#### Table 4: Publications consulted by agriculture lecturers

Source: Field survey data 2013

# Level of effort made by agricultural lecturers in accessing agricultural information.

The result in Table 5 shows that lecturers have made much effort in accessing agricultural information through electronic and internet facilities (mean = 3.4), journals (mean = 3.4), textbooks/monographs (mean = 3.1) and professional meetings (mean = 3.0). The high level of effort made in sourcing information through electronic/internet media is not surprising as web-based information source has recently become very popular not only among lecturers but researchers in general. Also, in Nigeria publication of journal papers in reputable journal outfit is one of the requirements for promotion of lecturers, hence the much consultation

and use of journals by lecturers. Professional meetings are also gaining more popularity among lecturers in Nigeria as this is one of the major opportunities through which they advance networking and collaboration among themselves. Therefore it is not surprising that lecturers are making much effort in attending these professional meetings. The pooled mean value of 2.7 shows that lectures have made effort in accessing agricultural information from all sources indicated in the paper.

# Table 5: Level of effort made by agricultural lecturers in accessing agricultural information

S/ N	Statements	Very Much	Much	Not much	Not at all	Mean	Remark
1	I use electronic/internet facilities to get agricultural information	45(56.2)	27(33.8)	6(7.5)	2(2.5)	3.4	Much
2	I use Library to source for agricultural information	11(13.8)	27(33.8)	29(36.2)	13(16.2)	2.5	Much
3	I consult Colleagues to get agricultural information	19(23.8)	26(32.5)	24(30.0)	11(13.7)	2.7	Much
4	I attend Professional meetings to get information	32(40.0)	27(33.8)	16(20.0)	5(6.2)	3.0	Much
5	I use Mobile phones to get agricultural information	7(8.8)	9(11.2)	28(35.0)	36(45.0)	1.8	Not much
6 a	I use Textbooks/monographs to search for gricultural information	30(37.5)	34(42.5)	12(15.0)	4(5.0)	3.1	Much
7	I use Journals to source for agricultural information	47(58.8)	24(30.0)	5(6.2)	4(5.0)	3.4	Much
8	I read Newspapers/magazines to get agricultural information	10(12.5)	17(21.2)	32(40.0)	21(26.2)	2.2	Not much
9	I use reference materials to search for agricultural information	17(21.2)	18(22.5)	27(33.8)	18(22.5)	2.4	Not much
10	I consult conference proceedings to get agricultural information	20(25.0)	21(26.2)	23(28.8)	16(20.0)	2.6	Much
11	I read newsletters/pamphlets to acquire agricultural information	8(10.0)	19(23.8)	37(46.2)	16(20.0)	2.2	Not much
12	I use Thesis/Dissertations to get agricultural information	17(21.2)	25(31.2)	31(38.8)	7(8.8)	2.7	Much

(65)

Source : Field survey data 2013
# Constraint encountered by agricultural lecturers in acquiring agricultural information.

The 26 statements used to capture constraints encountered by agricultural lecturers in accessing agricultural information was subjected to varimax rotated factor analysis. The suitability of data for factor analysis was determined using the Kaiser – Meyer – Olkin value which had a value of 0 .747, exceeding the recommended value of 0.6 [Kaiser – Meyer – Olkin measure of sampling adequacy (KMO)]; Bartlett's Test of sphericity reached statistical significance P = 0.000 (value is significant at 0.05 or smaller) supporting the factorability of the correlation matrix and correlation matrix which had many coefficient of above 0.3. Also the communalities which can be regarded as indicators of the importance of the variables in the analysis were generally high (above 0.50). Communalities values of 0.50 and above shows that the variables selected for the study are appropriate and relevant (Udofia 2011).

The factor analysis procedure with varimax rotation yielded an eight dimensional solution. The eight factors which altogether accounted for 69.04% of the total variance in the 26 original variables may be regarded as the major constraint faced by lecturers in accessing agricultural information. These factors include; financial incapacity and cost constraint (Factor 1), poor quality of research materials and personnel constraint (factor 2), poor access to information and electricity contraint (factor 3), unfavorable administrative policies and poor infrastructure (factor 4), time factor (factor 5), unfavorable attitude of colleague and peer distraction (factor 6), poor knowledge of and access to ICT/library facility (factor 7) and psychological problem (factor 8).

Factor 1 (financial incapacity and cost constraint) accounted for 26.38% of the total variance and as such the most significant factor. The variables that loaded high in this factor include lack of fund to acquire relevant informational material/gadgets (.635), lack of personal fund to attend professional meetings (.593), high cost of information and communication technology gadgets (.603) and high expenditures involved in attending conferences (.611). Poor financial status of lecturers has over the years known to be a limiting factor in their career progression as it limits them from participating in research activities, professional meetings and other important activities that will enhance their knowledge and skill capacity. A lot of funding opportunities have been put in place by the government and other funding agencies in the country but unfortunately these opportunities seem to be inaccessible by the lecturers.

Factor 2 (poor quality of publications and resource persons) accounted for 11.65% of the total variance. The variables that loaded high on this factor include poor quality of conference papers/proceedings (.545), poor quality of journal papers (.478) and poor knowledge of resource persons at workshops and trainings (.633). This collaborates with Nnaedozie (2008) which reported that inadequacy of current and relevant material in the library as an impediment to lecturers in meeting their information needs.

Factor 3 (Poor access to relevant information) was found to account for 6.65% of the total variance in the original data matrix. Under this factor, three variables loaded high namely; no access to e-books/journals/textbooks (.601), poor access to conference announcements and call for papers/articles (.578) and delay in getting information on professional meetings (.535). Similarly Gboyega (2012) found poor access to publications as a major constraint to satisfying information need. Factor 4 (Unfavorable administrative policies and poor infrastructure) accounted for 6.56% of the total variance. Three variables were found to load highly on this factor namely; lack of support from institution to attend conferences (.580), poor state of office accommodation (.524) and hoarding of information from academic staff(.525).

Factor 5 (time factor) was dominated by two variables namely too many family responsibilities (.512) and excessive many academic responsibility (.594). This is not surprising bearing in mind the extended family culture in the Nigeria. The agriculture lecturers during the focused group discussion highlighted that the family responsibilities are not only that of their immediate family but includes extended family. Also they explained that most universities are under staffed. This results in the few available ones having excess workload to carry making it very difficult for them to work effectively especially in their personal development. Factor 6 (unfavorable attitude of colleagues and peer distraction) accounted for 4.67% of the total variance in the matrix. The variables that loaded high on this factor include; peer/social distractions (.559) and uncooperative academic peers (.546).

Factor 7 (poor knowledge of and access to ICT, power and library facility) and factor 8 (psychological problem) accounted for 4.18% and 3.85% of the total variance respectively. The items that loaded high on factor 7 include poor supply of electricity (.518), inadequate information on how to use the library (.533) and poor network coverage for internet transmission (.620). Under factor 8, phobia for

# travelling (.534) and use of internet (.515) loaded high. **Table 6: Constraints encountered by agricultural lecturers in acquiring agricultural information**

		Loadings								
S/N	Statements	F1	F2	F3	F4	F5	F6	F7	F8	Communalities
1	Poor supply of electricity to power my computer	.418	.166	.337	329	.353	131	.518	316	.806
2	Inadequate information on how to use the library	.408	.167	110	.490	.062	070	.533	052	.604
3	Lack of fund to acquire relevant informational materials/gadgets	.635	.394	.039	128	.065	110	.035	.061	.597
4	Peer/social distractions	.321	062	435	.097	.289	.559	095	392	.746
5	Lack of funding opportunities to attend conferences.	.516	.353	.024	.003	.351	.268	.127	.187	.599
6	Denial of permission to attend conferences.	.360	.208	455	.508	.108	.032	.198	025	.659
7	Phobia on the use of the internet	.443	437	075	.193	.049	025	289	.515	.629
8	Poor network coverage for internet transmission	.437	.420	.220	.163	368	383	.620	254	.646
9	Obsolete research data in the library	.431	.531	.027	.350	171	.156	.217	.119	.637
10	Poor knowledge on how to surf the web.	.411	443	314	.222	.041	022	.506	.014	.619
11	Too many family responsibilities.	.418	040	.269	369	.512	.285	273	277	.710
12	No access to e-books/journals/text books	.355	.200	.601	.206	044	.007	240	.103	.592
13	Poor quality of conference papers/ proceedings	.431	.545	.374	.157	097	.445	.015	.031	.736
14	Poor quality of journal papers	.414	.578	.382	.143	.411	.059	.031	.160	.706
15	Poor knowledge of resource persons at workshops and trainings.	.425	.633	.438	.294	.223	316	.014	.008	.797
16	Lack of personal fund to attend professional meetings.	.593	.477	.107	182	082	210	269	.017	.747
17	High cost of information and communication technology gadgets.	.603	.363	073	184	186	.021	193	.154	.630
18	Poor access to conference announcements and call for papers/articles	.439	.117	.578	.335	409	.080	043	095	.607
19	High expenditures involved in attending conferences.	.611	.495	.208	246	163	262	014	066	.822
20	Lack of support from the institution to attend conferences.	.256	.488	062	.580	.308	.122	167	.138	.714
21	Too many academic commitments	.461	392	016	179	.594	.293	028	381	.741
22	Office accommodation not conducive	.393	094	156	.524	398	.373	.409	.174	.788
23	Uncooperative academic peers	.475	349	151	.444	020	.546	.283	007	.702
24	Phobia for travelling	.424	268	.231	093	014	024	.013	.534	.753
25	Hoarding information from academic staff	.465	235	336	.525	.121	089	.048	.235	.619
26	Delay in getting information of professional	.495	422	.535	317	098	246	.035	.151	.745
	Eigen value	6.859	3.683	1.730	1.706	1.271	1.214	1.088	1.000	
	% of variance	26.38	11.65	6.65	6.56	4.89	4.67	4.18	3.85	
	Cumulative %	26.38	38.24	44.89	51.45	56.34	61.01	65.91	69.04	

Source: Field survey, 2012



#### **Conclusion and recommendation**

The study extensively examined information-seeking behaviour of Agricultural lecturers in Southern Nigeria. Results obtained in the study confirmed some existing knowledge as well as identified new facts. The study showed that the most needed information by Agricultural lecturers is scientific/technical information. It also identified journal as the most consulted publication by the Agricultural lecturers and further concludes that agricultural lecturers in the study area have made much effort in accessing agricultural information. The major constraints the Agricultural lecturers encountered in acquiring information are financial incapacity and poor quality of research materials and personnel cost constraint. constraint, poor access to information and electricity constraint, unfavourable administrative policies and poor infrastructure, time factor, unfavourable attitude of colleague and peer distraction, poor knowledge of and access to ICT/library facility and psychological problem. Based on the result of the study, it was recommended that internet facilities at a subsidized rate should be made available for lecturers in their work places to enable them access the needed information for their work. Also trainings and workshops should be organized for these lecturers to enable them improve their knowledge and skill in the use of internet facilities. This will contribute in building their capacity and enhancing their teaching and research skill. Both the students, host communities and the nation in general will benefit from this as they will be more equipped to render better services. This will contribute in building the capacity of these students and host communities towards better agricultural practices that can facilitate poverty alleviation process. Finally, there is a need for the government and university management to sponsor agriculture lecturers in attending professional meetings as this will help to enhance their information sharing system.

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#### RESOURCE USE EFFICIENCY AMONG DRY SEASON VEGETABLE GARDENERS IN ENUGU URBAN, ENUGU STATE: A STOCHASTIC FRONTIER PRODUCTION FUNCTION APPROACH

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#### ABSTRACT

Some urban dwellers embark on urban farming to bridge the gap between urban food demand and supply. The main aim of the study is to determine the technical efficiency of resource use among dry season vegetable gardeners in the study area. Stochastic frontier production function was used to analyse the resource use by the farmers. The results showed that about 91.6% of the farmers have technical indices of above 80%. The maximum efficiency is 98.46% while minimum efficiency, 68.01%. Farmers' accessibility to fertilizer, land, extension services among others were recommended.

**Keywords:** Resource use efficiency, dry season, market gardener, and small holder farmers.

#### INTRODUCTION

Urban agriculture in recent times seems to have gained prominence in developing economies as it contributes immensely to socioeconomic development of the household in terms of gainful employment, wealth creation, poverty reduction and food security (Operah, 2007). In the cities, it helps to improve cleanness of the cities, environmental restoration and greening (Coffee et al, 2005).

In Nigeria, the practice of urban agriculture is orchestrated and reinforced by aftermath of structural adjustment programme (SAP), which characterized by fluctuation of food prices, unemployment and inflation (World Bank, 1990). Umo (2005) classified urban agriculture into mixed cropping and market gardening. Market garden is a system that make use of intensive cropping system involving planting of vegetables with peculiar closeness to big cities and markets (Densten et al, 1998). Intensive cropping system occurs in the hydromorphic area along the bank of streams, rivers and flooded planes, affluent from drains from premises and streets drainage (Operah, 2007).

The production methods of market gardeners include raised seed bed, spacing of crops on the beds, watering regularly with watering cans, use of improved seeds of

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exotic vegetable varieties and application of either organic manure or inorganic fertilizer (NPK, single super phosphate [CAN]) (Denten, et al, 1998). Indeed, a lot of exotic and local vegetables are grown through urban farming to meet the demand needs of urban dwellers. Coffee, et al, (2005) showed that more than 80% of the perishable vegetables that are consumed by city residents are produced within the city..

In spite of the contributions of urban agriculture to food security and food safety of the country, particularly among the urban dwellers, the programme has been threatened by water and land scarcities and environmental pollution. The worst form of this pollution is the industrial wastes such as waterproof contamination of our water and soils (Operah, 2007). Furthermore, Coffee et al (2005) cited odour from livestock reared in urban areas as environmental health hazards which often results in closed down of such ventures by the appropriate government agencies.

The urban farmers like any other farmers produces to satisfy the house-hold needs or make profit or both, such production entail efficient use of farm resources (Umo, 2005). Farm efficiency and its resources are vital in developing countries. The parametric programming, non parametric programming, deterministic statistical and stochastic frontier approaches are used to measure efficiency (Schipper, 2000 and Okoye & Onyenweaku, 2008). Among the above mentioned approaches, the stochastic frontier and non-parametric programming known as Data Envelopment Analysis (DEA), are the most popularly used. The stochastic frontier approach is preferred for assessing efficiency in agriculture because of inherent stochasticity involved (Coelli, 1994). Inefficiency in resource use and utilization in farming can seriously hamper or jeopardize the production and availability of staple food (Edet & Nsikak, 2007). Nevertheless, resource use efficiency and productivity are influenced by a variety of factors which include the type of technology, level of capital utilization, the commitment of the labour force and the level of skill acquisition both material and technical (Okezie, and Okoye, 2006). Therefore, estimating the level of technical efficiency of dry season gardening becomes imperative. This will make it possible to determine whether the deviation in technical efficiency from the Frontier output is due to farm specific factors or external random factors.

The broad objective is to determine the socio-economic factors and resource use efficiency among dry season market gardening of small holder farmers in Enugu town of Enugu State.

#### Material and Methods

The study was conducted in Enugu town, Enugu State, Nigeria. Enugu is located

within the following coordinates North  $6^{\circ}$  64'N, and  $5^{\circ}$  59'N, East  $6^{\circ}$  53'E and  $5^{\circ}$  56'E. Enugu has temperature range of 28 – 31°C, relative humidity of 72 – 85%, and annual rainfall of 12000mm - 23000mm.

The choice of Enugu was informed by its characteristic features of streams, rivers and sewage channels scattered all over the area. Enugu with coal deposits was the headquarters of former eastern region during colonial era, later east central state. Enugu later became the capital of former Anambra State and presently Enugu State capital.

Enugu is inhabited by people from various tribes and races within and outside Nigeria. They include public/civil servants, business men and women, company workers, farmers, artisans and petty traders. Enugu has high population rate of 1.4 million people (NPC, 2006) and consists of civil servants in the neighbouring states around Enugu state still operate from the metropolitan. More so, Enugu has become very attractive to unemployed youths who seek for job because of many federal and state ministries, parastatals, and private businesses.

The data for this study were primarily sourced and obtained from vegetable farmers using questionnaire, during the 2009 cropping season. Secondary data were also sourced through published and unpublished related literatures.

A total of 120 vegetable farmers were randomly sampled from areas in Enugu urban where vegetable cultivation is intensive. Baseline information on farmer's socioeconomic characteristics and input and output were collected and analyzed. Theoretical Framework of Stochastic Production Function

Efficiency can be defined as ability to produce the largest possible quantity of output from a given set of input. Efficiency is of technical, allocative and economic (overall efficiency) types (Farrel, 1975). Technical efficiency is the ability to produce a given level of output with minimum quantity of input.

Farrell (1975), first introduced technical efficiency measures. But the more satisfactory measure of technical efficiency through stochastic frontier model was independently formulated by Aigner et al (1977) and Meeusen and Vander Broeck (1988), which improved the estimation of technical efficiency by incorporating both statistical noise representing un-controlled exogenous factors and technical efficiency. The major features of the stochastic production function are that the disturbance term is a composite error consisting of two components – symmetric component and one sided component. The symmetric component captures the random effects due to measurement errors, statistical noise and other influences,

and is assumed to be normally distributed. The one sided component  $U_1$  captures randomness under the control of the firm. It attributes deviation from the frontier to inefficiency and is half normally distributed or exponentially distributed.

The stochastic frontier production function =

 $Y_1 = f(X_1B) \exp(V_1 - U_1) = 1.2$ -----(1) Where: Y = output of the 1<sup>th</sup> firm

 $X_1$  = corresponding (Mx<sub>2</sub>) vectors of unknown parameter to be estimated F (.) denote an appropriate function (e.g. Cobb Douglas, translog, etc)

 $\beta = beta$ 

Ui is the symmetric error component that accounts for random effect and exogenous shock

Where: Ui = 0 is one sided error component that measure technical inefficiency. Empirical Model

Stochastic production frontier was used which builds hypothesized efficiency determination into the inefficiency error component (Coell and Battese, 1996). The Cobb Douglas production functions as thus:

 $Ln (Qty) = \beta_0 + \beta_1 Ln (land) + \beta_1 Ln (lab) + \beta_3 Ln (fert) + \beta_4 Ln (plantma) + \beta_5 Ln (capital) + V_1 - U_1 - \dots - (2)$ 

Where: Qty is the quantity of vegetable in kg or bundle

Lan = land per hectare

Lab = labour employed in farm operation in manday

Fert = is the quantity of fertilizer used in kilogram

Plantma = is the planting materials in kg

Capital = is depreciated on capital input in Naira

 $V_1 =$  error term not under the control of the farmer

 $U_1 =$  error term under the control of the farmer

 $\beta o = intercepts$ 

 $\beta_1 - \beta_5 = \text{coefficient estimated}$ 

 $U_1 = d_0 + d_1(Ext) + d_2(Exp) + d_3(Age) + d_4(Edu) + e_1....(3)$ 

Where: Ext = access to extension contact (dummy)

Exp = is the farming experience in years

Age = is the age of the farmers in years

Edu = is the level of education attainment of the farmer in years

 $e_i = error term$ 

#### **Results and Discussion**

The following socioeconomic variables were studied viz: age, gender, migrant status, educational level attained, farming experience, household size and membership of cooperatives. On age, 45% of the respondents were within the age bracket of 31 - 40 years while the least were farmers in the age bracket greater than 50 years. This work contradicted the statement that farming is left for the ageing.

(Idowu, 1988) supported Umo, (2005) that urban farming are for young farming population because of rural-urban drift.

On gender, the female population (70%) topped the total respondent studied while the remaining 30%)) were male. This implies that women constitute a greater percentage of those engaged in vegetable production in the Enugu urban area. Vegetable production is less laborious than other farming especially root crops and does not require lot of physical strength (Udo and Akintola, 2005).

On migrant status, 68% of the total respondents were migrants and aborigines, whom are products of rural – urban drift in quest for greener pastures. The income accruing from these white collar jobs may be meager or non availability of such job, resulting in many city dwellers engaging in urban farming either as part-time or full time basis (Umo, 2005). Most of the respondents are educated (67.4%). This result is not only in line with migrant high education hypothesis but agreed with the works of Umo, (2005) and Udo and Etim (2008). Educated farmers are expected according to Okoye and Onyenweku (2008) to be more receptive to improve farming technique.

38.8%t of the respondents interviewed had farming experience ranging between 8–11 years, while the least had less than 3 years (11.7%). Nwaru, (1993) opined that farmers count more on their experiences than educational attainment to increase their productivity. Majority of the respondents had household size of 7–9 (45%). The implication of large household size is higher access to family labour, consequently reduction in the cost of production of vegetable in the study area.

8.3% of the respondents studied were identified with one cooperative society or the other while 91.6% were not. Cooperative society usually assists the member farmers in procuring inputs and credits without much difficulty and among other benefits.

Table 4 showed that most of the farmers interviewed reported that land scarcity was the limited factor to urban agriculture. Umo, (2003) confirms these findings, when he opined that the vegetable production during this period (dry season) is restricted only along source of water which is already a limited source in the region. Besides, market gardening is also viewed as only grown by people who have access to source of water. Other major constraints to market garden production as reported by the farmers were pests and diseases, soil fertility problem, theft and unavailability of extension agent.

The technical efficiency model specified was estimated by the maximum likelihood (ML) method using frontier 4.1 software developed by Coelli, (1995). The maximum likelihood estimates and inefficiency determination of the specified frontier were presented in the table 3. On estimation of technical efficiency, the stigma squared (L<sup>2</sup> 0.0797) the gamma ( $\gamma = 0.0876$ ) are high and sigma square (U<sup>2</sup>) has goodness of fit and agree with assumption of composite error term distribution. The gamma ( $\gamma$ ) shows that 0.0876 of the variability in the output of vegetable

farmers that are unexplained by the function is due to technical inefficiency (Okoye & Onyenweaku, 2008). Two variables labour  $(B_1)$  and fertilizer  $(B_3)$  were significant among the variables considered and hereby discussed as follows: Labour  $(B_1)$  – It was rightly signed positive and significant at 1%. This is in attestation to the fact that farming among small holder farmers in developing countries is manual and rarely mechanized, in effect constitute greatly to total cost of production. The non mechanization of these farms could be attributed to among others excessive land fragmentation, lack of affordable equipment and poverty (Udo, 2008).

Fertilizer  $(B_3)$  – The variable was significant at 1% probability level and positively signed as prior expected. This relationship may connote that 10% increase in fertilizer use may result to 8.436% improvement in the vegetable output in the study area. This result concurred with the work of Umo, (2008) on urban farming in Uyo, Akwa Ibom, of which the importance of fertilizer in boosting crop yield was stressed. The production elasticity of output with respect to quantity of fertilizer was 0.8436.

Among the socioeconomic variables considered as inefficiency determinants, only the coefficients of level of education and household size were significant and positive.

Educational Level attained  $(Z_1)$  – The variable had positive sign and significant at 5% probability level. The elasticity of production of education level attained was 4.862. This finding infer on the importance of the variable as a motivating factor to farmers in acquiring and utilization of innovation, more effectively. This leads to improvement in production methods and higher technical efficiency level (Edet and Nsikak, 2005). This result is synonymous with findings of Udo, 2005) and Udo and Etim (2006).

Household Size  $(Z_2)$  – The coefficient of household size was positive and significant at 1% probability level. This could mean that it is possible to increase vegetable production in the study area at low cost especially among aged poorer household members that are still living with their parents. This is more pronounced in situation where hired labour is expensive. More so, children of this economic class can be used as hired labours.

The frequency distribution of technical efficiency in dry season market gardening is presented in table IV. Individual technical efficiency indices range between 68.01% and 98.46% with mean technical efficiency of 92.96%. About 91.66% of the dry season market garden farmers have technical indices of above 80%. The high level technical efficiency obtained in this study was consistent with the low variance of the farm effect.

#### Conclusion and Recommendation

The major conclusions deduced from this study include:

- (i) Most of the urban farmers studied are literate women.
- (ii) Land and water availability are the major constraints to urban agriculture.
- (iii) Labour availability and fertilizer are the major determinants of technical efficiency of resource use among the respondents. While inefficiency determinant variables are educational level attained and house household size.
- (iv) From the result shows that there is still room for improvement in the level of technical efficiency of the farmers in the study area, is the mean efficiency score = 92.96%.

The following recommendations were made:

- i. Need to formulate policy aimed at improving farmers access to improved production inputs of land, fertilizer, credits and extension services to increase farmers technical efficiency and to encourage old and new entrants farmers especially youths in dry season vegetable production.
- ii. As women play significant role in the crop production, therefore free education for the girl-child is advocated.
- iii. Labour saving devices should be researched on, developed and disseminated to the farmers in order to reduce or curtail high cost of hired labour and consequently reducing the total cost of production.
- iv. Need for research and collaborations to promote the safe use of waste water in irrigating vegetables.
- v. Need to create public awareness on safe handling of the produce.
- vi. Finally, the need for family planning among the respondents, so as to get a manageable household size.

Table 1: Distribution of Socioeconomic Characteristics of Urban Farmers				
Character	Frequency	Percentage (%)		
Age				
< 20	10	8.3		
21-3	30 22	18.3		
31-4	40 54	45		
41-5	50 18	15		
> 50	16	13.3		
Total	120	100		
Gender				
Male	10	30		
Fema	le 22	70		
Total	120	100		
Migrant Stat	tus			
Migra	ant 82	68.3		
Nativ	e 38	31.7		
Total	120	100		
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Resource Use Efficiency Among Dry Season Vegetable Gardeners In Enugu Urban, Enugu State: A Stochastic Frontier Production Function Approach <sup>1</sup>Ume, S. I. And <sup>2</sup>Uloh, E.V

Level of Education		
No formal education	14	11.7
Primary school	25	20.8
Secondary school	46	38.3
Post secondary school	35	29.1
Total	120	100
Farming Experience		
1-3	14	11.7
4 – 7	22	18.3
8-11	46	38.3
12 & above	18	15
Total	120	100
Household Size		
1-3	10	8.1
4-6	35	29.1
7-9	54	45
> 10	21	17.5
Total	120	100
Membership of Cooperative		
Yes	10	8.3
No	110	91.7
Total	120	100

#### Source: Field Survey, 2009

### Table 2: Constraints to Market Garden Vegetable Production

Constraints	Percentages (%)
Land scarcity	65
Weeds	24
Pests and diseases	58
Scarcity of labour	34
Theft	52
Lack of extension agent	53
Inadequate planting materials	13
Lack of knowledge on harvest storage	23
Soil fertility	56
Lack of improved varieties	14

Source: Field Survey Data, 2009

\*Multiple responses

Technical Efficiency		Frequency	Relative Frequency (%)
< 60		0	-
61-70		2	1.67
71-80		8	6.67
81-90		10	8.33
90 - 100		100	83.33
Total		120	100
Mean technical efficiency	=	92.96	
Minimum technical efficiency	=	68.01	
Maximum technical efficiency	=	98.46	
Source: Field Survey, 2009			

### Table 4: Distribution of technical efficiency in dry season urban market gardening

Table 3: Maximum Likelihood Estimate of the Stochastic Frontier Function and Technical						
In	efficiency					
Variable	Parameter of	Coefficient	Standard error	t-statistics		
	Stochastic	Frontier				
Constant term	B <sub>0</sub>	3.712	2.614	1.420		
Labour	B <sub>1</sub>	0.117	0.156	0.748 <sup>xxx</sup>		
Farm size	B <sub>2</sub>	0.564	0.261	- 2.160		
Fertilizer	B <sub>3</sub>	0.8436	0.277	3.045 <sup>xxx</sup>		
Planting method	B <sub>4</sub>	- 2.172	0.371	- 5.851		
Inefficiency Effect	:					
Level of education	n (Z <sub>1</sub> )	4.862	1.334	3.644 <sup>xx</sup>		
Household (Z <sub>2</sub> )		2.092	2.065	1.449 <sup>xxx</sup>		
Farmer's age (Z₃)		3.142	2.889	1.096		
Farm size (Z <sub>4</sub> )		3.843	1.141	3.367		
Variance Paramet	er/Diagnostic					
Sigma squared (Q	2)	0.0794	2.4880			
Gamma (γ)		0.0876	1.0077			
Log likelihood		1.76778				
Log Ratio Test		5.7837				
No. of Observation	n	120				

xxx, xx, x are significant at 1%, 5% and 10% levels respectively

Source: Computed from Maximum Likelihood Estimate Result Field Survey Data, 2009

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#### Effect of Seed Size on Germination and Some Growth and Yield Components of Cowpea (*Vigna unguiculata L.*) Grown on Sandy Loam Soils in Maiduguri, Northeast Nigeria

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#### ABSTRACT

The effect of seed size on germination and early growth of cowpea (Vigna unguiculata L.) on some sandy loam soils of Maiduguri, Borno state was assessed during the 2014 rainy season. Cowpea seeds were sourced and tested using floatation method for viability. The seeds were later sorted into large, medium, and small sizes that weighed between 0.26-0.30g, 0.20-0.25g, and 0.15-0.19 g, respectively. Three seeds from each grade were sown into 5 pots filled with sterilized sandy loam soils and replicated 5 times in a completely randomized design. The seedlings were later thinned down to 2 seedlings per pot at 2 weeks after sowing (WAS). Data on germination and seedling establishment were respectively taken at 1 and 2-WAS, while plant height, stem diameter, number of leaves and branches per plant per pot and root-biomass were studied at 3 and 4-WAS. The results showed that large sized seeds germinated better (95%). The medium sized cowpea seeds trailed with 86.75% germination, while the small sized cowpea seeds followed with 83.50% germination. All the plant parameters studied differed significantly (P < 0.05) among the treatments, except for stem diameter at 2-WAS. However, the large and medium seeds recorded a generally comparable effect on the early growth characteristics of cowpea in the study area. Farmers are recommended to consider using large sized cowpea seeds during propagation.

Keywords: Cowpea, Seed-size, Germination, Growth, Sandy-loam

#### INTRODUCTION

The high demand for protein in human diets has repositioned both crop and soil scientists on the provision of good quality seeds and soil conditions for higher crop yields. The use of such qualitative seeds was found to increase crop yields by 15-20% (Ambika *et al.*, 2014). Cowpea seeds are rich in protein and are highly nutritious when eaten fresh or dried. Cowpea plays a vital role in both human diets and animal feeds, thereby the need for its sustainable production. Several studies have confirmed the effect of seed size on cowpea propagation, seedling vigor and

yielding quality (Roozrokh *et al.*, 2005); Hojjat, 2011). According to Morrison and Xue (2007), size is one of the most important characteristics of seeds that affect germination, seedling establishment and seed yield quality. Other studies on seed size in various plant species such as carrots, clover, wheat, barley, chickpea, soyabean and cowpea higher germination, seedling dry weights, food storages, and other yield components around the world (Roozrokh *et al.*, 2005).

In a similar work by Kaydan and Yagmur (2008), there were highly significant (P<0.05) differences among mean germination of larger and medium cowpea seeds, where larger seeds performed better. However, despite the wide spread report on the relative advantages of larger seeds on seed vigor and yield components, yet few scholars like Munir and Abdel-Rahman (2002) still argue that seed size could not influence plant performances in faba beans as reported by Ambika *et al.* (2014). This conflicting position further gave room for confirmatory research works of this kind. Therefore, the current work is aimed at testing the effects of different seed sizes on cowpea seed germination, seedling establishment and early growth characteristics, considering the lack of such information in the study area.

#### **MATERIALS AND METHODS**

#### The Study Area

The study was carried out at the Teaching and Research farm of University of Maiduguri, Borno State. Maiduguri city is located at latitude 11 50' 42"N and 13 9' 36" E, and finally within the Sahel Savanah vegetation of Nigeria. Maiduguri has both rainy (June - October) and dry seasons (November - May) of a tropical climate. The climate of the state is hot and dry for the greater part of the year (Nwagboso and Uyanga, 1999). The annual rainfall amounts vary between 499 and 951mm received in the area with a predominantly sandy loam soils (Appendix 1).

#### Seed Sources and Sorting

A local variety cowpea seeds (*Vigna unguiculata*) were sourced from the Monday Market, Maiduguri. The seeds are brown in color and weighed between 0.15 g and 0.30 g. Viability test was performed using floatation method. The viable seeds sunk beneath and the non-viable seeds floated on water. The viable seeds were later dried, while the non-viable seeds were discarded. The seeds were then sorted into 3 groups based on their sizes as large, medium and small, which respectively weighed between 0.15 - 0.19 g; 0.20 - 0.25 g; and 0.26 - 0.30 g). Each of the 3 seed grades consisted of 15 seeds, giving a total of 45 seeds used for this study. Ambika *et al.* (2014) similarly sorted seeds into large, medium, small and very small when studying seed size effects on some arable crop seeds.

#### Soil Sterilization, Experimental Design and Nursery Operation

Sandy loam soils were collected from the Teaching and Research Farm of

(85)

University of Maiduguri and placed in a sterilizing tank, then steamed for 40 minutes. The sterilized soil was allowed to cool at room temperature and later transferred into well labeled polythene bags and watered. The experiment was laid out in completely randomized design (CRD) and replicated 5 times. The large, medium and small sized seeds were respectively sown to 5 polythene bags for each seed grade at a rate of 3 seeds per bag and separated by an alley of 1 m apart. The seeds were later thinned down to 2 seeds per polythene bag.

#### **Experimental Design**

Fifteen seeds each from large, medium and small sized grades were respectively sown to each of the replications at 1 cm depths in the polythene bags, where the cowpea seed germination, growth and yield components were timely observed.

#### **Data Collection**

#### Seed Germination and Seedling Establishment

The seed germination was determined at 1 week after sowing (WAS) by physically counting the germinated cowpea seeds and their percentages computed for each seed size. Also, the seedling establishment was done by still counting the number of surviving seedlings at 2-WAS, and their percentage survival in terms of each seed size was as well computed.

#### **Data Analysis**

The data collected on seed germination, seedling establishment, growth characteristics, and the shoot and root biomass were subjected to the generalized linear model of Statistix 9.1 for the analysis of variance (ANOVA). The sample means were also separated using LSD at 0.5 level of significance.

#### **RESULTS AND DISCUSSION**

#### **Germination and Seedling Establishment**

The results on seed germination count and seedling establishment are presented in Table 1. The results showed that all the large sized seeds had better germination (95%) in comparison to other grades of seeds evaluated. The medium sized cowpea seeds trailed with 86.75% germination, while the small sized cowpea seeds followed with 83.50% germination. Conversely, the seedling establishment was patterned after seed germination in this study. However, there was a significant (P<0.05) difference among the treatment effects on the percentage seedling establishment compared to percentage germination which did not differ significantly (P<0.05). A similar work by Nagaraju (2001) reported higher germination of 93.95% and field emergence of 83% in large seeds compared to smaller seeds of sunflower. In addition, Ahirwar (2012) also reported that larger seeds had higher germination of 76%, followed by medium and small sized seeds with 74% and 59% respective germinations in *Alangium Lamarckii Thwaites*. The

higher germination and vigour of larger seeds could be due to the presence of higher amounts of carbohydrates and other nutrients than in the medium and small sized seeds (Ambika *et al.*, 2014)

Seed size	Germination	Seedling	Percent Seed	Percent Seedling
	Count	Establishment	Germination (%)	Establishment (%)
Large	14.25 <sup>a</sup>	13.50 <sup>a</sup>	95.00	94.50 <sup>a</sup>
Medium	13.00 <sup>ab</sup>	11.75 <sup>ab</sup>	86.75	92.50 <sup>ab</sup>
Small	12.50 <sup>ab</sup>	11.50 <sup>ab</sup>	83.50	90.00 <sup>ab</sup>
SE (±)	1.13	1.17	NS	3.85

			· ·	/					
Table	1:	Treatment	effects	on seed	germination	and see	edling e	stablishmei	ıt

*Key*: *Means in the same column having the same letter(s) are not significantly different at 5% level* 

#### **Effect of Seed Size on Cowpea Growth Parameters**

The effects of seed size on the heights of cowpea are presented in Table 2. The results showed that the plant heights, number of leaves, stem diameter and number of branches were significantly (P<0.05) affected by the seed size grades. The larger cowpea seed sizes recorded the highest plant heights, number of leaves, number of branches and stem diameters followed by the medium sized cowpea seeds. The small sized cowpea seeds had the least plant growth in this study. The results of effect of seed size on cowpea growth parameters at 4-WAS are still presented in Table 2. The results showed that all the growth parameters studied were more influenced by larger seed sizes than both the medium and small sized seeds. Nagaraju (2001) also reported higher increases in plant heights, number of leaves and stem diameters by 97.83%, 7.58 and 6.98 mm respectively, with larger seed sizes. As it was the case for studies at 2-WAS, the observations made during 4-WAS on the same growth characteristics revealed a repeated pattern of treatment effects.

Seed Size	Plant height	Number of leaves	Number of	Stem diameter
	(cm)		branches	(mm)
		<u>2 – W</u>	AS	
Large	16.04 <sup>a</sup>	61.61 <sup>a</sup>	23.33 <sup>a</sup>	1.23 <sup>a</sup>
Medium	15.28 <sup>b</sup>	46.33 <sup>b</sup>	11.67 <sup>b</sup>	1.16 <sup>b</sup>
Small	12.26 <sup>c</sup>	37.67 <sup>c</sup>	11.33 <sup>c</sup>	0.99 <sup>c</sup>
Mean	14.54	48.54	16.22	1.13
SE (±)	0.008	0.008	0.008	0.008
		4 - W	AS	
Large	18.35 <sup>a</sup>	79.20 <sup>a</sup>	25.67 <sup>a</sup>	1.46 <sup>a</sup>
Medium	17.42 <sup>a</sup>	70.25 <sup>b</sup>	21.33 <sup>b</sup>	1.34 <sup>b</sup>
Small	13.00 <sup>b</sup>	67.20 <sup>b</sup>	18.33 <sup>c</sup>	1.25 <sup>c</sup>
Mean	16.25	72.18	21.78	1.35
SE (±)	0.472	0.067	0.008	0.009
		<u>6 – W</u>	AS	
Large	21.33 <sup>a</sup>	114.33 <sup>a</sup>	38.67 <sup>a</sup>	1.62 <sup>a</sup>
Medium	21.09 <sup>b</sup>	107.33 <sup>b</sup>	37.20 <sup>b</sup>	1.54 <sup>b</sup>
Small	16.73 <sup>c</sup>	83.33 <sup>c</sup>	31.15 <sup>c</sup>	1.44 <sup>c</sup>
Mean	19.70	101.55	35.67	1.72
SE (±)	0.048	0.048	0.048	0.025

Table 2: Effect of seed size	on Cowpea growth p	arameters at 2, 4 and 6-WAS
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*Key*: *Means in the same column having the same lett er(s) are not significantly different at 5% level* 

It was only plant height that didn't differ significantly (P<0.05) between plots sown with large and medium seeds in this study. The results of the effects of seed size on cowpea growth parameters at 6-WAS showed that all the plant growth parameters still increased proportionally to the seed sizes. The large seeds recorded significantly (P<0.05) higher growth influences on the cowpea plants, followed by

the medium sized seeds, than the small sized seeds. Kaydan and Yagmur (2008) also reported higher seed germination, emergence and related agronomical aspects in many crop species. According to Cookson *et al.* (2001), larger seed sizes positively correlated with vigorous seedling growth in wheat.

#### Effect of Seed Size on Cowpea Shoot and Root Biomass Yields at 4-WAS

The results of the effect of seed size on cowpea shoot and root biomass yields are presented in Table 4. The results generally depicted a similar pattern of seed size effects on both the shoot and root biomass in this study. The larger sized seeds recorded significantly (P<0.05) higher shoot biomass, than the medium sized seeds and the smaller sized seeds with the least shoot biomass. The root biomass yield followed suit with that of shoot biomass, which also had a directly proportional yields to the cowpea seed sizes. Stougaard and Xue (2005) opined that 18% of increased yields could be attributed to larger seed sizes in wheat. In addition, Morrison and Xue (2007) reported that smaller seeds produced lower dry matter yields than medium, large and unscreened seeds. Similarly, Mehmet *et al.* (2011) and Nik *et al.* (2011) also reported that plants grown from larger seeds were more vigorous and produced greater dry matter yield than those of both medium and small sized seeds of wheat.

Seed Size	Shoot Biomass (g)	Root Biomass (g)
Large	20.08 <sup>a</sup>	2.87 <sup>a</sup>
Medium	19.67 <sup>b</sup>	2.07 <sup>b</sup>
Small	11.20 <sup>c</sup>	2.18 <sup>c</sup>
Mean	16.98	2.37
SE (±)	0.048	0.018

Table 3: Effects of seed size on cowpea shoot and root biomass yield at 6-WAS

*Key*: Means in the same column having the same letter(s) are not significantly different at 5% level.

#### **Conclusion and Recommendation**

From the results of this work, it suffices to conclude that cowpea seed sizes strongly correlates with plant growth parameters, proportionally. It also implies that the larger the cowpea seed size, then the more the cowpea seed germination, seedling vigor growth and yield components.

It is therefore recommended that cowpea farmers in the study area should use larger sized cowpea seeds during propagations for profitable production of cowpea yields.

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#### Analysis of the Effect of Economic Variables on the Profitability of Yam Marketers in Kogi State, Nigeria

By

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#### ABSTRACT

The study analysed the effects of economic variables on the profitability of yam marketers in Kogi State, Nigeria. The study specifically described the marketing channel for yam, examined the market performance of yam, determined the effect of selected economic variables on the profitability of vam marketers, and identified constraints to vam marketing in the state. A sample size of 200 vam marketers were proportionately selected from the four agricultural zones (A, B, C and D) in the state for questionnaire administration. Data obtained from these respondents were analysed using descriptive statistics, OLS regression analysis and mean score from a three point Likert type of scale. Results showed that yam marketing in the state had decentralized distribution channel. Market in agricultural zones B and C had significant correlation coefficient in their marketing performance. Transportation cost, rent/levies/commission, and quantity of vam purchased influenced vam marketers' profitability at 5% level. Furthermore, vam marketers in the state were constrained with inadequate market infrastructure, lack of uniform measure, long chain of distribution, and seasonality of the product. It is recommended that government should provide adequate transportation facilities and provision of extension services on marketing system and information to rural marketers.

Keywords: Marketing, Variables, Exponential, Performance, Channels

#### INTRODUCTION

Yam, a tropical crop in the genus *Dioscorea*, has as many as 600 species out of which six are economically important staple species. These are: *Dioscorea rotundata* (white guinea yam), *Dioscorea alata* (Water yam), *Dioscorea Cayensis* (yellow yam), *Dioscorea bulbifera* (aerial yam), *Dioscorea esculanta* (Chinese yam) and *Dioscorea dumetorum* (trifoliate yam). Out of these, *Dioscorea rotundata* (white yam) and *Dioscorea alata* (water yam) are the most common species in Nigeria (Acquah *et al.* 2007). According to Food and Agricultural Organisation (FAO, 2002), yam is one of Nigeria's leading root crops, both in terms of land under cultivation, the volume and value of production.

In 2005, FAO reported that Nigeria produces about 66.6% (26.6 million metric tons) of total world's yam production, with Ghana producing 9.8% (3.9 million metric tons) every year. Yam tubers are the consumable product of yam crop, and the tubers are sources of carbohydrate. The tubers can be prepared for consumption by boiling and eating with stew, roasted and eating with stew, boiling and pounding and eaten with stew, as pottage, yam balls, peeled, sliced and fried into yam chips (Opeke 2006).

Yam production in Nigeria has witnessed increased output yet has not been able to meet the demand of the people (FAO, 2002). Oyaide (2002) observed that this insufficiency is as a result of an increase in the Nigeria population. He noted that the growth rate of the Nigerian population is 4.3 percent as against the agricultural growth rate of 3.2 percent. So, the gap between domestic supply and demand is still wide but in favour of demand.

Yam marketers constitute an overwhelming population of those who are involved in agricultural produce marketing. According to Onyeabor (2009), yam marketing depicts a picture of a process of demand and motivation of sellers to distribute food items unto ultimate consumers at a profit. Olayemi (2004) observed that yam marketing is a very important but neglected aspect of agricultural development. He noted that more emphasis is usually placed by government on policies to increase food production with little or no consideration on how to distribute the food produced efficiently and in a manner that will enhance increased productivity and profitability.

The study was designed to analyse the effects of economic variables on the profitability of yam marketers in Kogi State, Nigeria. Precisely, the study described the marketing channel for yam, examined the performance of yam market, determined the effect of selected economic variables on the profitability of yam marketers, and identified constraints to yam marketing in the study area.

#### LITERATURE REVIEW

There are approximately 200 different varieties of yam with flesh colours varying from white to ivory to yellow to purple while their thick skin comes in white, pink or brownish-black. Their shape is long and cylindrical (oftentimes having offshoots referred to as "toes") while their exterior texture is rough and scaly. Moalic *et al* (2001) reported that although yam tubers are available throughout the year their season runs from October through December when they are at their best.

The nutritional value of yam in diet is remarkable. Yam contains a higher value in protein (2.4%) and substantial amount of vitamins (Thiamine, Riboflavin and Ascorbic acid) and some other minerals like calcium, phosphorus, Vitamins and

iron than any other common tuber crop (Otitolaiye and Hamzat, 1999 and Oyenuga, 1968). It is also comparable to any starchy root crop in energy and the fleshy tuber is one of the main sources of carbohydrate in the diet of many Nigerians. CGIAR (1996), further reported that the protein, phosphorus and potassium content of yam is considerably high than in sweet potatoes though the latter is richer in Vitamin A and C. Yam is a preferred food and a food security crop in some sub-Saharan African countries. Yam could be eaten as boiled yam or fried in oil.it can also be processed into yam flour or pounded yam. In many yam producing areas of Nigeria, yam is "food and food is yam" (Babaleye, 2003).

Kohls and Downey (2002) described agricultural marketing as "the performance of all business activities involved in the flow of agricultural goods and services from the point of initial production to the point where they are in the hands of customers. Abbot and Makehan (2000) described agricultural marketing, as including the selling to farmers of supplies needed for production. These include fertilizers, pesticides other agricultural chemicals, livestock feeds, farm machinery tools and equipment. Adegeye and Dittoh (2005) pointed out that marketing is concerned with all stages of operation which aid the movement of commodities from the farms to the consumers and this include: assemblage of goods, storage, transportation, processing, grading of all these activities. According to them, agricultural marketing also involves the supply of raw materials to processing industries and the marketing of processed products including an assessment of demand as well as related to agricultural marketing.

Profit is the excess of revenue over cost. Profit making is the major goal of any business because its realization leads to the attainment of other goals. Marketing profits are measured as net marketing contribution (NMC) (Ehirim *et al.*, 2003). Net marketing contribution is composed of three major components: sales, percent gross margin and marketing & sales expenses (M&SE). Marketing not only influences net profit but also affect investment levels (Farris *et al* 2010). According to Kohls and Uhl (1990), profits vary depending on the risk of business and the competitive nature of its markets.

#### METHODOLOGY

The study was carried out in Kogi State, North Central, Nigeria. Kogi State is located on latitude 6°30'N and 8°48'N and longitude 5°23'E and 7°48'E. The major occupations of the people are farming, civil service and trading among others. Kogi State has a total land Area of 29, 833km2 (11,518.659 square miles), population estimate is 3,595,789 (Federal Republic of Nigeria 2007). Kogi State has two seasons, wet and dry seasons. The wet season begins in March and ends in October and the dry season spans between November and March. The annual rainfall is between 106mm and 1524mm while the mean daily temperature ranges between 24° centigrade and 27° centigrade. There is a wide stretch of arable land for farming,

good grazing ground for livestock and large bodies of water for fishing. Cash crops commonly grown in commercial quantities include yam, cassava, rice, maize, beniseed (sesame), guinea corn, cocoa, coffee, cashew and oil palm. About 381,000 hectares of the total land area of Kogi State is under forest cover. The resources are very valuable for construction and furniture industries (Agricultural Development Project 2014).

One Local Government Area (LGA) was purposively selected from each of the four agricultural zones (A, B, C and D) in the state. The LGAs were selected due to their high level of involvement in yam marketing. One major market was selected from each LGA. The sampling procedure is shown below:

LGAs Selected	Sample Frame	Sample Size	Percentage
Kabba /Bunu	3313	24	12
Dekina	12895	94	47
Ajaokuta	1897	14	7
Ofu	9316	68	34
Total	2,7421	200	100

### Table 1: Distribution of Sample Size

Questionnaire was administered to the sampled respondents for data collection. Data obtained from the respondents were analysed using descriptive statistics, Ordinary Least Square (OLS) multiple regression model and mean score from a three point Likert type of scale.

### **OLS Multiple Regression Model**

This model was used to determine the effect of economic variables on profitability of yam marketers. The model for the multiple regression is specified thus;

 $Y = \beta_{o} + \beta_{1}X_{1} + \beta_{2}X_{2} + \beta_{3}X_{3} + \beta_{4}X_{4} + \beta_{5}X_{5} + \beta_{6}X_{6} + \beta_{7}X_{7} + e_{i}$ 

(95)

Where: Y = Profitability (in naira)  $X_1 =$  Transportation cost (in naira)  $X_2 =$  Quantity of yam purchase (in kilogram)  $X_3 =$  Educational level of the marketers (in years)  $X_4 =$  Cost of labour for loading/ offloading (in naira)

$$\overline{X} = \frac{FX}{N}$$

Where:  $\times$  = mean response, =summation, F = number of respondents choosing a particular scale point, X = numerical value of the scale point and N = total number of respondents.

Mean Score	v	100
Scale Point	Λ	1

#### **RESULTS AND DISCUSSION Channel of Yam Marketing**

The channel of yam marketing in the study area is shown in Figure 1 and Table 1



Figure 1: Marketing Channel for Yam in Kogi State, Nigeria Source: Field Survey, 2014.

Figure 1 shows that apart from the normal flowing sequence of yam from farmers to assemblers to wholesalers, to retailers and consumers, other interaction existed where the wholesalers and the retailers form an important group of intermediaries handling yam directly from the farmers.

Table 1. Categories of Tam Marketers					
Category	Frequency	Percentage			
Farmers	75	37.50			
Local assemblers	46	23.00			
Wholesalers	60	30.00			
Retailers	19	9.50			
Total	200	100			

#### Table 1: Categories of Yam Marketers

Source: Field Survey, 2014

Table 1 indicated that 37.50 percent of the yam marketers purchased yam from the farmers directly, 23 percent from local assemblers, 30 percent from wholesalers while only 9 percent purchased yam from the retailers. Also the handling of yam by retailers directly from the assembler existed in marketing of yam in the study area. This is an evidence of a decentralized distribution channel. This finding agrees with Ilori (2002) in a similar study.

#### Yam Market Performance

Market performance is the assessment of how well the process of marketing is carried out and how successfully its aims are accomplished. Olayemi (2004) considered the two major points in market performance to include market integration and average prices.

The essence of market integration is to determine whether there is a significant relationship between prices in two (2) markets. That is, whether there is a relationship between the prices per tuber in the various markets. Result in Table 2 indicated that only markets in zone B and zone C correlation coefficient was significant with 0.447. This implies that prices in the two markets were co-integrated while correlation coefficients between markets in other zones were not co-integrated. This could be as a result of variation in the purchase and selling price in both markets.

Market Integration	<b>Correlation Coefficient</b>		
Markets in Zone A and Zone B	0.035		
Markets in Zone A and Zone C	0.018		
Markets in Zone A and Zone D	0.123		
Markets in Zone B and Zone C	0.447		
Markets in Zone B and Zone D	0.052		
Markets in Zone C and Zone D	0.091		
Source: Field Survey 2014			

Average prices (total cost and total revenue) at different market in the zones for 50 tubers are presented in Table 3. The result shows that all yam marketers in Kogi state sell their product at prices more than the cost price. Even though the market in zone A tends to sell at higher prices, the result of the survey revealed that they do not earn much profit than markets in other zones. This could be attributed to higher cost incurred in the marketing process.

Prices [N] 50 tubers			
Total	Total Cost	Profit(TR-TC)	
Revenue(TR)	(TC)		
2500	9000	3500	
/500	6000	1500	
500	7000	2500	
0000	8000	2000	
5000	12000	3000	
1000	8000	3000	
2500	9000	3500	
1500	9000	2500	
7500	15000	2500	
3000	10500	2500	
4000	11500	2500	
4300	11000	3300	
	Trees (I           'otal           tevenue(TR)           2500           500           500           5000	Trees [1] 00 (addis)           otal         Total Cost           tevenue(TR)         (TC)           2500         9000           500         6000           500         7000           0000         8000           5000         12000           1000         8000           2500         9000           1500         9000           7500         15000           3000         10500           4000         11500	

Table 3:	Average	Price	Per 5	50 tubers	at Different	Levels	ſ₩I
14010 01				o ensers	at Dinerent		1.1

Source: Field Survey, 2014

#### Effect of Economic Variables on Yam Marketers' Profit

Output of the OLS analysis on the effect of economic variables on yam marketers' profit is presented in Table 4.

Out of the (7) seven variables included in the model, four (Transportation cost  $X_1$ , quantity of yam purchase  $X_2$ , educational level  $X_3$  and rent/levies/commission charge  $X_5$ ) were statistically significant. This indicates that these variables have influence on yam marketer's profit.

Transportation cost was found to be positively related to yam marketer's profitability and significant at 5 percent. This indicates that holding other variables constant and increasing transportation cost will lead to increase in yam marketer's profit. This agrees with Hail (2009) who reported that cost of transportation had important influence upon market prices and income received by marketers.

The coefficient for quantity of yam purchase was positive and statistically significant at 1 percent level. This is an indication that an increase in the quantity of yam purchased, holding all other variables constant will lead to an increase in yam marketer's profit. The result on educational level shows that the variable had direct relationship with marketers' profit and significant at 10 percent, implying that an increase in educational level of the yam marketer's profitables constant will lead to an increase in yam marketer's profit and significant at 10 percent, implying that an increase in educational level of the yam marketer's profitability. This finding agrees with Bzugu *et al.* (2005), that the level of education influenced yam marketer's profit.

Table 4 also indicated that rent/levies/communication charges showed a negative coefficient and was statistically significant at 5 percent level, implying that an increase in rent/levies/communication charge will lead to a decrease in yam marketers' profit, while decrease in rent/levies/communication charges holding all other variables constant will lead to increase in yam marketers' profit.

Variables	Linear	Double log	Semi log	Exponential
Constant	13720.61	4.552937	-94783.53	9.482452
	(1.20)	$(4.04)^{*}$	(-1.95)***	$(28.08)^{*}$
Transportation cost	0.3718393	-0.0045777	-289.8671	0.0000987
	(0.27)	(-1.04)	(-1.52)	(2.38)**
Quantity of yam purchased	22.93777	0.816873	23285.32	0.0007259
	$(12.87)^{*}$	$(17.74)^{*}$	$(11.69)^*$	$(13.78)^{*}$
Educational level	1522.194	0.0569724	1322.88	0.0528832
	(1.41)	(1.33)	[0.71]	$(1.66)^{***}$
Cost of labour, loading/offloading	-0.2810637	0.009163	17.816611	-8.54e-06
	(-1.31)	(1.57)	(0.07)	(-1.34)
Rent/levies/commission charges	-0.3214096	-0.0067818	-317.11	-6.50e-06
	(-3.07)*	(-2.93)*	(-3.17)	$(2.10)^{**}$
Selling price	-27.88676	0.0244035	-5054.706	-0.0012678
	(-0.37)	(0.12)	(-0.57)	(-0.56)
Communication charges	-96.8565	-0.0543257	-3672.869	0.0243294
	(-0.10)	(-1.15)	(-1.95)***	(0.89)
F-ratio 7, 192	38.35	103.43	42.37	47.94
_	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$\mathbf{R}^2$	0.5830	0.7904	0.6070	0.6361

 Table 4: OLS Regression Output on the Effect of Economic Variables on Yam

 Marketers' Profit

Source: Computed from Field Survey Data, 2014.

**Notes**: Figures in parenthesis are t-values \*, \*\*, and \*\*\* denote 1, 5, 10 percent level of significance respectively.

#### **Constraints to Yam Marketing**

Major constraints to yam marketing identified by the respondents are presented in Table 5. Inadequate market infrastructure also ranked moderately severe with a mean score of 2.31 and a proportion of 77 percent of the respondents, lack of uniform measurement was ranked as moderate constraints with a mean score of 2.15 and a proportion of 71.5 percent. The result agreed with Adegeye and Dittoh (2005) that most agricultural product is seasonal while the demand is stable throughout the year. This could be attributed to the fact that prices of most products do not remain constant following the chain of distribution in each season since they follow some regular seasonal pattern.

Constraints	HS	MS	NS	Mean	Proportion
				score	(%)
Inadequate market infrastructure	30	78	92	2.31	77.0
Lack of uniform measurement	42	87	71	2.15	71.5
Seasonality and perishability of the product	38	109	53	2.08	69.2
Poor transportation	54	111	35	1.91	63.5
Inadequate storage and warehousing facilities	78	80	42	1.82	60.7
Inadequate funding	113	71	16	1.52	50.5

### Table 5: A 3-point Likert type of scale on the constraints to yam marketing

Field Survey, 2014; HS= Highly Severe, MS= Moderately Severe, NS= Not Severe

Seasonality and perishability of the product had a mean score of 2.1 with a proportion of 69.2 percent which was moderately severe. This agrees with Okorie (2001) that there is loss of total rational yam production due to perishability nature of the product. The implication may be due to seasonal nature of the product.

Poor transportation ranked moderately severe with a mean score of 1.91 and proportion of 63.5 percent. According to Osuji (2010), road networks as well deplorable state of Nigeria roads hinder food crop distribution. Hail (2009) also asserted that costs of transportation had important influence upon market prices and income received by African marketers. The reason could be inadequacy of

vehicles and majority of feeder roads are not motorable during the rainy season resulting in high cost of transport charged. More so, instability of the price of Petroleum Motor Spirit-PMS (petrol) in Nigeria could lead to increased cost of transporting yam.

#### **Conclusion and Recommendations**

The marketing channel for yam in the study area is the decentralized one involving a fairly large number of traders effecting the distribution of yam from the producer to the final consumer. Transportation cost, quantity of yam purchase, educational level and rent/levies/commission charges significantly influenced the profit of yam marketers.

Based on the findings, the following recommendations were made:

1. There should be provision for adequate transportation facilities. Government should create conducive environment that would encourage private vehicle owners to set up commercial transportation services. Duties on new vehicles and spare parts should be reduced to make them affordable to intending transporters.

2. Taking into cognizance the role of education in yam marketers' profitability, government at all levels should organize extension services to educate marketers on marketing system. This will enhance their knowledge with its multiplier effect on increased profit.

3. Processing, grading, packaging, efficient handling facilities should be made available to both the farmers, marketers and consumer of agricultural food product in order to avoid post-harvest losses which will in turn improve farmers/marketers income, increase his purchasing power and result in food security.

4. There should be uniform unit of measurement, large market size and proper dissemination of duty by the security agencies for effective long chain of distribution.

5. The yam marketers should take the trade union more serious, as this will make the trade to have one voice and unity, which will enhance effective decision making.
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# Analysis of Constraints to Cassava Production Among Small Scale Farmers in Kogi State, Nigeria

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# ABSTRACT

The study was about factors constraining cassava production in Kogi State, Nigeria and it was carried out in 2011. Primary data which were used for the study were obtained by interviewing randomly selected 360 cassava farmers with a structured questionnaire. Information collected from the farmers was on constraints encountered in the use of inputs like land, fertilizer, labour, and on the disposal of cassava output. Farmers were asked to rate the severity of the constraints with the use of Likert scale and the data obtained were analysed with mean score model. Results indicated that scarcity of land, high cost of labour, high cost and scarcity of fertilizer, low market prices of cassava products among others were rated as very serious or just serious constraints to cassava production. Recommendations made to ameliorate these problems include reviewing land tenure system to make more land available for cassava production, encouraging youths to remain in the rural areas to provide labour, making fertilizers and herbicides available to farmers at cheap prices and encouraging farmers to form cooperative societies from where they can get loan for their farm activities among others.

Key Words: Cassava, Production, Constraints, Farmers

# INTRODUCTION

Cassava (*Manihot esculenta crantz*) is a perennial crop that stores food in its roots. It originated in North-East Brazil and Central America and was probably first grown for food by American Indians in those areas (Onwueme and Sinha, 1999). Cassava was brought to Nigeria from Brazil by the Portuguese traders who first landed on the southern coast between Bonny and Koko ports and became accepted and integrated into the farming systems of southern Nigeria (Ekandem, 1964). Emancipated slaves from Brazil, the West Indies and Sierra–Leone who returned to parts of southern Nigeria after the 1850s played an important role in stimulating the acceptance of cassava (Agboola, 1979). These emancipated slaves who knew how to process the crop into food of various forms settled among the local people of Lagos, Badagry, Abeokuta and Ijebu to whom they imparted their knowledge and also popularized the consumption of cassava products in the local food

economy (Agboola, 1979). In Eastern Nigeria, the crop was first introduced into the towns along the coast such as Calabar, Yenegoa and Port–Harcourt (Ekandem, 1964). With the acceptance of the crop in southern Nigeria, it soon began to spread into the interior. The movement of population between the south and the north and the improvement in communication tremendously helped to spread the crop inland. Cassava is now very popular among Nigerian farmers. Nigeria is currently the largest producer of cassava in the World with an estimated annual output of 37 million tones (FAO, 2004). It is a crop of high rainfall region and so most of its cultivation is in the southern and central regions of Nigeria.

The tuberous roots of cassava is the most valuable part because of its starch content which is prepared into different food recipes for human consumption. The leaves are used as vegetable because they supply protein, minerals and vitamins (Bokanga, 2004). The leaves, peels and flesh are used as animal feed (Aduku, 2004). Cassava has industrial uses in the production of alcohol and starch. Cassava is capable of filling the gap in food supply created by inadequate production of many food crops because it can grow on marginal soil. It does not require much of the labour and other inputs expended in the production of other crops. It has low fertilizer requirement because its bunchy leaves later drop on the floor to provide manure. The leaves also form canopy which protect the soil from the direct rays of the sun and hitting of drops of rain and their attendant consequences.

Despite all these comparative advantages in the domain of cassava production, most farmers cannot obtain the recommended yield on their farms. This is partly because most farmers produce on small pieces of land that are often scattered because of the prevailing land tenure systems in their localities which place limit on the amount of land they can inherit. Moreover, these small pieces of land are cultivated continuously without regard to fallow and natural regeneration of the soil nutrients. There is general poverty among the farmers as a result of low output. The financial market is not properly developed to inject enough capital into the system to empower the farmers. Our cassava and other crops are not doing as expected. Yet, previous studies in the area have not focused and identified problems that hinder the farmers from obtaining the recommended yields on their farms. Therefore, this study was carried out to identify some of those factors that make cassava to perform below standard and make necessary suggestions to ameliorate the situation.

# Materials and method

The study was carried out in Kogi State of Nigeria between June and November, 2011. The State is located between latitude  $6^{\circ}30$ 'N and  $8^{\circ}50$ 'N and Longitude  $5^{\circ}51$ 'E and  $8^{\circ}.00$ 'E (KOSEEDS, 2004). The State has a total population of 3, 278,487 people based on the 1996 population census which is made up of 1,691,737 males

# and 1,586,750 females.

A multistage random sampling technique was used to select the respondents for the study. In stage one, three Agricultural Zones out of the four Agricultural Zones were purposively selected for the study because cassava production was dominant there. In stage two, two Local Government Areas were selected from each agricultural zone. In stage three, four settlements that were well known in cassava production were selected from each Local Government Area making eight settlements from each Agricultural Zone. In stage four, a sample of 15 cassava farmers were selected from each settlement and interviewed with a well structured questionnaire. Therefore, the sample was made up of 120 cassava farmers from each Agricultural Zone and a total of 360 cassava farmers for the State.

Objective of the study was achieved by allowing the respondents to weigh the constraints to cassava production with a three point likert scale. The constraints were weighed as very serious (3), serious (2) and not serious (1) and these were analysed using mean score model in the tradition of (Osuala, 1993). The mean score model was stated as follows:

	VS	Ν	NS	Mean	propo	ortion of
Constraints				Score	respo	ndents (%)
Inadequate farm land	330	30	0	2-8	96-7	
High cost of labour	332	28	0	2.9	97.3	
High cost of fertilizers		292	64	4	2.8	93.3
Scarcity of fertilizers	280	64	16	2.7	91.0	
Losses due to pests and diseases		0	36	324	1.1	36.7
Inadequate extension service 0		33	316	1.0	32.3	
Low market prices of cassava232		92	36	2.5	84.7	
Inadequate credit facilities		256	72	32	2.6	87.3
High cost of transportation		332	28	0	2.9	97.3
Inadequate processing facil	lities	260	92	8	2.7	90.0
High cost of pesticides		36	33	280	1.3	42.0
High cost of herbicides		68	228	64	2.0	67.0
Pilferage of cassava produc	ets 124	204	32	2.3	75.3	

Table 1: Farmers' ratings of the constraints to cassava production

Legend: VS=Very serious; S=Serious; NS=Not serious. Source: Field Survey Data, 2011.

There is scarcity of labour as a result of the migration of able bodied youths from the rural areas to the cities, ageing of the current farmers, emergence of some white collar jobs such as teaching and agricultural extension services in the rural areas

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and increase in school enrolment by rural youths. All these result in scarcity of labour and the tendency for the few available ones to ask for more pay.

High cost and scarcity of fertilizers which were presented as separate constraints were rated as very serious with mean scores of 2.8 and 2.7 respectively. The proportions of the respondents who agreed with the ratings were 93.3 percent for high cost of fertilizers and 91.0 percent for scarcity of fertilizers. This is in agreement with the finding of (Saliu, 2010) who found out that 89.4 percent and 82.8 percent of the farmers in Kogi and Benue States respectively rated high cost and scarcity of fertilizers as very serious constraints. A bag of fertilizer was sold between N3,000.00 and N5,000.00. This means that one hectare that required 8 bags of fertilizers will cost a farmer between N24,000.00 and N40,000.00. Farmers cannot invest this huge amount of money on fertilizers alone.

Majority of the respondents with a mean score of 2.5 and a proportion of 84.7 per cent of the respondents rated low market prices of cassava as a very serious constraint. Prices of cassava have great role to play in how farmers allocate their land and other resources to cassava production. Unfortunately, farmers cannot determine the prices at which they sell their cassava and its by-products. Prices of cassava in the national and international markets depend on the forces of demand and supply. In the national market, the price of cassava can be as low as N5,000.00 per tone while in the international market the importing countries seem to play more significant role in price formation than the exporting countries (Federal Institute of Industrial Research Oshodi FIIRO, 2006).

Inadequate credit facility was rated as a very serious constraint with a mean score of 2.6 and a proportion of 87.3 percent of the respondents. This result is in agreement with (Mbah, 2008) who reported that capital was still a major hindrance to increased rural production in Owerri, Imo State, Nigeria. Credit in form of money is needed to buy farm inputs and improved technologies. Most farmers don't have access to it because of their low income and absence of collateral security with which they can take loan from commercial banks.

High cost of transportation was rated as a very serious constraint with a mean score of 2.9 and a proportion of 97.3 percent of the respondents. A good transport system is necessary for the movement of people, inputs and outputs in agriculture. An inefficient and expensive transport system adversely affects input and output cost and supply thereby reducing farmers' potential income (International Institute of Tropical Agriculture IITA, 1990).

Inadequate processing facilities were rated as a very serious constraint with a mean score of 2.7 and a proportion of 90.0 percent of the respondents. Cassava root tubers

are highly perishable and so they should be processed into various forms soon after harvest. The roots should be processed almost immediately after harvest to avoid deterioration because enzymic processes of deterioration accelerate 2-3 days after harvest (Fulani and Anda, 2006).

High cost of herbicides was rated as a serious constraint with a mean score of 2.0 and a proportion of 67.0 percent of the respondents. This is in agreement with (Olatunji, 2008) who found that farmers in Abia and Akwa Ibom States experienced difficulty with obtaining the required quantity of herbicide, timely supply of required quantity of herbicide and cost of required quantity of herbicide with mean score of 3.40, 2.75 and 2.27 respectively. Herbicide is a new technology in cassava production and its adoption and wide usage will reduce the cost of production as less man days of labour will be required for supplementary weeding.

Pilferage of cassava products was rated as a serious constraint with a mean score of 2.3 and a proportion of 75.3 percent of the respondents. Theft of cassava products disposes farmers of their investment leading to loss of income. Pilfering is a determining factor in the adoption and use of new technologies in agriculture because farmers who have fallen victims of pilferage and suffered great financial losses are likely going to reduce their investments in farming, and may eventually become reluctant to adopt and use agricultural innovations (Anonguku, Obinne and Daudu, 2008).

Losses due to pest and diseases, inadequate extension service and high cost of herbicide were presented to the farmers and were rated as no constraints to cassava production in the area.

# Conclusion

Cassava production is a farm business with many challenges. Farmers and those that are outside farming derive food and other benefits from its production. The challenges encountered are in the area of input supply, marketing and product transformation.

# Recommendations

Based on the findings of this study, the following recommendations are made to improve cassava production in Kogi State and Nigeria as a whole.

Land tenure system in operation in different parts of the country should be reviewed to make more land available to cassava farmers.

Projects that will make youths to stay in rural areas should be embarked upon so that rural-urban migration can be minimised. Electricity, pipe bone water and schools should be provided for this purpose.

Fertilizers, herbicides and other agricultural chemicals should be made available at cheap prices for farmers to use. Most of our farm lands have lost their natural nutrients and so they need artificial fertilizers to supplement the nutrients.

Farmers should be encouraged to form cooperative societies from where they can obtain loan for their farm operations. Farmers can also negotiate and get better prices for their farm produce through cooperative societies.

Good transport system should be put in place to reduce cost of transporting farm produce. Roads should be constructed to link up farm areas. Spare parts for vehicles should be made available at affordable prices.

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# GOVERNMENT EXPENDITURE ON INFRASTRUCTURE AND ECONOMIC GROWTH IN NIGERIA, 1981-2014.

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# **ABSTRACT:**

This paper examines the impact of public spending on infrastructure and economic growth in Nigeria during the period 1981 to 2014. A disaggregated public spending on construction, health, general administration and transport and communication was adopted. Ordinary Least Square (OLS) techniques, Philip-Perron, Johansen co-integration test for long-run relationship and Error Correction Model to measure the speed of adjustment towards the long-run equilibrium condition of the equation. The regression results indicate that government recurrent spending on construction, health, general administration and transport and communication impacted positively on economic growth during the period of study. Based on the findings, it is recommended that government should increase total recurrent expenditure by spending more on all the sectors captured as the explanatory variables. Also government should ensure adequate monitoring and supervisions of the funds disbursed to these sectors, in order to stimulate rapid economic growth in Nigeria.

# Keywords: Government expenditure, Infrastructures, Disaggregated analysis and Economic growth.

# **INTRODUCTION:**

The basic idea of the Keynesian prescription for overcoming the problems of economic downturns and unemployment was to unbalance the government budget. The government should reduce its tax and increase it spending in the economy. An important principle in the Keynesian economics which challenged one of the neoclassical conclusions, that the forces of the market system would automatically maintain full employment in the economy (Akor, 2010).

Public expenditure, particularly on infrastructure has remained a decisive issue in economic development, most especially in the less developed countries of Sub-

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Saharan Africa, where their economies is described by poor infrastructural service delivery, high level of corruption, declining productivity and policy instability. In the advent of Keynes ideas, government at all level both developed and developing economies has adopted a central role in the management of the economy which includes: provision of essential infrastructural facilities, direct investment in production and formulating national plans and programmes for even economic development.

Infrastructure is understood as an important input for industrial and overall economic development, while this is certainly true, infrastructural development involves fundamental structures such as power, transport, telecommunications, provision of water and maintenance of law and internal/external security that are paramount to economic activities and the lack of these services signal barriers to economic growth and development. Besides economic growth, they are many issues that have influenced public expenditure on infrastructure in Nigeria, they includes: openness, rate of urbanization, population density, government revenue, external reserves, type of government regimes and political instability among others.

Abu and Abdullahi (2010), Nworji, I. & Oluwalaiye, O. (2012) have argued and on the stands that increase in government expenditures do not actually promote growth and development, rather reduce overall performance of the economy. Supporting this is the fact that increases in government expenditures many result from increase in taxes or borrowing. If government at all level resort to borrowing to fund infrastructural facilities rather than taxes, then private sector investment will definitely reduce and growth will be prevented. On the other hand, Gregoriou and Ghosh (2007) discovered that countries with large government expenditure tend to experience higher growth, but effect varies across countries. Olugbenga and Owoye (2007) show the existence of a long-run relationship between government expenditure and economic growth and a unidirectional causality from government expenditure to growth for 16 out of the 30 countries considered, 10 countries confirmed Wagner's law and 4 countries had feedback relationship between government expenditure and economic growth.

In Nigeria, evidence showed that the total government expenditure in terms of capital and recurrent spending has continued to increase in the last three decades. Spending on agriculture, construction, transport and communication, health, education, defence, internal/external security is rising over time. For instance, government total capital spending increased from N 24,048.60 Million in 1990 to N 759,323.00 Million in 2007, and further N 2,632,876.50 Million in 2011 and later N 1.10 Trillion in 2014. While government total recurrent spending rose from N 1,032,700.00 Million in 2004 to N1, 964,216.00 in 2009. Recurrent expenditure stood at N 2,961,850.00 Million and N2.4 Trillion in 2010 and 2014 respectively

(CBN Statistical Bulletin, 2014). The various constituents of both capital and recurrent spending in Nigeria have been raised between 1990 and 2014.

Theoretically, in Keynesian Macroeconomics, government spending either on capital or recurrent in nature can contribute positively to economic growth through multiplier effects on aggregate demand. This implies that government is an exogenous factors and an instrument for increasing national income. Keynes argue that increasing government spending and reducing tax rates are the best ways to stimulate aggregate demand as an essential tool in time of recession or low economic activities, as well as building the framework for a strong economic growth and working towards full employment. The resulting deficits, according to him would be paid for by an expanded economy during the boom that would follow. Keynes then submits that decision taken by profit seeking private sector operators sometimes leads to inefficient macroeconomic result. Hayek (1989) criticized the Keynesian economics policies for what he called their fundamentally collectivist approach, arguing that such theories encourage centralized planning that lead to wrong investment of capital which may also result in business cycles boom and burst.

Despite the rise in government spending in Nigeria over these years, there are still public protests over rotten infrastructural facilities. Also merely few empirical studies have all-inclusive examinations of the impact of government spending on economic growth regardless of its importance for policy decision. Particularly, for Nigeria to be ready in its quest to become one of the largest economies in the world by the year 2020, and footing on her new Sustainable Development Goals programme, examining the impacts of public expenditure on infrastructure is an approach to speed up growth in the nation economy.

The fundamental question that the paper requires earnest answer is whether or not the government disaggregated spending impacted positively on economic growth in Nigeria. The paper attempts to respond to this question by empirically estimating the impacts of disaggregated social and community services and economic services spending on economic growth in Nigeria. The paper comprises section one introduction, section two review of related literature, section three is the methodology and section four is findings, conclusions, and recommendations.

# Literature Review

Empirically, there are mixed findings on the relationship between government expenditure and economic growth. A disaggregated approach was employed by Niloy *et al.* (2003) to investigate the impact of public expenditure on economic growth for 30 developing countries. They found that government capital expenditure to gross domestic product (GDP) has a significant positive correlation with economic growth, but the share of government recurrent expenditure to GDP

was shown to be insignificant in explaining economic growth while at the sectoral level, government investment and expenditure on education are the only variables that had significant effect on economic growth, especially when Budget constraint and omitted variables are included.

Mwafaq (2011) investigated the impact of public expenditure on economic growth, using a time series data on Jordan for the period 1990 to 2006 and found that the government expenditure at aggregate level has positive impact on growth of GDP which is in line with Keynesian theory.

Mansouri (2008) revealed, after studying the relationship between fiscal and economic growth in three North African countries, that there is a positive correlation between fiscal policy and economic growth and that 1 percentage rise in public expenditure would raise the real GDP by 1.26 percent in Morocco, 1.15 percent in Tunisia and 0.56 percent in Egypt. However, the result also affirms existence of long-run relationships between all the three countries.

Akpan (2005) made use of disaggregated approach to determine the component (which includes administrative, economic service, social and community services and transfers of government expenditure) that enhances growth and those that do not. The result revealed that there was no significant correlation between most government expenditures on economic growth in Nigeria. Nurudeen and Usman (2010) carried out a study on government expenditure and economic growth in Nigeria and found that both total capital expenditure and total recurrent expenditure on education had negative effect on economic growth, while government spending on transport, telecommunication, and health influenced economic growth.

Abu and Abdullah (2010) studied the relationship between government expenditure and economic growth in Nigeria from the period 1970 to 2008, applied disaggregated analysis in an attempt to resolve the impact of government expenditure on economic growth. Their results reveal that government total capital expenditure; total recurrent expenditure on education has negative effect on economic growth. On the contrary, government expenditure on transport, communication and health result in an increase in economic growth. They recommend that government should increase both capital expenditure and recurrent expenditure including expenditure on education as well as ensure that funds meant for development of these sectors are properly utilized. They also recommended that government should encourage and increase the funding of anticorruption agencies in order to tackle the high level of corruption found in public offices in Nigeria. Similarly, Mauro (1998) in his examination of the compositions of government expenditure discovered that corruption lowers expenditure on education and perhaps on health. Maku (2009) evaluated the link between government spending and economic growth in Nigeria by incorporating the model that specifies the effect of government consumption and investment spending, and private investment on real gross domestic product in Nigeria and found that private and public investments have insignificant effect on economic growth during the review period.

Mitchell (2005) evaluated the impact of government spending on economic performance in developed countries. He assessed the international evidence, reviewed the latest academic research, cited examples of countries that have significantly reduced government spending as a share of national output and analyzed the economic consequences of these reforms. Regardless of the methodology or model employed, he concluded that a large and growing government spending is not conducive to better economic performance. He further argued that reducing the size of government spending would lead to higher incomes and improve American's competitiveness.

Ighodaro and Okiakhi (2010) applied Co-integration test and Granger causality test to examine the growth effect of government expenditure, disaggregated into general administration, community and social services in Nigeria. Using time series data for 46 years ending 2007, the results obtained shows negative impact of government expenditure on economic growth.

In the same vein, Vu Le and Suruga (2005) studied the simultaneous impact of public expenditure and foreign direct investment (FDI) on economic growth from a panel of 105 developing and developed countries for the period 1970 to 2001 and adopt threshold regression techniques and fixed effects model. Their major findings were categorized into three: foreign direct investment, public capital and private investment play roles in promoting economic growth. Secondly, public non-capital expenditure has a negative impact on economic growth and finally, excessive spending in public capital expenditure can hinder the beneficial effects of foreign direct investment.

Olopade and Olopade (2010) examined how fiscal and monetary policies influence economic growth and development. The basis of their study was to establish the sections of government expenditure that enhance growth and development, classify those that do not, and recommend that they should be reduced to the barest minimum. The study applies an analytical framework based on economic models, statistical methods encompassing trends analysis and simple regression. They find no significant relationship between most of the constituents of government expenditure and economic growth.

### Methodology Data and Source of Data

The data on the chosen disaggregated government spending were sourced from Central Bank of Nigeria (CBN) statistical bulletin of 2014 and National Bureau of statistics (NBS).

# **Method of Estimation**

The paper adopts the Error Correction Mechanism (ECM) technique of analysis, Unit root test using Philip-Perron to test the Stationarity, Johansen Co-integration test to determine the long-run relationship, and Ordinary Least Square (OLS) techniques model to estimates and analyses the impacts of government recurrent expenditure on infrastructure on the growth of Nigerian economy. The error Correction Model is used to relate co-integrated variables in the short run. The Over-parameterized Error Correction Model captures all the variables including the lagged variables from which the significant variables are selected. The parsimonious error correction model involves selecting the most significant variables from the over-parameterized error correction model. This approach follows the work of Niloy et al. (2003) on a disaggregated approach to studies the impact of public expenditure on economic growth for 30 developing countries. Akpan (2005) used of disaggregated approach to determine the component (which includes administrative, economic service, social and community services and transfers of government expenditure) that enhances growth. Other studies closely related include Nurudeen and Usman (2010), Abu and Abdullah (2010), Mitchel (2005) and Ighodaro and Okirikhi (2010).

# **Model Specifications**

The structural relationship between government recurrent expenditure on infrastructure and the factors that influence economic growth consist of regression equation with disaggregated expenditure on the specified infrastructures being the independent and real gross domestic product (RGDP) as the dependent variable. The structural form of the model is specified as follows:

RGDP =  $\beta_{0+}\beta_1$ GECT +  $\beta_2$ GEHT +  $\beta_3$ GEGA +  $\beta_4$ GETC +  $\mu_1$ Where:

RGDP = Real gross domestic product as proxy for economic growth, (N)

GECT = Government expenditure on construction; (N)

GEHT = Government expenditure on health; (N)

GEED = Government expenditure on general administration; (N)

GEAG = Government expenditure on transport and communication, (N).

 $\mu_{\scriptscriptstyle 1\,=}$  the stochastic error term

 $\beta_{0,=}$  the intercept

 $\beta_{1,}\beta_{2,}\beta_{3,}\beta_{4}$  are parameters of estimates.

The ECM form is represented as;

(117)

# $l nRGDP_{t} = \beta 0 + \beta_{1} \sum_{t=1}^{n} \Delta l nGECT_{t-1} + \beta_{2} \sum_{t=1}^{n} \Delta l nGEHT_{t-1} + \beta_{3} \sum_{t=1}^{n} \Delta l nGEGA_{t-1}$ $\sum_{t=1}^{n} \Delta l nGETC_{t-1} + \sigma_{i} ECM (-1) + \varepsilon_{t}$

#### Results and Discussion The Result of Stationarity Test of Variables Table 1 Philip-Perron Unit Root Test

Variables	Philip-Perron Statistics	Critical Value (5%)	Probability	Order of Integration
RGDP	-5.371355	-2.957110	0.0001	1(1)
GECT	-13.506740	-2.957110	0.0000	1(1)
GEGA	-4.506740	-2.957110	0.0011	1(1)
GEHT	-24.73888	-2.957110	0.0001	1(1)
GETC	-6548419	-2.957110	0.0000	1(1)

Source: Author's Computation using E-views 7

The variables are stationary if the Philip-Perron statistics is greater than the critical value at 5% level. If the variables are non- stationary at levels, they are differenced once to become stationary. If after the first difference, variables still remain non-stationary they will be differenced the second time.

The result of the Philip-Perron test revealed that all the variables, RGDP, GECT, GEGA, GEHT and GETC are stationary after the first difference. Since all the variables were integrated at first difference (1(1)), it requires the co-integration test.

# 3.1.5 Co-Integration Test

Eigen value	5% Critical value	Trace Statistics	Hypothesized	Probability
			No. of cf(s)	
0.996588	69.81889	425.4106	None *	0.0001
0.976020	47.85613	243.6545	At Most 1*	0.0001
0.942543	29.79707	124.2574	At Most 2*	0.0000
0.610080	15.49471	32.84229	At Most 3*	0.0001
0.081036	3.841466	2.704257	At Most 4*	0.1001

#### Table 2. Johansen Co-Integration Test

Trace test indicates 4 co integrating equations at the 0.05 level Source: Author's Computation E.views 7

#### Table 3. Johansen Co-integration Test (Maximum Eigen Value)

Eigen value	5% Critical value	Maximum Eigen	Hypothesized	Probability
-		Statistics	No. of cf(s)	
0.996588	33.87687	181.7760	None *	0.0001
0.976020	27.58434	119.3771	At Most 1*	0.0000
0.942543	21.13162	91.41514	At Most 2*	0.0000
0.610080	14.26460	30.13803	At Most 3*	0.0001
0.081036	3.841466	2.704257	At Most 4*	0.1001

Maximum Eigen Value test indicates 3 co-integrating equations at the 0.05 level. Source: Author's Computation Using E-views 7

From the Johansen co-integration test result, Trace test and the Max-Eigen value test reveals that that there are four co integrating vectors among the variables (GECT, GEHT, GEGA, GETC) at 5 percent level of significance. Therefore, this suggests that there is a long-run relationship among the variables. If at least one variable is co-integrated; it calls for the Error Correction Model (ECM).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
С	25.31711	68.93520	0.367260	0.7173
D(RGDP(-1))	2.099788	0.080661	26.03212	0.0000
D(RGDP(-2))	-1.305869	0.092524	-14.11384	0.0000
D(GECT(-1))	0.010964	0.001748	6.272590	0.0000
D(GECT(-2))	0.022406	0.007420	3.019739	0.0068
D(GEGA(-1))	-0.011183	0.001628	-6.870506	0.0000
D(GEGA(-2))	0.008263	0.001963	4.208714	0.0004
D(GEHT(-1))	0.068846	0.000616	111.7467	0.0000
D(GEHT(-2))	-0.064233	0.004525	-14.19464	0.0000
D(GETC(-2))	-0.025689	0.010403	-2.469430	0.0227
ECM(-1)	0.056242	0.016900	3.328010	0.0034
R-Squared	0.999330	S.E of Reg	pression 3	06.3333
Adjusted R-Squared	0.998995	Durbin Wa	atson Stat. 3	3.395496
F. Statistics	2982.414	Prob (F. St	atistics)	0.000000

	Table 4:	<b>Result of</b>	the Error	<b>Correction Model</b>
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F. Statistics 2982.414 Prob (F. Statistic Source: Author's Computation using E-views 7

The result in table 4 shows that government recurrent expenditure on infrastructure such as on construction, health, general administration and transport and communication are statistically significant. More explicitly, 1 percent increase in government recurrent expenditure on infrastructures on the average will lead to 2.09 percent increase in Real Gross Domestic Product (RGDP). These conformed to economy theory that an increase in government expenditures will lead to an increase in economic growth.

The value of  $R^2$  is 0.99933 (99.33%) implies that 99.93 percent total variation in the RGDP is explained by the regression equation, while the remaining 0.67

percent is explained by other variables not included in the model and is accounted for by the stochastic error term ( $\mu$ ).

The value of adjusted  $R^2$  used in measuring the goodness-of-fit of the estimated model shows that after adjusting for degree of freedom, about 99.89 percent of the systematic variation in the RGDP is explained by changes in the explanatory variables (GECT, GEHT, GEGA, GETC) while 0.21 percent is accounted for by the stochastic error term ( $\mu$ ).

The F-Statistics 29.82.414 which is used to test the joint significance of the explanatory variables, found to be statistically significant at 5 percent level as indicated by the corresponding probability value 0.000000. The value of calculated F-Statistics is greater than the value of tabulated F-Statistics. This indicates that the regression equation has a strong goodness-of-fit (the model is significant in explaining the variation in RGDP).

The coefficient of the ECM indicates a speed of adjustment of 0.056242, implying that, about 6% of the deviation from equilibrium can be restored in one year.

# **Conclusion and Recommendations**

The paper examines the impact of disaggregated government expenditures on infrastructure and economic growth in Nigeria. Ordinary least square techniques and Error Correction Method were employed in the analyses and to measure the speed of adjustment of the model respectively.

Result shows that government recurrent expenditure on infrastructure on construction, health, general administration and transport and communication are statistically significant. The result agrees with the Keynesian's view that government expenditures enhance economic growth. A great performance of an economy in terms of economic growth may therefore be attributed to proper use of total government recurrent expenditures on infrastructures.

From the findings, the paper recommends that government should increase total recurrent expenditure by spending more on all the sectors captured as the explanatory variables. Also concerted effort should be made by the government to ensure that is should be adequate monitoring and supervisions the fund disburse to these sectors, so as to maintain efficiency in the usage of the funds to boost the level of economic growth in Nigeria.

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### Organic Farming and Environmental Sustainability: The Experience of Smallholder Farmers in Eastern Senatorial District of Kogi State, Nigeria

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#### ABSTRACT

This study focused on the potentials of organic farming as a means of sustaining the environment with greater emphasis on smallholder farmers in the eastern senatorial district of Kogi State, Nigeria. A total of 125 rural farmers were drawn from the 9 local government areas (LGAs) that make up the district through stratified random sampling. Structured interview schedule was administered to the respondents for data collection. Data generated was analyzed through the use of descriptive statistics such as frequency distribution, percentages, mean scores and ranking order. The results obtained showed that most (61.6%) of the farmers were males with the mean farm size of 2.9 hectares. Deforestation (60.8%), arable land use (56.8%), and indiscriminate use of agro-chemicals such as fertilizers, herbicides, etc. (54.4%) were identified as some of the major causes of soil/environmental degradation. While poor crop yield (52.8%), flooding of farmlands (51.2%) and infestation of pests and diseases (41.6%) were some of the effects of ecological degradation/problems. In a swift response to these problems, farmers in the district adopted some organic farming strategies such as mulching (65.6%), mixed cropping (62.4%) and bush fallowing (55.2%) among others to sustain the environment. It was recommended that adoption of organic farming practices should be sustained in the study area and Nigeria at large in other to improve soil productivity and continuous cropping and weather information and forecast by meteorological unit be held sacrosanct. And awareness creation and education of rural farmers on the need to adopt environmentally-friendly agronomic practices be strengthened.

**Keywords:** Environmental degradation, Climate change, Organic farming and weather forecast.

#### **INTRODUCTION**

Agriculture has been the basic source of subsistence for man over thousands of years. It provides a livelihood to half of the world population (Palaniappan and Annadurai, 2010). The natural environment with all its ecosystem services

comprises of the entire basis of life on earth, and there is a strong link between the state of the environment and food production (Nwachukwu and Onwuka, 2011). For crops, the state of the environment directly influences soil nutrient availability, surface and ground water for irrigation, rainfall and growth season, availability of insects for pollination and the effects of pests and diseases, the author continued. With the increase in human population and the need to meet their daily food needs, increase in agricultural production has to be doubled. This then calls for a change in the existing methodologies in food production. Hence, the need for high-yielding crop and animal varieties, higher fertilizer dosages, intensification in irrigation schemes and intensive cropping by bringing large areas of land under cropping among others. The adoption of these green revolution requirements has resulted in the elimination of thousands of traditional plants and animals with the concurrent loss of genetic resources and environmental degradation (Palaniappan and Annadurai, 2010).

Corroborating the above, UNEP/GRID in Palaniappan and Annadurai (2010) contended that, due to the increase in world population, environmental degradation arose as a result of unsustainable human agricultural practices and activities which now seriously endangers the entire food production platform of the planet especially in Africa. Soil/environmental degradation is a major environmental problem causing wide spread and serious impacts on water quality, biodiversity and emission of greenhouse gases such as carbon dioxide, methane, sulphur-dioxide etc. The chemical and physical ecological deterioration have major implications for agricultural productivity. A study conducted by International Food Policy Research Institute (IFPRI, 2001) revealed that nearly 40% of the world's agricultural land experiences adverse impacts of environmental degradation that smallholder farmers in eastern senatorial district of Kogi State, Nigeria adopted some forms of organic farming strategies to mitigate the effects.

The concept of organic farming/agriculture has been perceived differently by different people. To some, it implies the use of organic manures and natural methods of plant production and protection instead of using synthetic agro-chemicals like fertilizers, herbicides etc. The definition given by Lampkin (1990) appears to be the most comprehensive covering all essential features. He described organic farming as a production system which avoids or largely excludes the use of synthetic fertilizers, pesticides, growth regulators and livestock additives. Organic agriculture (OA) is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account the regional conditions require locally adapted systems. This is accomplished by using, where possible, cultural,

biological and mechanical methods as opposed to using synthetic materials, to fulfill any specific function within the system. An organic production system is designed to: enhance biological diversity within the whole system, increase soil biological activity, maintain long term soil fertility, recycle wastes of plants and animal origin in order to return nutrients to the land, thus minimizing the use of nonrenewable resources, rely on renewable resources in locally organized agricultural systems, and promote the healthy use of soil, water and air as well as minimize all forms of pollution thereto that may result from agricultural practices (Food and Agriculture Organization: FAO, 2007).

Organic farming system relies on crop residues, animal manures, legumes, green manures, off-farming organic wastes and aspect of biological pest control to maintain soil fertility and tilt, to supply plant nutrient and control insects, weeds and other pests (Lampkin, 1990). The practice does not imply the simple replacement of synthetic fertilizers and other agro-chemical inputs with organic inputs and biologically active formulations. Instead, it envisages a comprehensive management approach to improve the health of underlying productivity of the soil. Palaniappan and Annadurai (2010) asserted that, in a healthy soil, the biotic and abiotic components covering organic matter, including soil life, mineral particles, soil air and water exist in a state of dynamic equilibrium and regulate the ecosystem processes in mutual harmony by complementing each other. The state of soil life and the associated organic transformation will enhance the regenerative capacity of the soil and make it resilient to absorb the effects of ecological or climate vicissitudes (unexpected changes) and occasional failures in agronomic management. The success of agronomic agriculture depends to a great extent on the efficiency of agronomic management adopted to stimulate and augment the underlying productivity of soil resource. Organic agriculture (OA) avoids nutrient exploitation and increases soil organic matter content. In consequence, soils under OA capture and store more water than soils under conventional cultivation (Niggli, Fliessbach, Hepperly and Scialabba, 2008). Production in OA system is thus less prone to extreme weather conditions such as drought, flooding and water logging. OA is a low-risk farming strategy with reduced input costs and, therefore, lower risks with partial or total crop failure due to extreme weather events or changed conditions in the wake of climate change and variability (El-Hage and Hattan, 2002; Eyhorn, 2007).

The essential features of organic farming are: maximal but sustainable use of local resources; minimal use of purchased farm inputs (only as complementary to local resources); ensuring the basic biological functions of soil-water-nutrients continuum; maintaining a diversity of plant and animal species as a basis for ecological balance and economic stability; creating an attractive landscape which gives satisfaction to the local people; and increasing crop and animal diversity in

the forms of polycultures, agro-forestry system, integrated crop/livestock systems etc. to minimize risk (Palaniappan and Annadurai, 2010). In view the above, certain research questions are therefore asked. What are the perception of farmers on the causes of environmental/soil degradation? What are the percieved effects of this soil degradation on man and his farm operations? And what are the various organic farming strategies adopted by farmers to mitigate soil degradation?

This study therefore assessed the potentials of organic farming for environmental sustainability with special focus on the smallholder farmers in the eastern senatorial district of Kogi State, Nigeria. Specifically, the study was designed to:

describe the socio-economic variables of the farmers,

identify the perceived causes of soil/environmental degradation,

ascertain the effects of soil/environmental degradation by the respondents, and

determine the various organic farming strategies adopted by the farmers to mitigate soil/environmental degradation.

# Methodology

The study was carried in the eastern senatorial district of Kogi State, Nigeria. The district is majorly inhabited by the Igala speaking extract of the state. The area is made up of 9 local government areas (LGAs) namely: Ankpa, Bassa, Dekina, Ibaji, Igalamela/Odolu, Olamaboro, and Omalla. The area lies between Latitudes 6° 30" and  $8^{\circ}$  40" north and Longitudes  $6^{\circ}$  40" east with a total land area of 13,655sg/km. The district is bounded on the north by Benue and Nassarawa states, on the south by Anambra state, on the east by Enugu state and on the west by River Niger. Majority of the people are farmers growing both cash and food crops such as cashew, oil palm, citrus, cassava, yam maize, beans among others. The entire smallholder farmers constituted the target population for the study. A multi-stage sampling technique was adopted to select the respondents for data collection. From the 9 LGAs, 5 LGAs were purposively selected due their high level of organic farming. From each of the 5 LGAs selected, 2 villages were randomly selected to have a total of 10 villages, from each of the villages, 25 farmers were randomly selected thus making a total of 125 respondents for the study. Structured interview schedule was administered to these farmers to acquire the necessary information. Data collected were analyzed using descriptive statistics such as frequency distribution, percentages, mean scores and ranking order.

# **Results and Discussion**

# Socio-economic Variables of the Respondents

The results presented in Table 1 shows that most (61.6%) of the farmers were males, the females constituted 38.4%. The table also indicated that, 60.8% of the farmers

were within the age range of between 31-40 years which is adjudged as the productive age. Majority (36.0%) of the respondents had primary education, while 30.4% had secondary education. The mean household size of the farmers was 9 persons, while the farmers' mean farm size and farming experience were 2.9 hectares and about 18 years respectively. According to Obiora and Onwubuya (2011), many years of farming experience could imply that these farmers could have designed better ways for coping with changes in ecology/climate and their adaptation strategies. The findings further revealed that 66.4% of the farmers had either primary or secondary education. High literacy level is a strong catalyst for adoption of climate/environmentally-friendly production strategies such as organic farm practices.

Variable	F	%	М
Sex			
Male	77	61.6	
Female	48	38.4	
Age (Years)			
< 31	45	36.0	32.4
31-40	73	58.4	
>40	7	5.6	
Educational level			
No formal education	32	25.6	
Primary education	45	36.0	
Secondary education	38	30.4	
Tertiary education	10	8.0	
Household size			
1-5	64	51.2	8.7
6-10	48	38.4	
>10	13	10.4	
Farm size (Ha.)			
1-2	63	50.4	2.9
3-4	36	28.8	
5-6	18	14.4	
>6	8	6.4	
Farming experience (Years)			
1-5	0	0.0	
6-10	6	4.8	
11-15	21	16.8	
> 15	98	78.4	
Samman Eigld Summer 2016	M – Maan		

Table 1: Distribution of respondents based on their socio-economic variables

Source: Field Survey, 2016

M = Mean

# Perceived Causes of Soil/Environmental Degradation

Data in Table 2 show the various causes of ecological degradation in the study area. The findings revealed that deforestation (60.8%), arable land use (56.8%), indiscriminate use of synthetic agro-chemicals (like fertilizers, insecticides,

herbicides etc.) (54.4%), soil erosion (46.4%) among others, were the major causes of environmental degradation and climate change. The Tide Online Newspapers of January 18<sup>th</sup>, 2011 quoted by Uguru, Baiyeri and Aba (2011) noted that there was massive deforestation going on in Nigeria, and that the phenomenon poses a lot of danger because forest acts as "*carbon sink*" and when the forest is destroyed the carbon is then release into the atmosphere. The report further stated that deforestation and gas flaring were the major contributors to carbon emission in Nigeria, and regretted that, the laws protecting the forests in Nigeria have weak mechanisms of enforcement. Salinization (16.0%) was not regarded as a serious cause of environmental degradation, this could be probably due to low irrigation practices in the district as most farmers relied on natural rains for their farm operations. Ranching or animal husbandry was practiced in a small-scale by the farmers. Most often, the few stock (mainly goats, sheep, cow) were tethered during cropping season, hence the effect of overgrazing was not felt or noticed, hence little or no laterization (hard pan) is found.

*F	%
68	54.4
71	56.8
42	33.6
76	60.8
33	26.4
18	14.4
20	16.0
58	46.4
16	12.8
8	6.4
10	8.0
	* <b>F</b> 68 71 42 76 33 18 20 58 16 8 10

Table 2: Distributi	on of respondents based on the causes of environmental
degradati	on

Source: Field Survey, 2016

\*Multiple responses

# Effects of Soil/Environmental Degradation

Results presented in Table 3 revealed the various effects of environmental degradation as contended by the farmers in the eastern senatorial district of Kogi State, Nigeria. Poor crop yields (52.8%) ranked first, while flooding of farmlands and residential homes (51.2%) ranked second. Other effects were pests and disease

infestation (41.6%), loss of biodiversity (41.6%), collapsed buildings (38.4%) and unproductiveness/death of livestock (28.8%) ranked 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> respectively. The 2001 Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report revealed that poorest countries would be hardest hit by the effects of climate change or ecological degradation. The report further showed that there would be reduction in crop yields in most tropical and sub-tropical regions due to decreased water availability and new or change in insect pest incidence. Flooding of farmlands and residential homes is a common phenomenon in recent times. In Kogi State, over 150 homes were flooded and valuable properties were lost due to torrential rains and inundation between the months of August and September, 2012 (Captured from NTA 9 O'clock News update, Sept. 18<sup>th</sup>, 2012). The havoc which drew the attention of both state and federal governments, led to the visit of the nation's Senate President, Senator David Mark on 21<sup>st</sup> September, 2012 to have an on the spot assessment of the havoc.

Effect	*F	%	Rank
Poor crop yields	66	52.8	$1^{st}$
Flooding of farmlands	64	51.2	$2^{nd}$
Infestation of pests and diseases	52	41.6	$3^{rd}$
Loss of biodiversity	52	41.6	$4^{\text{th}}$
Collapsed buildings	48	38.4	$5^{\text{th}}$
Unproductiveness/death of livestock	36	28.8	$6^{\text{th}}$
Bleaching of ozone layer	31	24.8	$7^{\rm th}$
Desertification	28	22.4	$8^{\text{th}}$
Air and water pollution	25	20.0	$9^{\text{th}}$
Acid rains	4	3.2	10 <sup>th</sup>
Source: Field Survey, 2016	*Multiple responses		

 Table 3: Distribution of respondents by the effects of environmental degradation

# Organic Farming Strategies Adopted to Mitigate Ecological Degradation

Various organic farming strategies adopted by the farmers to mitigate ecological degradation are found in Table 4. These strategies commonly practiced were mulching (65.6%), mixed cropping (62.4%), bush fallowing (55.2%), change of planting dates (52.8%), agro-forestry (43.2%) and green manuring (41.6%) among others. One of the ways in which farmers can protect their soils is through the use of mulch (Farming Matters, 2012). When the soil is covered with a thick layer of organic matter, it is protected from extreme rain fall, winds or drought. Mulch also serves as a home for insects, helping to attract many species which significantly improve soil texture and soil fertility. A study conducted by Edoka, Adejo and Otitolaiye (2010) in Olamaboro local government area of kogi state, Nigeria revealed that, most (20.0%) of farmers in the LGA adopted bush fallowing

as their soil fertility management practice. The authors further revealed that, when fallow periods are long enough to permit full vegetation regeneration and soil fertility restoration, the cultivation system provides cost-effective means of sustainable agriculture in a depressed economy like that of Nigeria. Green manuring is another major strategy adopted by the farmers to mitigate their climatic problems. Crops grown for this purpose help to restore or increase the organic matter content of soils and increased productivity. Catch crops, shade crops, cover crops, forage crops, etc. are some of the strategies adopted to provide green manures. In green manuring, the crops could be grown *insitu* or brought from outside and incorporated into the soils.

Mixed/multiple cropping is a practice of planting two or more crops on a given piece of land at a time to ensure constant food production and to provide the vegetative cover to reduce run-off and serves as a security against crop failure (Edoka, 2008). This is majorly practiced in the eastern Nigeria where dearth of fertile land is a major hindrance to food production.

Organic farming strategy	* <b>F</b>	%
Mulching	82	65.6
Mixed farming	34	27.2
Crop rotation	46	36.8
Biological pest management	21	16.8
Green manuring	52	41.6
Crop diversification	48	38.4
Change of planting dates	66	52.8
Agro-forestry	54	43.2
Liming	15	12.0
Mixed cropping (multiple cropping)	78	62.4
Bush fallowing	69	55.2
Source: Field Survey, 2016	*Multiple responses	

Table 4: Distribution of respondents by organic farming strategies a	adopted
to mitigate ecological degradation	

# **Conclusion and Recommendation**

Soil and environmental degradation is a major global challenge, causing widespread and serious impacts on water quality, biodiversity and emission of climate changing green house gases. Land use by man has been singled out as a serious catalyst to ecological degradation. The negative effects of this phenomenon such as poor crop yield, flooding of both farmlands and residential homes, and loss of biodiversity have led to the current food insecurity and deaths in most developing countries of the world. Though farmers in the study area (kogi east senatorial district) adopted some environmentally-friendly production strategies such as mulching, mixed cropping, bush fallowing, agro-forestry among others to mitigate the effects of the environmental havoes or change in climate.

Based on these findings, the following recommendations are therefore made; Awareness and sensitization campaign should be strengthened by governments and non-governmental organizations on the need to adopt environmentally-friendly agricultural practices.

Agro-forestry policy has to be enacted by the government and improved tree seedlings be provided to farmers at a subsidized rate.

Government should also provide other farm inputs such as fertilizer, improved seed and animal stocks, etc. at a very low price.

Weather/meteorological unit should be cited close to rural people to provide farmers with relevant weather information and/or forecast to predict accurately possible occurrence of extreme weather events.

Channelized buildings should be discouraged or out-lawed by government. Town planning unit should be strengthened to give a good layout that allow free flow of running water without causing any havoc.

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# ASSESSING RECORD KEEPING AMONG POULTRY FARMERS IN KOGI WEST, NIGERIA

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# ABSTRACT

The study examined factors that influence farm record keeping among poultry farmers in the Western agricultural zone of Kogi State. Specifically, the study described the socio-economic characteristics of poultry farmers, the kinds of records kept by the farmers and determined factors that influence record keeping attitude of the farmers. Data for the study was collected from hundred and twenty poultry farmers randomly selected from three Local Government Areas in the zone. A combination of descriptive statistics and a binary logistic regression were used to analyze the data. Results from the description of the socio-economic characteristics of the respondents show that poultry farmers in the study area had considerable level of education and production experience. Also, majority of the poultry farmers were small-holders and had very minimal contact with extension agents during the farming season. The decision of the farmers to keep various kinds of record on the farm was observed to be significantly influenced by their level of education and experience, flock size and their status of operation. These factors had varying effect on the probability of record keeping by the farmers. It is therefore recommended that farmers need to be educated and trained on the basic techniques of record keeping. In addition, a simple data entry platform should be developed for the farmers to enter their data as the need arises.

Keywords: Poultry, management, education and records.

# INTRODUCTION

The agriculture sector in Nigeria employs approximately two-thirds of the total labour force and provides a livelihood for about 90 percent of the rural population (IFAD, 2014). The sector is characterized by considerable regional and crop diversity. This is evident in a range of tree and food crops, forestry, livestock and fisheries. In the livestock industry, poultry production occupies a prominent position in providing animal protein as it accounts for 25% of local meat production in Nigeria (Okunlola and Olofinsawe, 2007).

The Nigerian poultry industry is estimated at ₩80 billion (\$600 million) and is comprised of approximately 165 million birds, which produced 650,000 MT of

Assessing Record Keeping Among Poultry Farmers In Kogi West, Nigeria Ibrahim, M.K<sup>1</sup>, Akerele, D<sup>2</sup>. And Ebenehi, O<sup>3</sup>.

eggs and 290,000 MT of poultry meat in 2013 (WDI, 2014; Sahel, 2015). The sector is extremely fragmented with most of the chicken raised in backyards or on poultry farms with less than 1,000 birds. However, there are a number of large commercial players in the sector especially in the South-Western zone of the country, in close proximity to Lagos and its large market of 17.5 million people (Sahel, 2015). The poultry industry has a significant economic relevance as it provides a ready source of animal protein, income, and employment for the increasing population (Bosnjak and Rodic, 2008; Hodges, 2009).

Record-keeping refers to keeping, filing, categorizing and maintaining farm financial and production information. It can be accomplished through a variety of methods, from a basic hand record-keeping method to an elaborate computerized system (Odunsi et. al., 2005; and Delton, 2015). Essentially, accurate and up-to-date farm records are very useful tool in management and planning. Soludo (2002) stated that a farmer who has a well-kept farm record is in a more favourable position to access credit facility from financial institution than one who has no farm records. Similarly, Johl and Kapur (2001) stated that when farmers keep records, they continuously give the needed information for state and national farm policies such as land and price policies.

In spite of the very important role record keeping play in the growth of a farm business, farmers often consider it as a tedious task and therefore the decisions they make are guided by vague estimates and guesses based on their past experience of farming (Johl & Kapur, 2000; Poggio, 2006). This creates a condition where policy formulation, planning, monitoring and evaluation in the agricultural sector become difficult. This is because data collection from the records of farmers is practically impossible. Therefore this study seeks to assess farm record keeping behavior among poultry farmers. Specifically, the study describes the socio-demographic characteristics of poultry farmers, and identifies factors that influence farm record keeping decisions of poultry farmers.

# METHODOLOGY

The study was carried out in Zone A area of Kogi State Agricultural Development Project (KGADP). KGADP is originally divided into four Zones - A, B, C and D. Zone A where this study was carried out comprise of five Local Government Areas (LGA); Yagba-East, Yagba-West, Kabba-Bunu, Ijumu, and Mopamuro. In addition, the zone is made up of six extension blocks and 35 cells.

Random sampling technique was employed at various stages in data collection. In the first stage, three LGAs were selected from the Zone (Ijumu, Yagba-west and Kabba/Bunu). Then, two villages were randomly selected from each L.G.A making a total of six villages. Finally, twenty poultry farmers were randomly selected from each village. A total of 120 respondents were sampled. Data was obtained via

questionnaire directly administered to the respondents. A combination of descriptive statistics and logistic regression were employed in data analysis.

# **RESULTS AND DISCUSSION**

# Socio-Economic Characteristics of the Respondents

Descriptive results of the socio-economic characteristics of the poultry farmers are presented in Table 1. A selection of these characteristics is discussed below.

#### Age

It is observed from the Table that the average age of the poultry farmers in the study area is 44 years. This result is an indication that poultry farmers in the study area are in their active and productive age. This finding is in contrast to the current situation where there is an upsurge of labour migration from agriculture especially among the youths. Age is expected to influence the probability of record keeping by the farmers.

# Education

Educational level is measured here as the number of years spent in formal education. It is evident from Table 1.0 that the mean number of years spent in education among the poultry farmers is seven years. This is equivalent to having some level of secondary education. This considerable level of education among poultry farmers is expected to positively influence proper record keeping.

# **Farming experience**

The average farming experience among poultry farmers is 13.5 years. This is an indication that poultry farmers in the study area have considerable years of experience in the business. It is hypothesized that more experienced farmers are more likely to keep records of their farm operations than the less experience group. This position is supported by the findings of Enoch et. al (2010).

# **Flock size**

Flock size as used here refers to the amount of birds the farmers had on the farm at the point of conducting the survey for this study. On average, farmers in the study area had about 276 birds.

The implication is that majority of the poultry farmers sampled are small holders. The size of holding of the farmers is expected to have an impact on the probability of keeping records as confirmed by Johl and Kapur (2001). They observed that subsistence nature of farming does not produce any incentive for keeping farm records and farmers cannot engage separately trained accountants to help them in farm accounting.

#### **Extension contact**

This is measured as the number of times farmers are visited by extension agents

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within the farming season. It is expected that higher frequency of such visits would translate to higher probability of adopting improved and efficient farm management techniques such as record keeping. From our result, it is evident that farmers reported an average of only 1 visit for the farming season. Such irregular visit by extension agents is expected to influence the probability of record keeping by farm households negatively.

# Kinds of Farm Records Kept by Poultry Farmers

Results obtained from analyzing the kinds of records kept by the poultry farmers are presented in Table 2. It is evident from the results that based on the ranking of the common farm records, purchases and sales record ranked first (81%) as the most kept record among poultry farmers in the study area. This was followed closely by records on profit and loss (73.4%). This finding agrees with that of Okanta et. al. (2003) who reported that that majority of poultry farmers kept financial records. The predominance of purchases, sales, profit and loss records among the poultry farmers is an indication that most of the poultry farmers were more concerned about the productivity, profit or otherwise of the farm business.

# Determinants of Record Keeping by Poultry Farmers

Table 2 shows the results of the binary logistic regression model of the factors that factors that influence the decision of farmers to keep records of farm operations. The variables included in the model are hypothesized to influence record keeping decisions of poultry farmers. The choice of the variables was based on theoretical and empirical literature of relevant studies. It is evident from the results that the educational level, operation status, flock size, experience and marital status of farmers significantly influenced their decision to keep records of farm operations.

The significant relationship between farmer's level of education and the probability of record keeping was as expected. It is expected that education would play a significant role in the willingness and art of record keeping by the farmers. The direct relationship based on the sign of the marginal effect implies that the more educated a poultry farmer is, the higher his probability of keeping records of his farm operations. Studies such as Devonish et. al. (2000); Chapman (2008) have also emphasized the significant role education play in farm record keeping.

The operation status of farmers whether they operate the poultry business on a fulltime or part-time basis was observed to significantly influences their decision to keep records of farm operations. It is expected that poultry farmers who operate their farms on a full-time basis are more likely to keep farm records than part-time farmers. This position is corroborated by findings from previous studies (see for example, Enoch et. al., 2010;Onyeyinka et al., 2011).

As expected the number of birds owned by the farmer which indicates the scale of production significantly influenced the probability of keeping farm records.
The implication of the positive sign of the marginal effect is that poultry farms that operate on a larger scale are more likely to keep records of their farm operations than the small-holder farms. This finding is however at variance with that of studies such as Mariene (1995) and Devonish et al., (2000).

The level of experience of farmers in years was observed to be statistically significant at the 10 percent level. The implication of the significance and sign of the marginal effect is that the more experienced poultry farmers are more likely to keep records of farm operations than the less experienced ones. This is premised on the fact that the number of years spent in a particular enterprise may encourage the adoption of an innovation by farmers. This position has been supported by a number of studies (see for example, Agbamu, 2006 and Idrisa et al., 2012).

## **CONCLUSION AND RECOMMENDATION**

## Conclusion

The study examined the factors that influence record keeping decisions of poultry farmers. It was observed from the study that on average poultry farmers in the study area had considerable level of education and farming experience. They operated mainly on a small-scale and had minimal interactions with extension agents. In terms of the decisions they make on keeping records of farm operations, the study revealed that factors related to their level of experience, status and scale of operation influenced such decisions.

### Recommendations

The role of well-kept farm records in farm management cannot be emphasized enough. Records are employed in facilitating acquisition of credit, comparing level of performance with similar farms, guiding future management decisions on the farm and so on. This study therefore stresses the need for farmers to keep up-todate records on their various farm operations. These will serve as a tool for planning for both the farmer and government alike. To achieve this following recommendation are proposed:

Farmers should be trained irrespective of their educational status in basic techniques of record keeping. Such training should expose the farmers to the various kinds of farm records and their importance.

Farmers should be encouraged to keep up-to-date records by introducing an incentive where only farmers with such records can be beneficiaries. This could come in the form of grant or an interest-free loan available to only farmers well kept records.

A simple data entry platform should be developed for the use of the farmers as the need arises. This should be done in collaboration with the farmers to ensure familiarity and ease of use. This will further encourage record keeping among them.

Table 1: Selected Socio-economic Characteristics of Poultry Farmers					
Characteristics	Maximum	Minimum	Mean		
Age (in years)	63	25	44		
Education (in years)	19	0	9		
Farming experience (in years)	16	1	13.5		
Flock size (number)	502	50	276		
Extension contact (number)	2	0	1		

Field survey, 2015

# Table 1: Selected Socio-economic Characteristics of Poultry Farmers

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Extension contact (number)	2	0	1

Field survey, 2015

### Table 2: Farm Record Types Kept by Poultry Farmers

Kind of Record	<b>Frequency</b> *	Percent	Rank
Purchases	64	81.0	$1^{st}$
Sales	64	81.0	$1^{st}$
Profit & Loss	58	73.4	$2^{nd}$
Cash Book	21	27.6	3 <sup>rd</sup>
Farm Assets	15	18.9	$4^{th}$
Inventory	14	17.7	$5^{th}$
Inputs	13	16.5	$6^{\rm th}$
Credit	11	13.9	$7^{th}$

Field survey, 2015

\*Multiple response

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