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Table of Content

IJAERD E-Journal International Journal of Agricultural Economics & Rural Development - 7 (1): 2015

Cropping Intensification and Technical Inefficiency of Maize-Based Farming Households in Southern-Guinea Savanna (SGS) of Nigeria

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Abstract: Maize being a main staple food in Nigeria, high productivity and efficiency in its production are critical to food security and poverty alleviation. Thus, this paper estimates technical efficiencies of 252 maize–based farming households in southern-guinea savannah (SGS) of Nigeria and provided an empirical analysis of the determinants of technical inefficiency. Descriptive and inferential statistics, crop intensity index, and multiple regression analyses involving the stochastic frontier production function were the analytical tools employed to achieve the research objectives. The results showed that crop production intensity scores among the farming households ranged between 5.5 and 38.5 with a mean score of 23.1. Technical efficiencies of smallholder maize-based farming households ranged from 0.18 to 0.93 with a mean of 0.48. This result indicated the possibility of improving the efficiency of the sampled farming households by 52% with the existing resources and technology. The result of the inefficiency model shows that cropping intensification, farming experience and household size are the significant variables determining technical efficiencies these households. Favourable agricultural inputs prices as well as other policies that could facilitate households' access to agricultural inputs are suggested. Policies aimed at reducing household size should also be vigorously pursued.
Keywords: Domestic food production, importation, intensification and productivity, maize-based households and cropping systems.

INTRODUCTION

The attainment of food self sufficiency is a prominent development agenda facing most nations of Sub-Saharan Africa (SSA). Nigeria as the most populous nation in the region also faces challenges of reducing the country's dependence on food importation. Increased domestic food production is required to improve food self sufficiency ratio. Maize, one of the major staple foods in Nigeria, is important in agricultural policy decisions. Current maize production is about 8 million tonnes and its average yield is 1.5 t ha^{-1}. The average yield is lower compared to the world average of 4.3 t ha^{-1} and to that from other African countries such as South Africa with 2.5 t ha^{-1} (FAO 2009). There has been a growing gap between the demand for maize and its supply. The stronger force of demand for maize relative to supply is evidenced in frequent rise in price of maize and therefore, has great implication for the food security status and economic development of the Nigerian economy. It is reported that among other causes of the food crisis, gross underinvestment in agricultural production and technology in the developing world has contributed to static productivity, weak markets, and underdeveloped rural infrastructure (CSIS 2008).

The total land area planted to maize in 2003 was about 4.7 million hectares with an estimated output of about 5.2 million metric tonnes. The output increased by 14.5 percent to 5.9 million metric tonnes in 2005 (FAO 2006). This increase in maize production was attributed mainly to expansion in cultivated land areas rather than crop production intensification which according to Tiffen et al. (1994); is the use of increased average inputs on smallholding for the purpose of increasing the value of output per hectare. In an attempt at meeting the goal of increased domestic maize production, it has been observed that maize-based farming households do not take cognizance of the effectiveness of resource use in production. This is attributable to ignorance on the part of the households of the appropriate combination of inputs that gives the maximum output. Studies have shown that technical efficiency measures for Nigerian agriculture are low (Ajibefun and Daramola 2003, Rahji 2005, Oluwatayo et al. 2008, Oyewo et al. 2009). One of the reasons often attributed to decline in productivity is depletion in soil fertility primarily resulting from poor production practices characterized by low use of modern inputs. In order to avoid over generalization which often leads to ineffectiveness in government policies, there is the need to assess the current levels of technical efficiency of maize-based households and to identify the factors that affect the levels in the zone.

METHODOLOGY

Area of the Study: The study area is the Southern Guinea Savanna ecological zone of Nigeria located at longitude 38° 148° E and latitude 78° and 108° N. The zone is majorly made up of Kwara, Niger, Kogi, Taraba, Plateau and Benue States. The Southern Guinea Savanna of Nigeria has great potential for the intensification of maize production

beyond the present level due to its bimodal rainfall pattern, (a short early growing season followed by fairly long late season) high solar radiation and favorable temperature during the growing season. However, the zone is characterized by variable weather, fragile soils with low moisture holding capacity that is prone to drought (Fakorede et al. 2001). The soils are also mainly Alfisols that are low in organic matter. Thus, the region offers a lot of potential for intensification with a view to bringing about much required growth in the maize sub-sector of the Nigerian economy.

Sampling Procedure and Sample Size: The target population was the farming households in maize-based production systems in the Southern Guinea Savannan zone of Nigeria. A three-stage sampling technique was used to select sample for the study. The first stage involved a purposive selection of Kwara and Niger States. The two states had the least number of crop farmers in the zone in the year 2007 (NBS 2008). The ADPs zones are four and three in Kwara and Niger states respectively. The second stage involved the proportionate sampling of villages in each zone in the two states. Five percent of the villages were selected in each zone to give rise to a total of twenty-eight villages. The upgraded 2001 Agricultural Development Projects (ADPs) village listing served as the sampling frame for the selections in the two states. In each village, 10 farming households were selected among the farming households in the areas to make up a sample size of 280. However, only 252 questionnaires were found useful and analyzed.

Analytical Techniques: Descriptive and inferential statistics, crop intensity index, and multiple regression analyses involving the stochastic frontier production function were the analytical tools employed to achieve the research objectives. Following Shriar (2005) intensification activities such as intercropping, use of legume, use of fertilizer, pesticides use per hectare, use of herbicides, ploughing methods, use of organic fertilizer and improved seeds have been assigned a particular weight based on its contribution to production intensity. These led to weight values ranging from 2 to 3.5 points (Table 1)

Table 1: Scale ranges and weights associated with agricultural intensity index

Intensification activity	Scale range	Weight	Max. Points
Scale of cereal/ legume plots	0-3	3.5	10.5
Scale of improve seeds	0-3	3.0	9.0
Scale of Ploughing	0-3	2.5	7.5
Scale of intercropping	0-3	3.0	9.0
Scale of fertilizer use per ha	0-3	3.0	9.0
Scale of pesticides use per ha (excluding herbicides)	0-3	2.0	6.0
Use of organic fertilization	0-1	3.0	3.0
Scale of herbicides use per ha	0-3	2.0	6.0
Total			**60.0**

Adapted from Shriar 2005 but modified.

As evident from the Table 1, not all farming activities could be assessed in sufficient detail to justify using a 0-3 scaling and that the maximum points attainable by the household from all the intensification activities is 60. The index is stated as:

$$CI_i = \sum_{J=1}^{8} S_j W_j \qquad i = 1 \ldots N \text{----------Eq(1)}$$

Where

CI is the crop intensification index for the i^{th} household; S is the scale range for the agro-technology and strategy employed by the i^{th} household and W is the weight of the agro-technology and strategy employed by the i^{th} household

A scale range of 0-1 for the use of organic fertilization implies a yes/No dummy variable. If the household is engaged in the activity they get 1point and 0 if otherwise. In contrast, a scale range of 0-3 indicates whether the household undertakes the activity and if so, does so at low (1point), medium (2 points), or high (3 points) scale. The multi-level scales (low, medium, high) used in the index are based on the proportion of the total area cropped on which the strategy is practiced except for fertilizer and pesticide scales which are based on the quantities of these items used, calculated on a per hectare basis. Cereal/legume plots received the highest weighting of 3.5, because production values are likely to be more sustainable over time with legume (Shirar 2005). The scale of cereal/legume plots involves the intercropping of cereal with any leguminous plants .It takes the value of 0, for no, and 1, 2, 3 for low, medium and high levels of activity respectively.

The scale of improved seeds on the other hand, indicates the proportion of the area cropped on which improve seeds are grown. It takes the value of 0, for no, and 1 (if less than 40% is cropped), 2 (if 40-69% is cropped), 3 (if 70% and above is cropped) for low, medium and high levels of activity respectively. The primary tillage or cultivation implement used in land preparation in the study area represents the Scale of

Ploughing. It takes the value of 0, for no, and 1, 2, 3 for use of cutlasses and hoes, animal traction and tractor respectively. The scale of intercropping entails the intercropping of maize with other crops apart from legumes. It takes the value of 0, for no, and 1 (if less than 40% is intercropped), 2 (if 40-69% is intercropped), 3 (if 70% and above is intercropped) for low, medium and high levels of activity respectively (Shriar, 2005).

Based on the recommended fertilizer input rate by ADP (2000), fertilizer application rate per hectare of between 50-100kg, 150- 200kg and 250-300kg is hereby regarded as low, medium and high application rate respectively for scale of fertilizer use per hectare. The quantities of herbicides such as Altrazin, Gramozone, Primextra etc that are used up in the production processes on per hectare basis represents the scale of herbicide use per hectare. Based on ADP (2000) recommended rate of 3litres/ hectare, the following classifications are made: 0.1-1.5 litres, 1.6-3.0 litres and 3.1-4.5litres and are thus regarded as low, medium and high application rate respectively. The scale of pesticides use per hectare (excluding herbicides) involves the quantities of insecticides, fungicides, nematicides etc that are used up in the production processes on per hectare basis. Based on the ADP (2000) recommended rate of 4 litres/ hectare, the following classifications are made: 0.1-1.5 litres, 1.6-3.0 litres and 3.1-4.5litres and are thus regarded as low, medium and high application rate respectively. The scale of organic fertilization is a dummy variable, if the household is engaged in the use of animal dung's and/or poultry droppings on the farm to raise soil productivity the score is 1point and 0 if otherwise.

A Cobb–Douglas stochastic production frontier approach was used to estimate the production function and the determinants of technical efficiency among smallholder maize-based farming household. Given the potential estimation biases of the two-step procedure for estimating technical efficiency scores and analysing their determinants, the one-stage procedure is adopted following Battese and Coelli (1995). Although this approach has its own limitations, it remains one of the popular production functions in production frontier studies. The following model is estimated on the basis of the Battese and Coelli (1995) procedure:

$Yi = Xi\beta + (Vi - Ui), i = 1, N$,----------(2)

Where Y_i is the output of maize crop in grain equivalent. Xi is a k x 1 vector of input quantities of the $_i$th household (land is measured as the total plot area cultivated in hectares; and labour is estimated as man-days worked; fertilizer is the amount of fertilizer used on the plot in kilogram; seed is the quantity of seed in kilograms, regardless of the type of maize and agrochemicals is the quantity of chemicals used in liters). β is a vector of unknown parameters to be estimated: Where Vi are random variables, two-sided ($-\infty < vi < \infty$) normally distributed random error $N \sim (0,\delta v2)$, which are assumed to be independent of the Ui that captures the stochastic effects outside the farmer's control (e.g., weather, natural disasters, and luck, measurement errors in production, and other statistical noise).

The two components v and u are also assumed to be independent of each other. Thus, to estimate a Cobb-Douglas production functions, all the input and output data must be logged before the data is analyzed (Coelli 1995). The estimating equation for the stochastic function is given as:

$\ln Y = \beta 0 + \beta 1 \ln X1 + \beta 2 \ln X2 + \beta 3 \ln X3 + \beta 4 \ln X4 + \beta 5 \ln X5 + Vi - Ui$ -----(3)

The maximum likelihood estimation of equation yields consistent estimators for β, the variance parameters; gamma (γ), lambda (λ) and Sigma squared (δ^2).

Determinants of Technical Inefficiency

U_i =Inefficiency component of error term. It is assumed that the inefficiency effects are independently distributed and Ui truncation (at zero) of the normal distribution with means 0 and variance $\sigma^2 u$ where Ui is specified as:

$U_i = \delta o + \delta i Z_{1i} + \delta_2 Z_{2i} + \delta_3 Z_{3i} + \delta_4 Z_{4i} + \delta_5 Z_{5i} + \delta_6 Z_{6i} + \delta_7 Z_{7i}$- ----------(4)

Where

U_i=Technical inefficiency of maize-based farming household.

$Z_{1=}$ Farm size (in hectares)

$Z_{2=}$ Farming Experience in years

$Z_{3=}$Household size (number of direct and dependants of the household adjusted to adult equivalent).

$Z_{4=}$ Extension contact (number of visits by the extension agent).

$Z_{5=}$ Crop Production Intensification which was measured using Shriar (2005) index.

$Z_{6=}$Credit Access (1 if the household head has access and 0 if otherwise).

RESULTS AND DISCUSSION

Socioeconomic characteristics of farming households

The age of the farming households' heads ranged between 30 and 75 years with an average of 48.3 years as shown in Table 2.

Table 2: Socioeconomic characteristics of maize-based enterprise household heads

Variables	Frequency	Percentage
Age		
21-40 years	62	24.6
41-60 years	161	63.9
61-80 years	29	11.5

Total	252	100
Sex		
Male	216	85.7
Female	36	14.3
Total	252	100
Marital Status		
Married	198	78.6
Single	44	17.5
Widower/Separated	10	03.9
Total	252	100
Household Size		
1- 5	26	10.3
6- 10	117	46.4
11-15	99	39.3
16-20	10	03.9
Total	252	100
Education Status		
No formal Education	46	18.3
Quranic Education	77	30.6
Primary Education	81	32.1
Secondary Education	30	11.9
Tertiary Education	07	02.8
Adult Education	11	04.4
Total	252	100
Primary Occupation		
Farming	192	76.2
Agricultural Trading	19	07.5
Non-Agricultural Trading	24	09.5
Business	15	05.9
Civil Service	06	02.4
Total	252	100
Farming Experience (Yrs)		
1- 10	13	5.20
11-20	55	21.8
21-30	76	30.2
31-40	56	22.2
41-50	52	20.6
Total	252	100
Introduction to Farming		
Inherited	214	84.9
Farm Friends	22	08.7
Relations	16	06.4
Total	252	100

Source: Field Survey, 2011/2012

Sex distribution varies appreciably, 14.3% and 85.7% of the household heads were females and males respectively. The average household size is 11 persons in the zone. Most (69.3%) households are polygamous in nature. Majority (76.2%) of the household heads were predominantly farmers, while others were involved in both agricultural and non-agricultural trading, business and civil service as their secondary sources of livelihood. The farming households head's years of experience ranged between 5 and 45 years with an average of the average of 29.1 years. This indicates that most of the household' heads have been practicing farming for long. Majority of the household heads (72.6 percent) have inherited farming business as an occupation, while the remaining was introduced to it by either friends or relations. Eighty-two percent (82%) of the household heads are literate with most of them having primary education (32.1%) and this is closely followed by Quranic education (30.6%) Those who had tertiary education (2.8%) probably constituted the civil servant who engaged in part-time farming in the area.

Crop production intensification strategies in maize-based production systems

The crop production intensification strategies in the study area are capital-intensive, labour-intensive and land-intensive, or a combination of these. The capital-intensive strategies commonly used in the study area are the application of inorganic fertilizer, use of improved hybrid maize seed and agro-chemicals. The application rate ha^{-1} of inorganic fertilizer in the area was low (87.5kg) compared to the recommended rates of 300kg (Kwara Agricultural Development Programmes, 2000). Given the low inorganic fertilizer application rate, the farming households were unable to maintain or improve the maize production levels and yield. Most households (89%) used fertilizer mainly for the purpose of direct and immediate supply of needed plant nutrient to growing crops in the study area on an average farm size of 1.89 hectares and a Standard Deviation of 0.42832 This result revealed that fertilizer use was the most prevalent practice among the sampled farming households. The major herbicides used were attrazine, karate and Paraquate. The herbicide application rates was low (1.24litres) compared to recommended rate The mean level of application of the insecticides per hectare was 1.03 liters which is lower than the ADP recommended rate of between 3.0litres ha^{-1}. About 26% of the households used improved hybrid maize seed as a capital-intensive strategy on an average farm size of 0.87 hectares. The use of hybrid maize was more pronounced among households with requisite resources. The improved hybrid seed is a crop production intensification strategy used to improve the yields only when all agronomic aspects of planting, weeding and fertilizer application are strictly followed. The improved hybrid maize seed was not accompanied with the appropriate agronomic management practices that raise the yields by households in the study area (Table 3).

Table 3: Land management practice, percentage use and farm size in maize production

Input Use or Management Practice	Percentage of household use in maize-based production	Average Farm Size (ha)	Standard Deviation
Hybrid Maize	26.0	0.87	0.11045
Tractor Usage	09.0	2.31	0.19428
Minimum Tillage	87.0	1.05	0.45114
Cover Cropping	50.0	1.20	0.35071
Crop Rotation	23.4	0.65	0.38559
Organic Fertilization	22.0	1.29	0.44965
Mulching	05.0	0.57	
Intercropping	73.0	0.89	

Source: field survey 2011/2012

The labour-intensive strategies are most common since households in the study area were cash constrained. The household merely added labour in crop production, allowing more dense cropping, weeding and harvesting more intensively. Also due to land constraints, labour/land ratios are rising, and therefore households choose production methods that are as labour-intensive as possible to raise productivity. The households used two or more of the integrated soil management practices on their respective fields. Labour-intensive strategies were mainly soil management practices. These included uses of minimum tillage, crop rotation, cover cropping, animal manure application and mulching.

Minimum tillage was the second most prevalent land management practice after fertilizer use. About 87% of the sampled households practiced minimum tillage on an average farm size of 1.05 hectares. Other households that did not practice minimum tillage used animal traction and tractors to till the soil. Minimum tillage in the study area involved the use of hoes to disturb the soil in the process of constructing mounds or heaps.

Cover cropping; the third most prevalent land management practices in the area was practiced by about 50% of the households on an average farm size of 1.20 hectares. The practice was more common among high than low intensity households. The major problem with cover cropping practice is the opportunity cost which the households consider to be very high. Crop rotation was the fourth most common land management practices among the sampled farming households. About 23.4 percent of the sampled respondents practiced crop rotation on an average farm size of 0.65 hectares. Organic fertilization was another land management practice used by 22 percent of the sampled households on an average farm size of 1.29 hectares. Animal manure was commonly used in the southern part of Niger State, although most households complained of its bulkiness and high cost of application. A few households left plant residue in the furrows to rot and strengthen the soil after their initial land cleaning operations. In most cases, households who planted cowpeas ploughed the vegetation part into the soil after harvest with the aim of improving soil fertility. Mulching was the least prevalent land management practice among the sampled households. The land-intensive strategies are commonly practiced on increasingly small land sizes in the area. Intercropping was practiced by about 73% of the households on an average farm size of 0.89 hectares. Intercropping has long been recognized as a common practice among subsistence farmers due to the flexibility of labour used and less risk. Mixed cropping has been shown to lead to better utilization of land, labour and capital. It also results in less variability in annual returns compared with mono cropping (Eneh et al. 1997).

Levels of Crop Production Intensification of Maize-Based Farming Households.

The crop production intensity scores among the farming households in the zone is presented in Table 4.

Table 4:Levels of crop production intensification of farming households

Category	No of household	Range	Min	Max	Mean	Variance	Kurtosis
High Intensity	064	24.00	14.50	38.50	27.47	16.51	0.461
Low Intensity	188	26.50	5.50	32.00	19.57	26.66	-0.296
All Households	252	33.00	5.50	38.50	23.13	37.36	-0.217

Source: Field Survey, 2011/2012

It ranged between 5.5 and 38.50 with a mean score of 23.13. This study therefore used the mean crop production intensity scores as the threshold value and as a basis for classifying the farming households into high and low intensity categories. The high intensity farming households had the maximum and mean crop intensity scores of 38.50 and 27.47 respectively, which were higher than those of the low intensity households.

The number of households that fall within each of the intensity category provides additional data with which to compare the farming households. Majority (74.6%) of the households belong to the low intensity category while the remaining 25.4% are high intensity households.

The kurtosis value for a normally distributed households equals three. The Kurtosis value of -0.296 and 0.461 suggests that the variability in crop intensity from one farming household to the next is higher among low intensity households than those of high intensity households. The negative Kurtosis value (-0.296) implies greater level of inter-household variation among low intensity households in terms of the land size and cropping strategy. In contrast, high intensity households are much more homogenous from a socio-economic and farming systems stand point.

Maximum Likelihood Estimates (MLE) of Maize-Based Farming Households in SGS

Diagnostic Statistics

The estimate of the sigma-square (δ^2) is 0.3287. This is large and statistically significant at 1 percent (Table 5).

Table 5: Maximum Likelihood Estimates of the Stochastic Frontier Production Function

Variables	Parameters	Coefficient	t-values
Physical inputs			
Constant	β_0	0.4196	0.4669
Land (ha) (X_1)	β_1	-0.4183*	-1.9521
Labour (man-days) (X_2)	β_2	0.2126	0.1127
Seeds (Kg) (X_3)	β_3	-0.0840	-0.1006
Fertilizer (kg) (X_4)	β_4	0.8492***	12.025
Agrochemical(litres) (X_5)	β_5	-0.1235**	-2.3236
Inefficiency model			
Constant term	δ_0	0.1791	0.4246
Farm size (Z_1)	δ_2	0.0492	0.4380
Farming Experience (Z_2)	δ_2	-0.0213**	-2.2706
Household size (Z_3) --	δ_3	0.0535*	1.6754
Extension contact (Z_4)	δ_4	-0.3592	-0.5524
Crop intensification (Z_5)	δ_5	-0.6277***	-3.3689
Credit Access (Z_6)	δ_6	-0.5295	-0.1489
Diagnostic statistics			
Sigma square (δ^2)	$(\delta u^2 + \delta v^2)$	0.3287***	3.9528
Gamma (γ)	$(\delta u^2 / \delta^2)$	0.7789***	7.9756
Lambda	$(\delta u/\delta v)$	1.8767	
Log-likelihood function			-0.6356
δu^2	0.2560		
δv^2	0.0727		
Δu	0.5059		
Δv	0.2696		
Sample size (n)	**252**		

Source: Data analysis, 2011/2012
*** significant at 1%,
** significant at 5%,
* significant at 10%.

Lambda (λ) estimated at 1.8767, which is greater than 1 indicates a good fit and the correctness of the specified distributional assumption of the composite error term (Tradesse and Krishmamooorthy (1997).

The variance ratio represented by gamma (γ) is estimated as 77.89%. This suggests that systematic influences that are unexplained by the production function are the dominant sources of random error. That implies that the presence of technical inefficiency among the sampled maize based farming households heads explains about 80 percent variation

in error observed in the estimated stochastic production frontier. The generalized likelihood ratio is significant at 1 percent level suggesting the presence of the one sided error component. This implies that technical inefficiency is significant and a classical regression model of production function based on Ordinary Least Square (OLS) estimation techniques would be inadequate representation of the data. Thus, the results of the diagnostic stochastic confirm the relevance of the stochastic parametric production frontier and maximum likelihood estimator for the study.

The coefficient of fertilizer was positive and statistically significant at 1% level of probability. This implied that as the respondents increase the use of fertilizer, ceteris paribus, maize- based output increases. This implies that availability of fertilizer at affordable price generally determines the increase in land under maize production in any particular year in the zone. Thus areas cultivated to maize decrease as fertilizer subsidies are withdrawn. Similar results were obtained by Oluwatayo et al. (2008) and Oyewo et al. (2009); among Ekiti and Oyo states maize-based farming households respectively. Also, the coefficient of agro-chemical and land though negative, are statistically significant at 5% and 10% level of probability respectively. This suggests a situation of inappropriate (and hence, inefficient) use of these inputs in maize- based production systems in the study area.

Determinants of Technical inefficiency of Maize-Based Farming Households

The coefficient of farming experience is negative and statistically significant at 5% level of probability (Table 5). This is expected because as household heads gain more experience in maize production, it is expected that their efficiency level will increase. Oyekale and Idesa (2009) reported similar findings among maize-based farming households in Rivers state, Nigeria. On the other hand, Oyewo et al. (2009) reported a positive and significant relationship between farming experience and technical inefficiency. This implies that maize farmers in Ogbomosho having more years of experience are relatively less technically efficient or more inefficient. The coefficient of crop production intensification is negative and statistically significant 1% level of confidence. This implies that household's level of technical inefficiency tends to decrease with increased maize production intensification. This is expected because with increased maize intensification households are expected to use more of fertilizers, hybrid seeds and land management practices which in turn enhance their technical efficiency.

The coefficient of household size is positive on the other hand but significant at 10% level of probability. This indicates that household's level of technical efficiency increases with reduced household sizes. This finding agrees with the work of Ebong et al. (2009) but is inconsistent with the findings of Ebong (2005) and Onyenweaku et al. (2005), which identified a positive relationship between household size and technical efficiency among crop farmers.

CONCLUSION

Within the limitation of the data availability, the study has been able to measure crop production intensification, estimate technical inefficiencies as well as identify the factors determining technical efficiencies among maize-based farming households in the SGS ecological zone of Nigeria. Technical efficiency index computed showed that sampled households under study were highly technically inefficient, with a mean efficiency ratio of 0.48. Therefore, our result indicated that great potential exists for the maize-based farming households to further increase output using the available inputs and technology. Among those factors that have significant impacts on technical efficiencies are household size, crop production intensification and farming experience. This outcome thus suggests that household size, farming experience and cropping intensification of households are vital variables to be considered when policy-makers deliberate on ways to reduce in-efficiencies among maize-based farming households in the zone.

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Assessment of willingness to pay for management of inland waters in Southwestern Nigeria

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Abstract: This study assessed the wetland users' willingness to pay for sustainable management of wetlands. The study was based on respondents drawn across three Wetlands in Lagos, Ogun and Oyo states in Nigeria. Contingency Valuation (CV) technique was employed in assessing Willingness to pay for sustainable management of the Wetland. Tobit regression model revealed that years of education, income and location of the Wetland are the factors that influence respondent's Willingness to pay. This study recommends that formal education in Nigeria should be made to inculcate the wise use and management of Wetlands which they may not depend on for income generation.
Keywords: Contingent Valuation, Direct users, Iterative Bidding, Tobit regression, Wetlands.

INTRODUCTION

Economics is known to be concerned with the allocation of scarce resources in a way that the net benefits derivable by their uses are maximized over time (Olubanjo, 1999). These economic benefits are easily observable with respect to private goods: that is those that are purchased and disposed of in markets with determined prices. The case however is not the same for many natural resources such as the forests and Wetlands which provides valuable environmental services and benefits that are not exchanged in a market because they are public goods. As a result, most of these resources are often poorly managed and/or are explored in an unsustainable way. Thus, the quality of environmental services they provide including enhancement of biodiversity, climate regulation, nutrient recycling, and adding aesthetic value to the planet earth tends to decline over time creating environmental problems of un-imaginable proportions that now threatens both human and non–human life on the planet earth (Fernandez, 1999; Lockwood, 1998).

Wetlands – generally referring to marshes, swamps, floodplains, mudflats, estuarine and the littoral areas of large bodies of water - are among the Earth's most productive ecosystems (Barbier et al, 1997). They have been described both as "*the kidneys of the landscape*", because of the functions they perform in the hydrological and chemical cycles, and as "*biological supermarkets"* because of the extensive food webs and rich biodiversity they support (Mitsch & Gosselink, 1993). Wetlands perform a wide variety of functions that include flood control, ground water recharge, shore line stabilization and storm protection, climate moderation and also serve as habitat for living things, recreation, tourism and cultural values (Federal Ministry of Environment (FME), 2009; Bikangaga, 2007).

Globally, destruction of Wetland ecosystems is taking place at an alarming rate, with as much as about 50% of the World Wetlands already lost (O'Connell, 2003, RAMSAR, 2009). Most of these loses are due to human activities, including large scale diversion of water for irrigation, burning and exploitation of peat land, extensive drainage of marshes and pollution of lakes and rivers (RAMSAR, 2009). In Nigeria, the Baturiya Wetland was reported to be suffering from uncontrolled grazing by Fulani cattle and lopping of tree branches by the herdsmen, while uncontrolled fishing activities in the river system of Kirikasama/Nguru Wetland is causing heavy depletion of the fish stock in that Wetland (NEST, 1991). Furthermore, between the period 1986 and 2006, Wetlands, an important buffer against coastal floods had reduced significantly in coastal Lagos; Wetland loss of 38% to 100% has occurred in four coastal local government areas of Lagos (Adelekan, 2009). FME (2009) observed that the rising loss of Nigeria's Wetlands has resulted in the loss of countless species of animals and plants while the livelihood and culture of a large number of the people, most especially the local communities living around the Wetland, are being endangered. Moreover, the role of Wetland services for adaptation and mitigation to impacts of climate change is also being greatly challenged. Thus, there arises an urgent need for necessary safeguards and mechanisms to be put in place in Nigeria to maintain the ecological character of Nigerian Wetlands. Environmental valuation has been known as veritable tool for putting value on environmental goods and thus prevents their unsustainable use.

Environmental valuation involves the determination of monetary contribution that people are willing to pay in order to halt further degradation or reverse the damage that has been done on the environment. People's desire and consequent values expressed for such environmental improvement are popularly elicited through Willingness to pay (WTP). This approach is premised on the theoretical framework for the empirical valuation of consumer willingness to pay for improved quality in environmental goods. Based on the concept of utility maximization behavior of consumers, Othman et al. (2002), observed that Willingness to pay (WTP) is the amount of money a person would be willing to pay for higher level of environmental or commodity quality. They observe that WTP corresponds to the equivalent variation or equivalent surplus, which measures the amount of money a person is willing to give up to hold utility constant after there has been an increase in the price of a good that the person consumes. Similar views were expressed by Golan and Kuchler (1999), which pointed out that the use of WTP to determine consumers' welfare is a fundamental principle of the neoclassical theory. They noted that the WTP measures the resources individuals are willing and able to give up for a reduction in the probability of encountering a hazard that compromises their health.

Due to population and urban growth, conversion of wetlands to agricultural and other uses of the land, has led to the loss of wetland ecosystems functions. This has a negative impact on rural and urban livelihoods, especially on the poor who depend on the goods and service of wetlands as well as hampering the ability of the wetlands to contribute to the mitigation of climate change effects. It thus become imperative that various programmes that ensure the management of wetland is put in place. Against this background, it was pertinent to assess people's WTP to pay for sustainable management of wetlands which also is an indication of economic value people attach to them. The proposed study shall also be contributing to knowledge by applying non-market valuation techniques - Contigency Valuation (CV) and Willingness to pay (WTP). This, apart from contributing to increased knowledge of the suitability of the methodology, is expected to aid and improve wise use and management of Nigerian Wetland resources.

The broad objective of the study was to assess people's Willingness to pay for sustainable management of selected inland waters in Southwest, Nigeria. The specific objectives were to:

1. describe and compare the socioeconomic characteristics of various categories of Wetland service users in the study area;
2. determine the Wetland users' Willingness to pay for sustainable management of these Wetlands; and
3. examine the influence of various socioeconomic, attitudinal, location-specific, and other factors on the perceived value and Willingness to pay for sustainable management of the Wetlands;

2.0 Theoretical framework for wetland benefits valuation

According to consumer behaviour theory, one's response to increased cost is based on the perceived benefit of and perceived value derived from the product (Mahesh, 2005). Assessment of Wetland values is commonly based on the utility theoretic framework of consumer response to improvement in environmental services and system reliability, as illustrated, for example, by Vasquez, *et al.* (2009). In this study, it is assumed that each respondent seeks to maximizes an indirect utility function, V(Y, W, P, Z), which increases with income (Y) and positive attributes of (i.e. the perceived benefits of environmental services provided by) natural resources like Wetlands (W). Here W is a multidimensional vector of different attributes (e.g. quality, reliability) relevant to the sustainability of environmental services. Indirect utility, V decreases with prices of other goods (P), and is also affected by relevant socioeconomic characteristics (Z). Hence, the individual respondent will be willing to pay for environmental service improvements up to the extent that this payment does not decrease his utility below the original utility level. Thus, a respondent's maximum Willingness to pay (WTP) for any improvement (W1 or W2) in environmental services can be stated as follows:

$V(Y, P, W_0, Z) = V(Y - WTP_1, W_1, P, Z) = V(Y - WTP_2, W_2, P, Z)$

Where:

W_0 represents the status quo provision of environmental services,

W_1 represents improved quality of environmental services, and

W_2 represents some separate additional improvement in environmental services, such as system reliability.

A respondent's WTP for environmental services is, therefore, a function of these multidimensional environmental attributes, income, prices of other goods, and other relevant socioeconomic characteristics (Vasquez, *et al*., 2009).

According to Othman et al. (2002), Willingness to pay (WTP) is the amount of money a person would be willing to pay for higher level of environmental or commodity quality. They observe that WTP corresponds to the equivalent variation or equivalent

surplus, which measures the amount of money a person is willing to give up to hold utility constant after there has been an increase in the price of a good that the person consumes. Similar views were expressed by Golan and Kuchler (1999), which pointed out that the use of WTP to determine consumers' welfare is a fundamental principle of the neoclassical theory. They noted that the WTP measures the resources individuals are willing and able to give up for a reduction in the probability of encountering a hazard that compromises their health. This can be assessed using tools such as the Contingency Valuation, Travel Cost, Hedonic Pricing, and so on (James, 2002).

Wide range of estimation techniques are employed in literature to estimate WTP models. Vasquez et al. (2009) observed that Cameron and James (1987) censored logistic regression approach is often used to directly estimate WTP models from referendum voting data, while Ordinary Least Squares (OLS) is used to estimate a WTP model from responses to open-ended question. Other commonly used estimation methods include the binary choice (Probit and logit) regression model (e.g. Athanasios et al 2006), multinomial logit (e.g. Mwakubo and Obare, 2009) and the Tobit regression (e.g. Mwakubo and Obare, 2009) methods.

Specific applications of contingent valuation method in the area of wetland studies include Athanasios et al. (2006). They used Contingency (Contigent) Valuation method to obtain the average WTP as € 211.30 for separate functions of the Wetland. A lesser WTP value of €125.82 was however interestingly obtained for all Wetland functions as a whole. In the study, a logit model was used to establish the determinants of WTP. Variables used include income, gender, bid age, education and residence measured as a dummy. However the first three were the only significant ones although gender was significant at a lower level.

The study of Bikangaga et al. (2006) estimated the Willingness –to-Pay for the conservation of Lake Nabugabo Wetland system. The Wetland has earlier been designated a Ramsar site in 2004. They estimated the values from two different folds / angles. They are the local council's willingness to invest; which was between 5 and 10% of the councils' annual budget if money was readily available and the other; Willingness-to-Pay at the community level. The study revealed that 50% of respondents were willing to contribute small amounts to Wetland conservation ($1–$2). The study also revealed an interesting correlation between the level of education and people's views on conservation of Wetlands. Over half of the community members who thought that conservation would deprive them of their original benefits had received no education or only primary school education.

In the study of Mwakubo and Obare (2009), the Willingness to pay for Wetlands conservation was obtained by using the Contingent Valuation method. This study used data from 600 households in the Lake Victoria watershed in Tanzania, Kenya, and Uganda. A multinomial logit model was used to determine variables that influence the perception of Wetlands degradation. The household perception of Wetland degradation (wetstatus) was found to be relatively low. The model results showed that although the perception of Wetland degradation is modest, it is influenced by attributes of social capital. A Tobit model was also used to establish the determinants of Willingness to pay for Wetland conservation and the imputed value of Wetland product extracts. Land size and ownership, education level and household size all influence households' likelihood to actively engage in Wetland resource exploitation and Willingness to pay for its conservation.

Bateman et al. (2006) contrasted applications of both the Contingent Valuation (CV) and Contingent Ranking (CR) methods as applied to a common issue, the valuation of improvements to the water quality of an urban river (the River Tame, running through the city of Birmingham, UK). The study is sequel to earlier experimental work, in which the CV design used ensures that respondents are fully aware of all impending valuation tasks prior to undertaking any one of those tasks. Such an approach they affirmed is directly comparable to the CR design for which full awareness of all options is a pre-requisite. However, their findings indicate that the CV responses exhibit strong internal consistency with expected relationships observed between values and theoretically expected parameters. External comparisons show that CR valuations are substantially larger than those elicited through CV (with protest votes excluded), and that the response rate for the CR survey is significantly higher than that for the CV survey.

Verbic and Slabe-Erker (2009) also estimated the economic valuation of the Landscape Development and Protection Area of Volcji Potok, which is an important Slovenian cultural landscape area with internationally recognized qualities. In the study, the classical Contingent Valuation with a closed-version of discrete choice method, where the protest responses have been removed was employed to estimate the Willingness-to-pay. The average was estimated as SIT 388, with the highest value of WTP as SIT 475. In addition, results indicate that households are willing to pay from 1.8% to 7.55% of reported household income above their current water

bill for safe and reliable drinking water services. They used a probit regression to model the determinants of Willingness-to-pay. Respondent's income, the frequency of visiting the Wetland and values of perceived benefit were discovered to be the factors that influence their Willingness to pay. Others include conscientious respondents, perception of damage in unplanned situation, heritage value, functional characteristic and protest all measured as dummies. While the coefficients of age, gender, household size and domicile status were not significant.

METHODOLOGY

This study was based on data obtained from a cross-section of 197 respondents drawn across 17 communities around three Wetlands in Lagos, Ogun and Oyo states in Nigeria. The Wetlands included in this survey are the Lagos Lagoon, Eriti in Ogun and Eleyele in Oyo states. The Wetlands of Lagos were included based on the extensiveness of Wetlands found in the state. Eriti Wetland was however included because of its use for Agricultural purposes and its consequent involvement in FADAMA programmes. Eleyele Wetland is also notable in Oyo state particularly as the major source of potable water distributed for household use upon treatment in the area.

Eriti Wetland is found in Obafemi – Owode local government area of Ogun State. It is characterized by swamp or flood plain and riparian vegetation surrounded by Ogun River and its tributaries. The Eriti village is located in the humid tropical rainforest zone on latitude 6°50'N and 7°50'N and longitudes 3°18'E and 3°32'E some 20 kilometers on the southern corner of Abeokuta, Ogun State capital. It shares western boundary with Ewekoro/Ifo Local Governments. It covers an estimated area of 156Km^2. The population of Eriti Wetlands Communities is conservatively put at over "6,000". Eriti Wetlands are surrounded with freshwater Wetlands and other villages. Eriti village seems to be the largest among the villages in the area in terms of number of houses and by extension the population of the people living there. It is within a walking distance on foot paths to other villages. These villages include: Isiba, Ogunpa, Ajegunle, Oluwo Oke, Itori, Iboko and Arowa, Isare etc.

The natural watershed vegetation upon which the livelihoods of many villagers are based is the flood, terrestrially flat plain and River Eriti, a tributary of Ogun River. It possesses rich alluvial soil useful in farming as a result of seasonal inundation and overflow of the River during rainy season. The water reserves are extensively used for dry season crop production by irrigation and residual soil moisture. Being an agrarian community, the villagers have been utilising these Wetlands over the years particularly for farming and other livelihoods such as fishing, fuel wood production, grazing of animals, hunting, logging and soil excavation for building and other constructions among others.

The Eleyele Lake is found in Ido Local Government area of Oyo state. It is the major source of portable water upon which the majority of the Eleyele and its environs depends as the Eleyele water works sources water from this Wetland. This is subsequently treated and distributed for household use. The lake is surrounded by communities such as Awotan, Ijokodo, Apete, Eleyele, Olopomewa etc.

Livelihood activities found around this Wetland include farming, fishing, artisanship, trading, civil service etc. The Wetland is used for dry season crop production by irrigation and residual soil moisture but it is predominantly used in the production of agricultural crops such as cassava, maize and edible leaves such as *Cochurous olitorius, Amaranthus gangeticus, Celosia argentinae etc* among others. It also supports fishing which the people in the area readily explore for consumption and sales. Tilapia is the most common fish type found in this water although others such as catfish, starfish etc are available but in very little quantity when compared with Tilapia.

Some sides of the Wetland are protected by trees *(Meligna Aboria*) which were planted by the Federal Ministry of Forestry after being cut down and burnt in 1993 during the political uproar that followed Chief M.K.O Abiola's death. The entire perimeter of the Wetland is however not protected thus giving room to encroachment on such unprotected areas.

Lagos state has extensive bodies of waters that are fed by several Rivers. The Lagos Lagoon is fed by Yewa, Ogun and Ona/Ibu Rivers while the Wetlands of Badagry are mainly suppoted by discharges from the Yewa River. The Oshun, Shasha and Oni flow into Lekki Lagoon, from where water escapes to the sea, either via Lagos Lagoon, or through the swamps to the East.

Major activities supported by these Wetlands include artisanal fishing, farming, fuel wood production, grazing of animals, hunting, logging and soil excavation for building and other constructions among others. Other non Wetland activities are also found around these Wetlands.

Multistage sampling technique was used in this study. Stage one involves the purposive selection of three Wetlands (Eleyele, Eriti and Lagos Wetlands). The second stage involves the random selection of eighteen communities close to the water bodies while the third stage involves systematic random selection of respondents from residential buildings and from

farm/ nonfarm enterprises. Communities surveyed around Lagos Lagoon included Ebute Afuye/ Chief in Epe, Foolu, Ise, Odofin and Ibeju in Ibeju-Lekki, Itoga, and Ikoga Zebbe in Badagry. Those surveyed around Eleyele Wetland are Eleyele, Ijokodo, Apete, Awotan and Olopomewa while the communities visited around the Eriti Wetland which is one of the tributaries of the Ogun- Oshun River are Eriti, Oluwo-Isale, Olorunda, Saare, and Mokoloki harbouring another Wetland which is also a part of the Ogun-Oshun River.

Primary data were used for this study. The data were collected through the use of personally administered questionnaire. The data consists of information on socioeconomic as well as demographic characteristics of the respondents. Other data obtained included data on direct utilisation of Wetland services, the number of years the respondent has been living, working or visiting the Wetlands, among others. Data were also collected on whether or not the respondents' were willing to support sustainable management plans for the Wetlands through direct payment as well as the amount they are willing to pay for such improvement.

The analytical techniques employed for this study included both descriptive and quantitative techniques. Contingency Valuation (CV) technique was employed in assessing the respondents' Willingness to pay for sustainable management of the Wetland. The process entailed presentation of the hypothetical management plan to the respondent. This includes investment in advocacy, education and public awareness restoration of the lost/degraded Wetland which will involve in-situ/ex-situ actions i.e. reintroducing of some lost species of both plants and animals to enhance biodiversity , research and site management planning including fencing, planting of trees round the entire perimeter of the Wetland, waste management and recycling systems, etc.); and provision of basic amenities such as water, roads, electricity (improved), health care centers, etc. with a view to enhance esthetic and tourism value of the Wetland.

Values were elicited using the iterative bidding game approach, where a respondent was asked a series of questions to iterate towards a best possible answer. Table 1 summarizes the iterative bidding procedure adopted, following Georgiou, *et al* (1993)

The sensitivity test and biases such as payment vehicle and hypothetical bias were combated by first obtaining the respondents preferred mode of payment as well the improvement plans they desire in the pilot study. These as well as educating them about expenditure on this desired change being unavailable for the satisfaction of other needs were carefully woven into the design of the CV so as to eliminate (minimize) errors that could arise from such which may lower the credibility of the survey.

RESULT AND DISCUSSION

Three main categories of Wetland service users were identified among the survey respondents. These include the Indirect Users; these consist of people that are only resident in communities around Wetlands. They are not engaged in any Wetland based livelihood activity but they enjoy the environmental services provided by the Wetlands. Direct users; this is the category of people that directly explore the Wetlands for their livelihood pursuit but do not live around them. Direct and indirect users; they are the set of respondents that both live around Wetlands and actively explore or depend on the Wetlands for their livelihood sustenance.

Table 1 presents the distribution of the three categories of respondents across the three Wetland covered by the study. An exploration of Table 1 shows that majority (94.7%, 74.2%, and 70.4%) of the respondents in Eleyele, Eriti, and Lagos Lagoon both live and pursue livelihood around all the Wetlands respectively. The same trend was also observed in the pooled data (74.6%) irrespective of the Wetland location. This showed that irrespective of their location, Wetlands are actively explored by their surrounding community in generating income. This substantiates the claim by several studies that Wetland community dwellers depend on Wetlands as source of livelihood. Also, the Table revealed 14.2% of the respondents come from outside the immediate environment of the Wetland (direct users) to pursue livelihood activities. This shows that it is not only the Wetland community dwellers that depend on the Wetland for livelihood sustenance; people come from outside the Wetland fringe communities to explore the various income generating potentials of the Wetlands.

Table 1: Distribution of Respondents by Location, type of Wetland Use and Main Occupation

Benefit type	Wetland			All respondents
	Eleyele	Eriti	Lagos lagoon	
Direct & Indirect users	18 (94.7%)	72 (74.2%)	57 (70.4%)	147 (74.6%)
Direct users	1 (5.3%)	16 (16.5%)	11 (13.6%)	28 (14.2%)
Indirect users	0 (0.0%)	9 (9.3%)	13 (16.0%)	22 (11.2%)
Occupation				
Farming	3 (15.8%)	53 (54.6%)	40 (49.4%)	96 (48.7%)

Benefit type	Wetland			All respondents
	Eleyele	Eriti	Lagos lagoon	
Fishing	2 (10.5%)	17 (17.5%)	8 (.9%)	27 (13.7%)
Fish farming	0 (0.0%)	2 (2.1%)	4 (4.9%)	6 (3.0%)
Sand mining	0 (0.0%)	9 (9.3%)	1 (1.2%)	10 (5.1%)
Artisan	12 (63.2%)	2 (2.1%)	9 (11.1%)	23 (11.7%)
Others	2 (10.5%)	14 (14.4%)	19 (23.5%)	35 (17.8%)
TOTAL	**19**	**97**	**81**	**197**

Source: Data from Field Survey 2010

Further evidence from the Table 1 indicates that about half (48.7%) of the people found around Wetlands are involved in crop farming. Farming was thus the major activity that these Wetlands were being used for although large proportions (63.2%) of the people found around the Eleyele Wetland were artisans. This may be due to the fact that part of this water body is found in a commercial area (Eleyele Motor Park) while around the Lagos Wetlands other non-wetland livelihood activities such as food vending, trading, transport services, civil service etc. constitute about 23.5% of the peoples occupation which shows that they don't only rely on the Wetland only for income generation.

Socioeconomic characteristics such as age, educational level, and gender among others have been identified among key determinants of Willingness to pay (Vasquez et al., 2009) for sustainable management of natural resources. Therefore, this study analysed the personal characteristics of the survey respondents across the different categories of Wetland users and the results were presented on Table 2.

As shown on the Table 2, majority of the survey respondents and by extension people resident and or pursuing livelihood activities around the selected Wetlands are economically active, aged between 31-50 years (54.5%) and mostly (90.4%) married. They are predominantly educated either to the primary (35.5%) or secondary (39.1%) school level, with as much as 12.7% of them having no formal education. In terms of gender, although both sexes are involved in Wetland related activities, the male folk however constitute the majority (73.6%). By religion, the Christians constitute a slight majority (59.4%) as against the Muslims (40.6%). Also, the Table reveals that majority (64.4%) of the respondents have spent at least 10years either residing and or pursuing livelihood activities around the Wetlands.

Table 2: Distribution of Respondents by Personal Characteristics

Description	Wetland Service User Category			
	Direct users	Indirect users	Direct & Indirect users	All respondents
Number of respondents	28 (14.2)	22 (11.2)	147 (74.6)	197(100.0)
Age Group				
Below 30	6 (21.4)	2 (9.1)	27 (18.5)	35 (17.9)
31-40	8 (28.6)	7 (31.8)	48 (32.9)	63 (32.1)
41- 50	7 (25.0)	8 (36.4)	29 (19.9)	44(22.4)
51-60	4 (14.3)	5 (22.7)	25 (17.1)	34 (17.3)
Above 60	3 (10.7)	0 (0.0)	17 (11.6)	20 (10.2)
Sex				
Female	4 (14.3)	10 (45.5)	38 (25.9)	52 (26.4)
Male	24 (85.7)	12 (54.5)	109 (74.1)	145 (73.6)
Marital Status				
Married	25 (89.3)	17 (77.3)	136 (92.5)	178 (90.4)
Single	2 (7.1)	3 (13.6)	7 (4.8)	12 (6.1)
Widow(er)	1 (3.6)	2 (9.1)	4 (2.7)	7 (3.6)
Educational Level				
No Formal education	2 (7.1)	4 (18.2)	19 (12.9)	25 (12.7)
Primary	9 (32.1)	5 (22.7)	56 (38.1)	70 (35.5)
Secondary	13 (46.4)	10 (45.5)	54 (36.7)	77 (39.1)
Tertiary	4 (14.3)	3 (13.6)	18 (12.2)	25 (12.7)
Religion				
Christian	19 (67.9)	14 (63.6)	84 (57.1)	117 (59.4)
Muslim	9 (32.1)	8 (36.4)	63 (42.9)	80 (40.6)
Years spent around the Wetland				
Less than 5	6 (21.4)	2 (9.1)	25 (17.0)	33 (16.8)
5-10	5 (17.9)	8 (36.4)	24 (16.3)	37 (18.8)
11-15	9 (32.1)	5 (22.7)	31 (21.1)	45 (22.9)
16-20	3 (10.7)	3 (13.6)	18 (12.3)	24 (12.1)
Greater than 20	5 (17.9)	4 (18.2)	49 (33.3)	58 (29.4)
TOTAL	28 (100.0)	22 (100.0)	147 (100.0)	197 (100.0)

Source: Data from Field Survey 2010

Several studies (Verbic and Slabe Erker, 2009; Athanasios et al., 2006) had also reported the influence of socio demographic factors on WTP. For this reason this study first use descriptive methods to analyze these factors and the results were presented in Table 3.

Table 3: Willingness to pay by socio-demographic factors

Socioeconomic factors	WTP/year (N)	Standard Error of WTP
All respondents	**2914.65**	**233.33**
Age group		
Less than 30	2732.17	572.20
31-40	3846.56	119.28
41-50	3284.21	528.79
51-60	2448.90	337.06
Greater than 60	3071.74	721.25
Gender		
Male	2865.66	429.75
Female	2931.65	293.87
Educational level		
No formal Education	4210.95	1136.80
Primary	2769.95	332.15
Secondary	2937.12	352.37
Tertiary	2454.16	682.64
Years Spent around the Wetland		
Less than 5	2684.99	644.03
5-10	2645.72	423.60
11-15	4876.70	1267.08
16-20	2306.76	415.30
Greater than 20	2911.39	756.22
Wetland Service User Category		
Direct Users	4554.32	1184.79
Indirect Users	2633.48	596.94
Direct & indirect Users	2817.84	253.00
Wetland Area		
Eleyele	4126.29	742.39
Eriti	1898.19	322.97
Lagos lagoon	2554.94	255.39

Source: Data from field survey 2010

From Table 3, an average respondent has a WTP value of N2914.65 per year; those aged between 31-40years have the highest WTP of N3846.56 when compared with the other age groups while the females report a higher WTP of N2931.65 when compared with their male counterpart (N2865.66). Also, those with no formal education indicated their interest of willing to pay the highest (N4210.95) when compared with their contemporaries. This of course may be due to their total dependence on the Wetland for livelihood support as their choice of paid jobs is limited and less likely to be as financially rewarding as Wetland activities. Those who have spent between 11-15 years around the Wetlands and the direct users (those who come from neighboring communities to eke a living from the Wetland) indicate the highest value of N4876.70 and N4554.32 respectively when compared with others in their group. Among the three different Wetlands, the Eleyele people supposedly have the highest (N4126.29) WTP. The mean willingness to pay for the management of wetlands in the south west Nigeria was N2914.65 per year.

The result of the Tobit model on Table 4 revealed that three variables influence the respondent's Willingness to pay (WTP). They are education in years at ($p<0.01$), income ($p<0.05$), sub urban ($p<0.05$) and urban location ($p<0.01$) of the Wetlands. The coefficients of years of education, income and location of the Wetland in suburban as well as in an urban area (with reference to a rural Wetland) were significant and negative except for the urban dummy which is positive. This means that as educational qualification and income increase the respondent's Willingness to pay for sustainable management plans for these Wetlands reduces while the location of Wetlands in a sub urban area reduces respondents WTP when compared with that of a Wetland user's located rural area. However, location of the Wetland in an urban area positively influences WTP. This suggests that urban Wetlands users are willing to pay a higher amount when compared with their rural counterparts. In a nutshell, the users of sub urbanely located Wetlands are willing to pay a lesser amount while those in urban Wetlands are willing to pay a higher amount when both of them were compared with their rural counterparts.

Table 4: Tobit Regression model of factors that Influence Willingness to pay (WTP)

Explanatory Variables	Regression Coefficient	t-ratio	Marginal Effect
Constant	19.185	2.5684	
Age	-0.3538	-1.1061	-0.2565
Age square	0.2755E-02	0.7889	0.1997E-02
Female dummy	0.4523	0.2489	0.3279
Years of formal Education	-0.3106*	-1.7834	-0.2252
Years spent in Wetland	0.4461E-01	0.7842	0.3234E-01
Total income	-0.1849E-05*	-1.8440	0.1333E-01
Wetland share of income	1.4022	0.8112	1.0166

Explanatory Variables	Regression Coefficient	t-ratio	Marginal Effect
Farming dummy	2.3966	1.4535	1.7375
Fishing dummy	-1.3011	-0.7524	-0.9433
Resource collector dummy	-1.7305	-0.8126	-1.2546
Others dummy	-0.8526	0.3829	-0.6181
Sub-urban dummy	-5.1171**	-2.4679	-3.7099
Urban dummy	4.8912**	2.7016	3.5461
LLF	-1260.8260		
Predicted F(1)	0.7668		
Squared Correlation	0.6683		

*NOTE: *** ** * implies that associated parameter is significant at p<0.01, p<0.05 and p< 0.10 levels respectively. LLF - Log Likelihood Function.*

SUMMARY, CONCLUSION AND RECOMMENDATION

The study was based on primary data collected from 197 individuals residing only, residing and pursing livelihood, or pursing livelihood only around the Wetland. The data consists of socioeconomic characteristics of the respondents; main activities carried out by the respondents around the Wetland as well their perception of various Wetland benefits. The data collected were analyzed by the use of descriptive and quantitative techniques. Frequency distribution tables, means and percentages were used to describe the socioeconomic characteristics of the respondents, the main activities carried out by the respondents. Contingency Valuation method was used to determine Willingness to pay while Tobit regression was used to determine factors that influence Willingness to pay for the sustainable management of Wetlands.

The study identified three categories of Wetland users; those that only reside around the Wetland without directly exploring the Wetland for income generation (indirect users), those both residing and having livelihood pursuits (direct and indirect users) and those not residing but having livelihood pursuits (direct users) based on the Wetland resources. The study revealed that a typical Wetland dweller is 74.6% likely to be direct and indirect service users i.e. both live and depend on the Wetland for income generation.

Analysis of the Wetland dwellers personal characteristics showed that they are economically active, aged between 31-50 years (54.5%) and mostly (90.4%) married having predominantly primary (35.5%) or secondary (39.1%) school level of education, with as much as 12.7% of them having no formal education with the male folk constituting the majority (73.6%) and the Christians a slight majority (59.4%) as against the Muslims (40.6%).

Further revelations in this study are that an average wetland user is willing to pay N2914.65 per year for management of wetlands. Years of education, income and location of the Wetland in suburban as well as in an urban area (with reference to a rural Wetland) are the factors that influence respondent's Willingness to pay. The higher their years of schooling and income the lesser they are willing to pay. The sub urban Wetland user is also willing to pay a lesser amount while urban Wetlands users are willing to pay a higher amount when both of them are compared with their rural counterparts.

The findings of this study are that Wetlands regardless of their location are being explored for various income generating activities. This if combined with conservational plans for these Wetlands will help enhance their functioning for this purpose and that of ecosystem balancing. An average Wetland user is willing to pay N2914.65 per year for wetland management. People with higher level of education and income are however willing to pay less for Wetlands sustainable management plans. Also, a farmer in a sub urban Wetland is likely to pay lesser amount when compared with one who only resides and do not eke a living from the Wetland in a rural or urban area. The main conclusion of this study therefore is that an average Wetland community dweller is willing to pay for the sustainable management plans of Wetlands.

This study therefore recommends that formal education in Nigeria should be made to inculcate the wise use and management of Wetlands so as to help the educated appreciate the need to support the wetland management which they may not necessarily depend on for income generation.

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Assessment of youth attitude towards fish production in Abeokuta metropolis, Ogun state, Nigeria

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Abstract: This study assessed the attitude of youth towards fish production in Ogun State, Nigeria. Data were obtained from randomly selected youths in Abeokuta metropolis using structured interview guide. Data collected were analyzed using descriptive (frequencies and percentages) and inferential (Chi square and PPMC) statistics. . Results show that majority of respondents were male (82.0%), single (59.0%), had formal education (47.0%) and 64.0% had fish farming as their main source of income. Although 60.0% of the respondents strongly agreed that fish production activity was hard and stressful as it requires large capital (62.5%) youth had favourable disposition to fish production (55.8%). Inadequate capital and unfavourable government policy were identified as the top constraints towards involvement in fish production. Therefore, the study recommends that efforts should be put in place to make government policies favour youth involvement in fish production while credit schemes and or intervention funds specifically targeted at aquaculture and fish production development should be established to further encourage them.
Keywords: Youth attitude, Fish farming, Aquaculture development

INTRODUCTION

Nigeria appears to be in what economists call a poverty trap, a vicious circle that takes hard work and massive investment to break. While the population continues to rise in the face of acute food shortage and massive unemployment, poverty continues to spread like wild fire (Gabriel, 2012). Poverty has almost become a generational culture in Nigeria. Unemployment which is synonymous with poverty has become an albatross around the necks of the average Nigerian. This phenomenon has increased the already high dependency syndrome since many able bodied youths are still dependent on the existing workforce. Thus, the only antidote to this unfortunate situation is the personal involvement of the able bodied generation of youth in income earning ventures. One way in which the energy of the teeming population of youth can be positively and profitably channelled is the promotion of fish farming and fish farming estate where the nation has huge untapped potentials.

Nigeria has been regarded as the biggest importer of fish in Africa considering the present per capita fish consumption level in the country (FAO, 2011). The problem is that total domestic fish production is far less than the total domestic demand (Bada and Rahji, 2010). The unsatisfied demand will continue to be met through importation unless policies and actions are geared towards improving domestic production in a sustainable way through aquaculture (Rahji *et al.*, 2001). A review of aquaculture in Nigeria showed that only extremely small proportions of the resources available (both man and materials) were being utilised. Nonetheless, Nigeria has a great potential to increase the availability of fish by supporting and expanding aquaculture (Olomola, 1991; Ojo and Fagbenro, 2004).

Nigeria is capable of producing fish that can meet the standard protein requirement of her people. Nigeria is blessed with an estimated inland water mass of 12.5 million hectares capable of producing about 512,000 metric tonnes of fish annually (Ita *et al.,* 1985). There is a vast expanse of inland freshwater ecosystem from the coastal region in the South to the arid zone in the North. According to Inoni (2007), total domestic fish production fluctuated between 562,972 and 524,700 metric tonnes in 1983 to year 2003; while the output of fish farming during this period was 20,476 to 52,000 metric tonnes. Fish farming accounted for between 3.64 and 9.92% of total domestic fish production in Nigeria within this period, while the bulk of production came from artisanal fishing (Bamigboye *et al*., 2010). Current statistics of fish production in Nigeria shows that aquaculture production has increased reasonably from 56,355MT in 2005 to 152,796 MT in 2009 (FAO, 2011). The increase is connected to increasing population and awareness of the benefits of fish as a source of protein for healthier living. Nonetheless, the continued apathy of able bodied youth in fish farming remains a bane for self-

sufficiency in fish production in Nigeria since fish production is an energy and time demanding venture.

Studies on agriculture have found that, in most parts of Nigeria people involved in farming are economically active and between the age range of 35 and 50 years (Oladoja and Adeokun, 2013; Umunna *et al.,* 2013; Adeokun *et al.,* 2008; Babatunde *et al.*, 2007; Ifejika *et al.,* 2007). In actual fact, attitude of the youth population (people less than 30 years old) to agriculture and agricultural related enterprise has not been encouraging. On fisheries and aquaculture, Ifejika *et al.* (2007) reported 20% participation of youth. This level of participation is considered as not encouraging, pointing out that the issue of succession will affect future fish food supply because the active workforce is ageing. Some of the problems identified with youths attitude towards fish farming are: poor government policies, wrong assumption of youths that fish farming is meant for grassroots, wrong perception and attitude of the principal implementers and facilitators such as government, teachers, parent and other consumers and half-digested knowledge on fish production (Dada, 2003). Thus, research on contribution of youth (people less than 30 years old) to fish production and ways to enhance their participation remain germane.

Youth according to Nigeria's National Youth Development Policy (2001), comprises all young persons of ages 18 to 35, who are citizens of the Federal Republic of Nigeria. People in this age bracket definitely constitute a sizeable chunk of a nation's population on which the burden of nation building falls. They also constitute the major resource base for any country that want to embark on any meaningful rural development projects. Laogun (2002) observes that investment in the youth is the only way to ensure the future growth and development of any country. He further asserts that increasing number of young people must be trained and as quickly as possible, to provide leadership in agriculture industry, government and rural development projects. Youth are energetic, exposed to modern computer technologies and are seen as "vital sources of manpower for development". Hence, the kind of education (formal or informal) that youth are exposed to or have access to will determine the nation's overall developments. With the youth involvement in fish farming, Nigeria can be self-sufficient in fish production, increase fish production thereby making the country a net exporter of fish and fisheries products (George *et al.*, 2010). If great emphasis and attention is placed on commercial fish farming and the government provide the enabling environment for it.

Youth in urban settlements were mainly into motor cycle riding and other quick money making ventures but minority went into fish farming. The notion that agriculture is mainly the occupation of old people no longer holds because lot of youths are now encouraged into backyard farming as secondary occupation to augments their revenue, minimise unemployment, eliminate malnutrition and for food security. The specific objectives of this study were to describe the socioeconomic characteristics of the youth towards fish production in Ogun State, youth's attitudes towards fish farming, and constraints to involvement in fish farming. The study also tested a hypothesis to know whether socioeconomic characteristics are predictors of youth attitude towards fish production.

METHODOLOGY

Study area: Ogun State is a predominantly agrarian and maritime coastal state in Nigeria. The state is located in the rainforest vegetation belt of Nigeria within longitude 2^{o} $45^{'}$ E and 3^{o} $55^{'}$ E and latitudes 7^{o} $01^{'}$ N and 7^{o} $8^{'}$ N in the tropics. It is bounded to the west by the Benin Republic, to the south by Lagos State and the Atlantic Ocean to the east by Ondo state and the north by Oyo and Osun States (Olaoye *et al.*, 2007). It has a land area of 16,409.26 km^2 and a population of 2,820,298.66. Ogun State is people mainly by the Awori, Egba, Ijebu Ikale, Ilaje, Remo and Yewa. All except the Egun belong to the Yoruba Language sub family (Olaoye *et al*., 2010).

Abeokuta metropolis which is the capital city of Ogun State has only two (2) Local Government Areas namely; Abeokuta South Local Government Areas with the headquarters at Ake with 15 political wards and Abeokuta North Local Government areas having its headquarters at Akomoje with 17 political wards with a total population of 593,143 people as at 2006 census among which are predominantly youth (NPC, 2006).

Population of the study: The study population comprised of all male and female youth involved in fish farming in Abeokuta metropolis areas of Ogun State.

Sampling Techniques: Multi-stage random sampling procedure was used to select the youths. Firstly, Abeokuta metropolis was divided into two based on the local government areas. The first stage involved the random selection of 6 wards out of the existing 15 wards in Abeokuta South Local Government Areas and 7 wards from the existing 17 wards in Abeokuta North Local Government Areas (i. e 40% each) making a total of 13 wards for the survey. In the third stage, 10 youths were systematically selected to give 130 youths. At the end of the data collection exercise, 120 copies of the questionnaire were found suitable for data analysis.

The main instruments for primary data collection was well-structured questionnaires used to obtained data on the socioeconomic characteristics, youth's attitudes towards fish farming, and constraints to involvement in fish farming.

Data were analyzed using descriptive (frequency counts, percentages, etc) and inferential statistics (Chi-square and PPMC).

RESULTS AND DISCUSSION

Socioeconomic characteristics of respondents

Table 1 shows that majority (76.7%) of the respondents were within the active age group bracket of 25-30. Fish farming as a labour intensive business requires the involvement of enthusiastic, agile and innovative individual (Olaoye *et al.*, 2010). Thus, it was presumed that this age category of respondents in Abeokuta metropolis could easily cope with the rigors of fish farming business. Noting the importance of age on performances in agricultural enterprise development, Oladoja and Adeokun, (2013) stress the importance of young farmers' involvement in agriculture towards ensuring food security in Nigeria. Oluwasola and Ajayi (2013) point out that young farmer are in their prime age for production. Thus, the young age of the respondents should, all things being equal have positive impacts on enterprise size, earnings, and the ability to take risks and adopt modern innovation which they perceive to be capable of yielding higher incomes. Therefore, considering the positive correlation of age with acceptance of innovation and risk taking, if youth can be encouraged to be actively involved, there is hope for fish farming in Nigeria (Bello, 2000).

The gender, marital status and household size of the respondents are also important variables in the study as these variables determine to a large extent decision making on the fish farming system. The study found that 82.5% of the respondents were male and 59.2% single. This finding corroborates Ifejika *et al.* (2007) where he found only 20.0% of his respondents being involved in fish production in Borgu Local Government Area of Niger State, Nigeria. Among the reasons given by Ifejika *et al.* (2007) for low involvement of female in fish production were oppressive land tenure system and lack of interest. It is noteworthy that, in Yoruba land where this study was carried out in Nigeria, female are not in most cases heirs to land as they are believed to have a share with their husband (when they marry) and not with their parents. However, this contravenes the findings of Dey *et al.* (2002) in Ifejika *et al.* (2007) which reported 56.0% female involvement in aquaculture in China, Philippines, India, Bangladesh and Indonesia. Being mostly male and single is presumed to be a "plus" to the involvement in fish production since fish production requires physical/muscular strength exertion and also time demanding. Thus, it can be easily executed by youths in the study area.

Education plays a crucial role in influencing the youths and predispose them to new innovations. It was found that 93.3% of the respondents attained tertiary level education. The high literacy level of the respondents can be attributed to the presence of notable tertiary institutions in and around Abeokuta metropolis. Therefore, youth in the area are expected to explore the opportunity of the institutions of higher learning in the area to attain higher levels of education. Since youth in the study area are more enlightened, they can easily organise themselves into formal organisations. This will help them in innovation adoption and enhance their propensity for personal economic development through agri-entrepreneurship. In corollary, Ofuoku, *et al.* (2005) stressed that literacy level among farmers is a crucial factor in the adoption of innovation and technology.

Fish farming was the main source of income to 64.2% of the respondents while 45.8% ran their farms themselves. The respondents who run the operation themselves stand a chance of having higher profit margin but limited scale of operation. They are likely to commit more number of hours and efforts in order to succeed.

On sources of income, the study reveals that 55.0% of the respondents' source of income was from personal savings. This implies that only few may have the privilege of access to micro-credit. Most (91.7%) of the youth cultured catfish and 78.0% opined that fish seeds were readily available. This is good for aquaculture and fish production in the area. It was gathered that 98.0% of the youth had enough technical information about fish farming while most (96.7%) will recommend it to others. Most of the youth (64.2%) believed that fish farming will blossom in the area. The study also reveals that 82.5% of them did not belong to any fish farming association or cooperative society. This is a bane to capital acquisition for enhanced fish production among these young agripreneurs since they will continue to depend on the income pull from their agribusiness less personal upkeep expenses. This implies that the youth in this area have the propensity for a meagre plough backs into fish farming business.

Table 1: Distribution of youth fish farmers by their socioeconomic profile

Variables	Frequency	Percentage	Mean	Std. Dev.
Age (years)				
25 – 30	92	76.7		
31 – 40	26	21.7	29.32	3.73
41 – 48	2	1.6		
Sex				
Male	99	82.5		
Female	21	17.5		
Marital status				
Single	71	59.2		
Married	47	39.2		
Divorced	2	1.7		
Highest level of Education				
Secondary	7	5.8		
Polytechnic	57	47.5		
University	55	45.8		
Others	1	0.8		
Years of Schooling				
2-6	15	12.4		
7-14	60	50.1	13.49	4.14
>15	45	37.5		
Farm main source of income (N)				
Yes	77	64.2		
No	43	35.8		
Other sources of income (N)				
Broiler production	2	1.7		
Business	21	17.5		
Civil defence	2	1.7		
Civil servant	2	1.7		
P.T.A teacher	1	0.8		
Snailery	1	0.8		
Teaching	2	1.7		
Trading	12	10.0		
Do you belong to any fish farmers association				
Yes	21	17.5		
No	99	82.5		

Source: Field survey, 2013

Youth attitude towards fish production

Table 2 shows that 60.8% of the respondents strongly agreed that fish production activity was hard and stressful, 62.5% of the respondents strongly agree that fish production requires large capital and they could not afford it. However, 47.5% of the respondents disagreed that fish production provides low income while 54.2% of the respondents disagree that fish farming is not sustainable means of livelihood, 51.7% of the respondents disagree that fish production is meant for illiterate people.

Table 2: Distribution of youth by their attitudinal disposition to fish farming

Items	Strongly agree	Agree	Disagree	Strongly Disagree	I Do Not Know
Fish production activity is hard and stressful	73 (60.8)	33 (27.5)	1 (0.8)	13 (10.8)	
Fish production is meant for illiterate people	1 (0.8)	4 (3.3)	62 (51.7)	53 (44.2)	
It makes someone older that other	4 (3.3)	47 (39.2)	38 (31.7)	25 (20.8)	6 (5.0)
Fish farming is not sustainable means of livelihood	1 (0.8)	7 (5.8)	65 (54.2)	47 (39.2)	
Fish farming should not be practiced by youth but old age	6 (5.0)	12 (10.0)	35 (29.2)	67 (55.6)	
It requires large capital and not affordable	75 (62.5)	24 (20.0)	11 (9.2)	10 (8.3)	
It activities has negative effect on health	8 (6.7)	50 (41.7)	34 (28.3)	19 (15.8)	9 (7.5)
It is meant only for rural people	6 (5.0)	7 (5.8)	45 (37.5)	62 (51.7)	
Fish farming involves working for long hours	2 (1.7)	21 (17.5)	73 (60.8)	22 (18.3)	2 (1.7)
Fish farming provides low income	5(4.2)	7 (5.8)	57 (47.5)	51(42.5)	
Fish farming is too risky	65 (65.7)	11(9.2)	19 (15.8)	20 (16.7)	

Source: Field survey, 2013

Factors that influenced respondents' career choice of fish production

Table 3 shows the factors that influenced the respondents' career choice in fish production. Means of survival was ranked first by 90.0% of respondents among the various factors that influenced their choice of fish production as a career. Other reasons included environmental factors (70.0%), influence of parents or guardians (65.0%), influence by career guidance and counsellor (50.0%), influence by menace of unemployment (41.7%) and influence of friends (44.0%). However, poverty and government policy ranked among the least factors influencing youth career choice in fish production. This implies that, government policy on fish production is not stimulating enough so as to spur the youth towards making a career in fish production.

Table 3: Distribution of respondents by factors that influence their career choice of fish production

Factors	Frequency	Percentage	Ranking
Parent or Guardian			
Yes	78	65.0	3rd
No	42	35.0	
Family			
Yes	3	30.0	7th
No	84	70.0	

Factors	Frequency	Percentage	Ranking
Friends or peer group			
Yes	44	36.7	6th
No	76	63.3	
Unemployment			
Yes	50	41.7	5th
No	70	58.3	
Means of survival			
Yes	108	90.0	1st
No	12	10.0	
Career guardians or counselling			4th
Yes	60	50.0	
No	60	50.0	
Poverty			
Yes	31	25.8	8th
No	89	74.2	
Environmental influence			
Yes	84	70.0	2nd
No	36	30.0	
Government policy			
Yes	27	22.5	9th
No	93	77.5	

Source: Field survey, 2013

Constraints faced by youth fish producers

Table 4 shows the opinion of the youth on constraints they faced in their fish production enterprise. It was found that majority (78.3%) of the respondents strongly agreed that inadequate capital affects fish production. This situation was further aggravated by the unwillingness of financial institutions to grant loans to the farmers. In cases where loans are given; it is usually at very high interest rate (Omitoyin, 2007). Other constraints being faced includes land problem (63.3%), unavailable/ poor quality fish feed (70.0%) and poor quality fish seed (61.7%). These were strongly agreed upon by respondents as personal constraints being faced in fish production.

Table 4: Distribution of respondents by constraints in fish production enterprise

Variables	Yes	No
Inadequate capital	120	0
Problem of land	108	12
Unavailability/poor quality fish feed	107	13
Poor quality fish seed	107	9
Lack of credit facilities	114	6
Inadequate agricultural extension services	99	21
Market price instability	113	5
Parental restriction	93	27
Peer group	93	37
Spouse restriction	91	51

Source: Field survey, 2013

Hypotheses testing (Ho1)

Table 5 shows a significant association between some socioeconomic characteristics (sex, marital status and education) of respondents and their attitude towards fish production. This implies that, involvement of youth in fish farming is significantly based on the characteristics like sex, marital status and education. The finding on marital status and educational level corroborates Otufale (2013) that found marital status and educational level to have significant relationship with the attitude of the respondents towards farming activities. However, with this study on youth and their involvement in fish farming in Abeokuta metropolis, the non-significant relationship between age (Table 6) and attitude of youth towards fish farming negates Otufale (2013).

Table 5: Associations between socioeconomic profile and youth attitudes towards fish production

Variables	χ^2	df	CC	Decision
Sex	35.710	15	0.002	S
Marital Status	101.430	30	0.000	S
Education	76.615	45	0.002	S

Table 6: correlation between socioeconomic profile and youth attitudes towards fish production

Variables	R	P	Decision
Age	0.147	0.111	NS
Years of school	0.156	0.84	NS
Involvement in fish farming	0.120	0.191	NS
Average catch	0.004	0.965	NS

CONCLUSION AND RECOMMENDATIONS

It can be concluded that majority of respondents were male, single, had formal education, non-member of fish farming association and had fish farming as their main source of income. The respondents strongly agreed that fish production activity was hard and stressful as well as that fish production requires large capital and they could not afford it. Means of survival, environmental factors, influence of parents or guardians, influence by career guidance and counsellor, influence by menace of unemployment and influence of friends were the various factors that influenced their choice of fish production as a career. The constraint to youth's involvement in fish farming activities were inadequate capital, lack of credit facilities, market price instability, problem of land availability and poor quality fish seed. Involvement of youth in fish farming is significantly based on the characteristics like sex, marital status and education.

Consequently, the poverty situation can be and should be tackled effectively. Favourable governmental policies and credit facilities with ease of its acquisition by youth has been found to be an encouraging factor towards involving youth in fish production in Nigeria. Therefore, efforts should be put in place to make government policies favour youth involvement in fish production. Also, credit schemes and or intervention funds specifically targeted at aquaculture and fish production development should be established. This will further encourage youth to involve in fish production in Nigeria. It is therefore expedient that credit should be made available to this category of youth to enhance their levels of production. However, such credit should attract pocket friendly interest. Moreover, the procedure for access to such credit should be relaxed and encouraging so that youth could easily access it.

Besides these, in order to further encourage youth to take to fish farming, special intervention fund/scheme should be organised by government whereby funds would be disbursed basically to youths with feasible fish production project while Project Monitoring and Evaluation Department of the Intervention should be on hand to monitor and assess the performance of such intervention funds in fish production. Considering the urgent need to boost fish production level in Nigeria, government of Nigeria at various levels should enact policies that will further encourage the involvement of youth in fish production.

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Crop farmers' level of utilisation of agricultural information from *Agbe afokosoro* radio farm broadcast in Ogun state, Nigeria

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Abstract
The need to better the position of agricultural farm radio broadcast presupposes that it is evaluated continuously, hence, this study ascertained utilisation of agricultural information from *Agbe afokosoro* agricultural radio programme among crop farmers in Nigeria. A two-stage sampling procedure was used to randomly select 132 crop farmers. Data was collected on farmers' socioeconomic characteristics, access to, appropriateness and level of utilisation of agricultural information from the programme. Data was analysed using mean, standard deviation, chi square and correlation analysis at p=0.05. Results indicate that farmers' mean age and household size were 47.1± 10 years and 6 ± 3 persons respectively, were mostly male (64.4%) and had primary school education (35.6%). Crop farmers had adequate access to information on land preparation ($\bar{x}$=0.99), organic farming ($\bar{x}$=0.95), harvesting of crops ($\bar{x}$=0.98), and adjudged information from the broadcast as appropriate for their enterprise. Crop farmers utilised information on land preparation ($\bar{x}$=1.7), organic farming ($\bar{x}$=1.5), harvesting of crops ($\bar{x}$=1.6), integrated pest management techniques ($\bar{x}$=1.6) and site selection for crop production ($\bar{x}$=1.5). Respondents' income (r=0.0228) and farm enterprise (χ^2=0.069) were significantly related to their utilisation of agricultural information from the radio farm broadcast. It is concluded that the programme fulfilled the expectations of both the broadcast station and farmers as it was rated as accessible, appropriate and useful by farmers. Farmers' enterprise should be considered in future agenda of the radio farm broadcast.
Keywords: Agricultural information, farm broadcast, agricultural information access, appropriateness and utilisation

INTRODUCTION

Radio has a significant role to play in agricultural research dissemination due to gap between the agricultural researchers and the farming population that are regarded as end users. According to Food and Agricultural Organisation (FAO) (2010), the gap between research community and rural farmers becomes more manifest when one considers the large distances that separate researchers from rural farmers, language and diversity of cultures making it even more difficult for the research information to reach the intended audiences.

With radio broadcasting debut for development information dissemination (precisely weather report) on AM radio in Madison, in January 1921, radio broadcast for development news and agricultural information has come a long way. Perhaps, it is in light of this that the USAID (2012) asserts that it offers hope for overcoming the limitations of traditional extension, and well-positioned to represent the voice of the community. With advances in technology and the explosion of mobile phones in even some of the most remote areas of the globe, USAID (2012) concluded that the opportunities to further leverage radio's potential are now greater than ever.

In Nigeria, radio farm broadcast is conveniently traceable to the early 1960s when various regional governments in Nigeria, through the communication units of the ministries of agriculture, introduced the farm broadcast (Olajide and Amusat 2012). Subsequently, all national agricultural intervention programmes till date have made use of radio as potent tool of touching base with the targets and beneficiaries of development oriented programmes in health, agriculture and environment. With the growth in community radio stations in Africa over the past 20 years and about a decade now in Nigeria as well as the emergence of many community radio stations courtesy of the Federal Radio Corporation of Nigeria (FRCN), radio technology has the potential to completely transform the relationship between listeners and content providers.

Many Africa's governments lack resources to educate farmers about new agricultural practices and technologies that can help them increase their productivity and incomes. In Nigeria, for example, there is one government agricultural extension agent to every 3,000 farmers, giving each farmer less than 30 minutes of time with an agent per year (Bolarinwa and Yahaya, 2011; Olajide, 2011) and this seems to have worsened farmers' situation in accessing current agricultural information (Olajide, 2011). To circumvent this obvious lapse, various communication media are being used to transmit agricultural information to farmers in line with national policy on agriculture. The communication media include farm magazine, leaflets, newsletters, newspapers, pamphlets, radio and television, among others (Dare, 1990). Radio is the most preferred tool of mass communication in Nigeria as evident in the findings of previous studies (Yahaya, 2002; Zaria and

Omenesa, 1992; Omenesa, 1997; Ekumankama, 2000). Omenesa (1997) observes that radio programmes are usually timely and capable of extending messages to the audience no matter where they may be as long as they have a receiver with adequate supply of power. The absence of such facilities as road, light and water are no hindrance to radio. Similarly, such obstacles as difficult topography, distance, time and socio-political exigencies do not hinder the performance of radio. He further observes that illiteracy is no barrier to radio messages since such messages can be passed in audience's own language. Another advantage of radio programme is that it can be done almost anywhere through the use of a tape recorder (Nwuzor, 2000). It is probably because of these advantages of radio that it has been accorded a high priority as a means of reaching farmers.

The Ogun State Broadcasting Corporation OGBC), Abeokuta has been broadcasting *Agbe afokosoro* for the past seventeen years (since 1997). The programme uses dual language (English and Yoruba) and spans fifteen minutes from 7:30pm to 7:45pm every Wednesday of the week. It uses several formats (interview, discussion and lecture) and had broadcast agricultural information covering site selection, land preparation, crop rotation practice, organic farming and harvesting of crops. Therefore, its contribution to providing access to agricultural related information especially to crop farmers is not in doubt. However, level of utilisation of agricultural information disseminated through this medium is not certain. The obvious limitation of radio in overt behaviour change presupposes that its programme on many areas of human endeavour be continuously investigated to better position such programme. It is in the light of the above that this study answered the following research questions:

1. What are the socioeconomic characteristics of crop farmers in the study area?
2. What agricultural information has been accessed by crop farmers from the agricultural radio programme?
3. How appropriate is the agricultural information accessed by crop farmers through the radio programme?
4. What is the level of utilisation of agricultural information accessed by crop farmers from the radio programme?

METHODOLOGY

The study area was Ogun state, Nigeria. All registered crop farmers with the Ogun State Agricultural Development Programme (OGADEP) formed the study population. A two-stage sampling procedure was used to select respondents for this study. Firstly, two (Abeokuta and Ijebu-ode) out of four ADP zones in the state were randomly selected. The two zones have a total of 87 cells with 1,305 registered crop farmers. In each cell, 5% of all registered crop farmers were randomly selected in the second stage resulting in 132 crop farmers used as sample for the study. Key variables measured were access to, appropriateness of and level of utilisation of information from the radio farm broadcast. A content analysis of types of information on crop production disseminated through the farm broadcast in six months prior to the time of this survey was carried out. Based on this, a list of crop production related information was generated as basis for assessing access, appropriateness and utilisation of information from the farm broadcast. For access, lists of crop production information were presented to the respondents and were asked to indicate Yes or No to express whether they have obtained information in these areas from the radio broadcast and a score of 1 and 0 were assigned respectively. For appropriateness, farmers were asked to rate the information received as very appropriate, appropriate and not appropriate with scores of 2, 1 and 0 assigned respectively. Level of utilisation of the information of *Agbe afokosoro* (dependent variable) was measured by asking the respondents to indicate their level of utilisation of the information on a 3-point scale of always, sometimes and never utilised and was scored as 2, 1 and 0 respectively. Data collected was subjected to both descriptive (frequency counts, percentage distribution, mean and standard deviation) and inferential statistics (Chi-square and Pearson Product Moment Correlation (PPMC) at p=0.05

RESULTS AND DISCUSSION

Crop farmers' socioeconomic characteristics

Information on respondents' socioeconomic characteristics in Table 1 shows that respondents' age distribution ranged between 20 to 75 years with the mean age at 47.1 ± 10 years. More than one-third (34.8%) of the respondents fell between the ages of 30- 39 years, while only 9.9% were above 60 years of age. This implies that farming populace constitutes very active people despite threat posed by rural-urban migration. The table further reveals that while males were 64.4% of the respondents, females were 35.6%. This suggests that more males than females are involved in crop farming in the study area. This supports the findings of Azarian, Hassan and Samba (2012) who reported that there are more males than females in their study of agricultural information disseminated through radio among Malaysian farmers. Table 1, in addition, indicates that 50.4% had household size of 4-6 persons with mean household size of 6 ± 3 persons. This is similar to the

findings of Bankole, Adekoya and Nwawe (2012) that the mean household size of farmers was 6 persons. This might be because agriculture is generally a labour intensive venture hence encourages large family size which is usually used as source of labour especially in crop farming. Educational level of respondents in Table 1 reveals that only 18.2% had no form of formal education. A higher percentage (35.6%) of the respondents had primary education, 28.8% had secondary education while 17.4% of respondents had tertiary education. majority did not go beyond secondary school. Table 1 further shows that 77.3 % of the respondents had been engaged in agricultural production for more than 17 years, while only 22.7% of the respondents had been in farming for 17 years or less. This supports the findings of Ugwuja (2011) whose study shows that majority of farmers have experience in agriculture for above 15 years. Further findings reveal that 8.3% could not estimate how much they earned annually from agricultural production. However, majority (42.4%) of respondents earned between N200, 100 to N300, 000 worth of local currency annually from agricultural activity, while less than 13.0% earned above N300,000 annually from agricultural activities. This implies that, in spite of disincentive for agriculture, especially in Nigeria due to over reliance on foreign earnings from sale of crude oil, agriculture provides leverage for smallholder farmers in many and varied agricultural enterprises, including crop farming. This is in line with the findings of Ango, Ibrahin, Yakubu and Alhaji (2014) who found that farmers earned up to between N22, 100 to N32, 000 monthly from their various engagements in agricultural activities.

Table 1: Distribution of crop farmers by their socioeconomic characteristics

Variable		Frequency	Percentage
Age (years)	20-29	11	8.3
	30-39	46	34.8
	40-49	40	30.3
	50-59	22	16.7
	60 and above	13	9.9
Sex	Male	85	64.4
	Female	47	35.6
Household size	1-3	27	20.6
	4-6	66	50.4
	7-9	29	22.1
	10-12	9	6.9
Education	No formal education	24	18.2
	Primary education	47	35.6
	Secondary education	38	28.8
	Tertiary education	23	17.4
Farming experience	≤15 years	30	22.7
	16 – 30	50	37.9
	31 – 45	35	26.5
	≥46	17	12.9
Income (annual)	≤100,000	31	23.5
	101,000-200,000	28	21.2
	201,000-300,000	56	42.4
	. ≥301,000	17	12.9

Source: Field survey, 2013

Crop farmers' access to crop production information from *Agbe afokosoro* radio farm broadcast

The result in Table 2 shows crop farmers' access to crop production information from the farm broadcast. With a grand mean of 0.87; farmers had adequate access to information on land preparation ($\bar{x}$ =0.99), organic farming ($\bar{x}$ =0.95), harvesting of crops ($\bar{x}$ =0.98) and soil conservation for crop production ($\bar{x}$ =0.90). However, other information types like site selection for crop production (0.88) and improved fertilizer application in irrigated crop production ($\bar{x}$ =0.88) can be adjudged to be averagely accessed by crop farmers while access to information on integrated pest management techniques ($\bar{x}$ =0.63), effect of climate change on crop production ($\bar{x}$ =0.81) and crop rotation practice ($\bar{x}$ =0.84) were low. The probable explanation for the trend observed may be largely due to the fact that perhaps while issues related to climate change and integrated pest management are emerging issues in agriculture, other issues are regular features of a typical rural farm broadcast in Nigeria (Badiru 2013; Badiru and Adekoya, 2014). On a general note, *Agbe afokosoro* radio farm broadcast has fared well in providing relevant crop production information to farmers in the study area.

Table 2: Crop production related information accessed through *Agbe afokosoro* radio farm broadcast by crop farmers

Types of information	Mean	Standard Deviation
Site selection for crop production	0.88	0.32
Land preparation	0.99	0.92
Crop rotation practice	0.84	0.36
Organic farming	0.95	0.23
Harvesting of crops	0.98	0.14
Integrated Pest management	0.63	0.48

Types of information	Mean	Standard Deviation
techniques		
Effect of climate change on crop production	0.81	0.39
Improved fertilizer application in irrigated crop production	0.88	0.32
Soil conservation for crop production	0.90	0.30
Grand Mean	**0.87**	

Source: Field survey, 2013

Appropriateness of crop production information accessed through *Agbe afokosoro* radio farm broadcast by crop farmers

Available information on the appropriateness of crop production information accessed from *Agbe afokosoro* (Table 3) suggests that crop farmers found most of the information appropriate. Against the grand mean of 1.1, all listed information types were found to be appropriate by the farmers. However, information on land preparation ($\bar{x}$ =1.5), organic farming ($\bar{x}$ =1.4) and harvesting of crops ($\bar{x}$ =1.5) were found to be more appropriate than others. Though, the higher mean values for land preparation and harvesting may have thrown up surprises against the backdrop of the fact that these are farming activities that farmers engage on a regular bases; it equally provides basis for judging the appropriateness of the information as farmers are knowledgeable on what operates in these farming activities. Any slip on the part of programme presenter on these activities could be easily faulted by the farmers. For appropriateness values of organic agriculture information, it is a common knowledge that lots of information is disseminated in recent years about organic agriculture as a means of encouraging farmers to practice it. Juxtaposing the quality of information from other sources with what obtains in *Agbe afokosoro,* the appropriateness rating by respondents could have informed their judgement of quality of information from *Agbe afokosoro.* Without pre-empting what the picture of utilisation of such information looks like, it can be deduced that these respondents must have put some of these information to use.

Table 3: Distribution of farmers based on appropriateness of crop production information accessed through *Agbe afokosoro* radio farm broadcast by crop farmers

Types of information	Mean	Standard Deviation
Land preparation	1.5	0.55
Organic farming	1.4	0.55
Harvesting of crops	1.5	0.54
Site selection for crop production	1.2	0.44
Integrated Pest management techniques	1.0	0.35
Effect of climate change on crop production	1.2	0.40
Crop rotation practice	1.2	0.41
Improved fertilizer application in irrigated crop production	1.1	0.49
Grand Mean	**1.1**	

Source: Field survey, 2013

Utilisation of crop production information accessed through the *Agbe afokosoro* radio farm broadcast by crop farmers

Utilisation of information in the context of this study refers to the extent to which information derived from the programme is used by respondents in their crop farming enterprise. The result in Table 4 shows that with the grand mean of 1.4; land preparation ($\bar{x}$ =1.7), organic farming ($\bar{x}$ =1.5), harvesting of crops ($\bar{x}$ =1.6), integrated pest management techniques ($\bar{x}$ =1.6), site selection for crop production ($\bar{x}$ =1.5) had high utilisation. The picture presented in utilisation of crop production information accessed from *Agbe afokosoro* though was similar to what obtains in their assessment of access to such information from the radio programme, it slightly differs from what obtains in the appropriateness assessment by the respondents. Whereas information on land preparation, organic farming, harvesting of crops and soil conservation for crop production were adjudged as easily accessible, all information types were considered appropriate by the respondents. It therefore implies that *Agbe afokosoro* lived up to the expectations of both the broadcast station and the farmers.

Table 4: Utilisation of Crop production information accessed through *Agbe afokosoro* radio farm broadcast

Types of information	Mean	Standard Deviation
Land preparation	1.7	0.55
Organic farming	1.5	0.60
Harvesting of crops	1.6	0.55
Site selection for crop production	1.5	0.60
Integrated Pest management techniques	1.6	0.55
Effect of climate change on crop production	1.3	0.63
Crop rotation practice	0.8	0.51

Types of information	Mean	Standard Deviation
Improved fertilizer application in irrigated crop production	1.1	0.61
Soil conservation for crop production	1.2	0.55
Grand Mean	**1.4**	

Source: Field survey, 2013

Relationship between selected socioeconomic characteristics of crop farmers and their utilisation of agricultural information from the radio farm broadcast

Results in Table 5 reveals that while, respondents' income (r=0.0228) and farm enterprise (χ^2=0.069) were significantly related to their utilisation of agricultural information from the radio farm broadcast, respondents' religion (χ^2=0.69), marital status (χ^2=0.68), sex (χ^2=0.50), membership of farmers' association (χ^2=0.60), household size (r=0.16), age (r=0.82) and years of engagement in farming enterprise (r=-0.00), were not significantly related to their utilisation of information from the radio farm broadcast. This implies that while respondents' income and type of farm enterprise influence their utilisation of information from the radio broadcast, neither respondent's marital status, sex, household size, membership of farmers' association, age and years of engagement in farming enterprise influenced their utilisation of information from the radio farm broadcast. This is plausible if one considers the innovation cost factors in putting to use some information disseminated by the radio farm broadcast. In addition, the type of enterprise vis-à-vis information disseminated will go a long way to determine whether such information will be put to use. If information disseminated by the radio farm broadcast addresses issues of arable crop farmers, other crop farmers who are regular listeners might be incapacitated to put such information to productive use.

Table 5: Statistical analysis of respondent's socioeconomic characteristics

Variable	χ^2-values	r-values	Degree of freedom	p-value	Remark
Sex	0.059		1	0.500	Not Significant
Education	0.073		5	0.870	Not Significant
Marital status	0.105		3	0.689	Not Significant
Membership of association	0.055		1	0.608	Not Significant
Farm enterprise	0.069		5	0.000	Significant
Income		0.228		0.012	Significant
Age		0.820		0.348	Not Significant
Farming experience (years)		-0.058		0.580	Not Significant

Level of Significant=0.05

Relationship between appropriateness and the utilisation of agricultural information from the radio farm broadcast

Available data in Table 6 indicates that there was a significant relationship between information appropriateness and utilisation of agricultural information from the radio programme (r=0.628). If one considers the descriptive data on appropriateness of information from *Agbe afokosoro* farm broadcast which signifies that all information types are considered appropriate, this does not defile any logic as inappropriate information will only amount to waste of all resources (man-hour, fund and air time) ploughed into its broadcast.

Table 6: PPMC Analysis of respondent's appropriateness of information and of utilisation of information from the radio programme

Variable	r-value	p-value	Remark
Appropriateness vs. utilisation	0.628	0.00	Significant

CONCLUSION AND RECOMMENDATIONS

Available data from this study suggests that most crop farmers are relatively young and active, averagely educated, mostly male with minimal household size. Crop farmers accessed information on land preparation, organic farming, harvesting of crops and adjudged information from the broadcast as appropriate. Crop farmers equally utilised mostly information on land preparation, organic farming, harvesting of crops, integrated pest management technique and site selection for crop production. Respondents' income, farm enterprise and appropriateness of the information determine their

utilisation of agricultural information from the radio farm broadcast. It is concluded that *Agbe afokosoro* lived up to the expectations of both the broadcast station and the farmers, therefore, farmers' enterprise should be considered in future broadcast agenda of the radio farm broadcast. The programme should also provide information on possible credit sources for farmers so that they could access such to boost investment in their crop enterprise.

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Economics of Charcoal Production among Producers in Kwara State, Nigeria

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Abstract: Over exploitation of forest resources for commercial charcoal production is a worrying phenomenon in Nigeria. The forest is rapidly becoming depleted due to the human quest for fuel wood. The fast disappearance of trees may influence climate change which, may in the long run affect crop yields and deepen poverty. Thus, this study estimated the costs and returns as well as the determinants of charcoal production in the study area. Data collected were analysed using farm budget and multiple regression analyses. The farm budget analysis revealed an average profit per charcoal producer per annum of ₦150,827.74. The estimated multiple regression analysis revealed that quantities of woods, labour in man-days and producers' experience are the important determinants of charcoal production in the study area. Three main policy issues emerge from the results of this study. First, there is need to promote cheap and effective fuel source like the briquette through the use extension agents. The cost of electricity, kerosene and cooking gases should be lower than charcoal and firewood. Thirdly, there is need to provide other alternative ways of life such as provision of off-season employment so as to dissuade both rural and urban dwellers from energy driven deforestation.

Keywords: Forest resources, climate change, deforestation,

INTRODUCTION

Over two billion people in developing countries rely on biomass energy in the form of firewood, charcoal, crop residues, and animal wastes to meet their cooking and heating requirements (Millennium Ecosystem Assessment MEA, 2005). About 90 % of the 1.2 billion people living in poverty worldwide rely on forests to some extent for subsistence needs.It supplies about 95 percent of the domestic and commercial cooking energy needs in developing countries (Food and Agricultural Organisations of the United Nations FAO, 2007). The links between fuel wood (firewood and charcoal) use and deforestation, as well expected fuel wood shortages has been established (Kauppi *et al.,* 2006). The number of people relying on fuel wood is expected to keep increasing with an estimate of about three quarters of total residential energy in Africa by 2030 (International Energy Agency IEA, 2002). About 11.3 million hectares of forests are lost annually to agriculture, commercial timbering, uncontrolled fuel wood production and consumption .Unfortunately, 90 percent of cleared forest are never replanted (FAO, 2000). Moreover, it has been estimated that charcoal consumption is often growing faster than firewood consumption in Africa and South America (Wurster, 2010). The impact of wood fuel and its derivative (charcoal) on the energy requirements of developing nations cannot be underscored. The growing demand for charcoal in developing countries has resulted in localised deforestation in vulnerable areas.

Charcoal is the dark grey residue consisting of Carbon and any remaining ash, produced by the slow process of heating wood and other substances in the absence of oxygen, called Pyrolysis. It is an impure form of Carbon, which contains ash. However, it is an excellent domestic fuel, and can be made from virtually any organic material like wood, coconut shells, rice husks and bones, usually hardwood species like Acacia, Mangroves, Oaks and *Prosopis* are preferred for charcoal production. Charcoal though an old source of energy, is as well still a modern source of energy for cooking in both rural and urban centres, Kammen and Lew (2005) reported that half of the world's population use biomass fuels for cooking and that in 1992, 24 million tonnes of charcoal were consumed worldwide, with developing countries accounting for nearly all consumption, while Africa alone accounted for 50%. In Nigeria, Charcoal is mainly used for cooking, roasting of suya, barbecue, maize, plantain, cocoyam and yam, blacksmithing and bronze-casting (Izekor and Kalu 2007). Charcoal in addition, is now an export commodity in Nigeria, with a large market in the EU, USA and Asia. The prices range from $170 - $300/ton. Tropical Africa accounts for 70% of the exports and the market is all year round (Essiet 2009).

Good-quality charcoal burns cleanly and produces high heat. This important property, along with its low average ash content, makes charcoal desirable for metallurgy or as a domestic fuel. In weight, charcoal may be rather heavy to quite light depending on the weight of the dry wood of the various species used in its production. Charcoal is comparatively easy to ignite, and when of good quality burns evenly and without smoking. In many developing countries, charcoal and agricultural wastes constitute a major portion of total household energy consumption (Bamiro and Ogunjobi, 2015).

Many households in Nigeria are facing challenges of inaccessible to and unaffordable of clean, less dangerous and convenient cooking fuel. Studies have shown the sources of cooking energy in Nigeria to include electricity, liquefied natural gas (popularly known as cooking gas), kerosene, charcoal, firewood, wood waste, and agricultural waste (Zaku et al; 2013). The use of any of these sources of cooking fuel by a household has been faced with some challenges and also depends on the affordability, preference and availability. There has been long years of inconsistence in the supply of electricity while kerosene is faced with persistence scarcity and increase in price. The cooking gas is also very expensive and out of reach for the poor and low-income class (Babalola, 2011). The economic impact on households therefore led to either a switch in the choice of energy preferred for domestic use or a situation of energy combination by different income groups. Many of the people in the rural areas, as well as low-income class in the urban areas therefore preferred to switch to charcoal or firewood which they considered less expensive and available (Zaku et al 2013).

Furthermore, Nigeria is the largest oil producer in Africa holds the largest natural gas reserves on the continent and was the world's fourth leading exporter of liquidified natural gas. Despite these abundant resources many people in the country still rely on biomass energy in form of firewood, charcoal, crop residues and animal waste (Zaku et al 2013). Thus, this study determine factors influencing charcoal production, examine the costs and returns and identify the challenges facing charcoal production in the study area.

METHODOLOGY

Study area: The research was carried out in Moro Local Government Area of Kwara state, Nigeria. The LGA area is bounded by Kaima LGA in the West, Ifelodun and Edu LGAs in the North-east, Ilorin East and Ilorin West LGAs in the East and Asa LGA in the South. The headquarter is located at Bode-Saadu. The state was created on May 27, 1967 along with eleven other states in the federation. The state lies between latitude 7^{o} 45N and 9^{o}30N and longitude 2^{o}30E and 6^{o}25E. The annual rainfall ranges between 1,000mm and 1,500mm. Average temperature ranges between 30^{0}C and 35^{0}C. The state has a land area of about 32,500 square kilometers and shares boundaries with Niger state in the North, Kogi state in the East, Ondo and Osun states in the South and Oyo state in the West, it also shares an international border with Republic of Benin. According to the 2006 National Population Census report, the population of Kwara state stood at 2.73 million. Popular ethnic groups found in the state include; Yoruba, Fulani, Batunu, Nupe, Bokobanu and Gambari. Over 90 percent of the rural populace is involved in farming (Kwara Ministry of Information, 2004). The state has two main climatic seasons; the dry and wet seasons.

The natural vegetation of the state comprises the wooden and rain forest savannah. Major land forms in the state are plains, undulating hills and valleys. The favourable climate and the large expanse of land makes the wooded savannah in the state well suited for the cultivation of a wide variety of crops including cereals, tubers, legumes and vegetables like spinach, okra etc**.** The state is classified into four agro ecological zones by the Kwara State Agricultural Development Project (KWADP). The classification is based on the ecology and administrative convenience. These are: Zone A: Baruteen and Kaima Local Government Areas; Zone B: Edu and Patigi Local Government Areas; Zone C: Asa, Ilorin East, Ilorin West, Ilorin South and Moro Local Government Areas; and Zone D: Ekiti, Ifelodun, Irepodun, Offa, Oyun, Isin and Oke-Ero Local Government Areas.

Sources of data: Primary and secondary data were collected for the study. Secondary data involved desk study and/or review of relevant literature such as journals, technical documents, government gazettes, CBN annual reports and bullions, and published materials from the National Bureau of Statistics and the National Planning Commission (NPC), among others, Internet resources were also consulted. Primary data were collected with the aid of structured questionnaires.

Sampling method: The charcoal producers in Moro LGA of Kwara state constitute the target population for this study. A three-stage sampling technique was used to select sample for the study. The first stage involved purposive selection of Moro LGA. The choice of this area was informed by preliminary investigation which revealed that charcoal production is prominent in Moro LGA than other LGAs of Kwara state. This may be due to its proximity to Oyo State where charcoal production is more pronounced in the south western Nigeria forest zone. Also, based on the fact that observations have been made about charcoal production in this area, as charcoal kilns are usually seen and trucks loaded with tonnes of charcoal were also usually seen moving out of the area. In the second stage, 10 producers' associations were randomly selected from 15 producers' association in the LGA. In the third stage, 12 producers each from the 10 different associations were randomly selected to make up a sample size of 120 producers.

Data analysis: Data collected on the socioeconomic characteristics and challenges facing

charcoal producers were analysed using descriptive statistics such as percentages, means/averages, and frequency tables. Data collected on the factors influencing charcoal production in the area were analysed using Multiple Regression Analysis. Also, data collected on the profitability of charcoal production were estimated using Gross Margin Analysis.

Multiple Regression Models involve the use of three functional forms (Linear, Double Log, and Semi-log forms). Best Linear Unbiased Estimates (BLUE) the one that had the highest R^2, better F ratio and high significant coefficient was selected as the lead equation. The implicit form of the models were given by

$Y = f(X_1, X_2, X_3, X_4, X_5 + u)$.

Where

Y = Charcoal production in naira

X_1 = Labour in naira;

X_2 = Wood in number of trees

X_3 = Water quantity in litres

X_4 = Experience in years

X_5 = Educational status (dummy variables; formal education = 1, informal education = 0)

The explicit forms of the models are:

$Yt = bo + b_1Xt_1, + b_2Xt_2 + b_3Xt_3 + b_4Xt_4 + b_5Xt_5 + u$ … Linear Form

$Yt = bo + b_1\ln Xt_1, + b_2\ln Xt_2 + b_3\ln Xt_3 + b_4\ln Xt_4 + b_5\ln Xt_5 + u$…Semi-log

$\log Yt = bo + b_1\ln Xt_1, + b_2\ln Xt_2 + b_3\ln Xt_3 + b_4\ln Xt_4 + b_5\ln Xt_5 + u$ … Double log

Where, ln = natural log to base e

bi = coefficients of the explanatory variables

U = stochastic error term

The Gross Margin (GM) analysis focuses on the returns to the producer after the total variable cost of production has been deducted. The model for estimating the GM is outlined thus:

Gross value of output (GVO) which was obtained by multiplying the total output with market prices of output expressed in naira.

Less Total variable cost of production (TVC) comprised expenses (direct and imputed) on wood, water, mechanical services, hired labor, transportation and marketing etc.

Equals Gross margin (GM) (Tsoho, 2004).

Or

$GM = TR - TVC$

Where

GM = Gross margin of charcoal producers per annum

TR = Mean total revenue per charcoal producer per annum

TVC = Mean total variable costs per charcoal producer per annum

RESULTS AND DISCUSSION

Socioeconomic characteristics of the respondents

Table 1 shows the socioeconomic characteristics of the charcoal producers in the study area.

Table 1: Socioeconomic characteristics of respondents

Variables	Frequency	Percentage
Gender		
Male	112	93.3
Female	8	6.7
Age		
30-39 years	9	7.5
40-49 years	68	56.6
50-59 years	41	34.2
60 and Above	2	1.7
Marital Status		
Single	37	30.8
Married	83	69.2
Primary occupation		
Farming	71	59.2
Security guards	18	15
Bike rider	20	16.7
Drivers	3	2.5
Others	8	6.7
Educational Status		
No Formal Education	60	50
Primary Education	37	30.8
Secondary Education	13	10.8
Quaranic Education	10	8.4
Experience		
1 - 9years	19	15.8
10-19 years	59	49.1
20-29 years	27	22.5
30 and Above	15	6.7
Most preferred trees for production		
Prosposis Africana	74	62.5
Acacia spp	27	22.5
Azadirachta indica	8	6.0
Burkea africana	6	5.0
Psuedocedreta kotchy	5	4.0
Total	120	100

Source: Field Survey, 2014

Table 1 revealed that charcoal production is dominated by males (93.3%) compared to females (6.7%). This is not surprising because the operation is backbreaking and full of drudgery. There is a large age spread between charcoal producers that varied between 18 and 60 years. The activity appears to be dominated by the 40-49 (56.7%) age bracket. This is also not surprising since this is generally the most active age group in human life especially that the activity is an energy sapping one. Only 1.7% of the respondents are above 60 years of age. This set of

people can no longer carry out the laborious activities in charcoal production effectively. About 69.2% of the respondents are married with an average family size of five people. This influences charcoal production because a large family size will help cut labour cost. Majority of the respondents (59.2%) are farmers. This is not surprising because the primary occupation of the people of Kwara state is farming, while the remaining does a wide variety of occupation which includes bike riders, drivers, security guards, traders and bricklayers. About 46.7% of the respondents claimed charcoal production is a secondary occupation although, this was previously a coping strategy which has turned to a secondary occupation. This is similar to practices in Asia and other parts of the world as reported by Bhattarai, 1998. Nonetheless, it is a worse alternative because of the drudgery and health risks involved in charcoal production. For example the heat emanating from most of the kilns when picking burnt charcoal range between 30°C-40°C and fumes exuding from the carbonized wet-wood are perhaps poisonous but certainly irritate the eyes. In fact about 85% of respondents claimed that they will abandon charcoal production if there are better alternatives. Almost half (46.7%) of the respondents are full time producers.

The most (62%) preferably used tree is *Prosopis Africana.* This is due to its hardness and non-bristling quality. *Acacia spp* (22.5%) ranking second, *Azadirachta indica* ranking third, *Burkea africana* was ranked fourth and lastly *psuedocedrela kotchy* was ranked fifth. Other trees used as alternatives such are: *Terminalia macroptera, Anogeissus leiocarpus* and *Tamarindus indica.* Although any hard savanna tree could be carbonised for charcoal, the first five species identified above were mostly sought after. The preference ranking has a serious consequence for the environment and sustainable development. It implies that these preferred species will be extinct earlier than other species. As at present, searching for these species into the depth of the savanna forest has increased. However, some trees were not mostly felled for charcoal production. These trees includes: Teak, *Tectona grandis.,* locust bean tree, Tamarind tree, Shea butter tree, because they are considered to be of local economic importance. Also wet trees and trees that yield edible fruits are also not usually felled.

Gross margin analysis

The mean total revenue, total variable and fixed costs per charcoal producer per annum were ₦193,916.67, ₦31,794.56 and ₦11,294.36 respectively. Leaving a profit of ₦150,827.74 per charcoal producer per annum

Regression Analysis

Based on the criteria, the double log function was chosen as the lead equation. It has coefficient of multiple determination (R^2) of 0.893. Indicating that about 89 percent of the total variation in output was explained by the independent variables (Table 2). Although, linear function has the highest R2 value (0.943), the double log production function has been the most widely used in agricultural economics especially where interest revolves around quantitative estimates of returns to scale and resource productivities at the means of inputs. The labour quantity (X_1), wood quantity (X_2), and level of experience (X_4) are significant at 5% level. This implies that these variables are very important in production of charcoal and an increase will lead to increase in output. The lead equation can be presented thus:

$$Y = 1.044 + 0.667X_1 + 0.275X_2 - 0.082X_3 + 0.216X_4 - 0.024X_5$$

Table 2: Regression Analysis of Charcoal Producers

Functional form	Constant	X_1	X_2	X_3	X_4	X_5	R^2	F-value
Double log	1.044	0.667	0.275	-0.082	0.216	-0.024	0.893	200.132
	0.180	17.757*	4.070*	-1.456	4.901*	-1.316		

SOURCE**:** Computer printout data. *Significant at 5% level.

Challenges facing charcoal producers

One of the challenges facing charcoal production is health hazard. Table 3 indicates that 20.8% of the respondents suffer some form of irritation. They were however able to characterise them in to common types of irritation such as difficulty in breathing, coughing and tearing in the eyes. Also they suffered from fatigue and body aches. All these are associated with heat, Volatile Organic Compounds (VOCs) and carbon monoxide Northeast States for Coordinated Air Use Management (NESCAUM 2006). Most respondents said they normally take drugs such as Panadol (paracetamol), milk and hot water with robb (methylated balm) to recover. The technology itself has to do with channelling of smoke or vents. Depending on the expertise of producers, they can evade smoke problems to varying degrees. This may cause grievous health challenges such as lung, blood oxygen absorption problems and even cancers (Nescaum 2006, Anon, 2011).

High cost of labour is also a problem. About 73% of the respondents claimed labour influences their production. Fifty-three percent said they make use of family labour, comprising their wives, wards and children, which cost less. On the other hand, 47% of the respondents claimed they make use of non-family labour. This form of labour is either paid for annually, monthly or per charcoal kiln. The labour activities include felling of trees, cross cutting into short logs, construction of charcoal kilns among others. On an annual basis, a worker is paid an average of ₦70,000. Though this form of labour can work for more than one charcoal producers depending on the schedule of work. On a monthly basis, they are paid between ₦5,000 and ₦10,000 depending on the type of work done. This depends on the bargaining power of the producers and type of work to be done. However, the commonest mode of payment of labour usually used is per charcoal kiln, which are normally paid in man-days. Other challenges facing producers are: high cost of transportation, sourcing for marketers or buyers, laws against felling of trees, and high level of tax paid to government.

Table 3: Most important challenges facing charcoal producers

Challenges facing charcoal producers	Frequency	Percentage
High cost or unavailability of transportation	17	14.1
Sourcing for marketers/buyers	25	20.8
Level of tax paid to government	14	11.7
Law against felling of trees	29	24.1
Health hazard	25	20.8
High cost of labour	10	8.3
TOTAL	120	100

SOURCE: Field Survey, 2014

CONCLUSION AND RECOMMENDATIONS

This study set out to estimate the costs and returns as well as the determinants of charcoal production in the study area. Most charcoal producers are males, with an average age of 32 years. They have an average production experience of 7 years and mostly have no formal education. Majority of them are married with an average household size of 5 persons. The production of good charcoal requires the use of very hard woods; this has led to the preference of some trees over the other. The most preferred tree is *Prosposis africana* which produces dense good charcoal. The challenges facing charcoal producers in the area includes health challenges which includes irritation from smoke, fatigue and body ache, coughing, difficulty in breathing and tearing in the eye. Other challenges are high cost of labour, high cost of transportation, sourcing for marketers or buyers, high level of tax paid to government and the legislation against felling of trees. The profit per annum (₦150,827.74) from charcoal production which is more immediate than proceeds from sale of agricultural produce will continue to lure deprived rural dwellers to charcoal production despite the drudgery and health-risk associated with the production. Factors determining the charcoal production in the area are quantity of woods, labour in man-days and producers' experience. Three main policy issues emerge from the results of this study. First, there is need to promote cheap and effective fuel source like the

briquette through the use extension agents. The cost of electricity, kerosene and cooking gases should be lower than charcoal and firewood. Thirdly, there is need to provide other alternative ways of life such as provision of off-season employment to prevent further deforestation.

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Fisheries Information Needs of Artisanal Fishers in Coastal Communities of South-West Nigeria: Lessons for Effective Fisheries Information Dissemination

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Abstract: Information is considered one of the basic resources needed in today's world in order to be able to manipulate other factors of production. This study analyzed fisheries information needs of artisanal fishers in coastal communities of south-western Nigeria. A multi-stage sampling procedure was used in sampling 214 respondents. Data were obtained using a structured interview guide that was pre-tested with a Cronbach alpha internal consistency of 0.89 for information needs scale. Data were analyzed using frequency counts, percentages, means, standard deviation, Chi-square test, Pearson Product Moment Correlation and Analysis of variance. Results indicated that the mean age of the artisanal fishers was 43years; 86.9% were married and the mean household size was 8 persons. Findings also indicated that 21years and N46,105 were the average of fishing experience and income/trip respectively. Majority (88.8%) of the artisanal fishers do not have access to extension services. Furthermore, findings also indicated that the major information needs of the respondents were; Outboard engine maintenance ($\bar{x}$=2.97), Outboard engine safety ($\bar{x}$=2.94), Fishing crew safety ($\bar{x}$=2.81) and Fish preservation ($\bar{x}$=2.71).There were significant associations between artisanal fishers religion (χ^2=6.756, df=2, p<0.05), educational status (χ^2=8.044, df=4, p=<0.05) and information needs. Also, there were significant relationships between artisanal fishers age (r = 0.302, p< 0.01), years spent in formal school (r = 0.226, p< 0.01), years spent in fishing communities (r = 0.325, p < 0.01) and information needs. Results also revealed that there is a significant difference in the information needs of artisanal fishers across coastal south western, Nigeria. (F = 141.4, P < 0.05). It was concluded that the key areas of information need included outboard engine maintenance, outboard engine safety, fishing crew safety, fishing preservation. It is therefore recommended that relevant information should be packaged and provided based on the identified needs of the artisanal fishers in the fishing communities.

Keywords: Information needs, artisanal fishers, coastal fishing community

INTRODUCTION

Information is considered one of the basic resources needed in today's world in order to be able to manipulate other factors of production. Banmeke and Olowu (2005) opined that information has the tendency to stimulate the energy to act in an individual. Timely and adequate information enables an individual take the right decision at the appropriate time which will enable the individual function efficiently.

Motul'skij (2001) described information need as the feeling of lacking something and wishing to fill the gap. All activities of human always generate need for information about the changing environment and condition of the task performed. The character of human activities defines the character of information needs. Also, Devadason (1996) noted that information need represents gaps in current knowledge of the clients. He further stated that information needs depends on work activity, discipline, availability of facilities, motivational factors for information needs, needs to take a decision and to seek new ideas.

Fish protein is considered to be highly nutritious and more affordable when compared to some other sources of animal protein. Fish protein is also considered a relatively cheaper source of animal protein because of some vital nutrients that cannot be found in some other animal protein sources. The Nigerian fishery sub-sector which comprises both capture and culture fisheries can be broadly sub-divided into artisanal, commercial and culture fisheries. According to Raw Materials Research and Development Council (2007), over 10 million people are directly or indirectly engaged in fishery in Nigeria. This group of fishers commonly operates in inland waters, lagoons and creeks', extending to about five nautical miles off the sea shore (Adesulu and Sydenham, 2002).A large proportion of the Fish supply in many developing countries is supplied by artisanal fishers. In Nigeria, about 82% of the fish supply comes from artisanal fishers (Faturoti, 2011).

This is an indication of how important they are in the fishery sector of Nigeria's economy.

The Fishery sector plays a major role in the fresh water and marine water ecosystem of developing countries where artisanal fisheries supply the bulk of both inland and shore consumers, (Akegbejo-Samson, 2007).

According to Food and Agriculture Organisation (FAO, 2007) artisanal fisheries is defined as traditional fisheries involving fishing households, using relatively small amount of capital and energy, small fishing vessels, and short fishing trips, close to the shore, mainly for local consumption. Ogunbadejo, Alhaji and Otubusin (2007) asserted that artisanal fishery is the harvesting of fish from rivers, streams, lakes and ponds by small scale fishermen using both traditional and modern fishing gears. Artisanal fishing accounted for more than 80% of total fish production in Nigeria; while aquaculture accounted for less than 8% and industrial fishing fluctuates with a peak of 13.9% and minimum of 5.0%. Artisanal fishery sector is the most important sector, which accounts for the major fish supply in the developing world.

It is therefore pertinent that artisanal fishers are adequately equipped in order to meet this seemingly daunting task of providing the bulk of fish requirement through the provision of basic resources that will enable them function effectively. Timely and adequate information as a resource will enable an individual take the right decision at the appropriate time which will enable the individual function efficiently.

The general objective of this study is to determine the fisheries information needs of artisanal fishers in coastal areas of south-west, Nigeria. The specific objectives of the study were to:

1. Ascertain the socioeconomic characteristics of artisanal fisher in the study area
2. Ascertain the production characteristics of artisanal fishers in the study area
3. Determine respondents access to extension services in the study area
4. Investigate the specific fisheries information needs of artisanal fishers in the study area

Based on the drawn up objectives, these null hypotheses were tested:

$H_0$1: There is no significant association between artisanal fishers' socioeconomic characteristics and their information needs

$H_0$2: There is no significant difference in the need for fisheries information by artisanal fishers across coastal communities in south-west Nigeria

METHODOLOGY

The study was carried out in coastal South-west Nigeria which comprises Lagos, Ogun and Ondo States between November to December, 2014. South-west coastal area has a marine shoreline of about 250 km and extends inland about 32 km (at its farther points) from the shoreline and 200 km eastwards from the Nigeria/Benin Republic border. The coastal area has rich water resource for fishing and other aquatic activities. Annual rainfall varies from 1312 mm to 1726 mm with two pattern of rainfall season that last between April to November. Average minimum temperature ranges from 10^0 - 25^0 C with maximum of 27^0 - 37^0 and the relative humidity is about 60% throughout the year (Dublin Green *et al.*, 1997). Temperature in the coastal area is moderated by clouds and damp air (Kuruki, 2004).

A multiple stage sampling procedure was used for selecting respondents for this study. In the first stage, purposive sampling was used in selecting all the three (3) coastal states and this was based on the fact that the three states are domiciled in the study area. One (1) Local Government Area (LGA) namely; Ibeju-Lekki LGA from Lagos State, Ogun waterside LGA from Ogun State and Ilaje LGA from Ondo State were purposively selected, and this was based on the fact that these LGAs were the prominent ones within the coastal axis from each of the state.

The second stage in the sampling procedure involved the selection of fishing community. Convenient sampling techniques was used to select six (6) fishing community, from Ibeju Lekki, 9 from Ogun waterside and 4 from Ilaje. A total of Nineteen (19) fishing communities were selected for this study. The third stage involved the selection of the respondents. Watson (2001) sampling procedure, at confidential level of 95% was used to select Fifty percent (50%) of the artisanal fishers randomly in each of the fishing communities. Thus, a total number of 214 artisanal fishers were selected for the study as indicated in Table 1.

Data Analysis - The data obtained were subjected to descriptive (frequency distribution, percentages, mean and standard deviation) and inferential (Chi-square and analysis of variance) statistics using Statistical Package for Social Science (SPSS) version 15.0.

Table 1: Sample frame and sample size for artisanal fishers

SN	Fishing communities	Total number of artisanal fishers	No (50%) of selected artisanal fishers
A.	Lagos State (Ibeju-Lekki)		
1	Magbon Alade	20	10
2	Orimedu	16	8
3	Akodo	22	11
4	Lekki	24	12
5	Otola	24	12
6	Folu	20	10
B.	Ogun State (Ogun Waterside)		
1	Okun Igbeki	28	14
2	Okun Ileti	30	15
3	Okun Olosumeta	28	14
4	Okun Igbosere	26	13
5	Okun Bolorunduro	24	12
6	Okun Elefon	24	12
7	Okun Isekan	24	12
8	J.K Camp	22	11
9	Aba Gold	26	13
C.	Ondo State (Ilaje)		
1	Enu Amo	18	9
2	Okun Benin-boye	22	11
3	Okun Araromi	16	8
4	Okun Holy center	14	7
	TOTAL	428	214

Source: Field Survey, 2014

RESULTS AND DISCUSSION

Personal characteristics of respondents

Result in Table 2 revealed that the mean age of the artisanal fisher was 43years with 38.2% between the ages of 41 – 50 years. This implies that most of the artisanal fishers were still within their economically active and productive age group that can enhance efficient fish production. This finding is similar to that of Udoh (2003) who noted that about 62.2% of artisanal fishers were within the age range of 41-50years. Majority (86.9%) of the respondents was married and this may be adduced to the fact that most of the respondents rely on artisanal fishing to cater and fend for their household. Findings also revealed that 51. 9% of the respondents had primary school education while 28.0 % had secondary school education. It was therefore adduced from the finding that, artisanal fisher had basic literacy education.

Furthermore, majority (84.6%) of the respondents practiced polygamous marriage which is an indication that polygamous marriage is predominant among the respondents. It was observed that the respondents married more than one wife due to their involvement in the processing and marketing of their catch fish. Also, Table 2 indicates that the mean household size of the respondents was 8 and 54.6% had a household size of between 7 to 12 persons. This finding may be adduced to the polygamous nature of artisanal fishers' family. This result is similar to the report of Nwike (1989) and Fabusoro, Lawal-Adebowale and Akinloye as indicated in Olaoye (2010) that average household size in Africa was about 7 persons per household.

Findings in Table 2 also reveals that many (64.0%) of the artisanal fishers were of the Yoruba ethnic group while 24.3% were *Ilaje*. This is mainly due to the fact that the Yoruba ethnic predominate the area and the *Ilajes* are a predominant ethnic group in the coastal areas of this part of the country.

Table 2: Socioeconomic characteristic of artisanal fishers (n=214)

Variable	Frequency	Percent	Mean/Mode	Standard Deviation
Age (years)				
30 & below	27	12.6	43 years	9.90
31 – 40	60	28.0		
41 – 50	82	38.2		
51 and above	45	21.2		
Marital Status				
Single	9	4.2	Married	
Married	186	86.9		
Widowed	13	6.1		
Educational level				
No formal education	33	15.4	Primary Education	
Vocational education	02	0.9		
Primary education	111	51.9		
Secondary education	59	28.0		
Tertiary education	09	4.2		
Marriage Types				
Monogamy	33	15.4	Polygamy	
Polygamy	181	84.6		
Household size (person)				
6 and below	21	9.8	8 persons	3.29
7 – 12	117	54.6		
***Tribe**				
Nigerian	195	91.1	Nigerian	
Ghanaian	19	8.9		
Ilaje	52	24.3		
Ijaws	6	2.8		

Source: Field Survey, 2014
*Multiple responses

Production characteristics of respondents

Findings in Table 3 show that the mean year of experience of artisanal fishers was 21years while 37.4% had 11 to 20 years of experience in coastal artisanal fishing. It was observed that artisanal fishers with longer years of experience might determine factors that influence their fishing time and also able to forecast weather. The mean number of trips engaged-in by the artisanal fishers per week was 11 trips with 59.3% of the respondents indicating that they make between 8-14 fishing trips per week. The more fishing trips made by the artisanal fisher could be adduced to the use of outboard engines by the respondents which made the trips faster.

With respect to the number of years stayed within the community, the mean year of stay in the community was 39 years. Also, Table 3 shows that the mean income per fishing trip of the artisanal fishers was N46,105 with 55.1% indicating an income of N31,000 to N60,000 was realized per fishing trip. Furthermore, results in Table 3 shows that majority (77.1%) of the respondents use gills net while 73.1% use encircling net. It was observed that the gills net are the commonest net and it consist of rectangular, light weight nets joined together from end to end to form a very long horizontal curtain of netting which hangs loosely in water.

Table 3: Production characteristic of artisanal fishers (n=214)

Variables	Frequency	Percentages	Mean	Standard deviation
Fishing Experience				
10 and below	32	15.0	21years	9.33
11 – 20	80	37.4		
21 – 30	65	30.4		
31 and above	57	17.3		

Variables	Frequency	Percentages	Mean	Standard deviation
Number of Trip/Week				
10 and below	9	4.2	39 Trips	14.1
11 – 20	21	9.3		
21 – 30	28	13.1		
31 and above	156	72.9		
Years of stay in the community				
10 & below	9	4.2	39 years	14.1
11 – 20	21	9.3		
21 – 30	28	13.1		
31 and above	156	72.9		
Income per trip (N'000)				
30 and below	34	15.9	N46,105	
31 – 60	118	55.1		
61 – 90	39	18.2		
91 and above	23	10.7		
***Type of fishing gear used**				
Gill nets	165	77.1		
Encircling net	158	73.1		
Seine net	45	21.0		
Traps	20	9.3		

Source: Field Survey, 2014
*Multiple responses

Access to extension services

Finding in Table 4 shows that majority (88.8%) of the respondents did not have access to extension services while 9.3% indicated they often had access to extension services. This indicates that artisanal fisher do not readily have access to extension services which can negatively affect their productivity. In recent time it was observed that there is biasness of extension services towards crop production.

Table 4: Artisanal fishers' accessibility to extension services (n = 214)

Access to extension services	Frequency	Percentages
Very often	4	1.9
Often	20	9.3
Not at all	190	88.8

Source: Field survey, 2014

Information needs of artisanal fishers

Findings in Table 5 reveals that the major information needs of artisanal fishers were outboard engine maintenance ($\bar{x}$=2.97), outboard engine safety ($\bar{x}$=2.94), fishing crew safety ($\bar{x}$=2.81), fish preservation ($\bar{x}$=2.71), fishing injuries prevention ($\bar{x}$=2.61) and fishing craft protection ($\bar{x}$=2.61). This is an indication that issues relating to outboard engines is of paramount importance to the artisanal fishers and extension services should be directed at meeting these needs amongst others.

Table 5: Information needs of Artisanal fishers

SN	Information needs	Highly needed	Moderately Needed	Not Needed	Mean	Standard Deviation	Rank
1.	Outboard Engine Maintenance	207 (96.7)	7 (3.3)	00	2.97	0.17	1st
2.	Outboard Engine Safety	201 (93.9)	13 (6.1)	00	2.94	0.23	2nd
3.	Fishing Crew Safety	177 (82.7)	29 (13.6)	8 (3.7)	2.81	0.46	3rd
4.	Fish Preservation	158 (73.9)	50 (23.4)	6 (2.8)	2.71	0.52	4th
5.	Fishing Injury prevention	149 (68.6)	48 (22.4)	17 (7.6)	2.61	0.63	5th
6.	Fishing craft protection	148 (69.2)	39 (18.2)	27 (12.6)	2.61	0.66	5th
7.	Price standardisation	142 (66.4)	49 (22.9)	23 (10.7)	2.59	0.81	7th
8.	Modernize smoking kiln	146 (68.2)	27 (12.6)	41 (14.2)	2.52	0.77	8th

SN	Information needs	Highly needed	Moderately Needed	Not Needed	Mean	Standard Deviation	Rank
9.	Fish drying kiln	140 (65.4)	32 (14.9)	42 (19.6)	2.47	0.81	9th
10.	Fishing Gear weight (sinkers)	80 (37.5)	115 (53.7)	19 (8.9)	2.26	0.61	10th
11.	Fishing Gear Storage	89 (41.6)	35 (39.7)	40 (18.7)	2.25	0.73	11th
12.	Fishing Gear Floats	70 (32.7)	129 (60.3)	15 (7.0)	2.23	0.57	12th
13.	Fishing Gear	58 (27.1)	148 (69.2)	8 (3.7)	2.23	0.57	12th
14.	Fishing Craft Haulage	53 (24.8)	149 (69.6)	12 (5.6)	2.18	0.51	14th
15.	Fishing net fabrication	69 (32.3)	115 (53.7)	30 (14.0)	2.15	0.65	15th
16.	Method of Boat/Canoe Storage	51 (23.8)	147 (68.7)	16 (7.5)	2.14	0.52	16th
17.	Appropriate hanging ratio	68 (31.7)	100 (46.7)	46 (21.3)	2.07	0.71	17th
18.	Appropriate mash size	48 (21.0)	128 (59.3)	41 (19.2)	1.98	0.61	18th
19.	Use of scale and measure	33 (15.4)	142 (66.4)	39 (18.2)	1.95	0.56	19th
20.	Weather forecast	24 (11.2)	156 (72.9)	32 (15.9)	1.91	0.48	20th
21.	Techniques use in mariculture	9 (4.2)	52 (24.3)	153 (71.5)	1.30	0.51	21st

Source: Field Survey, 2014

Test of association between socioeconomic characteristics and information needs of artisanal fishers

Pearson Product Moment Correlation (PPMC) was used to test variables measured at interval level and the result is presented in Table 6 .Result shows that there were positive and significant relationships ($p<0.01$) between artisanal fishers' age ($r=0.302$), years spent in formal school ($r=0.226$), years spent in fishing communities ($r=0.325$) and their information needs. Also, there were negative but significant correlations ($p<0.01$) between artisanal fishers income per trip ($r=-0.295$**), income per week ($r=-0.296$**) and information needs.

Table 6: Test of correlation between selected socioeconomic characteristic and information needs

Variables	r	p-values	Remark
Age	0.302**	0.00	Significant
Years spent in school	0.226**	0.003	Significant
Years spent in fishing communities	0.325**	0.00	Significant
Income per trip	-0.295**	0.00	Significant

Source: Computed from Field survey (2014);
**correlation is significant at 0.01level (2-tailed)

Test of difference in the need for fisheries information across the study location

The result of this hypothesis that "there is no significant difference in the information needs of artisanal fishers across the study location locations" was tested using one-way Analysis of Variance (ANOVA). Findings in Table 7a reveal that there is a significant difference in the information needs of artisanal fishers across coastal south western, Nigeria. ($F = 141.4$, $P < 0.05$). This finding therefore indicates that the information need of respondents varies across the locations. For example, the proximity of fishers in Lagos state to urban cities and their access to relevant information might have reduced the level of their information needs. The hypothesis is therefore jettisoned and alternate hypothesis accepted.

Furthermore, a post-hoc multiple comparisons were carried out to indicate the significant differences among the study locations with respect to their information needs (using the Least Significant Difference (LSD) method). Table 7b shows that there are significant differences in artisanal fishers information need in Ondo state (Mean = 54.17), when compared with artisanal fishers information need in Ogun and Lagos states. A significant difference was also reported in Ogun State (Mean = 51.10) when compared with Ondo and Lagos state artisanal fishers information needs. There was also a significant difference in the information needs of artisanal fisher in Lagos state (Mean = 38.14) when compared with those in Ondo and Ogun states. Also, results in Table 7c reveal that artisanal fishers in Ondo state has the highest information need mean value, followed by Ogun state and Lagos state with the least information need mean values. It therefore implies that fishers in Ondo and Ogun states need more fisheries information than their counterparts in Lagos state.

Table 7a: ANOVA of the information needs of artisanal fishers across the study locations

Sources of Variation	Sum of Square	Df	Mean Square	F-Valve	P-Value	Decision
Between Group	9324.513	2	4662.257	141.4	0.00	S
Within Group	6889.373	212	32.964			
Total	16213.887	214				

Source: Computed from field survey (2014)

Table 7b: Post-Hoc (LSD) multiple comparison of variables information need

Location	Location (State)	Mean difference (I-J)	Std. Error	Significant
Ondo	Ogun	3.07*	0.98	0.002
	Lagos	16.03*	1.05	0.00
Ogun	Ondo	-3.07*	0.98	0.002
	Lagos	12.96	0.92	0.00
Lagos	Ondo	-16.03*	1.05	0.00
	Ogun	-12.96	0.92	0.00

Source: Computed from field survey (2014)
*The mean difference is significant at the 0.05 level

Table 7c: Post-Hoc (LSD) showing the Mean Values

	N	Mean	Standard deviation	Standard error
Ondo State	53	54.17	3.9161	0.5379
Ogun state	95	51.10	3.8619	0.4004
Lagos state	66	38.14	8.5213	1.0489
Total	214	47.83	8.7660	0.6020

Source: Computed from field survey (2014)

CONCLUSION AND RECOMMENDATIONS

Sequel to the outcome from the study, it could be concluded that artisanal fishers mainly use; gill nets, surrounding nets, seine nets and traps for their fishing activities and the key areas of information need included outboard engine maintenance, outboard engine safety, fishing crew safety, fishing preservation, fishing craft protection and fishing injury prevention. Also, fishers in Ondo and Ogun States need more fisheries information than their counterparts in Lagos state. It is therefore recommended that relevant information should be package based on the identified needs of the artisanal fishers and disseminated to the fishers in the fishing communities.

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HIV/AIDS Voluntary Counselling and Testing (VCT): Perspectives of Rural Youths in Oyo State, Nigeria

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Abstract: The HIV/AIDS pandemic has become a source of concern all over the world with much impact in Sub-Saharan Africa. In Nigeria, the current national rate is over 4%, despite this challenge, the patronage of Voluntary Counselling and Testing is still very low. This study was designed to ascertain the perspectives of rural youths towards HIV/AIDS Voluntary Counselling and Testing in selected rural communities in Oyo state. Multistage sampling technique was used to select 121 respondents as sample size for the study. Data were collected using interview schedule. Parameters assessed were personal characteristics, awareness, knowledge level, constraints affecting VCT and perception towards VCT. The data were subjected to descriptive and regression analyses. The result showed that majority (52.8%) were female, single (64.2%), Muslims (53.5%), and mainly of Yoruba tribe (81.0%) with mean age of 25years. Major information sources on VCT identified include television (89.3 %,) and radio (83.5%), while major constraints identified were, fear of outcome of the VCT result, stigmatisation and beliefs and majority had unfavourable perception towards VCT. Regression analysis revealed that knowledge and constraints were the major determinants of rural youth perspective about the programme. It becomes imperative to increase the level of knowledge of the respondents through awareness campaigns and training using their preferred information sources.

Keywords: HIV/AIDS**,** Voluntary Counselling and Testing, Perspectives, Rural youth.

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) caused by Human Immunodeficiency Virus (HIV) is a pattern of devastating infections which attacks and destroys certain white blood cells that are essential to the body's immune system (Odu and Akanle, 2008). HIV/AIDS is a major source of concern all over the world as it constitutes a major source of death and a threat to national development. The virus has negative impact on economic, social, political and most especially agricultural development of the nation, since it is believed that over 70% of Nigeria population reside in rural areas while engaging in agriculture as their main sources of livelihood. Sub-Saharan Africa although home to only 10% of the world's population has approximately 70% of all the persons living with HIV/AIDS (UNAIDS 2007). Statistics indicated that as at the end of 2007, an estimated 22 million adults and children in sub-Saharan Africa were living with HIV. Also, an estimated 1.5 million Africans died from AIDS while 11.6 million African children became orphans as a result of HIV/AIDS. Specifically, as at the end of 2007, Nigeria had 2.6 million people living with HIV/AIDS, 170,000 died of AIDS and 1.2 million were orphaned as a result of HIV/AIDS (Yahaya et al., 2010).

Nigeria is one of the countries with a relatively high prevalence 4.4% of people living with HIV/AIDS in Africa (UNAIDS/WHO, 2007). The first case of AIDS in Nigeria was reported in 1986. The virus spread rapidly from 1.8% (of the population) in 1991 to 3.8% in 1994, 4.5% in 1996, 5.4% in 1999, 5.4% in 2001, 5% in 2003 and dropped slightly to 4.4% in 2005 (National Action Committee on AIDS (NACA, 2006). The virus was said to be common among young and sexually active individuals between the ages of 18-48 years (Adeyipo, 2007). Similarly, (UNAIDS, 2008) estimated that in Nigeria about 3.1% of people between ages 15-49 are living with HIV/AIDS. According to (NBS, 2009), the prevalence rate of HIV/AIDS in Oyo State has increased from 1.8 in 2007 to 2.2 in 2008, most of which are youths. Due to the deadly effect of HIV/AIDS and other deadly diseases, Nigeria's life expectancy dropped from 53.8 years for women and 52.6 years for men in 1991 to 46 years for women and 47 years for men in 2007 (UNAIDS 2008). About 80% of HIV infections in Nigeria are transmitted through heterosexual activities, 10% of the new HIV infections are transmitted through blood transfusions while another 10% HIV infections are transmitted through mother to child transmission and other HIV risk behaviours, such as circumcisions and incision of tribal marks (Yahaya et al., 2010). The World Health Organisation estimated that youths comprised 50% of all new HIV infections and consequently must be targeted for education in decreasing transmission and reducing the stigmatization of HIV and increasing its diagnosis (WHO, 2004).

In Nigeria, HIV/AIDS is promoted by inadequate sexual health education, inadequate voluntary HIV testing and counselling, unhealthy cultural practices and poor health care system (Jimoh, 2003; Alao, 2004). A healthy condition is an essential condition to meaningful contribution to national and agricultural development. HIV/AIDS is a source of

threat to life, thus individuals need to be aware of HIV/AIDS infection and know their HIV status in order to help control its spread as well as effectively manage the ailment in case of people already infected. Various preventive strategies have been employed to curb the spread of HIV infection, as there is presently no cure. The strategies among others include: Abstinence, avoidance of multiple sexual partners, condom use and voluntary counselling and testing (VCT).

Notable among these strategies is Voluntary Counselling and Testing (VCT). VCT is necessary as it helps to reduce transmission and involvement in risky sexual behaviours. It also promotes early treatment and adjustment (Jimoh, 2003; Oshi *et al*., 2007). HIV/AIDS counseling involves educating a client or a group of clients on the control management and prevention of HIV/AIDS. Counseling assists people to make informed decisions, cope better with life challenges and prevent further transmission of HIV/AIDS. According to Tenibiaje, (2010), attitude of individual is a contributory factor for behavioural change towards VCT. It is against this background that this study was designed to investigate the perspectives held by youths towards HIV/AIDS voluntary counselling and testing in selected rural communities of Oyo State, Nigeria.

METHODOLOGY

Study area: Oyo state is located in the South-West geopolitical zone of Nigeria, Oyo State was one of the three States carved out of the former Western State of Nigeria in 1976. Oyo State consists of 33 Local Government Areas. The State covers a total of 27,249 square kilometres of land mass and it is bounded in the south by Ogun State, in the north by Kwara State, in the west it is partly bounded by Ogun State and partly by the Republic of Benin, while in the East by Osun State. The 2006 population census figure indicated that, youths constitute about 40 percent of the state population of 5,591,589 people (National Population Census, 2006). Apart from its administrative functions, Oyo also served as a centre of trade in agriculture and crafts manufacturing.

Study Population: The target population of the study comprise all the rural youth in Oyo state within the ages 18 to 30 years old (National Youth Development Policy of Nigeria, 2001)

Sampling procedure and sample size

Rural LGA	10% of the rural LGA	Sampled rural communities	No in the list of youth association	20% of sampled respondents
28	Ido	Ido	170	34
	Ibarapa east	Eruwa	210	42
	Iseyin	Iseyin	180	36
Total			**560**	**122**

Multistage sampling procedure was used for the study. Twenty eight rural local government (LGAs) out of the 33 local government areas in Oyo state were purposively selected. Three local government areas were randomly selected namely: Ido, Ibarapa east and Iseyin. Proportionately, 122 respondents were randomly sampled from the list of most prominent youth association in the selected rural communities used for the study but only 121 were analysable.

Measurement of variables

Perception towards HIV/AIDS voluntary counselling and testing- The information on perception was obtained using a five-point-likert scale of strongly agree, agree, undecided, disagree and strongly disagree with scores of 1, 2,3,4,5 assigned respectively for positively worded perception statement and the reverse for negatively statements. Perception categories were obtained using the mean score to categorise into favourable (≥ mean) and unfavourable (< mean) perception.

Knowledge of VCT for HIV/AIDS - Knowledge of the respondents was measured by obtaining their responses on a 10-point knowledge statements using dichotomous response of Yes or No. The correct statement attracted a score of 1 while incorrect response attracted a score of 0. The highest score was obtained as 10 while the lowest score was 0. The mean score was obtained and used to categorise the respondents' knowledge level (High or Low) based on the deviation from the mean. Respondents with scores below the mean were categorised as having low knowledge while those with mean's score and above were categorised as having high knowledge of VCT.

Constraints Associated with HIV/AIDS VCT - Thirteen factors were highlighted and marked as possible constraint to VCT. These factors were measured as Most severe 4, Severe =3, Not severe =2 and Not a constraints =1. The scores were computed

to obtain the mean and the mean was used to rank the constraints.

Method of data collection and analysis: Primary data were collected from the respondents by means of a pre-tested questionnaire. Data obtained include personal characteristic indices, information sources, awareness of VCT (Voluntary counseling and testing), and knowledge of HIV test among respondent, the constraints to VCT and perception of respondents towards VCT.

The data collected were subjected to descriptive and regression analysis to ascertain youths perspectives towards VCT of HIV/AIDS programme. The regression equation is as follows. $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \varepsilon$

Where Y is the dependent variable (Perception scores) β_0 is the intercept and β_1, β_2, β_3, β_4 and β_5 are the slope parameters of the model

X_1 = Awareness of VCT of HIV/AIDS (scores)

X_2, = Sources of information on VCT of HIV/AIDS (score)

X_3, = Knowledge of VCT of HIV/AIDS (score)

X_4, = Constraints to VCT of HIV/AIDS

X_5, = Age of respondents (years)

ε = error term.

RESULTS AND DISCUSSION

Personal characteristics of respondents

Table 1 revealed that majority (74.8%) of the respondents fall between the age brackets of 14-30 years. This implies that the respondents are in their sexual active stage of life and could be vulnerable to HIV/AIDS infection. Majority (52.8%) of the respondents were female and mostly single (64.2%). This makes the incidence of pre-marital sex possible and consequently predisposes them to HIV/AIDS infections. This finding is consistent with Mishra (2005) who opined that young people are highly vulnerable to HIV/AIDS. He asserted that in many countries, 60% of the new infections are among the age group of 15-24years and stressed that the highest rate of STD's are usually found among the youth of ages 20-24 who are predominantly single.

Table 1: Frequency distribution of respondents by personal characteristics n = 121

Variables	Frequency	Percentage
Age range in years		
14-20	34	27.6
21-30	58	47.2
31-40	29	25.2
Sex		
Male	58	47.2
Female	63	52.8
Marital status		
Single	79	64.2
Married	42	35.8
Occupation		
Student	55	44.7
Farming	4	3.3
Artisan	7	7.3
Technician	5	4.1
Apprentice	7	5.7
Teaching	9	7.3
Civil servant	3	2.4
Private business	29	23.6
Engineer	2	1.6
Religion		
Christianity	57	46.5
Islam	61	53.5
Traditional	2	1.6
Ethnic group		
Yoruba	98	81.0
Igbo	6	5.0
Hausa	8	6.6
Efik	9	7.4

Sources of Information

The results in Table 2 revealed that television (89.3%) and radio (83.5%) were the major sources of information on HIV/AIDS voluntary counselling and testing programme. Other prominent sources include friends (79.9%), print media (69.8%) and health workers (78.8%). The implication of this is that information on VCT promoted through television, radio, peers and health workers could facilitate behavioural change faster among youths in rural community. This corroborated the research findings conducted in Kenya where media and peers have been found to be an effective means of reaching young people on reproductive health issues (McCauley, 2004; Aarons & Jenkins, 2002 and Dennison et al., 2006).

Table 2:Sources of Information on VCT of HIV/AIDS n= 121

Source of Information	**Yes** Freq (%)	**No** Freq (%)
Television	92 (89.3)	11 (10.7)
Radio	76 (83.5)	15 (16.5)
Newspaper	44 (69.8)	19 (30.2)
Conference	24 (54.5)	20 (45.5)
Adults	30 (60.0)	20 (40.0)
Friends	51 (79.7)	13 (20.3)
Health workers	52 (78.8)	14 (21.2)

Awareness of VCT for HIV/AIDS

Result in Table 3 showed that majority (96.7%) of the respondents were aware of HIV/AIDS, 57.5% never had any HIV/AIDS test before, 58.7% were aware of VCT package while, 63.1% believed VCT was an option in HIV/AIDS programme. Majority

(71.3%) were willing to have VCT and 71.2% of the respondents submitted that there was no VCT centre around them.

Although, respondents were aware of VCT, the awareness was not adequate as indicated by majority (71.0%) of the respondents. Inadequate awareness may have negative influence on perspectives of the respondents towards the programme which may in turn affect their participation. Specific information packaging that will meet the need of the rural populace will enhance behavioural change among the youth.

Table 3: Awareness of VCT of HIV/AIDS n =121

Awareness	Freq	Percent
Aware about HIV	118	96.7
Had any form of HIV/AIDS test	51	42.5
Do you know that VCT is an option in HIV/AIDS program	71	58.7
Willing to have VCT	70	63.1
Do you know any VCT centre around	82	71.3
Is the process friendly	32	28.8
Is it very expensive	39	52.7
Do you think the present information on VCT is adequate	25	66.2
Is VCT a better option	31	29.0

Knowledge of HIV/AIDS voluntary counselling and testing

The results in Tables 4a and 4b of the survey revealed that majority (74.6%) of the respondents have low knowledge about VCT. This low knowledge may negatively influence their perspectives about HIV/AIDS voluntary counselling and testing programme. Consequently, rural youth knowledge of HIV/AIDS voluntary counselling and testing will help to reduce the risk of acquiring or transmitting HIV, access HIV-specific treatment, care and support, manage one's health and plan for the future (WHO,2002). VCT is also vital for providing access to emotional support, improving skills to cope with HIV-related anxiety, and increasing motivation to avoid risky behaviours (UNAIDS, 2000). Furthermore, counselling and testing provide awareness of safer options in preventing vertical HIV transmission if pregnant women and their families use such services and learn about their sera status. For society, widespread knowledge of one's HIV status can lead to better community mobilization against the epidemic, and may reduce HIV-related stigma and discrimination (WHO, 2002) and support human rights (Baggaley, 2001).

Table 4a: Knowledge of HIV/AIDS VCT

	Knowledge	Correct %	incorrect %	Mean
1	It is one of the several packages in HIV/AIDS program	85.3	14.7	0.85
2	There is no difference between VCT and other forms	34.3	65.7	0.34
3	VCT is not confidential	46.8	53.2	0.47
4	There are more than 3 phases in VCT	52.5	47.5	0.53
5	There exist a pre and post counselling stage in VCT	81.4	18.6	0.81
6	VCT has other test follow up	49.3	50.7	0.49
7	VCT for HIV/AIDS is not free	44.9	51.0	0.45
8	VCT has plans for ongoing support after test	60.0	40.0	0.60

Table 4b: Knowledge of HIV/AIDS VCT

Knowledge Category	Knowledge score	Frequency	Percentage
Low	0-4	85	74.6
High	5-9	36	25.5

Constraints associated with HIV/AIDS VCT

The result in Table 5 revealed that fear of outcome of the VCT result, stigmatisation and beliefs were the most prominent constraints associated with HIV/AIDS voluntary counselling and testing. This implies that going for the test could expose their secret sexual behaviour and consequently HIV/AIDS status. This finding is consistent with Yahaya, Jimoh and Balogun (2010) in a study conducted among youth in Kwara state and found that factors affecting the rate of acceptance of HIV/AIDS messages are ignorance, fear of being positive, poverty, inadequate VCT centre and stigmatization.

Table 5: Constraints associated with HIV/AIDS VCT

Constraints	Most severe		Severe		Not severe		Not a constraint		Mean	Rank
	F	%	F	%	F	%	F	%		
Fear of outcome	42	36.8	28	24.6	18	15.8	26	22.8	2.75	12th
Location and access to VCT centre has no privacy	44	39.6	25	22.5	23	20.7	19	17.1	2.85	10th
Cost of VCT is expensive	53	58.7	18	20.0	8	8.9	11	12.2	3.26	1st
Personnel problem/attitude of VCT staff is not friendly	45	50	14	15.6	20	22.1	11	12.2	3.03	6th
Lack of personal confidence	46	41.4	31	27.9	11	9.9	23	18.7	2.90	8th
Risk of losing popularity among peer groups	65	56.5	14	12.2	12	10.4	24	20.9	3.04	5th
Stigmatization associated with HIV/AIDS	62	55.9	19	17.1	14	12.6	16	14.4	3.14	2nd
Beliefs(Religious, cultural and personal)	66	60.6	8	7.3	15	13.8	20	18.3	3.10	3rd
Awareness problem	48	43.2	17	15.3	24	21.6	22	19.8	2.82	11th
Stigmatization and discrimination	51	47.7	15	14.0	20	18.7	21	19.6	2.90	8th
Time involve in taking VCT	56	51.9	21	19.4	16	14.8	15	13.9	3.09	4th
Complex process	51	53.1	12	12.5	12	17.7	16	16.7	3.02	7th
Inadequate VCT facilities	39	41.5	15	16.0	16	17.0	24	25.5	2.73	13th

Perception of HIV/AIDS VCT PROGRAMME

Result in Tables 6a and 6b perception categories showed that majority (56.7%) of the respondents had unfavourable perception towards HIV/AIDS voluntary counselling and testing programme. This might be as a result of inadequate awareness, low knowledge and severity of constraints associated with HIV/AIDS voluntary counselling and testing programme. The implication is that, respondents may not be willing to participate in HIV/AIDS voluntary counselling and testing programme. The result agree with the findings of a study in Nigeria by Oshi *et al.* (2007) which established that those young people who profess low self-perception of risk, least went for HIV screening.

Table 6a: Distribution of respondents based on perception of HIV/AIDS voluntary counselling and testing programme

Perception statements	SD Freq (%)	D Freq (%)	U Freq (%)	A Freq (%)	SA Freq (%)	MEAN
1. It is just another option in the HIV/AIDS program to prevent infection.	57 (49.1)	38(32.8)	5(14.3)	2(1.7)	14(12.1)	1.85
2. VCT process could be an effort of wasting time and resources	11(9.6)	13(1.3)	18(15.7)	35(30.4)	38(33.0)	3.66
3. On the surface, VCT appears to be the best package for youth on HIV/AIDS.	54(48.2)	35(28.5)	16(14.3)	4(3.6)	3(2.7)	1.81
4. I am worried that many people are not using VCT even when it is the way out to prevent the HIV/AIDS scourge.	23(20.7)	48(43.2)	24(21.6)	10(9.0)	6(5.4)	2.35
5. VCT is a strong tool/mechanism for behavioural change process	22(28.2)	25(32.1)	18(23.1)	6(7.7)	7(9.0)	2.04
6. VCT does not have any presumed negative effect on the patient	43(39.1)	38(34.5)	17(15.5)	5(4.1)	7(16.4)	2.37
7. I would always want to have it but for the poor access within our neighbourhood	44(43.1)	23(22.5)	17(16.7)	11(10.8)	7(6.9)	2.16
8. I can recommend it to another person base on my experience.	37(37.8)	38(38.8)	13(13.3)	5(5.1)	5(5.1)	2.01
9. The current process of VCT requires a lot	31(37.3)	31(37.3)	11(13.3)	7(18.4)	3(3.6)	2.04

Perception statements	SD Freq (%)	D Freq (%)	U Freq (%)	A Freq (%)	SA Freq (%)	MEAN
of improvement in order to encourage more patronage.						
10. I would be willing to be an ambassador of VCT on campus if given the opportunity.	31(37.3)	20(24.1)	20(24.1)	6(7.2)	6(7.2)	2.23
11. To me, VCT is a very good program.	69(62.7)	23(20.9)	7(6.4)	5(4.5)	6(5.5)	1.69
12. Even with the numerous problem been faced by VCT, it is recommendable.	37(35.9)	47(45.6)	9(18.7)	7(6.8)	3(2.9)	1.95
13. VCT's advantage still outweighs its flaws in every respect.	16(14.3)	17(15.2)	12(10.7)	32(28.6)	35(31.3)	3.47
14. VCT could lead to sexual freedom, growth and improper sexual behaviour if promoted and not controlled among the youth.	23(21.1)	21(19.3)	12(11.0)	25(22.9)	28(25.7)	3.12
15. VCT is only meant for adult and married couple, while the young ones are to understudy their parents.	12(10.6)	22(19.3)	20(17.7)	30(26.5)	29(25.7)	3.37
16. Getting tested and for HIV/AIDS is what matters but not necessarily through VCT.	12(11.7)	35(34.0)	21(17.1)	25(24.3)	10(9.7)	2.86
17. HIV/AIDS and VCT still remain western culture.	11(9.9)	23(20.7)	15(13.5)	28(25.2)	34(30.6)	3.46
18. The disposition of VCT staff is the reason for success and failure of the programme.	31(28.7)	29(26.9)	14(13.0)	22(20.4)	12(11.1)	2.58
19. There is no need for counselling as it has no effect on youth sexual behaviour.	16(9.9)	23(6.7)	15(13.5)	34(30.8)	28(30.6)	3.15
20. Reason why people don't want to use VCT is because of the stigma associated with anyone who eventually found tested positive.	31(28.7)	29(26.9)	14(13.0)	22(20.4)	12(11.1)	2.58

Table 6b: Categorisation of respondents based on their perception

Perception	Frequency	Percent
Unfavourable	69	56.7
Favourable	52	43.3
Total	121	100

Min = 20.0; Max = 100.0; Total mean score = 47.65

Determinants of youth perspectives towards HIV/AIDS Voluntary Counselling and Testing

Result of regression analysis from Table 7 shows that knowledge (Beta = 0.26, p = 0.01) and constraints associated with HIV/AIDS voluntary counselling and testing programme (Beta = 0.30, p = 0.00) contributed significantly to rural youth perspective about the programme. The implication is that constraints and knowledge of HIV/AIDS voluntary counselling and testing were the major variables that determine rural youth perspective about the programme.

Table 7: Regression analysis showing determinants of youth's perception towards HIV/AIDS VCT Programme

Model	B	t-value	p-value
Constant		4.504	0.000
Awareness	0.004	0.039	0.969
Information sources	0.073	0.755	0.452
Knowledge	0.256	2.626	0.010*
Constraints	0.300	3.335	0.001*
Age	0.078	0.924	0.357

Dependent Variable: perception

Predictors**:** (Constant), awareness, information sources, knowledge, constraints and age

* Significant at 5% level of significance, F = 7.41, R^2 = 0.24, Multiple R = 0.49, Standard Error = 11.81

CONCLUSION AND RECOMMENDATIONS

This study has shown that respondents were aware of HIV/AIDS voluntary counselling and testing programme, radio and television were the prominent information sources, knowledge level of the respondents about HIV/AIDS voluntary counselling and testing programme was low, major constraints identified were fear of outcome of the VCT result, stigmatisation and beliefs and majority had unfavourable perception towards VCT. Regression analysis revealed that knowledge and constraints were the major determinant of rural youth perspective about the programme.

Knowledge based information on HIV/AIDS voluntary counselling and testing targeted toward youth should be promoted on radio and television. Health extension workers should be adequately trained in order to handle issues related to the psychological effect of fear of VCT result outcome, stigmatisation and beliefs among others.

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Income inequality and poverty among farming households in Southwest, Nigeria

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Abstract: This study investigates income inequality and poverty among farming households. It relies on primary data collected from 150 rural farming households in southwest, Nigeria during the rainy and dry seasons. This was done to allow for seasonal variations in farmers' income and consumption. Data collected were analysed using descriptive statistics, FGT poverty measures, Gini coefficients and Tobit regression. The study finds that farmers' income level was higher during the rainy than dry season, while income inequality was higher during dry season compares with rainy season. Poverty incidence was higher during the dry season than rainy season. Furthermore, farm size, years of education and access to loan facilities negatively influence poverty, while, household size positively affect poverty during the two seasons. This study recommends improvement in the level of educational attainment, access to loan facilities and awareness on benefits of small family size.

Key words: Farming households, Income inequality, Poverty, Rainy and Dry seasons, rural Nigeria

INTRODUCTION

Income inequality and Poverty are problems affecting every nation of the world and they are parts of the greatest challenges facing mankind today. According to World Bank (2001), out of about world's 6 billion people; 2.8 billion lived on less than US$2 a day and 1.2 billion on less than US$1 a day. Of the latter, 24.3 per cent were in sub-Saharan Africa (SSA) increasing to 28.3 per cent in 2010. It was estimated that 1.4 billion people had consumption levels below $1.25 a day in 2010, while SSA of which Nigeria is one, accounted for 388 million of this number (Global Monitoring Report, 2012). While virtually all other regions of the world have been able to achieve the MDG1 of halving poverty by 2015, South Asia met the target up to about 25% and SSA failed to meet the target (World Bank Group, 2015). United Nations (2005) reveals that five years after the millennium summit where the objectives of the MDGs were reached, the condition of the poor has not improved significantly.

One important consensus in the literature on poverty is that it is a rural phenomenon (World Bank, 1990 and Fields, 2000). Rural poverty accounts for nearly 63 per cent of poverty worldwide, reaching 90 per cent in countries like China and Bangladesh and ranges from 65 to 90 per cent in SSA (World Bank, 2000). By this, it is acknowledged that rural communities are the worst hit by poverty where social services and infrastructure are limited or non-existent.

The great majority of those who live in rural areas in Nigeria are poor and depend on agricultural production and allied activities for food and income (Omonona, 2009). The current official statistics released by National Bureau of Statistics (NBS) shows that the national poverty rate is 69 per cent, while sectoral disaggregation shows urban poverty rate of 61.8 per cent and rural poverty rate of 73.2 per cent (NBS, 2012). Incidentally, the rural sector is the predominant sector in the Nigerian economy (63 per cent). It plays some fundamental roles, which include job creation at relatively low unit costs, and thus remains the most important sector with which to grow the nation's economy.

Evidence abound that among the rural poor, the farming households are poorer. For instance, Federal Office of Statistics (FOS) (1999) and Olaniyan and Bankole (2005) reveal that in 1980, 1985, 1992 , 1996 and 2004, the incidence of poverty were 32.1, 43.1, 38.7, 72.3 and 64.4 per cent respectively for Nigerian farming households and 16.3, 37.2, 36.0, 59.2 and 59.2 per cent for their non-farming counterparts respectively. This indicates that in the years under review, there are more poor families in farming households than in non-farming households. Hence, most of the poverty discussions in Nigeria are linked with agriculture (Canagarajah and Thomas, 1995; World Bank, 1996; Okumadewa, 1997; Omonona, 2001; Amao *et al*, 2009). This is because it is still the dominant economic activity in terms of employment and linkages with the rest of the economy (Nigerian National Planning Commission, 2004). While accounting for one-third of the GDP, it remains the leading employment sector of the vast majority of the Nigerian population as it employs two-thirds of the labour force (Chigbu, 2005). Also, about 90% of the country's food is produced by small-scale farmers cultivating tiny plots of land who depend on rainfall rather than irrigation systems (International Fund for Agricultural Development (IFAD), 2007).

However, these farmers, due to low productivity as a result of inadequate access to credit and

marketing facilities are said to be poor. They are also said to be poorer during the dry season than during the rainy season (Adeyonu *et al.*, 2012). This is because in spite of the presence of two major rivers - the Niger and the Benue, agricultural production is still predominantly rain-fed (Nigerian National Planning Commission, 2004). In the life of the farming households, this period is characterized by hunger and malnutrition, leading to sickness, inability to do hard work on regular basis and absenteeism from work which have negative impact on their quality of life as well as their productivity.

Similarly, the rapid economic growth that occurred between 1965 and 1974 created a serious income disparity in Nigeria, which is believed to have widened substantially (Aigbokhan, 1997; Ipinnaiye, 2001; Oyekale *et al*, 2006). In addition, levels of inequalities have been aggravated in Nigeria as a result of the new causes associated with technology changes, lack of good governance, corruption, weak democratic institutions and past military rule which did not allow free discussion of issues or formulation of truly representative governance organs in the society (Aigbokhan, 1997; 2000). Research efforts have confirmed that income inequality is still on the increase in Nigeria. There are enough evidences to show this. For instance, Canagarajah *et al* (1997) reported increased income inequality over the period spanning 1985 and 1992. This was established by an increase in the Gini coefficient from 0.381 in 1985 to 0.449 in 1992. In 1996/97 Gini index for Nigeria was 0.506, while it was 0.613 in 1998 (World Bank, 2003), however, using 2004 household data, Gini coefficient reduced to 0.58 (Oyekale *et al,* 2006). In contrary, comparing 2004 household data with 2010, Gini coefficient increased by 4.1% was also established that Gini index is higher in the rural areas than urban areas. In 1998, Gini index was 0.4799 in rural areas while it was 0.4132 in urban areas. In the same vein, in 2004 the Gini index of rural areas was 0.5808 while in the urban areas it was 0.5278 (Oyekale *et al*, 2006).

The problem of income inequality and poverty has for a long time been a cause of concern to the Nigerian government. Initial attention focused on rural development in addition to town and country planning as a practical means of dealing with the problem. Thus, the second and fourth National Development Plans contain both direct and indirect allusions to, as well as objectives of policies and programmes aimed at minimizing the causes of poverty (Obi, 2007).

Some of the policies and programmes that have been designed at one time or another, if not to meet the special needs of the poor, at least to reach them included: the establishment of the National Accelerated Food Production Project (NAFPP), Green Revolution, Agricultural Development Programme (ADP), National Directorate of Employment (NDE), People's Bank, Community Bank and Small-scale Industries Credit Scheme, the Family Support Programme (FSP), Presidential Initiatives on cocoa, cassava, rice, livestock, fisheries and vegetables, the National Land Agricultural Development Agency (NALDA), Directorate of Food, Roads, and Rural Infrastructure (DFRRI), Family Economic Advancement Programme (FEAP), National Poverty Eradication Programme (NAPEP), National Economic Empowerment and Development Scheme (NEEDS) and its counterparts at the state and Local Government levels. The procurement of 12 billion Naira worth of fertilizer between 2000 and 2003 at 25 per cent subsidy to farmers was especially targeted at reducing poverty amongst the farming households. In 2005, the sum of N50 billion was set aside as credit to farmers at a concessionary interest rate of eight per cent (Nuhu, 2007; Federal Ministry of Agriculture and Water Resources 2008).

Recently there has been a reorientation of the government's focus towards developing Community-based Poverty Reduction using Community Driven Development approach. In Nigeria, under this approach several programmes have been implemented and some are still on. Local Empowerment and Environmental Management Programme (LEEMP); Community-Based Poverty Reduction Project (CPRP) and Community and Social Development Project (CSDP) are social CDD projects while National *Fadama* Development Project (*Fadama* - II and III) is economic CDD project.

However, the fact that the incidence of poverty still remains very high, the existence of the various poverty alleviation programmes notwithstanding points to the ineffectiveness of the strategies and programmes (Osinubi and Gafaar, 2005).

Several studies such as: Omonona (2001), Oyekale *et al* (2006), Son (2007); Ibrahim and Umar (2007), Omonona *et al* (2008), El-Osta and Morechart (2008), Amao *et al* (2009) and Idowu *et al* (2011), Adeyonu *et al* (2012), Igbalajobi *et al* (2013), Mailumo et al (2015), Omotola & Salman (2015) have worked on income inequality and poverty, the issue of seasonality has not been properly addressed. Arising from the foregoing, this study has the following research questions: What is the level of income of farming households? What is the level of income inequality and poverty status of farming households? and finally what are the determinants of farming households' poverty during rainy and dry seasons?

The specific objectives are to:

1. examine the income level of the farmers during rainy and dry seasons;
2. assess the income inequality and poverty status of the farmers in rural areas of southwest and
3. analyse the determinants of Farming households' poverty during rainy and dry seasons

METHODOLOGY

Study area: The study was carried out in southwest geopolitical zone in Nigeria. It falls on longitude 6º to the north and latitude 4º to the south. It is marked by longitude 4º to the West and 6º to the East. It is bounded in the north by Kogi and Kwara states, in the east by Edo and Delta States, in the south by Atlantic Ocean and in the west by Republic of Benin. It has a land area of approximately 114,271 km^2 occupying approximately 12 per cent of Nigeria's total land mass. The vegetation is typically rainforest and comprises six states namely: Ekiti, Lagos, Ogun, Ondo, Osun and Oyo states. The total population is 27,581,992 and more than 96 per cent of the inhabitants are Yoruba whose main means of livelihood is farming (National Population Commission (NPC), 2006). The Climate is equatorial with distinct wet (rainy) and dry seasons and relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. The mean annual rainfall is 1480mm with a mean monthly temperature range of 18º-24º C during the rainy season and 30º-35º C during the dry season. The climate in the zone favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, kolanut, coffee, palm produce, cashew etc (NPC, 2006). Southwestern zone of the country was purposively selected for the study. The selection of the zone was based on the fact that it had the highest incidence of poverty in 2004 when compared with the other two zones in the southern part of the country. The poverty incidence in the zone was 43.0%, followed by south-south 35.1% and south-east 26.7% (NBS, 2005).

Sources of data and sampling techniques: Primary data were used for the study. They were collected from the household heads through the use of pre-tested, well-structured questionnaire during the rainy and dry seasons to allow for seasonal variations. Information was collected on household demographic/socioeconomic characteristics and expenditure. A multistage sampling technique was employed for the study. The first stage is the purposive selection of southwest, Nigeria from the three zones that formed the southern divide when the country is stratified into northern and southern divides. The second stage involved the random selection of Osun and Oyo states. The stage that follows was the stratification of Local Government Areas (LGAs) of each State into urban and rural areas as indicated by the Ministry of local government and chieftancy offices of both States. Osun State has 30 LGAs out of which 19 are rural, while Oyo has 33 LGAs and 21 of them are rural. The next stage was the random selection of two rural LGAs from each of the two states. The list of farming households from the LGAs selected was obtained from states' Agricultural Development Projects (ADPs). The fifth and final stage was the random selection of representative farming households using proportionate sampling method based on the population size of the LGAs selected. In all, 80 households were sampled in Osun state, while 120 households were sampled in Oyo state. However, only a total of 150 questionnaires were used for the analysis due basically to incompleteness of 50 household questionnaires from the two states.

Analytical techniques

Descriptive statistics: Sources and level of income of households and their socioeconomic characteristics were analysed using descriptive statistics: frequency distribution and percentages. Per capita household consumption expenditure was used as a proxy for per capita household income in this study. This is to overcome the problem of overstating or understating household income.

Annual per capita Expenditure

$$= \frac{\text{Annual expenditure of households}}{\text{Household size}} \quad (1)$$

Measurement of income inequality: Income inequality of households was achieved by using Gini Coefficient. To calculate Gini–coefficient, Morduch and Sicular (2002) noted that where incomes are considered so that $Y_1 \leq Y_2 \leq Y_3 \leq \ldots \leq Y_n$.

The Gini coefficient is given by:

$$I_{Gini}(Y) = \sum_{i=1}^{n} a_i(Y) Y_i \quad \text{and} \quad a_i(Y) = \frac{2}{n^2 \mu}\left(i - \frac{n+1}{2}\right)$$

therefore

$$I_{Gini}(Y) = \frac{2}{n^2 \mu} \sum_{i=1}^{n} \left(i - \frac{n+1}{2}\right) Y_i \quad (2)$$

,

Where,

n = the number of observations
μ = the mean of the distribution
Y_i = the income of the ith household
$a_i(Y_i)$ = the weight
i = the corresponding rank of total income.

Measurement of Poverty: Poverty status of households was achieved by using the Foster- Greer-Thorbecke (1984) class of poverty measures (FGT) including the Headcount Index (P_0), the Poverty Gap

Index (P_1), and the severity of Poverty Index (P_2). The FGT is presented below:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{Z-y}{Z}\right]^\alpha \quad (3)$$

Where,

Z = the poverty line defined as ⅔ of Mean annual per capita expenditure

y = the annual per capita expenditure –poverty indicator/welfare index per capita

q = the number of poor households in the population of size n,

α = the degree of poverty aversion; α = 0; is the Headcount index (P_0) measuring the incidence of poverty (proportion of the total population of a given group that is poor, based on poverty line). α = 1; is the poverty gap index measuring the depth of poverty that is on average how far the poor is from the poverty line; α = 2; is the squared poverty gap measuring the severity of poverty among households, that is the depth of poverty and inequality among the poor.

Determinants of Poverty

Various approaches have been designed in modelling the determinants of poverty. Some of the models used include the Ordinary Least Square (OLS) (Ravallion, 1996; Omonona, 2009), and the limited dependent variable models (logit, probit and Tobit) that are popular in the literature. While the OLS assume a continuous dependent variable, in the case of poverty, the response is a binomial process taking the values of 1 for poor and 0 for non-poor or vice versa, hence, the popularity of logit, probit and Tobit models in poverty analysis. The Tobit model is used when the intention is to differentiate between the extent of poverty among the poor (Omonona, 2001, Adejobi, 2004, Amaza *et al*, 2007, Balogun, 2011). It measures the effects of changes in explanatory variables on the probability of being poor. Here, the poor farming households have their poverty depth as their dependent variable while the non-poor ones have zero as their dependent variable.

Whereas, logit and probit models are used to examine the influence of the explanatory variables on the poverty status of the households. Here, the poor households are given a value 1, and non-poor ones with a value of zero for the dependent variable. According to Park (2010), the two models give qualitatively similar results, but the core difference lies in the distribution of error terms (disturbances); hence, there is no compelling reason to choose one over the other (Gujarati, 2004). Therefore, Tobit regression analysis was used to determine the factors affecting poverty among farming households in southwest, Nigeria. The model developed by Tobin (1958) is expressed below following McDonald and Moffit (1980), and adopted by Omonona (2001), Adejobi (2004), Amaza *et al*, (2007), Balogun (2011).

$$q_i = p_i = \beta^T X_i + e_i \quad (4)$$

$$q_i = p_1 \text{ if } p_1 > p_i^*$$

$$q_i = 0 \text{ if } p_1 \le p_i^*$$

$$i = 1, 2, 3...n$$

Where q_i is the dependent variable. It is discrete when the households are not poor and continuous when they are poor. P_1 is the poverty depth/intensity defined as $(Z-y_i)/Z$, Z is the poverty line, and y_i is per capita household expenditure in Naira (N), Xi is vector of explanatory variables, β^T is a vector of parameters and e_i is the error term.

The explanatory variables include:

X_1 = Age of the household head in years

X_2 = Gender of the household head (Male=1, otherwise = 0)

X_3 = Years of education of household head

X_4 = Household size

X_5 = Access to loan (Yes=1, otherwise = 0)

X_6 = Market distance in kilometres

X_7 = Water distance in kilometres

X_8 = Hired labour in man days

X_9= Farm size in hectares

However, since in the standard Tobit model, the estimated coefficients have no natural interpretation, we report marginal effects evaluated at sample means by taking the partial derivatives of equation 4 above with respect to each explanatory variable.

RESULTS AND DISCUSSION

Households' income during the rainy and dry seasons

Table 1 presents the level of respondents' income during the dry and rainy seasons. As shown in the table, the mean income of respondents during dry and rainy seasons was N5417.35 and N6080.91 respectively. This shows that the mean income decreased during dry season. This may be due to the fact that agricultural activities were greatly reduced during the dry season. When disaggregated by year of education, the result revealed that income increases as year of education increases in both seasons. This could be because the educated farmers are good adopters of new technologies. This in turn led to increased yield, and hence more income. This is in consonance with findings by Adepoju *et al* (2011) who showed that income level of rural households increases with increase in education. The result also shows that as farm size cultivated increases, mean income increases with that of rainy season higher

than that of dry season. This also implies that scale of production affects the mean income of farmers.

Table 1: Level of income by year of education and farm size during the rainy and dry seasons

Characteristics	Statistics	Rainy season	Dry season
All		6080.91	5417.35
		(1902.22)	(1949.07)
Year of	0-5	4925.77	4254.68
Education	6-11	(1456.22)	(1401.53)
	12-17	6519.01	5759.59
	≥18	(1399.15)	(1420.08)
		7380.76	6840.29
		(1706.58)	(1924.81)
		8971.41	8633.06
		(1846.88)	(1674.03)
Farm size	<2	5752.21	5128.94
	2-4	(1945.28)	(2035.11)
	>4	6399.66	5619.10
		(1320.19)	(1353.97)
		6585.18	6299.09
		(3476.02)	(3392.87)

Note: The figures in parenthesis are standard deviation
Source: Data Analysis, 2014

Income inequality during the rainy and dry seasons

Table 2 presents income inequality of respondents by year of education and farm size during the rainy and dry seasons. The results show that income inequality of respondents in the rainy season was 0.1710 and in the dry season increased to 0.1952. The table also reveals that as year of education increases, income inequality decreases in both seasons but income inequality among the respondents during dry season was more than that of the rainy season. In the same vein, as farm size increases, income inequality decreases. This implies that farmers with small scale of production tend to have low income compared with their counterparts cultivating large farm size. The result is in line with Oyekale *et al.*, (2004) and Awoniyi (2011).

Table 2: Income inequality by year of education and farm size during the dry and rainy seasons

Characteristics	Statistics	Rainy season	Dry season
All		0.1710	0.1952
Year of	0-5	0.6090	0.1954
Education	6-11	0.1162	0.1483
	12-17	0.1150	0.1342
	≥18	0.1084	0.1069
Farm size	<2	0.2738	0.2778
	2-4	0.1827	0.2069
	>4	0.1053	0.1302

Source: Data Analysis, 2014

Household poverty level

Poverty lines were computed for respondents using the two-thirds of mean per capita household expenditure in the rainy and dry seasons. The poverty lines are N4053.91 and N3611.56 per month in the rainy and dry seasons respectively. The poverty situation among the respondents is presented in Table 3. Based on the analysis, 33.3% of respondents live below the poverty line (poor) in the rainy season while in the dry season, it increased to 40.7%. This shows that during the dry season, the farmers tend to be poorer. This may be due to the fact that agricultural production in the study area is rain-fed. This concurs with the findings of Adeyonu *et al* (2012) who reported that poverty indices were higher during dry season than rainy season among rural farming households in Oyo state.

Also implicit in this finding is that as year of education increases, poverty reduces in both seasons. Although it reduces in both seasons as educational attainment advanced, that of rainy season reduces more than that of dry season. This again implies that years spent in acquiring formal education affects poverty. In similar vein, as farm size increases, poverty decreases. This is an implication that farmers with small scale of production tend to be poorer when compared with their counterparts that cultivate large farm sizes.

Table 3: Poverty profile by year of education and farm size during the rainy and dry seasons

Characteristics	Statistics	Rainy season			Dry season		
Variable		P0	P1	P2	P0	P1	P2
All		0.3333	0.0168	0.0001	0.4067	0.06021	0.0094
Years of formal	0-5	0.7218	0.0314	0.0023	0.6090	0.0290	0.0025
education	6-11	0.2000	0.0082	0.0008	0.1333	0.0072	0.0007
	12-17	0.1111	0.0062	0.0005	0.0667	0.0011	0.0000
	> 18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Farm size	<2	0.5455	0.0155	0.0017	0.5455	0.0097	0.0009
	2-4	0.5324	0.0172	0.0008	0.4156	0.0172	0.0008

Characteristics Variable	Statistics	Rainy season P0	P1	P2	Dry season P0	P1	P2
	>4	0.2258	0.0345	0.0028	0.1774	0.0570	0.0079

Source: Data Analysis, 2014

Determinants of poverty in the study area

Table 4 shows the factors associated with households' poverty level in the two seasons. The factors are the same in both seasons which include farm size, access to loan facilities, household size and years of education. Farm size, years of education and access to loan facilities negatively influenced poverty level of the respondents while only household size positively affected poverty status of the repondents in the study area. The magnitude was higher during raining season when compared to dry season. This is in agreement with findings by Balogun (2011) who revealed that negative association exists between farm size, years of education and access to loan facilities among rural households in southwestern, Nigeria.

Table 4 further shows that household size is positively and significantly related to poverty. The result reveals that a unit increase in household size increases the probability of being poor by 3.5% and 0.32% during rainy and dry seasons respectively. This is attributable to the fact that with increase in household size, the per capita expenditure is reduced which then leads to reduction in welfare level. This result supports literature that large household is associated with poverty (Gang *et al,* 2004*;* Anyanwu*,* 2005*;* Omonona *et al,* 2008 *and* Balogun, 2011). It was also found that education is significantly correlated to poverty during dry and rainy seasons. This is so because the highly educated ones are better able to adopt new improved agricultural technologies to raise productivity and income than the uneducated ones. Also, education helps in controlling the rate of child birth and prevent under age marriage; hence reducing the child dependency ratio in such educated farming households The result is in consonance with Palmer-Jones and Sen (2003), although contrary to the findings of Sadeghi *et al*. (2001) and Anyanwu (2005) that higher levels of education were not seriously needed in rural areas where a few well educated people live.

The result also shows that farm size matters in determining poverty among farming households during both seasons. This implies that an increase in the farm size of the household head decreases probability of farming household's going into poverty by 9.5% and 4.14% during rainy and dry seasons respectively. The implication is that poverty decreases as production scale increases which invariably will increase output and enhance income of the farmers. The lower value obtained during the dry season compared with rainy season could be a testimony to the fact that agricultural production in southwest Nigeria is rain-fed.

Table 4: Determinants of Poverty Level During the Rainy and Dry Seasons

Variables	Rainy season Marginal effects	Standard error	Z	Dry season Marginal effects	Standard error	Z
Age	0.00237	0.00222	1.07	0.00022	0.00127	0.17
Gender	0 .02944	0.01795	1.64	0.01727	0.02762	0.63
Years of education	-0.03511	0.00567	-6.20***	-0.01789	0.00325	-5.51***
Household size	0.14975	0.01701	8.81***	0.06454	0.00974	6.62***
Loan	-8.28e-06	0.00000	-2.08**	-4.40e-06	0.00000	-1.92*
Market distance	0 .00658	0.01099	0.60	0.00959	0.00630	1.52
Water distance	0.02944	0.01795	1.64	0.01345	0.01026	1.31
Hired labour	-0.00002	0.00004	-0.71	-0.00002	0.00002	-1.05
Farm size	-0.09576	0.02835	-3.38***	-0.04143	0.01625	-2.55**
Constant	-0.70389	0.08974	-7.84***	-0.48033	0.05077	-9.46***
R^2	0.5890			0.6059		

Note: Marginal effects (rather than coefficients) are shown in the table. The marginal effect is computed at the mean of regressors, for dummy variables it is given for a discrete change from 0 to 1. The dependent variable is the poverty gap. *** Significant at 1%, ** at 5% and * at 10%

Source: Data analysis, 2014

CONCLUSION

The findings of this study indicated that high level of education and large farm size as well as access to loan helps to raise the farmers' income thereby increasing their probability of escaping poverty. These support the fact that improvement in education and farm size with loan accessibility can contribute to raising the income of farming households and alleviate poverty in the study area. The policy implication is that farmers' income can be greatly increased through education, access to loan and direct increment of cultivated farm lands. Intensification of efforts on adult education programme most especially in the rural areas and provision of credit facilities for farm land expansion will go a long way in ameliorating poverty among farming households in the rural area. Also, awareness campaign about the benefits of small family size among the rural folks will contribute immensely to reducing poverty rate.

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Measurement of allocative efficiency in Acha (*Digitaria exilis*) production among small-scale farmers in Kaduna state, Nigeria

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Abstract: The study examined the allocative efficiency of Acha production in Kaduna State, Nigeria, using 200 randomly selected Acha farmers through the use of structured questionnaire. Data were analyzed using descriptive statistics and the translog cost function of the stochastic frontier model. Results showed that most farmers were at their active ages (average of 40 years), 75% were literate with an average farming experience of 13 years. All inputs costs were positively related to total cost of production and were significant ($p<0.05$). Farmers were not operating at full cost efficiency level, as the mean cost efficiency was 0.89. This inefficiency was influenced by production experience, formal education, extension contact, credit access and co-operative membership. More opportunities exist for improvement of allocative efficiency by the Acha farmers.

Keywords: Efficiency, stochastic, small-scale, Acha farmers, Nigeria

INTRODUCTION

Acha *(Digitaria exilis),* is also known with other names such as fonio, iburu, findi, fundi, pom and kabug in different West African countries and has been reported to be the oldest West African cereal (Cruz, 2004). It is a cereal which grows well in Nigeria and is a staple food in some parts of Nigeria and across fifteen North West African countries. It is indigenous to the savannah regions of West Africa and grows so fast that it can be cultivated two to three times in a year since it matures within 120 days (Dachi and Gana, 2008; Abdullahi and Luka, 2003). It grows well in Nigeria, mostly cultivated around Plateau, Bauchi, Kaduna and Niger states. Nutritional experts have acknowledged it as exceptional, as it has relatively low free sugar and low glycemic content which makes it adequate as a suggested diet for diabetic patients (Cruz, 2004; Balde *et al.,* 2008; Jideani and Jideani, 2011). *In-vitro* starch digestibility and glycemic property of acha, iburu and maize porridge have also been reported by Jideani and Podgorski (2009).

The focus on Acha for this study is derived from the fact that its consumption is on the increase due to the increasing awareness of its nutritional value (Jideani and Jideani, 2011). Despite the crop's ancient heritage and widespread importance, knowledge about its production remains very scanty even within West Africa itself. The crop has received but a fraction of the attention accorded to maize, sorghum and pearl millet, and a mere trifle considering its importance in the economy and its potential for increasing food supply. Although its production has been described to be low ranging from 600-700kg/ha (Cruz, 2004; CIRAD, 2011) in West Africa, its contribution in reducing hunger should not be neglected. There have been many studies which determined the relative efficiency of farmers, such as Ohajianya *et al*. (2010), Onyenweaku and Okoye (2007), Ike and Inoni (2004), Rahman (2002), Wadud and White (2000) and Tzonvelekas *et al.* (2001), the only few that analyzed allocative efficiency focused on other crops other than acha. Even the few studies on Acha production have shown an increasing importance of the crop amidst growing utilization as food. A review by Jideani (2012) shows the need for more scientific investigation on acha, iburu and tamba cereal grains.

The central argument in this paper is that smallholder agricultural productivity in Nigeria can be re-capacitated through the efficient allocation of resources. Hence, the study aims at identifying the farmers' socioeconomic characteristics, estimating their allocative efficiency and its determinants using the stochastic frontier translog approach. The significance of this study is that it will provide information that can contribute to the policy debate on cost effective ways of raising smallholder productivity.

METHODOLOGY

Study area: The study was conducted in Kaduna State, Nigeria (between latitude 09^0 02' and 11^0 32'N of the equator, 06^0 15'and 80^0 50'E of prime meridian).

Sampling: Multi-stage sampling technique was used to select Acha farmers across three Local Government Areas (Jaba, Kachia and Kagarko) which were purposively selected on the basis of being the prominent Acha producing areas of the State. Simple random sampling was then employed in selecting 200 Acha farmers for data collection.

Data Collection: The information collected include socioeconomic characteristics of farmers

(age, farm size, educational background, output, experience and household size of the farmer), the major components of costs of inputs (land area under cultivation (ha), labour in man-days, cost of fertilizer, cost of seeds, cost of agrochemicals and cost of farm implements employed in production) and total value of output (sum of cash receipt from selling farm products including that consumed in the household). Information on the questionnaire covered 2012 farming season while interviews were conducted by trained enumerators.

Analytical Tools: Descriptive statistics (mean, frequency, percentage and standard deviation) and inferential statistics (the empirical stochastic frontier production model specified in a translog cost function) were used to analyse the data.

Theoretical Framework and Model Specification

Frontier efficiency model has been used extensively in measuring the level of efficiency in farms. Considering the works of Battese and Coelli (1995), the stochastic frontier translog cost functions as used by some authors (such as Kibaara, 2005) were employed in the analysis for this study. The stochastic frontier production function can be written as:

$$Y_i = f(X_i\beta)e^{(v_i-\mu_i)}$$
$$i = 1, 2, 3, ..., N \quad \text{..... (1)}$$

Where Y = output of the i^{th} farm, X_i = vector of inputs, β = vector of parameters, v_i = random error term, and u_i = inefficiency term. The term v_i is the symmetric component which accounts for random variation in output due to factors outside the farmer's control such as measurement errors, weather condition, drought, strikes, luck, etc. It is assumed to be independently and identically distributed normal random variables with constant variance, independent of μ_i. On the other hand, μ_i is assumed to be non-negative exponential or half-normal truncated (at zero) $N \sim (\mu_i, \sigma^2)$ random variable associated with farm-specific factors, which leads to the i^{th} firm not attaining maximum efficiency of production; μ_i is associated with technical inefficiency of the farmer (Coelli *et al*., 1998; Battese and Rao, 2002). N represents the number of farms involved in the cross sectional survey. Technical efficiency (TE) of an individual farm is defined in terms of the ratio of the observed output to the corresponding frontier output, conditioned on the level of inputs used by the farm. Technical inefficiency (TI) is therefore defined as the amount by which the level of production for the firm is less than the frontier output.

$$TE = \frac{Y_i}{Y_i^*} = \frac{f(X_i\beta)e^{(v_i-\mu_i)}}{f(X_i\beta)e^{v_i}} = e^{-\mu} \quad \text{..... (2)}$$
$$TI = 1 - TE$$

Where, $0 \le TE \le 1$ with 1 defining a technically efficient farm, Y_i is the observed output and Y_i^* the frontier output. Technically efficient farms are those that operate on the production frontier and the level by which a farm lies below its production frontier is regarded as the measure of technical inefficiency; if μ_i equals zero, then TE equals one and production is said to be technically efficient. Technical efficiency of the i^{th} farm is therefore a relative measure of its output as a proportion of the corresponding frontier output. A farm is technically efficient if its output level is on the frontier, which implies that Y_i / Y_i^* equals one in value.

Several studies specified a Cobb-Douglas production function to represent the frontier function. The Cobb-Douglas function however, restricts the production elasticities to be constant and the elasticities of input substitution to unity (Wilson, *et al*., 1998). Also, there are times when the marginal effect of a variable depends on another variable, hence the need to choose functional forms that include interaction terms (Asteriou and Hall, 2011). The translog cost model is specified as

$$\ln Y_t = \alpha_0 + \sum \alpha_k \ln X_{ki} + \frac{1}{2}\sum\sum \alpha_{kj} \ln X_{ki} \ln X_{ji} + (v_t - \mu_t)$$
…….. (3)

where, ln denotes natural logarithms, y and x variables are defined in Table 1, α's are parameters to be estimated. The inefficiency model is estimated from the equation given below.

$$\mu_t = \delta_0 + \sum \delta_m \psi_i \quad \text{……..…….. (4)}$$

The variables ψ_i are the inefficiency variables.

This study therefore employed the stochastic frontier cost function using the translog functional form which is given by:

$$\ln C_t = \beta_0 + \sum \beta_k \ln P_{ki} + \frac{1}{2}\sum\sum \beta_{kj} \ln P_{ki} \ln P_{ji} + (v_i + \mu_i)$$
……..(5)

Where C_i represents the total input cost of the i^{th} farms; f is a suitable function such as the Cobb-Douglas function; P_i represents cost of inputs employed by the i^{th} farm in food crop production measured in naira; β is the parameter to be estimated,

v_i and μ_i are the random errors and assumed to be independent and identically distributed truncations (at zero) of the $N \sim (\mu_i, \sigma^2)$ distribution as earlier defined. These were obtained using the computer programme, frontier version 4.1 (Coelli, 1996). The *a priori* expectation is that the estimated coefficients of the function provide some explanation for the relative efficiency levels among individual farms. The allocative efficiency of individual farmers is thus defined in terms of the ratio of the predicted minimum cost (C_i^*) to observed cost (C_i) ranging between 0 and 1.That is:

$$AE_i = \frac{C_i^*}{C_i} \quad \text{..... (6)}$$

$$= \frac{F(X_i\delta)e^{(v_i+\mu_i)}}{F(X_i\delta)e^{v_i}} = e^{\mu} \quad \text{..... (7)}$$

Therefore, the parameters, variables and the interactions that were included in the production function model are shown below:

$$In\ C = In\ \beta_0 + \beta_1 In\ P_1 + \beta_2 In\ P_2 + \beta_3 In\ P_3 + \beta_4 In\ P_4 + \beta_5 In\ (P_1)^2 + \beta_6\ (P_2)^2 + \beta_7\ In\ (P_3)^2 + \beta_8\ In\ (P_4)^2 + \beta_9\ In\ (P_1 * P_2) + \beta_{10}\ In\ (P_1 * P_3) + \beta_{11}\ In\ (P_1 * P_4) + \beta_{12}\ In\ (P_2 * P_3) + \beta_{13}\ In\ (P_2 * P_4) + \beta_{14}\ In\ (P_3 * P_4) + (V+U) \quad \text{..... (8)}$$

Where,

ln = natural logarithm to base e

C_i = total cost of Acha production (N)

X_1 = cost of labour used in crop production (N)

X_2 = cost of seeds (N)

X_3 = cost of fertilizer (N)

X_4 = cost of agrochemicals (N)

β_0 = intercept

β_{1-14} are the coefficients of the variables and their interactions

v_i = assumed independently distributed random error or random stocks which are outside the farmer's control

u_i = technical inefficiency effects which captures deviation from the frontier.

The inefficiency model is estimated from the equation:

$$\mu_t = \delta_0 + \sum \delta_m Z_i \quad \text{..... (9)}$$

$$u_i = \delta_0 + \delta_1 Z_{1i} + \delta_2 Z_{2i} + \delta_3 Z_{3i} + \delta_4 Z_{4i} + \delta_5 Z_{5i} + \delta_6 Z_{6i} + \delta_7 Z_{7i} + W \quad \text{..... (10)}$$

The variables Z_i are the inefficiency variables considered to be:

Z_1 = production experience (number of years)

Z_2 = years of formal education (number of years)

Z_3 = membership of association (dummy: 1if a member, 0 if not a member)

Z_4 = access to credit (dummy: 1if accessed, 0 if no access)

Z_5 = extension contact (number)

Z_6 = household size (number of persons)

Z_7 = off-farm income (N)

RESULTS AND DISCUSSION

Socioeconomic characteristics of Acha farmers

The socioeconomic characteristics of the respondents are presented in table 1. The study revealed that majority (68%) of the respondents were men. Most of the respondents (55%) were above 35 years, with a mean age of 40.3 years. This implies that majority of the farmers were youths; an economic active age that can make positive contribution to agricultural production. Most respondents (64.5%) had major occupation as farming, implying that Acha production is just another form of diversification in farming. This contributed widely to the use of family labour by the households as the wives and children constituted the labour force. The literacy level among the farmers in the study area was average, as majority (75%) had at least one form of formal education or the other. Ohajianya *et al.* (2010) also observed that formal education has a positive and significant influence on maize farmers' allocative efficiency. Almost half (42%) of the respondents had up to 20 years farming experience with an average of 13 years. Just as the saying 'experience is the best teacher'; this shows that the managerial ability of the farmers can be inferred to be reasonably good. The study also revealed an average land size of 0.9ha which were mostly acquired through inheritance. The household size of respondents ranged between 1 and 15 with an average of 8 members. A large household size also means more mouth to feed, such that for a given farm size large households could produce a smaller market surplus (Minot *et al.*, 2006). However, in traditional agriculture, the larger the household size the more labour force is available for farm activities.

Table 1: Descriptive statistics of respondents' socioeconomic characteristics

Variables	Frequency	Percentage	Mean
Sex			
Male	146	68.00	
Female	64	32.00	
Total	200	100	
Age			
35 and below	90	45.00	
36 and above	110	55.00	40.3
Total	200	100	
Household size			
1-5	22	11.00	
6-10	118	59.00	

Variables	Frequency	Percentage	Mean
11-15	60	30.00	8.0
Total	200	100	
Level of education			
Tertiary	29	14.50	
Secondary	56	28.00	
Primary	64	32.00	
No formal education	51	25.50	
Total	200	100	
Production experience			
20 and below	116	58.00	
21 and above	84	42.00	13
Total	200	100	
Farm size(ha)			
≤1	138	69.00	
>1	62	31.00	0.9
Total	200	100	
Major occupation			
Farming	129	64.50	
Otherwise	71	35.50	
Total	200	100	
Membership			
of	57	28.50	
Association	143	71.50	
Yes	200	100	
No			
Total			

Cost Function Analysis

The estimates of stochastic frontier cost function of Acha farmers in the study area are shown in table 3. The variance ratio (γ = 0.973) and total variance (δ^2 = 0.134) are statistically significant at 1% level. The total variance estimates goodness of fit and the correctness of the specified distributional assumption of the composite error term. The variance error of 0.981 implies that 98% of disturbance in the system is due to inefficiency, one-sided. All the variables included in the model at the first order level had direct (positive) relationship with the total cost of production. This shows that the farmers operate in stage one of the classical production function and thus increased labour demand, procurement of Acha seeds, fertilizer and agrochemicals should be encouraged since the factors are under-utilized.

Table 3: Estimates of the Stochastic Frontier Cost Model for Acha Farmers

Variable	Parameter	Coefficient	Std Error
Cost Model			
Constant	A	0.144	0.112**
Lnseedcost	X_1	0.226	0.014**
Lnlabourcost	X_2	0.679	0.012**
Lnfertilizercost	X_3	0.033	0.002**
Lnagrochemcost	X_4	0.009	0.002**
$(lnseedcost)^2$	X_1^2	0.031	0.001**
$(lnlabourcost)^2$	X_2^2	0.016	0.001**
$(lnfertilizercost)^2$	X_3^2	0.004	0.0001**
$(lnagrochemcost)^2$	X_4^2	0.001	0.0001**
*lnlabcost*lnfertcost*	X_2X_1	0.008	0.002**
lnlabcost lnagrochemcost*	X_2X_3	0.011	0.010
lnlabcost lnseedcost*	X_2X_4	0.046	0.003**
lnfertcost lnagrochemcost*	X_3X_1	0.016	0.012
lnfertcost lnseedcost*	X_3X_4	0.021	0.011*
*lnagrochemcost*lnseedcost*	X_4X_1	0.063	0.026**
Diagnostic Statistics			
Sigma Square	σ^2	0.134	0.010**
Gamma	γ	0.981	0.103**
Log Likelihood Function	LLF	-69.92	

**P<0.05, **P<0.01*

This means that the total cost of Acha production increases by the value of each coefficient as the quantity of each variable is increased by one, *ceteris paribus*.

Seed cost (X_1):- This shows estimated coefficient of 0.226 which is statistically significant at 1%, showing direct effect on cost allocation. The positive relationship of seed cost and allocative

efficiency indicates that a unit increase in seed cost will result to an increase in total cost of production by 0.226. This is in line with the *a priori* expectation.

Labour cost (X_2) had a significant ($p<0.01$) positive (0.679) relationship to total cost of Acha production. The implication of this is that the total cost of producing Acha is increased as more labour is put into use. Similar result of positive relationship between labour and allocative efficiency was obtained by Ogundari *et al.* (2006) in their study on economies of scale and cost efficiency in small scale maize production in Nigeria.

Fertilizer cost (X_3):- This shows estimated coefficient of 0.033 and is statistically significant at 1%, showing direct effect on cost allocation. The positive relationship of fertilizer cost and total cost indicates that a unit increase in fertilizer cost will result to an increase in total cost of production by 0.033.

Cost of agrochemicals (X_4) shows estimated coefficient of 0.009 which is statistically significant at 1%, also showing direct effect on cost allocation. This positive relationship indicates that a unit increase in the cost of agrochemicals will result to an increase in total cost of production by 0.009.

The second order terms which show possible non-linear changes of the effects over time revealed that all the coefficients of the square term (own interactions) are statistically significant at different levels. The cross interactions also maintained strong statistical significance, except for X_2X_3 and X_3X_1 variables which were not. The own second derivatives and the cross second derivatives all showed direct (positive) relationships with total cost of production.

Determinants of Allocative Inefficiency

The inefficiency variables and their contribution to allocative inefficiency is as shown on table 4. Although only five (5) of the variables were significant, the coefficients of the variables are negatively signed, implying that total cost of production is increased by the magnitude (or coefficient) of each variable as the quantity of each variable is increased by a unit.

Production experience (Z_1) was negatively signed implying that cost inefficiency decreases with higher production experience. This means that experience affects allocative (cost) efficiency positively ($p<0.05$). This is in conformity with the assumption that farmers' allocative efficiency is affected by experience since different levels of experience affect ability to obtain and process information on input cost (Ogundari *et al.*, 2006 and Giroh *et al.,* 2011).

Formal education (Z_2) is inversely related to allocative inefficiency. This indicates that the higher the level of education of Acha farmers the lower the cost inefficiency vis-à-vis higher cost efficiency. That is, farmers with more years of schooling allocate their input cost more efficiently than their counterparts with lower years of schooling. This is in line with the expectation that educational level affects financial planning which invariably affects cost efficiency. Paudel and Matsuoka (2009) obtained a similar result in their study on cost efficiency estimates of maize production in Nepal using Chitwan district as a case study.

Table 4: Inefficiency Estimates of the Stochastic Frontier Cost Model

Variables	Parameters	Coefficients	Standard error
Constant	δ_0	-1.679	0.0001**
Production experience	δ_1	-0.211	0.102**
Formal education	δ_2	-0.446	0.182**
Association	δ_3	-0.231	0.135*
Access to credit	δ_4	-0.108	0.053**
Extension contact	δ_5	-0.175	0.084**
Household size	δ_6	-0.164	0.796
Off farm income	δ_7	-0.213	0.192

**P<0.10, **P<0.05*

Membership of association (Z_3):- The coefficient estimated had a negative sign and was significant at 5%, implying that membership of association directly relates with allocative efficiency. In other words, it means that those who have stayed longer in the association tend to allocate their cost of input more efficiently than those who have fewer years of membership vis-à-vis non members of

association. This could be so because information on price of inputs flows among members easily; and benefits such as credits are granted as a result of long membership in the association. This agrees with the notion that association serve as information link to farmers as a result of exchanging ideas and experiences among members (Olagunju, 2008).

Access to credit (Z_4):- The estimated coefficient of access to credit was negatively related to cost inefficiency and was significant at 5%; also implying that it positively affects cost efficiency.

Farmers who have access to credit are likely to be more cost efficient than those who do not. This is so because credit helps farmers to purchase the needed inputs on time.

Access to extension contact (Z_5):- the value of the estimated coefficient was negatively related with allocative inefficiency and statistically significant. Farmers with access to extension contact tend to be more cost efficient than their counterparts without extension contact. The result confirms the assertion that extension agents serve as educators and information bearers on new innovations to clientele, implying that farmers get information on input prices from extension agents.

Allocative Efficiency Distribution of Acha Farmers

The allocative efficiency distribution indices revealed that 89% of the sampled farmers allocate their cost efficiently at 50% and below. The allocative efficiency distribution of sampled farmers ranged from 43% to 98% with mean of 84%. The distribution seemed to be skewed to the right. This shows a wide distribution of allocative efficiency among the farmers in the area. However, none of the respondents had a 100% allocative efficiency index. Even with the mean of 0.84, about 52% of the farmers were frontier farmers since their efficiency scores were ≥80%; the average farmer needs a cost savings of about 19%, that is, [(1 – 0.84/0.98)*100] to attain the status of the most allocatively efficient farmer. This implies that resources could be allocated to their best alternative uses and prices could as well be allowed to perform their functions in the use of inputs.

Table 4: Estimates of allocative efficiencies of Acha farmers

Efficiency	Frequency	Percentage
0.40-0.49	1	0.50
0.50-0.59	2	1.00
0.60-0.69	30	15.00
0.70-0.79	61	30.50
0.80-0.89	84	42.00
0.90-0.99	22	11.00
Total	**200**	**100**
Minimum		**0.43**
Maximum		**0.98**
Mean		**0.84**

CONCLUSION AND RECOMMENDATION

It can be concluded from findings of the study that Acha farmers in Kaduna State were not operating at full allocative efficiency level. All the cost variables were significant to the total cost of production. However, the total cost of production has the highest response to labour cost, followed by seed cost, fertilizer cost and cost of agro-chemicals. Hence, opportunities exist for improvement of allocative efficiency. Not being a member of the association, credit inaccessibility and extension contact led to the misallocation of resources in Acha farming. Based on the findings, it is recommended that:

1. Credit services should be extended to Acha farmers to enable them purchase farm inputs, increase farm holding and hire labour for farming activities.
2. Extension services to the Acha farmers should be intensified so as to extend improved practices that will help reduce production costs and improve productivity.
3. The farmers should make use of benefits of membership of farmer associations by pulling their resources together to help themselves obtain inputs such as seeds, fertilizer and agrochemicals.

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Training needs of cassava farmers in Egbeda local government area of Oyo state, Nigeria

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Abstract: This study assessed the training needs of cassava farmers in Egbeda local government area of Oyo State, Nigeria. Simple random sampling technique was used to select one hundred and twenty (120) respondents from six communities in the study area. Data were collected using interview schedule and analysed using both descriptive and inferential statistics. The results revealed that, majority of the respondents (60.0%) belong to the age group of 31-50 years. Higher percentage of the respondents (71.7%) were married and (54.2%) of them had no formal education. Majority of the respondents (60.0%) had cassava farming as their primary occupation with many of them (58.3%) having a farm size of less than five hectares. Few (18.3%) of the farmers had access to extension agents and majority of them (46.7%) planted local variety of cassava. Area of training highly needed by the respondents includes choosing desirable variety (71.6%),industrial utilization of cassava chips (70.8%) and fertilizer application (64.2%).The major constraints limiting farmers access to training include lack of credit facilities (72.5%) among other variables. There is significant association between respondents age (χ^2=19.462, p<0.05), educational level (χ^2=13.132, p<0.05), farm size (χ^2=15.156, p<0.05) and training needs of the farmers. Also there is correlation between constraints (r=0.153, p<0.05) and training needs of the respondents among other variables. It is recommended that training programmes should be organised for farmers in the areas where they are deficient in knowledge and skills.
Keywords: Training, needs, cassava, farmers, local government.

INTRODUCTION

Cassava, *Manihot esculentus* is a dicotyledonous perennial plant belonging to the botanical family Eupharbiarceae. It is a starchy root crop that is grown almost entirely in the hotter lowland tropics. The crop is also known under a variety of names according to the region in which it is cultivated; cassava in the English speaking countries of North America, Europe and Africa, in French speaking countries as tapioca. The total amount of cyanogenie glycosides in cassava root is often used to place the numerous cassava cultivars into two major groups, the 'bitter' variety, in which the cyanogenie glycosides are distributed throughout the tuber and are at a 'high' level, and the 'sweet' varieties in which the glycosides are confirmed chiefly to the peel and are at a 'low' level (Ojeagbase, 2008).

In Nigeria and many parts of the world, cassava (*Manihot eceulenta*) plays a major role in the economy both as source of food and as industrial raw materials. In the Western and Eastern parts of Nigeria, cassava occupies an important position in the agricultural economy. The root accounts' for over 50 percent of carbohydrates intake when processed into various foods, (Adjebeny – Asem, 1990).Cassava must be adequately processed before it can be consumed as food. Raw cassava is known to contain Linamarin and lotanstralin, which when acted upon by linamarase (the enzyme released when cassava root cells are rupture), are converted to hydrocyanic acid (HCN).The HCN is converted into thiocyanate, a sulphur containing compound when it enters the blood stream, Thiocyanate is detoxified using body sulphur after which it is excreted in urine. Thicyanate is known to be poisonous to the body by using up the body sulphur during detoxification, thereby interfering with the thyroid glands uptake of iodine, resulting in goiter. The most common species of cassava tubers in Nigeria are known to have high cyanide concentration. Processing cassava into gari is known to reduce the cyanide content of cassava quite considerably. This is a reduction of 98.17 percent as compared with 69.85 percent reduction of boiled tuberous roots, (Anga, 2005).

Training can be described as a planned process to modify attitude, knowledge, or skill behaviour through learning experience to achieve effective performance in an activity or range of activities. Its purpose in the work situation is to develop the ability of the individual and to satisfy the current and future needs of the organisation. Certo (1997) posited training as "act of increasing the skills that will enable employees to better meet the organisations goals. He further stated that training can improve productivity by holding down a variety of costs and also, well-trained employees can deliver higher quality than poorly trained people. Training has the potential for making a major contribution towards improved agricultural management particularly in ways that would directly benefit the small scale farmers. Training is undertaken to enable the employee adjust to the changes taking place in the organisation, mainly those that require the acquisition of new skills and expertise. Farmers may not adapt to the level expected, and this can be as a result of inadequate training in cassava planting materials and processing technologies.

Needs represent an imbalance or lack of adjustment between the present situation or status quo and a new or change set of conditions assumed to be more desirable. The term "need" in essence, signifies the lack of something that if present would in his or another view furthers the welfare of an individual, family or community. In the same vein Gates (1984) defines needs as "an inclusive terms to brace drives, impulses, goals, sets, urges, motives, desires, carvings, wants, and wishes a need exists as a state of tension which leads a person towards activities which relieve tension. More specifically, needs may be described as the differences between what is and what ought to be and hence always imply a gap between these conditions. Halim and Ali (1997) refer to the gap as a problem which usually occurs when a difference exists between desired performance and actual performance.

Training needs thus identified knowledge and skill gap between what is and what ought to be in the execution of specific tasks towards the achievement of set goals and objectives. It can be considered a condition in which there is a difference between "what is and what should be" (FAO, 1991). Kogan (1993) defines training need as a condition in which there is a difference between job done to current ability of jobholder and job done excellently. This difference can be in terms of the knowledge, attitude or skills that trainees require to perform their jobs effectively. Patel (1980) differentiate between "training needs and developmental needs" as the total growth and effectiveness of the individual helping the individual to realize the potential that he or she seems capable of achieving and preparing the individual for handling future higher responsibilities. It is apparent that development needs are broader than training needs. But for practical purposes, training need includes developmental needs. Development takes a longer – term view and although still based on bahavioural changes or learning, adopt a far longer time scale. It encompasses such area as life – long learning, the learning organisation and organisational development. Development focuses on the longer-term needs of the employer and employee (Bratton and Gold, 1994).Patel (1980) also observed that the tendency for most organisation whenever a problem arises has been to say that there is training need. He posited this as being responsible for ill-conceived training needs and training programmes. He is of the opinion that, it is necessary to develop alternative solutions without rushing into hasty training programme. This assertion about the concept of training needs shed light to the need for understanding clearly, the training need of people in any programme of training. Therefore, the condition of cassava farmers will not only be influenced by decisions reached about their training needs, but also by the extensive physical and human resources that will have to be committed in helping them meet their training needs. The training needs of cassava farmers will depend among other things on the skills, knowledge and attitudes that are desirable for them. It also depends on how much their present condition differs from those of optimal conditions in meeting their needs. The study will assist policy makers on broad policy measures and interventions by developing training programmes that will increase the productivity of cassava farmers. The study will further examine which areas of the inefficient practices, cassava farmers need training with a view to finding sustainable solution to the planting methods and processing of cassava technologies in Egbeda Local Government Areas of Oyo State, Nigeria.

Objectives of the Study

The study examined the areas of training needed by cassava farmers in Egbeda Local Government Areas of Oyo State. Specifically the study attempted to:

1. describe the socioeconomic characteristics of the cassava farmers,
2. determine the training needs of cassava farmers in the study area,
3. identify the sources and types of cassava cultivars cultivated in the study area and
4. identify cassava farmer's production constraints.

Research Hypotheses:

$H_0$1: There is no significant relationship between some selected socioeconomic characteristics of the cassava farmers and their training needs.

$H_0$2: There is no significant relationship between constraints and training needs of farmers in the study area.

METHODOLOGY

The study was conducted in Egbeda Local Governments Area of Oyo State, Nigeria. This area lies in the South Eastern zone of the state. It is bounded in the north by Lagelu Local Government, in the south by Ona – Ara Local Government, in the east by Osun State and in the west by Ibadan North Local Government area. The target population of the study are farmers who specialize in the cultivation of cassava in 2013/2014 cropping season in Egbeda local government. It is made up of about one hundred and twenty (120) communities. A simple random sampling technique was used in selecting twelve communities and ten (10) registered farmers from each community making a total of 120 respondents used for the study. The dependent variable for this study was training needs of cassava farmers. This

was measured by listing the areas of training needs of cassava farmers on 3 point rating scale of highly needed which attracted a score of 2, fairly needed which attracted a score of 1, and not needed which attracted a score of 0. Also respondents constraints in cassava production was measured on a 3 point rating scale of severe= 2, partially severe=1, and not severe=0. The data collected were subjected to descriptive statistics such as frequencies counts, percentages and means while the inferential statistics used in testing the hypotheses of the study are Chi – Square (χ^2) and Pearson product moment correlation (PPMC).

RESULTS AND DISCUSSION

Socioeconomic characteristics of cassava farmers

Table 1 shows the socioeconomic characteristics of the respondents. The result show that, majority (60.0%) of the respondents belong to the age group of 31-50 years. The implication of this is that majority of the cassava farmers were in their middle age, and this is likely to influence their productivity. This result is in line with the finding of Ajayi, (2008), who found that majority of the cassava farmers were in their active age. Result also shows that higher percentages (71.7%) of the respondents were married, 75.8% were male, and 57.7% of them belong to the Islamic faith group. Majority (54.2%) of the respondents had no formal education, while a few, (21.7%) had both primary and secondary education. This finding agrees with the opinions of Erhabor and Emokaro (2007), that cassava production in Nigeria is cultivated by farmers who have low educational qualifications. Majority (60.9%) of the farmers had cassava farming as their primary occupation with quite a number of them (58.3%) having a farm size of less than five hectares. This implies that most of them are small scale farmers. This is in line with the findings of Oyeyinka et al (2011) that the small scale farmers constitute more than 70% of all farmingpopulation in Nigeria.

Table 1: Distribution of socioeconomic characteristics of cassava farmers, n=120

Characteristics	Frequency	Percentage
Age in years		
Less than 25	12	10.0
25-30	10	8.3
31-40	25	20.8
41-50	47	39.2
51-60	18	15.0
Above 60	08	6.7
Marital status		
Single	27	22.5
Married	86	71.7
Widowed	05	4.2
Separated	02	1.7
Sex		
Male	91	75.8
Female	29	24.2
Religion		
Christianity	48	40.0
Islam	62	57.7
Others	10	8.3
Educational level		
No formal education	65	54.2
Adult literacy	27	22.5
Primary education	20	16.7
Secondary education	06	5.0
Tertiary education	02	1.6
Primary occupation		
Cassava farming	72	60.0
Trading	14	11.7
Farming	27	22.5
Artisan	07	5.8
Farm size		
>5 hectares	70	58.3
5-10 hectares	28	23.3
11hac-15hectares	14	11.7
<15hectares	08	6.7

Source: Field survey, 2014

Respondents' sources and types of cassava cuttings cultivated.

The result in table 2 shows that majority (43.3%) of the respondents got their cassava cuttings from the middle men, 31.6% got theirs from the ministry of agriculture, 18.3% got theirs from the extension agents and 6.7% got theirs from other farmers and friends. This implies that the Oyo State Agricultural Inputs Supply Company (OSAISCO) which is supposed to enhance the supply of inputs such as fertilizers, desirable varieties of cassava to farmers has not been able to perform this role as expected. This is why the farmers have to depend mostly on the middlemen who normally charge exorbitantly on the inputs supplied. Results also show the breakdown of farmers by the types of cassava cutting they planted in 2013/2014 cropping season. Result shows that a larger proportion (46.7%) of the farmers planted local variety, followed by 26.7% of the farmers who planted recycled improved variety. A very low

proportion (5.0%) of the farmers planted improved cassava varieties. The implication of this finding is that improved cassava varieties are not widely spread in the study area. This is why majority of the farmers concentrated on the cultivation of local variety of cassava cultivars. Also this may be due to the skill and knowledge gap of the farmers thereby necessitating their training needs.

Table 2: Distribution of respondents by sources and types of cassava cutting cultivated

Sources of cassava cuttings	Frequency	Percentage
Extension agents	22	18.3
Friends/other farmers	08	6.7
Ministry of agriculture	38	31.6
Middle men	52	43.3
Type of cassava cuttings		
M98/00409	06	5.0
92B/00068	10	8.3
99/2123	05	4.2
Recycled improved variety	32	26.7
98/2132	0	0.0
M98/0068	07	5.8
97/4779	04	3.3
Local variety	56	46.7

Source: Field survey, 2014.

Respondents Training Needs

Tables 3 show the training needs of cassava farmers. This table reveals that, choosing of improved varieties (70.1%), multiplication of planting materials (68.4%), and industrial utilization of cassava (65.9%), fertilizers application (64.2%), spraying of insecticides (60.0%) and modern processing technique (70.8%) were areas which respondents highly needed training. The quest for training in these areas by the farmers might be as a result of the recent high demand for cassava products in Nigeria for export and the policy of the government on the value chain addition of cassava by flour mills and pharmaceutical companies. Farmers' acquisition of training in these areas will increase their income as asserted by Ajayi (2008).

Table 3: Respondents training needs in cassava production and processing

Training needed	Highly needed	Fairly needed	Not needed	Mean Score
Preparation of cuttings	70 (58.4)	22 (18.3)	28 (23.3)	2.3
Choosing desirable varieties	85 (70.1)	25 (20.8)	10 (8.3)	2.7
Planting of cuttings	65 (54.1)	38 (31.7)	17 (14.2)	2.6
Multiplication of planting material	82 (68.4)	10 (8.3)	28 (23.3)	2.3
Intercropping	16 (13.3)	20 (16.7)	74 (61.8)	0.9
Fertilizer application	77 (64.2)	30 (25.0)	13 (10.8)	2.7
Land weeding	20 (16.7)	18 (15.0)	82 (68.3)	0.9
Spraying of insecticides	72 (60.0)	20 (16.7)	28 (23.3)	2.3
Storage of cassava tubers	20 (16.7)	15 (12.5)	85 (70.8)	0.8
Link to buying agents and market	64 (53.3)	36 (30.0)	20 (16.7)	2.5
Traditional processing	20 (16.7)	23 (19.2)	77 (64.1)	1.1
Modern processing	85 (70.8)	17 (14.2)	18 (15.0)	2.6
Industrial utilization of cassava	86 (71.6)	20 (16.7)	14 (11.7)	2.6
Making quality hour	20 (16.7)	25 (20.8)	75 (62.5)	1.1
Selection of varieties suitable for produce processing	31 (25.8)	56 (46.7)	33 (27.5)	2.2
Procedure for credit acquisition	65 (54.2)	45 (37.5)	10 (8.3)	2.8
Equipment purchasing process packaging	79 (65.9)	31 (25.8)	10 (8.3)	2.8

Source: Field survey, 2014
Figures in brackets represent percentages.

Respondents' constraints on cassava production

The results in table 4 shows that the areas in which the respondents realized substantial constraints on cassava production were, inadequate credit facilities (X=2.8), lack of training (X=2.6), inadequate skill on cassava production (X=2.5), lack of extension contact (X=2.6), and lack of improved varieties (X=2.9) among other ones. This result is in agreement with the finding of Nweke et al (2002), who posited that training needs of farmers on cassava production indicated that respondents were fully

aware of the areas of cassava production and processing where training needs is inevitable.

Tables 4: Respondents constraints in cassava production

Constraints	Not severe	Partially severe	Severe	Mean Scores
Lack of improved variety	20 (16.7)	29 (24.1)	71 (59.2)	2.9
Unavailability of planting material	44 (36.7)	34 (28.3)	42 (35.0)	1.9
Inadequate post-harvest handing	36 (30.0)	22 (20.0)	60 (50.0)	2.1
Lack of extension contact	16 (13.3)	42 (35.0)	62 (51.7)	2.6
Lack of training	15 (12.5)	20 (16.7)	85 (70.8)	2.6
Inadequate skill on production	21 (17.5)	29 (24.2)	70 (58.3)	2.5
Inadequate skill on utilization	38 (31.7)	32 (26.7)	50 (41.6)	2.0
Pests and diseases effect	46 (38.4)	10 (8.3)	64 (53.3)	1.8
Inadequate credit facilities	10 (8.3)	23 (19.2)	87 (72.5)	2.8
Marketing problem	30 (25.0)	24 (20.0)	66 (55.0)	6.0

Source: Field survey 2014
Figures in brackets represent percentages.

Relationship between respondents' socioeconomic characteristic and training needs:

Tables 5 show the results of chi-square analysis of the relationship between selected socioeconomic characteristics and cassava farmers training needs. The table revealed that age of the respondents has a significant relationship with training need (χ^2 =19.462, P< 0.05). The implication of this finding is that as cassava farmers get older more training is required in the areas of need identified so as to keep them abreast of the latest development and improvement on cassava cultivars. This finding is in line with the result of (Ogunleye et al 2012) and in contrast with the findings of Ajayi (2008) who posited that farmers being in their active age so tends to respond swiftly to training. Furthermore, there is a significant association between the respondents level of education (χ^2 = 13.132, P, <0.05), farm size (χ^2 = 15.156, P< 0.05) and their training needs. This findings corroborated the opinion of Ajayi, (2008), who posited that the farmer with less educational level are likely to have more quest for training needs, because farmers in this category would want to learn more in order to improve their production.

Tables 5: Relationship between respondents' socioeconomic characteristics and training need.

Variables	Chi-square value	Degree of freedom	P-value	Remark
Age	19.462	4	0.53	S
Marital status	8.347	3	0.71	NS
Sex	7.890	1	0.34	NS
Religion	7.164	2	0.31	NS
Educational level	13.132	4	0.45	S
Primary occupation	6.143	3	0.18	NS
Farm size	15.156	3	0.61	S

Source: Field survey, 2014

Correlation coefficient between constraints and training needs of cassava farmers.

The result of the Persons Product Moment Correlation analysis in table 6 indicated that there is significant relationship between constraints on lack of extension contact and training needs of cassava farmers (r=0.153, P<0.05). The implication of this finding is that the training needs of cassava farmers are significantly impeded by lack of extension contact. This might be the reason why the farmers do not have access to improved variety of cassava cuttings which could have boosted their production. Furthermore, there is significant relationship between inadequate credit facilities and training needs of cassava farmers (r=0.338, P< 0.05). This implies that majority of the cassava farmers do not have access to credit facilities which invariably affected their acquisition of necessary skills and knowledge to boost their cassava production and improve their processing techniques.

Table 6: correlation coefficient between constraint and training needs of farmers

Constraints	T-value	P-value	Decision
Lack of extension contact	0.153	0.006	S
Inadequate credit facilities	0.338	0.000	S

Source: Field survey, 2014

CONCLUSION AND RECOMMENDATIONS:

The study concluded that most of the respondents were male, with majority of them between 31-50 years of age. The study clearly showed that farmers are yearning for training in new areas of cassava production and processing technologies. However, some constraints like choosing desirable varieties and industrial utilization of cassava chips have been found militating against the training needs of cassava farmers. Based on the findings of the study, the following recommendations were suggested.

1. There is need for mass literacy campaign for the cassava farmers. Since majority of them had no formal education, this will enhance their understanding of the training needs on cassava production and processing technologies.
2. There is need for improvement on the extension farmers –ratio in the study area, since most of the farmers do not have access to extension agents. This will provide adequate information to farmers on new cassava production and processing technologies.
3. The government should provide loan and credit facilities to farmers in order to be able to purchase desirable varieties of cassava cultivars, fertilizers and processing equipment.

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Viewers' perception of *Oju-oja* agricultural marketing television programme of Ekiti State Broadcasting Service, Ekiti state, Nigeria

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Abstract: This study assessed viewers' perception of Oju-oja agricultural marketing television programme of Ekiti State Broadcasting Service, Ekiti state, Nigeria with the view to have feedback for quality programme content. Multistage procedure was used to select 204 respondents from selected local government area, wards and households. Data were collected on respondents' socioeconomic characteristics, viewing pattern and constraints faced by viewers. Data were analysed using frequencies, percentages, mean, chi-square and Pearson product moment correlation at p=0.05. Results show that 52.5% were within active age of between 31 and 50 years of age, had secondary education (53.4%) with sources of income ranging from marketing of agricultural produce like cocoa (25.5%), crop production (19.1%) and livestock production (15.7%). Majority of the respondents had access to (92.2%) and owned television sets (74.5%) with 27.9% watching the programme on a weekly basis and 51.5% had watched regularly in the last one year. Viewers were constrained by unfavourable schedule (46.5%), irregular power supply (43.1%), lack of feedback (37.7%) and non-richness of content (34.5%). There was an overall favourable perception of Oju Oja agricultural marketing on Ekiti State Television Station. Viewers' socioeconomic characteristics such as age ($\chi 2$ = 14.7), marital status ($\chi 2$ = 18.4) and source of income ($\chi 2$ =26.7) had significant relationship with the viewership of the programme. Level of constraints (r= -0469) was also significantly correlated with viewership of the programme. The favourable disposition of viewers should be leverage on by addressing the constrained elements of unfavourable schedule, lack of feedback and non-richness of the content.

Keywords: Viewership, Programme content, Television ownership, Oju-Oja

INTRODUCTION

Information is critical to the social and economic activities that are essential to the development process. Stanley (1990) was of the view that information is one of the basic human needs. Information is very crucial for everyday living to people all over the world and enables people to relate with one another. It plays an important role in almost every human activity (Meyer 2000). Adedoyin (1990) noted that a steady flow of accurate, understandable and factual information brings about scientific innovations with which the farmers' problems can be solved.

Radio and television are popular organs in disseminating agricultural information to rural farmers. Meanwhile, television overcome the shortcoming of radio as a medium as pointed out by the Food and Agricultural Organisation (FAO) (1999) that audience can-not see what is being described as major shortfall to adequacy of radio communication. Television offers sight and sound, and it makes dramatic and lifelike representations of people and products. In addition, television has in recent times overcome the barrier of its elusiveness to people. Regardless of income or educational level, average households in Nigeria and most developing nations now have access to television set. In spite of many advances in communication technology, television has been acclaimed to be one of the most important communication tools available till date Al-Namlah (1998).

Much of its success in teaching lies in the unique combination of sight, sound, and motion. This coupling of audio and visual stimuli has proven that it can change human behaviour and ultimately improves farmers' learning (Nazari and Hassan, 2011 and Okeh, 2002). While the amount of detailed information that can be transmitted by the television is unlimited, it also serves important and valuable function in stimulating public to new ideas. As television becomes an increasingly inseparable part of children's everyday life, researchers have established that television can equally serve more important purposes in adult life (Okeh, 2002).

Moreover, at the inauguration of Western Nigerian Television (WNTV) in Ibadan in 1959, Chief Obafemi Awolowo said "television was to serve as a teacher, entertainer and stimulus and will be relevant in the nation's transformation into a modern and prosperous entity (Aina, 1990). This is true if one considers the evolution television programming has undergone since its inauguration in 1959. While television and general broadcast media have long ceased to be the monopoly of government, its roles in the education and sensitization of many Nigerians in all fronts; political, social, education, health and general development purposes is enviable.

Oju-oja agricultural marketing television programme is an entertainment education outreach of

Ekiti Television (EKTV), a division of broadcasting service of Ekiti state. It is a Yoruba language interactive market place programme with focus on educating people of Ekiti and its environs on market activities and provision of information such as availability of commodities, the seasonal variability of food stuffs, the price comparison within and between market locations. Its entertainment bit includes tales telling, culture and value orientation, identification of prominent market figures and personalities. It is aired on a weekly basis, every Friday between 2.30 pm and 3.00pm on EKTV.

Meanwhile, according to Okeh (2002), agricultural marketing information can improve our communities by effective provision of relevant information. To facilitate learning and information assimilation, the instruction or information must be packaged in such a way that it will be easily acceptable and appealing to the conscious and subconscious minds of receivers (Schulz, Fischer and Frey, 2010). This formed the foundation of entertainment education which provide fun, pleasure and arouse interest in listeners or viewers as they also benefit from the important information packaged with entertainment programmes.

The *Oju-oja* television programme; a derivative of entertainment education is on continuous broadcast on EKTV that serves as an avenue for bringing up to date marketing information to communities in Ekiti state, and has been on air since 2010. Therefore, there is the need to feel the pulse of the targets of *Oju-oja* programme about their perception of this agricultural marketing television programme. This is against the backdrop of the fact that a television or media programme of any kind is as good as the quality of feedback it receives from viewers. It is in view of the above-mentioned that this study was designed to conduct the viewership analysis of *Oju-oja* agricultural marketing programme in Ekiti state communities. The study was broadly aimed at determining viewers' perception of *Oju-oja* agricultural marketing television programme in selected communities of Ekiti State. Specifically, the study determined the viewers' socioeconomic characteristics, viewing pattern and constraints faced by the viewers in accessing agricultural marketing information from the *Oju-oja* agricultural marketing television programme.

METHODOLOGY

The study was carried out in Ekiti state; one of the six south-western states of Nigeria. Multistage sampling procedure was used to select respondents in the study area. In the first stage, twenty-five percent of the Local Government Areas (LGAs) was randomly selected to have four LGAs. In the second stage, twenty-five percent of the wards within the selected Local Government Areas was randomly selected resulting in 12 wards. From house numbering and census of households in each ward, there was an average of 85 households. Ten percent of households in each ward were randomly selected in the third stage to give a total of 102 households. Finally, any two members of each household (one male and female each) were interviewed resulting in 204 respondents. Major variable (viewers' perception) was measured with a 10 item perception statements and operationalized on a 5-point Likert-type of Strongly Agreed, Agreed, Undecided, Disagree and Strongly Disagreed with scores of 5,4,3,2 and 1 respectively awarded for all positively worded statements and in the reverse order for all negative statements. Perception mean scores for each item on the scale were established to properly situate respondents' perception of each item on the scale as well as their overall disposition. Data were analysed using frequencies, percentages, mean, chi-square and Pearson Product Moment Correlation at p=0.05.

RESULTS AND DISCUSSION

Socioeconomic characteristics of respondents

Table 1 shows that 28.4% of the sampled respondents were between ages of 41 and 50 years, 24.0% were between 31 and 40 years while 21.6 % were between 51-60 years. The result implies that most of the respondents fell within the economically active age. Age factor is significant in agricultural information accessibility and utilization. Okwu, Kuku and Aba (2007) and Oladele (2005) posited that young people even among farmers are more responsive to new ideas and practices while older ones are conservative and less responsive to adoption of new ideas and practices.

Table 1 further shows that both male and female respondents were 50.0% each. This was as a result of purposive sample selection of both sexes in the methodology. This was to make an equal representation of the sexes. The distribution of respondents according to their religious affiliation reveals that 87.2 % were Christians, 11.3% were Muslims while 1.5% were traditional worshipers.

Table 1 also indicates that more than half (53.4%) of the respondents had secondary education, 43.6% had tertiary education while only 2.0% and 1.0% had primary education and religion education, respectively. This implies that most of the respondents were literate. Therefore, high literacy in Ekiti community was a positive parameter for information communication and development programme implementation. This is supported by Okwu, Kuku and Aba (2007) that individual's level

of education can affect his or her access, comprehension and adoption of modern agricultural practices. On marital status of the respondents, Table 1 further reveals that majority (76.0%) of the respondents were married while 21.0% were not with 50.0% of the respondents having between 4-6 members in their households and 41.7% had between 7-10 members. This suggests that majority of the respondents have fairly large family size.

Table 1 shows that 19.1 % were involved in crop production as their source of income, 25.5% of the respondents were into marketing of agricultural produce, 15.7% were into livestock production, 12.3% were involved in processing, 17.6% were civil servant, and 3.9% were involved in trading of non-agricultural produce while 5.9% were artisans. This implies that majority of the respondents were involved in one form of agricultural enterprises or the other.

Table 1: Socioeconomic characteristics of the respondents

Characteristic	Frequency	Percentage
Age		
10-22	14	6.9
21-30	26	12.7
31-40	49	24.0
41-50	58	28.4
51-60	44	21.6
61-70	13	6.4
Sex		
Male	102	50.0
Female	102	50.0
Religion		
Christianity	178	87.2
Islam	23	11.3
Traditional	3	1.5
Education		
Primary education	4	2.0
Secondary education	109	53.4
Tertiary education	89	43.6
Religion school	2	1.0
Marital status		
Single	43	21.0
Married	155	76.0
Divorced	2	1.0
Separated	4	2.0
Family size		
1-3	17	8.3
4-6	102	50.0
7-10	85	41.7
Main source of income		
Crop production	39	19.1
Livestock production	32	15.7
Processing	25	12.3
Marketing of agricultural produces	52	25.5
Civil service	36	17.6
Trading of non-agricultural produce	8	3.9
Artisans	12	5.9
Total	**204**	**100**

Source: Field survey; 2013

Viewing pattern of *Oju-oja* agricultural marketing television programme

Access to and ownership of television set

Available data in Table 2 shows that majority of the respondents (92.2%) had access to television set while 7.8% did not have access to television. Also, 74.5% of the respondents owned television set while 25.5% did not own television set. Most of those who owned television set were head of households (husbands) and in some cases there were joint ownerships of television set especially between husband and wife.

Frequency of watching *Oju-oja* agricultural marketing television programme

Table 2 further indicates that 27.0% of the respondents did not watch the programme at all, 20.1% viewed once in a month while 25.0% watched twice in a month. About one-third (27.9%) viewed the programme frequently on a weekly basis. This implies that while only about one third of the respondents watched on regular basis as scheduled, quite a large proportion watched sparingly on a monthly and bi-monthly basis. This suggests in the overall that the *Oju-Oja* agricultural marketing programme does not command required viewing intensity. This might be due to several reasons including broadcast hour or the media saturation as reported by Olajide (2011). This is specially so as unfavourable schedule was implicated as one of the constraints affecting viewership even in this study.

Respondents' viewing companions

Table 2 further reveals that 32.8% of the respondents indicated that they viewed the programme alone while a reasonable proportion (32.4%) indicated that they viewed with 1 to 3 people and 25.0% of the respondents indicated that they viewed with 4 to 6people. With this result, it can be deduced that what the programme lacked in

frequency of viewing was compensated for in number of viewing companions. This could ameliorate for whatever the programme lacked in frequency of viewing among sampled respondents. Further investigation into the viewership of Oju-Oja programme reveals that more than half (51.5%) of the respondents and 25.0% had viewed the programme for between 24-36 months and more than 12 months, respectively. This means that most respondents have watched the programme for at least one year and at most for more than two to three years. This confers on the majority of the respondents the ability to evaluate the relevance of the programme for what it was designed to achieve.

Discussion of *Oju-oja* programme by viewers with other people.

Table 2 also indicates that 33.8% never discussed issues raised in the programme with anyone while 32.4% and 25.0% indicated that they frequently discussed the programme with between 1 to 3 and 4 to 6 persons, respectively. If peradventure most of the people that viewers discussed this programme with are not from among those who were their viewing companions, it can be assumed that this avenue provides platform for further sensitization of the programme and what it represents. However, if majority of those viewers discuss the programme with are from the viewing companion, it also provides opportunity for message reinforcement and by extension further understanding of the content of the programme.

Table 2: Distribution of respondents based on viewership parameters

Viewership parameters	Category	Frequency	Percentage
Do you have access to television set?	No	16	7.8
	Yes	188	92.2
	Total	**204**	**100**
Do you own a television set?	No	52	25.5
	Yes	152	74.5
	Total	**204**	**100**
How frequently do you watch *Oju-oja* programme	I don't watch at all	55	27.0
	Once in a month	41	20.1
	Twice in a month	51	25.0
	Weekly	57	27.9
	Total	**204**	**100**
With how many people do you normally watch the programme	None	67	32.8
	One-three people	66	32.4
	Four – six people	51	25.0
	Seven – nine people	16	7.8
	Ten and above	4	2.0
	Total	**204**	**100**
How many people do you regularly discuss *Oju-oja* programme with?	None	69	33.8
	One-three people	61	29.9
	Four – six people	52	25.5
	Seven – nine people	8	3.9
	Ten and above	14	6.9
	Total	**204**	**100**

Source: Field survey; 2013

Constraints to viewing *Oju-oja* programme

Data presented in Table 3 indicates a mixed-bag of prospects and constraints faced by viewers in their quest for informative and entertaining television programme. Whereas lack of access to television was not perceived as a constraint by 64.7%, more

importantly, language of broadcast and richness of the programme content were also considered as no constraints by 92.9% and 40.2% of the respondents, respectively. Also, more than one third of the respondents (36.6%) felt feedback was not a constraint. Contrastingly, however, unfavourable schedule, irregular power supply, lack of feedback and non-richness of content were considered as severe constraints by 46.5%, 43.1%, 37.7% and 34.5%, respectively. The unfavourable schedule being a constraint further reinforces the not too frequent viewership of the programme as earlier reported in this study.

Table 3: Distribution of respondents by constraints to viewership of OjuOja agricultural marketing television programme

Constraints	Not a constraint		Mild constraint		Severe constraint		Total	
Constraint items	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Lack access to Television	132	64.7	28	13.7	44	21.6	204	100
Irregular power supply	64	31.4	52	25.5	88	43.1	204	100
Lack of feedback from viewers	74	36.3	53	26.0	77	37.7	204	100
Language use for the presentation	188	92.2	10	4.9	6	2.9	204	100
Content not rich enough	82	40.2	51	25.0	71	34.8	204	100
Unfavorable schedule	44	21.6	65	31.9	95	46.5	204	100

Source: Field survey; 2013

Respondents' perception of *Oju-Oja* agricultural marketing programme

Data on Table 4 suggests an overall favourable perception of *Oju Oja* agricultural marketing on Ekiti State Television Station. However, critical elements of what make good radio or television programme especially those that target development issues were not favourably perceived. With overall mean perception of 3.8, the programme fared well in provision of information on market locations ($\bar{x}$ = 4.7), coverage of wide range of agricultural commodities ($\bar{x}$ = 4.0), provision of adequate agricultural products marketing information ($\bar{x}$ = 3.9) and enhancement of viewers' bargaining power ($\bar{x}$ = 3.8). Be this as it may, the programme was not favourably perceived along appropriate broadcast hour ($\bar{x}$ = 3.0), existence of feedback mechanism ($\bar{x}$ = 3.7) and correlation of its prices with what obtains in the market ($\bar{x}$ = 2.8). The variable of appropriate broadcast hours stands tall in this respect considering the fact that even in this study, unfavourable schedule was perceived as a constraint. Studies (Yahaya, 1995; Olajide Raheem and Oyedele, 2014; Badiru and Adekoya, 2014; Ladele, Ladigbolu and Badiru, 2014) have established a strong correlation between broadcast hour, appropriate media content and schedule with frequent viewership or listenership of a media programme. Against the backdrop of the fact that this study was anchored on the importance of feedback to enhance quality programme packaging, low or non-existence of feedback calls for redress.

Table 4: Distribution of respondents based on perception of *Oju-Oja* agricultural programme

S/No	Perception statement	Mean
1	The broadcasting hour for the Oju-Oja programme is appropriate	3.0
2	Adequate agricultural products marketing information are not regularly disseminated through the programme	3.9
3	Programme contents cover a wide range of agricultural commodities	4.0
4	Messages disseminated through the Oju-Oja is very clear	3.8
5	Feedback mechanism is not incorporated in the Oju-oja programme	3.7

S/No	Perception statement	Mean
6	Pieces of information provided by the Oju-Oja have been quite useful in my price bargaining in marketing my agricultural products	3.8
7	Information from the Oju-Oja sometimes correlate with what obtains in the market	2.8
8	Over the years, the programme has helped considerably to boost the sale of my farm products	3.7
9	The viewership of Oju-Oja has reduce the taboos and social practices that are risk to food security	3.8
10	Oju-Oja promote quick location of where some produce can be found	4.7
	Overall Mean perception	**3.8**

Source: Field survey, 2013

Viewers' socioeconomic characteristics, constraints and viewership of *Oju Oja* agricultural marketing programme

Available data (Table 5) on viewers' socioeconomic characteristics, constraints and viewership of Oju Oja programme reveals that while age ($\chi 2 = 14.7$), marital status ($\chi 2 = 18.4$) and source of income ($\chi 2 = 26.7$) had significant relationship with the viewership of the programme. This implies that viewers' age, marital status and income to a large extent dictate respondents' viewership of *Ojo Oja* programme. The finding with respect to age is corroborated by Fawole and Olajide (2012) where the duo reported a significant correlation between farmers' age and use of information and communication technology. A critical assessment of the set of findings in this study especially with respect to age and income will seem like different level of sophistications come with different age and income level in the use of any technology. Whereas sophistication decreases with age, while it increases with level of income. As it applies to this findings, while younger respondents may not have hooked regularly to *Oju Oja* programme, respondents with higher income may have shut out the programme while they were hooked to cable television service. Furthermore, level of constraints (r= 0469) was significantly correlated with viewership of the programme. This implies that the higher the levels of constraints respondents have, the higher the likelihood not to watch the programme. This is reinforced by the fact that respondents were reportedly constrained by unfavourable schedule, irregular power supply, lack of feedback and non-richness of content.

Table 5: Analysis of viewers' socioeconomic characteristics, constraints and viewership of *Oju Oja* agricultural marketing programme

Variables	χ^2	r=value	df	p-value	Remark
Age	14.7		3	0.01	S
Sex	0.25		1	1.287	NS
Religion	0.22		2	0.90	NS
Educational qualification	0.16		3	0.69	NS
Marital status	18.4		3	0.00	S
Family size	1.0		2	0.579	NS
Main source of income	26.7		7	0.00	S
Constraints		0.469		0.00	S

Conclusion and recommendations

This study assessed viewers' perception of *Oju-Oja* agricultural marketing television programme of Ekiti State Broadcasting Service, Ekiti state, Nigeria with the view to have feedback for quality programme content. Most respondents were within active age, had secondary education and sources of income ranged from marketing of agricultural produce, crop production and livestock production. Respondents had access to and owned television sets, watched the programme on weekly basis and had watched regularly in the last one year. However, viewers were constrained by unfavourable schedule, irregular power supply, lack of feedback and non-richness of content. There was an overall favourable perception of *Oju-Oja* agricultural marketing on Ekiti State Television Station. Viewers' age, marital status and source of income were related with the viewership of the programme. Level of constraints was also significantly correlated with viewership of the programme. It s recommended that the station, programme director, anchor and the entire production crew should reschedule the programme to a more favourable period. The programme should also provide slots for addressing feedback and improve on the content of the programme.

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