AGRICULTURAL ECONOMICS AND EXTENSION RESEARCH STUDIES (AGEERS)



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ECONOMIC ANALYSIS OF RICE PRODUCTION IN BENDE LOCAL GOVERNMENT AREA OF ABIA STATE, NIGERIA

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ABSTRACT

The study examined the Economics of rice production in Bende Local Government Area of Abia State. The specific objectives of the study were to describe the socio-economic characteristics of the rice farmers, estimate the costs and return of rice farmers and to determine the factors influencing the output of rice farmers in the study area. Data for this study were obtained with the use of structured questionnaire administered to one hundred and twenty (120) randomly selected rice farmers. Data were analysed with the use of the descriptive statistics, Net Farm Income model and the Ordinary Least Squares regression model. The result showed that a net income of \$88,360.00 was obtained. The profitability index was 0.41, implying that for every naira invested; in rice production, 41 kobo was returned to the farmer. Thus rice production in the area was profitable. The result of the ordinary least squares regression model showed that farm size, labour input, quantity of seed, educational level and access to credit were the significant variables that influenced the output of rice farmers in the study area. It is recommended that government should create an enabling environment through the provision of subsidized inputs and credit facilities to boost the productivity of rice farmers in the study area.

Keywords: Profitability, Rice production, Net income, Rice farmers.

INTRODUCTION

Rice *(oriza sativa)* is an annual crop which belongs to the graminae family. It is the second most widely grown cereal crop and the staple food for more than half the world's population. According to Babafada (2003), Rice is the fourth major cereal crop in Nigeria after sorghum, millet and maize in terms of output and cultivated land area. It is a major staple and the most popular cereal crop of high nutritional value grown and consumed in all ecological zones of the country (Ohaka, et al., 2013; Ohajianya &Onyeweaku, 2003).

The demand for rice consumption in Nigeria has risen tremendously to about 10% per annum since the mid-1970s due to increase in population growth, increased income levels, rapid urbanization and changing consumer preferences (Food and Agriculture Organisation, FAO, 2001). The demand for rice has been increasing at a much faster rate in Nigeria than in other West African countries. For instance, during the 1960's Nigeria had the lowest per-capita annual consumption of rice in the West Africa sub-region with an annual average of 3kg. Since then, Nigeria per-capita consumption levels have grown significantly at 7.3% per annum, Okorowa and Ogundele, (2005) consequently, per-capita consumption during the 1980 increased to an average of 18kg and reached 22kg between 1995 and 1999. According to Riceweb (2001), the average Nigeria now consumes 24.8kg of rice per year, representing 9% of total caloric intake. As a result of the high consumption rate, domestic production has never been able to meet the demand thereby leading to considerable importation of milled rice to bridge the gap between domestic demand and supply.

Yuguda (2003) was of the view that before the advent of oil, Nigeria produced almost enough rice for local consumption; however, with the discovery of oil in the 1970's its production

declined. The cause of the decline was attributed to the civil war of 1967 to 1970 as well as the general neglect of agriculture upon the discovery of oil. The greatest impact of the "Oil boom" manifested more in the agricultural sector than in any other sector. While, Nigeria had attained some level of self-sufficiency in food production in the first decade of political independence, by 1980 and onward, the nation slid into the position of being the largest food importer in Africa. According to Watts and Basset (1986) agricultural export production had effectively collapsed by the mid1970s, food production stagnated, food import grew by 70% and real food output per capita over the period between 1970-1978 fell by 1.5%.

Successive Nigerian Governments established various programs such as the National Cereal Research Institute (NCRI), Federal Rice Research Station, the Presidential Initiative on Increased Rice Production, Processing and Export, the River Basin Development Authorities, the Operation Feed the Nation and other programs to boost the local production in the agricultural sector. However, despite these interventions by the Government, it is pertinent to note that the demand-supply gap for rice still persists. This could be due to the fact that most of these policies however, did not adequately address the problems associated with production in the areas of resource use efficiency, costs and return to rice enterprise (Rahman, 1994)

Recent rice production figures from 2004 put national rice production at 2.96 million tonnes of rice cultivated on an area of 1,595,840 hectares. This estimate established a yield of 1.82 metric tonnes per hectare and total milled rice of 1,480,168 tonnes, while total national demand of milled rice is estimated at 3.0 million tonnes per annum. There is therefore a deficit of 1,519,832 tonnes of milled rice (Fakayode et al., 2010).

It therefore becomes imperative to examine the economics of rice production to determine if it is a profitable enterprise to engage in. The specific objectives were to describe the socio economic characteristics of the rice farmers, estimate the costs and returns to rice production and to determine the factors influencing the output of rice production

MATERIALS AND METHODS

The study was conducted in Bende Local Government Area of Abia State. The Local Government Area is made up of seventeen communities with an estimated population of about 128,227 people and an area of 104km²(NPC, 2006). The people of Bende are predominantly farmers and local traders. The major crops cultivated are yam, rice, cassava, cocoyam and oil palm. Bende was purposively selected for this study because the area is noted for both low land and up land rice production.

The Multi-stage sampling technique was employed in selecting the sample size. In the first stage, six communities were purposively selected out of the seventeen communities in the Area. In the second stage, the registered rice farmers in the selected communities were identified with the assistance of extension agents from Abia Agricultural Development Program (ADP) and this formed the sample frame. Thirdly, from this sampling frame 20 rice farmers were randomly selected from each of the six communities thereby giving a sample size of one hundred and twenty (120) rice farmers

Primary data were collected with the use of structured questionnaire, while secondary sources of information were collected from journals, conference proceedings and relevant literature.

Data were analysed using the descriptive statistical tool, Farm budgeting technique and the Ordinary Least Squares Regression model. The descriptive statistical tools were used to analyze the socio-economic characteristics of the farmers, the Farm budgeting techniques such as Gross Margin and Net farm income (NFI) were used to estimate the costs and return of rice production while the Ordinary Least Squares Regression model was used to analyse the factors influencing the output of the rice farmers.

| he Gross Margin (GM) is expressed as: |
|--|
| GM = TR - TVC(1) |
| GM= Gross Margin |
| R=Total Revenue |
| VC=Total Variable Cost. |
| On the other hand, Net Farm Income (NFI) is expressed as: |
| IFI=Revenue – Total cost |
| IFI=TVP –(TVC+TFC)(3) |
| Vhere |
| IFI= Net Farm Income. |
| VP=Total value of production |
| The multiple regression model was implicitly expressed as; |
| $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e)$ (4) |
| Vhere; |
| V = Output of rice (kg) |
| $X_{1} = $ farm size (hectares) |
| $X_2 =$ labour input (man days) |
| $X_{3} =$ quantity of seeds planted (kg) |
| $X_{4} = $ quantity of fertilizer (kg) |
| K ₅ = educational attainment (years) |
| X_{6} = access to credit (1 = yes, 0 = no) |
| <i>L</i> ₇ = farming experience (years) |

e = error term

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents in the Area

Table 1 shows the distribution of the respondents according to their socio economic characteristics Table 1 Distribution of the respondents according to their socio economic characteristics

| Variable | Frequency | Percentage |
|--------------------------|-----------|------------|
| Gender | | - |
| Male | 79 | 65.83 |
| Female | 41 | 34.17 |
| Age | | |
| 20 - 30 | 19 | 15.83 |
| 31 - 40 | 33 | 27.50 |
| 41 - 50 | 45 | 37.50 |
| 51 and above | 23 | 19.17 |
| Mean | 41 | |
| Educational attainment (| years) | |
| 0 | 8 | 6.67 |
| 1 -6 | 56 | 46.66 |
| 7 – 12 | 39 | 32.50 |
| 13 and above | 17 | 14.17 |
| Mean | 7 | |
| Farming Experience | | |
| 1-5 | 22 | 18.33 |
| 6 - 10 | 35 | 29.17 |
| 11 - 15 | 46 | 38.33 |
| 16 and above | 17 | 14.17 |
| Mean | 9 | |

Source; Field Survey (2017)

According to Table 1, majority (79%) of the respondents were males and their mean age was 41 years, indicating that the respondents are at the active and productive stage of their life. The study also revealed that majority (46.6%) of the respondents in the area had attained primary

education, indicating that the respondents in the area are moderately educated. This is consistent with the findings of Orebiyi (2000) who opined that education is an investment in human capital which is able to raise the quality of skill of man, narrow his information gap and increase his allocative abilities thereby leading to more productive performance. The study further revealed that the mean farming experience was 9 years, implying that rice production is practically done by well experienced farmers.

| | Items | Total value N | Percentage to total cost |
|---|---------------------------------|--------------------------|--------------------------|
| Ā | Total value of production | 215,000 | |
| В | Variable costs | | |
| | Cost of labour (mandays) | 45,608.00 | 36.01% |
| | Cost of Fertilizer (bags) | 18,100.00 | 14.29% |
| | Cost of seeds (naira) | 8,200.00 | 6.48% |
| | Cost of agrochemicals (litres) | 4,320.00 | 3.41% |
| С | Total variable cost | 76,228.00 | 60.19% |
| D | Fixed costs | | |
| | Rent on land | 45,000.00 | 35.50% |
| | Depreciation on farm implements | 5,412.00 | 4.27% |
| Е | Total fixed cost | 50,412.00 | 39.81% |
| F | Total cost | 126,640.00 | 100.00% |
| G | Net farm income | 88,360.00 | |
| | Gross margin | 138,772.00 | |

Costs and Return of Palm Oil Marketers

Table 2: Costs and Return of Rice Production per hectare in the Study Area

Gross margin = \$138,772, Operating ratio (C/F) = 0.60 and Profitability Index (G/A) = 0.41 Source: Field Survey (2017)

The result of the cost and returns of rice production as presented in Table 2, revealed that the total revenue (sales) from rice production per hectare was \$215,000. It was also shown that the variable costs constituted the highest share of costs of production representing 60.19% while the fixed cost is39.81%. The average gross margin income of the respondents and their net farm incomes were \$138,772.00 and \$86,360.00 respectively, This corroborates with the study of Adewumi & Omotesho (2002) who reported that higher gross margin leads to profit maximization which is the central objective of producers. The Profitability Index (PI) was 0.41, which implies that for every naira invested, 41 kobo was returned to the rice farmer, implying that rice production is a profitable enterprise in the study area.

| Table 3: Multiple regression results between output of rice farmers and selected variables | | | | | | |
|--|----------------|----------------|---------------|-------------------|--|--|
| Variables | Linear | Double log | Semi log Ex | <u>xponential</u> | | |
| Farm size (X_1) | 0.6550 | 0.9450 | 0.9340 | 0.6620 | | |
| | (6.488)(9. | 350** (6.0 | (4.83 | 31) ** * | | |
| Labour input (X ₂) | -0.1190 | 0.2150 | 0.0600 | -0.0430 | | |
| | (-0.398) | (1.116)* | (0.859)(-0.6) | 668) | | |
| Quantity of seed (X ₃) | 0.4300 | 0.2000 | 0.4100 | 0.2410 | | |
| | $(4.800)^{**}$ | (3.836)** | (5.165)** | $(1.984)^{**}$ | | |
| Quantity of fertilizer (X ₄) | -0.0130 | 0.0390 | 0.0430 | -0.1200 | | |
| | (-0.134) | (0.751) | (-0.543) | (-0.937) | | |
| Educational level (X ₅) | 0.0450 | 0.0700 | 0.1980 | -0.1200 | | |
| | $(1.043)^*$ | $(1.629)^{**}$ | (3.018)*** | (-0.375) | | |
| Access to credit (X_6) | 0.0370 | 0.0510 | 0.0000 | 0.0790 | | |
| | (0.885) | $(1.231)^*$ | (-0.0060) | (1.375)* | | |
| Farming experience (X ₇) | -0.0560 | -0.0760 | -0.0050 | -0.0300 | | |
| | (-0.8930) | (1.072) | (-0.420) | (-0.350) | | |
| R ² | 0.9230 | 0.9260 | 0.8290 | 0.8590 | | |
| F-ratio | 4.2264 | 2.9185 | 16.1218 | 6.3358 | | |
| Constant | 18.2908 | 15.4209 | 38.9126 | 29.0422 | | |

| Factors Influencing | the Output of Rice | farmers in the Study Area |
|----------------------------|--------------------|---------------------------|
|----------------------------|--------------------|---------------------------|

**= significant at 1%,*= significant at 5%

Source: Field Survey

Table 3 above, showed that the double log functional form produced the best fit, hence it was chosen as the lead equation. This is based on the fact that it has the highest value of coefficient of multiple determination (\mathbb{R}^2), highest number of significant variables and conformity to a priori expectation. The F-ratio was statistically significant at 1%, implying that the sample data fit the model and the independent variables are important explanatory factors of the variation in the dependent variable. The R² was 0.926 meaning that about 93% of the total variation in the dependent variable was accounted for by the independent variable. The table also shows that the coefficient for farm size, labour input, quantity of seed, educational attainment and access to credit were significant, while the coefficients of quantity of fertilizer and farming experience were not significant. This is in line with the study of Fakayode, et al., 2010. The coefficients of farm size, quantity of seed, educational attainment were positive and significant at 1% level, implying that there is a direct relationship between these variables and the output of rice farmers and that an increase in the hectare of farmland, quantity of seeds cultivated, and level of educational attainment of the farmer will invariably lead to an increase in the output of the farmers in the study area. Also the coefficients of labour input was also positive and significant at 5% level implying that an increase in labour input will invariably lead to an increase in the output of rice farmers and also, the coefficients of access to credit was also positive and significant at 5% level implying that an increase in credit accessibility will invariably lead to an increase in the output of rice farmers in the study area. This study also corroborated with the findings of Ohaka et al., (2013); Rahman (1994); Ohajianya & Onyeweaku, (2003) who reported that there would be increased rice outputs and farm income if resource inputs were equally distributed among large scale and small scale farmers by the agencies charged with farm inputs distribution.

CONCLUSION

The study concludes that rice production is profitable and the study also found out that farm size, labour input, quantity of seed, educational level and access to credit affects the output of rice farmers in the study area.

RECOMMENDATIONS

Based on these finding, the following recommendations were made;

- 1. Government should create an enabling environment to boost the productivity of rice farmers in the area through the provision of subsidized inputs and credit facilities to rice farmers.
- 2. Farmers should be assisted and educated on the need to form cooperative societies as this will increase their chances of obtaining credit facilities.

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AGRICULTURAL EXPORT EARNINGS AND EXTERNAL DEBT STOCK IN NIGERIA (1980 – 2015)

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ABSTRACT

This study examined agricultural export earnings and external debt stock in Nigeria from 1980 – 2015. The study utilized time series data from various editions of National Bureau of Statistics and Central Bank of Nigeria Statistical Bulletins. Data obtained were analyzed using Unit Root test, Johansen Co-integration and Error Correction Mechanism (ECM). The co-integration results revealed the existence of long-run relationship between the external debt stock (EDS) and the explanatory variables (external debt service payment, agricultural export earnings and official exchange rate). The ECM result revealed that external debt service payment was negatively signed and significant at 5% level with external debt stock. Agricultural export earnings was negatively signed with external debt stock and not significant at 5% level. Official exchange rate was significant and positively signed with external debt stock. Thus, increase in agricultural export earnings, did not significantly reduce external debt stock in Nigeria during the period of study. It was recommended that external debt and assistance should be invested in agricultural production to diversify the economy and for the expansion of agricultural export base. This would increase agricultural export earnings, as oil exports can no longer be relied upon for meaningful foreign exchange earnings.

Keywords: External debt stock , agricultural export earnings, official exchange rate, external debt service, economy.

INTRODUCTION

Generally, agricultural export earnings stand for the earnings of a country that are generated through the exports of agricultural commodities, agricultural by-products and its services to other nations (Ushahemba, 2015). According to Oji-Okoro (2011) available records revealed that the contribution of agricultural export commodities to the total exporting goods for Nigeria was over 70% in the 1960s. However, beginning from 1970s agriculture lost this position to crude oil and gas in terms of contribution to the total export and government revenue. The unstable nature of the world crude oil and gas market starting from the 1980 led to a sudden drop in export earnings, of the now oil dependent government. In spite of this reduced export revenue Nigeria government began to borrow in an attempt to modernize certain areas of the economy.

Supporting debt acquisition, Andrew (2009) asserts that it is normal for developing countries facing economic hardship to acquire external assistance in the form of loan to supplement domestic savings and fund account deficits. Nevertheless, whether or not the debt would be helpful to the borrowing country will rest on how the loan is used in the key sector of the economy or for ordinary consumption.

According to Oyetade et al (2016) the \$29.960 billion is again taking Nigeria back to the dark past when the external debt derailed the economic growth and weakened the agricultural export earnings before total cancellation of 18 billion of the \$30.85 billion by the Paris Club of creditors in 2006. Similarly, Udeh et al., (2016) posited that debt by the government is an

impediment to export and that debt and its servicing can easily become a burden on the internal and external sectors of the economy. However, Adejuwon and James (2016) disagreed when they opined that the *a priori* expectation was that external debt would bring about economic growth and expansion of agricultural exports. In addition, they argued that over emphasis on negative effect of debt will cause economic morbid fear of debt, resulting in debt avoidance when it would have stimulated the economy by bringing in the much needed capital for infrastructural investment and the diversification from oil to agriculture.

Theoretical Framework

Several theoretical contributions have been made as regards the various economic sectors and variables such as agricultural export, economic growth and external debt. The study adopted the dual-gap theory and debt-overhang theory because of the issues relating to debt, savings and investments amongst others.

Dual-gap: According to Omoruyi (2005), the dual-gap theory explained that most economies have experienced a short fall in trying to bridge the gap between the level of savings and investments and have resorted to external borrowing in order to fill this gap. This gap provides the motive behind external debt.

Debt-overhang theory: Krugman (1982), posited that debt-overhang occurs when a nation's debt is more than its debt repayment ability. Based on the theory, Krugman, further explained debt overhang as one whereby the expected repayment amount of debts exceeds the actual amount at which it was contracted. Debt overhang effect comes into play when accumulated debt stock discourages investors from investing into the private sector for government. Audu (2006) relates the concept of debt overhang to Nigeria's situation. He stated that debt service burden has prevented rapid economic growth and development in Nigeria. Nigeria's expected debt service is seen as an increasing function of her output and as such, resources that would have been used for developing the economy are indirectly taxed away by foreign creditors in the form of debt service.

Empirical Literature

Empirically, different methods and variables had been employed to study agricultural exports, non-oil export earning's external debt in the past. Audu (2006) examined the relationship between external debt, public investment and economic growth in Nigeria within the period 1970 – 2002. The co-integration test and Vector Correction results unmasked that public investment, economic growth and debt service had significant relationship with external debt stock in Nigeria. Similarly, Ogunmuyiwa (2011) used Augmented Dickey-fuller test, Johansen Co-integration method, Vector Correction Method and Granger Causality Test to determine the relationship between two variables (gross domestic product and external debt) in Nigeria from 1970 to 2007. The results indicated that causality exist between gross domestic product and external debt in Nigeria.

MATERIALS AND METHODS

This study was based on time series data obtained from various sources, from 1980-2015. Aggregate National data on external debt stock, external debt service, agricultural export earnings and exchange rate were sourced from various editions of National Bureau of Statistics (NBS) and Central Bank of Nigeria bulletins. Most past studies on external debt stock had focused on economic growth. This study shifted focus to other variables. This empirical analysis showed the relationship between external debt stock, external debt serviced, agricultural export earnings and exchange rate in the Nigerian economy. In addition, the study presented an up-to-date review of agricultural export earnings and external debt stock in

Nigeria. Past empirical studies showed that external debts acquisitions were not invested in agriculture, hence no effect on agricultural export earnings. The major method of analysis employed in this study is the Unit Root Test (URT), Johansen Co-Integration Test and Error Correction Mechanism (ECM).

Model Specification

From the theoretical and empirical literature reviewed and in line with Darma (2006), the study specifies a model in which External Debt Stock (EDS) is expressed as a function of External Debt Service Payment (EDP), Agricultural Export Earnings (AEE) and Official Exchange Rate (OER). Thus, the model is specified as follows:

EDS = f (EDP, AEE, OER).....(1) EDS = $a_0 + a_1 EDP + a_2AEE + a_3OER + U_t$(2) To reduce the challenge of multicollinearity, the log-linear form of the model is: LOG EDS = Log $a_0 + a_1 LOG EDP + a_2Log AEE + a_3 Log OER$(3.4) Where: EDS = External Debt Stock EDP = External Debt Service Payment AEE = Agricultural Export Earnings OER = Official Exchange Rate in Naira per Dollar U_t = Error term a_0 = Intercept a_1, a_2, a_3 = Coefficients The *a priori*, expectation is; $a_1 < 0, a_2 < 0, a_3 < 0$, at the same time.

Unit Root Test for Stationarity (Augmented Dickey Fuller)

| Variables | ADF Test | Critical Value | | | Order of integration |
|-----------|-----------|----------------------|----------------------|--------------------|----------------------|
| | | 1% critical value | 5% critical value | 10% critical value | |
| EDS | -4.000845 | -3.639407 | -2.951125 | -2.614300 | Order one |
| EDP | -5.818167 | -3.646342 | -2.954021 | -2.615817 | Order one |
| AEE | -5.586356 | -3.639407 | -2.951125 | -2.614300 | Order one |
| OER | -5.551680 | -3.639407 | -2.951125 | -2.614300 | Order one |

Table 1: Unit Root Test for Stationarity (Augmented Dickey Fuller)

Source: Authors' Computation, 2016

The unit root analysis involves testing the order of integration of the individual series under consideration. Thus, the result of the Unit Root Test in Table 1 shows that at various levels of significance (1%, 5% and 10%), the time series were stationary.

Specifically all the variables (external debt stock, external debt service payment, agricultural export earnings and official exchange rate) were integrated of order one or first difference. Thus, all the time series in this study were stationary because their respective ADF values were found to be greater than their critical values at 1%, 5% and 10%.

Johansen Co-integration Test

This test was conducted in order to ascertain the run long relationship among the variables. The results presented in Table 2 showed that there were cointegrating equations at 5% significance level. This is because only two equation's trace statistic test value was greater

than the critical value at 5%. Thus, there is a long run relationship amongst the variables used for the analysis thereby fulfilling the condition of error fitting model.

| Table 2. Sonansen Co-megration Test | | | | |
|-------------------------------------|----------------------|--------|--|--|
| (Trace Statistics) k=2, r=3 | Critical Values (5%) | Prob | | |
| 140.2652 | 47.85613 | 0.0000 | | |
| 63.73512 | 29.79707 | 0.0000 | | |
| 8.066189 | 15.49471 | 0.4584 | | |
| 0.106040 | 3.841466 | 0.7447 | | |

Table 2: Johansen Co-integration Test

Source: Authors' Computation, 2016.

Note: r represents number of co-integrating vectors and k represents the number of lags in model.

| Parsimonious Error Correction Mechanism (ECM) Result for the Estimated Model |
|--|
| Table 3: Parsimonious Error Correction Mechanism Result for the Estimated Mode |
| Dependent Variable: DLOG(EDS) |

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--|---|--|---|--|
| C DLOG(EDS(-1)) DLOG(EDS(-2)) DLOG(EDS(-3)) DLOG(EDP(-1)) DLOG(AEE(-1)) DLOG(OER(-1)) ECM(-1) | -0.246092 -0.259291 0.359678 0.269669 -1.174724 -0.063100 1.536046 -0.056647 | 0.208644 0.243124 0.196179 0.159298 0.321734 0.274374 0.577997 0.272920 | -1.179479 -1.066497 1.833415 1.692858 -3.651233 -0.229979 2.657536 -0.207560 | 0.2514 0.2983 0.0810 0.1053 0.0015 0.8203 0.0147 0.8376 |
| R-squared Adjusted R-squared F-statistic Prob(F-statistic) | 0.611253 0.426135 3.301969 0.010122 | Mean dependent var S.D. dependent var Durbin-Watson stat | | 0.136322 0.920050 2.090451 |

Source: Authors' Computation, 2016.

To correct the pitfall in the short run results and adjust to the long run equilibrium relationship, the parsimonious ECM was conducted. The error correction result shown in Table 3 revealed that the overall model is satisfactory with an R^2 of 0.611. Thus the variation in external debt stock as explained by the external debt service, agricultural export and official exchange rate is 61%. The coefficient (-0.056647) of the ECM is negatively signed. Thus, the parsimonious error correction model will correct the deviation from the short run to long-run equilibrium by 5.6647%. Also, the Durbin Watson value of 2.09 which is very close to 2.0 depicts a lesser degree of autocorrelation. The F-statistic of 3.30 with the probability of 0.014 is significant at the 5% level, meaning that the three independent variables are significant in explaining the level of external debt stock in Nigeria, during the period of study. External debt service payment was negatively signed with external debt stock, meaning that a percentage increase in external debt service payment leads to a reduction in external debt

stock in Nigeria by -1.174724%. Meanwhile, the external debt service payment variable was significant with external debt stock. Therefore, the alternative hypothesis was accepted. Agricultural export earnings is negatively signed with external debt stock but statistically not significant at 5% level. This reveals that a percentage increase in agricultural export earnings decreased the external debt stock in Nigeria during the period of study by -0.063100%. Since the variable is not significant at 5% level, the null hypothesis was accepted and it is concluded that there was no significant relationship between agricultural export earnings and external debt stock in Nigeria during the period of study.

Meanwhile, official exchange rate was positively signed with external debt stock and statistically significant implying that a percentage increase in official exchange rate positively influenced external debt stock in Nigeria by 1.536046%. Also, the variable was statistically significant at 5%. Therefore, the alternative hypothesis was accepted, meaning that there was a significant relationship between official exchange rate and external debt stock in Nigeria.

CONCLUSION

From the results and findings of this study, it is established that the level of external debt stock in Nigeria was not determined by the level of agricultural export earnings. It can therefore be said that increase in agricultural export earnings have not played a significant vital role in reducing or imparting the external debt stock in the period under review, thereby validating the null-hypothesis of this research. It is clear that external debts acquisition in the past has not been properly invested in agriculture so as to cause enough and substantial impact on agricultural export earnings in Nigeria. In addition, higher external debt servicing is capable of reducing the total external debt, though at the expense of starving the social sector of the economy of vital scarce resources needed for the provision of social services.

RECOMMENDATIONS

Based on this, the following recommendations were made:

- i. External debt and assistance should be invested in agricultural production to diversify the economy and for the expansion of agricultural export base, as oil export can no longer be relied upon for a stable economy and meaningful foreign exchange earnings.
- ii. The government and debt management office should set mechanisms in motion to ensure that loans meant for the agricultural sector are properly utilised.

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EFFECT OF IN-SERVICE TRAINING ON JOB PERFORMANCE OF FRONTLINE EXTENSION OFFICERS OF OGUN STATE AGRICULTURAL DEVELOPMENT PROGRAMME (OGADEP), NIGERIA

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ABSTRACT

The study assessed the effects of in-service training on the job performance of frontline extension officers in Ogun state, Nigeria. Total enumeration was used to select 85 extension officers in the 4 agricultural zones of OGADEP. Structured questionnaire was used to collect primary data from respondents. Data collected were analysed using descriptive and Chi square. Results revealed mean age of respondents to be 45 years, mostly (80.0%) males, with mean work experience of 15 years and qualifications ranging from OND to MSc degree in agriculture-related courses. Furthermore, 84.7% of extension officers have benefitted from inservice training with majority (47.2%) having participated once since joining the service. The factors affecting in-service training of extension officers were desires of extension officers to get trained (Mean = 4.34), availability of fund for training (Mean 3.11) and accessibility to training facilities (Mean = 3.00). The χ^2 analysis results showed that there is significant association between in-service training and job performance ($\chi^2 = 29.69$, df = 10, p < 0.05), while the personal characteristics of respondents that had significant relationship to in-service training were years of experience (χ^2 =34.448, df =24, p< 0.05), rank of extension officers $(\chi^2=36.982, df=24, p<0.05)$, income $(\chi^2=31.685, df=12, p<0.005)$ and age $(\chi^2=16.410, df=8, p<0.005)$ p < 0.005). The study concluded that low level of commitment of employers counted against provision of regular in-service training to extension officers. The study recommended among others that frontline extension officers need regular in-service training in order to improve their productivity and achieve the organizational goals and objectives.

Keywords: In-service training, Job performance, Agricultural Development Programme, Ogun State, Nigeria.

INTRODUCTION

In a growing economy like Nigeria, the agricultural sector needs well-trained extension personnel to disseminate new ideas to farmers in rural areas in order to improve their productivity and welfare of the rural dweller in general. Agricultural extension workers are the intermediary between the research institute and farmers. The frontline extension workers are otherwise known as Village Extension Agents (VEAs) and Block Extension Agents (BEAs) under the Agricultural Development Programmes (ADPs) adopted by almost all the states in Nigeria. The former covers "circles" or "cells" and hence work often with individual farmers who are mostly men, while the latter (essentially a female) covers the entire block and hence work with women farmer groups in all circles and cells. The VEAs and BEAs (Extension officers) function as non-formal agricultural teachers and provide feedback and feed-forward communication between the ADP and farmers. They also function as counsellors to the farmers on how to make wise decisions in farm management (Akinbode, 2000; Oladoja, 2004; Evenson, 2006; Iwena, 2007; Issahaku, 2014; Olatunji, Onumadu, and Ifeanyi-Obi, 2015).

Training has been defined as the act of increasing the knowledge and skills of an employee in a particular job (Njoku, 2015; Jahangiri *et al.*, 2015; Fejoh and Faniran, 2016). Furthermore, it is as an important contribution or activities which are designed to improve on-the-job performance of the employee (Flippo, 2005; Idonije, 2005). It aims at acquiring knowledge, skills and attitude in order for a worker to perform up to set standard or for effective job delivery. Training is broadly classified into 2 types according to Iwuagwu and Aiwuyo (2017) as:

- <u>Pre-service training</u>: This is an academic training leading to certification, and it is offered by formal institution such as university or colleges, following specific curriculum for a certain duration.
- <u>In- service training</u>: It is a process of staff development by organisations, from time to time, for the purpose of increasing the performance of the employee holding a position with assigned responsibilities.

According to Van Dorsal (1962), in-service training may be broadly categorised into five different types:

<u>Induction or Orientation Training</u>: This type of training is given immediately after employment in order to introduce the new extension officer to his or her job and to develop an attitude of personal dedication to the organisation goal.

<u>Foundation training</u>: This is also for newly employed staff. It assists every staff to acquire professional knowledge about various rules and regulation of the government's financial transaction, administrative capability, communication skills, and leadership ability.

<u>Maintenance or Refresher Training</u>: This training updates and maintains the specialized "subject-matter" knowledge of the incumbent officer.

<u>On-The-Job Training</u>: This is ad-hoc or regularly scheduled training, such as fortnightly training session (FNT) under the training and visit (T&V) system of extension (Benor and Baxter, 1984), and is provided by the superior officer or the subject-matter specialists to the subordinate field staff.

<u>Career or Development Training</u>: This type of in-service training is designed to upgrade the knowledge, skills, and ability of employees to help them assume greater responsibilities in higher positions.

Job performance on the other hand, is a commonly used, yet poorly defined concept in industrial and organizational psychology (the branch of psychology that deals with the workplace and human resource management). Despite the confusion over how it should be exactly defined, performance is an extremely important criterion that relates to organizational outcomes and successes (Campbell, 1990; Campbell, McCloy, Oppler, and Sager, 1993). From a psychological perspective, Campbell, (1990) describes job performance as functioning of an individual worker within a work environment.

Job performance is a consistent and important outcome for core self-evaluations (CSE). The concept of core self-evaluations was first examined by Judge, Locke, and Durham (1997) as a dispositional predictor of job satisfaction, and involves four personality dimensions; locus of control, neuroticism, self-efficacy, and self-esteem. The way in which people appraise themselves using core self-evaluations has the ability to predict positive work outcomes, specifically job satisfaction and job performance. The most popular theory relating the CSE trait to job performance argues that people with high CSE will be more motivated to perform well because they are confident they have the ability to do so (Bono& Judge, 2003).

Motivation is generally the most accepted mediator of the core self-evaluations and job performance relationship (Erez & Judge, 2001). These relationships have inspired increase in research on job performances and its valuable implications for organisation.

Many efforts in agricultural development currently are aimed at improving the livelihoods of farmers by improving their technology base (Ayinde, 2012; Murphy, 2017). However, suggestions on the process of acquainting farmers to this technology (that is, the role of extension workers) are mentioned in passing (Ayinde, 2011). The extension officers constitute the main link between research institutes and the farmers, who break research findings into simpler, comprehensible ways to the farmers for better utilisation. This implies therefore, that as the frontier of knowledge on agricultural development changes, there is the need to expose agricultural extension officers to regular in-service training to build their self-confidence and high level of competence in their professional callings, while meeting up with emerging challenges that are capable of affecting their farmers. It will also be of great benefit to the farmers in enhancing improvement of their farm productivity (Olaniyan & Ojo, 2008). In the light of the above, this study assessed in-service training of agricultural frontline extension workers in Ogun State. The study addressed the following research questions:

- What are the socio-economic characteristics of frontline extension officers?
- What are the types and frequency of in-service training the agricultural extension officers have benefitted from?
- What are the factors affecting the participation of frontline extension workers in inservice training?
- What are the job performance indicators for in-service training?

The specific objectives were to: describe the socio-economic characteristics of frontline extension officers; identify the types and frequency of in-service training given to extension officers; determine the factors affecting the participation of frontline extension officers in in-service training, and to describe the job performance indicator for in-service training.

The following hypotheses were tested:

- H₀₁: There is no significant association between in-service training and job performance of frontline extension workers in the study area.
- H₀₂: There is no significant association between the personal characteristics and frequency of in-service training.

MATERIALS AND METHODS

This study was conducted in Ogun State in South-Western Nigeria. The State was created in February, 1976 and it lies in the tropics and covers a land area of about 16,025 square kilometres. It is located in the rainforest vegetation belt of Nigeria within longitude 2⁰ 45' E and 3⁰ 55' E and latitudes 7⁰ 01' N and 7⁰ 8' N in the tropics. It is bounded in the west by Benin Republic, in the south by Lagos state and Atlantic Ocean, in the east by Ondo State, and in the North by Oyo and Osun States. It covers a land area of 16,409.28 square kilometres. The rainy season starts around the middle of March and continues until late October. The dry season starts in November and lasts until February in most locations in the state. Rainfall ranges between 1600mm and 900mm annually. The state is warm throughout the year with a temperature of between 28°C and 35°C, humidity is between 85 percent and 95 percent. It boasts of lots of arable and cash crop production and the farmers in the state are serviced by

the Ogun State Agricultural Development Programme for transmission and training of the farmers in latest agricultural technologies (Ogun State Profile, 2018).

The Ogun State Agricultural Development Programme (OGADEP) was established in the state to make the state self-sufficient in food production. For administrative purposes, the programme has divided the state into four agricultural zones, Abeokuta, Ijebu Ode, Ilaro and Ikenne. The four zones were used for this study.

The sampling frame was the total number of VEAs and BEAs in OGADEP in all the four zones of Ogun State. Total enumeration technique was used to pick all the village extension officers (VEAs and BEAs) in all the zones; which comprised of 24 personnel in Abeokuta zone, 32 personnel in Ijebu-ode zone,11personnel in Ikenne and 18 in Ilaro. This is to promote inclusiveness of all the extension officers' views and also capture as many responses as possible. This gives a total of 85 respondents. Interviews were conducted during fortnightly training programme (FNT) with the aid of structured questionnaire which covered information on their socioeconomic characteristics, types of training exposed to, among others.

The independent variables of the study are types of in-service training and social-economic characteristics of respondents. These are measured as follows while the dependent variables are the types of in-service training.

- 1) Age was measured in years.
- 2) Sex was measured in nominal form with the number assigned as Male=1, Female=2.
- 3) Educational level was measured based on the highest level attained as OND=1, HND=2, BSc=3, MSc =4, PhD =5.
- 4) Marital status was measured in nominal form as Single=1, Married =2, Separated=3 Widow =4.
- 5) Religion was measured by Christianity=1, Islam=2, Others =3.
- 6) Degree Option was measured as follows: Crop science=1, Animal science=2, Agricultural Extension=3,Fishery=4,Agricultural Economics=5, Soil Science=6, Forestry=7, Agricultural Administration =8.
- Rank or Cadre was measured by ascribing values to the ranks as follows: Higher Agricultural Superintendent/Agricultural Officer I=1, Agricultural Officer II/ Senior Agricultural Superintendent=2, Senior Agricultural Officer/Principal Agricultural Officer I=3, Assistant Chief Agricultural Officer=4, Chief Agricultural Officer=5, Assistant Director=6, Deputy Director=7, Director=8.
- Work Designation was measured with arbitrary scores as follows Zonal Manager=1, Subject Matter Specialist=2, Block Extension Supervisor=3, Village Extension Agent =4, Block Extension Agent =5, Enumerators=6.
- 9) Year(s) of experience was measured in years
- 10) Grade level and step was measured by direct recording of values
- 11) Income (N) was measured in Naira according to the following ranges: $\leq 30,000 49,999 = 1,50,000 69,999 = 2,70,000 89,999 = 3,90,999 110,000 = 4, while <math>\geq 120,000$ and above = 5

The dependent variable of the study is job performance. The employees job performance was measured by generating some perceptual statements which respondents gave answers to using a 5-Point Likert type scale of strongly agree (5) to disagree(1), while coding of answers to negative statements were reversed.

Data were analysed using descriptive statistical tools such as tables, frequency and percentage tables as well as Chi square to test the stated hypotheses.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Frontline Extension Officers

| Table 1: Distribution of respondents according | | | |
|--|-----------|------------|------------------------|
| Description | Frequency | Percentage | Mean/Mode |
| Age group (Years) | | | |
| 30-39 | 11 | 12.9 | |
| 40-49 | 58 | 68.2 | 45.43 years |
| 50-59 | 16 | 18.8 | |
| Sex | | | |
| Male | 68 | 80.0 | Males |
| Female | 17 | 20.0 | |
| Education | | | |
| OND | 4 | 4.7 | |
| HND | 41 | 48.2 | HND certificate |
| BSc. | 34 | 40.0 | |
| MSc. | 6 | 7.1 | |
| Degree option | | | |
| Crop science | 40 | 47.1 | Crop science |
| Animal science | 16 | 18.8 | _ |
| Agric. Extension | 19 | 22.4 | |
| Fisheries | 3 | 3.5 | |
| Agric. Economics | 7 | 8.2 | |
| Rank of Respondents | | | |
| Higher Agric. supt./ Agric. officer 1(HAS/AOI) | 2 | 2.4 | |
| Agric. Officer II/Senior Agric. Supt. (AOII/SAS) | 19 | 22.4 | |
| Senior Agric. Officer/Principal Agric. Officer | 26 | 30.6 | SAO/PAO |
| (SAO/PAO) | | | |
| Assistant Chief Agric. officer (ACAO) | 16 | 18.8 | |
| Chief Agric, officer(CAO) | 14 | 16.5 | |
| Assistant director(AD) | 6 | 7.1 | |
| Others | 2 | 2.4 | |
| Designation | | | |
| VEA | 59 | 69.4 | VEAs |
| BEA | 26 | 30.6 | |
| Years of experience (Years) | | | |
| 1-5 | 3 | 3.5 | |
| 6-10 | 31 | 36.5 | |
| 11-15 | 20 | 23.5 | 153 years |
| 16-20 | 14 | 16.5 | 10.0 years |
| 21-25 | 11 | 12.9 | |
| 26-30 | 4 | 47 | |
| 31_35 | | 24 | |
| Income (N) | 2 | 2.7 | |
| 50 000 00-69 999 00 | 12 | 14 1 | |
| 70 000 00-89 999 00 | 25 | 20 A | |
| 90 000 00_110 000 00 | 23 77 | 29.4 | N 90 000 00- |
| 20,000.00-110,000.00 | 21 | 51.0 | N 11 000 00 |
| Above 110 000 00 | 21 | 247 | F1 1,000.00 |
| AUVIC 110,000.00 | 21 | ∠+./ | |

Table 1: Distribution of respondents according to their socio-economic characteristics

Source: Field survey, 2015

The mean age of the frontline extension officers was approximately 45 years (Table 1) indicating that extension officers were still in their active age group. This according to Ayinde (2011) will enable the respondents to discharge their jobs with optimum efficiency if exposed to regular in-service trainings. Majority (80%) of the frontline extension workers were males while the remaining 20% are females. This implies that the men patronised extension service more than their female counterparts. The highest level of education among the respondents was tertiary, which ranged from Ordinary National Diploma (OND) to Masters of Science

(M.sc). Those possessing HND certificates for instance, constituted 48.2% of the respondents while 40% had B.Sc. degrees. This means that the frontline extension workers had the requisite qualifications to perform optimally and are therefore, better positioned for the demand of their assignments. In the same vein, most (35.3%) of the respondents had their basic degrees in crop science while 27.1% had their degree in agricultural extension. Generally, all the respondents demonstrated diversity of basic qualification in all areas of agricultural science, these are expected to be useful for extension delivery system in the study area.

Majority (30.6%) of the respondents were in the cadre of Senior Agricultural Officer/Principal Agricultural officers within the ADP while the highest ranked personnel (7.1%) belonged to the Assistant Director cadre. Informal discussions with respondents showed that respondents got their promotions on regular basis. Further, majority (69.4%) of the sampled respondents were designated Village Extension Agents (VEAs) while the remaining 30.6% were Block Extension Agents (BEAs). This designation is in line with the principle of Training and Visit system (Benor and Baxter, 1984) being practiced by the Ogun State ADP. Furthermore, the mean years of experience of the extension personnel was approximately 15 years while majority (23.5%) belonged to the 11- 15 years' category. This implies a fairly high level of experience for a better extension delivery system. The modal income level (56.5%) per month accruable to the extension personnel was \$90,000.00 - 110,000.00 per month. This implies that respondents were fairly remunerated, which may impact positively on their performance.

| nave undergone | | | |
|----------------------------|-----------------------|------------|-----------------------------|
| Item | Frequency | Percentage | Mode |
| | (n=85) | % | |
| Participation inin-service | e training | | |
| Yes | 72 | 84.7 | |
| No | 13 | 15.3 | Yes |
| Type of training particip | ated in by responde | ents* | |
| Induction | 44 | 61.1 | |
| Foundation | 32 | 44.4 | On the job and induction |
| | | | training |
| On the job | 44 | 61.1 | |
| Career/development | 32 | 44.4 | |
| Frequency of participation | on in in-service trai | ning | |
| Annually | 6 | 8.3 | Once for all the time spent |
| Every two years | 10 | 13.8 | |
| Once in five years | 22 | 30.5 | |
| Once for all the time | 34 | 47.2 | |
| spent | | | |
| NT | $(\mathbf{M} = 7)$ | 11 0015 | |

| T | vpes and | Frequency | of In-serv | vice Training | Enioved I | ov Respondents |
|---|----------|-----------|--------------|---------------|-----------|----------------|
| _ | | | or in over , | | | |

Table 2: Distribution of respondents according to type and nature of in-service trainings they have undergone

Note: * Multiple responses (N = 72) Source: Field survey, 2015

The results in Table 2 showed that most (84.7%) of the extension officers had attended one form of in-service training or the other. Also, majority (61.1%) of the respondents had attended both induction and on the job trainings, while 44.4% apiece had been exposed to foundation and career/development trainings. These are indications that extension officers have had exposure to trainings that could improve their capabilities on the job. With respect to frequency of participating in in-service training however, majority (47.2%) had only recorded one in-service training participation since joining the ADP, while 30.5% of the respondents had participated once in 5 years. Only 8.3% of the respondents had benefited from in-service

trainings yearly. These imply that regularity of in-service training in the ADP is low, this may have implication on the job performance of the extension officers in the study area.

Factors affecting Participation of Frontline Extension Agent

Table 3: Distribution of frontline extension agent according to factors affecting participation in in-service training

| Statement | SA | Α | IND | D | SD | Mean |
|---|----------|--------------|------------|----------|----------|------|
| Funds are readily available for training | 7(8.2) | 11(12.9) | 10(11.8) | 42(49.4) | 15(17.6) | 2.25 |
| frontline extension agents in my cadre | | | | | | |
| Training is not important for frontline | 4(4.7) | 1(1.2) | 4(4.7) | 34(40) | 42(49.4) | 1.72 |
| extension agents | | | | | | |
| Facilities for training are not readily | 5(5.9) | 18(21.2) | 22(25.9) | 27(31.8) | 13(15.3) | 2.71 |
| available | | | | | | |
| Training facilities are easily accessible | 3(3.5) | 24(28.2) | 36(42.4) | 18(21.2) | 4(4.7) | 3.05 |
| Funds are rarely available for training | 6(7.1) | 34(40.0) | 19(22.4) | 15(17.6) | 11(12.9) | 3.11 |
| frontline extension agent in my cadre | | | | | | |
| Frontline extension agent are | 5(5.9) | 5(5.9) | 32(37.6) | 25(29.4) | 18(21.2) | 2.46 |
| incompetent and do not discharge | | | | | | |
| responsibility effectively. | | | | | | |
| Frontline extension agents need to be | 41(48.2) | 36(42.4) | 5(5.9) | 2(2.4) | 1(1.2) | 4.34 |
| trained continuously | | | | | | |
| Training facilities are quite adequate | 8(9.4) | 15(17.6) | 36(42.4) | 21(24.7) | 5(5.9) | 3.00 |
| Note: Figures in bracket represent per | Sourc | e: Field sur | rvey, 2015 | | | |

The results in Table 3 showed that 49.4% disagreed that funds were readily available for training of frontline extension agents while few respondents strongly agreed (8.2%) that fund was readily available for training of frontline extension agents. This explains the reason why most (47.2%) had just one in-training since their employment in the establishment (Table 2).

Also, majority (49.4%) strongly disagreed with the notion that training is not important implying that respondents would have loved to experience more in-service trainings subject to positive disposition by their establishment. In the same vein, 31.8% of the respondents showed disagreement to the notion that training facilities were not readily available, implying that there is likelihood that the establishment may not wish to commit resources to training respondents in this respect. Also, most (40.0%) respondents agreed that fund availability for in-service training were cadre specific. Despite all the above, 29.4% and 21.2% of the respondents agreed and strongly disagreed respectively that the frontline extension officers were incompetent. This implies that despite all the odds facing the extension officers, they still harbour personal conviction that they were competent on the field and discharged their responsibilities effectively. Respondents further opined that continuous training is a necessity for all extension personnel with majority (48.2%) strongly agreeing to this assertion while 42.4% also agreed as well. These imply that the need to continuously organise in-service training for extension officers cannot be over-emphasised as it will keep them abreast of latest development in the field of agriculture.

Based on the mean values computed, it can be adduced that the most important factor affecting in-service trainings among extension officers were the latent desires of extension officers to get trained (Mean 4.34). Others include rare availability of fund for training (X=3.11), accessibility of training facilities (X=3.05) and the adequacy of training facilities (X=3.00).

| indicators | | | | | | | |
|--|----------|----------|-------------|--------------|----------|------|-------------|
| Indicators | Very | Often | Indifferent | Occasionally | Never | Mean | Rank |
| | Often | | | | | | |
| I organized farmers trainings I attended personal | 33(38.8) | 43(50.6) | - | 9(10.6) | - | 4.18 | Often |
| training/workshops to improve myself at work | 16(18.8) | 32(37.6) | 5(5.9) | 25(29.4) | 7(8.2) | 3.29 | Often |
| Work environment conducive | 4(4.7) | 12(14.1) | 50(58.8) | 11(12.9) | 8(9.4) | 2.92 | Indifferent |
| Salary is complimentary to my level | 20(23.5) | 29(34.1) | 21(24.7) | 7(8.2) | 8(9.4) | 3.54 | Often |
| Motivated to excel at work | 1(1.2) | 22(25.9) | 30(35.3) | 20(23.5) | 12(14.1) | 2.76 | Indifferent |
| Never been rewarded | 2(2.4) | 6(7.1) | 33(38.8) | 13(15.3) | 31(36.5) | 2.24 | Indifferent |
| My work experience assist me to work better | 32(37.6) | 41(48.2) | 5(5.9) | 3(3.5) | 4(4.7) | 4.11 | Often |
| I have received query from my boss in the past | 2(2.4) | - | 1(1.2) | 4(4.7) | 78(91.8) | 1.16 | Never |
| Career development improves job performance | 19(22.4) | 20(23.5) | 8(9.4) | 25(29.4) | 13(15.3) | 3.08 | Often |
| Hard work commendation | 6(7.1) | 9(10.6) | 46(54.1) | 5(5.9) | 1(1.2) | 2.20 | Indifferent |
| My clients look up to me for professional advice | 33(38.8) | 46(54.1) | 5(5.9) | 1(1.2) | - | 4.29 | Often |
| Boss trust my diligence | 19(22.4) | 39(45.9) | 18(21.2) | 6(7.1) | 3(3.5) | 3.76 | Often |
| Additional qualification cannot improve performance | 4(4.7) | 2(2.4) | 31(36.5) | 4(4.7) | 44(51.8) | 2.03 | Never |
| Clients do not find my advice useful | 5(5.9) | 3(3.5) | 8(9.4) | 7(8.2) | 62(72.9) | 1.61 | Never |
| Years of experience not | 8(9.4) | 5(5.9) | 21(24.7) | 1(1.2) | 63(74.1) | 2.06 | Never |
| assisting my competence | | | | | | | |
| Closeness to retirement affects my diligence | - | 1(1.2) | 18(21.2) | 3(3.5) | 63(74.1) | 1.49 | Never |
| Inadequate resources | 3(3.5) | 4(4.7) | 13(15.3) | 9(10.6) | 56(65.9) | 1.69 | Never |
| I am diligent at work | 28(32.9) | 37(43.5) | 7(8.2) | 7(8.2) | 6(7.1) | 3.87 | Often |
| Clients too many | 3(3.5) | 13(15.3) | 33(38.8) | 14(16.5) | 22(25.9) | 2.54 | Indifferent |
| Verbal warning given by my | 3(3.5) | 14(16.5) | 11(12.9) | 13(15.3) | 44(51.8) | 2.05 | Never |
| boss motivates me | | | | | | | |
| Mileage claim paid regularly in past 10 years | - | 3(3.5) | 17(20.0) | 15(17.6) | 50(58.8) | 1.68 | Never |
| I like getting recognition for my job | 8(9.4) | 44(51.8) | 16(18.8) | 11(12.9) | 6(7.1) | 3.44 | Often |
| I achieve my yearly target | 23(27.1) | 52(61.2) | 1(1.2) | 9(10.6) | - | 4.05 | Often |
| My boss is a great mentor | 15(17.6) | 56(65.9) | 9(10.6) | 3(3.5) | 2(2.4) | 3.93 | Often |
| Farmers innovativeness | 14(16.5) | 42(49.4) | 7(8.2) | 19(22.4) | 3(3.5) | 3.53 | Often |
| Co-workers not co-operating | - | 9(10.6) | 24(28.2) | 9(10.6) | 43(50.6) | 1.99 | Never |

Perception of Job Performance Indicators by Respondents

Table 4: Distribution of respondents according to their perception on job performance indicators

Source: Computed from Field survey, 2015.

Table 4 shows the perception of respondents on job performance indicators. Majority (89.4%) of the extension officers often organised training for the farmers while 56.4% of the respondents attended training and workshops personally to train themselves. Most (58.8%) of the respondents were however, not excited by their work environment. This is expected since most of the respondents were field staff and are thus not frequent visitors to their head offices. The extension officers did not give any directional indication of being motivated to work excellently (35.3%) while 34.1% respondents felt they were often motivated to excel at work. Also, 57.6% of the respondents were not

complimentary (commensurate) to their grade level compared to other colleagues in the core ministry of agriculture in the same state.

In the same vein, respondents were indifferent as to whether they were ever rewarded at work but felt their level of experience (85.8%) continued to push them on to work better with their increasing experience on the field, while often believing that their career development was the impetus they needed to improve their job performance. Generally, respondents believed that additional educational qualifications had capability to improve performance of extension officers, while they disbelieved that clients did not find their advice useful nor whether closeness to retirement and inadequate resources affected their diligence at work.

Hypotheses Testing

 Table 5: Hypothesis testing of the association between in-service training and job performance indicator

| Item | χ^2 | DF | P-Value | Decision | Remarks | | | |
|--|----------|----|---------|----------|-----------|--|--|--|
| In-service training versus job performance | 29.69 | 10 | 0.031 | S | Reject Ho | | | |
| | | | | | | | | |

Key: χ^2 = Chi-square value DF = Degree of Freedom

Source: Computed from Field survey, 2015.

Hypothesis One: This states that there is no significant association between in-service training and job performance of the extension officers in the study area. This hypothesis was tested using chi-square at p<0.05 (Table 5). Result in the chi- square reveals that there exist significant association between in-service training and job performance ($\chi^2 = 29.69$, Df = 10, p< 0.05). Therefore, the null hypothesis is rejected implying that in-service training has significant effect on the job performance of frontline extension agents. In-service training therefore, is a major factor towards improving the job performance of extension officers in the study area. This fact is also attested to by Balta, Arsian and Duru (2015); Njoku (2015), Jahangiri *et al.* (2016) and Murphy (2017), who viewed training as intrinsic impetus for performance.

Hypothesis Two: This states that there is no significant relationship between personal characteristics of the respondents and frequency of in-service training. The hypothesis was tested in null form at p< 0.05 using chi-square analysis. The results in Table 6 showed that the years of experience (χ^2 =34.448, df=24, p< 0.05), rank of extension officers (χ^2 =36.982, df=24, p< 0.05), income (χ^2 =31.685, df=12, p<0.005) and age (χ^2 =16.410, df= 8, p<0.005) have significant association with the frequency of training of extension workers.

| and needdeney of | | | | | | | | | | |
|---------------------|----------|----|----------------|----------|-----------|--|--|--|--|--|
| Variables | χ^2 | Df | P-Value | Decision | Remarks | | | | | |
| Marital status | 7.057 | 8 | 0.531 | NS | Accept Ho | | | | | |
| Years of experience | 34.448 | 24 | 0.010 | S | Reject Ho | | | | | |
| Rank of respondents | 36.982 | 24 | 0.001 | S | Reject Ho | | | | | |
| Educational level | 11.652 | 12 | 0.174 | NS | Accept Ho | | | | | |
| Degree option | 29.513 | 28 | 0.114 | NS | Accept Ho | | | | | |
| Income | 31.685 | 12 | 0.002 | S | Reject Ho | | | | | |
| Age | 16.410 | 8 | 0.037 | S | Reject Ho | | | | | |
| Designation | 6.325 | 8 | 0.189 | NS | Accept Ho | | | | | |

Table 6: Hypothesis testing of the association between personal characteristics of respondents and frequency of in-service training

Key; χ^2 = Chi-square value, Df= Degree of Freedom P-value= Probability level Source: Computed from Field survey, 2015.

This implies that with increase in respondent's experience, rank, age and income, there is likelihood of exposure to and attendance of in-service trainings. Jahangiri *et al.* (2016) opined that older staff (by implication, higher income personnel) tend to be exposed to more training relative to younger ones.

CONCLUSION

The study assessed the effect of in-service training on job performance of frontline extension officers in the study area. Results from the study indicates that the extension personnel have had at least one exposure to in-service training since their recruitment, but the officers were displeased by the low level of commitment of their employers to providing regular in-service training, despite the fact that their perceived impressive job performance (in terms of farmers training and excellence at work, among others) had not waned.

RECOMMENDATIONS

The study has shown that the extension personnel were not exposed to the needed regular and continuous training. It is in the light of this, the following recommendations were made:

- 1. Frontline extension officers need regular and more exposure to in-service training in order to improve their productivity and achieve the organizational goals and objectives. The agency (employer) needs to incorporate yearly financial commitment to actualise this.
- 2. In-service training should be extended to all staff irrespective of rank, years of experience or level as every officer contributes his or her quota to the achievement of the organizational goals.
- 3. Training needs assessment should be carried out yearly before budgeting and sponsoring extension workers for training in order to make in-service training create needed impacts among employees.

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ANALYSIS OF YAM MARKETING IN IKA SOUTH LOCAL GOVERNMENT AREA, DELTA STATE Nwadiolu, R and Tibi K. N. Department of Agriculatural Extension and Management Delta State Polytechnic, Ozoro azuromanus@gmail.com

ABSTRACT

This work was carried out on the analysis of Yam Marketing in Ika South Local Government Area, Delta State. The specific objectives were to describe the socio-economic characteristics of yam marketers (wholesalers and retailers), describe marketing channel for Yam marketing, estimate profitability of Yam marketing by the intermediaries, and to identify constraints to yam marketing in the area. Data were collected from 120 marketers in 4 markets in the study area. Data were collected using pre-tested questionnaire and analyzed using descriptive and inferential statistics. Findings revealed that majority (75%) of the marketers were females 87.5% of them were married. The distribution channels for yam marketing in the area indicated four channels. The enterprise proved profitable with net marketing incomes of \aleph 3,293,720 for wholesalers and N 6,000 for the retailers. The retailers were more efficient than the wholesalers in the business. High perishability of yam in storage, instability of product price, high cost of transportation, Scarcity of credit facilities and inadequate market information.

Keywords: Marketing efficiency, income, distribution, retailers.

INTRODUCTION

Agriculture has been associated with production, processing, marketing and distribution of essential crops and livestock products. Apart from being the basic source of food supply of all the countries of the world –whether underdeveloped, developing or even developed, agriculture plays a critical role in the entire life of a given economy. 75 percents of worlds' poor live in rural areas and mostly rely on agriculture for their livelihoods (World Bank, 2014)In Nigeria, agriculture is the primary source of income to rural dwellers and also provides employment for 70 percent of working population in Nigeria. Nigeria economy depends on agriculture and it contributes 40 percents to the National Gross Domestic Product (GDP) (Agbaje, 2016). Food Crop Sub-sector (with yam, maize, sorghum, millet, rice, cocoyam and cassava as the main food crops grown in the country) contributed about 28 percent to GDP representing about 75-76 percent of the share of the agriculture sector's contribution to GDP (Central Bank of Nigeria (CBN), 2012). One of the crops that have substantially contributed to food security in Nigeria is yam and it has become an increasingly integral component of the Nigeria diet in recent years (National Bureau of Statistics (NBS), 2013).

Yam (*Dioscorea spp*) is a starchy staple in form of large tubers produced by annual and perennial vines grown in Africa, the Americas, the Carribean, south Pacific and Asia (International Institute for Tropical Agriculture (IITA), 2009). Yam is a primary agricultural commodity in Africa where its cultivation began 11,000 years ago (IITA, 2009). The crop with more than 600 species out of which six are socially and economically important in terms of food, cash and medicine. Some of the species includes; water yam (*Dioscorea alata*), white yam (*Dioscorea rotundata*) and yellow yam (*Dioscorea cayanensis*)(Zaknajiba and Takno, 2013).Yam production is regarded as a source of food security and employer of labour in many areas where it is cultivated (Nahanga and Becvarova, 2014) and has potential for livestock feed and industrial starch production (Ayanwuyi, Akinboye and Oyetoro, 2011). In addition, yams constituted an average of 32% of farmers gross income derived from arable crop (Central Bank of Nigeria, 2008)

MATERIALS AND METHODS

The study was conducted in Ika South Local Government Area, Delta State, the population of the study comprised all yam marketers in Ika South Local Government. A simply random Sampling Technique was used to select 30 yam marketers (15 wholesalers and 15 retailers) from each of the selected markets, thus making a sample frame of 120 respondents. Description statistics such as means, frequency distributions, percentages and budgetary method were used for data analysis

The budgetary model is expressed as NP=TR-TC GM = TR-TVC NR = TR-(TVC+TFC) Where NP=Net Profit TR=Total revenue TC=Total cost TVC=Total Variable Cost TFC=Total Fixed Cost

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of the yam marketers

The socio-economic characteristics of the respondents as summarized in Table 1 shows that majority (75%) of the yam marketers were females while 25% were males. At wholesaler and retailer levels with 60.4% and 84.7% respectively, the female intermediaries were predominant in the enterprise. The predominance of female intermediaries in the business suggested that yam marketing business is not strenuous enterprise and also requires relatively low capital that women can easily raise. This finding is in line with Ibitoye (2014) and low capital intensive business. Table 1 shows that most (43.3%) of the respondents were above 40 years of age. The result indicated that more wholesalers (43.8%) than retailers (43.0%) were on this range. A minimum of 27 years, maximum of 65 years and a mean of 46 years were recorded for the intermediaries. This finding implied that the respondents were relatively young. The young age of the respondents is economically advantageous for information disseminated and adoption of new marketing ideas. This agrees with Ebewore (2010) who reported that age is considered as an important variable because of its influence on people's attitude, skills, aspiration and that young farmers tend to be more flexible in their decision and accept innovations more readily.

Result on educational level of the respondents as presented in Table 1 indicated that greater portion (56.7%) of the respondents had Senior School Certificate. This finding suggested that the yam marketers were educated. Educated entrepreneurs understand the risks and uncertainties that are scientifically equipped to understand the complexities of these eventualities. This finding is justified by Nwibo and Alimba (2013) who observed that formal education provides entrepreneurs with a greater capacity to learn about new production processes and product designs, offers specific technical knowledge conducive to firm expansion and increase owner's flexibility.

Distribution of the respondents by marital status is shown in Table 1. Result indicated that most (87.5%) of the respondents were married. This implied that married men and female dominated the yam marketing enterprise in the study area. This finding corresponds with Okoedo & Okwuokenye (2016), who found the predominance of married individuals in retail yam marketing in Delta State, Nigeria.

| Variable | Wholesalers | | Retailers | | WH & RT (combined) | | |
|---------------------------|-------------|------|-----------|------|-----------------------|------|------------|
| | F | % | F | % | F | % | Mean/Mode |
| Gender: | | | | | | | |
| Female | 29 | 60.4 | 61 | 84.7 | 90 | 75.0 | |
| Male | 19 | 39.6 | 11 | 15.3 | 30 | 25.0 | Female |
| Ασε· | | | | | | | |
| <30 years | | | | | | | |
| 30 - 39 years | 0 | - | 13 | 18.1 | 13 | 10.8 | |
| 40-49 years | 2 | 4.2 | 10 | 13.9 | 12 | 10.0 | |
| 50-59 years | 21 | 43.8 | 31 | 43.0 | 52 | 43.3 | |
| 60 and above | 19 | 39.6 | 7 | 9.7 | 26 | 21.7 | |
| | 6 | 12.4 | 11 | 15.3 | 17 | 14.2 | 46 years |
| | | | | | | | |
| Educational level: | | | | | | | |
| FSLC | 6 | 12.5 | 25 | 34.7 | 31 | 25.8 | |
| SSCE | 32 | 66.7 | 36 | 50.0 | 68 | 56.7 | Q vears |
| ND/NCE/BSC | 10 | 20.8 | 11 | 15.3 | 21 | 17.5 |) years |
| | | | | | | | |
| Household size: | | | | | | | |
| <5 persons | 27 | 89.6 | 20 | 27.8 | 47 | 39.2 | |
| 5 – 9persons | 18 | 37.5 | 33 | 45.8 | 51 | 42.5 | |
| 10-14 persons | 2 | 4.2 | 11 | 15.3 | 13 | 10.8 | 7 persons |
| 15 – 19persons | 1 | 2.0 | 5 | 6.9 | 6 | 5.0 | / persons |
| 20 and above | 0 | - | 3 | 4.2 | 3 | 2.5 | |
| | | | | | | | |
| Marketing experience: | | | | | | | |
| < 5 years | 3 | 6.3 | 17 | 23.6 | 20 | 16.7 | |
| 5-9 years | 2 | 4.2 | 19 | 26.4 | 21 | 17.5 | |
| 10 - 14 years | 7 | 14.6 | 13 | 18.0 | 20 | 16.7 | 12.1 years |
| 15 – 19 years | 28 | 58.3 | 11 | 15.3 | 39 | 32.5 | , |
| 20 and above | 8 | 16.6 | 12 | 16.7 | 20 | 16.7 | |

Table 1: Socio-economic statistics of yam marketers

Source: computed from survey data, 2016. Note: WH =Wholesaler; RT = Retailer

Results on distribution of respondents by household size (Table 1) indicated that majority (42.5%) of the respondents had household size between 5-9 persons. Respondents that fell within this range were more among the retailers (45.8%) than among the wholesalers (37.5%). This was followed by respondents with household size of less than 5 persons (39.2%), while 10.8%, 5% and 2.5% of them had 10-14, 15-19, and 20-24 persons respectively. A mean household size of 7 persons (a minimum of 4 persons and a maximum of 20 persons) was recorded for the respondents. This finding is an indication that the yam marketers have relatively large household sizes. Entrepreneurs with large family sizes will find it difficult to save and invest owing to the high dependency ratio which translates to more consumption expenditure. This is in line with Adeyemo and Bamire (2005) who revealed that large

household size increases the consumption pressure on the farmers and thereby reducing their levels of investment, savings and propensity to save.

Table1 also reveals the distribution of the respondents according to marketing experience. Most (32.5%) of the respondents had spent 15-19year in yam marketing business. This group is followed by those that had spent 5-9 years (17.5%), 10-14 years (16.7%), less than 5 years (16.7%) and 20 years and above (16.7%). The marketers acquired marketing experience of 12.1 years with the least and most experienced marketers gaining years of experience of 4 and 35 years respectively. This suggested that the marketers were experienced in the business, which is needful for agribusiness development. This is in line with the view of Okeke, Mbanasor and Nto (2015) that relevant entrepreneurial and managerial experience confers upon an entrepreneur a greater sense of perceived behavioural control and a stronger belief in his own ability to target good investments and contribute to the growth of the food and agricultural sector.

Yam Marketing Channels in the Area

Findings from the study show that distribution of yam in the area indicated four channels (fig.1). The first channel indicated that the producer/supplier made direct sells to the consumer. In the second channel, the producer/supplier sold to retailer and the retailer sold to the consumer. The third channel was a movement of the product from the producer/supplier to the wholesale who then sold to the consumer. Finally, in the forth channel, the product flowed from product/supplier to the wholesale to retailer and then to the consumer/user. The fourth channel had the highest number of intermediaries in the distribution of yam in the study area.



Figure 1: Distribution channels of yam in the area

Also, the study revealed that there were activities of trading association or unions in the yam markets. These unions through their synergy or combined actions influenced the marketing activities and/or their members as the goods flowed along the distribution channels. This finding concurs with Ajani (2001), that wholesale and retail market of yams is usually characterized by activities of trading associations.

Profitability of the Yam Marketing in the Area

| Variable | Wholesaler | Retailer | WH & RT (combined) | % of TC |
|---|------------------------|------------------------|------------------------|---------|
| Total revenue (Sales) | 6,216,120 | 9,936,440 | 16,152,560 | |
| Variable cost (VC): | | | | |
| Purchases | 2,369,400 | 3,760,230 | 6,129,630 | 89.4 |
| Transportation | 390,700 | 78,000 | 468,700 | 6.8 |
| Loading | 28,000 | 15,600 | 43,600 | 0.6 |
| Offloading | 19,500 | 7,800 | 27,300 | 0.4 |
| Miscellaneous | 100,000 | 25,000 | 125,000 | 1.8 |
| Total Variable Cost (TVC) | 2,907,600 | 3,886,630 | 6,794,230 | 99.1 |
| Gross Margin (TR - TVC) Fixed cost: | 3,308,520 | 6,049,810 | 9,358,330 | |
| Store rent | 10,000 | 36,000 | 46,000 | 0.7 |
| Depreciation on marketing equipment | 4,800 | 7,200 | 12,000 | 0.2 |
| Total Fixed Cost (TFC) | 14,800 | 43,200 | 58,000 | 0.9 |
| Total Cost (TFC + TVC) NMI/Profit (GM-TFC) | 2,922,400 3,923,720 | 3,929,830 6,006,610 | 6,852,230 9,300,330 | |
| MNMI (NMI/n) | 68,619 | 83,425 | 77,503 | 100 |
| ROI (TR/TC) | 2.1 | 2.5 | 2.3 | |
| NROÌ (NMI/TC) | 1.1 | 1.5 | 1.3 | |

Table 2: Estimated monthly profitability of the enterprise

Source: Computed from survey data, 2016. Note: WH = Wholesaler, RT = Retailer; n = number of respondents.

The result of the estimate profit for yam marketing in Benue State is presented in Table 2. The marketers spent total marketing cost of N 6,852,230 with variable costs amounting to N 6,794,230 (99.1%) and fixed cost of N 58,000 (0.9%). The variable cost composed of purchases, transportation, loading, offloading and miscellaneous expenses which accounted for 89.4%, 6.8%, 0.6%, 0.4% and of the total cost respectively. The fixed cost had store rent and depreciation on marketing equipment which constituted 0.7% and 0.2% respectively of the total cost.

Furthermore, the Table 1 revealed that the marketers realized total revenue of \$16,152,560 after spending a total cost of \$6,852,230 realized a net marketing income/profit of \$9,300,330 mean net marketing income of \$77,503 return on investment of 2.3 and net return on investment of 1.3. The net return on investment figure (1.3) implied that together, the marketers realized \$1.3k on every 1\$ expended on the enterprise in a month. In comparison, the wholesalers and retailers realized net marketing incomes, mean net marketing incomes, return on investment and net return on investment figures of \$3,293,720 &\$6,006,610; \$68,619 &\$83,425; 2.1 & 2.5 and 1.1 & 1.5 respectively. The existence of difference between mean net marketing incomes of the intermediaries negates the null hypothesis that stated that there was no significant difference between mean net marketing incomes realized by the wholesalers and retailers of yam in the study area. The net return on investment figures implied that the wholesaler and retailers realized \$1.1k and 1.5k respectively on every 1\$ expended on the enterprise in a month. The result indicated that the enterprise was profitable in both wholesaler and retailer levels, but more profitable at the retailer

intermediary. This result is in consonance with Njoku and Nnamani (2016) who noted that yam marketing was a profitable enterprise.

CONCLUSION

Effective and efficient marketing of yams is not only critical, but also central to support the recent increase in world production output and sustenance of Nigeria's status as the leading producer of the crop. Yam marketing in Benue State, Nigeria proved a profitable venture given the positive value of net marketing income, return on investment and net return on investment, but a good level of inefficiency exists among the intermediaries and some constraints posed challenge to better profits from the enterprise.

RECOMMENDATIONS

Taking deliberate measure to mitigate the constraints and improve yam marketing efficiency is expedient and would ensure higher profits and better welfare for the marketers.

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COMMUNITY-BASED ADAPTATION MEASURES AMONG FOOD CROP FARMERS IN SOUTH-EAST, NIGERIA

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ABSTRACT

This study examined community-based adaptation strategies among the food crop farmers' South-East, Nigeria. It specifically identified and analysed indigenous adaptation measures among food crop farmers, and tested if there were differences in adaptation measures by the food crop farmers in the selected States. Both primary and secondary data were used. Multistage sampling technique was adopted for this study to select 370 food crop farmers in the study area. Data collected were analysed using descriptive statistics and analysis of variance. The results obtained showed 84.41% and 45.46% of the respondents who diversified from farm to non-farm activities and changed from crop to livestock indicated that these adaptation measures were not effective. Also, changing planting date, tree planting, use of soil conservation techniques and use of resistant variety were found to be the most effective adaptation measures in South-East, Nigeria. There were significant differences in adaptation measures in the study area based on the significant F-calculated value of 3.588from ANOVA result. A post-hoc test result showed significant difference between Abia and Ebonyi States with a mean difference value of 0.2613696. The study recommended the provision of basic amenities and soft loans to farmers as well as an improvement in extension services

Key words: Climate change, Adaptation measures, South-East, Nigeria

INTRODUCTION

Nigeria is the Africa's major region where food output per capita has been decreasing in last three decades. Being characterized by primitive technology and low productivity, Nigeria's agriculture has not kept pace with increasing demand for food. One key factor in this shortfall is the declining availability of arable land per capita. Food and Agricultural Organization report shows that in 1969, the available arable land per capita stood at 0.633 and reduced to 0.1915 in 2014. This, according Zabbey (2007), is attributed mainly to increasing concentrations of greenhouse gases in the atmosphere and population growth. Nigeria's climate is grossly variable and this manifest in climate extremes such as droughts, floods water supply variability and soil degradation. This increased climate variability, coupled with the high dependence of Nigeria's economies on agriculture, makes farmers, particularly those in South-East, Nigeria (whose is largely rain fed), very susceptible to climate vagaries. Climate change could occur naturally as a result of a change in the sun's energy or Earth's orbital cycle (natural climate forcing), or it could occur as a result of persistent anthropogenic forcing, such as the addition of greenhouse gases, sulphate aerosols, or black carbon to the atmosphere, or through land-use change (United Nations Development Programme, 2009).

Human population growth has remained the principal reason for increasing demands for energy and land resources (Intergovernmental Panel on Climate Change, 2007). This is evident specifically through the burning of fossil fuels to produce energy for industrial use, transportation, and domestic power, and through land-use change for agriculture and forest (Crowley, 2000) Also, when ecosystems are altered and vegetation is either burnt or removed, the carbon stored in them is released to the atmosphere as Carbon (IV) Oxide. The most
veritable option to control the negative impacts of climate change in Nigeria is adaptation(Federal Ministry of Environment, Nigeria, 2010). However, the country's low adaptive capacity, resulting from poor financial resources, low technological capabilities and weak institutions seem to pose a barrier to adaptation to climate change (United Nations Framework Convention on Climate Change, 2007). This notwithstanding, several adaptation strategies are currently being practiced to cope with present climate variability in the Nigeria; these strategies range from deployment of early warning systems, sustainable agricultural management systems and improved crop cultivars and lots more(Onyeneke & Madukwe, 2010). There is the need to examine the latest indigenous adaptation options in order to integrate them into national and international development plan.

The paper therefore, specifically examined the indigenous adaptation measures to climate change practiced among food crop farmers in Anambra, Ebonyi and Abia States and make policy recommendations. The hypothesis tested was that there were no significant differences in adaptation measures to climate change among food crop farmers in South-East, Nigeria.

MATERIALS AND METHODS

The study was conducted in South-East, Nigeria which is located between Latitudes 5°N and 6°N, and longitudes 6°E and 8°E. (M. S. Corporation 2009 cited in Nwaiwu, et al., 2013). The South-East states fall within the rainforest ecological zone, characterized by tall trees and climbing plants. It experiences two seasons, the rainy and dry seasons. The rainy season in this zone usually begins in February or March while the dry season usually lasts from November to December or February. The annual rainfall ranges from 2,000 and 3,000 mm with mean annual temperature of 28°C (Building Nigeria's Response to Climate Change, 2011). The topography varies from plain, hilly, gently undulated and low lands.

The inhabitants are mainly traders, farmers, civil servants and artisans. The principal food crops are yam, cassava, cocoyam, maize and oil palm, (Ohajianya & Osuji, 2012). Land use types in the area are shifting cultivation and mixed cropping. The predominant soil in the area is deep well drained sandy loam soil which is generally porous and acidic (Ezemonye & Emeribe, 2012).

The five states that make up the South-East Nigeria are Abia, Imo, Anambra, Enugu and Ebonyi States. Multi-stage sampling technique was adopted for sample selection. In the first stage, three states (Abia, Ebonyi and Anambra) out of the five states were purposively selected based on differences in topography and vegetative covers. Based on the differences in the number of LGAs in each agricultural zone of the selected States, a proportionate sampling technique was used to select 6 LGAs from Abia State, 5 LGAs from Ebonyi State and 8 LGAs from Anambra State in the first stage. The selection was based on the 40% of the total number of LGAs in each Agricultural zone.

In the second stage, Lists of communities in each selected LGA were collected from the community development officer at the Local Government headquarters. The selected 6, 5 and 8 LGAs in Abia, Ebonyi and Ananbra have 57, 41 and 67 communities respectively. In the third stage, 24, 16 and 27 communities were proportionately selected from Abia, Ebonyi and Anambra states. The proportionate technique was based on 40% of the total communities in the selected LGAs. At stage four, 64 villages from Abia, and 57 villages from Ebonyi and 78 villages from Anambra state were selected. The selection at the village level was at the rate of 40% out of 161 villages in Abia State, 144 villages in Ebonyi State and 196 villages in Anambra State. Lists of food crop farmers in the selected villages which form the sampling frame were compiled with help of village heads and resident extension agents. For Abia and Ebonyi States, there were 428 and 306 registered food crop farmers respectively while Anambra State had 506 registered farmers. At the Final stage, 30 % was used across board to

select 128 food crop farmers from Abia State, 91 food crop farmers from Ebonyi State and 151 food crop farmers from Anambra State. This gave a total sample size of 370 food crop farmers, with only 232 booklet of questionnaire returned. A breakdown of the sample selection is presented on Table 1 below.

| Tuole II Sumple Selection | 01100000100 | 1 willions | | |
|---------------------------|-------------|--------------|---------------|-------|
| | Abia State | Ebonyi State | Anambra State | Total |
| Total LGAs | 17 | 13 | 21 | 51 |
| Selected LGAs | 6 | 5 | 8 | 19 |
| Total Communities | 57 | 41 | 67 | 165 |
| Selected Communities | 24 | 16 | 27 | 67 |
| Total Villages | 161 | 144 | 196 | 501 |
| Selected Villages | 64 | 57 | 78 | 199 |
| Total Registered Farmers | 428 | 306 | 506 | 1240 |
| Selected Farmers | 128 | 91 | 151 | 370 |
| | | | | |

| Table 1: | Sample | Selection | of Food crop | Farmers |
|----------|--------|-----------|--------------|---------|

Source: Field Survey Data, 2014

A 3 point likert scale was used to analyse the different indigenous adaptation measures used by food crop farmers in the study area. The number (3, 2, 1) were used to denote very effective, effective and not effective respectively. In order to calculate the mid-value the numbers were summed up and divided by 3(1+2+3=6/3=2).

Testing of hypothesis which states that, there are no significant differences in adaptation measures to climate change among the food crops farmers in South-East, Nigeria was performed using the Leverene's test analysis of variance (ANOVA) and Scheffe/Turkey test.

Levene's test is a preliminary test for running Analysis of variance and is used for validating the assumption of homogeneity of variance. Scheffe/Turkey test on the other hand is a post-hoc test used in Analysis of Variance. Post hoc tests are designed for situations in which the researcher has already obtained a significant F-test with a factor that consists of three or more means.

The ANOVA model is specified following (Ohajianya & Osuji 2012; Pedhazur, 1999).

| F | = | MSSB | | SSB/(k-1) | |
|-------------------------|----------------------|---|----------------|---|--------|
| | | MSSW | = | SSW/(n-k) | eq3.12 |
| TSS | (total s | sum of squar | re) = SSW | + SSB | eq3.13 |
| n _j n SSW | V (sum | of square w | ithin group) | $= \sum_{i=1}^{\infty} \sum_{j=1}^{\infty} (X_{ij} - \overline{X_j})^2$ | eq3.14 |
| n SSB i=1 | $=\sum_{i}$ | $(\overline{X}j - \overline{\overline{X})}^2$ | | | eq3.15 |
| Whe | ere, | | | | |
| X _{ij} = | i th adap | otion measure | e score of far | mers from state j | |
| $\overline{Xi} =$ | Mean a | adaptation sco | ore of respon | ding farmers in stat | e i |

 \overline{X} = Grand mean adaptation score of farmers in South-East Nigeria

- F = Value by which the statistical significance of the mean differences was judged
- SSB = Sum of squared deviations between the scores on adaptation measures of farmers to climate change in the three states of South-East Nigeria.
- SSW = Sum of squared deviations within the scores on adaptation measures of farmers to climate change in the three states of South-East Nigeria
- n_j = Sample size of food crops farmers from state j
- n = Sample size of food crops farmers in South-East Nigeria
- K = Number of states in South-East Nigeria
- k-1 = Degrees of freedom for SSB (numerator)
- n-k = Degrees of freedom for SSW (denominator)

After these tests, the F calculated was compared with the F tabulated. The rule that null hypothesis be accepted if the estimated is less than the tabulated value of F at 5% level of significance was adopted.

RESULTS AND DISCUSSION

Indigenous adaptation measures in Anambra State

Results on Table 2 show the Anambra State food crop farmers' response regarding the adaptation measures they adopted within the period under review.

| Adaptation measures | Very effective | Effective | Not effective | Mean score | Rank |
|---|-----------------------|-------------------|----------------|---------------|--------|
| Planting different varieties | 11 (14.29) | 55 (71.42) | 11 (14.29) | 2 | 5 |
| Changing planting date | 77(100) | 0 (0) | 0 (0) | 3 | 1 |
| Diversifying from farm to non-farm | 2 (2.6) | 10 (12.99) | 65 (84.41) | 1.18 | 7 |
| Changing from crop to livestock | 22 (28.57) | 20 (25.97) | 35 (45.46) | 1.83 | 6 |
| Tree planting | 77 (100) | 0 (0) | 0 (0) | 3 | 1 |
| Use of soil conservation techniques Use of irrigation/watering | 77(100) 76 (98.70) | 0 (0) 1 (1.30) | 0 (0) 0 (0) | 3 2.98 | 1 2 |
| Use of resistant variety | 77 (100) | 0 (0) | 0 (0) | 3 | 1 |
| Use of short gestation crops | 60 (77.92) | 17(22.08) | 0 (0) | 2.78 | 3 |
| Use of fertilizer | 54 (70.13) | 2 (2.60) | 21 (27.27) | 2.43 | 4 |

Table 2: Indigenous Adaptation Measures by Respondents in Anambra State

Source: Field Survey Data, 2014

Based on the 3 point likert scale adopted to quantify the variable, the mid-value was 2. Result on Table 2, reveals that all the respondents who adopted planting different varieties, changing planting date, tree planting, the use of soil conservation techniques and the use of resistant variety as adaptation measures adjudged them as being very effective with the mean score (3) greater than the mid-value (2). Planting a number of different crops in the same plot or in different plots as suggested by Nhemachena and Hassan (2007) reduces the risk of crop failure as different crops are affected differently by climate events. This implies that these strategies are indeed effective indigenous adaptation measures. A good number of them (98.70%, 77.92% and 70.13%) also indicated that irrigation/watering, short gestation crops and fertilizer use were very effective adaptation measures.

Furthermore, 84.41% and 45.46% of the respondents who diversified from farm to non-farm activities and changed from crop to livestock indicated that these adaptation measures were not effective. These two measures ranked 7th and 6th respectively and their weighted mean score (1.18 and 1.83) were both less than the mid-value. This implies that diversifying from farm to non-farm activities and changing from crop to livestock were not effective as indigenous adaptation measures in Anambra state.

Indigenous adaptation measures in Ebonyi State

Table 3 presents the indigenous adaptation strategies adopted by food crop farmers in Ebonyi State.

| Adaptation measures | Very effective | Effective | Not effective | Mean score | Rank |
|---|-------------------|------------|---------------|---------------|------|
| Planting different varieties | 12 (15.38) | 55 (70.51) | 11 (14.11) | 2.01 | 7 |
| Changing planting date | 70 (89.74) | 0 (0) | 8 (10.26) | 2.79 | 4 |
| Diversifying from farm to non-farm activities | 1 (1.28) | 2 (2.56) | 75 (96.16) | 1.05 | 9 |
| Changing from crop to livestock | 3 (3.85) | 50 (64.10) | 25 (32.05) | 1.72 | 8 |
| Tree planting | 78 (100) | 0 (0) | 0 (0) | 3 | 1 |
| Use of soil conservation techniques | 72 (92.31) | 2(2.56) | 4 (5.13) | 2.87 | 3 |
| Use of irrigation/watering | 56 (71.79) | 2 (2.56) | 20 (25.65) | 2.46 | 6 |
| Use of resistant variety | 78 (100) | 0 (0) | 0 (0) | 3 | 1 |
| Use of short gestation crops | 60 (76.92) | 18 (23.08) | 0 (0) | 2.76 | 5 |
| Use of fertilizer | 76 (97.44) | 2 (2.56) | 21 (27.27) | 2.97 | 2 |

Table 3: Indigenous Adaptation Measures by Respondents in Ebonyi State

Source: Field Survey Data, 2014

Based on the 3-type likert scale adopted to quantify the variable, the mid-value was 2. From the table, all the respondents in the study area adopted tree planting and resistant variety as adaptation strategies and their respective mean scores were greater than the mid-value which was 2. This shows that these measures were actually effective. Use of fertilizer and use of conservation techniques were adjudged very effective. Both measures ranked 2nd and 3rd respectively and their mean scores were both greater than 2 which was the mid-value.

More so, diversifying from farm to non-farm activities was not an effective adaptation measure as confirmed by 96.16% of the respondents. Diversifying from farm to non-farm activities ranked 9th with mean score (1.05) and it is less than the mid-value. On the contrary, 64.10% and 70.51% of them deemed changing from crop to livestock and planting different varieties to be effective. Changing from crop to livestock and planting different varieties ranked 8th and 7th respectively.

Indigenous adaptation measures in Abia State

Table 4 presents the indigenous adaptation strategies adopted by food crop farmers in Abia State.

Table 4: Indigenous Adaptation Measures by Respondents in Abia State

| Adaptation measures | Very effective | Effective | Not effective | Mean score | Rank |
|---|------------------------|-------------------|----------------|---------------|--------|
| Planting different varieties | 7 (9.09) | 60 (77.92) | 10 (12.99) | 1.96 | 8 |
| Changing planting date | 77 (100) | 0 (0) | 0 (0) | 3 | 1 |
| Diversifying from farm to non-farm | 20 (25.97) | 7 (9.09) | 50 (64.94) | 1.58 | 9 |
| Changing from crop to livestock | 15 (19.48) | 50 (64.94) | 12 (15.58) | 2.04 | 7 |
| Tree planting | 74 (96.10) | 2 (2.60) | 1 (1.30) | 3 | 2 |
| Use of soil conservation techniques Use of irrigation/watering | 77 (100) 70 (90.91) | 0 (0) 7 (9.09) | 0 (0) 0 (0) | 3 2.91 | 1 3 |
| Use of resistant variety | 69 (89.61) | 7 (9.01) | 1 (1.30) | 2.33 | 5 |
| Use of short gestation crops | 60 (77.92) | 17 (22.08) | 0 (0) | 2.78 | 6 |
| Use of organic fertilizer | 70 (90.91) | 6 (7.79) | 1(1.30) | 2.89 | 4 |

Source: Field Survey Data, 2014

Results on Table 4, shows that changing planting date and use of conservation techniques were very effective and they ranked 1st. Tree planting, use of irrigation/watering, use of organic fertilizer and resistant variety ranked 2nd, 3rd, 4th and 5th respectively. According to Gbetibouo (2009) adopting a new resistant crop variety is the main strategy used to adapt to increasing temperature, building water-harvesting schemes is a popular adaptation strategy to those experiencing the effects of decreased precipitation. Approximately, 65% of the respondents adjudged diversifying from farm to non-farm activities as being effective. Also, 77.72% and 64.94% of the respondents respectively showed that planting different variety and changing from crop to livestock effective.

Result of Analysis of Variance (ANOVA)

| | | ANOVA | | | |
|------------|-----------|-------|--------|-------|------|
| South-East | | | | | |
| | Sum of | Df | Mean | F | Sig. |
| | Squares | | Square | | |
| Between | 2 060 | C | 1 490 | 2 500 | 020 |
| Groups | 2.900 | Z | 1.460 | 5.300 | .029 |
| Within | 04 427 | 220 | 412 | | |
| Groups | 94.437 | 229 | .412 | | |
| Total | 97.397 | 231 | | | |
| CE: 11D | nt n 2014 | | | | |

Table 5: Differences in Adaptation Measures in South-East, Nigeria

Source: Field Data, 2014

Differences of the adaptation measures used by farmers among the selected States were examined using the Analysis of Variance (ANOVA) and the result is presented on Table 5. From the table, F-calculated (3.588) was greater than F-tabulated (2.65) at 1% significant

level. The null hypothesis that there are no significant differences in adaptation measures to climate change among the food crops farmers' in South-East, Nigeria therefore was rejected and the alternative accepted. This result of significant differences called for a post-hoc test (Scheffe/Turvey test) and this was to ascertain the sources of the differences. Prior to this, a Levene's test of homogeneity showed that the assumption of homogeneity of variance was not violated.

Table 6: Multiple Comparisons of Scores on Adaptation Measures to Climate of Change in South-East, Nigeria

| Dependent V | Variable: Sou | th-East | | | | | |
|-------------|---------------|------------|-----------------|----------|------|------------|---------------|
| | (I) | (J) States | Mean Difference | Std. | Sig. | 95% Confid | ence Interval |
| | States | | (I-J) | Error | | Lower | Upper |
| | | | | | | Bound | Bound |
| | Abia | Ebonyi | .2613696* | .1031636 | .032 | .018001 | .504738 |
| Abla | Abla | Anambra | .2094779 | .1034958 | .109 | 034674 | .453630 |
| | Ebonyi | Abia | 2613696* | .1031636 | .032 | 504738 | 018001 |
| HSD | LUOIIYI | Anambra | 0518917 | .1031636 | .870 | 295260 | .191477 |
| , | Anomhro | Abia | 2094779 | .1034958 | .109 | 453630 | .034674 |
| | Anambra | Ebonyi | .0518917 | .1031636 | .870 | 191477 | .295260 |

Source: Field Data, 2014*. The mean difference was significant at the 0.05 level

The statistical significance of the differences between each pair of group is presented on Table 6 and this gives the result of the post-hoc tests. From the table, the mean difference value (I-J) between Abia and Ebonyi states showed that the two groups being compared are significantly different from each other at P < 0.05. Hence, it concludes that the adaptation measures in Abia and Ebonyi States are statistically different from each other.

CONCLUSION

Having identified and analysed some indigenous adaptation measures to climate change, the study concluded that the use of soil conservation techniques and resistant varieties as well as planting of more trees will serve as the most effective adaptive measures in curbing climate change in South-East, Nigeria.

RECOMMENDATIONS

- i. It is therefore recommended that resilience interventions should target individual households within a community.
- ii. Measures such as providing fertilizer (at affordable rate), drought/disease resistant varieties, sinking of boreholes etc. that improve the adaptive capacity of the farmers should be put in place since they have indirect implication for reducing sensitivity to climate change
- iii. Meteorological information should be disseminated in local languages for farmers to understand better.

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ADOPTION OF CLIMATE CHANGE ADAPTATION STRATEGIES BY CASSAVA-BASED FARMERS IN EMOHUA LOCAL GOVERNMENT AREA OF RIVERS STATE

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ABSTRACT

The study analysed the effects of socio-economic economic characteristics of farmers on the adoption of climate change adaptation strategies in Emohua Local Government Area of *Rivers State. Data for the study were collected with Structured Questionnaire from sixty (60)* farmers using a combination of multistage and purposive sampling technique. Data were analyzed using Simple descriptive statistics and Multiple Regression Model. Results revealed that majority (38.3%) were between the age bracket of 31-40 years, while 51.7% of them were males, 48.3% were married, 60% of the respondents had formal education or the other, 60% had household size of 6 -10 people. Majority (58.3%) of the farmers indicated that they have fully adopted planting of crops with early rainfall as a climate change adaptation strategy, while 56.7% use early maturing crops and 46.7% indicated change in planting dates. Results of multiple regression analysis showed that level of education, household size and extension contacts had significant influence on adoption. The study also revealed that the major constraints to adoption include; low awareness level, lack of access to improve crop varieties, low institutional capacity at local government level and limited knowledge on adaptation. The study therefore, recommends that extension programmes should be mounted in communities to increase awareness of climate change.

Keywords: Climate Change, Adaptation Strategies, Adoption

INTRODUCTION

Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period, typically decades or longer. Climate change causes higher temperature, rising sea level, change in precipitation patterns and more frequent weather related disaster (Nzeh & Eboh, 2011).Climate change has moved beyond being an environmental challenge to one that threatens livelihood and development around the world especially in the developing countries. Global warming and its aftermath has exposed many local communities to greater environmental risks such as flooding, drought, desertification, soil degradation, erratic rainfall patterns, heat stress, pest and diseases and others (Ozoh, 2010).

Parry (2012) observed that extreme weather event are likely to become more intense and frequent and the effect on ecosystem will be more severe, with up to 30% of plant and animal species at risk of extinction. Projected climate change is likely to affect millions of people, especially those with low capacity to adapt through increase in malnutrition and consequent disorder. This will have implication for child growth and development, the altered burden of water related diseases, the increased frequency of cardio respiratory infections disease carriers into new regions vectors.

The productivity of rural population has been greatly hindered by climate change which has manifested in different form such as low rainfall, drought, rising sea level and global warming. Men have higher social status as a result of more access to schooling and training and they are less affected by the impact of this change, and the households headed mostly by women are often the most chronically poor groups within rural communities (Food and Agriculture Organization, 2012).

In Nigeria, impact of climate change is already felt at different level, this include rising temperatures, late onset of rains in few places and now spreading to so many parts of the country (Archibong, 2011). The rise in daily average temperature in northern Nigeria has cause

reduction in the yield of crop and livestock production, invariably affecting their livelihood. Rising temperature has caused rivers, stream and falling well water levels, meningitis and kidney stones which increases the rural farmers spending thereby reduces their income. Rising temperature on the high lands of Nigeria has been implicated in increased incidence of malaria, building Nigeria response to climate change, (Building Nigeria's Response to Climate Change, 2011).

In the arid northern parts of Nigeria, higher temperatures will contribute to dry conditions which underlie accelerated wind erosion. These are extremely serious situations given that soil erosion is already of catastrophic proportions in Nigeria whether viewed as gully or sheet erosion while floods annually ravage many parts of the country during the rainy season. For example, it is estimated that in Abia, Anambra and Imo States, there are no fewer than 600 gully erosion sites (Umeagbalasi, 2012).

Recurring flood along the coastal communities in Nigeria has left no fewer than 25 million in Nigeria being displaced and devastated in recent times. Those living along the coastal communities of River Niger, Delta, Benue, Sokoto, Katsina, Lagos, Ondo, Bayelsa, AkwaIbom, Anambra and Cross River states are gravelly affected by the incessant flood menace, (Nmadu, 2012). The worst is that property worth billions of naira has been destroyed by the flood. The continuous ravaging flood has put many Nigeria into untold hardship which those in the coastal communities are grossly affected.

Kuckelberg (2012) conducted a survey which examines the impact of climate change on livelihoods of farmers and agricultural workers in Ghana. The result shows that there are reduction in farmer's income as a result of loss of crop; food insecurity and social insecurity.

Saadat and Islam (2011) conducted a research on impact of climate change on rural livelihood in Bangladesh and the result shows that climate change caused damage on assets like education facilities, increases ill health, causes increases of interrupted power supply, scarce water for irrigation, damage of property and less production of crops.

Agriculture remains a major source of food, industrial raw material and a means of earning foreign exchange. It employs close to 70 per cent of the Nigerian population, Agricultural practice in the country is dominantly rain-fed and therefore particularly vulnerable to the impacts of climate change. Similarly, livestock production, which involves the herding of cattle, goats and sheep raised principally in the northern states, is also heavily dependent on rainfall and thereby equally vulnerable (Federal Ministry of Environment, 2009).

Empirical study on effects of socio-economic characteristics of farmers on adoption of adaptation strategies in Oyo state showed that household size, extension visits and non-farm income significantly impact on the various strategies used on adaptation to climate change (Ajao and Ogunniyi, 2011). This study focuses on the effect of socio-economic characteristics of cassava based farmers on the adoption of climate change adaptation strategies in Emohua Local Government Area of Rivers State. The specific objectives of the study were to; describe the socio-economic characteristics of respondents in Emohua Local Government area; examine level of adoption of climate change adaptation strategies by the farmers; and examine the relationship between socio-economic characteristics of farmers and level of adoption of climate change adaptation strategies.

MATERIALS AND METHODS

The Study was conducted in Emohua Local Government Area of Rivers State. Emohua Local Government is one of the twenty three local government areas of Rivers State. It is made up of 12 communities which are Akpabulltu, Ogbakiri, Emohua, Ibaa, Obelle, Rumundele, Elele Alimini, Omudioga, Egbeda, Ubinma, Odegu, Rumuekpe. Multi-stage sampling technique was used in selecting respondents. First stage was random selection of three (3) communities from the twelve (12) communities, this selected communities were Emohua, Elele Alimini and Rumundele, second stage was random selection of two villages from each selected community

making it a total of six (6) villages, the last stage was purposive selection of ten (10) cassava based farmers from each village making a total of sixty (60) respondents for the study. The reason for selecting purposively was to select only cassava based farmers. Data were collected using well structured questionnaire and oral interview. Data were analysed using descriptive statistics and Ordinary Least Square Multiple regression analysis.

Model specification, $Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e_i)$ Equation 1 Where Y=Adoption index, derived based on the responses from the listed climate change adaptation strategies, which was captured by pooling a 3-point Likert scale of adopted =3, partially adopted =2, and not adopted =1. $X_1 = Gender (dummy, male =1, female =0)$ $X_2 = Age (years)$ $X_3 = Level of education (years)$ $X_4 = Household size (number)$ $X_5 = Marital status (dummy, single =0, married =1)$ $X_6 = Membership of the cooperative (dummy, yes =1, No=0)$

X₇ =Extension contact (dummy, yes =1, No=0)

 $X_8 =$ Farming experience (years)

 $e_i = error term$

The relationship between the dependent and each of the independent variables was examined using the four functional forms: linear, semi-log, exponential and double- log.

Linear: $Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + e$... Eqn 2 Semi-Log: $Y = B_0 + B_1 \log X_1 + B_2 \log X_2 + B_3 \log X_3 + B_4 \log X_4 + B_5 \log X_5 + B_6 \log X_6 + B_7X_7 + B_8X_8 + B_7X_8 + B_7$

 $B_7 log X_7 + B_8 log X_8 + e...$ Eqn 3 Exponential: log Y= $B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + e$..Eqn 4

Double Log: $\log Y = B_0 + B_1 \log X_1 + B_2 \log X_2 + B_3 \log X_3 + B_4 \log X_4 + B_5 \log X_5 + B_6 \log X_6 + B_7 \log X_7 + B_8 \log X_8 + e$Eqn 5 B_o = intercept.

 $B_1, B_2...B_{10}$ =estimated coefficients.

RESULTS AND DISCUSSIONS

Socio Economic Characteristics of the respondents

Table1 showed that 51.7% of the farmers were males, while 48.3% were females. Majority (38.3%) of the farmers were between the age bracket of 31- 40years old. The above finding indicates that the farmers were mainly middle aged who are in the economically active stage and has the ability to increase yield. The result from Table 1 also showed that 40.0% of the farmers had no formal education, 16.7% had adult education, 18.3% of the farmers had primary education while 10.0% of the farmers attained secondary education and 15.0% received tertiary education. Findings also showed that majority (60%) of the farmers had 6 to 10 members in their household, 31.7% of the farmers were single, while 48.3% of the farmers were married. It was also found that 28.3% were members of cooperative societies while 71.7% were not. Since majority were not members of cooperative societies, their access to farm resources like credits and even extension contact might be lean and this would not encourage adoption.

Findings showed that 35.0% of the respondents had above 20years farming experience, 35.0% have been visited by extension agents, while 65.0% were not visited by extension agents. This is not good because visit or contact with extension provides opportunity for transfer of skill, knowledge and information which facilitates adoption. About 38.3% of the farmers know about adoption of climate change adaptation strategies through radio, 26.7% of the farmers

| Table 1: Distribution of soc | io-economic characteristics of | farmer |
|------------------------------|--------------------------------|---------|
| Variable | Frequency | Percent |
| | | |
| Gender | | |
| Male | 31 | 51.7 |
| Female | 29 | 48.3 |
| Age | | |
| 21-30 | 20 | 33.3 |
| 31-40 | 3 | 5.0 |
| 41-50 | 14 | 23.3 |
| Above 50 | 23 | 38.3 |
| Education level | | |
| No formal education | 24 | 40.0 |
| Adult education | 10 | 16.7 |
| Primary | 11 | 18.3 |
| Secondary | 6 | 10.0 |
| Tertiary | 9 | 15.0 |
| Household size | | |
| 1-5 | 19 | 37.7 |
| 6-10 | 36 | 60.0 |
| 11-15 | 4 | 6.7 |
| Above 20 | 1 | 1.7 |
| | | |
| Farming experience | | |
| 1-5 | 11 | 18.3 |
| 6-10 | 11 | 18.3 |
| 11-15 | 10 | 16.7 |
| 15-20 | 7 | 11.7 |
| Above 20 | 21 | 35.0 |
| Membership of cooperative | | |
| societies | | |
| Yes | 17 | 28.3 |
| No | 43 | 71.7 |
| Extension visit | | |
| Yes | 21 | 35.0 |
| No | 39 | 65.0 |
| Sources of information | | |
| Friends/relatives/neighbour | 16 | 26.7 |
| Extension agents | 4 | 6.7 |
| Radio | 23 | 38.3 |
| Newspaper | 4 | 6.7 |
| Others | 13 | 21.7 |
| Marital status | | |
| Single | 19 | 31.7 |
| Married | 29 | 48.3 |

Source: field survey, 2014

Divorced Widowed

know about climate change through friends/relatives/neighbours, 21.7% of the farmer got to know about the climate change through others, 6.7% got the information through television

16.7

3.3

10

2

and extension visit, while 6.7% of the farmers got to know about climate through the newspaper.

Levels of adoption of climate change adaptation strategies

Table 2: Distribution of levels of adoption of climate change adaptation strategies

| Adaptation strategies | Fully adopted | Partially adopted | Not adopted |
|---|------------------|----------------------|-------------|
| Planting of crop with early | | | |
| rainfall | 35(58.3) | 21(35.0) | 4(6.7) |
| Use of early maturing crop varieties | 34(56.7) | 18(30.0) | 8(13.3) |
| Change of planting date | 28(46.7) | 28(46.7) | 4(6.7) |
| Change the time of land preparation | 20(35.0) | 26(43.3) | 13(21.7) |
| Change the harvesting date | 13(21.7) | 33(55.0) | 14(23.3) |
| Use of different varieties | 17(28.3) | 25(41.7) | 18(30.0) |
| Moving from farming to non- farming | 22(36.7) | 15(25.0) | 23(38.3) |
| Different crops | 33(55.0) | 19(31.7) | 8(13.3) |
| Moving to a different site | 27(45.0) | 24(40.0) | 9(15.0) |
| Tree planting | 17(28.3) | 27(45.5) | 16(26.7) |
| Use of indigenous Knowledge | 17(28.3) | 19(13.7) | 24(40.0) |
| Change from crop to livestock | 9(15.0) | 18(30.0) | 33(55.0) |
| Use of credit | 19(31.7) | 18(30.0) | 23(38.3) |
| Increase use of irrigation/ground water | 10(16.7) | 17(28.3) | 33(55.0) |

Source: field survey (2014)

The result on Table 2 showed that 58.3% of the farmers indicated that they fully adopted planting of cassava with early rainfall as an adaptation strategies, use of early maturing crop

varieties was fully adopted by 56.7% of the farmers, 46.7% of the farmers indicated that they fully adopt change of planting date, while the use of different crops recorded 55.0% as fully adopted by the farmers. Findings from the result also showed that 45.5% of the farmer partially adopt the use of tree planting ,40% indicated they do not adopt the use of indigenous knowledge ,55% indicated that they do not adopt diversifying from crop to livestock while 55% also showed that they do not use irrigation as a climate change adaptation strategy.

From the findings, it is obvious that farmers fully adopted only five(5) out of fourteen (14) listed adaptation strategies practices. This indicates that the level of climate change adaptation practices is still low, this could be as a result of the strenuous nature of some of the practices like planting of different varieties, tree planting or low awareness of climate change in rural communities.

| Table 3: Regression results on adoption of climate change adaptation strategies | | | | |
|---|-----------|-----------|-------------|------------|
| Variables | Linear | semi log | Exponential | double log |
| Constant | 3.013 | 20.708 | 3.060 | 19.512 |
| | (16.951) | (2.817) | (11.898) | (3.846) |
| Gender(X1) | 0.004 | -0.313 | -0.010 | 0.120 |
| | (0.111) | (-0.205) | (194) | (0.114) |
| Age (X ₂) | 0.000 | -0.695 | -0.028 | 0002 |
| | (-0.105) | (-0.389) | (445) | (0039) |
| Level of edu(X ₃) | 0.047 | 2.854 | 0.104 | 1.274 |
| | (3.105)* | (2.855)* | (2.979)* | (2.977)* |
| Hhold size(X ₄) | 0.018 | 3.617 | 0.124 | 0.528 |
| | (2.320)** | (2.449)** | (2.400)** | (2.359)** |
| Marital | -0.038 | -2.453 | -0.077 | -1.278 |
| status(X ₅) | (-0.908) | (-1.352) | (-1.220) | (-1.062) |
| Coop memb (X ₆) | -0.022 | -0.331 | -0.015 | -0.559 |
| | (-0.480) | (-0.177) | (230) | (-0.433) |
| Farming exp(X ₇) | 0.000 | 0.257 | 0.016 | 0.003 |
| | (0.305) | (0.325) | (0.561) | (0.073) |
| Extension | 0.066 | 2.518 | 0.088 | 1.911 |
| $contact(X_8)$ | (1.193) | (1.421) | (1.413) | (1.867)*** |
| R ² | 0.568 | 0.593 | 0.625 | 0.678 |
| F-value | 3.731* | 3.838* | 3.959* | 4.103* |

| Determinants of adoption of climate change strategies |
|---|
| Table 3: Degression results on adoption of elimete change |

Source: Data analysis(2014) *Significant at 1% level** Significant at 5% level** *Significant at 10% level Values in parenthesis are the t- values.

Results of regression analysis for the socio economic characteristics for all the four functional forms are presented in the Table3. Double -log form was chosen as the lead equation based on

the high value of R^2 , more significant coefficients, highest F- value and conformity to a priori expectations of the regression coefficients.

The coefficient of multiple determination (\mathbb{R}^2) value of 0.678 indicates that about 67% of the variation in the level of socio- economic characteristics could be explained by the explanatory variables while the remaining 33% was due to other factors not specified in the model, F-ratio with 4.103 in the regression result at 1% level of significance implies that all the variables have significant or joint effect on the dependent variables.

Level of education was significant at 1% and has positive coefficient. Education is the bedrock of knowledge and as farmers' level of education increases; there will be an increased awareness of available adaptation strategies to climate change. Therefore, efforts at mitigating climate change should involve policies that strengthen educating the farmers, especially agricultural education.

Household size is significant at 5% and related positively to adaptation strategies. This implies that larger household will have more labour input, subsequently can easily adopt to different climate change strategies. Also extension contact is significant at 10% and has positive coefficient. This shows that extension services disseminate innovations to the farmers. Marital status has a negative coefficient and is not significant. This shows that married farmers may not have time to adopt climate change strategies because of other family responsibilities.

Age has a negative coefficient though not significant; this shows that younger people will work hard to adopt to climate change strategies because they have more energy than older people. Cooperative membership, gender and farming experience are not significant.

CONCLUSION

The study analyzed the socio-economic factors that influence adaptation to climate change in Emohua Local Government Area, Rivers State, Nigeria. The study revealed that majority of the farmers are not adopting many of the strategies listed in this study. The study also showed that level of education, household size, extension contacts of the farmers are statistically significant, and they affect adoption of climate change adaptation measures. It also indicates that coefficients of age, marital status, years of farming experience and marital status are not significant, implying that they are not important determinants of adoption of climate change adaptation measures.

RECOMMENDATIONS

The study therefore recommends that extension programmes should be mounted in communities to increase awareness of climate change and adaptation measures which will help to reduce vulnerability.

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EFFECTIVENESS OF LIFT ABOVE POVERTY ORGANIZATION AGRICULTURE AND RURAL DEVELOPMENT INITIATIVE ON FEMALE AND MALE FARMERS IN EDO STATE, NIGERIA

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ABSTRACT

Non-governmental organizations usually target the vulnerable groups to alleviate poverty for the purpose of sustainable development. The study therefore examined the effectiveness of the Lift Above Poverty Organization's (LAPO) Agriculture and Rural Development Initiative (LARDI) on male and female farmers in Edo State. Data were obtained from 120 small-scale registered farmers using a structured questionnaire administered through interview schedule and analyzed using descriptive and inferential statistics. Results show that majority of the respondents were males (72.5%), above the age of 40 (93.3%) and the mean age was about 51.5 years, married (91.7%), with the majority (70.8%) of the respondent having a family size of 5-8 persons and the mean of about 6persons and farm sizes<1.5 hectares (42.5%)and a mean farm size of 3.7ha. There were significant differences at 5% before and after participation in LARDI with respect to credit accessed (t=20.260), farm size (t=28.398) and income (t=16.405) of farmers. Also, there were significant differences between male and female beneficiaries with respect to credit accessed (t=8.044), farm size (t=6.281) and income (t=14.319) from LARDI intervention. Constraints encountered included inability to obtain enough credit (\bar{x} =2.86), inadequate storage facilities (\bar{x} =2.52), inadequate market for produce (x=2.18) and short repayment period (x=2.04). LAPO's agricultural and rural development strategies were effective in enhancing the status of women and men farmers however, more credit could be advanced and repayment period extended to enable beneficiaries increase productivity and income..

Keywords: Poverty alleviation, Gender, Non-Governmental Organization, Rural Development

INTRODUCTION

Poverty is present in rich and poor nations of the world but more prevalent in the developing world. In most nations,, inequality between the rich and the poor is quite high and the gap often widens continuously.. The causes of poverty include bad government policies, corruption, limited access to production resources and other factors (Babashola, 1997).In 2001, it was revealed that three-quarters of the world are living on less than two dollars per day and are mostly found in the rural areas. According to Agbamu (2005), sixty percent (60%) of the world's poorest people will still be rural in 2020. In support Ali (2013) stated that Africa alone harbours three hundred million (300 million) of the world's population that are absolutely poor. Adequate rural development will lead to effective and efficient agricultural system that will not only supply food and animal protein but will foster the utilization of natural resources in sustainable manner (CGAIR, 1995).

The Government and other relevant agencies have made effort to alleviate poverty among farmers in Nigeria over the years. Despite these, reports have shown that over85% of these farmers are still poor, illiterate and mal-nourished.(World Health Organization and Food and Agriculture Organization of the United Nations (WHO and FAO/UN) (2011)). Non-

governmental organizations usually target the rural areas to alleviate poverty for the purpose of sustainable development. Lift Above Poverty Organization (LAPO), a Non- Governmental Organization (NGO) was established in 1987 to address the persisting problem of poverty among farmers in the country. It transformed into a microfinance institution in 1990 and incorporated social development programmes as a major component in achieving organizational goals. LAPO's strategy is poverty focused, innovation driven and limited to excellence (Ehigiamusoe, 2011). LAPO's rural and agricultural development initiative (LARDI) objectives include income generation enhancement, gender sensitization, health awareness, social capital development and empowerment with farming information and inputs as well as employment generation for youths.

The question therefore is how has LARDI been effective from the perspectives of female and male beneficiaries in the study area? The specific objectives were to describe the socio economic characteristics of LARDI farmers in Edo state; examine the respondents access to LAPO and LARDI's services, their perception of the effectiveness of the services, and identify the constraints to effectiveness for optimal benefit from the programme.

MATERIALS AND METHODS

The study was conducted in Edo State, located in the southern geo-political zone of Nigeria. The State has a geographical area of 17,802 km² (6,873 square miles) and State lies 6° 30'N 6° 00'Ewith population density of 3,487,502 people, (National Population Commission, (2006). The average temperature is about 25 °C (77 °F) in the rainy season, and about 28 °C (82°F) in the dry season. Its vegetation comprises the mangrove swamp forest, rain forest and savannah vegetation. Edo State is endowed with agricultural products such as rubber, oil palm, groundnuts, soya beans, cocoa, yam, cassava, and vegetables cultivated by the farmers in the State.

The population for the study consisted of the small scale farmers who were registered with LAPO branches in Edo State. The sample consisted of twenty four (24) respondents each from the branches as follows; Afuze, Benin, Igarra, Igueben and Okada who were purposively selected for uniformity to give a total of 120 respondents/farmers per LGA. Data were collected using structured questionnaire and analyzed using descriptive statistics such as means, percentages, and frequencies while t-test statistical tool was used to test the hypotheses.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Table 1 shows the socio-economic characteristics of the respondents. Findings show that majority (72.5%) of the respondents were males, 37.5% of them were within the age of 51-60years while the mean age was 51.5years, 91.7% were married, 70.8% had family size of 5-8 with mean age of 6persons. Majority (72.5%) of the respondents had secondary education, 42.5% had farm sizes between 4-6 hectares and mean farm size of 3.7ha and 43.5% had 11-15 years of farming experience with mean of 14.9years. Majority (65.8%) of the farmers engaged in arable crop farming while (97.5%) of the farmers' source of farm labour was hired.

The annual income of the respondents showed that majority (80.8%) earned between \$50,001-100,000, while 10% earned below \$50,000, with the mean income of the respondents being \$73,125,000 per annum (\$6,093/month) This shows that LARDI farmers earned more income than average Nigerian farmers.

| Variables | Descriptions | Freq | (%) | Mean (x) | |
|------------------|----------------------------|----------|--------------|--------------|--|
| | Female | 33 | 27.5 | | |
| Sex | Male | 87 | 72.5 | | |
| | ≤30 | 2 | 1.7 | | |
| | 31-40 | 6 | 5.0 | | |
| Age | 41-50 | 39 | 32.5 | 51.5years | |
| | 51-60 | 45 | 37.5 | | |
| | >60 | 28 | 23.3 | | |
| | Single | 4 | 3.3 | | |
| | Married | 110 | 91.7 | | |
| Marital Status | Divorced | 1 | 0.8 | | |
| | Widow(er) | 4 | 3.3 | | |
| | Separated | 1 | 0.8 | | |
| | <u>≤4</u> | 33 | 27.5 | | |
| Family size | 5-8 | 85 | 70.8 | 5.9/6persons | |
| · | 8-12 | 2 | 1.7 | 1 | |
| | Primary | 29 | 24.2 | | |
| | Secondary | 87 | 72.5 | | |
| Educational | Standard 6 | 3 | 2.5 | | |
| level | HND/BSC | 4 | 0.8 | | |
| Farm size (ha) | <2.0 | 25 | 20.8 | | |
| | 2.1-4.0 | 42 | 35.0 | 3 66ha | |
| | 4 1-6 0 | 51 | 42.5 | 5100114 | |
| | >6.0 | 2 | 1 7 | | |
| | <10 | 33 | 27.5 | | |
| Farming | 11-15 | 52 | 43.3 | | |
| evnerience | 16-20 | 27 | 22.5 | 14 Quears | |
| (voors) | >20 | 8 | 67 | 14.7years | |
| (years) | Mixed (crop and | 79 | 65.8 | | |
| Farming | livestock) | 17 | 05.0 | | |
| ontorprise type* | Livestock forming | 18 | 15.0 | | |
| enter prise type | Arable Crop | 85 | 70.8 | | |
| | forming | 85 | /0.0 | | |
| | Livesteels Forming | 40 | 22.2 | | |
| | | 40 | 55.5 07.5 | | |
| | LANDI Demografi covince | 117 | 97.5 | | |
| Source of form | Other Coor emetizing | 114 5 | 95.0 | | |
| Source of farm | Man av lan dans | 5 | 4.2 | | |
| capital" | Francisco de ferror de | 1 | 0.8 | | |
| | ramily and friends | 5 | 2.5 | | |
| A | ≤#30,000 | 1 | 0.8 | N72 125 000 | |
| Annual income | ₩ 50,001-100,000 | 9/ | 80.8 | ₩/3,125,000 | |
| | ₩ 100,000-150,000 | 8 | 6.7 | | |
| | >==== 150,000 | 5 | 2.5 | | |

• • • .• 6 D -

Source: Field survey, 2013

This result agrees with findings by Ehigiamusoe (2011) that finance is a key component for the economic development of the people, as it enhances farmers' ability to acquire farm input and corresponding increase in output. LAPO was the major source of farm capital which satisfies LAPO's core objective which is to enhance the income generating capacity of the poor through access to flexible financial services.

^{*}Multiple response

| | Female | | Male | | Pooled | |
|--|--------|------|------|------|--------|------|
| Services | Mean | SD | Mean | SD | Mean | SD |
| Trainings | 3.00 | 0.00 | 2.98 | 0.05 | 2.99* | 0.09 |
| Sourcing agrochemicals | 2.96 | 0.04 | 3.00 | 0.00 | 2.98* | 0.18 |
| Linkage with extension services | 2.97 | 0.17 | 2.98 | 0.18 | 2.95* | 0.22 |
| Linkage with market for produce | 2.91 | 0.29 | 2.93 | 0.25 | 2.92* | 0.31 |
| Loan disbursement | 2.88 | 0.33 | 2.88 | 0.25 | 2.88* | 0.36 |
| Equipment and tractor hiring | 2.73 | 0.57 | 2.86 | 0.37 | 2.79* | 0.52 |
| Sales of farm tools (hoes, cutlasses etc.) | 1.80 | 0.59 | 1.99 | 0.47 | 192 | 0.53 |

Respondents Access to LAPO's Agricultural Improvement Services

| Table 2: Res | pondents Access to | o LAPO's Agricultu | ral Improvement Services |
|--------------|--------------------|--------------------|--------------------------|
|--------------|--------------------|--------------------|--------------------------|

Source: Field Survey, 2013*Access (mean ≥ 2.00)

Table 2 shows that the respondents had access to LAPO's services with trainings being the highest (\bar{x} =2.99), agrochemicals (\bar{x} = 2.98), extension services (\bar{x} = 2.95), loan (\bar{x} = 2.92), linkage with market (\bar{x} =2.88) and equipment and tractor hiring (\bar{x} =2.79). However, the mean for farm tools (hoes, cutlasses etc.) is low (\bar{x} =1.92). This again shows that the respondents do not sell off these tools as they require them for their farming activities. No wonder the assertion by Enwere (2006) that it is important to improve the access of poor farmers to credit as long as they possess the needed competence and capacity to pay-back at the right time.

Respondents' Perception of Effectiveness of LARDI Services

Table 3: Respondents' perception of effectiveness of LARDI services

| | Female | | Male | | Pooled | |
|--|--------|------|-------|------|--------|------|
| Services | Mean | SD | Mea | SD | Mean | SD |
| Sourcing agrochemicals | 3.00* | 0.00 | 3.00* | 0.00 | 3.00* | 0.00 |
| Trainings | 3.00* | 0.00 | 3.00* | 0.00 | 3.00* | 0.00 |
| Linkage with extension services | 2.97* | 0.17 | 2.97* | 0.18 | 2.97* | 0.22 |
| Linkage with market for produce | 2.91* | 0.29 | 2.93* | 0.25 | 2.93* | 0.31 |
| Loan disbursement | 2.88* | 0.33 | 2.87* | 0.25 | 2.92* | 0.36 |
| Improved equipment (tractors and implements) | 2.73* | 0.57 | 2.86* | 0.37 | 2.83* | 0.52 |
| Sales of farm tools (hoes, cutlasses etc.) | 1.70 | 0.59 | 1.99 | 0.47 | 1.91 | 0.53 |

Source: Field Survey, 2013*Effective (mean > 2.00)

Table 3 shows that various services rendered under LARDI were assessed by the respondents as effective except in the sale of farm tools (\bar{x} =1.91). The highly perceived as effective services were sourcing agrochemicals (\bar{x} =3.00), training (\bar{x} =3.00), linkage with extension services (\bar{x} = 2.97), linkage with market (\bar{x} =2.93), for loan disbursement (\bar{x} =2.92) and for improved equipment (tractors) hiring (\bar{x} =2.83). The low mean value for sales of farm tools is an indication that the respondents do not rate this service as effective which is also implied in the low level of access revealed in Table 2. This might be a service LARDI downplays. However, the result is inconsistent with the findings of Ehigiamusoe (2011) which accounted for successful result of microcredit services in terms creating employment and reliable means of incentive to millions of farming households around the world.

| Variahles | Pooled | | Difference | t-value | Decision |
|----------------------------|------------|------------|------------|---------|-------------|
| v al lables | Before | After | Difference | t-value | Decision |
| Credit accessed (Naira) | 149,458.33 | 315,711.25 | 166,252.92 | 20.260 | Significant |
| Land accessed (Ha) | 1.89 | 3.66 | 1.77 | 28.398 | Significant |
| Income (Naira) earned | 41,966.67 | 65,550.01 | 23,583.34 | 16.405 | Significant |
| Source: Field Survey, 2013 | p<0.05 | | | | |

Differences in selected LARDI services indicators before and after participation

Table 4 shows that under LARDI, the mean values increased for all the variables considered after respondents' participation. Result of t-test analysis presented in the table shows that credit accessed (t=20.260), farm size (t=28.398) and income (t=16.405) were significantly different at 5% before and after participation in LARDI. This is an indication that LARDI services were effective with respect to these variables. This could translate to enhanced income consequently, poverty alleviation.

Table 4: Differences in selected LARDI services indicators before and after participation

Difference between female and male respondents with respect to selected variables

Table 5 shows that there were significant differences between male and female beneficiaries with respect to credit accessed (t=8.044), farm size (t=6.281) and income (t=14.319) from LARDI intervention.

Table 5: Difference between female and male respondents with respect to selected variables

| Variables | Female | Male | Difference | t -value | Decision |
|-------------------------|------------|------------|------------|----------|-------------|
| Credit accessed | 274,696.97 | 331,268.39 | 56,571.42 | 8.044 | Significant |
| Farm land accessed | 2.12 | 3.66 | 1.54 | 6.281 | Significant |
| Income (N) | 50,606.06 | 71,045.99 | 20,439.93 | 14.319 | Significant |
| | | | | | |

Source: Field Survey, 2013

Males had the higher means for all the variables which is an indication that females seem to be poorer and could be encouraged, assisted or targeted for enhanced assistance to improve their status.

| Respondents | | | | | | |
|--|-------|------|-------|------|--------|------|
| Constraints | Femal | e | Male | | Pooled | 1 |
| | Mean | SD | Mean | SD | Mean | SD |
| Difficulty in obtaining enough credit | 2.82* | 0.64 | 290* | 0.31 | 2.86* | 0.44 |
| Inadequate extension contact | 1.03 | 0.17 | 1.13 | 0.43 | 1.10 | 0.38 |
| Inadequate market for produce | 2.27* | 0.67 | 2.09* | 0.61 | 2.18* | 0.63 |
| Inadequate storage facilities | 2.66* | 0.75 | 2.46* | 0.64 | 2.52* | 0.67 |
| Unavailable land for farm expansion | 2.03* | 0.68 | 1.95 | 0.43 | 1.98 | 0.51 |
| High cost of farm inputs | 1.85 | 0.51 | 1.95 | 0.43 | 1,93 | 0.45 |
| Complexity of newly introduced technology | 1.85 | 0.62 | 1.76 | 0.53 | 1.78 | 0.55 |
| Poor access to extension services | 1.03 | 0.17 | 1.01 | 0.11 | 1.02 | 0.13 |
| Ineffective teaching on farming methods | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 |
| Lack of information on improved technologies/practices | 1.03 | 0.17 | 1.01 | 0.00 | 1.01 | 0.09 |
| Loan processing is cumbersome | 1.73 | 0.76 | 1.44 | 0.52 | 1.52 | 0.61 |
| Do not have collateral | 1.06 | 0.24 | 1.07 | 0.25 | 1.07 | 0.25 |
| Repayment period is too short | 2.26* | 0.71 | 1.82 | 0.80 | 2.04* | 0.78 |
| No insurance coverage | 1.39 | 0.66 | 1.68 | 0.74 | 1.60 | 0.73 |
| Experienced natural disasters (specify) | 1.18 | 0.39 | 1.45 | 0.62 | 1.38 | 0.58 |
| Loan for farming was diverted due to unforeseen problems | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 |

Constraints to Effectiveness of LARDI Services as Perceived by the Male and Female Respondents

Table 6: Constraints to Effectiveness of LARDI Services as Perceived by the Respondents

Source: Field Survey, 2013*Serious (mean > 2.00)

Table 6 shows the seriousness of the constraints to effectiveness of LARDI services as perceived by the respondents. The most serious general constraints were; inability to obtain enough credit ($\bar{x}=2.86$), inadequate storage facilities ($\bar{x}=2.2$), inadequate market for produce ($\bar{x}=2.18$), too short repayment period ($\bar{x}=2.04$). The most serious constraints for female respondents were inability to obtain enough credit ($\bar{x}=2.82$), inadequate storage facilities ($\bar{x}=2.66$), inadequate market for produce ($\bar{x}=2.27$), too short repayment period ($\bar{x}=2.26$), and inability to expand farm land ($\bar{x}=2.03$). Male respondents had similar serious constraints but with less intensity and except inability to obtain enough credit($\bar{x}=2.90$) which was indicated more serious than females. Too short repayment period and unavailability of farmland for expansion did not constitute serious problems for the males.

These are indications that LARDI was an effective programme which reduced farmers' constraints generally, male respondents seemed to be more favoured due to less constraints they indicated.

CONCLUSION

The study has shown that access and perception of effectiveness of LARDI services were high. Also credit accessed, size of farmland and income of farmers increased significantly upon participation. Male and female respondents differed significantly with respect to LAPOindicators considered with lower values for females in credit accessed, size of farmland and income. However, the respondents still encountered serious constraints which affected effectiveness which included inability to obtain enough credit, inadequate market for produce, inadequate storage facilities and short repayment period.

RECOMMENDATIONS

For farmers to fully maximize the benefits derivable from LARDI participation:

- 1. LAPO should review the loan repayment period upwards, provide more market information and extension services in post-harvest technologies.
- 2. Insurance coverage should also be introduced into the programme to ensure higher productivity and reduce poverty.

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COMPARATIVE ANALYSIS OF THE EFFECTS OF MONETARY AND FISCAL POLICIES ON LIVESTOCK OUTPUT IN MILITARY AND DEMOCRATIC PERIODS IN NIGERIA (1983-2014) Okidim, I.A and Tuaneh. G.L Department of Agricultural and Applied Economics

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ABSTRACT

The study was on the comparative analysis of the effects of monetary and fiscal policies on livestock output in military and democratic periods in Nigeria(1983-2014. Specifically the study determined the effects of monetary policy on livestock output in both military(1983-1999) and democratic periods (1999-2014); the effects of fiscal policy on livestock output in both military(1983-1999) and democratic periods(1999-2014 and assessed the trend livestock out in both periods in Nigeria. Data were analysed using descriptive statistics, F-Chows test and ordinary least square regression analysis. Results showed that in military era all fiscal policy were positively related to livestock output while budgetary allocation to agriculture showed negative relationship. Domestic and foreign debt showed positive relationship during democratic period. The study further reported that monetary policy such as interest rate and inflation showed positive relation relationship with livestock output. Exchange rate and money supply were negative in military era. In democratic era inflation and money supply were negative while interest rate and exchange rate had positive relationship with livestock. The mean livestock output in military was 143.43 tones with standard deviation of 8.06 and correlation coefficient of 0.51%. The mean livestock during democratic era was 638 tonnes, correlation coefficient was 0.71% while standard deviation was 11.32. The F chow test showed that there were structural changes in monetary and fiscal policy since chow-fcal 359 > ftab2.80. The study recommended that since livestock output was better during democratic era than in military period, democratic institution be strengthened to manage monetary and fiscal policy.

Keywords Monetary, Fiscal, Livestock, Democratic, Military

INTRODUCTION

Monetary and fiscal policy dynamics is concerned with the changes and swings in money supply, interest rate and credit supply as well as changes in government taxes and borrowing Sani, Amusa & Abeyangi (2013). A lot of researchers have attempted to measure the effects or the implication of these changes on economic growth. However, there have been two major changes in the pursuit of monetary and fiscal policy since the inception of the central bank of Nigeria. These changes occurred in military and democratic rule 1983-1999 and 1999 to date in the military era, emphasis was placed on direct monetary control and heavy reliance on government or public sector participation while in democratic rule the monetary policy was mainly market driven and private sector participation and control (Bolaji, 2014)

During the military, the monetary and fiscal policy control coincided with period of structural Adjustment program (SAP). The economic principal was totally dominated by the oil sector, increased in public sector participation and overdependence on external sector (Chucku, 2010)

The post SAP era and the present democratic era have gradually introduced new monetary and fiscal policy which are market friendly designed to maintain fiscal balance and balance of payment viability that are export oriented especially in the agricultural sector with the introduction of agricultural production subsidies, deregulated interest rate, farm credit support scheme such as anchor borrowers commercial Agriculture credit scheme (CACS) among others.

The Agricultural sector has not performed to its desired level probably because of its several decades of government failure to create the right macro economic environment that will give farmers the right incentives. There may have been increase in output over the years, but there is no evidence to link the increase in output to changes in monetary and fiscal policy operations (Odewunmi 20013). According to Udensi, (2012) that increase in output in agriculture was not due to monetary and fiscal policy but rather due to increase in expansion of cultivated land, it has been widely reported by stakeholders that after the 2017 economic recession, the Nigeria economy bounced back due to the 3.7% growth of the agricultural sector. As a result of this growth, government has become concerned in pursuing policies that will increase agricultural growth. It is on the basis of this that this study is carried out to ascertain the effects of monetary and fiscal policy on livestock, in previous and current government. The study achieved the following specific objectives to: determine the effects of monetary policy on livestock output in both military and democratic era 1983-1999 and 1999-2014; determine the effects fiscal policy on livestock in both periods 1983-1999 and 1999-2014 and to assess the trend of livestock in both periods (Military and democratic era 1983-1999 and 1999-2014).

MATERIAL AND METHODS

This study was conducted in the entire Nigeria. Nigeria is located on the gulf of Guinea in West African. Nigeria occupies an area of 923, 789 square kilometers and is bordered on the East by republic of Cameroon, on the West by the Republic of Benin and on the North by Niger Republic and has a population of 151, 212, 254 million (World Bank, 2011). Its coastline is about 853km and her continental shelf is 20m depth, its territorial sea is 12 nautical miles. According to (National Bureau of Statistics, 2012) Nigeria is one of the largest producers of oil; the 10th in the world, her foreign earnings depend on oil for instance, over 90% of her foreign earnings come from oil According to Cleaver & Shereiba,(1994) About 70% of the population who reside in rural area depend on agriculture as a means of livelihood, about 30.96 million hectares are used for cultivation of crop (arable crop 30.90) and 20.94 million hectare (23%) for pasture, about 14.57 million hectare (16.5%) for forest. Rivers/lakes occupy 11.66 million hectare (13%). Others occupy 12 million ha. Majority of the famers (81.0%) are small holder's farmers, (Cleaver and Shereiber, 1994)

Data for this study were analysed using descriptive statistics, F- chow test, ordinary least square regression analyses, correlation coefficient and trend analyses

The implicit form of the multiple regression model was specified as follows:

Yi = $F(X_{1m}, X_{1d}, X_{2m}, X_{2d}, X_{3m}, X_{3d}, X_4m, X_4d U_t)$1.1 where:

Y = Livestock (tons)

 X_{1d} = Inflation rate (%)

- X_{2m} = Inflation rate (%)
- X_{2m} = Interest rate (%)
- X_{2d} = Interest rate (%)
- $X_{3m} = Money supply (\mathbb{N})$
- X_{3d} = Money supply (\mathbb{H})
- $X_{4m} = Exchange rate (\%)$
- X_{4d} = Exchange rate (%)
- $U_t = error term$

It is expected *a priori* that the coefficient of X_1 , X_2 , X_3 , $X_4 > 0$ for the periods.

Four functional forms were also specified as follows

Linear Function

 $Y = b_o + b_1 X_{1m} + b_2 X_{1d} + b_3 X_{2m} + b_4 X_{2d} + b_5 X_{3m} + b_6 X_{3d} + b_7 X_{4m} + b_8 X_{4d} + Ut. \dots 1.2$

Semi – log function

 $\begin{array}{ll} Y & = Inb_{o} + b_{1} \ I_{n} \ X_{1m} + b_{2} \ In \ X_{1d} + b_{3} \ In \ X_{2m} + b_{4} \ In \ X_{2d} + b_{5} \ In \ X_{3m} + b_{6} \ In X_{3d} + b_{7} \ In \ X_{4m} + b_{8} \ In X_{4d} + U_{t} 1.3 \end{array}$

Double-log

 $In \ y = In \ b_o + b_1 \ In \ X_{1m} + b_2 \ In \ X_{1d} + b_3 \ In X_{2m} + b_4 \ In \ X_{2d} + b_5 \ In \ X_{3m} + b_6 \ In \ X_{3d} + b_7 \ In \ X_{4m} + b_8 \ In \ X_{4d} + U_t 1.4$

Exponential Function

 $L \ n \ Y = b_o + b_1 \ X_{1m} + b_2 X_{1d} + \ b_3 X_{2m} + b_4 \ X_{2d} + \ b_5 \ X_{3m} + \ b_6 \ X_{3d} + \ b_7 \ X_{4m} + b_8 \ X_{4d} + U_t 1.5$

Chow's model was specified as follows:

where:

- $\sum ep^2$ = pooled unexplained variation in agricultural output in military and democratic eras (1983-2014)
- $\sum e_1^2$ = Unexplained variation in agricultural output in military era (1983-1999)
- $\sum e_2^2$ = Unexplained variation in agricultural output in democratic (1999 -2014)
- K = number of parameters
- n_1 = number of observations in military era
- n_2 = number of observations in democratic era

If Fcal > F0.5 then there are significant effect or changes in agricultural output(livestock) in the two periods (1983-1999) and (1999-2014)

RESULTS AND DISCUSSION

Fiscal policy and output of livestock during military era (1983-1999)

Table 1 showed that in 1983 livestock output was 91.9 thousand metric tonnes. The livestock output increased to 100 metric tonnes in 1984 and further increased continuously throughout the military era up to 190.4 thousand metric tonnes in 1999. From 1983 to 1999, fiscal policy (budgetary allocation to agricultural sector, domestic and external debt also increased.

| Year | Livestock (MT) | Allocation (X5)=N'Million | Domestic debt (X ₆) (N'million) | External Debt (X7)(N'Milion) |
|------|-------------------|------------------------------|---|------------------------------|
| 1983 | 91.9 | 121.5 | 22.2 | 10,577.7 |
| 1984 | 100.0 | 285.3 | 25.7 | 14,808.7 |
| 1985 | 104.3 | 1018.1 | 27.9 | 17,300.6 |
| 1986 | 108.1 | 925.4 | 28.4 | 41,452.4 |
| 1987 | 103.9 | 394.3 | 36.8 | 100,789.1 |
| 1988 | 110.4 | 650.0 | 47.0 | 133,956.3 |
| 1989 | 117.8 | 104.6 | 47.0 | 240,393.7 |
| 1990 | 157.1 | 196.6 | 84.1 | 298,614.4 |
| 1991 | 160.7 | 622.0 | 116.2 | 328,453.8 |
| 1992 | 159.3 | 924.5 | 178.0 | 544,264.1 |
| 1993 | 161.6 | 2835.3 | 273.8 | 633,144.4 |
| 1994 | 164.1 | 3719.1 | 407.6 | 648,813.0 |
| 1995 | 171.0 | 6927.1 | 477.7 | 716,865.6 |
| 1996 | 176.0 | 557.4 | 420.0 | 617,320.0 |
| 1997 | 180.4 | 7929.6 | 501.8 | 595,931.9 |
| 1998 | 181.3 | 11840.4 | 560.8 | 633,017.0 |
| 1999 | 190.4 | 38259.8 | 794.8 | 2,577,374,4 |

| Table 1 | fiscal | nolicy | and out | out of li | vestock | during | militar | v era (| 1983_199 | 9) |
|----------|--------|--------|---------|-----------|---------|--------|---------|---------|----------|----|
| I able I | IIscal | poncy | anu out | jut of fi | VESLOCK | uurmg | mmuar | y era (| 1202-122 | 7) |

4)(www.indexmundi.com/fact.nig.

It showed that the relationship between fiscal policy and output of livestock was positive. Specifically, between 1983 to 1988 the increase in livestock output was not proportional to the increase in budgetary allocation. From 1983 to 1984 when budgetary allocation moved from 121,3 million to 285.5 million, output of livestock did not increase in the same proportion.

Fiscal policy and livestock output (metric tonnes) in democratic era in Nigeria(1999-2014

Table 2 showed that in 1999, livestock was190.4 thousand metric tonnes. In 2001 it increased to 195.8 and then increased continuously to 204.0 thousand metric tonnes in 2002. Output of livestock further increased to 306.29 thousand metric tonnes in 2005. In 2014 it rose to 1573.05 thousand metric tonnes in the same vein, allocation to agricultural sector increased from 382.59 million in 1999.to 649.43 million naira in 2001.

| Year | Livestock (Y) MT | Allocation N' N'm(X ₅) | Domestic debt.N'M (X ₆) | External Debt N'M. (X ₇) |
|------|---------------------|---------------------------------------|---|---|
| 1999 | 190.4 | 382,59.8 | 794.8 | 2,577,374.4 |
| 2000 | 190.7 | 105.96.4 | 898.3 | 3,130,250.9 |
| 2001 | 195.8 | 649,43.4 | 1,017.0 | 3,176,291.0 |
| 2002 | 204.0 | 440,.3.8 | 1,116.0 | 3,932,884.7 |
| 2003 | 214.2 | 160.45.2 | 1,329.7 | 4,398,501.9 |
| 2004 | 243.39 | 597.73.4 | 1,370.3 | 36,600.0 |
| 2005 | 306.29 | 907.98.2 | 1,525.9 | 19,486.0 |
| 2006 | 378.70 | 3,391,6.6 | 1753.3 | 7,887.0 |
| 2007 | 434.15 | 3,830.0 | 2,169.6 | 8,378.0 |
| 2008 | 512.94 | 13,168.9 | 2320.3 | 7,445 |
| 2009 | 583.62 | 16,692,4. | 2,228.0 | 9,579 |
| 2010 | 979.56 | 17,654.9 | 4,551.8 | 9,574.0 |
| 2011 | 1,115.66 | 17, 275 | 5,622.8 | 10,178.0 |
| 2012 | 1,251.93 | 13,983 | 6537.5 | 10,402.0 |
| 2013 | 1,399.48 | 13,308 | 7,119.0 | 10,475.0 |
| 2014 | 1,573.05 | 12,312 | 7,207.0 | 10,501 |

Table 2 Fiscal policy and livestock output (metric tonnes) in democratic era in Nigeria(1999-2014

Sources 1: Central Bank of Nigeria Statistical Bulletin Various Years (2003, 2014) 2: National Bureau of Statistic Various Years (2009, 2010)

3: Index Mundi (2015) (www.indexmundi.com/fact/nig.lendinginterest

3. International Monetary Fund World Economic Outlook Database, April 2015.

The table showed that as budgetary allocation increased, livestock also increased. Allocation to agricultural sector was highest in 2010 with 17,654.91billion naira. Domestic debt also increased within the same period. As domestic and external debt measured, livestock also increased. This implies that during the democratic era money borrowed were channelled towards livestock production

| Military era 1983- | 1999 | Democratic era 1999-2014 | | |
|--------------------|---------------------|--------------------------|----------|--|
| | Coefficient t-ratio | Coefficient | t-ratio | |
| Regressor/ | | | | |
| Constant | 223.0814 | 269.0524 | | |
| Budgetary | 0.0750 | -0.0924 | 1.1337 | |
| Allocation | (0.0218) 4.54** | (0.0815) | | |
| (X_{1t-1}) | | | | |
| Internal debt | 0.0559 | 0.0922 | 2.8902* | |
| (X_{2t-1}) | (0.0166) 3.3879** | (0.0654) | | |
| External debt | 0.0651 | 0.0654 | 3.0704** | |
| (X_{3t-1}) | (0.0304) 2.1414* | (0.0213) | | |
| \mathbb{R}^2 | 0.8693 | 0.7593 | | |
| F-value | 10.285 | 4.2043 | | |
| Observation | 17 | 15 | | |

Table 3 multiple regression results of the effects of fiscal policy on livestock output in military and democratic eras in Nigeria (1983-2014)

Source; summarized from computer output

*and ** Significant at 1% and 5% respectively, standard error in parenthesis

Table 3 showed multiple regression result and the lead equations for both military and democratic eras. From the lead equation the following regression equations Y_1 and Y_2 for military and democratic eras respectively were generated as follows

$$\begin{split} Y_1 &= 223.0814 + 0.0750 X_{1t-1} + 0.0559 X_{2t-1} + 0.0651 X_{3t-1} \\ & (0.0750) \quad (0.0218) \quad (0.0166) \quad (0.0304).....1.7 \\ R^2 &= 0.869 \end{split}$$

$$\begin{split} Y_2 &= 269.0524 \text{ - } 0.0924X_{1t\text{-}2} + 0.0922X_{2t\text{-}2} + 0.0654X_{3t\text{-}2} \\ & (0.0815) \quad (0.0654) \quad (0.0213).... 1.8 \end{split}$$

 $R^2 = 0.759$

The results showed that in military era the coefficient of budgetary allocation to agricultural sector was positive, while all coefficients during democratic era were positive except budgetary allocation agricultural sector. The implication of these signs is that during the military era, as budgetary allocation increased output of livestock also increased, while in democratic era, increase in budgetary allocation to agricultural sector also decreased output of livestock. This suggests that allocation to agricultural sector was better managed during the democratic era. It also meant that the livestock industry never performed better and was not better positioned for growth. The fiscal policy with respect to livestock output had good performance during military era. This agrees with the study of Abu and Modecai (2016) who conducted a study on impact of public expenditure on Agricultural output in Nigeria (1981-2014) and found out that budgetary allocation had a negative relationship with output.

According to (FAO, 2014) livestock production and animal products declined by 10% because of decline in fiscal operations and macro economic imbalances in less developed countries. Policy choices by government in many developing countries played a significant role in widening or tightening the gaps between production and demand of livestock and livestock products.

If public expenditure favours livestock production, there will be increase in output of livestock and livestock product such as milk, meat, hide and skin. This can increase real income due to changes in relative meat prices. Abu and Modecai (2016) reported that there is always economic prospect for fiscal policy that favours livestock since it has propensity to reduced import and increase export, argued that fiscal. Between 1999 and 2014 there was favourable fiscal policy as indicated by the regression results William (1994) reported that if public expenditure favours agricultural financing and investment policy there will be increase in agricultural output. The coefficient of multiple determination (R^2) of 0.8693 and 0.7593 showed that in military era 86% of variations in livestock was explained by fiscal policy variables while in democratic era, 75% of the variations in livestock were jointly explained by the fiscal policy, only 14% and 25% respectively were not explained but were accounted for by the error terms (Ut). The f-value of 10.285 and 4.2043 respectively showed that the overall model was significant since the both values were greater (>) than the tabulate value of 1.96% at 1% and 5% level during military and democratic periods.

| Year | Livestock | Inflation | Interest | Money | Exchange |
|------|-----------|---------------------|---------------------|------------------------------------|------------|
| | MT | (X ₁)(% | (X ₂) % | Supply (X ₃)(M' N) | rate (X) % |
| 1983 | 91.9 | 11.50 | 9.98 | 17.69 | 0.7241 |
| 1984 | 100.0 | 13.00 | 10.24 | 20.11 | 0.7649 |
| 1985 | 104.3 | 11.75 | 9.43 | 22.30 | 0.8938 |
| 1986 | 108.1 | 12.00 | 9.96 | 33.81 | 2.0206 |
| 1987 | 103.9 | 19.20 | 13.96 | 37.57 | 4.0179 |
| 1988 | 110.4 | 17.60 | 16.62 | 38.26 | 4.5367 |
| 1989 | 117.8 | 24.60 | 20.44 | 45.90 | 7.3916 |
| 1990 | 157.1 | 27.70 | 25.30 | 52.86 | 8.0378 |
| 1991 | 160.7 | 20.80 | 20.04 | 75.40 | 9.9095 |
| 1992 | 159.3 | 31.20 | 24.76 | 101.11 | 17.2984 |
| 1993 | 161.6 | 36.09 | 31.65 | 165.34 | 22.0511 |
| 1994 | 164.1 | 21.00 | 20.48 | 230.29 | 21.8861 |
| 1995 | 171.0 | 20.79 | 20.23 | 289.09 | 21.8861 |
| 1996 | 176.0 | 20.86 | 19.84 | 345.85 | 21.8861 |
| 1997 | 180.4 | 23.32 | 17.80 | 413.28 | 21.8861 |
| 1998 | 181.3 | 21.34 | 18.18 | 488.15 | 218860 |
| 1999 | 190.4 | 27.19 | 20.29 | 628.95 | 92.34 |

 Table 4: Livestock output and Monetary policy during military era in Nigeria(1983 - 1999)

Sources; (1) Central bank of Nigeria Statistical Bulletin various years.(2) National Bureau of statistics, various issue. (3)Index mundi(2014)(www.indexmundi.com/fact.nig.

Table 4 showed monetary policy and output of livestock during military era in Nigeria(1983-1999) The table showed that in 1983 livestock output was 91.9 thousand metric tonnes. The table further showed that livestock output increased to 100 metric tonnes in 1984 and increased continuously throughout the military era up to 190.4 thousand metric tonnes in 1999. The monetary policy within the military period also grew. Inflation was 11.50%. in 1983 and 1984 it moved to 13.00%. It moved astronomically to 19.20% in 1987, then 27.70% in 1989. In 1993 it reached all year highest within the military period when it rose to 36.09%. Interest rate and monetary supply also increased. Interest rate was 9.98% in1983, In 1984, it moved slightly higher to 10.24% and fell back to 9% in 1985 and 1986 it increased highest within the military period when it rose to 31.66%. Money supply and exchange rate was 17.69 million naira in 1999 without break. Exchange rate also grew in the same pattern. In 1983 the dollar exchange with the naira at 0.724%. in 1987, the dollar exchange for 4.017 naira. In 1999 it increased to 92.34 dollar to the naira. The table showed that livestock increased with increase in monetary policy

| Year | Livestock | Inflation | Interest | Money | Exchange rate |
|------|-----------|---------------------|---------------------|---------------------|---------------|
| | MT | (X ₁) % | (X ₂) % | Supply (X 3) M'N | (X) % |
| 1999 | 190.4 | 27.19 | 20.29 | 628.95 | 92.34 |
| 2000 | 190.7 | 21.55 | 21.27 | 878.46 | 101.70 |
| 2001 | 195.8 | 21.35 | 23.44 | 1,269.32 | 111.23 |
| 2002 | 204.0 | 30.19 | 24.77 | 1,505.96 | 120.58 |
| 2003 | 214.2 | 22.88 | 20.71 | 1,952.92 | 137.76 |
| 2004 | 243.39 | 20.32 | 19.18 | 2,131.82 | 133.14 |
| 2005 | 306.29 | 19.49 | 17.95 | 2,637.91 | 137.70 |
| 2006 | 378.70 | 18.70 | 16.90 | 3,797.91 | 129.93 |
| 2007 | 434.15 | 18.36 | 16.94 | 5,127.40 | 128.37 |
| 2008 | 512.94 | 18.70 | 15.48 | 8,008.20 | 117.72 |
| 2009 | 583.62 | 22.62 | 18.36 | 9,411.11 | 146.59 |
| 2010 | 979.56 | 22.51 | 17.59 | 11,304.91 | 150.33 |
| 2011 | 1,115.66 | 22.42 | 16.02 | 12,172.42 | 152.08 |
| 2012 | 1,251.93 | 23.79 | 16.79 | 13,895.39 | 161.31 |
| 2013 | 1,399.48 | 24.94 | 16.72 | 15,150.29 | 156.96 |
| 2014 | 1,573.05 | 25.50 | 16.55 | 17,680.52 | 196.13 |

Table 5 Livestock output and monetary policy in Nigeria during democratic era(1999-2014

Sources 1: Central Bank of Nigeria Statistical Bulletin Various Years (2003, 2014) 2: National Bureau of Statistic Various Years (2009, 2010)

3: Index Mundi (2015) (www.indexmundi.com/fact/nig.lendinginterest

4. International Monetary Fund, World Economic Outlook Database, April, 2015.

Table 5 showed monetary policy and output of livestock during democratic era in Nigeria(1999-2014) The table showed that in 1999 livestock output was 190.4 thousand metric tonnes. The table further showed that livestock output increased to 204.0 metric tonnes in 2002 and increased continuously throughout the democratic era up to 1,573 metric tonnes in 2014. The monetary policy within the democratic period also grew. For monetary policy, Inflation was 27.19%. in 1999, in 2000 it was 21.55% and further fell to about 21% in 2001. In 2002 it moved to 30.19%. It further dropped drastically to 18% between 2006 and 2008. Interest rate and money supply also increased. Interest rate was 20.29 in 1999 while it moved slightly to 21% in 2001, it later moved to 24% in 2002. It further fell to 16% between 2011 and 2014. Money supply and exchange rate had a steady increase between 1999 to 2014. In 1999, money supply was 628 million naira while exchange rate was 92.34 naira to the dollar. Money supply further grew uninterrupted between 2000 and 2014 without break. Exchange rate also grew in the same pattern. The table showed that livestock increased with increase in monetary policy.

| Military era 1983-1999 | | Democratic era | 1999-2014 | |
|------------------------|-------------|----------------|-------------|------------|
| | Coefficient | t-ratio | Coefficient | t-ratio |
| Regressor/ | | | | |
| Constant | 93.1033 | | 108.4424 | |
| | (0.0349) | | (0.0339) | |
| Inflation | | | | |
| (X_{1t-1}) | 0.0068 | | 0.0556 | -4.3101 ** |
| | (0.0021) | 3.2381** | (0.0129) | |
| Interest rate | | | | |
| (X_{2t-1}) | -0.0066 | | 0.0741 | 3.6502 ** |
| | (0.0019) | 3.4737 ** | (0.0203) | |
| Money supply | -0.0067 | | 0.0348 | |
| (X_{3t-1}) | (0.0048) | 1.3998 | (0.0107) | 3.2523 ** |
| Exchange rate | | | | |
| (X_{4t-1}) | -0.0094 | | 0.0729 | 1.1912 |
| | (0.0029) | 3.2414** | (0.0612) | |
| R^2 | 0.7138 | | 0.7715 | |
| F-value | 2.4923 | | 2.5312 | |
| Observation | 17 | | 15 | |

Table 6: Multiple regression results of the effects of monetary policy on livestock output in Nigeria in military(1983-1999) and democratic eras(1999-2014)

Source; summarized from computer output

*and ** significant at 5% and 1% level standard error in parenthesis

Table 6 shows effects of monetary policy on livestock output in both military and democratic eras.

The regression results produced the following regression equations.

 $Y_1 = 93.1033 + 0.0068X_1 + 0.0066 X_2 - 0.0067 X_3 - 0.0094X_4$ (0.0021) (0.0019) 0.0094 (0.0029).....4.11

 $R^2 = 0.714$

 $\begin{array}{rcl} Y_2 &=& & 108.4424 - & 0.0556X_1 + 0.0741 \ X_2 &- & 0.0348 \ X_3 &+& 0.0729X_{4.....4.12} \\ R^2 &= & 0772 \\ & & & & \\ & & & (0.0129) \quad & (0.0203) \quad & (0.0107) \quad & (0.0612) \end{array}$

The regression equation during the military era showed that inflation and interest rate were positively related to livestock output. While money supply and exchange rate were negatively related to output. In democratic era only inflation has a negative relationship with livestock. During the military and democratic eras the regression equations showed that livestock output increased with increased in interest rate. A reasonable level of interest rate can increase output. This is because according to Udoka and Rowland (2012) increase in interest rate can mobilized adequate savings, a low interest rate can discourage savings mobilization, this can have a negative effect on quantity of output

According to Udoka and Rowland (2012) that in the early 1990 under financial sector liberalization, market determined interest rate did not permit direct government intervention, ,

the study further concluded that income was a major determinant of the demand for money and not interest rate. This does not agree with the work of Babalola et al (2015) who reported in their study of inflation, interest rate and output growth that a slight increase in interest rate can lead to a tremendous fall in output because demand for money depends on interest.

The study of Morley (1992) did not agreed with the position of Miralle (2007) and Eme and Johnson (2012). This is because Morley (2012) reported that in twenty eight countries who devalue their currencies reported that devaluation or increase in exchange rate can reduce output, import growth and terms of trade.

This study showed that exchange rate was positive with output of livestock this means that increase in exchange rate regime also increase output. This agrees with the study of Eme and Johnson (2012) who studied the effect of exchange rate movements on economic growth in Nigeria and reported that an increase on exchange rate or an outright devaluation can improve trade balances and this can as well increase local production, although there will be an initial depression. Mireille (2007) also agreed with the fact that increase in exchange rate or devaluation can increase output if it is anchored on domestic price adjustment of traded goods.

Comparatively, this study showed that monetary policy performed better during democratic era since most of the monetary policy had favrouable outcomes. The coefficient of multiple determination (\mathbb{R}^2) in military era showed that 71% of the variation in livestock output was jointly explained by monetary policy only 29% was not explained. In democratic era a coefficient of 0.7715 showed that 77% of the variation in livestock was explained by monetary policy only 23% was not explained but was taken care of by the error term. The f-value of 2.49 for military period showed that the model was significant at 5% level. While the f-value of 2.5317 for democratic era also showed that the model was also significant at 5% level.

| Agricultural Output(trend variable) | Values | |
|--------------------------------------|----------|--|
| Mean (Ton) | 143.43.T | |
| Standard deviation (Ton) | 8.06 | |
| Maximum (Ton) | 190.4 | |
| Minimum (Ton) | 91.9 | |
| Trend (Ton/year) | 1.478* | |
| Correlation coefficient (r) | 0.513* | |
| * significant at 5% | | |
| Source; summarized from computer out | out.2016 | |

| Tend of various livestock output in military era (1983-1999) | |
|--|---|
| Table 7 Trend of Agricultural Output (Livestock) in military era (1983 – 1999) |) |



Fig. 1

LAO = 3.096 + 1.478T, r = 0.513Fig 4.3 Graphical presentation of Agricultural Output (Livestock) in military era in Nigeria (1983 – 1999)

Tables 6 and 7 and figures 1 and 2 showed the trend of agricultural output (livestock) In military(1983-1999) and in democratic era (1999-2014) respectively. The value of livestock output in military era showed that the mean output was 143.43mt while in the democratic era the mean was 638.9mt.

Livestock output in Nigeria during democratic era(1999-2014)

Table 7 Trend of Aggregate Agricultural Output (Livestock) in democratic era 1999 – 2014)

| Agricultural Output | Values | |
|-----------------------------|---------|--|
| Mean (Ton) | 638.9 | |
| Standard deviation (Ton) | 11.32 | |
| Maximum (Ton) | 1573.05 | |
| Minimum (Ton) | 190.7 | |
| Trend (Ton/year) | 2.503* | |
| Correlation coefficient (r) | 0.716* | |
| * significant at 5% | | |

Source; summarized from computer output,2016



Fig. 2: Graphical presentation of Agricultural Output (Livestock) during democratic period (1999-2014)

LAO = 3.849 + 2.503T, r = 0.716%

This indicates that the mean output of livestock during democratic rule was higher than that in the military. The standard deviation of 8.06mt and 11.32mt respectively for both period were quite smaller which suggests that there was high level of reliability in the data. The maximum value of livestock was 190.4mt tons in the military era while that of democratic era was 1573.05mt. This means that output of livestock was higher during democratic era. The trend and the correlation coefficient as shown by the following equation LAO =3.096 + 1.4789, means that there was a positive correlation between output and years, that is, as years increased output also increased. Also, trend and correlation coefficient were significant at 5% level in military era, the trend equations for livestock in military era was LAO =3.096 + 1.478T, (r = 0.513) and in democratic era it was (LAO = 3.849 + 2.503T) and it showed that there was a positive correlation between livestock output and years. The trend of 2.503 and coefficient of correlation of 0.716 showed that output was significant at 5% level. The f-chow test was conducted and the result showed that the Fcal and Ftab were as follows: *Fcal* = 359.1362

 $Ftab = (V_1 = 2, V_2 = 28) 2.80$

Since $Fcal = 359.1362 > Ftab = (V_1 = 2, V_2 = 28) = 2.8$

we therefore reject Ho

With the result of this hypothesis, the study reported that indeed there were significant structural changes in fiscal and monetary policy that affected livestock output at both periods.

CONCLUSION

Fiscal policies were found to perform better during military era than in democratic period. This is because fiscal policy had favourable outcomes than monetary policy. The following coefficients were obtained during military rule $Y_1 = 223.0814 + 0.0750X_{1t-1} + 0.0559X_{2t-1} + 0.0559X_{2t-1}$

 $0.0651X_{3t-1}$. This means fiscal policy measures had favourable all outcomes with a good fi(R²) of 86%. This showed that during military rule management of fiscal policy favoured the growth of livestock. For monetary policy, only exchange rate showed favourable outcomes as follows Y₂ = $108.4424 - 0.0556X_1 + 0.0741 X_2 - 0.0348 X_3 + 0.0729X_4$. inflation, money supply and interest rate did not show any favourable outcomes. The implication of this is that monetary policy did not help to increase the growth of livestock.

RECOMMENDATIONS

The study recommended that since livestock output was better during democratic era than in military period, democratic institution be strengthened to manage monetary and fiscal policy.

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ASSESSMENT OF THE PRODUCTIVITIES OF COOPERATIVE FISH FARMERS IN IJEBU NORTH LOCAL GOVERNMENT AREA, OGUN STATE, NIGERIA

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ABSTRACT

This study examined the influence of cooperative activities on fish farmers' productivity in Ijebu North LGA. Five cooperative societies were randomly selected from the 15 existing cooperatives in the study area making a total sample size of 80 respondents. Data were analysed using descriptive, budgetary and Chi-square analyses. Results indicated that 88.2% were males, married (57.4%) with mean household size of 3 people while 17.6% of the respondents had secondary and post-secondary education respectively. Respondent's modal annual income was between \$100.001.00 and \$500.000.00. The returns on investment (ROI). labour cost (ROL) and pond (RPP)were 1.33, 3.54 and $\cancel{1}232$, 365.15 respectively. Chi-square results indicated a significant relationship between ROI and co-operators' experience (χ^2 = 25.641, df=9, p<0.01); annual income (χ^2 = 27.852, df=9, p<01), educational status (χ^2 = 32.830, df=12, p<0.01) and number of ponds ($\chi^2 = 16.312$, df=6, p<05). Also, ROL was found to be significantly associated with co-operators' experience ($\chi^2 = 13.213$, df = 6, p < 0.01), annual income ($\chi^2 = 11.329$, p < 0.01), educational status ($\chi^2 = 22.590$, df = 8, p < 0.05) and number of pond ($\chi^2 = 9.625$, df=4, p<0.05). Further, significant relationship exists between RPP and, cooperative experience ($\chi^2 = 19.546$, df=9, p<0.05), annual income ($\chi^2 = 25.413$, df=9, p<0.01) and number of ponds ($\chi^2=15.670$, df=6, p<0.01). The study concluded that cooperative participation is a viable tool towards improving fish farmers' productivity. The study recommended among others that funding should be provided to fish farmers through their cooperatives to procure adequate equipment for improved productivity.

Keywords: Cooperatives, Fish farmers, Productivity, Ogun State, Nigeria

INTRODUCTION

Cooperative organisation has assumed worldwide prominence given its mention in the erstwhile MDGs-Millennium Development Goals (Birchall, 2004) and subsequent mention in the current (SDGs-Sustainable Development Goals (ILO, 2017). Cooperatives has become a major revenue mobilisation strategy for most agricultural (and other) entrepreneurs in recent years and their activities are restricted mainly at the informal sector of the Nigerian economy(Birchall, 2013). The workability of cooperative as option for input distribution (Nweze, 2002; ILO, 2014), revenue and credit mobilisation (Bhuyan, 2007; Odetola et al., 2015), marketing (IFAD, 2012) and education of members (Hermida, 2008), asset acquisition (Adeyemo, 2005), livelihood improvement (Kumar et al., 2015), among others, cannot be overstressed.

Co-operative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise (International Co-operative Alliance, 2007). Cooperatives are engaged in various human business endeavours especially, agricultural cooperatives which are sub-divided based on the dominant activities they perform. An example in this respect is fish farmers' cooperatives, which operate either as production or and mainly thrift and credit for the purpose of boosting the business of aquaculture. Cooperatives pursue different sets of objectives depending on the need of the owners. Some of the objectives include improving members bargaining power when dealing with other businesses, reducing costs for the needed

supplies, obtaining products or services, providing market access or broaden market opportunities, improving product or service quality as well as facilities while increasing income distribution of the cooperative earnings (Birchall, 2013).

Agricultural productivity refers to the output produced relative to a given level of input(s) in a production process. More formally, it can be defined as the ratio of the value of total farm outputs to the value of total inputs used in farm production (Adewuyi et al., 2010). Agricultural productivity can be partial or total productivity depending on the number of inputs or process under consideration. For example, in fish production, the most limiting factor is the pond (whether earthen or concrete among others), so, return per pond would give an indication of revenue made by fish farmers on a given area of the designated fish pond. (Wiebe et al., 2003 & Zepeda, 2001). Partial productivity (or a single factor productivity-SFP) is given defined as the ratio of a measure of output quantity to the quantity of a single input used (Fulginiti & Perrin, 2000) while the total factor productivity encompasses as many of pertinent inputs as possible (Adewuyi et al., 2010)

Agricultural production in Nigeria arguably faces two major challenges. One is the problem associated with non-availability, or severe restrictions, of agricultural credit which enables farmers to access and apply various inputs for improved production and profit. The other concerns the various difficulties encountered with the availability, cost, and relevance of the appropriate technology necessary for improved yield (Haldar & Saha, 2015). Traditionally, small-scale farmers, especially in the rural areas, have mostly relied on informal means of financing, including loans from family members and friends who lend to farmers more as a social obligation. This in turn, limit their capability for capital mobilisation for improved productivity (Bene et al., 2009). Co-operative membership therefore, provides the needed impetus for willing farmers to access loans at lower interest, and have access to vocational training and other support services

Farmers cooperatives, apart from providing thrift and credit services to members (Nweze, 2002), also provide ancillary services such as input to farmers (Bhuyan, 2007), group training on new technologies, group processing and marketing as well as functional education to their members, among others (Hermida, 2008) among others.

Cooperatives improve farm productivity by obtaining inputs at low cost, and by adopting sustainable farming techniques through management and organizational development of members. Cooperatives organization not only directly benefit their members, but also have positive effects for the rest of society (Halda & Saha, 2015). Cooperatives have been found useful to smallholder fish farmers because they help to mobilize assets, knowledge and skills and become easily accessible to traders and buyers (Odetola et al., 2015) while also assisting in risk sharing (ILO, 2017).

This study therefore, intends to test the veracity or otherwise of the above assertions under the general hypothesis that membership of cooperatives by fish farmers improves their productivity. The foregoing brings up the need to find answer to the following questions such as what are the socio-economic characteristics of the farmers in the study area; what is the fish farm production pattern of the respondent; what is the productivity level of fish farms in the study area and what are the relationships between fish farmers' personal and production characteristics on their productivity?

Specifically, the following objectives were achieved: description of the fish farm production pattern of respondents; determination of the productivity of the fish farm enterprises and the

relationship between farmers' personal and production characteristics on their productivity in the study area.

The hypotheses tested by this study were:

- Ho_I: There is no significant relationship between respondents' personal characteristics and their productivity.
- Ho₂: There is no significant relationship between respondents' production characteristics and their productivity.

The two hypotheses were tested using Chi square test at 1%, 5% and 10% level of significance.

MATERIALS AND METHOD

The study was carried out in Ijebu North Local Government Area (LGA) of Ogun State, Nigeria. The LGA covers an area of about 1,250 sqkm. It is bounded in the North by Oluyole Local Government of Oyo State in West by Ijebu East Local Government, in the South by Ijebu-Ode Local Government and in the East by Ikenne Local Government. The major towns in Ijebu North Local Government include: Ijebu Igbo, Ago-Iwoye, Oru, Awa and Ilaporu. Farming is the predominant occupation of the people of Ijebu North Local Government Area while fish farming is the type of farming system mainly practiced in the LGA. (Ogun State ministry of Local Government and Chieftaincy Affairs, 2010).

The population of this study were fish farmers; producers of catfish (*Clarias gariepinus*) who were members of fish farmers' cooperative societies in Ijebu-Ode zone. The survey for this work was accomplished using multi-stage sampling technique. In the first stage, Ijebu-North LGA (in Ijebu Ode zone) was picked using purposive sampling technique, given their proven high fish production potential in the zone. The second stage featured use of total enumeration technique to select the existing 15 cooperative societies as at the time of the study. The third stage involved adoption of simple random sampling technique to pick ten per cent (5) fish farmers' cooperative societies were selected out of the 15 fish cooperative societies this gave a total of 80 co-operators altogether. However, only 65 questionnaire could be used for meaningful analysis constituting 85% return rate. Data were collected using structured questionnaire tailored towards meeting the objectives of the study.

The dependent variable is fish farm productivity. The productivity indices were generated following Adewuyi et al., (2010) while some productivity indices were also adapted following the authors principle. The productivity indices are:

- a) Return on investment (ROI), which is derived as TR/TC
 Where,
 TR= Total revenue (₩)
 TC= Total cost (₩)
- b) Return per pond (RPP), which is derived as: TR/NP Where, TR= Total revenue (₩) NP= Number of ponds (₩)
- c) Return on labour cost (ROL), which is derived as:

TR/TCL

Where, TR= Total revenue (\mathbb{N}) TC_L = Total cost incurred on labour (\mathbb{N})

d) Gross margin per kg fish produced, which is derived in two stages as:

i) GM=TR-TVCWhere, $GM=Gross margin (\mathbb{N})$ TVC = Total variable cost (\mathbb{N})

ii) Gross margin per kg fish produced is then derived as: GM /FKg $\,$

Where, GM= Gross margin (N) FKg= Total kilogramme of fish produced

Both description and inferential statistical tools were used to analyse the data collected for this study. The descriptive statistical tools used involved the use of frequency and percentages tables, while Chi square was used to test the hypotheses identified by the study.

| Socioeconomic Characteristics of the fish farmers | | | | | | | | | |
|---|-----------|------------|----------------|-------|--|--|--|--|--|
| Table 1: Socio-economic characteristics of respondents ($n = 68$) | | | | | | | | | |
| Variable | Frequency | Percentage | Mean | SD | | | | | |
| Sex | | | | | | | | | |
| Male | 60 | 88.2 | | | | | | | |
| Female | 8 | 11.8 | | | | | | | |
| Marital status | | | | | | | | | |
| Single | 26 | 38.2 | | | | | | | |
| Married | 39 | 57.4 | | | | | | | |
| Divorced | 1 | 1.5 | | | | | | | |
| Widowed | 2 | 2.9 | | | | | | | |
| Educational status | | | | | | | | | |
| Informal education | 10 | 14.7 | | | | | | | |
| Primary education | 10 | 14.7 | | | | | | | |
| Secondary education | 12 | 17.6 | | | | | | | |
| Post-secondary education | 12 | 17.6 | | | | | | | |
| Vocational training | 24 | 35.3 | | | | | | | |
| Household size (Number o | f people) | | | | | | | | |
| 1-3 | 44 | 64.7 | | | | | | | |
| 4-6 | 23 | 33.8 | 3.28 ≈3 people | 1.101 | | | | | |
| >7 | 1 | 1.5 | | | | | | | |
| Experience in cooperative | (Years) | | | | | | | | |
| 1-5 | 59 | 86.8 | | | | | | | |
| 6-10 | 6 | 8.8 | 3.59 ≈4 years | 1.221 | | | | | |
| 11-15 | 2 | 2.9 | • | | | | | | |
| >16 | 1 | 1.5 | | | | | | | |

RESULTS AND DISCUSSION

Source: Field data collection, 2015

Majority (88.2%) of the fish farmers were males indicating that fish production activities in the study area was male dominated (Table 1) implying that fish production was more popular amongst the males. Most (57.4%) of the respondents were married, while the modal educational status (17.6%) of the respondents were secondary and post-secondary education respectively. This implies that the fish farmers would have the capability adopt improved technologies capable of improving their fish productivity level (Bene et al, 2009). The mean household size was 3 people while respondents experience in cooperative activities was approximately 4 years.

Fish Farm Production Pattern

| Variable | Frequency | Percentage | Mean | SD |
|--------------------------------|-----------|------------|-------------------------|-------|
| Pond culture | | | | |
| Earthen pond | 68 | 100.0 | | |
| Number of pond | | | | |
| 1 | 26 | 38.2 | | |
| 2 | 29 | 42.7 | $2.41 \approx 2$ ponds | 0.043 |
| 3 | 13 | 19.1 | - | |
| Fish culture method | | | | |
| Monoculture | 68 | 100.0 | | |
| Feeding management | | | | |
| Imported and local sources | 68 | 100.0 | | |
| Cycle of production (Mont | ths) | | | |
| 4-5 | 9 | 13.2 | | |
| 5-6 | 59 | 86.8 | $5.57 \approx 6$ months | 1.001 |
| Weight of fish at table size | (Kg) | | | |
| 1-1.5 | 40 | 58.8 | | |
| 1.6-2.0 | 28 | 41.2 | 1.54Kg | |
| Annual income (N) | | | - | |
| <100,000 | 2 | 3.9 | | |
| 100,001-500,000 | 44 | 86.3 | | |
| 500,001-1,000,000 | 5 | 9.8 | | |
| >1,000,000 | | | | |

Table 2: Distribution of respondent according to their fish farm enterprise (n=68)

Source: Field data collection, 2015

All the fish farmers produced fish in earthen pond, practiced monoculture under intensive management system with a mean of 2 ponds per farmer (Table 2), indicating a fairly subsistent fish production system. All the farmers culture Catfish (*Clarias gariepinus*) using imported and local feed sources, which gives a mean weight of 1.54kg per fish at table size. The fish farmers' modal annual income of \aleph 100, 001.00 and \aleph 500, 000.00, suggests a fairly high income for the respondents (Adewuyi et al., 2010).

Productivity Level of Fish Farms in the Study Area:

| | | - | - |
|---------------------------------------|--------------|-----------------|---|
| Variables | Amount (N) | % of total cost | |
| a) Total Revenue | | | |
| 2,200kg table fish at \Re 1,350/kg | 2,970,000.00 | | |
| Cost of production | | | |
| Fixed cost items (Depreciated) | | | |
| Cost of pond (22sq metres) | 14,666.00 | 0.65 | |
| Measuring scale | 3,300.00 | 0.15 | |
| Drag net | 5,000.00 | 0.22 | |
| Cutlass | 1350.00 | 0.06 | |
| Bowls | 1,250.00 | 0.06 | |
| b) Total fixed cost | 25,566.00 | 1.14 | |
| Variable cost | | | |
| Labour cost | 560,000.00 | 24.89 | |
| Feed cost | 1,600,350.00 | 71.14 | |
| Liming | 12,800.00 | 0.57 | |
| Fertilisation | 12,200.00 | 0.54 | |

13.800.00

25,000.00

2,224,150.00

2,235,050.00

1,232,365.15

734,950.00

1.33

3.54

339.02

0.61

1.11

98.86

Table 3: Cost, return per year and productivity of fish enterprises in the study area

Source: Field data collection, 2015

Medication

d) Total Cost

Productivity

e) Profit per year

Return per pond (\mathbb{N})

Return per labour

Transportation/marketing

Return on investment (a/d)

Gross margin per Kg (\mathbb{N})

c) Total variable cost

The total fixed cost (Depreciated) of fish production in the study area constituted 1.14% of the total cost of production, while the variable cost items constituted 99.51% (Table 3). The major variable inputs that imposed so much weight on fish production was pre-formulated feed cost (71.14%), thus, this is the most limiting input in fish production, and fish farmers need to get a way round it by developing equally nutritious local feed derivatives, in order to reduce cost. Labour cost is also attributable to 24.89% of the total variable cost of fish production in the study area, which presupposes that fish farmers need to evolve less labour consuming technology for higher labour productivity.

Further, the mean return on investment of 1.33(Table 3) recorded indicates that for every \$1.00 invested, \$0.33 was generated as profit. This indicate that fish farming in the study area was profitable and that there was a relatively high resource productivity amongst the fish farmers. The yearly return per pond of \$1,232,365.15 also suggests that for every additional earthen pond constructed, respondents will be able to generate additional yearly revenue of \$1,232,365.15, which further attests to the lucrative nature of the business. Similarly, labour utilisation was found to have high productivity, given the value of 3.54, suggesting that for every \$1.00 expended on labour, fish farmers were able to realise \$3.54. This reflects adequate management of labour resource by the respondents. Also, the gross margin per kg of fish produced (\$339.02) shows that, holding fixed items constant, the fish farmers were able

to generate a profit of \aleph 339.02 per kg of fish sold. This confirms that fish production in the study area has high productivity relative to resources committed into production.

| Productivity measure | Frequency | Percentage | Mean |
|--|-----------------------|------------|----------------|
| Return on investment (ROI) | | | |
| 0-1.00 | 20 | 29.4 | |
| 1.01-1.50 | 42 | 61.7 | 1.33 |
| 1.50-2.00 | 5 | 7.4 | |
| >2.00 | 1 | 1.5 | |
| Return per pond (RPP)(N) | | | |
| 1-500,000 | 5 | 7.4 | |
| 501,000-1,000,000 | 15 | 22.1 | ₦ 1,232,365.15 |
| 1,001,000-1,500,000 | 45 | 66.1 | |
| 1,501,000-2,000,000 | 3 | 4.4 | |
| Return on labour (ROL)(N) | | | |
| 1.00-5.00 | 53 | 77.9 | |
| 5.1-10.00 | 12 | 17.7 | 3.54 |
| >10.01 | 3 | 4.4 | |
| Gross margin (GM) per kg fish produ | ıced (N) | | |
| 1-100 | 4 | 5.9 | |
| 101-200 | 8 | 11.8 | |
| 201-300 | 3 | 4.4 | 339.02 |
| 301-400 | 40 | 58.8 | |
| 401-500 | 3 | 4.4 | |
| >501 | 10 | 14.7 | |

Table 4: Distribution of respondents according to their productivity level

Source: Computed from field data collection, 2015

Table 4 showed that the modal (61.7%) number of fish farmers recorded ROI between 1.01 and 1.50 while the modal (66.1%) RPP was found to be between \$1,001, 000.00 and \$1,500,000.00 per cycle. In the same vein, the modal (77.9%) ROL was between 1.00 and 5.00 while the modal (58.8%) GM per kg of fish produced was between \$301 and \$400.00 per kg.

| Table 5: | Relationship | between | cooperative | fish | farmers' | socioeconomic | and | production |
|-----------|-------------------|-------------|-------------|------|----------|---------------|-----|------------|
| character | istics on their p | productivit | ty | | | | | |

| Variable | Chi square | Df (n-1) (r-1) | P-value | Decision |
|---------------------------|------------|----------------|---------|-----------|
| Return on investment | | | | |
| Co-operators experience | 25.641 | 9 | 0.003 | Reject Ho |
| Annual income | 27.852 | 9 | 0.001 | Reject Ho |
| Educational status | 32.830 | 12 | 0.001 | Reject Ho |
| Number of pond | 16.312 | 6 | 0.041 | Reject Ho |
| Return per pond | | | | |
| Cooperative experience | 19.546 | 9 | 0.015 | Reject Ho |
| Annual income | 25.413 | 9 | 0.007 | Reject Ho |
| Educational status | 0.637 | 12 | 8.623 | Accept Ho |
| Number of pond | 15.670 | 6 | 0.003 | Reject Ho |
| Gross margin per kg fish | | | | |
| produced (N) | | | | |
| Cooperative experience | 29.51 | 15 | 0.001 | Reject Ho |
| Annual income | 18.32 | 15 | 0.041 | Reject Ho |

| Educational status | 3.31 | 20 | 0.754 Accept Ho | |
|------------------------|--------|----|-----------------|--|
| Number of pond | 1.12 | 10 | 0.621 Accept Ho | |
| Return on labour cost | | | | |
| Cooperative experience | 13.213 | 6 | 0.001 Reject Ho | |
| Annual income | 11.329 | 6 | 0.048 Reject Ho | |
| Educational status | 19.590 | 8 | 0.054 Reject Ho | |
| Number of pond | 9.62 | 4 | 0.044 Reject Ho | |

Source: Computed from field data collection, 2015.

The summary of the hypotheses tested is shown in Table 5. The table shows that experience in cooperative activities significantly associates with ROI (p<0.01). This suggests that improved fish production experience has capability to improve fish farmers' productivity. Furthermore, Fish farmers' annual income (p<0.01), educational status (p<0.01) and number of pond (p<0.05) show significant relationship to ROI in fish production. Higher income expectedly provides funds for expansion of the business, while education confers better managerial skills on fish farmers for higher productivity of inputs committed into production. In the same manner, experience in cooperative activities (p<0.05), annual income (p<0.01), well as number of pond (p<0.01), have significant association with RPP. This suggests that increased fish farmers' experience in cooperatives activities will provide more exposures to technical trainings that can improve fish productivity in the study area.

Furthermore, increase in income of the respondents (p<0.05) would assist respondents to generate invest more revenue to construct additional earthen ponds with attendant increase in revenue. Also, cooperative experience showed significant (p<0.01) relationship to gross margin per kg of fish produced suggesting that the importance of cooperative activities among fish farmers in the study area cannot be overemphasised. The table also revealed that experience in cooperative activities (p<0.01) also have the capability to improve return per labour cost incurred in fish production while improvement in annual income (p<0.05), educational status of respondents (p<0.05), and number of ponds (p<0.05) also have significant relationship to return to labour cost. These imply that participation in cooperative activities, improved educational status, increase in the number of ponds and annual income are expected to improve fish farmers' capability for better labour management (Halda and Saha, 2015).

CONCLUSION

This study has been able to demonstrate the relationship of cooperative participation on the productivity of fish farmers in the study area. Fish farmers personal and production characteristics such as their educational status, number of ponds and annual income as well as number of ponds were found to be significantly related to the productivity indices of the fish farmers in the study area. Cooperative participation is therefore, a viable tool towards improving fish farmers' productivity.

RECOMMENDATIONS

The following recommendations were made:

- 1. Government should encourage fish farmers' participation in cooperatives by using them as media to reach the farmers for technological incentives rather than targeting individuals who would divert such incentives to unintended purposes.
- 2. Funding should also be provided to fish farmers through their cooperatives to procure adequate equipment for improved productivity. This is because high income is likely to confer opportunity to increase number of ponds per farmers, hence higher output and more income for such beneficiaries.

3. Extension agents should utilise cooperative forum to reach the farmers to pass new information on new technology and strategies to assist fish farmers for improved productivity.

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EFFECT OF COMPOUND FARMING ON LIVELIHOOD SUSTENANCE OF RURAL WOMEN FARMERS IN IMO STATE

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ABSTRACT

The study analyzed livelihood sustenance practices among rural women compound farmers in Imo State Data were collected using questionnaire from 108 randomly selected rural compound farmers, and analyzed using, percentage and mean score. The results showed that majority of the farmers were married young females with a mean household size of 5 persons who have completed their secondary education. The result also indicated that 29.6% are artisans as well as low income earners and non members of social organizations (69.4%). The result showed that cassava was the most cultivated crop in compound farming (66.7%) while majority (75.9%) reared poultry. The result showed that the major contributions of compound farming to livelihood sustenance of the rural women farmers are providing daily income (\vec{x} =3.5) among others. Inadequate finance (\vec{x} =3.7), lack of knowledge about agronomical practices and livestock management (\vec{x} = 3.3 were the major constraints militating against compound farming in the area. There is need for government and intervention agencies to provide incentives like input materials to encourage more farmers to harness available lands in their compounds for farming purposes.

Key words: compound farming, livelihood, rural women, sustenance.

INTRODUCTION

Agriculture has remained a major player in Nigeria's economy contributing about 25.49% of the gross domestic product (GDP) from the total exports and 70% non-oil exports production (Central Bank of Nigeria (CBN) 2010; National Bureau of Statistics (NBS), 2017). It plays a leading role in the non oil sector by supporting about 63% of the population directly and with about 70% contribution to job creation in the informal sector (CBN, 2010; Oladele & Oladele, 2011). (Philip, Nkonya, Pender & Oni, 2008) blended the law of agriculture being the principal source of livelihood in Nigeria and the sector employs nearly three quarters of the nation's workforce.

Livelihoods are the sum of ways in which people make a living. In most communities in low income countries poor families balance a set of food for income earning activities (Carney, 1998). Livelihood according to Ellis, (2006) is defined as comprising the assets (natural, physical, human, financial and social capital), the activities which may include crop production, livestock production, self employment, farm labour, on-farm labour and access to these mediated by institutions and social relations that together determine the living gain by an individual or farm household. A means of earning a living, employment, income, job, work career, occupation, living maintenance, means, subsistence, support etc. Livelihood becomes sustainable when it can cope with and recover from stress and shocks and maintain or enhances its capabilities and as sets both now and in the future, while not undermining the natural resource base (Chambers & Conway, 1992).

Smith (2013) defines sustainability as a process of delivery more safe nutritious food per unit of input resource, whilst allowing the current generation to meet its need without compromising the ability of future generation to meet their own needs. Sustainable agriculture means enabling farmers to grow more with less, i.e. to produce more food, feed, fiber and fuel while using less water, land, energy and other input, thus improving resources efficiency in farming with the help of clever technology (Food and Agriculture Organization (FAO), 2011). In Nigeria, households take up various activities to gain and sustain their livelihoods. However, the nature of these livelihood activities depends on the availability of assets, resources, labour, skills, education, social capital, seasonality, agro-climate/agro-ecology, and gender (men and women) (Porter, Blaufuss, Owusu & Cheampong, 2007; Ogunlela & Mukthar, 2009; Akinwale, 2010).

Rural women play critical role in agricultural development. In rural economies the small holder women farmers are indispensible stakeholders especially because she is at the fore front in the process of food production. According to Ibe, (2011) rural women contribution to agriculture serves as the bases for the production of food and fiber, as well as source of capital to the small scale farmers in Nigeria who actually feed the nation. The food and Agriculture Organization (FAO, 2008) reported that with the increasing male migration women are becoming sole producers of food for the maintenance of the family. This shows that women play a major role in traditional activities such as subsistence food production, house hold chores, food processing, home craft and market trade (PTP). However, the drift in farm labour is highly forcing many rural women to engage in nonfarm livelihood activities such as street vending, petty trading etc. leading to declined productivity.

Compound farms have been referred to as home garden and backyard garden at different times. Several authors (Matthew Njoku, Adesope, & Dimkpa, 2001; Ugwu 2006) have described compound farms as those farms close to the homestead which are intensively cultivated with annual staples. A well developed compound farm is a complete farming system; it is most direct means of supplying families/households with most of the non-staple food they need year round (FAO, 2006). Compound farms/homestead farming practice require little capital, low risk utilization of waste, and it is easy to manage. It can produce food for meals and secondly, products from the farm can be sold for income to buy other essential things. Households' including young children needs the right food and sufficient quantity of variety of food in all season of the year. This therefore makes compound farming an important land unit for households as it usually the center of family lives. However, these notwithstanding, its potential benefits are not being optimally exploited. Again, with the rapid growth in population, low agricultural productivity and increasing food demand, Compound farming becomes relevant and indispensable in addressing these challenges and more importantly in reducing hunger, food insecurity and in enhancing environmental sustainability in Imo State. Furthermore, there exists dearth or no empirical record on the activities of rural women on compound farming practice in the study area hence, the study, since compound farming has a lot of benefits aimed at contributing positively to livelihood sustenance of women compound farmers in the state. The specific objectives were to examine the socioeconomic characteristics of rural women farmers, identify specific crops and livestock produced in compound farms, determine the effects of compound farming on to livelihood sustenance of rural women farmers, and identify constraints militating against compound farming in the study area.

MATERIALS AND METHODS

The study was conducted in Imo State, Nigeria. Imo State is among the five states that make up the southeast geopolitical zone of Nigeria. It lies within latitude 4⁰45N and 7⁰15N and

longitude 6⁰50E and 7⁰25E and covers a total land area of about 5100 square kilometers. It shares common boundaries with Abia State on the East, Anambra State on North, Rivers State on the South and on the West by Delta State and River Niger. The State is divided into three (3) agricultural zones; namely; Owerri, Orlu, and Okigwe and has 27 local government areas with an estimated population growth rate of 3.35 percent (NPC, 2010). The people are predominantly Igbos and Christians. The major activity of the people includes farming, trading, agro processing among other livelihood activities. Cassava, yam, rice, maize, leafy vegetables, cashew, melon, mange, palm oil etc; constitute the major crops grown by the people with Extension activities being undertaken by Imo State Agricultural Development Programme (ADP).

Data were obtained from primary sources through interview schedules and use of structured questionnaire. Multistage sampling technique was employed in the process of sample selection. In the first stage, three (3) local governments were randomly selected from each of the agricultural zones that make up the State, in the second stage; two (2) communities were chosen from each L.G.A which gives 18 communities. In the third stage, One Village was randomly selected from each of the communities, making it 18 villages. The fourth stage involved the random selection of 6 (six) farmers each from the selected villages, giving a total 108 farmers for the study. The sampling frame for the study was the list of the 316 rural women compound farmers from sampled communities in each of the local government area as compiled with the assistance of extension agents of the state ADP. Data were analyzed using percentages, and mean scores.

The effects of compound farming were measured using the 4 point likert scale.

The following points where assigned to the scale Contribute very highly (CVH) = 4 Contribute Moderately (CM) = 3 Contribute poorly (CP) = 2 Do not contribute (DC) = 1 Mean = $\frac{4+3+2+1}{4}$ = 2.5

This benchmark of 2.5 implies that mean scores less than 2.5 indicate poor effect or contribution while mean scores of \geq 2.5 indicate high contribution.

Also, the constraints of compound farming were measured with 4 point like type scale. The following point was assigned to the scale; Strongly Agreed (SA) = 4 Agreed (A) = 3 Disagreed (D) = 2 Strongly disagreed (DS) = 1 Mean = $\frac{4+3+2+1}{4} = 2.5$, which is the benchmark.

Therefore, mean scores of < 2.5 indicate disagree, while mean scores of ≥ 2.5 indicate agree.

RESULTS AND DISCUSSION

Socio-economic Characteristics

The distribution of respondents according to their socioeconomic characteristics is presented in Table 1.

| Table 1: Distribution of farmers accord | characteristics Mean | | |
|---|-------------------------|--------------|------|
| A ga (voors) | rrequency | Fercentage | Mean |
| ~ 20 | 1 | 0.0 | |
| 20 - 27 | 23 | 21.3 | |
| 28 35 | 23 67 | 62.0 | 31 |
| 26 - 55 36 13 | 11 | 10.2 | 51 |
| 30 - 43 | 6 | 5.6 | |
| ++ - 51 | 0 | 5.0 | |
| Sex | | | |
| Male | 34 | 41.7 | |
| Female | 64 | 59.3 | |
| Total | 108 | 100 | |
| | | | |
| Marital Status | 12 | 11.1 | |
| Single | | | |
| Married | 82 | 75.9 | |
| Divorced | 4 | 3.6 | |
| Widowed | 8 | 7.4 | |
| Household size (number of people) | | | |
| 1-6 | 82 | 75.9 | 5 |
| 7-12 | 24 | 24.1 | - |
| | | | |
| Educational attainment | | | |
| No formal education | 19 | 17.6 | |
| Primary education completed | 38 | 35.2 | |
| Secondary education completed | 43 | 39.8 | |
| Tertiary education completed | 8 | 74 | |
| Tertury education completed | 0 | / | |
| Major occupation (income sources) | | | |
| Farming | 23 | 21.3 | |
| Civil service | 22 | 20.4 | |
| Petty trading | 31 | 28.7 | |
| Artisanship | 32 | 29.6 | |
| Income level | | | |
| High (N 500,000) | 0 | 0.0 | |
| Medium ($N200,000 - N499,000$) | 12 | 11.1 | |
| Low (< N200,000) | 96 | 88.9 | |
| Social Organization Membership | | | |
| Members | 33 | 30.6 | |
| Non member | 75 | 60 <i>4</i> | |
| Source Field Data 2017 | 15 | <u>0</u> 7.т | |
| Source, 1 1014 Data, 2017 | | | |

Table 1 shows the distribution of farmers according to their socio-economic characteristics. The result revealed that majority (62.0%) of the farmers were within the age of bracket 28 - 35 years, while 0.9% of the farmers fell under the age of 20 years, with mean age of 31 years which indicates that compound farming is mainly undertaken by young and youthful persons who are within their productive age of life. The farmers as indicated in the result were majorly (59.3%) women implying that compound farming is mainly undertaken by female farmers, thereby confirming the findings of Ani (2004) that the farm workforce is dominated by women. Greater percentage (75.9%) of the farmers were married, while (3.4%) of the farmers were divorced, suggesting that compound farming is undertaken to meet farmers' households' food needs.

The mean household size of the farmers was 5 persons implying that the farmers maintained very moderate household size in conformity with Onwumere (2008) which reported that homestead farmers usually use hired labour for their farm operations due to their characteristic small household size. The result revealed mostly, farmers have completed secondary education (39.8%), as their highest educational attainment. while (7.4%) of the farmers only completed tertiary education.

Again, this result agrees with Ani (2007) which observed that the farm population is dominated by farmers with low educational status. The major (29.6%) occupation of the farmers as revealed by the result is artisanship, and thus agrees with Nwachuwu (2003) that most small scale farmers are engaged in the informal sector where they engage in low income occupational activities. The result indicated that majority (88.9%) of the farmers are low income earners. This supports the earlier finding of Onwumere (2008) that farming at homestead is largely undertaken by individuals with low income status. The result finally showed that majority (69.4%) of the farmers were non members of social organization, which implies that they have less chances of sharing information and cross fertilizing ideas with other farmers (Nwachukwu, 2003).

| Crops | Frequency* | Percentage |
|----------------------------|------------|------------|
| assava | 72 | 66.7 |
| am | 53 | 49.1 |
| Aaize | 36 | 33.3 |
| Vegetables | 37 | 34.3 |
| Cocoyam | 29 | 26.9 |
| Melon | 14 | 13.0 |
| Spices | 3 | 2.8 |
| Fruit trees | 24 | 22.2 |
| Multiple responses were re | corded | |

Specific Crops and Livestock Produced in Compound Farming Crops

Source: Field Data, 2017

The distribution of farmers by specific crops produced in compound farming in Table 2. The result showed that cassava (66.7%) was the most cultivated crop in compound farming followed by yam (49.7%), and fruit trees (22.2%). This result confirms the findings of Ukpongson, Chikaire, Anaeto & Nwankwasi (2011) which found cassava as a viable export crop, rolling in foreign exchange and improving the livelihood of the rural dwellers. Nnadi & Akwiwu (2006) calls the crop a food security crop which holds wonderful potentials for the transformation of the country side considering its easy access and huge calorie content. On the

part of yam, the nutritional value of the crop as a rich source of carbohydrate and relevance in the Ibo tradition has also given it relevance among low income farmers.

Livestock

| Livestock | Frequency * | Percentage |
|-----------|-------------|------------|
| Goat | 56 | 51.9 |
| Sheep | 2 | 1.9 |
| Fisheries | 8 | 7.4 |
| Snail | 4 | 3.7 |
| Poultry | 82 | 75.9 |
| ~ | | |

Table 3: Distribution of Farmers by Specific Crops Produced in Compound Farming

Source: Field Data, 2017 *Multiple response recorded

Table 3 is the distribution of farmers by specific livestock produced in compound farming. The result showed that majorly (76%) of the farmers reared poultry. 52% reared goat, while 8% fisheries. This result aligns with Anigbogu (2011) which highlighted the importance of poultry production in the livelihood activities of farmers to include increase in income, food security, egg and meat production, poultry waste for organic fertilizer. He noted further that due to the livelihood importance of the sub-sector, poultry production in developing countries like Nigeria is projected to increase from 56% to 90% by the year 2050. This result also highlights the importance of goat rearing as a major food source at homestead (Federal Ministry of Agriculture and Rural Development (Omotesho & Lawal, 2011).

Effect of Compound Farming on Livelihood Sustenance of Rural Women farmers

The distribution of farmers according to level of effects of compounding farming on livelihood sustenance of rural women is presented in Table 4.

| | Areas of effect | Contribute very highly | Contribute moderately | Contribute poorly | Do not contribute | Mean |
|----|---|---------------------------|--------------------------|-------------------|----------------------|------|
| 1. | Compound farming provides daily income for my family | 71 | 23 | 14 | 0 | 3.5* |
| 2. | Provides source of meat for household | 54 | 29 | 25 | 0 | 3.3* |
| 3. | Provides source of food for household | 58 | 21 | 29 | 0 | 3.3* |
| 4. | Provides source of output for subsequent planting seasons | 21 | 15 | 72 | 0 | 2.5* |
| 5. | Provides capital | 24 | 23 | 61 | 0 | 2.7* |
| 6. | Provides healthy source of nutrient | 42 | 31 | 33 | 0 | 3.0* |

| Table 4: Dist | ribution o | f farmers | by | level | of ef | ffect o | of | compound | farming | on | livelihood |
|---------------|------------|-----------|----|-------|-------|---------|----|----------|---------|----|------------|
| sustenance of | rural won | nen farme | rs | | | | | | | | |

| 7. | Increases food security | 23 | 31 | 51 | 3 | 2.7* |
|-----|---|----|----|----|----|------|
| 8. | Reduces cost of living | 34 | 39 | 13 | 22 | 2.8* |
| 9. | Complements my other source of livelihood | 54 | 21 | 19 | 14 | 3.1* |
| 10. | supplies ready food at homestead | 21 | 15 | 10 | 62 | 2.0 |

Source: Field Data, 2017 $\bar{X} \ge 2.5$ (High Contribution*), $\bar{X} < 2.5$ (Poor Contribution)

The result showed that compound farming significantly affected the livelihood sustenance of the farmers in nine areas which include; providing daily income ($\bar{x} = 3.5$), providing source of meat for household ($\bar{x} = 3.3$), providing source of food for household ($\bar{x} = 3.3$) compliment other source of livelihood ($\bar{x} = 3.1$), providing healthy source of nutrient ($\bar{x} = 3.0$), reduces cost of living ($\bar{x} = 2.8$), increases food security ($\bar{x} = 2.7$), provides capital ($\bar{x} = 2.7$), provides source of output for subsequent farming season ($\bar{x} = 2.7$). This result agrees with Nnadi and Aneato (2013) which stated that through food production at homestead, farmers are able to generate daily income that enables them to provide food for their household members, cope with poverty, provide quality healthcare for their household and attend to other social obligations.

Constraints in Compound Farming

The distribution of rural farmers according to constraints militating against compound farming is presented in Table 5.

| Constraints | | Strongly Agreed | Agreed | Disagreed | Strongly disagreed | Mean |
|-------------|--|--------------------|--------|-----------|-----------------------|------|
| i. | Inadequate finance | 78 | 30 | 0 | 0 | 3.7* |
| ii. | Lack of knowledge about agronomical practices and livestock management | 56 | 40 | 12 | 0 | 3.4* |
| iii. | Lack of interest due to drift in farm labour | 29 | 71 | 8 | 0 | 3.2* |
| iv. | Lack of access to land due to cultural limitations by men counterparts | 42 | 51 | 15 | 0 | 3.3* |
| v. | Inadequate availability of land space | 6 | 41 | 2 | 59 | 1.9 |
| vi. | High price of input | 14 | 43 | 21 | 30 | 2.4 |
| vii. | Inadequate storage facilities | 5 | 24 | 10 | 69 | 1.8 |
| viii. | Poor market | 21 | 24 | 15 | 48 | 2.2 |
| ix. | Disease out break | 17 | 23 | 21 | 47 | 2.1 |
| х. | theft | 2 | 31 | 27 | 47 | 1.9 |

Table 5: Distribution of Farmers by Constraints in Compound Farming by rural women

Source: Field Data, 2017. $\overline{x} \ge 2.5$ (Constraint*), $\overline{x} < 2.5$ (No constraint)

Table 5 is the distribution of farmers according to their constraints to compound farming. The result revealed that the major constraints militating against the compound farming were: inadequate finance ($\bar{x} = 3.7$), lack of knowledge about agronomical practices and livestock management ($\bar{x} = 3.4$), lack of access to land due to cultural limitation by men counterpart ($\bar{x} = 3.3$) and lack of interest due to drift in farm labour ($\bar{x} = 3.2$). This result confirms the findings of Okoroma, Nnadi Anaeto, Echetama, Uche-Nwachi & Anaeto, (2015)

that inadequate finance has remained a major problem undermining farmers' productivity in Imo State. Finance is needed by farmers to purchase farm inputs, pay for labour, and buy agrochemicals among other needs. Poor knowledge of agronomical practices according to FMARD (2011) incapacitates farmers' abilities to produce crops, especially, small scale farmers.

CONCLUSION

The study concludes that the farmers who engaged in compound farming are mainly low income married women farmers who are within their youthful age. Compound farming provides daily income, source of food, meat for farm households, complement other sources of livelihood provide healthy source of nutrient, reduces cost of living, increases food security and capital of the farmer. Cassava was the most cultivated crop in compound farming while poultry was the most reared livestock. Inadequate finance, lack of knowledge about agronomical practices and livestock management, lack of access to land due to cultural limitation by men counterpart and lack of interest due to drift in farm labour were the major constraints militating against compound farming.

RECOMMENDATION

Based on the findings, the study therefore recommends:

- 1. Government should provide soft loans and credit for the rural women farming households, this could be achieved by not demanding collateral from them.
- 2. It is recommended that the rural women farming household should form cooperatives and mutually take advantage of pooled resources in improving their net farm income.
- 3. Program on the relevance/importance of compound farming as well as agronomic practices and live stock management as a means of Sensitization, improving the livelihood of the rural women household should be embarked upon by change agents.
- 4. Women should be given equal ease of access to lands, resources, and opportunities regardless of gender.

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