EFFECT OF CASSAVA FARMERS' PARTICIPATION IN EXTENSION TRAINING PROGRAMME ON THEIR OUTPUT IN KOGI STATE, NIGERIA

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ABSRTACT

This study analyzed the effect of cassava farmers' participation in extension training programme on their output in Kogi State, Nigeria. It describe the socio-economic characteristics of the cassava farmers, evaluate the costs and returns on cassava production and constraints associated with cassava production in the study area. Primary data were collected from 120 randomly selected cassava farmers using structured questionnaire complemented with an interview schedule. Data collected were analyzed using descriptive statistics (such as frequency count, percentages and mean) and inferential statistics such as Ordinary Least Square (OLS) regression analysis. The finding revealed that majority (65.8%) of the respondents were males, while 67.5% were married. The mean age of the respondents was 44 years, household size was 6 people and mean year of education of 13. The costs and returns result showed gross margin and net farm income of ₦36,264.38 and ₦35,058.98 respectively with profitability ratio of ₦2.73 implying that for every one naira invested, there is returns of 2:72 kobo, thus profitability enterprise. The OLS regression result revealed R^2 of 0.6109, and F-statistic value of 8.52 which is statistically significant ($p<0.01$). The coefficient of participation is 1165.88 at $p<0.1$ implying that there was significant effect of participation in extension training programme on cassava output. Major constraints identified by the respondents were problem of inadequate capital (67.5%), problem of transportation (65.8%), problem of pests and diseases (62.5%) and problem of land degradation (60.8%) ranked 1st, 2nd, 3rd and 4th, respectively. In conclusion, there is significant effect of cassava farmers' participation in extension training programme on their output in the study area. It was therefore recommended that programme implementers should endevour to provide relevant production inputs especially planting materials along with the training.

Keywords: Cassava farmers, participation, extension training programme

INTRODUCTION

Cassava (*Manihot esculenta C.*) is a tuberous, woody, shrubby and perennial plant belonging to the family *Euphorbiaceae*. It is a major food and industrial crop in tropical and sub-tropical Africa, Asia and Latin America (Adekanye *et al*., 2013). In Nigeria, the cassava crop plays a major role in the food economy (Dauda *et al.,* 2017). Despite cassava being regarded as poor man's food, is consumed by both rural and urban households. Cassava production is dominated by small-holders farmers operating on a small-scale with fragmented plots and crude implements resulting into poor yield (Muhammed, 2015).

According to Muhammed-Lawal *et al.* (2013), majority of the cassava farmers are small-scale farmers who cultivate mostly less than 2 hectares of land using rudimentary implements. Generally, cassava farmers are constraint by a wide range of technical, institutional and socio-economic factors which includes problem of pests and diseases, agronomic problems, land degradation, shortage of planting materials, food policy changes, access to markets, limited processing options and inefficient/ineffective extension delivery systems (Muhammed, 2015).

Agricultural extension and advisory services (EAS) can be defined as systems and mechanisms designed to build and strengthen the capacity of rural farmers and other stakeholders (Christoplos, 2010). Thus, agricultural extension training progamme is a system which assist rural people through educational procedures in improving farming methods and techniques, production efficiency and income for better standard of living (Sarker and Itohara, 2009).

It is noteworthy that extension training programme could be accomplished by providing access to information and technologies. More so, by enhancing agricultural skills and practices, capacity to innovate, and address varied rural development challenges through training programs (Mbo'o-Tchouawou and Colverson, 2014). Extension service providers usually foster the advancement of the agricultural sector by encouraging farmers' participation in training programmes for technology adoption (Mbo'o-Tchouawou and Colverson, 2014).

Most of the extension training activities are based on voluntary participation as farmers usually participate in a programme that address their needs and preferences. Participation of farmers in extension training programmes also give them the chance to improve on their decision-making process and application of technical skills for increase agricultural production and income. Increasing agricultural productivity in cassava production is very complex which challenges the capacity of both extension workers, farmers, farming systems and even the environment (Berthe, 2015). This implies

that agricultural development is achieve through the capability of people to be effective and productive economic agents.

Extension education system for training farmers as provided by most Africa countries including Nigeria had little to no effect on the farmers' production output. Extension agents are lacking in participatory problem-solving skills as most farmers are not usually involved in decision-making process. This has led to poor participation and low adoption of technologies for increase output and improve standard of living. It is against this backdrop that this study was conceived to determine the effect of cassava farmers' participation in extension training programme on their output in Kogi State, Nigeria.

Objectives of the Study

The specific objectives of the study were to:

(i) describe the socio-economic characteristics of the cassava farmers in the study area;

(ii) evaluate the costs and returns of cassava farmers;

(iii) determine the effect of cassava farmers' participation in extension training programme on their output, and

(iv) identify the constraints associated with cassava production in the study area.

METHODOLOGY

Study Area

This study was conducted in Kogi State, Nigeria. The State lies between longitudes $5^{\circ}40'$ E and $7^{\circ}49'$ N, and latitude $6^{\circ}33'$ E and $8^{\circ}44'$ N of the equator (Muhammed *et al.,* 2019). The estimated land area of Kogi State is 29,833 km^2 with a population of 3,278,487 (NPC, 2006). The projected population as at 2014 using 3.2% growth rate was 4,218,101. The vegetation zone of the State is Sudan Savanna experiencing dry and wet seasons with the usual harmathan period. The mean annual temperature is $32.1^{\circ}C$, while the mean annual rainfall is 800mm. The three major ethnic groups and languages are

Igala, Ebira and Okun (Muhammed *et al.,* 2019). The people of the State are pre-dominantly farmers engaged in crop and livestock production.

Sampling Procedures and Sample Size

The population for the study was basically cassava farmers in the State. A multi-stage sampling procedure was used to select respondents for the study. The first stage involved the purposive selection of Lokoja Local Government Area (LGA) being the capital of Kogi State and concentration of extension programmes in the area. The second stage was a random selection of four (4) districts from Lokoja LGA, while third stage was a random selection of two (2) villages from each of the districts to get eight (8) villages. The fourth and last stage involved random selection of fifteen (15) cassava farmers from each of the villages to get a total of one hundred and twenty (120) respondents for the study.

Method of Data Collection

Cross-sectional household survey data from primary source was used for the study. Data were collected with the aid of questionnaire administered to 120 respondents and complemented with an interview scheduled. More so, secondary information were obtained from journals, newspapers, textbook, lecture notes and articles as well as the internet materials. The data for the study were collected between August – October, 2018.

Method of Data Analysis

Data collected were analyzed using both descriptive (frequency distribution count, percentages and mean) and the inferential (Ordinary Least Square (OLS) regression) statistics as well as farm budgeting technique.

Model Specification

Farm Budget Technique

The farm budget tools or budgetary technique involves the cost and return analysis. The analyses comprises the Fixed Cost (FC), Variable Cost (VC), Total Cost (TC), Total Revenue (TR), Gross Margin (GM) and Profit. This is mathematically expressed as:

TC = TVC + TFC.

TR = P * Q (P = Price and Q = Total output (kg))

GM = TR – TVC

Profit = GM – TFC or TR – TC

In addition, the following profitability ratio was also determined such as:

Benefit cost ratio (BCR) = Total revenue/ Total cost

Profitability ratio = Net return/ Total cost

Ordinary Least Square (OLS) regression model

Ordinary Least Square (OLS) regression was used to determine the effect of cassava farmers' participation in extension training programme on their output. The implicit form of the OLS regression model is mathematically expressed as below:

$Y = f(X_1, X_2, X_3, X_4, X_6, X_7, X_8, X_9)$

The OLS model in its explicit form is expressed as:

$Y = \beta_o + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + e$

Where;

Y = Output of cassava production measured in kilogram

X_1 = Farm size in hectares

X_2 = Fertilizer in kilogram

X_3 = Agro-chemical in litres

X_4 = Labour usage in man days

X_5 = Age in years

X_6 = Education in years of formal schooling

X_7 = Farmers experience in years of farming

X_8 = House-hold size in numbers

X_9 = Participation in extension training programmes (1 if participated, 0 if otherwise)

α = Constant

$\beta_1 - \beta_9$ = regression coefficients

e = error term

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The socio-economic variables examined in the study were age, gender, marital status, household size, educational status, farming experience, farm size and income. From Table 1, the majority (69.2%) of the respondents were within the age range of 31 – 50 years with mean age of 44 years, implying that the cassava farmers were in the most productive stage of their life. This finding is in corroboration with Muhammed *et al.* (2019) who reported that cassava farmers in their study area were in their productive years with mean age of 42 years. Majority (65.8%) of the respondents were males and 34.2% were females implying male dominance in cassava production, while majority (67.5%) of the respondents were married implying availability of labour supply in the near future as most farmers married for the purpose of pro-creation that will give a helping hand on the farm.

Also, majority (70.0%) of the respondents had household size ranging from 6 – 10 people with a mean household size of 6 people. This implies that the cassava farmers have relatively large household size which could assist in the farm as family labour. More so, all the respondents acquired formal education

like primary (317%), secondary (45.0%) and tertiary (23.3%) implying high level of education which could influence easy participation in extension training programmes in the study area. This corroborates with the findings of Nsoanya and Nenna (2011) who reported high educational level is an advantage for innovation adoption and transfer.

Table 1: Socio-economic Characteristics of the Cassava Farmers (n = 120)

Description	Frequency	Percentages	Mean
Age (Years)			
21 – 30	17	14.2	44
31 – 40	45	37.5	
41 – 50	38	31.7	
> 50	20	16.6	
Gender			
Male	79	65.8	
Female	41	34.2	
Marital Status			
Single	13	10.8	
Married	81	67.5	
Divorced	11	9.2	
Widowed	15	12.5	
Household Size			
< 6	10	8.3	6
6 – 10	84	70.0	
> 10	26	21.7	
Educational Status			
Primary	38	31.7	13
Secondary	54	45.0	
Tertiary	28	23.3	
Experience (Years)			
< 11	15	12.5	23
11 – 20	80	66.7	
21 – 30	25	20.8	
Farm Size (Hectares)			
1.1 – 3.0	83	69.2	2.1
> 3.0	37	30.8	
Monthly income (Naira)			
< 10,001	29	24.2	47,900.08
10,001 – 20,000	9	7.5	
20,001 – 30,000	27	22.5	
30,001 – 40,000	27	22.5	
> 40,000	28	23.3	

Source: Field Survey, 2018

In terms of farming experience, Table 1 revealed that most (66.7%) of the respondents had experience ranging from of 11 – 20 years in farming activities with mean experience of 23 years. This implies that the cassava farmers have been into cassava production for long time. This finding is agreement with Muhammed *et al.* (2019) who reported that the respondents in their study area had high farming experience. Furthermore, most (69.2%) of the respondents had farm size between 1 – 3 hectares with mean farm size of 2.1 hectares implying that the cassava farmers were operating on a small-scale, while more than half (52.5%) of the respondents earned an income between 10,000 – 40,000 with mean income of 47,900.08 implying that the respondents were low income earners.

Costs and Returns of Cassava Farmers

The result of farm budgeting technique used to estimate the cost and returns of the cassava farmers in in the study area is presented in Table 2. The cost and return analysis revealed total variable cost of ₦11,635.65 representing 90.61 percent of the total cost of production per hectare per cassava farmer in the study area, while total fixed cost was ₦1,205.40 representing 9.39 percent of the cost of cassava production. However, cost of labour ₦7,707.07 was the highest among the variable cost of production representing 60.02 percent, followed by cost of agro-chemical at ₦1,687.50 representing 13.14 percent, cost of fertilizer value was ₦1,526.50 at 11.89 percent and cost of planting material value of ₦714.58 representing 5.56 percent of the total cost of production per hectare. This implies that most of the expenses incurred in cassava production in the study area is on labour usage alone, hence labour is an important factor of production which farmers should put more emphasis on in order to minimize its cost for an increase net income. The result is in line with the findings of Akanbi *et al.* (2011) who reported that fertilizer, labour and agrochemicals were the most important inputs in crop production in Nigeria. However, the total revenue, gross margin and net farm income of the cassava farmers was found to be ₦47,900.08, ₦36,264.38 and ₦35,058.98, respectively, with a profitability ratio of 2.73.

This implies that for every ₦1 invested by the cassava farmers in production, ₦2:73 kobo is realized in returns, thus cassava production is a profitability enterprise in the study area.

Table 2: Costs and Returns estimate for the Cassava Production

Items	Amount(₦)/hectare	% of Total Cost
Variable Costs		
Cost of labour	7,707.07	60.02
Cost of planting material	714.58	5.56
Cost of fertilizer	1,526.50	11.89
Cost of agro-chemical	1,687.50	13.14
Total Variable Cost (TVC)	11,635.65	90.61
Fixed Costs		
Depreciation (cutlass, hoe, etc)	1,205.40	9.39
Total Fixed Cost (TFC)	1,205.40	9.39
Total Cost (TC)	12,841.05	100.0
Returns	47,900.03	
Gross Margin	36.264.38	
Net income (NI = GM – TFC)	35,058.98	
Profitability Ratio (NFI/TC)	2.73	

Source: Field Survey, 2018

Effect of Participation in Extension Training Programme on Cassava Output

Ordinary Least Square (OLS) regression model was used to determine the effect of cassava farmers' participation in extension training programme on cassava output and the result is presented in Table 3. The estimated regression result revealed coefficient of determination R^2 value of 0.6196 implying that about 62% variation in the cassava output is explained by the explanatory variables specified in the model, while 38% unaccounted for could be due to some externalities beyond the control of the researcher. The F-statistic of the model was 8.52 which is significant at 1% level of probability indicating overall model goodness of fit. Out of the nine (9) independent variables included in the

model, four variables (age, education, household size and participation) were found to be statistically significant at 1% and 10% levels of probability, respectively.

Table 3: Regression estimates on the effect of cassava farmers' participation in extension training programme on cassava output

Variables	Coefficients	Standard Error	t – value
Constant	117.4103	1502.43	0.08
Farm size	329.1986	241.238	1.36
Fertilizer	8.1226	5.1067	1.59
Agro-chemical	-0.0464	0.1046	-0.44
Labour	11.9336	12.3297	0.97
Age	-184.4787	44.9853	-4.10***
Education	284.1035	77.0396	3.69***
Experience	54.5900	34.1121	1.60
Household size	343.9217	73.2580	4.69***
Participation	1165.888	638.5812	1.83*
R – squared	0.6196		
Adjusted R – squared	0.5866		
F – statistic	8.52***		

Source: Field Survey, 2018
***implies significant at 1% and *implies significant at 10%

The coefficient of age (-184.48) was negative and statistically significant at $p<0.01$ implying an inverse relationship. A unit increase in age of the respondents could lead to decrease in the output of cassava in the study area. This means that as the cassava farmer's age increases, the energy and zeal to increase area of cultivation reduces resulting to decrease in their cassava output.

The coefficient of education (284.10) was positive and statistically significant at $p<0.01$ implying a direct relationship. A unit increase in educational status of the cassava farmers will lead to an increase in their cassava output. This is because; education tends to expose an individual to better opportunities which could help improve the level of production.

The coefficient of household size (342.0647) was positive and statistically significant at $p<0.01$ implying a direct relationship. A unit increase in household size of the cassava farmers will lead to an increase in their cassava output. This could be due to the fact that household sizes is very important in agricultural system. Large household sizes guarantee supply of family labour in cassava production leading to expansion in area of cultivation and in turn increase output.

The coefficient of participation (342.0647) was positive and statistically significant at $p<0.10$ implying a direct relationship. A unit increase in cassava farmers' participation in extension training programme will lead to an increase in their cassava output. Participation of farmers in extension training programmes give them the chance to improve their decision-making process and application of technical skills acquired for increase production.

Constraints associated with Cassava Production

The constraints faced by cassava farmers in the study area is presented in Table 4. The result revealed that problem of inadequate capital (67.5%) ranked 1st among the constraints faced by the cassava farmers in cassava production. This is followed by problem of transportation (65.8%), problem of pests and diseases (62.5%) and problem of land degradation (60.8%) ranked 2nd, 3rd and 4th, respectively among the constraints of the cassava farmers. Other constraints identified include shortage of planting materials (55.0%), unavailability of production inputs (26.7%), unavailability of labourers (25.8%) and poor extension service delivery (20.8%) ranked 5th, 6th, 7th and 8th, respectively among the constraints faced by the farmers. The least constraints faced by the cassava farmers was inadequate rainfall (15.0%) and attack from Fulani herdsmen (7.5%) ranked 9th and 10th, respectively. This finding is in line with that of Ironkwe *et al.* (2010) who identified high cost of production inputs, inadequate capital, scarcity of improved cassava varieties, poor market price and difficulties in land acquisition as constraints faced by cassava farmers in Enugu State.

Table 4: Distribution of Respondents based on Constraints faced in Cassava Production

Constraints	Frequency*	Percentages	Rank
Problem of inadequate capital	81	67.5	1st
Problem of transportation	79	65.8	2nd
Problem of pests and diseases	75	62.5	3rd
Problem of land degradation	73	60.8	4th
Shortage of improved planting materials	66	55.0	5th
Unavailability of production inputs	32	26.7	6th
Unavailability of labourers	31	25.8	7th
Poor extension services delivery	25	20.8	8th
Inadequate rainfall	18	15.0	9th
Attack from Fulani herdsmen	9	7.5	10th

Source: Field Survey, 2018 ***Multiple Response**

CONCLUSION

Based on the findings of the study, it could be concluded that the cassava farmers were in their active and productive age, married and highly experienced in farming activities. Although, they are operating on a small-scale with low income earning. Cassava production is profitable enterprise despite the fact that high labour cost was incurred in the course of production. More so, cassava farmers' participation in extension training programme was found to have positive and significant effect on the cassava output because training build their capacity to combine scare production resources optimally. Problem of inadequate capital, transportation, pests and diseases are the major constraints faced by the cassava famers in the study area.

RECOMMENDATIONS

This study therefore recommends that:

i. Since most of the respondents involved in cassava farming in the study were in their active and productive age, and educated. Financial institutions should assist to provide flexible credit facilities that will boost cassava production.

ii. Cassava production was found to be profitable enterprise in the study area. It was therefore recommended that relevant stakeholders (Government and Non-Governmental Organizations like IFAD, USAID, UNDP and FAO) should formulate polices that will enhance and guide job creation through cassava farming especially among youths to reduce unemployment and social vices.

iii. It was found out that participation in extension training had effect on cassava output. Thus, there is need to enhance the capacity of the farmers by extension agents through training in area of cost minimization especially with regards to labour usage which constitute greater percentage of cassava production costs incurred.

iv. It is recommended that the cassava farmers should form a cooperative societies to enable them access capital and other resources needed for cassava production.

v. Government and relevant stakeholders should also provide basic infrastructures such as good road network and transportation system that will enhance easy movement of produce from farms to urban centres for increase income.

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