As revealed in Table 2 above, Variable cost /ha was ₦107,094.99 which constituted 96.57% of the production cost in which the cost incurred on labour and yam seed alone took 40.09% and 22.90% respectively of the overall cost/ha, while the fixed cost/ha was ₦3,799.57 which constituted 3.43% of the total cost. Total cost/ha was ₦110,894.56, total revenue ha realized was ₦438,718.32, gross margin was ₦331,623.33 and net farm income was ₦327,823.76. The result also shows that yam cultivation is gainful in the area under review with the gross ratio seen to be 0.25. This implies that the complete ranch costs was about 25% of the gross income. The result concur with the study of Akinola and Owombo (2011) who reported that a less than gross ratio proportion is attractive for any homestead business the lower the proportion, the higher the return per naira contributed.

Determinants of yam production yield in the area under review

Table 3: Estimated regression co-efficient of determinants of yam production output

Variable	Linear	Semi- log	Exponential	Cobb Douglas
Constant	65.225	-22306.11	7.896	5.956
	(-0.14)***	(-4.44)***	(56.44)***	(4.44)***
Farm size (Ha)	3934.328	2717.114	0.558	0.445
	(11.07)***	(4.08)***	(5.26)***	(10.66)***
Capital input(?)	-0.039	1203.090	-7.620	0.084
	(-1.26)	(2.70)***	(-0.08)	(2.93)**
Fertilizer(Kg)	1.150	22.876	-0.000	0.004.937
	(0.88)	(0.37)***	(-0.83)	(0.10)
Labor(Man-day)	18.504	1757.937	0.006	22.306
	(7.33)***	(3.02)***	(-3.1)***	(8.41)***
Planting material (?)	0.136	1680.452	6.720	0.119
	(10.69)***	(3.68)***	(1.77)*	(4.07)***
Age (years)	55.116	-158.239	0.002	0.077
	(0.47)	(0.19)	(0.06)	(-1.49)
Marital status	419.537	1551.395	-0.042	0.077
	(1.99)**	(1.07)*	(-0.66)	(1.32)
Experience(years)	-192.255	-562.173	-0.008	-0.063
	(-2.24)**	(-1.07)	(-0.33)	(-1.86)*
R^2	0.95.85	0.736	0.729	0.920
Adjusted R^2	0.957	0.727	0.720	0.918
F-ratio	721.55***	87.19***	84.20***	362.60***

Source: Field Survey data, 2016. *** = Significant at 1% level of probability, **= Significant at 5% level of probability, *= Significant at 10% level of probability, Not significant. (Figures in parenthesis are t-values)

From Table 3 the lead equation for the factors of yam cultivation is the Linear functional form. This is because it has an R^2 value of 0.956. This implies that about 95.85% distinction in yam productivity was explained by the clarifying variables (X_1-X_8) included in the model, while the remaining 4.15% not explained is because of variables not included in the model as well as errors in estimation. The test for R^2 given by the F-ratio (721.55) was significant at 1% level of probability and also means that the explanatory variables adequately explained the difference in the dependent variables Y (yam output).

economic characteristics of yam producers in the study area

Table 1 shows that yam producers in the study under review mean age of 41 years. This means that a good number of the yam farmers in the study are still within their active and productive age. The Table further showed that majority (87.76%) of the yam producers are male, while 12.24% are female. This might be the reason that yam cultivation requires a lot of energy of which most women cannot cope with the rigorous activities involved. This is in consonance with the study of Ewunwe et al., (2008) who reported that yam farming is a male dominated enterprise in Oyo state.

Furthermore, about 81.08% of the yam farmers are married, 17.76% are single while 0.39% are divorced and 0.77% are widowed. Since a good number of the yam farmers are married, it means that the family sizes will increase and, in this way, improve provision of family labour. This concur with the study of Deolu (2012) who opined that a number of the yam farmers in Niger state are married.

Moreso, the result on Table 1 shows that 26.25% of the farmers had primary education, 24.17% had no education, 22.39% had quranic and others had either adult or higher education. This means that majority of the farmers had at least primary education. This disagreed with the study conducted by Ekunwe et al., (2008) who opined that a good number of yam producers had did not attend formal education. Average number of persons per household was 8. The result is in agreement with the study of Deolu (2012) and disagreed shows that majority (61.7%) of yam farmers in Paikoro LGA, Niger State have family size above 16 members. About 26.25% of farmers had more than 31 years of yam cultivation, 20.46% had between 21 and 30 years, 20.08% 11and 20 and 15.83% had between 6 and 10 years of experience. Experience therefore enhances the practical competence of the farmers in their farm operations. This is in accordance with the study of Deolu (2012) who opined that a large number of yam farmers in Mokwa L.G.A, Niger State have above 30 years of farming experience. It was further observed that 72.9% of the yam farmers had cultivated area of less than 5 hectares. This implied that the farmers had small farm sizes which indicated the subsistence level of farming.

Profitability of yam production in selected Local Government Area of Niger State

Table 2: Cost and return analysis of yam cultivation in the study areas

Item	Amount (₦)	Percentage (%)
Variables Cost (VC)		
Labour (hired)	44,459.81	40.09
Land rent	1,094.33	0.99
Fertilizer	10,441.58	9.42
Yam seed	25,400.00	22.90
Yam barn	6,557.00	5.91
Insecticide/pesticide	669.59	0.60
Herbicide	7,052.85	6.36
Staking material	3,388.68	3.06
Transportation	8,031.15	7.24
Total Variable Cost (TVC)	107,094.99	96.57
Fixed Cost (FC)		
Depreciation on farm inputs	1,814.72	1.64
Interest amount	1,984.86	1.79
Total Fixed cost (TFC)	3,799.587	3.43
Total Cost (TC)	110,894.56	100.00
Total Revenue (TR)	438,718.32	395.62
Gross Margin(GM)	331,623.33	
Net Farm Income (NFI)	327,823.76	
Operating Ratio (OR)	0.24	
Gross Ratio (GR)	0.25	

Source: Field Survey data, 2016

AGRICULTURE AND ALLIED SCIENCES (AJAAS)

ECONOMIC ANALYSIS OF YAM PRODUCTION IN SOME SELECTED LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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ABSTRACT

The research details an empirical illustration of the key underlining factors that shapes yam farming and production in Shiroro and Paikoro LGA of Niger state. The demographic and institutional characteristics of the yam farmers revealed the gender dominance (87.26%) of yam production by male while an average age of 41 years was obtained among the yam farmers. The production cost structure revealed an average variable cost/ha of (N 107,094.99) and this accounted for 96.57% of total production cost in the area under study. Furthermore, the inferential statistic (Multiple regression) for determinants of yam production offered significant insight on the interaction between dependent and explanatory variables. Farm size (t= 11.07), labour (t=7.33), and cost of yam seed (t=10.69) were statistically significant at 1% probability level .Family size (t=0.47) and farming experience (t=-2.24) also emerged as key determinants of yam production in area under study at 5% probability level. Some fundamental production constraints were enumerated by respondents to include, erratic rainfall pattern, high cost of planting materials, lack of access road and poor extension service. Conclusively, on the account of our research findings we suggested specific policy action to ease the price and access to critical inputs to stimulate yam output and the enterprise profitability in the study area.

Keywords: Yam, Production, Economics and Analysis

INTRODUCTION

Nigeria has been reported to be among the countries that produce food and agricultural resources most especially yam (National Bureau of Statistics, 2012). Yams belong to genus Dioscorea members of the flowering plant which are monocots, similar to palms, and orchids. Yams are mostly found in Africa, and can also be stored for months without refrigeration. About 72percent of the yam been produced in West Africa comes from Nigeria and Nigeria without help has accounted for 70percent of the world's production (Zaknayiba and Tanko, 2013). They occur to be the most expensive but also most preferred food among the tuber and root crops (Okelola *et al*, 2014). Yam production in Nigeria is very high and Nigeria is one of the world's top yam producers. Food and Agricultural Organization (FAO) (2013) reported that harvested surface area worldwide for yam production has increased from 1.15 million (Ha) in 1961 to 5.04 million (Ha) in 2012. Yield (Hg/Ha) in the world also increased from 72.35 thousand metric tons in 1961 to 116.65 thousand metric tons in 2012. While Nigeria represented over 65% (38 million metric tons) of the world yam production. Valued at $7.75 billion and cultivated about 2.9 million hectares of land in 2012.

Nigeria has not received the required amount of attention (Orkwor and Asiedu 1999). This

Constraints to yam cultivation in Paikoro and Shiroro Local Government Area of Niger States

Table 4 above reveals that insufficient rainfall top the list of constraint table with 77% followed by expensive nature of planting materials. Poor road, lack of farm association, poor extension service, high interest rate of acquiring credit, inadequate market information, inadequate access to productive land, inadequate storage facilities follows respectively and are also of great concern as they affect yield of yam in the area under review. Other constraints that limit the yam productivity in the area under review are pest and disease, land ownership and pilfering/theft. The result is in agreement with the study of Zaknayiba and Tanko (2013) who opined that reveal that inadequate access to farm inputs, limited finance, poor product prices, inadequate of storage facilities, problem of pests and diseases adversely affect yam production.

CONCLUSION

The study concluded that yam production is a highly profitable agricultural enterprise and that yam production output is highly dependent on farm size, labour and price of yam seed and it also have limiting factors such as poor road access, expensive nature of planting materials poor extension service, lack of access to production land etc. that must be combated. The study recommended that farmers should be encouraged by extension agents to form farmers' associations/co-operatives so as to pull efforts together and assist one another to collectively gain access to resources which they will use in purchasing the needed items for yam production which might invariably increase their productivity. Government should subsidize inputs and make them more accessible to the farmers.

Furthermore, the result on Table 3 shows that land cultivated, labour cost and cost of seed are significant determinant of yam output at 1% level of probability in the area under review. This means that as farm size increases, the farmers' yam output also increases. The result also shows that labour is also a significant determinant of yam output at 1% level of probability in the area under review. This implies that increase in labour also leads to growth in output of yam. Cost of yam seed is also imperative at 1% level of probability as revealed in Table 3, this means that as the price of yam seed increases the output of yam also increases this might be due to the fact that farmers might think that cost of yam might increase the following season and as such more care will be given to yam enterprises which can eventually lead to increase in output. Furthermore, using the coefficient values, the result shows that a unit increase in farm size, labour and cost of yam seed will lead to an increase in yam output by 3934.32, 18.56 and 0.14 respectively. This agrees with the findings of Ajibola (2010) who reported that for any upward review in input, output also increase.

More, so, the result on Table 3 shows that marital status is statistically significant at a probability level of 5%. This means that the more the farmers get married the more the output in yam production. This might be translated to increase in house population which might also lead to more accessibility to labour provided my family members of the farmer who can help in carrying out yam output. Also Table 3 also indicate that the amount of knowledge is significant at 5% but having an opposite relationship which means that the higher the level of farming experience the lower the output in yam production. Contrary to a priori expectation, however, it must be emphasized that yam farming demands a lot of energy which tend to reside in youthful age and consequently favors competitive output and profitability. The result therefore, does not concur with the study of Okoye *et al.* (2009) who opined that more skilled farmers were more efficient in their decision-making processes.

Table 4: Respondents constraints to yam production

	Frequency	Percentage	Rank
Constant	202	77.99	1
Insufficient rainfall	193	74.52	2
High Cost Of Planting Material	175	67.57	3
Poor Road	144	55.60	4
No Farm Association	129	49.81	5
Poor Extension Service	126	48.65	6
High cost of credit	111	42.86	7
Inadequate market information	100	38.61	8
Inadequate storage facility	100	38.61	
Lack of access to productive land	95	36.68	10
Pest and disease	86	33.20	11
Land ownership	47	18.15	12
Pilfering/Theft			
Total	1508*		

Source: Field Survey, 2016

*Multiple responses,

account for the fall in output rate from 42% in 1990 to 16.3% in 2001 despite the crop's production taking up more land, from 1270 million hectares in the same year (Federal Ministry of Agriculture, FMA 2001). Since yam remains a major staple food in Nigeria based on its cultural role and contributing to rural and regional economies (Kalu and Erhabor, 1992), this has called for a concrete effort to curb this decline in yield. Hence, a research into the economics of yam output shed light on the factors affecting the yield of yam per hectare by specifically determining the profitability of yam production and ascertain the determinant of yam production yam production in the study area.

METHODOLOGY

A 4-stage sampling method was used to sample the participants for this study. In the first stage, two Local Government Areas in the State were purposively selected (Shiroro and Paikoro) from Agricultural Zone II because of large production of yam in the areas. In the second stage, two villages were randomly chosen from each of the selected Local Government Areas, to equal the sum of four (4) communities. In the third stage, sampling of yam farmers was done proportionately using Yamane's (1967) formular.

$$n = \frac{N}{1+N(e)^2} \quad \ldots\ldots(1)$$

Where n= sample size N= sample frame, 1=constant e = limit of tolerate error at 0.05 probability level. Thus a total of 259 yam producers were interviewed. Applying the formula above, Erena, Ubandoma, Tungan Mallam and Tutungo had 45, 65, 70 and 79 respondents respectively. Data were gathered using survey and interview schedule.

METHOD OF DATA ANALYSIS

Descriptive and inferential statistics were used to conduct analysis. Gross margin analysis was used to determine the profitability of yam enterprise while Multiple regression analysis was used to ascertain the determinate of yam production in the area under review. The models are specified as;

Model specification for gross margin

GM = TR –TVC, TC = TVC + TFC Π = TR - TC

Where: GM = Gross margin, TC = Total cost, TFC = Total fixed cost, TVC = Total variable cost, Π = Net production margin or profit

The multiple regression model is specified as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, e) \quad \ldots\ldots(2)$$

Where: Y = Production output (kg)

X_1 = Farm size (ha)

X_2 = Capital input (₦)

X_3 = Fertilizer (₦)

X_4 = Labour cost (man days)

X_5 = Cost of yam seed (₦)

X_6 = Farmers experience (years)

X_7 = Age of farmer (years)

X_8 = Gender (male =1, Female = 0)

e = error term

explicate form of the model above is as follows:

- = - 0 +- 1 - 1 +- 2 - 2 + - 3 - 3 + - 4 - 4 + - 5 - 5 ------ + - 17 - 17 +- .

(3)

Exponential Form

= - 0 +- 1 - 1 +- 2 - 2 + - 3 - 3 + - 4 - 4 + - 5 - 5 ----- + - 17 - 17 +- .

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(4)
Semi-log Form
(5)
Double-log Form
(6)
Where:
B_o=Intercept or constant term
X_1-X_8-Independent variables as defined above
B_1-B_8= Coefficients to be estimated
e= error term

RESULTS AND DISCUSSION

Table 1: Socio - economic characteristics of yam producers in the study area

Description	No of Respondents	Percentage (%)	Mean
Age			
Less than 21	14	5.41	
21 – 30	53	20.46	
31 – 40	77	29.73	
41 – 50	69	26.64	
Above 51	46	17.76	40
Sex			
Male	226	87.26	
Female	33	12.24	
Marital status			
Married	210	81.08	
Single	46	17.76	
Divorced	1	0.39	
Widowed	2	0.77	
Education			
No education	60	23.17	
Quranic	58	22.39	
Adult	18	6.95	
Primary	68	26.25	
Secondary	40	15.44	
Tertiary	15	5.79	
Household size			
1-5	94	36.29	
6-10	95	36.68	
11-15	47	17.76	
16-20	17	6.56	
Above 20	7	2.70	8.0
Farming Experience			
1-5	52	20.08	
6-10	41	15.83	
11-20	45	17.37	
21-30	53	20.46	
31-40	68	26.25	16
Farm size			
0.1-1.0	96	37.00	
1.1-2.0	93	35.90	
2.1-3.0	70	27.03	
Total	259	100	

Source: Field Survey data, 2016