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Economic Analysis of Groundnut Production in Shiroro Local Government Area of Niger State, Nigeria

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Abstract
The study examined the economics of Groundnut Production in Shiroro local government area of Niger State, Nigeria. To achieve the objectives of the study, multi-stage sampling technique was used to select 81 groundnut producers. Data were collected from the sampled respondents in single visit interviews using structured questionnaires. The collected data were analyzed using descriptive statistics, farm budgeting model and production function (regression) analysis. Results of the study revealed that most of the respondents were males, married and within productive labour age. Most of the respondents also had modern education (54.32%). They obtained most of their investment capital from informal sources, mainly personal savings, village money lenders, family and or friends. The result further showed that groundnut production in the area is profitable as revealed by the gross margin and profitability analysis. Similarly, the result of the regression analysis also showed that 70.5% of the variation in the output of groundnut is explained by the variables included in the model (age, farm size, labour input, fertilizer, pesticides) as revealed by $R^2 = 0.705$. Some of the constraints in groundnut production as revealed by the respondents include poor transportation, inadequate investment capital, water shortage, incidence of pests and diseases, among others. However, incidence of pests and diseases ranked first while shortage of drying space ranked least among these constraints. Therefore, providing better roads, formation of viable cooperative societies, and provision of irrigation facilities and establishment of rural financial institutions would further increase productivity and profitability of groundnut production in the area.
***Key words*: Groundnut production, resources use efficiency, profitability and Niger State.**

Introduction

Groundnuts are legume whose fruits are formed underground. Each fruit or nut usually contains two, three or even more seeds. It is one of the most important annual cash crops grown in the agricultural export programmes of Nigeria and Gambia (Baidu *et al*: 1997). Groundnuts are widely grown in West Africa but the crop thrives best in the thickly populated area of Savannah zone (Godwin, 2007). In Nigeria, the crop is grown mainly in Kano State but also cultivate in Sokoto, Borno, Kaduna, Katsina and Niger States. The cultivation of groundnuts in the Northern part of Nigeria occupies over 30 percent of the total global volume (Akinyosoye, 1988 and Aminu *et al*., 2010). According to FAO (2004), groundnut is grown in nearly 100 countries, and the major producers include China, India, Nigeria, U.S.A, Indonesia and Sudan. However, Economies and Social conditions play important roles in farmer's choices and decisions in going into groundnut production (Defumier, 1994). Therefore, the search for technical options by international and National Research Institutions to alleviate biophysical constraints to groundnut production in West Africa, needs not only to consider socio-economic constraints to groundnut production in West Africa, when designing new technologies but also needs to be complemented with policies and programmes that alleviate socio-economic constraints (Baidu *et al*: 1997).

Furthermore, groundnut is a major cash crop in West Africa Savannah regions and elsewhere, being an important source of oil for making soap, margarine, salad, oil, pomade, cooking oil, valuable source of protein, fats, energy and minerals. The haulms (vegetative plant parts) provide excellent hay for feeding livestock (FAO, 2002, 2004). Similarly, the crop is also an excellent and important local diet.

t can be eastern raw, roasted, or in stews, and groundnut cake bye-product of oil crushing are useful animal feed (FAO, 2002). Groundnut generates cash income to many poor farmers in leveloping world, especially in sub-saharan African (SSA) and Asia. In Senegal for instance, groundnut production and processing represent about 2 per cent of Gross Domestic Product GDP) and 9 percent of exports in that country World Bank, 2004). However, the production onstraints of this important crop include nadequate capital for the adoption of novations in its production; sociological roblems (such as the land tenure problems), on-availability/or high cost of fertilizer, pests nd diseases infestation (e.g. Groundnut Rosettle /irus Diseases infestation and Aphids among thers (Godwin, 2007).

In spite of the rapid production and ncrease consumption rate of groundnut, there re a number of production problems that need to e evaluated to provide an enabling environment or its production in the study area. This will ring about increase income and better standard f living to its growers. In addition, groundnut roduction in the study area has a lot of otentials (Sheik, 2005), but its production ystems are complex and little understood by the rmers, which require further investigation to be onducted to generate useful and constant formation to the growers, with a view to dvising them on how to improve their roductivity. Also, one of the main objectives of nall-scale farmers is the maximization of their ross Margin (GM), which entails high rate of turns on investment (Adewumi *et al*., 1999) nd it is hoped that his study will go a long way assisting the groundnut farmers to achieve this tal objective, thus improving their standard of ving.

he objectives of this study therefore, were to:

- Highlight the socio-economic characteristics of the farmers in the study area;
- Determine the types of resources used in groundnut production in the area;
- Determine the profitability of groundnut production enterprise in the area; and
- Identify constraints to groundnut production in the area.

ethodology

The study area is Shiroro local overnment area of Niger State, Nigeria. Niger ate was created on the 3rd February, 1976 from e defunct North-Western state by the late head of State, General Murtala Muhammad. Niger state lies between latitude 9°36' North and longitude 6°22' East. The state lies in the Guinea Savannah agro ecological zone of the country with favourable climatic conditions for crops and livestock production. It is bordered to the North by Sokoto State, West by Kebbi State, South by Kogi, State and South-West by Kwara State, Kaduna State and the Federal Capital Territory (F.C.T) share common boundaries with the state to the North and East respectively. About 85% of Niger State populations are farmers while the remaining 15% engage in other vocations such as business, white collar jobs etc. Niger State experiences distinct dry and wet seasons with annual rainfall varying from 1,100mm in the Northern parts to 1,600mm in the southern parts of the state respectively (NSADP, 2005). The minimum temperatures range between 21°C-37°C. The rainy season lasts for about 80 days in the Northern parts and about 120 days in the Southern parts of the state. The average sunshine hours is about 6-9. Generally, the climate, soil and hydrology of the state permits the cultivation of most Nigerian staple food crops such as yam, maize, millet, sorghum, groundnut etc and still allows sufficient opportunities for grazing, fresh water fishing and forestry development. The state has a population of 3,950, 249 people (NPC, 2006). The state covers a total land area of 85,733,175km² or about 8.6 million hectares which represents 9.3 percent of the total land area of Nigeria (FRN, 2007). Shiroro LGA, has its administrative headquarters at Kuta.

A multi-stage random sampling procedure was used to select respondents from the LGA. In the first stage, 3 districts were purposively selected based on the predominance of groundnut farmers in those districts, namely Kuta, Gwada and Mutundaya districts. This is then followed by a random selection of 2 localities from each of the districts. The localities selected were Mutundaya; Maipei, Gindou; Gwada; Kuta and Shiroro in the selected districts respectively. Lastly, 13 groundnut farmers were randomly selected for each of the localities but 16 farmers were selected for the last locality because of the relative higher population of groundnut farmers in it. This gave a total sample size of 81 farmers in all. The sampling frame was however drawn from the localities consisting of all the groundnut farmers. The village Head assisted the researcher with the sampling frame from which samples were drawn.

Primary data were collected with the use of well structured questionnaires, personal interview schedules and observations. The researcher was assisted by well trained enumerators as well an extension agent resident in each of the villages in data collection. Information was collected on farmers' socio-economic characteristics and production activities. More often than not, all the 81 questionnaires were valid for analyses

Method of Data Analysis

Descriptive statistics: Simple descriptive statistics such as means, frequency distribution, tabulations, percentages, and ranking were used to realize objectives i and iv.

The Multiple regression model: This is a tool for analyzing problems of resource productivity and returns to scale in agriculture. It displays the technical relationship between resource-input and product-outputs (upton, 1979). The four functional forms are explicitly stated as follows:

Linear functional form:

$Y = b+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5 + U$.....equation 1

Semi-logarithm functional form:

$Y = \log b+b_1\log X_1+b_2\log X_2+b_3\log X_3+b_4\log X_4+b_5\log X_5 +\log U$ .....equation 2

Exponential functional form

$\log Y = b+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5 + U$.....equation 3

Double-logarithm, Power or Cobb-Douglass functional form:

$\text{Log } Y = \log b+b_1\log X_1+b_2\log X_2+b_3\log X_3+b_4\log X_4+b_5\log X_5 +\log U$

Where: b or log b = intercept, and represent the level of output when input is zero

b_1-b_5 = regression coefficient of the level of dependent variables (age, land, labour, fertilizer and pesticides.

U= The disturbance error term, represents residual factors and captures the variables omitted from the model but affect the total output.

Model specifications:

X1 = Age: measured in years

X2 = Land: measured in hectares (ha)

X3 = Labour: measured in man days

X4 = fertilizer: measured in kilogram (kg)

X5 = pesticides: measured in littre (l)

Results and Discussion

Socio-economic characteristics of groundnut farmers:

The summary statistics of some important socio-economic variables of the groundnut farming households in the study area are presented in Table 1. The result revealed that an average groundnut farmer in the study area is made, aged between 40-60 years and has a household size of 11.82 persons. The majority (54.32%) had modern education (either primary, secondary or tertiary; 22.21 years of farming experience (Each cultivated about 7.15 ha of land (mostly in scattered plots of land), acquires land through inheritance and utilizes both family and hired labour (66.67%) for farm operations. Most of the respondents (38.27%) obtained parts of their investment capital from their own savings. However, since this was generally inadequate, about 62% obtained loans from various sources such as money lenders, family and friends, etc. Meanwhile, commercial banking sources of loan for farming activity (Baba, 2004) are seen as not bankable by the formal institutions (Table 2). Furthermore, the capital obtained from the money lenders and cooperative societies was either in cash or kind (improved seedlings, fertilizers and pesticides). Either way, the farmers complained of high interest charges.

Table 1: Some socio-economic characteristics of the groundnut farming households (N-81)

Variables	Frequency	Percentage
Age (Years)		
15-30	18	22.22
31-45	37	45.68
46-60	17	20.99
Above 60	9	11.11
	X=40.60	
	SD=13.39	
Gender (in numbers):		
Male	69	85.19
Female	12	14.81
Marital status (in numbers):		
Single	18	22.22
Married	61	75.31
Widower	2	2.47
Level of education (in numbers):		
Islamic/Quranic education	7	8.64
Adult education	11	13.58
Primary education	39	48.15
Secondary education	4	4.94
Tertiary education	1	1.23
None	19	23.46
Household size (in numbers):		
5 and above	11	13.58
6-10	15	18.52
11-15	36	44.44
Above 15	19	23.46
	X=11.82	
	SD=2.04	
Farming experience (in years)		
1-10	13	16.0
11-20	27	33.3
21-30	22	27.11
31-40	11	13.5
Above 40	8	9.88
	X=22.21	
	SD=6.43	
Farm size (ha):		
0-5	23	28.39
6-10	39	48.15
11-15	12	14.81
Above 15	7	8.64
Method of land acquisition		
Rented	14	17.28
Inherited	49	60.49
Gift	18	22.22
Sources of labour supply:		
Family	27	33.33
Family and hired	54	66.67

X = Mean; SD = Standard deviation

Source: Field survey, 2009.

Table 2: Sources of investment capital

Sources of capital	Frequency	Percentage
Agricultural bank	2	2.47
Cooperative	21	25.93
Money lenders	3	3.70
Family and friends	17	20.99
Traditional savings	7	8.64
Personal savings	31	38.27

Source: Field survey, 2009.

Types and Levels of Resource – use in Groundnut Production

Regression analysis was used to examine the relationship between the value of groundnut output (in Naira, ₦) and the variables that effect groundnut production. An econometric model was estimated. The results of the analysis are shown in Table 3. Results in the table indicated that the exponential functional form is the lead equation and was chosen for further analysis/discussion. It has an R^2 value of 0.705 implying that, about 70.5% of the variation in groundnut output (Y) is explained by variables X_1 = (Age). X_2 = (farm size). X_3 = (Labour). X_4 = (fertilizer) X_5= (pesticides) included in the model, while the remaining 29.50% is as a result of non inclusion of some explanatory variables. The F-statistics which is 35.930 is also statistically significant at 1% level and is an indication that variables X_1-X_5 included in the model adequately explained the dependent variable. Further analysis of the result in Table 3 also shows that only three (3) out of the five (5) variables modeled were statistically significant, explaining the output of groundnut in the study area. These are X_1 (age), X_2 (farm size) and X_3 (fertilizer). The lead equation is presented thus:

$$Y = b+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5 + U$$

$$\ln Y=10.515+1.054E-02X1 + 9.826E-02 + 3.865E-0.6 + 4.027E-06.876E-06$$

The coefficient of farmers' age (X_1) is 1.054E-02, which is positive and statistically significant at 10%. This implies that there is a positive and statistically significant relationship between the age of the farmers and the output of groundnut in the study area, since majority of the farmers in the study area were within the working and active age groups or prime age of labour productivity and might likely adopt innovations. The coefficient of farm size (X_2) is 9.826E-02 (0.09826) which is positive and statically significant at 1%. This implies that there is a significant positive relationship between the farm size and output of groundnut in the study area. In other words, as farm size increases, the output realized from ground nut also increases. Large farm size coupled with good management practices would translate into increased output of groundnut. Further, the coefficient of labour input (X_3) is 3. 865) and fertilizer (X_4) is 4.027E-06 (1.580) and the both positive, implying a positive but non-significant relationship with the output groundnut. The coefficient of pesticides (X5) is 6.876E-06 (1.908) which is positive and statistically significant at 10% level. This is evident that a significant and positive relationship exists between the output of groundnut and pesticides application. Higher volume of pesticides application (especially for the control of Aphids-such as Aphid cracivora that transmits Groundnut Rosette Virus Disease) is an evidence of larger output of groundnut.

Gross Margin and Profitability analysis

The profitability analysis in Table 4 revealed that groundnut production in Shiroro LGA of Niger State is profitable. The entrepreneur recorded a GM of 1,376,652.39 per hectares and a NFI of 614,317.39. This is not only because of available human and materials resources. The table also revealed that the GR/ha was positive (2,190,848.58) while the TC of production stood at a minimal of N1,576,531.19/ha. However, variable cost constituted 51.64% of the TC of production, and this was attributed to high labour input cost, dominated by the imputed cost (opportunity cost) of unpaid family labour. Furthermore, the enterprise also recorded an impressive ROI to capital, which was 38.97%. it must be noted that the high NFI & GM was a result of the subsidized inputs by the LGA council in the study area.

Table 3: Regression results: Determinants of Groundnut production in Shiroro LGA of Niger State, Nigeria

Variable	Linear	Exponential	Double-log	Semi-log
Constant	-2237.466	10.56	7.297	-1503271
	(-0.085)	(69.457)	(4.611)	(-0.438
X1:Age(Year)	-56.107	1.054E-02	0.104	-33737.298
	(-0.059)	(1.914)	(0.523)	(-0.780)
X2: Farm size (ha)	22246.865	9.826E-02	0.787	163886.68
	(6.349)***	(4.854)***	(5.716)**	(5.482)***
X3: Labour input	0.116	3.865E-06	0.217	18556.882
(Mandays)	(0.129)	(0.745)	(1.221)	(0.482)
X4: Fertilizer (kg)	1.226	4.027E-06	5.674E-02	16234.042
	(2.779)	(1.580)	(1.000)	(1.318)
X5: Pesticides (1)	0.515	6.876E-06	9.543E-04	-18772.726
	(0.825)	(1.908)*	(1.59)	(-1.442)
R^2	0.691	0.705	0.783	0.642
R^2-adjested	0.671	0.686	0.768	0.618
F-ratio	33.597***	35.930***	54.029***	26.900
n	81	81	81	81

Note: *** implies statistically significant at 1% level;** implies statistically significant at 5% level; * implies statistically significant at 10% level: Figures in parenthesis are the respective t-value

Source: computed from field survey data, 2009

Table 4: Profitability analysis of Groundnut farmer in Shiroro LGA of Niger State

Item	Cost	Percentage	Return
Gross revenue (GR)			2,190,848.588
Variable cost (VC)	814,196.19	51.64	
Seeds	355,987.05	22.58	
Pesticides (Agrochemicals)	37,708.64	2.39	
Family labor (opportunity cost)	347,677.42	22.05	
Hired labour	56,019.08	3.55	
Marketing/transportation cost	16,804.00	1.07	
Fixed cost (FC)	762,335.00	48.36	
Depreciation on farm tools & equipment			
Total cost (TC)	762,335.00		
Gross margin (GM)	1,576,531.19	100.00	
Net farm income (NFI)			1,376,652.39
Rate of return on investment (ROI)			614,317.39
		36.79%	

Source: field survey data, 2014

Constrains to groundnut production

The result of the analysis of factors affecting groundnut production in the study area is shown in Table 5. Groundnut producers in the study area face several challenges, some of which may account for the swings in groundnut production. Incidence of pests and diseases especially Aphids and Groundnut Virus Disease was the most critical (20.61%) and therefore ranked first among these factors. They also complained about inadequate availability of vehicles and lack of access road for conveying groundnut to the required destinations at the required time (12.42%) and ranked fourth among the factors. This development has pushed many farmers to resort to using wheel barrows or motor-cycles and sometimes head porterage. The situation is further worsened by the high cost of transportation as a result of high cost of petroleum products, consequent of the deregulation of the downstream sector. The next most important constraint identified by a major population of the respondents (18.79%) is shortage of rainfall. The respondents complained of erratic rainfall.

This situation is further aggravated by lack of irrigation facilities to supplement natural rainfall in the area. This factor ranked second in the myriad of factors affecting groundnut production.

The respondents also identified inadequate capital as a serious threat to groundnut production in the area (11.21%). Little capital is available for them for investment. Although, some of the producers were members of cooperative societies, this has not alleviated their financial problem. Most of them still rely on personal savings, borrowing from friends (Table 2). More so, formal financial institutions like the commercial banks are not common in the area. The informal credit sources particularly the money lenders in the villages charge high interest rates and are unable to meet the investment and capital requirement of the producers. This factor however ranked sixth. Furthermore, shortage of drying space for groundnut products, shortage of labour (especially when schools are on session), low yield (due to persistence in local varieties) are some of other factors reported by the respondents in the area.

Table 5: Distribution of respondents according to constraints to groundnut production

Item	Cost	Percentage	Ranking
Inadequate capital	37	11.21	6
Poor transportation	41	12.42	4
Shortage of drying space	13	4.00	8
Water (rainfall) shortage	62	18.79	2
Shortage of labour	40	12.12	5
Incidence of pests and diseases	68	20.61	1
Low yield/output	46	13.94	3
Shortage of land/land tenure problems	23	7.00	7
Total	330*	100.00	

* Multiple responses

Sources: Field survey, 2009

Conclusion and Recommendations

The study examined economics of groundnut production Shiroro local government area of Niger State, Nigeria. The result of the study showed that groundnut production was quite profitable as revealed by the NFI and GM analysis. However, the high returns to groundnut production cannot be unconnected with the supply of inputs (such as fertilizers, chemical, pesticides, etc) to its grower's at subsidized rates by local government council in order to encourage its production in the area. Given the profitable nature of groundnut production as the results of the study suggests, it could be concluded that other factors, are responsible for the dwindling interest of farmers in groundnut production in the area. But this conclusion is only tentative. To reach a definite conclusion, further studies are needed to be conducted on the groundnut production in the study area.

In terms of policy recommendation however, the formation of viable cooperatives for easy access of credit to the farmers should be encouraged, formal and/or semi-formal financial institutions should be established in the area to carter for farmers, financial/investment needs. Extension education for farmers should be encouraged and access roads such as the feeder roads should be constructed to alleviate the suffering associated with the evacuation of products from the production centers to the required destinations.

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