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ECONOMIC ANALYSIS OF GROUNDNUT PRODUCTION IN KONTAGORA LOCAL
GOVERNMENT AREA OF NIGER STATE, NIGERIA.

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ABSTRACT

This study assessed the economics analysis of groundnut production in Kontagora Local Government Area of Niger State, Nigeria. Multi-stage sampling technique were adopted which involves the purposive selection of Kontagora and simple random selection of farmers from four villages were used to collect primary data from 80 respondents from the study area with the aid of a well-structured questionnaire. Descriptive statistics, farm budgetary analysis, Cobb-Douglas production function were used as analytical tools for the study. The analysis found that groundnut production is profitable, the farm budgetary analysis shows total revenue of ₦170,283.9 and net farm income of ₦35,411.3 per hectare and a profit of ₦36,429/ha Cobb-Douglas production function gave us R^2 value of 0.393. Finding shows that seed, pesticide and labour exert significant difference in determining the output of the groundnut farmers. The result of the resource use efficiency showed that land, pesticide and herbicide were underutilized, seed, fertilizer and labour were over utilized. Therefore recommendation such as provision of credit facilities, provision of seeds at subsidize rate and extension agents in other to create awareness should be provided and the adoption of improved technologies and good agricultural practices.

Keywords: Socio-Economics Factors, Groundnut production, Kontagora.

INTRODUCTION

In developing countries, groundnut has become an important crop where it serves as a source of protein, vitamins and cooking oil. Groundnut is the world 13th most significant food crop and the world's 4th most vital source of edible oil, 3rd most important source of



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vegetable protein. (Lawal & Muhammad, 2018). The haulms is good for feed supplement for livestock as it increases farmers income most especially during the dry season when fresh green grasses are not available and the fodder is in high demand. (ICRISAT, 2015)

Groundnut is mostly consumed directly as raw, roasted, salted or either boiled. However, oil is one of the most important products of the crop which can be used in domestic and for industrial purposes. Groundnut is used for industrial materials for producing oil for cakes and fertilizer. (Nnamdi, 2010). It is also processed and included as an ingredient in a wide range of other products, local diets which includes; groundnut paste, groundnut cake, groundnut porridge made with millet, groundnut candy and groundnut soup. The shells are used for fuel by some local oil factories and sometimes spread on the field for soil amendment. The uses of groundnut plant over the years make it an excellent cash crop for domestic markets as well as foreign trade in several developing and developed countries. (Godfrey *et al.*, 2020)

Groundnut is cultivated in subtropical regions of more than 100 countries in the world on nearly 31.2 million hectares, and total output of more than 60 million metric tons per hectare in 2014. (ICRISAT, 2015). Nigeria's groundnut production since 1912 has continuously improved maintaining first position in Africa with 39% of total production with the combination of smallholders and commercial farmers. In the year 2015 Nigeria's total production was 3, 467,446mt and in 2019 recorded 4,500,050mt. (NEPC, 2020). Groundnut is importantly cultivated in both tropical and sub-tropical countries. It is assume to be the most popular and widely cultivated legume in Nigeria because of its adaptation to varied climatic conditions. (Godfrey *et al.*, 2020). In Nigeria, groundnut is mostly cultivated sole or in mixtures with other crops like maize, sorghum or millet; the leading producing states include Niger, Kano, Jigawa, Zamfara, Kebbi, Sokoto, Katsina, Kaduna, Adamawa, Yobe, Borno, Taraba, Plateau, Nasarawa, Bauchi, and Gombe States (NAERLS,



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2011). The popular varieties in Nigeria are Kano local, Kano 50, Castle cary, Samnut 21, Samnut 22, and Samnut 23 (rosette resistant varieties) (Garba 2002 & FAO, 2011).

Groundnut production is one of the major activities of rural farmers; it has created job opportunities and provides income to farmers in Nigeria. The small scale groundnut farmers are faced with numerous challenges such as insufficient capital, to invest in modern production. In Nigeria, in spite of increase in consumption of groundnut, there are factors militating against its production among which are pest and disease, limited availability of cultivars that are adapted to drought or disease resistance, since it is mostly grown in the northern parts of Nigeria and even where appropriate cultivars are being grown. However, it is expected that result from this study would provide suggestion which may be useful in improving groundnut production in Kontagora Local Government Area of Niger State and the country at large, to support groundnut farmers in improving their productivity, income, farm output and overall standard of living. The aim of this study is to evaluate the costs and returns associated with groundnut production in Kontagora Local Government Area of Niger State, determined the relationship between inputs and output as well as the resource use efficiency of groundnut production in the area.

METHODOLOGY

The Study Area

Niger State covers a total land area of about 76,000km² which is about 9% of the total area of the country. The state is now being administrated under the twenty-five (25) local government area structures (NPC, 2006). The state is located in the derived savanna vegetation zone in the North Central part of Nigeria between latitude 8°20'N to 11°30'N and longitude 3°30'E to 7°20'E (NPC, 2006). Niger state population projection for 2016 has shown that Niger State has population of 5,556,247, while Kontagora has population of 213,000 (NBS, 2016). The total land area of Kontagora is about 2,081square kilometer. The



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study area is heterogeneous in the composition of ethnicity, it is agrarian area by nature and has a high percentage of its population engaged in farming as an occupation.

Sampling Techniques

Multistage and random simple techniques were exploited to gather information from the farmers. Data were collected for 2019 season with the assistance of the extension agents attach to each of the villages that were sampled. Out of five (5) districts (Rafin Gora, Logi, DogonnFadama, Kampani and Kairo), Loji and Rafin Gora were purposively selected due to large cultivation of the crop every season. In each district (4 villages) were randomly selected and in each village 20 farmers were randomly selected which gives a total sample size of eighty (80) respondents of the farmers.

Analytical tools

Descriptive statistics such as mean, frequency distribution, percentage were used to achieve the objectives that focused on socio-economic characteristics of farmers in the study area. It was also used to identify the problems associated with groundnut production in the study area. Other analytical tool includes farm budget analysis and Cobb-Douglas production function.

Farm budget analysis

Farm budget analysis was used to assess the costs and returns to groundnut production in the study area. The returns were expressed in Naira per hectare (₦/ha). Costs comprise both fixed and variable costs. Fixed cost comprises of cost of land rent on simple farm tools. Variable cost includes: cost of seed, fertilizer, herbicide and labour.

$$GM = TR - TVC$$

$$NFI = GI - TC$$

$$TC = TFC + TVC$$



$$RNI = \frac{NFI}{TC}$$

TC

Where;

GM = gross margin

TR = Total Revenue

TVC = Total Variable Cost

TFC = Total Fixed Cost

RNI= Return on every naira invested

NFI = Net farm income

TC= Total cost of groundnut

Cobb-Douglas production function

Cobb-Douglas production function was used to express the relationship between the dependent variable (output) and the independent variables. Cobb-Douglas production was appropriate for resource use efficiency analysis based on econometric, statistical and economic criteria.

The Cobb-Douglas production function is expressed as

$$Y = AX_i^{b_i} \dots \dots \dots (1)$$

Where “i” ranges from 1 to 6

By taking the natural logarithm on both sides of the equation

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + \ln e \dots \dots \dots (2)$$

Where,

\ln = natural logarithm

a = constant

Y = output (kg)



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X_1 = farm size (ha)

X_2 = labour (manday)

X_3 = fertilizer (kg)

X_4 = pesticide (litre)

X_5 = herbicide (litre)

X_6 = seed (kg)

e = error term

The resources used efficiency was computed for each resource input using.

$$r = \frac{MVP}{MFC}$$

Where;

MVP = Marginal Valued Product

MFC = Marginal Factor Cost

The MVP will be estimated as follows

$$MVP = MPP \cdot P_y$$

Where MPP = Marginal Physical Product

P_y = Price of output per unit

If $r = 1$, resources is efficiently utilized or $MVP = MFC$

If $r > 1$, resources is underutilized or $MVP > MFC$

If $r < 1$, resource is over utilized or $MVP < MFC$

RESULTS AND DISCUSSION

Table 1 shows a mean farm size of about $2^{1/2}$ hectares implying that majority of the groundnut farmers were operating on a small-scale level. About 79% of the farmers were male while 21% were female. Farming practices in Nigeria especially in the rural area are more labour-intensive in nature hence few females are involved in the production aspect.



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The age distribution of the farmers showed a modal age range of 41-50years with a mean age of about 41 years. This implies that groundnut farmers in the study area are adults in their prime and active working age which will most likely translate to high efficiency of production. In terms of household size, the mean household size was 8. Large household size can be an advantage because it is a cheap source of family labour. The educational level of the farmers showed that about 65% of the farmers had one or more form of formal education. This shows that more than half of the farmers were literate. This is very important in the adoption of improved and good agricultural practices necessary to improve productivity.



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Table 1: Socioeconomic characteristics of the groundnut farmers

Variables	Frequency (n=80)	Percentage	Mean
Farm size(ha)			
≤1	31	38.8	2.395
2-3	38	47.5	
>4	11	13.8	
Sex			
Male	63	78.8	
Female	17	21.3	
Age (years)			
≤20	1	1.3	40.58
21-30	16	20.0	
31-40	25	31.3	
41-50	27		33.8
>51	11	13.8	
Marital status			
Married	62	77.5	
Single	12	15.0	
Divorced	2	2.5	
Widowed	4	5.0	
Household size			
1-5	30	37.5	8.25
6-10	22	27.5	
11-15	22	27.5	
16-20	6	7.5	
Educational status			
No formal education	1	1.3	
Arabic education	27	33.8	
Primary education	27	33.8	
Secondary education	19	23.8	
Tertiary education	6	7.5	
Farming experience			
≤20	47	58.8	21.04
21-30	21	26.3	
31-40	9	11.3	
>40	3	3.8	
Access to credit			
No	61	76.3	
Yes	19	23.8	
Cooperative society			
No	52	65.0	
Yes	28	35.0	
Extension contact			
No	32	40.0	
Yes	48	60.0	
Seed variety			
Local	73	91.3	
Hybrid	7	8.8	

Source: Field Survey, 2019



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The distribution of farmers by access to credit revealed that about 24% of the groundnut farmers had benefitted from a credit institution while 76% had not benefitted from credit institution but relied only on their savings. This shows that credit access in the study area was very low. Regarding extension contact, about 60% of the groundnut farmers had access to extension agent which is more than half of the respondents. Extension contact is very important as it will go a long way to speed up the rate of adoption of improved technology. The Table further revealed that about 91% of the groundnut farmers adopted the use of local seed varieties while just 9% made use of hybrid seeds. This shows that there is low adoption rate of improved seed varieties in the study area.

The farming experience showed a modal farming experience of less than or equal to 20 years with a mean farming experience of about 21 years. This shows that majority of the groundnut farmers in the study area have been farming for a very long time indicating that it is their major source of livelihood. This result was in line with that of Nandi, Gunn & Yurkushi (2011) who also made similar findings in their study.

The distribution according to cooperative membership showed that 65% of the groundnut farmers do not belong to a cooperative society. This may have a negative effect on the farmer as most of this programme setup to assist farmers are usually extended to farmers whenever they are in group (Shuaibu, 2018).



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Table 2: Costs and returns to groundnut production in the study area

Input	Quantity (kg)	Unit cost(₦)	Amount (₦)	Percentage%
A. Variable cost				
Fertilizer	2.74kg	1500	4110	3.26
Agro- chemical	4.02 Lt	2500	10050	7.96
groundnut seed	16.04kg	850	13634	10.80
Family labour	251.85/md	100.72	25371.37	20.10
Hired labour	504/md	100.72	50762.88	40.21
Transportation	-	-	22302.95	17.67
Total variable cost			126231.2	100
B. Fixed cost				
Equipment	Quantity	Amount (₦)	Useful life	Depreciation value (₦)
Hoe	3	1500	5	900
Cutlass	2	2500	3	1666.67
Sprayer	1	25000	10	2500
Land (rental value/annum)	1	-		3574.73
Total				8641.4
C. Revenue				
	Quantity(kg)	Unit price (₦/Kg)	Amount (₦)	
Gross Farm Income (GFI)	243.262	700	170283.4	
D Gross margin(C –A)			44052.2	
Net Farm Income (D – B)			35410.3	
Rate of return (NFI/TC)			0.272	

Source: field survey, 2019

Table 2 shows that on average the total variable cost was ₦126,231.2/ha, constituting about 94.30% of the total cost of production while the average total fixed cost was ₦8,641.4/ha, constituting about 6.5% of the total ₦133854.9/ha incurred on production. On average, the



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total revenue of the groundnut farmers is ₦170,283.9/ha giving total net revenue of ₦35411.3/ha. The gross margin of the enterprise was also ₦44052.7/ha indicating that the enterprise was able to recover all variable cost during the production season. The profitability indices showed a rate of return on capital invested of ₦0.214 and a rate of return of ₦1.272 which implies that for every ₦1 invested, the farmer made a profit of ₦0.272 kobo.

Table 3: Estimation of Cobb-Douglas production function for groundnut production

<i>Variables</i>	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	1.618	0.298	5.423	7.24E-07
<i>In land</i>	0.100	0.144	0.697	0.488
<i>Inseed</i>	0.179**	0.080	2.242	0.028
<i>Inpesticide</i>	0.272**	0.133	2.050	0.044
<i>Inherbicide</i>	0.106	0.103	1.029	0.307
<i>In fertilizer</i>	0.072	0.050	1.452	0.151
<i>In labour</i>	0.176**	0.083	2.126	0.037
	R²	0.393		
	Adjusted R² =	0.343		

Source: field survey, 2019

The Cobb-Douglas production function for groundnut production in the study area is shown in Table 3 which reveals a coefficient of determination of 0.393. This implies that the estimated variables explained 39.31% of the variation in output of the groundnut farmers. The variables included in the model were: land, seed, pesticide herbicide, fertilizer and labour. Seed, pesticide and labour exerted significant difference in determining the output of the groundnut farmers. The coefficient for pesticide used is positive and significant at 5%. This shows that a 1% increase in the quantity of pesticide used will increase the output



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by 27.2%. Increasing the quantity of pesticide used will reduce pest infestation on the farm which will in turn result to pest inflicting lesser damage on crops.

The result of the analysis shows that groundnut production is a profitable business in the study area since both the fixed and variable cost was covered during the course of production.

The coefficient of quantity of seed used was positive and significant at 5%. This implies that a 1% increase in the quantity of seed used will increase the farms output by 17.8%. That is, the more seed sown, the more the output gotten from the farm. Increase in competition for nutrient is unlikely to occur as groundnut plants are capable of trapping nitrogen in its root nodules. Ayinde *et al.* (2011) also made similar finding in their studies.

The coefficient of labour used was positive and significant at 5%. This means that a 1% increase in the labour input will increase the output by 17.6%. This is in line with general opinion that labour contributes significantly to output. This affirms with the findings of (Ajibefun *et al.*, 2004) who asserted that labour contributed significantly to farm productivity.

Table 4: Resource use efficiency analysis of groundnut production

Variables	$MVP = b_i \cdot \frac{Y_i}{X_i}$	$MFC = P_x$	r	Remark	Implication
Land	13284.5	1197.50	11.09	MVP>MFC	Underutilised
Seed	154.66	703.01	0.22	MVP<MFC	Overutilized
Pesticide	21912.37	3500.38	6.26	MVP>MFC	Underutilised
Herbicide	2972.29	2830.75	1.05	MVP>MFC	Underutilised
fertilizer	59.63	175.38	0.34	MVP<MFC	Overutilized
Labour	101.04	2526.03	0.04	MVP<MFC	Overutilized

Source: Field survey, 2019



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Table 4 shows the ratio of the resource use efficiency for different inputs in groundnut production in the study area. When the value of the resource use efficiency (r) is greater than one, it shows that resources are underutilized. When the value is less than 1, it shows that the resources are over utilized and when the value is equal to 1, it shows that the resources are efficiently utilized. The ratio of MVP to MFC for pesticide usage is positive and greater than 1, which shows underutilization of pesticide on the plant. The farmer should use the recommended level of pesticide in order to increase the level of output. The MVP of herbicide is greater than the MFC of herbicide which shows underutilization of herbicide on the farm. The farmer should use the recommended level of herbicide in order to control weed effectively.

The ratio of MVP to MFC for fertilizer is positive but less than 1, which shows over utilization of fertilizer (inorganic) in groundnut production. This implies that the farmer used more than the recommended level of fertilizer. The farmer should use the recommended level of fertilizer in order to ensure maximum output. The VMP of labour is less than the MFC of labour which shows overutilization of labour and as such, adjustment is required in the number of man –days in order to increase the level of output.

The MVP of seed is less than the MFC of seed which shows over utilization of seed. Adjustment in seed quantity is required in order to get more output. (Ali *et al.*, 2017) also made similar findings in their study.



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4. Problems associated with groundnut production in the study area

Constraints	Frequency	Percentage
High cost of inputs	57	71.3
High cost of hiring labour	53	66.3
Inadequate credit facilities	60	75.0
High cost of rent	40	50.0
Incidence of pest and diseases	55	68.8
Poor access to agricultural information	41	51.3
Lack of quality planting materials	25	31.3
Lack of extension services	52	65.0

Source: Field survey, 2019

The problems associated with groundnut production in the study area were: High cost of inputs, high cost of hiring labour, inadequate credit facilities, high cost of rent, incidence of pest and diseases, poor access to agricultural information and lack of quality planting materials. Inadequate credit facilities were the major problem highlighted by the groundnut farmers in the study area. The farmers complained of difficulties in acquiring soft loans from financial institution. Access to credit when properly channelled, will enable the farmer to acquire more input to boost production. High cost of input was ranked second in the problem facing the groundnut farmers in the study area. The farmers complained of high cost of acquiring agricultural inputs such as seed, labour, chemicals etc. All these should be provided to the rural farmers at a subsidized rate. Incidence of pest and disease was ranked third in the problem facing the groundnut farmers. This shows that pest and diseases cause adverse effect to the crops. The negative effect of this is that it will reduce the amount of profit that can be realised by the farmer. Incidence of pest and disease can cause losing of crops which can affect output.



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CONCLUSION AND RECOMMENDATION

The result of the study shows that groundnut production in the study area is a profitable business. Seed, pesticide and labour had significant differences on the output of the farmers. Over utilization of inputs was recorded for seed, fertilizer and labour while underutilization of inputs was noticed in the use of land, pesticide and herbicide.

We recommend the following based on our findings. Farmers should be encouraged in the use of improve seed variety (Hybrid) and technologies practices in agriculture as these will improve the yield of groundnut. They should also be trained by extension agents on the optimum use of input to avoid the over utilization or underutilization of inputs. Incentives and agricultural inputs should be provided to our rural farmers at a subsidized rate in order to ensure expansion of production and supply. Extension agents should create awareness on the adoption of improved technologies and good agricultural practices. This will go a long way in maximizing the farmers output.

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