Economics of Groundnut (*Arachis hypogaea L.*) Production in Bali Local Government Area of Taraba State, Nigeria

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Abstract

The study was carried out to analyze the economics of groundnut (Arachis hypogea L.) production in Bali Local Government Area of Taraba State, Nigeria. Multistage sampling technique which involves purposive selection of five wards from Bali LGA and simple random selection of 75 farmers from five wards were employed in collecting primary data using structured questionnaire. The data collected were analyzed using descriptive statistics, farm budgeting and regression analysis. The result showed that the mean age of the farmers was 35 years, 66.7% were married, 61% were female and 78% of the ground nut farmers had one form of education or the other. The mean years of farming experience was 6 years, the mean household size was 6 persons and the mean farm size was 2 ha. The analysis found that the total cost of producing groundnut per hectare was \$170,610 and the gross margin was \$90,070. The profit of \$75,040 was actualized with a benefit cost ratio of ¥1.44. The regression analysis indicated that Cobb-Douglas production function gave the best fit with R^2 value of 0.64. The coefficients of fertilizer (2.2301), farm size (1.5795) and labour (0.3782) were all positive and statistically significant at varying levels of probability. The coefficient of herbicide (-0.9423) was negative and statistically significant. The result revealed that the most severe problems affecting groundnut production were inadequate finance, lack of improve seed and high cost of labor which were ranked 1st, 2nd and 3rd respectively according to severity. In conclusion, groundnut production was profitable in the study area despite being affected with notable problems. The study therefore recommends investment and participation in groundnut farming by investors as it is a profitable venture. Also, government should establish organized marketing systems to moderate the activities of middlemen which will enhance more profit for the farmers.

Keywords: Economics, Groundnut, Production, Bali, Taraba State, Nigeria

Introduction.

Groundnut (*Arachis hypogaea L.*) is the third most important oil seed crop in the world (FAO, 2019). It contains 48-50% oil, 26-28% protein and 11-27% carbohydrate, minerals and vitamin (Mukhtar, 2019). According to (FAO, 2018) groundnut is grown on 46.8 million hectares worldwide, with a total production of 57.1 million metric tons and an average productivity of 3.1 metric tons/ha. Developing countries like in Asia, Africa, and South America constitute 98% of

global production of this crop (FOA, 2018). The production of groundnut is concentrated in Asia and Africa, where the crop is grown mostly by smallholder farmers under rain-fed conditions with limited inputs because of farmer's inability to access credit (NAERLS, 2014)

Groundnut plays an important role in the diets of both rural and urban populations, particularly, because of its high contents of protein and carbohydrate. It is also rich in calcium, potassium, phosphorus, magnesium and vitamin E. groundnut meal, a by-product of oil extraction, is an important ingredient in livestock feed (Taru *et al., 2010*). The multiple uses of the groundnut plant make it an important food and cash crop for domestic consumption and export in many developing and developed countries. Globally, 50% of total groundnut production is used for oil extraction, 37 for confectionery use and 12 for seed (Taru *et al., 2010*).

Over the years, groundnut farmers have been faced with a number of problems like poor yield and insufficient of credit facilitates which has drastically reduced their production level. Mukhtar (2019) noted that there seems to be no increase in the farmers' production level despite the use of improved varieties of groundnut. This shows that even though research findings have made a big headway during the past five decades, the benefit, of research findings may have not been fully utilized by farmers. Crop assessment and the post-harvest surveys reports over the last five years showed a continuous decline in the productivity of the main crops (Mukhtar, 2019). This has resulted in a knowledge gap and the persistence of the problems that hold back development. Therefore, it is worthwhile to identify and study groundnut production and marketing problems, to fill in the information gap and look into the possible ways and means of increasing the farmer income through accumulating capital and enhancing productivity and marketing. This is very necessary if we are to attain the noble target of self-sufficiency in food production. There is, therefore, the need for evaluation of the economics of groundnut production as an effort at contributing to the information base that could be used by groundnut farmers in Bali local government area of Taraba State to enhance their productivity and profitability. The specific objectives were to: describe the socio-economic characteristic of the groundnut farmers in the study area, estimate the cost and return of groundnut production of the farmers in the study area, determine factors influencing the production of groundnut farmers in the study area and identify constraints faced by the farmers in the study area.

Methodology

The study area

This study was carried out in Bali Local Government Area of Taraba State, Nigeria. Bali Local Government Lies between latitudes of 7^0 51' 31" N and longitude 10^0 58' 18" E. The local government shares boundary with Gashaka Local Government area at the South Eastern part, Donga Local Government area at the Northern part, Ardo-kola Local Government area at the North Eastern part. Bali Local Government falls under the Tropical Savannah Climate. The local government covers a land area of 9,146 square kilometers and a population of 17,467 according to Nigeria population census 2016. It is surrounded by a river situated within the Northern Guinea savannah ecological zone with two distinctive seasons, dry and rainy season. The crops produced in the study area includes; groundnuts, maize, rice, soybeans, sorghum, millet, cassava and yam. Beside the crops they also take part in livestock production such as; cattle, sheep's, goats, pigs, poultry among others. They are also engage in fishing all year round other activities (Oruonye, 2013).

Method of data collection

Data for this study was from primary source, the primary data were collected using structured questionnaire and personal interview.

Sampling procedure and sample size

Multi-stage sampling technique was used for the study. In stage 1, purposive selection of five wards (Bali A, Bali B, Suntai, Maihula and Badakoshi) from the eleven (11) wards in Bali Local Government Area, based on their predominance in groundnut production in the study area. In stage 2, simple random sampling was used to select seventy-five (75) respondents (sample size) from the five wards using 10% ratio proportional (Bali A: 12, Bali B: 14, Suntai: 17, Maihula: 18 and Badakoshi:14) to the population size of the farmers in each of the wards in the study area.

Method of data analysis

Data for this study were analyzed using descriptive statistic, farm budgeting techniques and regression analysis. The descriptive statistic such as mean, frequency and percentages were employed to address objectives the socio-economics characteristics of the respondents and constraints to groundnut production while the farm budgeting techniques was used to address the cost and return of the groundnut farmers. Multiple regression analysis was used to address the factors influencing the productivity of groundnut farmers in the study area.

Farm Budget Techniques

This is defined as the difference between gross income and total variable cost (Mshelia *et al., 2005*). The equation is expressed as follow:

Where $GM = Gross margin (\mathbb{N})$, $GR = Gross Revenue (\mathbb{N})$ and $TVC = Total variable cost (\mathbb{N})$. GR which is also called total value of production is the physical product multiply by unit price of the product.

Net Farm Income (NFI) analysis

The net farm income is calculated mathematically as follows:

 $NFI = TR - TC \dots (2)$

Where NFI = Net Farm Income (\mathbb{N}), TR = Total Revenue (\mathbb{N}), TC = Total cost (#)

Total revenue includes revenue incurred from sale of groundnut. The total cost consists of fixed and variable cost, (Olukosi and Earbhor. 1988). The fixed cost included the cost of depreciation of farm tools. The straight-line depreciation method will be use for the fixed assets. The variable cost includes cost of seeds, cost of fertilizer, cost of labour, cost of Agrochemicals, cost of shelling of nuts, cost of storage, cost of transportation. The net farm income could be positive depending on whether the total revenue exceeding the total cost. It will be used to determine the profitability of the groundnut enterprise.

Regression Analysis

Regression is defined as the amount of change in the value of one variable associated with a unit change in the values of the other variables. However, this study applied four functional forms as linear, double-log, semi-log and exponential functions to determine the inputs (independent variables) and output (dependent variable) relationship. The specifications of the functions are given as:

(i). Linear functions

(ii). Double-log function

 $lnY = lnb_0 + b_1 lnX_1 + b_2 lnX_2 + b_3 lnX_3 + b_4 lnX_4 + U_i$ (4) **Semi-log function** (iii). **Exponential function** (iv). $lnY = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + U_i.....(6)$ where: Y = Groundnut yield (kg) $X_1 =$ Seeds (kg) X_2 = Agrochemical (liters) $X_3 =$ Farm size (ha) $X_4 = \text{Labour (N/Ha)}$ $b_0 = \text{Constant}$ $U_i = \text{Error term}$ $b_1 - b_4$ = Estimated regression parameters The a *priori* expectation was that the coefficients of $X_1 - X_4$ would be positive. **Results and Discussion**

Socio-economics characteristics of the respondents.

The results in table 1 revealed that majority (61%) of the respondents were female, while male constituted 39%. This shows that female dominate the groundnut production in the study area. Also, many (45%) of the respondents were within the age limit of 31-40 years, with a mean of 35 years. This implies that groundnut farmers in the study area were within their active and productive age. This result agrees with the finding of Aboki *et al.*, (2018) who reported that farmers within their active age can positively contribute to agricultural production. On marital status, the result showed that majority (66.7%) of the respondents were married. This implies that groundnut production in the study area is dominated by married persons and could be a source of income for families. This finding is supported by Mohammed *et al.*, (2014), who stated that the high number of married persons is evident that agricultural could serve as a source of job creation.

Furthermore, majority (54%) of the respondents had household size of 6-10 persons with a mean size of 6. This implies that family labor would be readily available when needed for groundnut farming operation. The educational distribution of the respondents revealed that majority (78%) of the groundnut farmers had one form of education or the other while 12% had no formal education. Hence, they have high likelihood of adopting improved groundnut production technologies more than the uneducated respondents. Gali (2017) pointed out that education has positive and significant impact on farmers and greatly influence their decision making and adopting of innovations that consequently affects their productivity. Analysis in table 1 unveiled that the experience of the farmers in groundnut production was 6-10 years with the mean of 6 years of experience. This entailed that the farmers would use this experience to manage their groundnut farms better. This result is further supported by Idrisa et al. (2012) who revealed that the number of years spent in agricultural activities might serves as indication of practical knowledge acquired. As for source of capital, the table shows that majority (57.3%) of the respondents sourced their capital from personal saving. This finding agrees with that of Mohammed et al., (2013) which states that most farmers sourced capital from their personal savings. On farm size, the result shows that most (50.7%) of the respondents had farm size of 1-5 hectares with a mean farm size of 2 ha. This shows that groundnut production comprised mostly small-scale farmers in the study area.

This finding corroborates with the findings of Arene *et al.*, (2010) who opined that majority of Nigeria farmers are small scale farmers who cultivates less than 5 hectares

Characteristics	Frequency	(N=	Percentage	Mean
	75)		(%)	
Gender				
Male	29		39	
Female	46		61	
Age (years)				
21-30	20		26.70	
31-40	34		45.00	35
41-50	14		18.70	
51 & above	7		9.30	
Marital Status				
Single	18		24	
Married	50		66.70	
Widow	7		9.30	
Household Size				
1-5	25		33	
6-10	40		54	6
11 & Above	10		13	
Form of Education				
No formal Education	10		13	
Primary Education	7		9	
Secondary Education	30		40	
Tertiary Education	22		29	
Source of capital				
Personal saving	43		57.3	
Cooperative	11		14.7	
Friends and family	6		8	
Proceed from farm	15		20	
Farm Size				
< 0.5	27		36	
1-5	38		50.7	2
6 & above	10		13.3	
Farming experience				
1-5	25		33	
6-10	40		54	6
11 years & above	10		13	

 Table 1: Socio-economic Characteristics of the respondents in the Study Area

Source: Field Survey, 2021.

Average cost and return of groundnut production

Table 2 below is the average cost and returns of groundnut production per hectare in the study area. The results revealed that the total cost of producing groundnut per hectare was \$170,610 gross margin was \$90,070 and the profit obtained was \$75,040. The gross margin analysis for groundnut production shows that the total variable cost per hectare was \$155,580 which accounted

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for 91.2% of the total cost of groundnut production. The average fixed cost was \$15,030 which accounted for 8.8% of the total cost of production. Thus, the total cost of groundnut production per hectare was \$170,610. The total revenue (TR), Gross margin (GM) and Net farm income (NFI) per hectare were \$245,650, \$90,070 and \$75,040 respectively. This implies that groundnut production is a profitable enterprise in the study area. The benefit cost ratio was 1.44. This implies that for every naira invested on ground nut production, there's a return of \$1.4. This result is in agreement with the study of Aboki *et al.*, (2018) who also found that groundnut production is highly profitable in the study area.

Items	Amount (N /hectare)
Total Revenue	245,650
Variable Cost	
Seeds	11,500
Fertilizer	45,150
Agrochemicals	25,200
Labour	65,200
Transportations	8,530
Total Variable Cost	155,580
Fixed Cost	
Depreciation on Farm Tools	9,830
Depreciation on Land	5,200
Total Fixed Cost	15,030
Total Cost = TFC+TVC	170,610
Gross Margin= TR-TVC	90,070
Net Farm Income (GM-TFC)	75,040
Benefit Cost Ratio= TR/TVC+TFC	1.44

Source: Field survey (2021)

Factors that influenced groundnut production in the study area

The regression analysis was used to determine the physical relationship between the groundnut inputs with yield. Groundnut output was regressed with the independent variables (Seeds, farm size, fertilizer, agrochemicals and labour). Based on the summary of the results, Double-logarithm function gave the best fit and was chosen as the lead equation. The selection of lead equation was based on the comparison of coefficients of multiple determinations (R^2) , statistical significance of the F-ratios, the magnitude of standard error of the estimated parameters, statistical significance of the estimated regression coefficients $(b_1 - b_7)$ and the a *priori* expectation. The coefficient of determination R² was 0.64 which indicated that 64% of the variation in the yield is explain by the variables included in the model. However, it is only fertilizer (X_2) , herbicide (X_3) , farm size (X_4) and labour (X_5) that were significant. The coefficient of fertilizer (2.2301) was positive and statistically significant at 1% level implying that a 1% increase in fertilizer will bring about 2.23kg increase in output. The coefficient of farm size (1.5795) was positive and statistically significant at 5 % level implying that a 1% increase in farm size of farmers will bring about 1.57kg increase in output. This also indicated that land as a factor of production is very important in groundnut production in the study area as farmers tend to derive the benefits of economies of scale. This result is in conformity with the finding of Lawal and Mohammed (2018) who found out that farm

size is one of the most important factors in groundnut production. Also, the coefficient of labour (0.3782) was positive and statistically significant at 5 % level implying that an increase in labour of farmers will bring about increase in output. However, the coefficient of herbicide (-0.9423) was negative and statistically significant at 5% level implying that an increase in herbicide will bring about decrease in output. This could be the case of toxicity to plant as the case may be.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
С	-1.41342	0.85312	-1.66	0.102
Seeds (X ₁)	-0.28054	0.23341	-1.20	0.234
Fertilizer (X ₂)	2.23013	0.46875	4.76	0.000***
Herbicide (X ₃)	-0.94234	0.39986	-2.36	0.021**
Farm size (X ₄)	1.57947	0.49378	3.20	0.002**
Labour (X ₅)	0.37816	0.17871	2.12	0.038**
R-squared	0.6420			
Prob. (F-statistic)	0.0000			
Adjusted R-squared	0.6161			

Source: Field Survey, 2021 Note: *** Significant at 1% and ** significant at 5%.

Major constraints to groundnut production in the study area

The distribution of the respondents based on constraints faced by groundnut farmers in the study area is presented in Table 4. The result revealed that the most severe problems affecting groundnut production were inadequate finance (30.2%), lack of improve seed (25.6%) and High cost of labor (16.6%) where these ranked 1st, 2nd and 3rd respectively according to severity. Other constraints include poor storage facilities (16.3%) and pest and disease (9.3%) were ranked 4th, 5t^h, and 6th respectively. The finding revealed that all the respondents were faced with one problem or the other. Inadequate finance is a major problem affecting agricultural activities from production, processing, storage and marketing (Akarue and Ofoegbu, 2012).

Constraints	Frequency	Percentage (%)	Rank
High cost of labor	40	16.6	3
Poor storage facilities	35	16.3	4
Pest and disease	20	9.3	5
Inadequate Finance	65	30.2	1
Lack of Improved Variety	55	25.6	2
Total	215*	100	

-	-	-		-		
Table	4: The	Major	Constraints of	Groundnut Production	in the Study A	Area

Source: Field survey, 2021 *Multi

*Multiple Responses

Conclusion and Recommendations

The study revealed that groundnut production is a profitable venture in the study area. The farmers in the study area are in their active age and literate. The problems that were found to be associated with groundnut production in the study area include: high cost of inputs, high cost of labour, lack of finance, lack of storage facilities and pest and diseases. These challenges have implications for farm yields and returns from production. The specific factors influencing the profitability of groundnut production in the study area are; farm size, cost of fertilizer and cost of labour.

Based on the outcomes of the study, the following recommendations are made to improve groundnut production in the study area.

- 1. Having known that, groundnut production in the study area is a profitable venture, investors are encouraged to invest and participate in groundnut farming.
- 2. The farmers should form cooperative groups. This would guarantee members to approach financial institutions for credit facilities thereby reducing the problems of collaterals which impeded access to credit facilities.
- 3. Government should establish organized marketing systems where farmers will have proper and reliable linkages with buyers there by reducing the undue exploitative tendencies of the middlemen. Moderating the activities of these middlemen will enhance more profit for the farmers.
- **4.** Simple and improved storage facilities should be provided so that surplus of groundnut can be stored to avoid spoilage.

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