ECONOMIC ANALYSIS OF SESAME PRODUCTION IN GUMA LOCAL GOVERNMENT AREA OF BENUE STATE, NIGERIA

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ABSTRACT

This study analyzed the economics of sesame production in Guma Local Government Area of Benue State, Nigeria. Data was collected from 80 respondents using structured questionnaires and analyzed using descriptive statistics, ordinary least square and gross margin analysis. The findings of the study showed that the factors affecting sesame production are farm size(0.276), farming experience(-32.135), fertilizer(0.013) and gender(0.005) which all have probability significance at P-0.05 while Age(119.512) is signinificant at P-0.01 and household size(4.762) is at P-0.10. The positive coefficients have increasing effects on the yield of sesame while the negative coefficient has a decreasing effect on sesame yield. The profitability result shows that total variable cost per hectare by sesame farmers (₦147,381.00) and the total revenue (₦304,560.00) yielded a gross margin of ₦157,179.00 per hectare hence, sesame is a profitable venture. Inadequate funds, Lack of extension services, High cost of fertilizers, High cost of agrochemicals Were the severe constraints faced by farmers in sesame production in the study area. It was therefore recommended that Farmers be encouraged to form well-managed cooperatives or producer farmer groups and networks as avenues for accessing inputs as well as credit facilities to invest in farming, the government and research institute should make fertilizer and agrochemicals available at the right time and also at a subsidized rate.

Keywords: *Sesame seed, Production, Profitability, Constraints*

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INTRODUCTION

Background to the Study

Sesame (*Sesamum indicum*) also known as benniseed a member of the family Padaliaceae is an ancient oil seed known to mankind. Sesame grows in a wide range of environments extending from semi-arid tropics and subtropics to temperate regions. There are 22 countries that are major producers of sesame in the world, 13 are in Africa, 6 in Asia and 3 in Latin America (Central and South America). Myanmar, India, and China are the highest producers, while Mali, Bangladesh, Paraguay and Benin are the least producers. FAO statistics reveal that these major sesame-producing countries together account for 92.6% of the world sesame production (UNSD, 2017; FAOSTAT, 2022). India remains the major producer of sesame accounting for more than 40% of the world's sesame area and 27% of world production. Seventy percent of the world's sesame crop is grown in Asia, with Africa growing 26% (Zerihun, 2012). Africa has become second in the world in production, increasing its production by 25% with its seven countries belonging to the largest group of sesame seeds marketers in the world, two of which are in West Africa, Nigeria with 39,800 tons and Burkina Faso with 18,107 tons (Dossa et al., 2017). The peak of sesame seed production in Nigeria was achieved in 2012, at nearly 994,800 metric tons Dokua (2022). Nigeria was the largest sesame producer in Africa as at 2013 according to Food and Agricultural Organisation Statistics (FAO STAT, 2013) . In 2020, the amount of sesame seeds produced in Nigeria reduced to 490,000 metric tons, in the preceding year, 510,000 metric tons of the flowering plant was produced, (Business Day, 2022).

The primary uses of the sesame seeds are as a source of oil for cooking and in the making of rolls, cracker chips of cakes, soup, spices and in jam (Abou-Gharbia et al., 200). The young leaves may also be eaten in stews, and the dried stems may be burnt as fuel with the ash used for local soap making, but such uses are entirely subordinate to seed production (RMRDC, 2004). The oil is used as raw material to produce paints, margarine and varnishes (Nyiatagher and Ocholi, 2015). It is used in pharmacology (Anilakumar et al., 2010) and in industries with products such as perfumes, cosmetics for the skin, hair oils and soaps. Sesame oil can be used in the manufacturing of soaps, paints, perfumes, pharmaceuticals, and insecticides. Sesame meal, left after the oil is pressed from the seed is an excellent high protein source (34–50%) and used as feed for poultry and livestock (Bikoko-Pum, 2017).

In Nigeria, it is consumed or processed as candies, seed toasted or roasted with salt, sesame seed soup and sesame seed oil. Nigeria also exports sesame which contributes 0.5% of the total export value of non-oil commodities and 36.59% to the agricultural exports market (FDC, 2018). The need to analyze the economics of sesame production has prompted the researcher to ask the following questions. What are the factors affecting sesame production? What is the level of profitability of sesame producers? What are the constraints faced by sesame producers in Guma Local Government Area?

Materials and methods

Study area

The study was conducted in Guma Local government Area in Benue state Nigeria. Guma Local Government Area is one of the twenty-three (23) local government areas in Benue State, situated in Benue West Nigeria with its headquarters as Gbajimba. The Local Government is named after 'River Guma' in Benue State. It is located at latitude 7º 30′-8º03′ E and longitude 8º04′-9º02′ N.

The local government has a land mass of 240,000 square, Kilometer and a population of 280,300 as at the 2022 estimation (city population, 2022). The climatic condition of Guma varies in cycles over the years, with monthly temperature varying between 27.0-28.0 and may go up to a maximum of 30.1-80.1 during the hottest period. Guma local government area is bounded to the south by Tarka, Makurdi and Buruku LGAs, to the east by Logo LGA and to the north and west by Nasarawa State. The people of Guma local Government are majorly farmers, the area receives 900-1 000 mm of rainfall annually. rainy season is the period of intensive agricultural activities when the indigenous people mainly Tivs are engaged in fishing and farming of crops like Benniseed, yam, guinea corn, maize, rice, sesame and cassava which are the principal food and cash crops.

Sampling Procedures

A multi-stage sampling technique was used to select sesame farmers for this study. In the first stage, purposive sampling technique was used to select four (4) wards within the LGA. The selection of the wards was based on the fact that they are the most prominent sesame producing areas of the LGA (BNARDA, 2011). Secondly, two (2) major villages were randomly selected from each of the four (4) selected wards. Thirdly, ten (10) sesame farmers were randomly sampled from each of the two (2) villages giving a total sample size of eighty (80) sesame farmers.

Data Collection
Primary data was used in this study. This was collected with the aid of questionnaire, respondents were interviewed and their responses were recorded. Data was collected on socioeconomic characteristics of sesame farmers, input costs and returns, factors affecting production of sesame, constraints faced by sesame farmers and the profitability of sesame

Data Analytical Techniques
Descriptive Statistics was used to described the constraints faced by sesame farmers in the study area. Regression analysis was used to evaluate the factors affecting sesame production and budgetary method was used to analyze the profitability of sesame in the study area.
Model Specification

Ordinary Least Square Regression
Ordinary least square regression was used to ascertain factors influencing the production of Sesame in Guma Local Government Area. The implicit model is as follows:
$Y = f(X_1, X_2, X_3, X_4, \ldots X_9, U)$
Where Y = Sesame output (Kg)
X_1, = Farm size (hectares)
X_2 = Capital (₦)
X_3 = Labour (man-days)
X_4 = sesame seed (Kg)
X_5 = Age (years)
X_6 = Years of farming experience (years)
X_7 = Household size
X_8 = Fertilizer (Kg)
X_9 = Gender (Dummy; 1=male, 0=female)
U =error term
The explicit forms of these models are as follows:

Linear function
$Y=b_0 + b_1 X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + U_i$
.
Gross margin Analysis
Profitability was estimated using budgetary tool, which will measure the difference between total revenue (TR) and the total cost (TC). Net return is given as *TR-TC* Where;
TR = Total Revenue
P.Q (P=Price, Q=Quantity); TC= Total cost.
The gross margin was calculated as follows: GM = TR - TVC
Where;
GM = gross margin; TR = total revenue or gross income (sale of sesame seed); and TVC = total variable cost.
TVC = TOC + TLC

Where;
TOC = total operating cost
TLC = total labour cost.

Results and discussion
Factors Affecting Sesame Farmers
Table 1 presents the results of the factors affecting sesame farmers. From the result, Farm size (X_1) had a positive and significant ($p< 0.05$) effect on the yield of sesame. The bigger the size of a farm, the more the yield of sesame that will be produced in the study area. Age (X_5) had a positive and strong significant ($p< 0.01$) effect on the yield of sesame. The older the farmer, the more experienced she/he is in production of sesame and the more innovative the farmer will be. Farming experience (X_6) had a negative and significant ($p< 0.05$) effect on the yield of sesame. This implies that the farming experience of the farmer does not increase the yield of sesame in the study area.
Furthermore, household size (X_7) had a positive significant ($p< 0.10$) influence on sesame farmers' yield. With a large household size, a farming family is able to increase the yield. Fertilizer (X_8) had a positive significant ($p< 0.05$) effect on the output of sesame in the study area. Application of fertilizer on the farm had great effect on

output. Finally, gender (X_9) had a positive and significant ($p< 0.05$) effect on the output of sesame from the result. A male farmer has more energy to work on the farm hence, the yield of sesame of such a person will increase in the study area. Other variables like capital, labour and sesame seed were not significant on the yield of sesame in the study area. The result obtained was in line with apriori expectation which suggests that a unit increase in farm size, household size (assisting in labour) and fertilizer will increase sesame output. The result is in line with that Kossivi *et al.* (2023) in his work Economic of sesame (*Sesamum indicum* L.) production in Northern BeninThe estimated R-squared shows that the independent variables explain 93% of variations in the total output of sesame.

Table 1. Factors Affecting Sesame Farmers.

Model	Coefficients	Standardized Error		Sig.	
	B	S. E	t-ratio	prob	
C	-117.420	14.614	-8.035	0.000	
Farm size (X_1)	0.276**	0.118	2.341	0.022	
Capital (X_2)	-0.070^{ns}	0.051	-1.381	0.171	
Labour (X_3	0.012^{ns}	0.019	0.608	0.545	
Sesame seed (X_4)	-0.003^{ns}	0.008	-0.337	0.737	
Age (X_5)	119.512***	3.056	39.104	0.000	
Farming experience (X_6)	-32.135**	12.327	-2.607	0.011	
Household size (X_7)	4.762*	2.631	1.810	0.074	
Fertilizer (X_8)	0.013***	0.001	0.231	0.002	
Gender (X_9)	0.005***	0.004	0.272	0.001	
R Square	0.93				
Adjusted R Square	0.80				
Durbin-Watson	2.00				

1% (***), 5% (**) and 10% (*) level of significance respectively; ns = not significant
Source: Field survey, 2023.

Profitability of Sesame Production

Table 2 shows the result of profitability of sesame production. The result shows that the total variable cost per hectare by sesame farmers was ₦147,381.00 and the total revenue was ₦304,560.00. Thus, the gross margin obtained was ₦ 157,179.00 per hectare. It can therefore be concluded that sesame production in Guma Local Government Area of Benue State is profitable. This result is in agreement with the result reported by Rukwe *et al.* (*2020*) in Economics of Sesame Production among Small Scale Farmers in Southern Part of Taraba State, Nigeria. They reported that for every ₦ 1 Invested in Sesame farming there was a return of ₦ 3.30.

Table 2: Gross Margin in Naira per Hectare for Sesame Production

Item	Unit Price (₦)	Quantity per hectare (kg)	Naira/Hectare	Percentage
Total Revenue	200/kg	1,522.8	304,560.00	
Variable cost				
Cost of seed	215.10	30	6,453.00	4.4
Cost of fertilizer	2,068.00	10	20,680.00	13.8
Cost of pesticides	1,423.00	10	14,230.00	9.7
Cost of herbicides	1,337.11	9	12,034.00	8.2
Cost of labour	1,658.85	40	66,354.00	45.1
Cost of transports			7,630.00	5.2
Others (feeding health care etc)			**20,000.00**	13.6
Total variables cost			**147,381.00**	100.0
Gross margin			**157,179.00**	

Source: Field survey, 2023

Constraints Associated with Sesame Production in the Study Area

Table 3 presents constraints faced by sesame farmers in the study area in order of ranking. Inadequate funds, Lack of extension services, High cost of fertilizers, High cost of agrochemicals were the severe constraints faced by farmers in sesame production in the study area. The result obtained is similar to that of Aboki *et al.* (2020) who reported that majority of sesame farmers were facing a similar problem of lack of funds in the study area, Abu *et al.,* (2012) also reported that 75.8% of sesame farmers stated that high cost of agrochemicals was one of the constraints faced by sesame farmers in the study area and Rukwe *et al.* (2020 identified Lack of extension services as a severe constraint faced by sesame farmers. Insufficient labour, Inadequate land, Lack of credit facilities were ranked lowest among the constraints faced by farmers.

Table 3: Constraints Faced by Sesame Farmers

Constraints	Frequency	Percentage	Ranks
Inadequate fund	165	88.7	1st
Lack of extension services	134	72.0	2nd
High cost of fertilizers	120	64.5	3rd
High cost of agrochemicals	112	60.2	4th
Insufficient labour	87	46.8	5th
Inadequate land	76	40.9	6th
Lack of credit facilities	65	34.9	7th

Source: Field survey, 2023

*** = Multiple response**

CONCLUSION AND RECOMMENDATION

Conclusion

Respondents in Guma local government area of benue state Nigeria had farm size, age, farming experience, household size, fertilizer and gender as factors affecting them in producing sesame. The result revealed that sesame is a profitable venture in the study area and the constraints that are top on the list are inadequate funds,lack of extension services and high cost of fertilizer affecting the production of sesame.

Recommendation

Based on the findings of the study, it is recommended that

- Farmers should be encouraged to form well-managed cooperatives or producer farmer groups and networks as avenues for accessing inputs, output markets, as well as credit facilities to invest in farming.
- To cope with the problem of inadequate and high cost of fertilizers and agrochemicals, the government should help subsidize them for easy assessibility to the farmers in the study area
- Extension workers should be deployed to work with the farmers to assist them with innovative ideas for increased output

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