

ANALYSIS OF COST AND RETURN FOR SESAME PRODUCTION IN NASARAWA STATE: IMPLICATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA.

Godwin Anjeinu Abu¹, Daniel Abah¹ and Stephen Adogwu Okpachu²

1. Department of Agricultural Economics, University of Agriculture, Makurdi, Nigeria

2. Federal College of Education (Technical) Potiskim, Yobe State, Nigeria

ABSTRACT

The study analyzed the cost and return among sesame farmers in Nasarawa State of Nigeria. This is with the view to describe the socio-economic characteristic of the farmers and determine the cost and return in sesame production. A purposive sampling technique was used to collect data from 194 sesame farmers. Descriptive statistics and gross margin analysis were used for the analysis. The socio-economic characteristics of the respondents such as age was found that the majority (94.8%) are still within their active age, majority (82.0%) of the respondents are male and 73.2% are married and 56.7 percent of them attended one form of education or the other. The mean gross margin pre hectare is N132,910, the mean total revenue is N254,000 and the mean total variable cost is N121,410 while labour cost is the highest cost incurred by the respondents. The mean output obtained by the respondents is 2155.73 kilogram. It was recommended that extension workers and other relevant organizations should provide training for sesame farmers on the best way of combining the various inputs used in sesame production, this is to enhance their efficiency level and Government should look into the inherent potential in sesame business as that will increase foreign earning and local industries for processing sesame into industrial usage.

Key words: analysis, development, Nasarawa, Nigeria, production, Sesame, sustainable

INTRODUCTION

Sesame (*sesamum indicum*) belongs to the plant family *Pedaliacea* commonly called beniseed in Nigeria. It is an important oilseed crop believed to have originated from tropical Africa, where you have the greatest genetic diversity. It was later taken at a very early date to India where a secondary centre of diversity developed (Purseglove, 1969). Oplinger *et al* (1990) indicated it to be highly prized oilseed crop in Babylon and Assyria about 4,000 years ago. The name sesame is used in Literature worldwide. It is also known as “simsim” in East Africa, “Till” in India and “Gingely” in Sri-Lanka. The Hausa, Ibo, Yoruba, major tribes of Nigeria call it “Ridi”, “Ekuku” and “Isasa” respectively. Other tribes in Nigeria also have names for it.

Sesame is an important crop to Nigerian agriculture, it is quite extensively cultivated, it yields in relatively poor climatic conditions, and widely used within Nigeria and is an important component of Nigeria’s agricultural exports. As a small holder crop, often intercropped with others, the extent of cultivation is poorly known and there is little information on yields or productivity. For the most part the surplus crop is commercialized bulked up and exported with minimal

processing limited to drying and cleaning (RMRDC Survey,2004).

The total world crop area under sesame is about 6(six) million hectares. Sixty-six per cent of this is concentrated in Asia. Twenty five per cent of world sesame is planted in Africa (mainly Nigeria, Ethiopia and Sudan) and eight per cent in America, Venezuela, Mexico, Guatemala and Columbia) (FIIRO, 1990). The leading world producer's are India, China, Mexico and Sudan in Africa. Total annual consumption is about 65% for oil extraction and 35% for food. The food segment includes about 42% roasted, 12% grounded, 36% washed and processed and 10% roasted and salted (RMRDC Survey, 2004).

Sesame is an annual self pollinating plant with an erect pubescent, branching stem. It is between 0.60 to 1.30m tall. The leaves are ovale to oblong. While the lower leaves are tri-lobed, the upper leaves are undivided, irregularly serrated and pointed. The older cultivators have smooth cupped leaves with leaf like out growth on their lower surfaces. Some cultivators have many branches while others are relatively unbranched. The flowers are tabular, pendulant, bell shaped and two lipped with a pale purple or rose to white colour and are 1.9 to 2.5cm (0.75 to 1 inch) long. In addition, the flowers are borne on short glandular pedicles. One flower is produced at each leaf axil and the lower flowers usually bloom 2 to 3 months after planting with continuous blooming until the upper most flowers are opened. The fruit is an oblong, mucronate, pubescent capsule containing numerous small, oval and yellow, white, red, brown or black seeds. Sesame is an annual self pollinating plant with an erect pubescent, branching stem. It is between 0.60 to 1.30m tall. The leaves are ovale to lanceolate or oblong. While the lower leaves are tri-lobed, the upper leaves are undivided, irregularly serrated and pointed. The older cultivators have smooth cupped leaves with leaf like out growth on their lower surfaces. Some cultivators have many branches while others are relatively unbranched. The flowers are tabular, pendulant, bell shaped and two lipped with a pale purple or rose to white colour and are 1.9 to 2.5cm (0.75 to 1 inch) long. In addition, the flowers are borne on short glandular pedicles. One flower is produced at each leaf axil and the lower flowers usually bloom 2 to 3 months after planting with continuous blooming until the upper most flowers are opened. The fruit is an oblong, mucronate, pubescent capsule containing numerous small, oval and yellow, white, red, brown or black seeds. The seeds are pear-shaped, (with cotween 26 to 30% while that of the meal varies from 48 to 59%. The protein is high in methionine and essential amino acid with surplus (up to 34%). This is unusual for most plant proteins. The defaulted meal prepared from dehulled seed does not contain undesirable pigment. These unique properties make sesame an excellent protein source for supplement soybean, peanut and other plant proteins, which lack sufficient methionine, to increase their nutritive values (RMRDC Survey, 20004).

The study's specific objectives are to describe the socio-economic characteristics of sesame farmers, determine cost and return in sesame production and the implication for sustainable development in Nigeria.

METHODOLOGY

This study was conducted in Nasarawa State with capital at Lafia. The State is made up of thirteen Local Government Areas. The state lies between latitude 7° and 9° North and longitude 7° and 10° East (Nasarawa State Ministry of Information, 2005).Nasarawa State covers an area of 27,117km² with estimated population of 1,863,275 people (N P C, 2006). It has a mean temperature range from 25°C in October to about 36°C in March while rainfall varies from 13.73mm in some places to 145mm in other places. Alluvial soils are found along the Benue trough and their flood plains. The

forest soils which are rich in humus and literates are found in most part of the State. There are also sandy soils in some parts of the State. Solid minerals notable are salt and bauxite.

The state is an agrarian state with large percentage of the populace engaged in farming and agro-allied activities. The soil texture is sandy loam and very fertile for crops like sorghum, cowpea, cassava, rice among others that are cultivated in the study area.

The population for this study comprised of all sesame farmers in Nasarawa State. Purposive sampling technique was used to select two Local government areas namely, Doma and Lafia Local Government Areas due to their high level of involvement in sesame production. Five villages were further selected from each of the two Local government areas given a total of 10 villages. And in each village selected 10 sesame farmers were selected given a total of 200 sesame farmers used for the study.

The data for this research were collected from both primary and secondary sources. The primary data for the study were generated from the sesame farmers in Doma and Lafia Local Government of Nasarawa State using a well structured questionnaire. The questionnaire was administered with the assistance of Extension workers from NADP. The secondary data were collected from NADP, Federal, State and Local Government Ministry of Agriculture, Federal and State Office of Statistics as well as journals, seminar papers, World Bank reports, thesis, internet and other relevant published and unpublished materials.

The data collected for this study was analyzed using both descriptive and inferential statistics. The descriptive statistics such as mean, standard deviation, frequency and percentages was employed to analyzed objectives i and Gross Margin Analysis was used to analyze data on objective ii

Gross Margin Analysis

Gross margin Analysis is a model that is used to estimate the costs, returns, profitability or loss per hectare. The total revenue represents the value of the output from the farm (e.g physical quantity of the crop multiplied by the unit price). The total cost, on the other hand is made up of the “variable” and “fixed” components. Variable cost also called specific costs varies directly with the level of production and include expenditure on seeds, fertilizer, chemical, hired labour etc. Fixed costs are known as overhead cost that do not vary with the level of output and consist of cash expenses (on repairs and maintenance, interest on long term loan etc) and non cash adjustment (depreciation on farm tools, equipment and machinery).

The Gross Margin (GM) analysis of Sesame in Nasrawa State was expressed as:

$$GM = TR - TVC \text{-----} 1$$

Where GM= Gross Margin

TR= Total Revenue

TVC= Total Variable Cost

GM = Total revenue from sesame production minus Total variable costs incurred in the course of production of one hectare of sesame.

This estimation will serve as a profit index of sesame farmers in the study area. The higher the GM the more likely a farm is considered to be profitable and the smaller the GM, the lesser the profit possibility.

RESULT AND DISCUSSION

Socio-economic and Institutional Characteristic of Sesame Farmers in Nasarawa State

The socio-economic and institutional characteristic of the respondents is presented in Table 1. The result revealed that 94.8 percent of the respondents were still within their active age of between 21 – 60 years. The mean age of the respondents was found to be 41.44 years. This result agrees with the findings of Yusuf et al. (2007) that most farmers are within their active years and can make positive contribution to agricultural production. Analysis of gender in sesame production indicated that men comprised 82 percent while women comprised 18 percent. The result implies that sesame production is still dominated by men in the study area.

The result also shows that 73.2 percent of the respondents were married. The high proportion of the respondents who are married is an indication that family labour could be available for sesame farmers in the study area. The result revealed that 50 percent of the farmers were part time sesame farmers while 50 percent practiced sesame farming on a full time basis. This suggests that half of the farmers had alternative employment. The result of the study also indicated that most (72.2%) of the respondents used hired labour for their farm operation; therefore the average labour is 182 man-days.

The proportion of sesame farmers who were literate in the study area was slightly higher than illiterate. Njoku (1991) in his study on factors influencing adoption of innovation discovered that formal education has a positive influence on adoption of innovation. In the sampled area 56.7 percent of the farmers had one form of former education or the other while 43.3 percent had no education. Analysis of farm size shows 60.30 percent of the farmers with farm size of between 0.2 and 3.0 hectares. This is with the mean of 4.969 ha, this implies that majority of the farmers had small farm holdings. Imoh and Essien (2005) found that farm size affects adoption of technology and that determine whether farmer will use improved seed.

Furthermore, farmers' experience in sesame production was on the average 12.8 years, while about 81 percent of the respondent had an experience of sesame production from 5 years and above. This depicts good signal for high productivity. The result of the size of the sesame farmers' household shows that majority (81.3%) of the respondent had a household of more than six (6) people. This implies that family labour would be readily available when needed for sesame farming operation.

The study also revealed that most of the respondent (69.9%) never received any training on sesame production. This depicts low level of information about sesame production and may likely result to inefficiency in production. The analysis also indicate that majority (75.8%) of the respondents had no access to formal sources of credit/loan. This implies that only 24.2 percent of the respondents had access to formal credit/loan. The result agrees with the findings of Otubusin (1986) that access to formal credit is a major constraint to farmers in Nigeria. The implication is that the size of sesame production will be low and other inputs will be affected since capital is not available to enhance production. Furthermore, the result revealed that most (61.3%) of the respondents had no access to extension services. This could

affect their level of awareness about certain techniques that relates to the production of sesame.

The study revealed that average off-farm income of sesame farmers from other activities was found to be ₦13, 100. Huffman (1980) opined that increased non farm work reduces financial constraints, specifically for resource poor farmers and thus enable them to purchase input that will enhance effective production; however, the situation may have negative implication on proper supervision of farm activities.

Cost and Return Analysis of Sesame Production in Nasarawa State

The result of the cost and return analysis in sesame farming is presented in Table 2. The result showed the mean total revenue to be N254,000 per hectare and the mean total variable cost to be N121470. The result also revealed a significant difference ($t = 10.192, P < 0.05$) between total (TR) and total variable cost (TVC) in Table 3. This implies that the mean total revenue is greater than the mean total variable cost which indicates that there is cost efficiency in the usage of inputs by the respondents in the study area. The result also showed that the mean of labour with cost of N72982 was the highest among the other costs. This shows that the farmers spent more on labour than other inputs.

Cost and return analysis was undertaken to determine the gross margin of sesame farmers in Nasarawa State. Table 2 revealed that the mean gross margin is ₦132,910, the maximum is ₦1290000 and a minimum gross margin is - ₦31700 per hectare. This implies that some of the farmers experienced negative returns a serious from the mix inputs and outputs got from their farms. There is every need for the farmers to be educated on the required inputs needed to give the right gross margin to ensure the sustainability of the production

Output of Sesame in Kilogram Produced by Sesame Farmers in Nasarawa State.

Table 4 summarized the result of the output of sesame produced by the respondents. The result revealed a mean output of 2155.73 kilogramme of sesame produced by sesame farmers in the study area, with a minimum of 17 kilogramme and a maximum of 14,000 kilogramme. This implies a moderately high output of sesame produced by sesame farmer in the study area. The result further revealed that 81.5 percent produced over 600 kilogramme of sesame in the study area this implies that farmers within that range are likely to make profits *ceteris paribus*.

Total Variable Cost of Production of Sesame

The result in Table 5 presented a distribution of farmers based on total variable cost (TVC) sesame produced. The results revealed that on the average, a farmer incurred a total variable cost of N121470 to produce average output of sesame of 2155.73kg. Though majority of the respondents (56.7%) incurred a total variable cost of N70001 and above in sesame production for the season, however 43.3 percent incurred below N70000 in producing sesame. This implies that 43.3 percent of the respondents are likely to make minimal profit in sesame production.

Total Revenue of Sesame Produced by Sesame Farmers in Nasarawa State.

The result summarized in Table 6 revealed the distribution of farmers based on total. The result indicated that majority (82.5%) of the sampled farmers had total revenue that range from N70,001 per hectare and above of sesame produced. The result further revealed that, on the average a farmer earned revenue of N254,000 per hectare from the production of sesame. The result implies that a small proportion (17.5%) of the respondents earned less than N70000 per hectare of

sesame produced. When compared with the average total variable cost of the respondents (N121,470) the result suggests a high probability of profit making from sesame enterprise in the study area.

Gross Margin of Sesame Produced

The result in Table 7 summarized gross margin of sesame produced by respondents. The result revealed that majority (63.9%) of the sampled farmers had gross margin that range from N70,001 per hectare and above of sesame produced. Mean profit earned of sesame produced was found to be N132910 per hectare. This implies that sesame production is a profitable enterprise in the study area.

Conclusion and Recommendation

The result of this study revealed that majority of the respondents were still within the active age and the mean age of the respondents was 41.44 year. Sesame production in Nasarawa State was still primary male dominated enterprise as women only constituted 18.0 percent of the respondents and majority of the sesame farmers were married (73.2%) and the result further revealed that majority of the respondents used hired labour (72.2%) and 50 percent of them were full time farmers while the other 50 percent were engaged in other business besides sesame farming. The mean gross margin was N132,910, the maximum was N1290,000 and the minimum gross margin was -N31700 and the mean total revenue was N254,000 per hectare while the mean total variable cost was N121,470 per hectare and labour cost N72,989 per hectare rank the highest cost in the production sesame in Nasarawa state. The output of sesame obtained by the pooled respondents was moderately high with a mean of 2155. 73 kilogram's. The study found sesame production to be profitable. This complements the government macroeconomic goal of diversifying the livelihood base of Nigerians. The profit translate to increased household consumption, increased aggregate demand and brings about sustainable development. Based on the findings of the study, Extension workers and other relevant organization should provide training for sesame farmers on the best way of combining the various inputs used in sesame production, this is to enhance their efficiency level and Government should look into the inherent potential in sesame business as that will increase foreign earning and local industries for processing sesame into industrial usage.

Table 1: DISTRIBUTION OF SOCIO -ECONOMIC AND INSTITUTIONAL CHARACTERISTICS OF SESAME FARMERS IN NASARAWA STATE

Index	Frequency	Percentage
Age (years)		
<20	3	1.6
21 – 40	93	47.9
41 – 60	91	46.9
>61	7	3.6
Total	194	100.0
Mean	41.44	
Sex		
Male	159	82.0
Female	35	18.0
Total	194	100.0

Marital status		
Married	142	73.2
Single	52	26.8
Total	194	100.0
Status of farmer		
Full time	97	50.0
Part time	97	50.0
Total	194	100.0
Labour type		
Hired labour	140	72.2
Family labour	54	27.8
Total	194	100.0
Labour (man day)		
<100	114	58.7
101 – 200	38	19.6
201 – 300	17	8.8
>301	25	12.9
Total	194	100.0
Mean	182	
Level of education		
No formal education	84	43.3
Primary	12.4	12.4
Secondary	48	24.7
Tertiary	38	19.6
Total	194	100.0
Farm size (ha)		
<10	40	20.6
1.1 – 2.0	52	26.8
2.1 – 3.0	25	12.9
>3.1	77	39.7
Total	194	100.0
Mean	4.969	
Farming experience(years)		
<5	36	18.6
5 – 9	43	22.2
10 – 14	41	21.1
>15	74	38.1
Total	194	100.0

Mean	12.97	
Household size		
<5	36	18.6
5 – 9	53	27.3
10 – 14	53	27.3
>15	52	26.8
Total	194	100.0
Mean	11.68	
Training in sesame production		
Farmers trained	59	30.1
Farmers not trained	135	69.9
Total	194	100.0
Access to credit		
Access	47	24.2
No access	147	75.8
Total	194	100.0
Off sesame farm income #		
<10,000	133	68.6
1001 – 20,000	36	18.6
20,001 – 30,000	12	6.2
>30001	13	6.7
Total	194	100.0
Mean	13150	

Source: Field survey, 2009

Table 2: SUMMARY STATISTICS OF GROSS MARGIN EARNED BY SESAME FARMERS IN NASARAWA STATE.

Item	Mean	Std deviation	Minimum	Maximum
Total revenue (#)	254000	218038.81	15	1500000
	255			
Cost of fertilizer (#)	25500	25254.93	0.0	160,000
Cost of chemical (#)	12600	14069.60	0.0	60,000
Cost of seed (#)	2308.87	1862.89	0.0	11000
Cost of labour (#)	72982	71282.42	0.03	400,000
Transport cost (#)	7959.28	11149.61	0.0	75,000
Total variable cost (#)	121470	101506	0.0	470,000
Gross margin (#)	132910	181627	-31700	1290000

Source: Data analysis, 2009

Table 3: TEST OF DIFFERENCE OF MEANS OF TOTAL REVENUE, TOTAL VARIABLE COST PER HECTARE OF SESAME OBTAINED BY SESAME FARMERS IN NASARAWA STATE.

	Means	Std deviation	Difference	T	LOS
Total revenue	25400	218038.81	132911	10.192	0.05
	0				
Total variable cost	12147	101506			
	0				

Sources: Data analysis, 2009

T-test significant at 1% leve

Table 4: DESCRIPTIVE STATISTICS OF THE OUTPUT IN KILOGRAMME OF SESAME PRODUCED BY SESAME FARMERS IN NASARAWA STATE.

Output range	Frequency	Percentage
<100	2	1.0
101 – 600	34	17.5
601 – 1100	44	22.7
<1101	114	58.8
Total	194	100.0
Mean	2155.73	
Minimum	17	
Maximum	14,000	
Standard deviation	2054.95	

Source: Analysis from survey data, (2009)

Table 5: DISTRIBUTION OF THE TOTAL VARIABLE COST PER HECTARE OF SESAME PRODUCED BY SESAME FARMERS IN NASARAWA STATE.

TVC range	Frequency	Percentage
<20,000	24	12.4
20,001 – 70,000	60	30.9
70,001 – 120,000	26	13.4
<120,001	84	43.3
Total	194	100.0
Mean	121470	

Source: Data analysis, 2009

Table 6: DISTRIBUTION OF THE FARMERS BASED ON REVENUE OF SESAME PRODUCED IN NASARAWA STATE.

TR range	Frequency	Percentage
<20,000	4	4.6
20001 – 70,000	25	12.9
70,001 – 120,000	24	12.4
>120,001	136	70.1
Total	194	100.0
Mean	2544000	

Source: Analysis from Survey Data (2009)

Table 12: DISTRIBUTION OF THE FARMERS ACCORDING TO GROSS MARGIN OF SESAME IN NASARAWA STATE.

Gross margin range	frequency	percentage
≤ 20,000	34	17.5
20,001-70,000	36	18.6
70,001-120,000	45	23.6
≥ 120,001	79	40.7
Total	194	100.0
Mean	132910	

Source: Analysis from Survey Data (2009).

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