Profitability of Sesame production in Gombe state, Nigeria

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Abstract

The paper examines profitability of sesame production in Gombe State, Nigeria. A total of 469 structured questionnaires were distributed to randomly selected sesame farmers in the State. Descriptive statistics and farm budget model were used to analyze the data collected. The study reveals that majority of sesame farmers (80.0% and 87.80%) were male and married with up to 82.50% and 41.0% of the sesame farmers had one form of formal education or the other and cultivated less than 5.0 ha of land. Budget analysis shows that sesame farmers realized a net income of N17,258.20/sesame farmer and N6,303.81/ha of land and N196.42/man-day of labour; gross margin of N46,776.52/sesame farmer and N17,085.82/ha of land and N532.36/man-day of labour; return per naira of N11.83 and gross ratio of 0.89. The study identified inadequate capital, price fluctuations, low quality of sesame to plant, lack of storage and processing facilities and insecurity among others as major constraints to sesame production in Gombe State. The study recommends that Governments provide price support to sesame marketers, encourage sesame marketers to form cooperative societies to take advantages of economies of scale and access loans from financial institutions, obtain appropriate price for their products; provision of improved seeds and other farm inputs at subsidized rates, quantity, place and time to sesame farmers will enhance productivity of sesame farmers in Gombe State, Nigeria.

Keywords: Sesame, Farmers, Cost and returns, Profitability, Gombe State

Introduction

Sesame (Sesamum indicum L. Pedaliaceae) nicknamed the "queen of oilseeds" is an ancient oil crop of African origin. Sesame is a nutrient-dense plant containing oil, protein, lime ash, crude fiber, oxalate, soluble carbohydrates and phytate. Sesame oil is used in the manufacturing

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of soaps, paints, perfumes, pharmaceuticals and Insecticides etc. The Sesame meal left after the oil is pressed from the seed is rich in protein (34 - 50%) and is used as feed for poultry and livestock (Fabrice et al, 2022). The crop is grown in a wide range of environments from semi-arid tropics to temperate (Islam et.al., 2018). The World's largest sesame producers include Myanmar, India and China, while the lowest producers are Mali, Bangladesh, Paraguay and Benin. According to FAO statistics, (FAOSTAT, 2022; Dossa, et al., 2023), the major sesame producing countries accounts for 92.6 % of global sesame production. Africa accounts for 25 % of the global production, with Sudan, Uganda, and Nigeria leading. Nigeria's major sesame producing states are: Benue, Nassarawa, Jigawa, Yobe, Gombe, Kano, Plateau, Katsina, and Kogi States, with Benue and Nassarawa states as leading producers (Mohammed, 2021). These states cultivated over 80,000 hectares of sesame with an annual average yield of 40,000 MT.

Sesame is one of the key agricultural commodities grown in Nigeria and is one of the most significant contributors to the Gross Domestic Product of Gombe State and Nigerian economy. It is the second largest foreign exchange earner after Cocoa. Similarly, it serves as a source of income for millions of Nigerians among others. However, despite its economic importance not much was written on Profitability of Sesame Production in Gombe State. It is against this background that this study was carried out to examine Profitability of Sesame Production in Gombe State. Specifically, the study will describe the socio-demographic and economic characteristics of sesame farmers; determine the cost, return and profitability index and as well as constraints to sesame production in Gombe State.

Methodology

Gombe State (Jewel in the Savannah) was created on 1st October, 1996 during the regime of General Sani Abacha. The State was located at the center of the North Eastern part of Nigeria between Latitudes 9°30` and 12°30`N and Longitudes 8°45` and 11°45`E of the equator. The State has a land area of 20,265 km2 and a population of 1.85 million people (NPC, 2006).

The vegetation of Gombe State is Guinea Savannah grassland with concentration of woodlands in the South-East and South-Western part of the state. The State has an average annual rainfall of 850mm and warm temperature not exceeding 30°C during hottest months of March to May. Gombe State is mainly mountainous, undulating and hilly to the south-east and flat open plains in the central, north, north-eastern, west and north west. The Gongola River traverses the State watering most of the Northern and North-eastern part of the State before emptying into the River Benue at Numan. Other numerous streams that are seasonal also serve as tributaries to the Gongola River. As the underground water reserve in the State is therefore high. The State has three Dams namely: the Dadin Kowa Multipurpose Dam, Balanga Irrigation Dam and Cham Dam. Gombe State is made up of people of diverse ethnic, cultural and religious background. The major ethnic groups are: Fulani, Tangale, Waja, Tera, Bolewa, Jukun, Gera, Pero, Tula, Chamawa, Lunguda, Kanuri, Dadiya, Hausa, Yoruba, Igbo etc. The major economic activity of the people in the study area is agriculture and marketing (GOSEEDS, 2010).

Data Collection and Analysis

The study was conducted through a survey of sesame farmers in Gombe State located in the North-eastern part of Nigeria. The population

for this study involved all sesame farmers in Gombe State. Respondents for the study were selected through multistage sampling procedure. The first stage involved purposive selection of Gombe State from the list of 36 states in the country. In the second stage, 10 Local Government Areas (LGAs) were also purposively selected from the state based on probability proportionate to size. The third stage involved random selection of sesame farmers from the villages selected in each LGA based on probability proportionate to size making a total of 469 respondents. Data were collected from Sesame farmers through scheduled interview using 469 structured questionnaires in the villages selected. Descriptive statistics like sum, mean, frequency distribution and farm budgeting: Gross Margin (GM) and profitability index were used to analyse the data collected.

Model Specification and Analytical Technique

Gross Margin model (GM) is mathematically stated as:

$$GM = \text{Gross Revenue (GR)} - \text{Total Variable Cost (TVC)} = \sum_{i=2}^{n} P_i Q_i - \sum_{i=1}^{n} P_j X_j \quad \ldots 1$$

Where, GM = Gross Margin (N),
TR = Total Revenue from sales of sesame output (N),
TVC = Total Variable Cost N),
Qi = Total Quantity of sesame seeds sold
Pi = Price per bag of sesame seed (N),
Qji = Quantity of inputs used by sesame farmers
Pj = Price of inputs (N),
An enterprise is considered profitable if the Gross margin (GM) is positive. It means that the Gross Revenue (GR) is greater than Total Variable Cost (TVC). If for any reason GM is negative the enterprise is not profitable. Therefore, the higher the GM, the higher the profitability of the enterprise and vice versa.

Results and Discussion

Socio-Demographic and Economic Characteristics of Sesame Producers

The socio-demographic and economic characteristics of sesame producers examined in this study includes: gender, age, marital status, household size, educational level, years of experience in sesame production, membership of cooperative and access to credit were identified and described.

Gender of sesame producers

The distribution sesame producers in Gombe State according to their gender are shown in Table 1. The study revealed that majority of the respondents (80.0%) were male while only 20.0% are female. Since nearly all the respondents were male. It shows that sesame production in Gombe State is a male dominated enterprise. This is mainly due to Islamic doctrine of "Purdah" which requires women to stay indoors, while the men provide their daily needs. Islam and Christianity are the predominant religions in the study area. The above finding is in line with Lawal et.al. (2017), Jejaw (2018) and Samuel et.al. (2020) who found that majority (87.04%, 85.0% and 66.67%) of sesame producers in Niger State, West Armachiho in Ethiopia and Yobe State to be males, but different from Bernard et.al. (2021) who found majority (57.9%) of sesame producers in Hong local Government Area of Adamawa State to be females.

Age of sesame producers

Table 1 shows the distribution of sesame producers in Gombe State according to their age.

With the mean age of 44.22 years, the table shows that 0.64% of the sesame producers are less than 20 years old, 23.03% and 35.61% of the sesame producers falls between the ages of 31 to 40 years and 41 to 50 years respectively. The study further revealed that 24.30% of sesame producers are more than 50 years of age (Table 1). From the table we can see that large proportions (75.7%) of sesame producers were in their productive period (20-50 years). Only 24.30% of the respondents were of advanced age (more than 50.0years). The results corroborate with Lawal et.al. (2017) who found majority (80.25%) of sesame producers in Niger State to be between 20-40 years, Rukwe et.al. (2020) who found majority (93.1%) of sesame producers in Southern Taraba State to be between 20-50 years and Bernard et.al. (2021) who found majority (71.9%) of sesame producers in Hong local Government Area of Adamawa State to be between the ages of 31-50 years. The high incidence of youth in the population is a welcome development for extension workers in their endeavor to improve agricultural productivity in Gombe State.

Marital status of sesame producers

The distribution of sesame producers in Gombe State according to their marital status is shown in Table 1. The study revealed that 87.80% of the producers involved in sesame production are married, 0.8% and 1.1% are divorced and widows. The study also revealed that 2.60% of the respondents are widowers while only 7.7% of the respondents have never married (single). The above finding is in line with Garba et.al. (2018) who found 82.3% of sesame producers in Jigawa State to be married, Rukwe and Zubairu (2019) got 63.4% of sesame farmers in Kurmi Local Government Area of Taraba State to be married and Samuel et.al. (2020) found 77.22% of sesame producers in Yobe State to be married implying that they shoulder responsibility which enhances effective decision making and productive thought.

Household size of sesame producers

Table 1 shows the distribution of sesame producers in Gombe State based on their household sizes. With the mean household size of 7.83, the table shows that 8.5% of sesame producers have family size of less than 5 people. The table also shows that 44.8%, 24.3%, 12.6% of sesame producers have family sizes of between 5 to 10, 11 to 15 and 16 to 20 people respectively. However, only 9.8% of the sesame producers have family sizes of more than 20 people (Table 1). Early marriage, dependents and polygamous nature of family life are common among communities in Gombe State. The mean household size of 7.83 persons is higher than 4.9 persons obtained by Jejaw (2018), 5.0 persons by Myint and Mon (2019) and 7 persons obtained by Samuel et.al. (2020), but lower than the value of 9 persons obtained by Rukwe and Zubairu (2019) in their different studies

Table 1: Distribution of sesame producers' socio-demographic characteristics

Socio-economic Characteristics	Number of Respondents	Percentage (%)	Mean	Standard Deviation
Sex				
Male	375	80.0		
Female	94	20.0		
			44.22	**11.67**
Age				
≤ 20	3	0.64		
21- 30	77	16.42		
31- 40	108	23.03		
41– 50	167	35.1		
>50	114	24.30		
Marital Status				
Single	36	7.7		
Married	412	87.8		
Divorced	4	0.8		
Widow	5	1.1		
Widower	12	2.6		
Household Size			**7.83**	**4.65**
< 5	40	8.5		
5 – 10	210	44.8		
11 -15	114	24.3		
16 – 20	59	12.6		
>20	46	9.8		
Total	**469**	**100**		

Source: Field Survey, 2018.

Other socio-economic characteristics examined in the study include educational levels and years of sesame farming experience and farm size etc were presented in table 2 as follows:

Educational level of sesame producers

In agriculture, education is usually valued as a means for acquiring knowledge about new farm technologies. Table 2 shows the distribution of sesame farmers in Gombe State according to their educational levels. The table revealed that 2.6% of the sesame farmers have religious (Quranic or Christian) education, 14.1% have adult education, and 11.5% have primary education. The table also revealed that 51.0% and 20.0% of the sesame farmers have Secondary and Post-Secondary Education respectively. While, only 1.71% of the sesame farmers in Gombe State have not gone to any school (Table 2). This shows that 95.69% of sesame producers in Gombe State had one form of western education or the other. The finding is in consonance with Sharon (2016) who found 97.8% of sesame farmers in Benue State have one form of Education or the other, Lawal et.al. (2017) also got 81.48% of sesame farmers in Niger State to have primary, secondary or tertiary education. Moreover, Samuel et.al. (2020) found 100% of sesame farmers in Yobe State to be literate and Bernard et.al. (2021) who found 96.5% of sesame producers in Hong Local Government Area of Adamawa State to have one form of western education or the other. The high literacy level among respondents means that such farmers would tend to adopt improved farm practices faster than respondents who are non-literate or illiterate. The non-literate farmers tend to be tradition-bound and appear to resist

new ideas. It seems therefore, that extension effort in the Gombe State would be enhanced by the high literacy level among the sesame farmers.

Table 2: Distribution of sesame producers according to their socio-economic characteristics

Socio-economic Characteristics	Number of Respondents	Percentage (%)	Mean	Standard Deviation
Educational Level				
Religious Education	12	2.60		
Adult Education	66	14.10		
Primary Education	54	11.50		
Secondary Education	239	51.0		
Post-Secondary Education	94	20.00		
Not gone to any School	4	1.71		
Farming Experience (Years)				
< 5	6	1.28	4.33	1.68
5 – 10	172	36.67		
11- 15	102	21.75		
16 – 20	116	24.73		
>20	73	15.57		
Farm Size (Hectares)				
< 5	191	40.7	2.74	2.60
5 – 10	187	39.9		
11 – 15	32	6.8		
16 – 20	39	8.3		
>20	20	4.3		
Total	**469**	**100**		

Source: Survey data, 2018.

Farming experience of sesame producers

The distribution of sesame producers based on their experience in sesame production in Gombe State is shown in Table 2. The table shows that 1.28% of the sesame producers have farming experience of less than 5 years. The study also revealed that 36.67%, 21.75% and 24.73% of sesame producers had between 5 to 10 years, 11 to 15 years and 16 to 20 years' experience in sesame production in Gombe State. The table further revealed that 15.57% of the sesame producers have more than 20 years' experience in sesame production (Table 2). The mean farming experience is 4.33 years. This shows that 83.15% of sesame producers have farming experience of more than 5 years. The above findings corroborate with Garba et.al. (2018) who found 83.3% of sesame farmers in Jigawa State to have farming experience of more than 6 years, Samuel et.al. (2020) got 93.33% of sesame farmers in Yobe State to have farming experience of between 6-20 years and Bernard et.al. (2021) that got 52.6% of sesame farmers in Hong Local Government Area of Adamawa State to have farming experience of between 10-20 years.

Farm size of sesame producers

Table 2 shows the distribution of sesame farmers in Gombe State based on their farm sizes. With the mean farm size of 2.74 hectares, the table showed that 40.7% of sesame producers have farm size of less than 5.0 hectares. This shows that a lot of sesame producers in Gombe State are small-scale farmers. The result is in consonance with Garba et.al. (2018) who got

majority (84.6%) of sesame farmers in Jigawa State to have cultivated less than 2 hectares of land, Samuel et.al. (2020) also found majority (77.77%) of sesame producers in Yobe State to have land size of between 1-3 hectares and Bernard et.al. (2021) got majority (70.2%) of sesame producers in Hong local Government Area of Adamawa State to have farm size of between 1-2 hectares. The table also revealed that 39.9%, 6.8% and 8.3% of the sesame producers had farm sizes of between 5 – 10, 11 – 15 and 16 – 20 hectares of land respectively. The table further revealed that only 4.3% of the sesame producers had more than 20.0 hectares of land devoted to sesame production with overall mean farm size of 2.74 hectares (Table 2).

Cost, Returns and Profitability of Sesame Production in Gombe State

The farm budget model was employed to estimate costs, returns and net farm income (NFI) of sesame producers in Gombe State. The main objective of any business venture is to make profit. Analysis of profit is a valuable tool which business organizations used to make their strategic business plan and investment decisions. Analysis of cost and return is the basis for determining profitability of agricultural businesses using net income. Thus, net farm income is the difference between total revenue and total cost of production. This section presents and discusses the results of budgetary analysis.

Gross farm income of sesame producers in Gombe state

The Gross Farm Income (GFI) was obtained by multiplying the physical quantity of sesame produced by the unit price and summing together for all the respondents. The unit price used was the farm gate prices. Gross Farm Income for all respondents was found to be N76,525,117.15 (Table 3). This gave an average gross farm income of N163,166.56 per respondent, N59,599.00 per hectare, N1,857.00 per man-day of labour, N37.66 per kilogram of sesame seed and N4.57 per kilogram of fertilizer.

Cost of sesame production in Gombe state

Information on costs components of sesame production in Gombe State are reflected in table 3. Accordingly, it shows the total cost of sesame production incurred by all the respondents to be N68,431,020.91. This gave an average of N145,908.36 per farmer, N53,295.19 per hectare, N33.68 per kilogram of sesame seed, N1,660.58 per man-day of labour and N4.09 per kilogram of fertilizer. The total cost is made up of "variable" and "fixed" components or costs. The variable cost includes farmers' expenditure on sesame seeds, inorganic fertilizer, tractor and animal draft hire, agrochemicals (insecticide, herbicides, seed dressing chemicals), transportation, bagging, hired labour as well as imputed cost of family labour. While the fixed cost in the study area is limited to depreciation on durable capital goods like hoes, cutlass, rakes, axes/matchets and ridging hoes etc. The values of these components of the variable and fixed costs constituted 79.77% and 20.23% of the total cost of sesame production in Gombe State.

Table 3: Costs and return to sesame production in Gombe State

S/no	Variable (s)	Gross value (₦)	Percentage (%)	Hectare of land used (ha)	Value per hectare (₦ /ha)
A	**Gross Income**				
	Sesame Sales	76,525,117.15		1284	59,599.00
B	**Variable Cost (VC)**				
	Sesame seeds	2,031,850	2.97	1284	1,582.44
	Labour	30,900,190	45.16	1284	24,065.57
	Fertilizer	16,740,600	24.46	1284	13,037.85
	Herbicides	694,850	1.02	1284	541.16
	Insecticides	1,318,000	1.93	1284	1,026.48
	Transport	1,101,050	1.61	1284	857.52
	Empty bags	560,780	0.82	1284	436.74
	Tractor hire	814,900	1.19	1284	634.66
	Extension	424,710	0.62	1284	330.77
	Total Variable Costs (TVC)	**54,586,930**	**79.77**	**1284**	**42,513.19**
C	**Fixed Costs(FC)**				
	Rent on Land (1284 ha)	10,547,046.41	15.41	1284	8,214.21
	Depreciation on Fixed Assets	3,297,044.5	4.82	1284	2,567.79
	Total Fixed Costs (TFC)	13,844,090.91	20.23	1284	10,782.00
D	**Total Cost (TC = TFC + TVC)**	**68,431,020.91**	**100**	**1284**	**53,295.19**
E	**Gross Margin (TR - TVC)**	**21,938,187.15**		**1284**	**17,085.82**
F	**Net Income (TR - TC)**	**8,094,096.24**		**1284**	**6,303.81**

Source: Survey data, 2018.

The study further revealed that, among the variable costs, cost of labour input constituted 45.16% of total cost of sesame production. This shows that labour is the costliest single input in sesame production in Gombe State. The above finding is in line with Rukwe et.al. (2019) who found cost of labour in Kurmi LGA of Taraba State to constitute 41.79% of total variable cost, Myint and Kyaw (2019) found cost of labour in Pakokku Township in Myanmar to constitutes 60.62% of the total variable costs, Samuel et.al. (2020) obtained cost of labour in Yobe State to be 45.1% of total variable cost, Rukwe et.al. (2020) found cost of labour in Southern part of Taraba State to form 64.87% of total cost of production, Islam et.al. (2022) got cost of labour (hired and family) in Bangladesh to be 45% of total cost. Fertilizer, sesame seeds, insecticides, transport, tractor hire, herbicides and bagging constituted 24.46%, 2.97%, 1.93%, 1.61%, 1.19%, 1.02 and 0.82% of total cost of production respectively. Extension is the least constituting only 0.62% of the total cost of sesame production in Gombe State (Table 3).

The fixed cost constituted only 20.23% of the total cost of production. The low level of fixed costs is a reflection of low level of investment on fixed inputs by sesame producers in the Gombe State.

Profitability Index of Sesame Production in Gombe State

Analysis of cost and return is the basis for determining profitability of sesame production. Gross margin and net income for sesame

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producers and other profitability indices and ratios were computed and presented in table 4 below:

Gross margin (GM) and net income (NI) for sesame producers

Gross margin is obtained by subtracting total variable cost from gross farm income for all respondents in Gombe State. It is the commonest tool used to assess the profitability of farm businesses under the assumption that fixed cost of production is negligible (Michael, 2018). Where fixed cost is not negligible, net income is used to determine farm profits. Gross margin for all respondents was N 21,938,187.15 (Table 3). This gave an average of N46,776.52 per respondent, N17,085.82 per hectare of land, N532.36 per man-day of labour, N10.80 per kilogram of sesame seed and N1.31 per kilogram of fertilizer.

The net farm income was obtained by subtracting the total cost of production from gross farm income. The net farm income for all the respondents was N8,094,096.24 giving an average of N17,258.20 per respondent, N6,303.81 per hectare of land, N196.42 per man-day of labour, N3.98 per kilogram of sesame seed and N0.48 per kilogram of fertilizer respectively. The average rate of return to investment (ROI) in sesame production in Gombe State (define as net farm income per hectare divided by total cost per hectare and multiplied by 100) was found to be 11.83%, implying that sesame farmers in Gombe State realized a profit of about N11.83 kobo for every naira invested. Therefore, sesame production is profitable in Gombe State. The study also revealed a gross ratio (ratio of total cost of production to gross farm income) of 0.89 and operating ratio (ratio of total variable cost to gross farm income) of 0.71. Since these ratios are positive and less than one, it shows that inputs were profitably and efficiently utilized for sesame production in Gombe State. The finding is in line with Myint and Mon (2019) who got sesame production in Pwint Phyu Township of Myanmar to be profitable with Benefit Cost Ratio of 1.52, Myint and Kyaw (2019) found sesame production in Pakokku Township of Myanmar to be profitable with Benefit Cost Ratio of 1.22, Samuel et.al. (2020) got sesame production in Yobe State to be profitable with Average Rate of Return of 2.07, Rukwe et.al. (2020) found sesame production in Southern part of Taraba State to be profitable with Return on Investment (ROI) of 3.30 and Islam et.al. (2022) found sesame production in selected areas of Bangladesh to be profitable with Benefit Cost Ratio of 1.51.

However, a very high ratio 0.89 and 0.71 is not favorable for businesses due to high total cost of sesame production when compared to gross farm income realized from sale of sesame. Since cost of labour (45.16%), fertilizer (24.46%), rent on land (15.41%) and sesame seed (2.97%) are major contributors to the high total cost of sesame production in Gombe State. Then effort should be made towards reducing production cost of sesame in the State through among others the use of labour-saving means like use of machineries, herbicides, sprays of fertilizer (fertilizer in liquid forms), improved sesame seeds that are high yield, weed resistant, subsidies for inputs and price support for sesame producers etc. Similarly, effort should be made towards stabilizing price of sesame seeds and increasing yield of sesame through the supply of improved sesame seeds to farmers that are high yielding, weed resistant and other sesame production inputs at subsidized rates, reducing cost of transportation especially reducing price of petrol/diesel per liter etc.

Table 4: Profitability index and ratios of sesame production in Gombe State

S/no	Variable (s)	Gross money value (₦)	Hectares of land used (ha)	Value per hectare (₦ /ha)
E	Gross Margin (TR - TVC)	21938187.15	1284	17085.82
F	Net Income (TR - TC)	8094096.24	1284	6303.81
G	Gross Margin per Labour = Gross Margin/Man-days of Labour	532.36		
H	Return per Naira Invested (RI) = Gross Margin /Total Variable Cost	0.402		
I	Profitability Index (PI) = Net Income/Total Revenue	0.15		
J	Rate of Return to Investment (IRR) = Net Income *100/Total Cost	11.83%		
K	Operating Ratio (OR) = TVC/TR	0.71		
L	Rate of Return on Fixed Cost (RRFC) = Gross Margin * 100/Total Fixed Cost	158.47%		
M	Fixed Ratio (FR) = TFC/TR	0.18		
N	Gross Ratio (GR) = TC/TR	0.89		
O	Gross Margin Per Seed = Gross Margin /Seed (kg)	10.80		

Source: Survey data, 2018

Constraints to Sesame Production in Gombe State

A lot of challenges were identified to constrained sesame production in Gombe State. These challenges include: inadequate capital, fluctuation in prices, poor quality sesame seeds, lack of processing and storage facilities, insecurity, poor road networks especially in rural areas, inadequate fertilizer and mistrust (Table 5). Table 5 shows the distribution of respondents based on constraints to sesame production in Gombe State. To understand severity of the constraints, the constraints were ranked as 1st, 2nd, 3rd etc. Inadequate capital, fluctuation in prices, and poor sesame seeds were identified to be the most important constraints to sesame production in Gombe State.

From the study, it was found that availability of land and labour inputs does not seem to be an important factor militating against increased sesame production in the Gombe State. The method of land acquisition which is mainly through rent (39.40%) and inheritance (36.20%) means that land is available in Gombe State, and easy to obtain. Similarly, the high proportion of hired labour (68.53%) during rainy season also shows that, there is enough human labour to hire. However, the problem was not that of having labour to hire but having the money to pay for the services of hired labour and other farm operations for sesame production. The result is in consonance with Sharon (2016), Myint and Mon (2019), Myint and Kyaw (2019), Rukwe et.al. (2020) in their various studies. Moreover, Samuel et.al. (2020) and Tahir et.al. (2021) also found inadequate capital as important constraint to sesame production. The study further revealed that, 78.90% of the respondents did not obtained credit from any formal or informal sources for the purpose of sesame production. Similarly, respondents

identified instability of sesame prices as factor militating against increased sesame production in the study area. Sesame farmers complained that prices of sesame fluctuate and sometimes lower than the price of related produce groundnut and soya bean. Islam et.al. (2021) and Islam et.al. (2022) identified low price of sesame at time of harvest as constraint to sesame production in Bangladesh.

Table 5: Constraints to sesame production in Gombe State

Constraints	Frequency	Percentage	Rank
Inadequate Capital	158	13.24	1st
Fluctuation in Prices	158	13.24	1st
Poor Sesame Seeds	158	13.24	1st
Lack of Processing Facilities	153	12.82	2nd
Lack of Storage Facilities	153	12.82	2nd
Insecurity	*153*	12.82	2nd
Poor Road Networks	137	11.48	3rd
Inadequate Fertilizer	121	10.14	4th
Mistrust between Sesame Producers and Marketers	2	0.17	5th
Total	**1193**	**99.97**	

Source: Survey Data 2018.

The second (2nd) most important constraints to increased sesame production in Gombe State were insecurity, lack of processing and storage facilities. The study revealed that 12.82% each of the respondents complained of insecurity, lack of processing and storage facilities. A lot of sesame farmers complained of losing part of their sesame to thieves.

The third (3rd) most important constraints to sesame production in Gombe State was poor road networks especially in rural areas of the state. The study shows that 11.48% of the respondents complained of poor road networks which constrained the smooth movement of inputs (fertilizer and pesticides) and sesame in and out of their localities.

The fourth (4th) most important constraint to sesame production in Gombe State was inadequate supply of farm inputs, especially inorganic fertilizers. The study revealed that 10.14% of the respondents complained that inorganic fertilizer is usually in short supply, where it is available when needed; the prices are usually high and beyond the reach of farmers. Sesame farmers also complained of adulteration of fertilizers especially with sand. The inadequacy, coupled with fear of adulteration and high prices limits the quantity of fertilizer that sesame farmers can buy and also limits their farms sizes. Islam et.al., (2022) identified lack of improved sesame seed and good quality fertilizer as constraint to sesame production in Bangladesh. This contributed to the low yield on their sesame farms and so profit.

The fifth (5th) most important constraint to sesame production in Gombe State is mistrust between sesame producers and marketers. The study revealed that 0.17% of sesame producers in the state complained of mistrust between them and buyers of their sesame. Sometimes sesame marketers bought sesame on credit from sesame farmers but fail to pay them back. Such sesame farmers tend to seek for police/court intervention.

Conclusion and Recommendations

Based on findings from the study, the study concludes that sesame production in Gombe State is a male dominated enterprise with majority of sesame farmers being young and energetic having a mean age of 44 years with an average household size of 7 persons in their households. Majority of the farmers were cultivating a farm size of < less than or equal to 3 hectares with an average farming experience indicating they are small holder farmers. Majority does not benefit from economies of scale arising from non- cooperative membership and access to credit for improved productivity. Evidence of little investment on fixed inputs like machineries and equipment by sesame farmers in Gombe State making cost of hired labour to be high, yet sesame production is a profitable enterprise based on profitability indices and ratios obtained worth investors to venture into its production. Constraints that are inimical to sesame production identified among others includes: inadequate capital, fluctuation in sesame prices, insecurity, lack of storage and processing facilities and good road networks etc. The following recommendations were made in order to enhance sesame production in Gombe State: -

1) Federal, State and Local Governments should come up with incentives that will encourage female join agricultural production, processing and marketing. Women in Agriculture (WIA) programme should be strengthened to attract more women into Agricultural production, processing and marketing.
2) Sesame producers and marketers should be encouraged to form cooperative societies to enable them pool their resources and also have access to farm inputs like credit fertilizer, improved seeds, extension services and information on sesame prices from formal institutions etc. This will enhance sesame production and marketing not only in Gombe State but Nigeria at large.
3) The sesame seeds produced in Gombe and Nigeria in general is mostly of low-quality due adulteration by soil, dust during harvesting, threshing and winnowing. Similarly, the product is in raw form not processed (so no value addition). Sesame from Nigeria will not compete well with sesame from other parts of the world, as such sesame farmers do not get appropriate price for their sesame. Therefore, provision of storage, cleaning and processing facilities for sesame seeds will not only add value to it, but also increase opportunities for employment and income to sesame farmers, Nigerians and Nigeria's GDP.
4) Banks and insurance companies should be encouraged to provide loans and insurance cover to sesame farmers and marketers in Gombe State and Nigeria. This will help sesame farmers and marketers to adopt and use new technologies for increased sesame production and marketing activities, income and standard of living.
5) The Federal and Gombe State Governments should provide social infrastructures like accessible roads, electricity, water supply etc to rural communities to increase the flow of inputs and agricultural products into/out of rural areas, reduce cost of transportation and rural-urban migration, etc.

Governments should come into the supply chains of Agricultural products by facilitating the flow of products through stabilizing prices (reducing purchasing price of sesame seeds) and transportation cost along the value chains (setting Guaranteed minimum prices, buffer stock storage system etc.), reducing taxes, supply of improved sesame seeds to farmers that are high yielding, weed resistant and other sesame

production inputs at subsidized rates, reducing cost of transportation especially reducing price of petrol/diesel per liter and price support for sesame marketers etc.

References

1) Ali, R. M. (2018). Estimation of production function of sesame in sudan: a case study of El gadaref State. M.Sc Thesis, Department of Economics, University of Gezira, Sudan. Accessed on 21 December, 2022.
2) Adole, S. O. (2016) economic analysis of sesame production among small-holder farmers in Benue State, Nigeria. M.Sc Dissertation, Department of Agricultural Economics and Rural Sociology, Ahmad Bello University, Zaria, Nigeria. PP 50-63.
3) Bernard, H. Tahir A. D., Alkali, H. M. & Ojo, C. O. (2021). Analysis of resource use efficiency of sesame production in Hong Local Government Area of Adamawa State. Badeggi Journal of Agricultural Research and Environment. 03(01), 1-9. E-ISSN: 2695-2114. Doi: https://doi.org/10.35849/BJARE202003002 . Accessed at www.ncribjare.org
4) Dossa, K., Konteye, M., Niang, M., Doumbia, Y. & Cisse, N. (2017). Enhancing sesame production in West Africa's Sahel: A comprehensive insight into the cultivation of this untapped crop in Senegal and Mali. Agriculture and Food Security. 6(68). DOI: https://doi.org/10.1186/s40066-017-0143-3.
5) Fabrice, K. D., Anibueze, A. E., Emmanuel, Y. M. & Olusola, A. O. (2022) Economic analysis of sesame (Sesamum indicum L.) production in Northern Benin. Front. Sustain. Food Syst. 6:1015122.doi: https://doi.org/10.3389/fsufs.2022.1022022.105122.
6) FAOSTAT, (2022). Production: Crops and Livestock Products. Available online at https://www.fao.org/faostat/en/#compare . Rome, Italy. Accessed on August 6, 2022.
7) Garba, A.; Idrisa, Y. L. & AbdulHamid, A. (2018). Comparative analysis of economics of sesame production between improved sesame seed adopter and non – adopter farmers in Jigawa State, Nigeria. Journal of Agricultural Economics, Environment and Social Sciences. 4(1): ISSN: 2476-8423. Retrieved on 21/12/2022 from https://www.jaeess.com.ng/index.php/jaeess/article/view/8
8) Gebretsadik, D., Haji, J. And Tegegne, B. (2019). Technical, allocative and economic efficiencies and sources of inefficiencies among large-scale sesame producers in Kafta Humera District, Western Zone of Tigray, Ethiopia: non-parametric approach. Gebreselassie, S. & Getachew, D. (Eds). Proceedings of the Sixth Ethiopian Economics Association (EEA) Regional Conference on the Tigray Regional State Economic Development. ISBN-978-999-44-54-68-6. PP 1-26.
9) Gelalcha, D. S. (2009). Sesame trade arrangements, costs and risks in Ethiopia: A baseline survey. https://www.wur.nl/upload_mm/9/a/9/59d09a46-b629-4014-b2bdRepor170610.pdf
10) GOSEEDS (2010). "Gombe State Economic Empowerment and Development Strategy": Handbook, Abuja, Dandafid Nig. Ltd.
11) Hagose, L. W. (2017) Strategic analysis of sesame (Sesamum indicum L.) market chain in Ethiopia: A Case of Humera district. International Journal of Plant and Soil Science, 15(4), 1-10, 31928. Doi: https://doi.org/10.9734/IJPSS/2017/31928.
12) Islam, S.; Rahman, M. H.; Haque, M. R. & Sarker, M. M. A. (2021). An economic study on sesame variety Binatil-3 in some selected areas of Bangladesh. IOSR Journal of Agriculture and Veterinary Science, 14(1):21-26.
13) Islam, S.; Mosharraf Uddin, M. M.; Habibu R. M. & Sultana, R. (2022) Financial analysis of sesame production in selected areas of Bangladesh, The Journal of Bangladesh Agricultural Economists Association 17: 139-146. ISSN: 2789-3502.

14) Jejaw A. (2018). Economic efficiency of sesame production in West Armachiho Woreda, North Gondar, Ethiopia. M.Sc Thesis, Department of Economics, Bhirdar University, Ethiopia. Accessed on Wednesday 21 December, 2021 from DSpace Repository, DSpace Institutions institutional repository. https://ir.bdu.edu.et/handle/123456789/11915
15) Lawal, A. F., Adedeji, S. O., Bwala, M. A., Umaru, A. & Momoh, J. (2017). Technical efficiency of sesame production in Niger State, Nigeria. Conference Proceedings of the 18th Annual National Conference of the Nigerian Association of Agricultural Economists held at Federal University of Agriculture, Abeokuta, Nigeria 16th – 19th October. 2017. PP 730-734.
16) Mary, N., Sowjanya, B., Sunandini, G. P., & Supriya, K. (2023). Constraints analysis in procurement and processing of sesame in No Telangana Zone, Telangana, India. International Journal of Plant & Soil Science 35(22) Article no. IJPSS. 109987.ISSN: 2320-7035. Pp 611-617 DOI: https://doi.org/10.9734/IJPSS/2023/v35i224171.
17) Mengstu, B. G., Worku, T., Girma, G. G., Kahsay, T. M. & Mewael, K. A. (2019) Value chain analysis of sesame (Sesamum indicum L.) in Humera District, Tigray, Ethiopia, Cogent Food & Agriculture, 5:1,1705741, DOI:10:1080/23311932.2019.170541. Retrieved from https://doi.org/10:1080/23311932.2019.170541 On 22 December, 2024.
18) Michael, J. (2018). Analysis of production efficiency and profitability of maize-based cropping systems in Adamawa State, Nigeria. Ph.D Thesis, Department of Agricultural Economics and Extension, Abubakar Tafawa Balewa University, Bauchi, Bauchi State, Nigeria.
19) Myint, T. & Mon, Y. A. (2019) Assessment of value chain management of sesame in Pwint Phyu Township, Magway Region, Myanmar. Journal of Economics and Sustainable Development. ISSN 2222 – 2855. 10(12) DOI: https://doi.org/10.7176/JESD/10-12-13. PP 117 – 128.
20) Myint, T. & Kyaw, E. T. (2019). Assessment of supply chain management of sesame seed in Pakokku Township, Magway Region, Myanmar. International Journal of Agricultural Marketing, 6(2), 215-224. ISSN 0521-9965 www.premierpublishers.org.
21) National Agricultural Extension Research and Liaison Services (NAERLS). (2010). Beniseed production and utilization in Nigeria. Extension Bulletin No 154, Horticulture Series No 5. 17/7/2011. Available at www.naerls.gov.ng/extmat/bulletins/beniseed.pdf
22) National Population Commission (NPC) Abuja, Nigeria (2006). The 2006 population census official gazzete, Vol. 94(24).
23) Rukwe, D. T. & Zubairu, E. A. (2019). Determinant of technical efficiency of sesame production in Kurmi Local Government Area of Taraba State, Nigeria. IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS). E-ISSN: 2319-2380, p-ISSN: 2319-2372. 12(5) Ser. I. 43-51. Retrieved from www.iosrjournals.org on 5/9/2024
24) Rukwe, D. T., Aboki, E., Luka, P. & Nyam, C. M. (2020). Economics of sesame production among small scale farmers in Southern Part of Taraba State, Nigeria. Journal of Agricultural Economics, Environment and Social Sciences, 6(1): 103 – 112. ISSN:2476-8423. Retrieve from https://www.jaeees.com.ng on 22/12/2022.
25) Samuel, E. J., Baba, G. S., Abba, S. S. U. & Enan, T. (2020). Analysis of profitability of sesame production in Yobe State, Nigeria. American Journal of Economics. 4(2):46 – 69. ISSN: 2520-0453. Accessed on 21/12/2022 at www.ajpojournal.org
26) Sharon, O. A. (2016). Economic analysis of sesame production among smallholder farmers in Benue State, Nigeria. M.Sc Thesis, Department of Agricultural Economics, Ahmadu Bello University, Zaria, Nigeria.

27) Shavgulidze, R., Bedoshvili, D., & Aurbacher, J. (2017). Technical efficiency of potato and dairy farming in Mountainous Kazbegi District, Georgia. Ann. Agrarian Sci. 15, 55-60.

28) Sirany, T. & Tadele, E. (2022). Economics of sesame and its use dynamics in Ethiopia. A review Hindawi The Scientific World Journal. Article ID 1263079. https://doi.org/10.1155/2022/1263079.

29) Tahir, A. D.; Alkali, H. M. & Saleh, R. A. (2021). Analysis of Costs and Return of Sesame Production in Hong Local Government Area of Adamawa State, Nigeria. Journal of Agricultural Economics, Environment and Social Sciences. 7(2): 186 – 193. ISSN: 2476-8423. Accessed on 22/12/2022 at http://www.jaeess.com.ng

30) Wana, H. F. (2016). Economic efficiency of sesame production in Babogambel District of West Wollega Zone, Oromia Region, Ethiopia. M.Sc Thesis, School of Agricultural Economics and Agribusiness, Haramaya University, Ethiopia.