
Contribution of Sesame Production to the Livelihood of Farmers in Dutsin-Ma Local Government Area, Katsina State, Nigeria

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Abstract: Sesame production is an important enterprise that could boost incomes of its producers, thereby improving their livelihoods. It has been one of the cash crops produced in Nigeria, mostly by small scale farmers in order to acquire income for taking care of their families. In Katsina State, sesame is considered as one of the commercial crops for local and international markets. Thus, assessment of sesame contribution to the livelihood improvement of the farmers is vital. This could help to pay more attention to its production and utilisation. Data collected from 100 farmers were used to assess contribution of sesame production to the livelihood of farmers in Dutsin-Ma Local Government Area. Descriptive Statistics and Farm Budgeting Techniques were used to analyze the data. The net farm income (124,665.92/ha) obtained from the enterprise helped to improve farmers' livelihood assets; sesame contributed 36.80% to each livelihood asset acquired by the farmers. Education, Housing, transportation, communication and livestock were among the assets that had greatly improved. It was noticed that the farmers were not gaining the optimum benefits associated with the enterprise; they were not processing sesame for oil extraction and soap making, which deprived them from accessing numerous other benefits. Farmers should organize themselves into strong cooperative societies to enable them access government and non-governmental loans and assistance packages. Governments and Non-Governmental Organizations should help to enlighten and train the farmers on how to further process and market sesame products.

Keywords: Sesame Production, Contribution, Farmers' Livelihood

1. Introduction

Sesame (*Sesamum indicum* L.) is one of the important cash crops that can boost incomes of its producers and marketers which could in turn help in improving their livelihoods. It is one of the ancient oil seed crop known and used by mankind, which original area of domestication was not clear but it is considered to have its origin in Africa and spread through West Asia, China and Japan [1-3]. It is the eighth edible oil seeds in terms of production in the world, and has higher oil content than other oil seed crops (National Agricultural Extension and Research Liaison Services [4]. Presently, Myanmar is the world leading producer of sesame (785,038 Metric tons) followed by India (755,346 Metric tons),

Tanzania (663,935 Metric tons), Nigeria (588,334 Metric tons) and China (392,414 Metric tons) which occupied 2nd, 3rd and 5th position, respectively [5]. Nearly 55% of world sesame is produced in Africa; Tanzania, Nigeria, Ethiopia, Sudan, Burkina Faso and Mali are leading producers and exporters from the Continent [6].

Sesame has been one of the cash crops produced in Nigeria, mostly by small scale farmers, which help them to acquire more income for taking care of their families as well as improving their livelihood assets. The major producing areas in the Country are Benue, Nasarawa, Jigawa, Yobe, Gombe, Kano, Plateau, Katsina and Kogi States [7]. It is cultivated on over 80,000ha across most of the Northern States for food and oil, with Benue and Nasarawa States being the highest

producers of the crop, which has an annual average output of not less than 40,000MT [8]. Nigeria exported 140,850 metric tons of sesame seed in 2010, which earned it a gross income of \$139,000,000, despite the fact that the crop is cultivated on a small scale basis [9] (Umar, Muntaga, Muhammad & Jantar, 2013). It has remained popular cash crop among farmers due to its good local and international markets potentials [10].

Sesame can be cultivated on less fertile land where some crops cannot grow and develop very well [11]. It was also realized that it can be cultivated on marginal lands and rough areas due its resistance to droughts and high temperature [12]. Thus, it is one the resilient crops that can be grown very well in West African Sahel's arid climate [13]. Therefore, sesame provides farmers with opportunity to better utilize every nooks and corners of their farm land optimally, which is capable of helping them to boost their farm incomes and consequently improve their livelihood assets.

Sesame is used for various purposes such as raw materials in agro-allied industries, food, feed as well as means of generating revenue for its producers, marketers and governments. For instance, its seeds are used in confectioneries, biscuits, breads, etc., and may be baked into crackers, often in the form of sticks [14]. Its oil is used for cooking; medicine for treating ulcer and burns; making aerosols and manufacturing of margarine; its low grade oil is locally used in making soap, paints, lubricants, and illuminants and the byproduct obtained from its seeds processing is used in making animal feeds [15]. Sesame products are locally processed and utilized in various forms in States where the crop is cultivated. The popular among the locally processed products are: "*Kantun-ridi*" (Sesame biscuit) and "*Kunun-ridi*" (Sesame pop). Locally, oil is extracted from the seeds and the cake is made into "*Kulikuli*" (Sesame cake) which is used with the leaves in the preparation of local soup known as "*Miyar-taushe*" (Sesame soup). At local level, the oil is also used for cooking as well as for medicinal purposes such as the treatment of ulcers and burns, and the stem and oil extract are used in making local soap [16].

In Katsina State, sesame is considered as one of the commercial crops for local and international markets and the average yield per hectare was 7.5 tons [17]. Despite the aforementioned benefits of Sesame, less attention is directed towards its production and processing in Dutsin-Ma Local Government Area (LGA) for optimum benefits. Thus, improvement in the production and process of the crop could greatly help in increasing farm incomes as well as enhancing the livelihoods of the farmers and marketers of the crop in the LGA. Therefore, it is important to assess the contribution of sesame production to the livelihood improvement of the farmers in the Dutsin-Ma LGA of Katsina State so that appropriate measures could be taken by the farmers, governments and Non-Governmental Organizations (NGOs) in order to boost the production of the crop which could in turn help in the improvement of the living standard of people in the Local Government and the State in general.

2. Methodology

Dutsin-Ma is one of the thirty four Local Government Areas (LGAs) of Katsina State, Nigeria. It got its name from a hunter called Ma who lived on the main rock (which means *dutsi* in Hausa) many years ago, which started to grow in to village; people called it Dutsin-Ma (Rock of Ma) which became a large town and eventually the headquarter of the LGA [17]. The LGA which occupied a total area of 527km² is situated between Latitude 12°27' 18"N and Longitude 7° 29' 29"E and has projected population of 229,200 people and shares border with Kurfi LGA to the North, Charanci, Kankia and Matazu LGAs to the East, Dan-Musa LGA to the South and Safana LGA to the West [18].

The LGA is dominated by Hausa and Fulani people majority of them lived by production of different types of crops (sesame, maize, millet, sorghum, cowpea and groundnuts, etc.) and livestock (cattle, sheep, goat, poultry, fish, etc.). They also carry out different types of off-farm activities such as civil service, trade, carpentry, brick-laying, iron work, among others.

2.1. Sampling Procedure

Multi stage sampling procedure was used to select sample. The first stage involved a purposive selection of four communities (Gizawa, Ruwan-rawa, Darawa and Kofa) from the LGA based on their prominence in sesame production. The second stage involved the determination of number sesame producers in each village. The third stage was the determination of the proportion of respondents in each village and fourth was the random selection of the respondents, which was achieved using ballot system. Thus, 27, 26, 23 and 24 sesame producers were randomly selected from Gizawa, Ruwan-rawa, Darawa and Kofa communities, respectively. This gives a sample size of 100 sesame producers.

2.2. Data Analysis and Model Specification

Data were analyzed using Descriptive Statistics and Farm Budgeting Technique (FBT). The FBT is specified as:

$$NFI = P_y Q_i - P_x X_i \quad (1)$$

Where:

NFI = Net farm income (profit).

P_y = Price of output

Q_i = Quantity of output obtained by *ith* farmers

P_x = Price of inputs used.

X_i = Quantity of inputs used by *ith* farmers.

i = number of respondents ($i = 1, 2, 3, \dots, 100$).

To determine the contribution of sesame in the improvement of livelihoods of the producers, the average net farm income obtained by the respondents from sesame production was compared with the average total income obtained from others sources such as other crops production, livestock keeping, off-farm activities etc. The percentage of sesame income to the total income of the respondents was termed as sesame contribution to the incomes of the farmers.

Thus, sesame contribution is determined as;

$$SCFI = \frac{ANFIS}{ATIF} * 100 \quad (2)$$

Where:

SCFI = Sesame contribution to the farmers' income.

ANFIS = Average net farm income from sesame production.

ATIF = Average total income of the farmers.

It is considered that sesame production has contributed the same percentage in any improvement in the livelihood assets of the farmers.

Table 1. Descriptive statistics of the variables used in the study.

Variables	Minimum	Maximum	Mean	Standard deviation
Net farm Income/ha (₦)	1,099.00	293,208.12	124,665.92	31,766.57
Variable cost/ha (₦)	22,504.53	64,023.04	40,507.52	16,460.73
Fixed cost/ha (₦)	10,090.19	30,700.20	19,528.54	10,770.46
Total cost/ha (₦)	36,599.04	82,999.11	60,036.06	23,597.67
Income from other sources (₦)	90,000.00	560,000.00	214,119.89	75,586.05
Age	22.00	5.00	47.57	12.80
Household size	1.00	25.00	10.00	5.72
Farm size (sesame)	0.25	10.00	2.43	1.26
Education	1.00	16.00	7.21	4.04
Experience	2.00	30.00	9.79	5.23
Cooperative membership	0.00	1.00	0.21	0.41
Extension contacts/season	0.00	3.00	0.58	0.65

₦ = symbol of Nigerian currency, ha = hectare.

Source: Field survey, 2018.

3. Results and Discussion

3.1. Descriptive Statistics of the Variables

The results presented in Table 1 show the descriptive statistics of the variables used in the research. It can be seen that the average net farm income obtained from sesame production, average total income obtained from other sources, household size and farm size allocated to sesame production were 124,665.92, 214,119.89, 10 people and 2.43ha, respectively. It differs from that of [19] which revealed that the average net farm income of the farmers in Southern part of Taraba State was 178,128.80. This might possibly be due to different geographical locations of the study areas, varieties and prices of the products. [20] reported that sesame yield depends on the environment, cultivars and cultural practices.

Very few of the respondents were members of cooperative societies and none of them admitted that he obtained loan from governments, NGOs or any financial institutions for financing his sesame enterprise. The failure to organize themselves into strong farmers' cooperative societies might be one of the reasons that deprive them from obtaining loans from government, NGOs and financial institutions.

3.2. Contribution of Sources of Income to the Livelihood of Farmers

There were many sectors that contributed to the improvement of the livelihoods of farmers which includes production of other crops, livestock keeping, off-farm activities, salary, etc. The average net farm income (₦ 124,665.92/ha) of the sesame producers was computed and compared with average income (₦ 338,785.81/person) the producers obtained from all sources in order to see the contribution of sesame in the improvement of the producers' livelihood.

Different types of livelihood indicators (physical, natural, financial, social and institutional) were considered. The results in Table 2 show that sesame production contributed 46.98% of the respondents' total incomes per season which was the highest contribution relative to others sources of incomes from which the sesame producers earned their living. Therefore, sesame production was the major contributor of improving the livelihood assets of sesame producers among all other sources. Salary was the least contributor to the total income of the producers. It can also be noticed from Table that 93.97% of the respondents' incomes came from agricultural activities, which implies that they mostly depend on farming to sustain their living. Thus, majority of the respondents accepted farming as their major occupation rather than working in government or other organizations.

Table 2. Respondents major sources of income.

Source of Income	Average Income (₦)	Percentage of Total Income
Livestock	70,132.00	20.70
Off Farm Activities	15,025.25	4.44
Salary	9,360.45	2.76
Sesame	124,665.92	36.80
Other Crops	119,602.19	35.30
Total	338,785.81	100.00

₦ = symbol of Nigerian currency.

Source: Field Survey, 2018.

Therefore, based on the contribution of sesame production to the total income earned by the respondents, it is suffice to say that in any improvement in the livelihood assets of the respondents, sesame production has contributed 46.98%. Thus, it could be concluded that sesame production is an important enterprise that helps in improving the livelihood of its producers in Dutsin-Ma LGA.

3.3. Contribution of Sesame to the Improvement of Livelihood Assets of Farmers

Sesame production as can be seen from the results presented in Table 3 contributed in the improvement of houses of the farmers. The Table shows that majority (89.00%) of the respondents possessed mud houses instead thatch houses they used to live in. It was even appreciable to found that only 2.00% of the respondents were living in thatch houses. Therefore, incomes from sesame production helped the farmers to live in better houses, which is one of the livelihood indicators (physical).

Table 3. Respondents ownership of physical assets.

Assets	Frequency	Percentage (%)
Housing		
Thatch	2	2.00
Mud	89	89.00
Cement	9	9.00
Total	100	100.00
Transportation		
Car	5	5.00
Bicycle	28	28.00
Motorcycle	67	67.00
Lorry	7	7.00
Total	100	100.00
Communication Gadget		
Television	9	9.00
Radio	56	56.00
GSM	96	96.00
Total	161*	161.00*

*Multiple responses.

Source: Field Survey, 2018.

The results Table 3 also revealed that majority (67.0%) of the respondents had admitted that due to sesame production they purchased motorcycle instead of using bicycle or tracking to their farms. 7.00% and 5.00% of them stated that they had purchased lorry and cars, respectively. This shows that there was improvement in the transportation facilities of the farmers.

It can also be seen in Table 3 that majority (96.00%) of the respondents possessed mobile phones, 56.00% of the respondents possessed radio set while, only 9.00% of the respondents possessed television set. This means that sesame production has contributed to the improvement of communication facilities of the respondents especially the modern ones (mobile phones) which they did not possessed before. Farmers used mobile phone to communicate very fast and get prompt responses that helped in solving their problems. According to [21], ICT has played an important role in improving education, livelihood, poverty, agriculture, trade and health, because it has been used to access valuable information.

the results presented in Table 4 indicate that majority (84.00%) of the respondents admitted that due to sesame production they had purchased more sheep and goats, while 39.00% and 78.00% admitted that they had purchased more poultry and farm land, respectively. The Table also revealed that 60.00% of the respondents sourced their drinking water

from well they constructed. Only 18.00% of them stated that they relied on rivers for drinking water. This indicates that natural livelihood assets of the respondents had improved due to income they acquired from sesame enterprise.

Table 4. Distribution of the respondents based on acquisition of the natural assets.

Assets	Frequency	Percentage
Land and Livestock		
Work Bull	27	27.00
Farm Land	78	78.00
Cattle	17	17.00
Sheep and Goat	84	84.00
Poultry	39	39.00
Total	245*	245.00*
Water Sources		
Borehole	94	94.00
Well	60	60.00
River	18	18.00
Total	177*	177.00*

*Multiple responses

Source: Field Survey, 2018.

The results in Table 5 revealed that 91.00% of the respondents stated that they mostly relied on health care centers in obtaining medicine for the treatment of diseases that infected them. Only 21.00% admitted that they mostly relied on herbal treatment of diseases that affected them. This implies that the respondents had the opportunities and ability to transport themselves and family members to improved sources of health care for the treatment of diseases that affect them.

The above finding implies that sesame production being the major contributor of the respondents' income helped them in improving the health status because, instead of relying solely on traditional medicine which is cheaper and having more side effects, they resolved to visit health care centers for medication. This is a sign of improvement of farmers' health status, which implies that they can afford to buy medicine based on doctors' prescription.

Table 5. Respondents access to sources of healthcare services.

Source	Frequency	Percentage (%)
Herbal	21	21.00
Health care center	91	91.00
Chemist	23	23.00
Total	135*	135.00*

*Multiple responses.

Source: Field Survey, 2018.

3.4. Assessment of Improvement of Sesame Producers' Livelihood Assets

This assessment was based on the responses of the farmers on how sesame production helped in improving their livelihood assets, and the ranking was based on the high level of improvement of the assets. It can be seen from the results presented in Table 6 that out of ten (10) indices used to measure the improvement on the livelihood of the respondents, education ranked 1st in terms of improvement,

medication and transportation were both ranked 2nd while communication, farm equipment and savings were ranked 4th. The findings indicate that the educational attainment of households has improved faster than other livelihood indicators. This is a very important step forward because, improvement in education could enhance farmers' ability to

understand and evaluate information on new techniques and processes. If the educational status of an individual improved, it is expected that the ability of such individual to think and come up with very good decision would also improve, which could in turn help in the improvement of other livelihood indicators.

Table 6. Assessment of improvement of sesame producers' livelihood indicators.

	Small		Moderate		High		Not at all		Rank
	Freq	%	Freq	%	freq	%	Freq	%	
Education	60	60.0	33	33.0	6	6.0	1	1.0	1 th
Medication	6	6.0	91	91.0	2	2.0	1	1.0	2 nd
Transportation	27	27.0	69	69.0	2	2.0	2	2.0	2 nd
Communication	1	1.0	94	94.0	1	1.0	4	4.0	4 th
Farm equipments	36	36.0	63	63.0	1	1.0	0	0.0	4 th
Saving	22	22.0	76	76.0	1	1.0	1	1.0	4 th
Housing	6	6.0	92	92.0	0	0.0	2	2.0	7 th
C. Membership	13	13.0	0	0.0	0	0.0	87	87.0	7 th
Access to loan	0	0.0	0	0.0	0	0.0	100	100.0	7 th
Access to water	5	5.0	94	94.0	0	0.0	1	1.0	7 th

Source: Field Survey, 2018.

The results presented in Table 6 also indicate that majority (87.00%) of the farmers admitted that they did not organize themselves into sesame producers cooperative societies. This could be one of the reasons why all the farmers admitted that they were not able to access loan for financing their sesame production. Farmers could strength their position if they organized themselves into cooperative societies and fully participate in plans offered by governments [22].

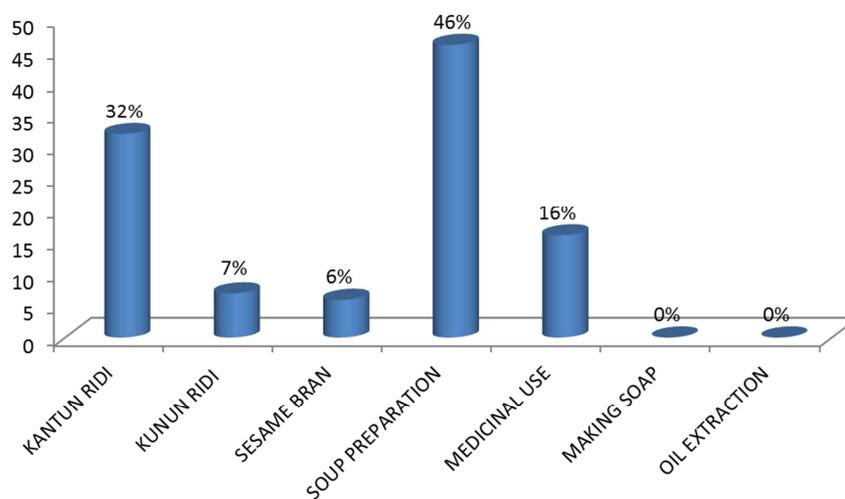
It can also be observed from the results presented in Table 6 that 94.00% of respondents stated that sesame enterprise has moderately helped in the improvement of their transportation and communication assets, while 91.00% and 76.00% stated that it has helped in the improvement of their medication and saving status respectively.

Therefore, it can be deduced that sesame production in Dutsin-Ma LGA has been contributing to the improvement of the livelihoods of the producers. Thus, if the farmers could be assisted in a way that could help them to improve their

sesame production, they could earn more income from the enterprise and their livelihood could continue to improve greatly.

3.5. Uses of Sesame to Farmers

Apart from earning incomes from sesame production that help in raising their livelihoods, farmers in the study area used sesame for various purposes which include *kantun ridi*, *kunun ridi*, feeding their animals with the bran, soup preparation and medicinal purposes. Figure 1 shows that 46.0% of the respondents used sesame products in soup preparation, whereas 32.0%, 16.0% and 6.0% of them used the products to prepared *kantun ridi*, medicinal purpose and obtain sesame bran for feeding their livestock respectively. This means that sesame production is an important enterprise that provides numerous benefits to the farmers as well as other people in Dutsin-Ma LGA and its environs.



Source: Field Survey, 2018.

Figure 1. Distribution of sesame farmers based on uses of sesame.

Figure 1 also revealed that sesame producers in Dutsin-Ma LG were not using sesame products in extraction of oil and making soap. This finding is not in line with that of [12] which revealed that stem and the oil extracted from sesame seeds are used in preparation of local soap in all the states where the crop is cultivated. Therefore, if the farmers and some people in the Area could be trained on how to extract oil and make soap from sesame products, it could help them to earn more income, which could in turn boost their livelihood assets. This is because, its oil is easy to extract, which makes it one of the major oil seeds in the ancient world [2]. It is also reported that its oil has been used in cooking for preparation of soup and in medicine for treatment of ulcer and burns, as well as manufacturing of margarine, soap, paints, lubricants, and illuminants [14].

4. Conclusion

Sesame production in Dutsin-Ma LGA has positive contribution to the improvement of livelihood assets of the farmers especially education, transportation, medication and communication. The net farm income obtained from the enterprise contributed certain percentage in the purchasing cost of each livelihood asset acquired by the farmers. Thus, sesame production has contributed greatly in the improvement of the livelihoods of the producers.

Farmers were not processing sesame into so apandoi letraction. Thus, the famers were losing some benefits associated with processing of sesame products.

The producers were not organized into strong cooperative society, which makes it difficult for them to access loans and similar benefits that could contribute more to the improvement of their livelihoods.

5. Recommendations

- 1) Sesame producers should organize themselves into strong cooperative societies and participate in their activities as this would help in improving their production, processing and marketing of their sesame products as well as obtaining loans and other benefits from governments and other sources.
- 2) Governments and Non-Government Organizations should assist farmers in finding more ways of processing and utilizing sesame products in order to obtain optimum benefits from its production.
- 3) Governments, Non-Government Organizations and companies should provide assistance to the farmers in the form of loan, improved seeds, fertilizers, chemicals, etc. at subsidized prices in order to improve sesame production in the area.
- 4) More researches should be carried out about sesame production and processing in a way that could help in the improvement of the livelihoods of the farmers and other people in the LGA and its environs.

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