Profitability Analysis of Sorghum Production in Kuje Area Council of Abuja, Nigeria

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Abstract. The study examined the profitability of sorghum production in Kuje, area council in the federal capital territory Abuja, Nigeria. Multi-stage sampling technique was used to obtain the sample for the study and the data were obtained through the use of semi structured questionnaire administered to a sample of eighty sorghum farmers in Kuje area council of Abuja, Nigeria. The data were analyzed using descriptive statistics, farm budgetary technique and four-point Likert scale. Evidence from the result revealed that net farm income was ₦270,314. The rate of return on investment was 1.59 indicating that sorghum production was profitable in the study area. Result for Likert scale analysis of the constrain faced by sorghum farmers revealed that use of recycled seed was the major problem faced in sorghum production. The study therefore recommended policies that will increase the availability of certified sorghum seed at affordable price should be implemented also the availability of the seeds so as to increase sorghum production.

Key words: Profitability, Sorghum, Abuja, Nigeria

Introduction

Sorghum (*Sorghum bicolor*) is one of the five most important cereal crops in the world, is an essential cereal for Nigerians, as well as the rest of the world (Edia, 2019). It's an important food crop in West Africa and the most important cereal food in the Northern states of Nigeria (FAO, 2004). Nigeria is the largest sorghum producer in West Africa, accounting for about 71% of the total regional sorghum output (FAO, 2012). Nigeria's sorghum production accounted for 35% of the African production in 2007 and the third largest world producer after the United States and India. Sorghum is grown on about 5.6 million hectares in Nigeria, the current annual supply is estimated to be about 6.2 million tons and a demand of over 7 million tons leaving a deficit of about 0.8million tons (APP, 2016). Although sorghum is majorly produced in Bauchi, Borno, Zamfara, Yobe, Gombe, Adamawa, Kaduna, Jigawa, Niger, Kebbi, Taraba, Plateau, Sokoto, Katsina, and Nasarawa. The study focused on the production in Abuja to ascertain the level of profitability among farmers in Kuje area council of Abuja, Nigeria. Low soil fertility, damage by birds, lack of access to improved varieties of sorghum, use of recycled seeds, lack of access to production inputs, in adequate tractor hiring services, or lack of access to the hiring points, storage pests are some of the traditional challenges faced by sorghum farmers in Abuja. The study focuses on profitability of sorghum enterprise in Kuje area council of Abuja given the level of literacy among sorghum farmer. Cost and returns information are required by investors to determine the profitability of the production system. One cannot speak of profit without having a full account of the revenue and cost structure of the business. The problem is that most farmers keep little or no financial record of farm. The issue of farm cost is very important especially when the concern is on the economies of farming. Even under small scale farming, farm cost assumes an important position in production decision making. Many rural farmers sell their farm produce at giveaway prices regardless of the cost of production. They do this in order to meet some pressing needs of their families thus remaining in perpetual poverty. They hardly break even not to talk of making profit. Most farmers do not realize that their family labor constitutes a portion of the production cost and they continue to get unfair market prices for their produce seasonally. It's on this

backdrop that this study seeks to determine the profitability of sorghum production among farmers in Kuje area council of Abuja.

Objectives of the Study

The main objective of the study is to determine the Profitability of Sorghum Production among Farmers in Kuje Area Council in Abuja while the specific objectives are to:

1. determine socio-economic characteristics of sorghum farmers
2. analyze the cost and return of sorghum production in the study area
3. analyze the constraints in sorghum production in the study area

Methodology

Study Area

Abuja is located in the center of Nigeria and has a land area of 8,000 square Kilometers (Jaiyeola, 2016). The area is located between latitude $8^0$55'52''N, $9^0$14'34''N and longitude $6^0$51'36''E, $7^0$11'35''E (Balogun, 2001). Abuja has rich soil for Agriculture and enjoys an equable climate that is neither too hot nor too cold all year round. Abuja experiences two weather conditions. These are the rainy season which begins around March and runs through October, the dry season (usually characterized by bright sunshine) which begins from October and ends in March. During the rainy season daytime temperatures reach 28°C (82.4°F) to 30°C (86.0°F) and night time hover around 22°C (71.6°F) to 23°C (73.4°F). In the dry season, daytime temperatures can soar as high as 40°C (104.0°F) and night time temperatures can dip to 12°C (53.6°F). Crops grown in Abuja are millet, maize, sorghum, cowpea, groundnut, rice, eggplant among others. At the 2006 census, the population of Kuje Area Council was at 97,233, with 49,420 males and 47,813 females. While the city of Abuja had a population of 776,298 (NPC, 2006).

Method of Data Collection

Primary data was used for the study. The data were obtained with a semi-structured questionnaire using interview schedule; the questionnaire was used to collect information on the socio-economic variable, inputs/outputs costs variables among others.

Sampling Techniques

Multi-stage sampling techniques were used to obtain the relevant data used for this study. In the first stage Kuje Local Government Area was purposively selected because of its rural attributes and the availability of sorghum farmers. Four wards Chibiri, Kabi Kuje, Kujekwa where randomly selected in the second stage from the list of ten wards in Kuje. The last stage involved a random sampling of twenty sorghum farmers from the list of sorghum farmers obtained from Agricultural Development project (ADP) from each of wards. Thus, a total of 80 farmers was sampled.

Method of Data Analysis

The analytical tools used in this study to achieve stated objectives include both descriptive and inferential statistics. Descriptive statistics, farm budgetary technique was used to examine the cost-return, while the Likert scale was employed to analyze constraints in sorghum production in the study area. Statistical package for social science (SPSS 20) was used to analyze the objectives. These are further explained below:

Descriptive Statistics: This analytical tool was used to examine the socio-economic characteristics of rice famer in the study area. Descriptive statistics involve the use of mean, mode, range, frequency distribution tables, percentages etc.

Farm Budgeting Techniques: Costs and return analysis in rice production was calculated using farm budgeting techniques (Gross and net-farm income analysis). The net farm income model is specified as

NFI = GR – (TFC +TVC) (1)

Where:

NFI = Net farm income (₦)

GR = Gross revenue (₦)

TFC = Total fixed costs (₦)

TVC = Total variable costs (₦)

GR = Total Revenue from rice production

TC = TFC + TVC

TR = P.Q

Where: P = Price of rice produced in Naira per kilogram, Q = Output of rice produced in kilogram.

To determine the profitability of sorghum production we apply ROI.

Return on investment

$$= \frac{\text{Net farm income}}{\text{Total cost}}$$

Likert scale: A Likert Scale is a type of rating scale used to measure attitudes or opinions. With this scale, respondents are asked to rate items on a level of agreement. For example: Strongly agree, Agree, Neutral, Strongly. In determining the constraints faced by the rice farmers. Constraint can be ranked on a 4-points numerical rating scale in which,

Strongly Agree = 4

Agree = 3

Disagree = 2

Strongly disagree = 1

The mean score of each constraint can be calculated thus;

Mean score = total score of each of the constraint / total number of respondents

Mean score = 4+3+2+1 / 4

Mean score = 10/4

Mean score = 2.5

Once the respondents have answered, numbers are assigned to the responses. For example:

Strongly agree=4 Agree =3 Disagree=2 Strongly disagree=1 This enables you to assign meaning to the responses.

Results and Discussion

Socioeconomic Characteristics of Sorghum Farmers in the Study Area

Table 1 shows the distribution of sorghum farmers by their socioeconomic characteristics Majority (53%) of the sorghum farmers in the study were female. This disagrees with Aduda et al. (2013) who posit that Sorghum production seem to be a male dominated activity may be due to the fact that women majored in processing. This is not the case in Kuje area council as the female farmers are also actively involved in sorghum farming.

It also, shows that most (68.8%) of the sorghum farmers were married. This implies that more couples are involved in sorghum production in the study area.

It further indicates the age distribution of sorghum Farmers in the study area. The mean age of sorghum Farmers in the study area was calculated to be about 48.3 majority (38.8%) of the sorghum farmers in the study area are between ages 41-50. This is a clear indication that they were middle age farmers that could handle any of the cultural operation in sorghum

production. This agrees with the findings of Aduda et al. (2013). This implies that farmers in the study area are within the productive stage. Age is an important determinant of social – economic status of a population since people wear in energy as they advance in age.

Furthermore, it indicates majority of the sorghum farmers have formal education. This would aid effective technology adoption and ease the cultural practices need to fully implement developmental projects. This disagree with Baiyegunhi (2009) who posit that illiteracy level was high among sorghum farmers.

It depicts that the mean farming experience was approximately 17 years that is, on the average a sorghum farmer in the study area has about 17 years of experience. Majority (45%) of the sorghum farmers in the study area have between 1-10 years of experience in sorghum production. This might be because sorghum production is one of the major occupations of the respondents in the study area, hence from childhood they are engage in sorghum farming.

It shows that the mean farm size was about 1.77 hectares that is, on the average a sorghum farmer in the study area has farm size of about 2 hectares. Majority (40%) of the sorghum farmers in the study area have between 0.1- 2.00 hectare of farm land hence small-scale farmer. This might not unconnected to the perennial issue of land tenure system which has resulted to fragmented land holdings.

Table 1: Socioeconomic Characteristics of Sorghum Farmers in the Study Area

Items	Frequency	Percentage
Sex		
Female	42	52.5
Male	38	47.5
Marital Status		
Single	15	18.8
Married	55	68.8
Widow/Widower	10	12.5
Age		
31-40	28	35.0
41-50	31	38.8
51-60	14	17.5
61-70	7	8.8
Educational Level		
No formal education	18	22.5
Primary education	24	30
Secondary education	5	6.3
Tertiary education	33	41.3
Farming Experience		
1-10	36	45.0
11-20	24	30.0
21-30	11	13.8
31-40	7	8.8
41-50	2	2.5
Farm Size		
0.1 - 2	29	36.2
2.01- 5.00	24	30.0
5.01 and above	27	33.8
Total	**80**	**100**

Source: Field Survey, 2019.

Cost and Return Analysis of Sorghum Farmers in the Kuje Abuja

Table 2 shows the gross margin analysis per hectare of sorghum production in Kuje area council, Abuja. From the result the total revenue was calculated to be ₦440,000 the total cost was ₦169,686 which is a sum of the total variable cost and total fixed cost. The total variable cost is a sum of all the labor cost, cost of seed, fertilizer and agrochemicals, which are ₦82,790, ₦4,770, ₦16,200 and ₦15,630 respectively. The total fixed cost was ₦30,000. The net farm income was calculated to be ₦270,314 which means that on average a sorghum farmer in the study area will earn a profit of ₦270,314. This result is in line with Baiyegunhi (2009), Aduda (2013), Sani (2013) who posit that sorghum production was lucrative. The return on investment was calculated to be 1.59. This indicates that sorghum production in the study area is profitable. The total variable cost was calculated to be 82.32% of total cost. Total labor cost was calculated to be 48.79% of the total costs and 59.27% of the total variable cost. This means that most the expenditure of sorghum farmer in the study area was on variable cost of which is 59.27% was spent on labor. This finding is in agreement with those of Ereinstein, (2003) that "cereal production is very labor intensive and relies on a significant contribution of paid labor". The total fixed cost was 17.69% of the total costs.

Table 2: Average Costs and Return of Sorghum Production per Hectare

Items (Annual)	Amounts (₦)	% of Total Cost
Total Revenue……. (A)	**440,000**	
Variable Costs		
Seeds	4,770	
Fertilizer	16,200	
Agrochemicals	15,630	
Labor Cost		
Land preparation	18,630	
Planting	7,500	
Fertilizer application	4,060	
Weeding	20,900	
Harvesting	16,000	
Cost of threshing	15,700	
Total Labor Cost	**82,790**	**48.79**
Transportation	15,200	
Empty jute sacks	5,096	
Total Variable Costs…… (B)	**139,686**	**82.32**
Fixed Cost		
Rent on land	30,000	
Total Fixed Cost…… (C)	30,000	**17.69**
Total Cost (B + C)	**169,686**	
GM (A-B)	**300,314**	
NFI (GM-C)	**270,314**	
ROI	**1.59**	

Source: Computed from Field Survey 2019.

Constraints Faced Sorghum Production

Table 3 shows that majority (77%) of sorghum farmers agree that low soil fertility is one of the constraints in sorghum production in the study area. Fertile soil is bed rock agricultural production. This was also ranked 2nd in order of severity based on the mean score.

It also shows that majority (78%) of the sorghum farmers agree that damages by birds was a major constraint to sorghum farmers in the study area. This was also ranked 3rd in order of severity based on the mean score.

It also depicts that majority (74%) of sorghum farmers agree that lack of access to improved seed is a major constraint sorghum production in the study area. Improved seed is key improve yield. This was ranked 4thin order of severity based on the mean score.

It further shows that majority (72%) of the sorghum farmers agree that use of recycled seed was a major constraint to sorghum farmers in the study area. The mean value was calculated to be 1.93.This was ranked 1st in order of severity based on the mean score.

Also, majority (92.5%) of the sorghum farmers agree that lack of access to production input is a major constraint to sorghum production in the study area. This was ranked 5thin order of severity based on the mean score

Table 3: Constraints Faced in Sorghum Production

Items	Frequency	Percentage	Mean
Low Soil Fertility (2nd)			**1.88**
Strongly Agree	15	18.75	
Agree	62	77.50	
Disagree	1	1.25	
Strongly disagree	2	2.50	
Damage by Birds (3rd)			**1.81**
Strongly Agree	22	27.5	
Agree	53	66.25	
Disagree	3	3.75	
Strongly disagree	2	2.50	
Lack of Access to Improved Seed (4th)			**1.74**
Strongly Agree	29	36.25	
Agree	45	56.25	
Disagree	6	7.5	
Strongly Disagree	2	2.50	
Use of Recycled Seed (1st)			**1.92**
Strongly Agree	22	27.5	
Agree	50	62.5	
Disagree	5	6.25	
Strongly Disagree	3	3.75	
Lack of Access to Production Input (5th)			**1.7**
Strongly Agree	18	22.5	
Agree	56	70.0	
Disagree	2	2.50	
Strongly Disagree	4	5.0	
Total	**80**	**100**	

Source: Field Survey 2019.

Conclusion and Recommendation

The study therefore concluded that sorghum production was profitable in the study area and recommended policies that will increase the availability of certified sorghum seed at affordable price should be implemented to increase sorghum production.

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