Analysis of Costs and Returns on Maize Production among Small-scale Farmers in Osun State Nigeria

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Abstract：Maize is one of the staple food crops in Nigeria. The crop provides steady income for the teaming unemployed labour force and has the potential of bridging the food security gap among the households. This study analyzed the costs and returns on maize production among small scale farmers in Osun State Nigeria. A multistage sampling technique was employed to select one hundred and eighty (180) maize producing farmers for the study. Data were collected using structured questionnaires. Descriptive statistics and gross margin analysis were employed to describe the socio-economic characteristics and estimate the profitability of maize enterprise respectively. The result of the analysis showed that majority (80.0%) of the respondents were male with mean age of 42.3 years. 84.5 percent were married and most could read and write. The mean household size was about 7 persons. The gross margin was estimated to be ₦ 638,465.22 with a benefit-cost ratio (BCR) of ₦1.74. This implies that maize production in the study area is profitable. The major problems militating against maize production in the study area were lack of control measures against pests and diseases, poor social infrastructures coupled with high transportation cost and low market price of maize. In order to make maize production more profitable, it is recommended that government should however provide to farmers farm inputs at affordable rate.

Introduction

One of the main problems facing Nigerian agricultural sector is the provision of food to meet the requirements of her ever increasing population. One of such important food crops is maize (*Zea mays* L.). It is one of the most important cereal crops cultivated in the Sub-Saharan Africa (FAO, 2014). Maize serves as an important staple food for over 50 percent of the population in Africa (FAO, 2010). When taken into consideration the world cereal acreage, yields and output, maize is ranked the fifth largest in land area cultivated, third largest in yield and fourth largest in output (Surinder, 2011). Maize provides about 15 and 19 percent of the world's protein and calories, respectively (Surinder, 2011).

More maize is cultivated every year than any other cereal crops. About 50 species of maize exist and consist of different shapes, colours, textures, and sizes. Yellow, white, and red maize are cultivated and consumed by most people. Though it is a grain, it is consumed as a vegetable. The grains of this crop are rich in vitamins A, C, E, carbohydrate, essential minerals, dietary fiber and protein (Mohammad *et al.,* 2014). Maize constitutes the major ingredient of animal feed. Also, ethanol used as bio-fuel and for medical purposes could be produced from maize grains (Monsanto, 2014).

Nigeria, the most populous country in Africa with about 175 million people is essentially agrarian in nature with over 80 percent of the farmers cultivating in many cases less than 2 hectares of land. Over the years, the Nigerian governments at various levels had adopted different agricultural programmes and policies aimed at increasing productivity of small scale farmers. According to Ojo (2000), Zalkuwi, Dia and Dia (2010), maize production is faced with constraints like low capitalization, price fluctuation, diseases and pests and poor storage facilities. These have affected its production over the years. In view of this, the study, looked at the profitability of maize production among the small scale farmers, examined the socio-economic characteristics of maize growers and also identified the constraints facing the production of this crop in recent time.

Materials and Method

The study was conducted in Osun State Nigeria. A Multi-stage sampling technique was employed to select small scale maize farmers for the study. At the first stage, three (3) Local Government Areas (LGAs) were selected. The second stage involved the random sampling of 3 communities from each Local Government Area. The final stage involved the selection of 20 farmers randomly from each community, in all, a total of 180 respondents were selected for the study (Table 1).

Data were collected with the use of structured questionnaire administered on the respondents. The data comprised socio-economic characteristics of farmers, input used, output realized, and constraints faced by maize farmers.

Table 1: Distribution by towns/villages sampled

Location/LGA	Copies of questionnaire	
	Distributed	Retrieved
EDE NORTH LGA		
Adejuwon Ede	20	20
Agbede Ede	20	20
Alajue Ede	20	20
AYEDIRE LGA		
Ile Ogbo	20	20
Kuta	20	20
Oke-Osun	20	20
IWO LGA		
Ode Adan	20	20
Okeba	20	20
Gidigbo	20	20
Total	**180**	**180**

Descriptive statistics such as frequency counts, means and percentages were employed to describe data on respondents' socio-economic characteristics. Also, descriptive statistics were used to describe constraints to maize production while Gross Margin Analysis was employed to estimate the costs and returns of maize to farmers in the study area.

Gross margin analysis

Gross Margin is the difference between gross revenue and total variable cost.

$$GM = PQ - \sum_{j=1}^{m} C_j X_j \dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where:
GM = Farm gross margin;
P = Market price of output;
Q = Quantity of output;
C_j = Unit price of the variable input j;
X_j = Quantity of variable input j used;
m = Number of variable input used.

Results and Discussion

Socio-economic characteristics of respondents

The study revealed that majority (80.0%) of the small scale maize farmers were males (Table 2). This can be attributed to the culture of the study area. Here, men always have right to land as a productive resource than women. This study corroborates the findings of Oladejo and Adetunji (2012) that there has been a great disparity between men and women in the size of landholdings. The mean household size was about 7 persons. This implies that maize growers have a fairly large household size. The study further revealed that most of the respondents were adults with mean age of 42.3 years. The majority (71.1%) had between 1 and 10 years farming experience. In addition, 52.2 percents of the respondents used both family members and hired or paid workers. The result also indicated that, the majority (85.6%) of the respondents were not cooperative society's members (Table 2).

Table 2: Socio-economic characteristics of respondents

Variable	Frequency	Percentage
Gender		
Male	144	80.0
Female	36	20.0
Marital Status		
Married	152	84.5
Single	28	15.5
Educational Level		
None	32	17.8
Adult Education	26	14.4
Primary Education	60	33.3
Secondary Education	30	16.7
Tertiary	32	17.8
Age (years)		
< 31	4	2.2
31 - 40	62	34.4
41 - 50	52	28.9
51 - 60	52	28.9
> 60	10	5.6
Household Size		
1 - 3	16	8.9
4 - 6	64	35.6
7 - 9	45	25.0
10 - 12	32	17.8
> 12	23	12.7
Farming Experience (years)		
1 - 10	128	71.1
11 - 20	30	16.7
21 - 30	10	5.5
> 30	12	6.7
Labour Source		
Hired	68	37.8
Family	18	10.0
Both	94	52.2
Cooperative society membership		
No	154	85.6
Yes	26	14.4
Source of Planting Materials		
Farm Stock	16	8.9
Open Market	14	7.8
Farm Service Centre	146	81.1
Others	4	2.2
Cropping System		
Mixed Cropping	110	61.1
Sole Cropping	40	22.2
Others	30	16.7

The implication is that only a few farmers would have access to credit facilities, since lending institutions will prefer to give credit to cooperatives

rather than individuals. It has been argued that cooperatives play a significant role in boosting agricultural production. The study further revealed that majority (81.1%) of the respondents got their planting materials (maize seeds) from Farm Service Centres. Also the majority (61.1%) were into mixed cropping. This type of cropping system is common among the small scale farmers because it serves as food security for their households.

Estimated costs and returns in maize production per hectare

Based on gross margin analysis in Table 3, the average total variable costs incurred on maize production in the study area was ₦ 366,494.57, while total revenue was ₦ 1,004,959.79. Therefore, the gross margin (GM) was ₦ 638,465.22. This positive value indicates that maize cultivation in Osun is indeed a profitable farm enterprise. The benefit-cost ratio of ₦ 1.74, also indicates that for every one naira spent, ₦ 1.74 will be realized as revenue. This implies that 174% profit will be realized from the production of maize per hectare.

$$GM = TR - TVC$$
$$GM = ₦1,004,959.79 - ₦366,494.57$$
$$= ₦638,465.22$$

Therefore,

$$\text{Benefit Cost Ratio } (BCR) = \frac{Benefit}{Cost}$$
$$= \frac{₦638,465.22}{₦366,494.57}$$
$$= ₦1.74$$

Table 3: Gross margin analysis of maize production

	Items	Value
A	**Revenue (₦)**	
1.	Average Total Output (kg)	7,081.67
2.	Unit price per kg	141.91
3.	Average Total Revenue (1x2)	1,004,959.79
B	**Average Variable Input Cost (₦)**	
4.	Cost of Maize Seeds	26,848.89
5.	Cost of Labour	120,778.90
6.	Cost of Agro-chemicals	18,626.78
7.	Cost of Fertilizer	200,240.00
8.	Total Variable cost (4+5+6+7)	366,494.57
C	**Gross Margin ₦(3 – 8)**	638,465.22

Constraints to maize Production

The results in Table 4 show that 55.5 percent of the respondents in the study area faced insect pests and diseases problem on their various farms. This could lead to yield reduction. As a result of this, farmers could also incur losses if proper control measure is not employed on time. Also, 32.2 percent of the respondents had market glut as their constraint. This

shows that some maize farmers in the study area have no enough buyers for their produce. However, 33.3 percent of the respondents identified poor infrastructural facilities as their problem. This shows that infrastructural facilities such as, good roads, hospital, pipe-borne water, etc in the study area have influence on the production and profitability of maize. This indicates that the infrastructural facilities in the study area are not adequate. This may affect the profitability of maize production. Poor infrastructural facilities increase cost of production. Also, it encourages rural-urban migration of the able bodied especially young ones that are needed in agricultural production.

About, 53.3 percent of the respondents encountered problem of low market price for their maize produce. Also, 10.0 percent of the respondents complained about low supply of labour. This may be due to low wage rate or other factors affecting supply of labour. High prices of farm inputs were another factor militating against maize production in the study area. About 30.0 percent of the respondents were affected by this problem. This reveals that the price of inputs like improved seeds, fertilizer and agro-chemical, etc are too expensive for the farmers to buy. This will definitely has negative effect on the farmers productivity vis-à-vis profitability.

In addition, 58.9 percent of the respondents reported high transport cost as their constraint in maize production. This problem may be due to the bad roads linking the rural areas to urban areas. In the study area, it has been established that transporters do charge high fares to convey farm produce to markets. This will definitely reduce the farmer's profit and income.

Only 22.2 percent of respondents were faced with the problem of poor storage facilities. This reveals that poor storage facilities are also production constraints in the study area. In order to sell at reasonable price later, there is need to store maize immediately after harvest.

Lack of government support was also a constraint to maize production in the study area. About 35.6 percent of the respondents identified it as their problem. The governments at all level have not been responsive enough in subsidizing agricultural inputs, controlling the prices of agricultural produce and giving out loans to farmers at affordable interest rate.

Also, 31.1percent of respondents identified unpredictable climate as their constraint. This shows that the inevitable effects of climate change also pose problems in the study area. Finally, 32.2 percent of respondents were having other constraints apart from the aforementioned problems in the production of maize.

Table 4: Distribution of the respondents by constraints to maize production

Constraints	Frequency	Percentage
Pests and diseases	50	55.5
Market Glut	29	32.2
Poor Infrastructures	30	33.3
Low Market Price	48	53.3
Low Labour Availability	9	10.0
High Prices of Farm input	27	30.0
High Transportation Cost	53	58.9
Poor storage Facilities	20	22.2
Lack of Government Support	32	35.6
Climate Change	27	31.1
Others	29	32.2

Conclusion and Recommendations

The study estimated costs and returns of maize production among small scale farmers in Osun State Nigeria. A multistage sampling technique was used to select 180 farmers in the study area. Data were collected and subjected to descriptive statistics and gross margin analysis. The findings on the costs and returns of maize production in the study area revealed that the total variable cost was ₦366,494.57 which represent about 37% of the average total revenue. The study revealed that maize cultivation is a profitable enterprise in the study area. The benefit-cost ratio of ₦1.74 estimated from this study indicates that for every one naira spent, ₦1.74 will be realized as revenue. This means that 174% profit will be realized from one hectare of maize cultivated. This profit margin should attract financing from the lending institutions to maize production. Since maize production is profitable, there is need for the government to attract more unemployed youths into this business. Also, agrochemicals needed to tackle the incidence of pests and diseases should be provided at affordable prices by the government. In order to reduce transport cost, good road should be constructed by the government. Also, the problem of low market price could be tackled by controlling the supply of maize into the local markets. Finally, the farmers should come together and form cooperative societies.

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