



Costs and Return Structure of Small-Scale Maize Farmers In Yewa Division, Ogun State, Nigeria

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Abstract

The increasing demand of maize coupled with limited arable land forced many maize farmers to cultivate maize on the same land for an extended time. This deliberate action affects the crop yield and profit for small-scale maize farmers. To provide the necessary impetus to identify factors that affect farmers' profitability, such as input costs, market prices and yield levels, this study examines the cost and return structure of small-scale maize farmers in the Yewa division of Ogun State, Nigeria. A multistage sampling technique was employed to carefully select a total of one hundred and five (105) respondents for the study and descriptive and budgetary analysis was used to analyze the data. The descriptive analysis showed that 75.24% of respondents were males with an average age of 46.88. About 79.05% of the respondents were married with an average household size of six (6) people. Likewise, the descriptive analysis also revealed that inadequate funds and capital (88.57%), pest and diseases problem (83.81%), poor soil fertility and land degradation (60.95%) and lack of irrigation facilities (54.29%) as major production constraints faced by the small-scale maize farmers in the study area. From the budgetary analysis result, the estimated total revenue was put at N231,490.00, the gross margin was N144,685.87, and the net farm income was calculated to be N78090,621.82. The rate of return on investment in maize production in the study area is 64.33% while the profitability index is estimated to be 39.15%, indicating that small-scale maize production in the study area has a high likelihood of generating substantial returns and is considered financially viable. This study, therefore, recommends that government should actively promote and support small-scale maize production by providing farmers with the necessary resources, training, and access to finance.

Keywords: Budgetary analysis, small-scale farmers, maize production, Ogun State

Introduction

Maize has become a popular choice for many farmers in Nigeria as they diversify their crop production. The cultivation of maize has expanded due to its market demand and economic benefits, leading farmers to replace their previous cash crops with maize cultivation (Chiaka *et al.*, 2022). Maize is one of the most significant staple foods in the world today, accounting for more than half of worldwide calorie intake (World Atlas, 2017, Girei *et al.*, 2018). Maize is Nigeria's most important staple food, and it has developed to be a local 'cash crop,' particularly in the southwestern portion of the country, where at least 30% of cropland is devoted to small-scale maize cultivation using diverse cropping strategies (Girei *et al.*, 2018). Adesiyani (2015) noted that maize is the most important staple food in Nigeria and it has grown to be a local 'cash crop' most especially in the southwest part of Nigeria where at least 30% of the cropland has been devoted to small-scale maize

production under various cropping system. Small-scale farmers growing maize can alleviate household hunger in rural communities and the aggregate effect could double food production in Nigeria. Between 1980 and 2003, Nigeria produced approximately 4.7 million tonnes of maize on average, and maize's contribution to total grains produced increased from 8.7% in 1980 to approximately 22% in 2003. Maize was planted on approximately 561397.29 hectares of Nigerian land, accounting for approximately 61% of total cultivable land in Nigeria (Adesiyani, 2015).

The importance of the maize crop cannot be overemphasized because of its wide global distribution, low price relative to other cereals and wide range of biological and industrial properties, maize has been put to more use than any other cereal crop. Nigeria is the leading maize producer in the West African sub-region and the world's tenth-largest producer (FAO, 2008).

According to 2008 Food and Agricultural Organization, (FAO) statistics, Nigeria produced about 7.5 million tons of maize in a cropped area of about 3.8m hectares area with an average yield of 1.9 metric tons per hectare. The expansion of the land area devoted to maize production as a result of the increasing population is putting a strain on the land available for maize cultivation, forcing farmers to cultivate a crop on the same land for an extended period, reducing yield and the profit of the small-scale maize farmers. Likewise, the use of inputs like fertilizers and pesticides can significantly improve maize yields and profitability. However, many farmers in Africa and Nigeria face challenges in accessing these inputs, either due to high costs or limited availability. Additionally, some studies have found that the profitability of maize production in these regions can be affected by market prices, transportation costs, and other factors beyond the farmers' control.

Girei *et al.* (2018) examined the economics of small-scale maize production in Toto Local Government Area of Nasarawa State. The Results of the regression analysis revealed that the output of small-scale maize farmers was influenced by farm size, marital status and annual income at 1% and 5% respectively. A gross margin of N170,594.50 was earned from one hectare of maize farm with a return per naira invested of 2.40. The cost of labour constituted a greater proportion of the costs of production, accounting for about 58.38% and 39.52% of the total variable cost and the total cost respectively. Studies carried out by Ayeni (1991), Isinika *et al.*, (2003), Ogunsumi *et al.* (2005) and Adesiyani (2015) revealed that the majority of small-scale maize farmers are facing a lot of constraints ranging from lack of high-yield varieties, poor soil fertility, a crude method of farming, and are subsistence production. The cost structure in maize production can also pose several constraints for small-scale farmers. Maize production requires various inputs such as seeds, fertilizers, pesticides, and machinery. The cost of these inputs can be a significant constraint for farmers, especially small-scale farmers with limited financial resources. Fluctuations in input prices can further add to the cost burden. The aggregate response of farmers to positive prospects in maize production depends on the economic viability of production, hence a comprehensive analysis of their cost and return structure will provide a good guide to policymakers on "What is missing" and "What should be done" to consistently boost the output of maize. From these observations, this research seeks to answer the following pertinent questions: what are the militating problems affecting small-scale maize and the profitability level of small-scale maize farmers in the study area?

Methodology

This research was conducted in the Yewa division of Ogun State, Nigeria. Yewa division consists of five (5) Local Government Areas (LGAs) with a total land mass of approximately 5,878 km² (Lawal-Adebawale, *et al* 2018). To ensure that the respondents are distributed

evenly, we used a multistage sampling technique. The first stage involves a selection of all the five (5) local governments in the Yewa division viz: Yewa South LGA, Yewa North LGA, Imeko-Afon LGA, Ado-Odo/Ota LGA, and Ipokia LGA. The second stage however involved the selection of two (2) farming communities in each of the 5 LGA to bring the total number of farming communities to ten. The third state which is also the final stage involved random selections of eleven (11) respondents from each of the selected ten (10) communities, Thus, a total of one hundred and ten (110) farmers were chosen for this study. A well-structured questionnaire was used to collect primary data from the selected farmers. However, 5 out of the 110 questionnaires administered were rejected due to inconsistencies in the information provided. As a result, only one hundred and five (105) questionnaires were examined. The data were analyzed using descriptive analysis and budgetary analysis.

Model specification

Budgetary analysis was used to estimate the cost and returns of the small-scale maize producers in the study area. The profitability was measured using profitability ratio analysis, which was specified as follows:

$$\text{Profit (II)} = \text{Total Revenue (TR)} - \text{Total Cost (TC)}$$

$$\text{TC} = \text{Total Variable Cost (TVC)} + \text{Total Fixed Cost (TFC)}$$

From the results of the Budgetary Analysis, the following were obtained.

- i. Gross Margin (GM) = TR – TVC
- ii. Net Farm Income (NFI) = TR – TC
- iii. Profitability index or Return on Sale = NI / TR.
- iv. The Rate of Return on Investment (%) (RRI) = (NI / TC) x 100.

Where:

GM= Gross margin

TR=total revenue

NI=net income

Results and Discussion

Socio-economic characteristics of the small-scale maize farmers

Table 1 shows the result of the socioeconomic characteristics of small-scale maize farmers. It can be observed from the table that 38.10% of the respondents were between the age bracket of 41 and 50 years of age, with a mean age of 46.88 years. This indicates that the majority of small-scale maize farmers in the study area were in their prime labour productivity age, with 75.24% of respondents being male. The marital status of the respondents confirmed that 79.05% were married, while the majority (47.62%) of the small-scale maize farmers in the study area were educated up to primary school level, with an average year of schooling of 7.28 years. The socio-economic statistics also showed that 66.67% of respondents have a household size of 4 to 6 people, with a mean household size of 6 people. The respondents' farming experience ranges from 2 to 38 years, with the majority (39.05%) having 11 to 20 years

of experience in maize farming, with an average of 13 years of farming experience.

Production Constraints Faced by Small-scale Maize Farmers

According to Table 2, it was observed that 88.57% of the respondents identified inadequate funds and capital as a major problem faced by maize farmers in the study area. This observation supports the earlier study of Aduba *et al.* (2013a), Girei *et al.* (2018) and Ali *et al.* (2023), who also noted that inadequate capital is one of the major constraints faced by small-scale farmers in the production of maize. This suggested why the small-scale maize farmers were not operating at full capacity in the study area. Our findings also showed that 83.81% of the respondents identified pest and diseases problem as one of the militating factors against maize production in the study area. This corroborates the findings of Girei *et al.* (2018), who observed that pest and diseases problem is one of the major severe problems militating against maize production. About 60.95% of the respondents also identified poor soil fertility and land degradation as one of the production constraints faced by the small-scale maize farmers in the study area while 54.29% of the respondents identified lack and inadequate irrigation facilities as a major production constraint. These findings also agree with Girei *et al.* (2018), who found that the most severe problems militating against maize production were poor soil fertility, lack of irrigation water in the dry season and lack of storage and processing facilities. Other problems identified in the field include poor accessibility to agrochemicals, labour scarcity or supply problems, use of varieties with low genetic potential, inadequate storage facilities, transportation problems and poor extension delivery systems to farmers.

Cost and Return Structure

Budgetary Analysis was used to estimate the profitability of the small-scale maize farmers in the study area. The fixed inputs were land, cutlass, hoe, knapsack sprayer and so on. These fixed inputs were depreciated using a straight-line method to know their annual cost of depreciation. The component of variable costs includes seed, labour, fertiliser and insecticide among others. Gross margin and net margin were computed in Table 3. The result discussed below relate only to their last production season. Table 3 presents the statistics of the variables for the budgetary analysis. The mean farm size was 2.85 acres. The mean value of sales from maize was N193,971.43 and the monetary value of quantity consumed/offered as a gift by the household was N37,518.57, thus the estimated total revenue was put at N231,490.00. Total variable cost (N86,804.13) contributed the highest portion of the total cost with hired labour and family labour accounting for 29.5% and 12.98% of the total variable cost respectively. This agreed with an earlier report of Aduba *et al.* (2013b) which revealed that labour constituted the major component of cost and concluded that it represented about 54.5% of the total production cost. The Total fixed cost (N 54,064.05) accounted for about 38.27%. The

gross margin was estimated to be N144,685.87 while the net farm income was calculated to be N78090,621.82. The rate of return on investment in maize production in the study area is 64.33% while the profitability index is estimated to be 39.15%. This implies that small-scale maize production is profitable in the study area. These observations were in support of the earlier findings of Aduba *et al.* (2013b) and Girei *et al.* (2018), who confirmed that small-scale maize production has a high likelihood of generating substantial returns and is considered financially viable.

Conclusion

The study confirmed that the majority of the small-scale maize farmers were in their prime labour productivity age and the majority of them were educated up to primary school level, with average years of schooling of 7.28 years. It was also observed from this study that the major problems faced by maize farmers include inadequate funds and capital, pest and diseases problem, poor soil fertility, inadequate irrigation facilities, poor accessibility to agrochemicals, labour scarcity, and use of varieties with low genetic potential, inadequate storage facilities, transportation problems and poor extension delivery system to farmers. The rate of return on investment in maize production is 64.33% while the profitability index is estimated to be 39.15%. Thus, the study concluded that small-scale maize production is profitable in the study area. The study, therefore, calls for an effective improvement in the level of efficiency among small-scale maize farmers, provision should be made by governments and other stakeholders in the agricultural sector to provide farmers with access to affordable inputs such as seed, fertilizer, pesticides, and other agrochemicals. Thus this will go a long way to eradicate the problems of pests and disease, poor soil fertility, and the use of varieties with low genetic potential. Farmers should be effectively taught on pest and disease control techniques, particularly integrated pest management (IPM), by extension agents; this will be more achievable if the country's current extension system is strengthened. The study observed that inadequate funds and capital is one of the prominent production constraints encountered by small-scale maize farmers in the study area, the study, therefore, recommended that government should support small-scale maize farmers by offering them accessible loans with reasonable interest rates. The study recommends provisions for improved irrigation infrastructure by the government to curb the problems of inadequate irrigation facilities that were identified on the field. Finally, the study recommends the provision of effective extension services on maize production, since poor extension delivery system was one of the militating obstacles to maize production in the study area,

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Table 1: Socio-economic characteristics of the small-scale maize farmers

Socio economic Variable	Frequency	Percentage (%)	Mean
Age			46.88
≤ 40	23	21.90	
41 – 50	40	38.10	
51 - 60	21	20.00	
61 – 70	12	11.43	
> 70	9	8.57	
Gender			
Male	79	75.24	
Female	26	24.76	
Marital Status			
Single	5	4.76	
Married	83	79.05	
Divorced	7	6.67	
Widowed / Widower.	10	9.52	
Educational Status			7.28
No Formal Education	21	20.00	
Primary Education	50	47.62	
Secondary Education	31	29.52	
Tertiary Education	3	2.86	
Household Size			6
1 – 3	9	8.57	
4 – 6	70	66.67	
7 – 9	23	21.90	
10 Above	3	2.86	
Years of Experience			13
< 10	21	20.00	
11-20	41	39.05	
21-30	38	36.19	
> 30	5	4.76	
Total	105	100	

Source: Field survey, 2023

Table 2 : Distribution of Respondents According to Production Constraints

Constraints	Frequency	Percentage (%)
Inadequate fund and capital	93	88.57
Excess market supply and spoilage	26	24.76
Pest and diseases problem	88	83.81
Labour scarcity or supply problem	13	12.38
Use of varieties with low genetic potential	35	33.33
Inadequate storage facilities	13	12.38
Transportation problems	27	25.71
Poor soil fertility and land degradation	64	60.95
Poor extension delivery system to farmers	26	24.76
Poor accessibility to agrochemical	38	36.19
Lack and inadequate irrigation facilities	57	54.29
Total	105	100

Source: Field survey, 2023

Table 3: Budgetary Analysis of Small-scale Maize Farmers N=105

Items	Average (₦)	(%) Total
Value of sales from maize	193,971.43	83.79
Value of quantity consumed by the household / offered as a gift	37,518.57	16.21
Total Revenue	231,490.00	100
Variable Cost		
Total cost of planting materials (seeds)	3,895.71	2.81
Hired labor	40,928.57	29.50
Family labor	18,000.54	12.98
Fertilizer	9,007.14	6.49
Transportation	4,621.43	3.33
Storage Cost	1,231.88	0.89
Herbicides	2,140.29	1.54
Insecticide / Pesticide	6,978.57	5.03
Total Variable Cost (TVC)	86,804.13	62.17
Fixed Cost		
Rent on land	30,122.67	21.71
Depreciation on Hoes	3,388.74	2.44
Depreciation on Knapsack Sprayers	11,661.66	8.41
Depreciation on Cutlasses	3,565.80	2.57
Depreciation on others	5,325.18	3.84
Total Fixed Cost (TFC)	54,064.05	38.27
Total Cost (TVC + TFC)	140,868.18	100
Gross Margin (TR – TVC)	144,685.87	
Net Farm Income (TR–TC)	90,621.82	
Rate of Return On Investment (NI/TC×100)	64.33	
Profitability Index = NI/TR×100%	39.15	

Source: Field Survey 2023