



## ECONOMICS OF FLUTED PUMPKIN FARMING IN CALABAR SOUTH LGA, CROSS RIVER STATE, NIGERIA

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### ABSTRACT

This study is a profitability assessment of fluted pumpkin farming in Cross River State, Nigeria. Specifically, it determined the associated cost and returns, evaluated enterprise profitability and ascertained the influence of socio-economic factors on profitability of fluted pumpkin farming in the study area. Multistage sampling was engaged in the selection of respondents, primary data were collected using questionnaire and oral interview and analyzed using descriptive statistics, cost and returns/ profitability analyses and the ordinary least square technique of the multiple regression analysis. The total cost and revenues per hectare were N218, 854.00 and N444, 657.00 respectively in the study area. The profitability analysis revealed a positive gross margin of N248, 049.00, a net income of N225, 803.00 and a benefit cost ratio of 2.03 per hectare implying that fluted pumpkin production is a profitable venture in the study area. The regression analysis showed that cost of labour (1.451) positively and significantly influenced profitability of fluted pumpkin farming at 5% significance level. The identified constraints were access to capital/ credit, lack of storage facilities and high cost of inputs. The study recommends public/ private sector partnership for enhanced input delivery, intensification of extension education and facilitation of better access to credit.

**Keywords:** Economics, pumpkin, Profit, Profitability, Vegetable

### INTRODUCTION

Fluted Pumpkin (*Telfaria Occidentalis*) is a popular vegetable crop that is widely grown and consumed across tropical West Africa. This growing acceptability is established on several fronts, first of all is the income and employment generation as well as poverty reducing potential that the crop possesses. Again, fluted pumpkin accounts substantially for essential vitamins, minerals and dietary fibre when consumed as food thereby reducing the menace of nutritional deficiency with recourse to affordability. Furthermore, research shows that *telfaria's* nutrient-rich composition and bioactive compounds may help prevent diseases, supporting overall health and well-being (Muoneke *et al.*, 2011; Kuku *et al.*, 2014).

Nigeria has an established fluted pumpkin value chain. In fact, the last two decades have witnessed the increasing importance of *Telfaria* production and consumption especially in Southern and eastern Nigeria where it has earned several local names such as “Sokoyokoto” in Yoruba, Ugu” in Igbo, “Ikong-Ubong” in Efik, Ibibio, and features as a major occupation of many small scale producers both in the rural and urban communities, providing suitable livelihood option for a good number of unemployed people especially women. (Udoh and Akpan, 2020; Akpan, 2021; Ikewucho, 2020). Adam *et al.*, 2020; Ebukaba, 2021; Adeoye, 2022).

Fluted pumpkin production consist of several operations and require some substantial amount of input use with cost implications. Where there is limited knowledge and consequential low adoption of organic technology, *telfaria* farmers struggle to earn decently, committing scare resources to the high input demands of the enterprise ( Ubokudom and Idiong, 2016), implying that the claims of reasonable revenue (Utobo *et al.* 2017) to farmers from *Telferia* production may not translate into wide margins as investment in high-cost inputs such as is expedient for optimum production most likely submerges supposed return. On the other hand, resource poor farmers have difficulties achieving minimum recommended quantities of essential inputs that guarantee improved yields, with attendant effects on output per area and returns. A profitability assessment will present a better

understanding of how *telfaria* farming transcends a quick fix from the menace of poverty and rural unemployment, showcasing its inherent potential for birthing sustainable financial freedom.

Profitability is the ability to generate earnings or profits over a specific period relative to revenue, assets or equity. In agriculture, the financial performance and efficiency of farm operations are best assessed by analysing enterprise profitability. The procedure involves assessing the relationship between costs, revenues and estimating returns in order to determine the economic viability of farming activities, allowing for identification of strengths, weaknesses, and areas for improvement and ultimately ensuring more informed decision making for sustainable and profitable farming (Udoh, 2020).

A clear identification of the fundamental issues concerning profitability is essential not just to policy formulation and implementation but providing support to design of programs that are targeted towards expanding fluted pumpkin production in Calabar South Local Government in particular and in the Southern region of Nigeria. Understanding profitability related issues in fluted pumpkin farming is crucial to influencing resource allocation decision and determining the returns on investment. It is in the light of the foregoing that this study borders on the economics of small-scale fluted pumpkin (*Telfaria occidentalis*) farming in Calabar South, Cross River State. Specifically, it seeks to determine the cost and returns/ profitability of fluted pumpkin farming in the study area, and determine the socio-economic factors influencing the profitability of fluted pumpkin farming in the area.

### MATERIALS AND METHODS

The study was conducted in Calabar South Local Government Area (L.G.A.), Cross River State, Nigeria. Calabar South is located in the southern part of Cross River State and forms part of the Calabar metropolis. The area lies between latitude 4° 54' N and longitude 8° 19' E, with an average elevation of 97 meters above sea level. Calabar South L.G.A. is

characterized by a humid tropical climate, with an annual rainfall of 2000-3000 mm and temperature ranging between 25°C and 32°C. The soil is fertile loamy soil, making it highly suitable for vegetable cultivation, including fluted pumpkin (*Telfaria occidentalis*). Multi-stage sampling technique was used to select respondents for the study. At first, Calabar South L.G.A was purposively selected due to the significant volume of fluted pumpkin production and availability of active farmers. In Stage two, five (5) major farming communities notable for fluted pumpkin production namely-Anantigha, Ediba, Duke Town, Henshaw Town, and EfutAbua were purposively selected while stage three involved the proportionate selection of 70 small-scale fluted pumpkin farmers who cultivate less than 1 hectare and actively participate in local markets from the list of vegetable farmers made available by heads of farming associations using the Taro Yamane formula. Primary data were collected using structured questionnaire and oral interview and used for data analyses. Data collected were analysed using Descriptive statistics (mean, frequency, percentages), Gross Margin Analysis, Cost-Benefit Analysis and Multiple Regression Analysis.

The gross margin analysis/ Cost- Benefit analyses were used to determine the profit/profitability of small-scale fluted pumpkin farming as follows;

#### Gross Margin

$$\text{Gross Margin (GM)} = \text{Total Revenue (TR)} - \text{Total Variable Cost (TVC)}$$

Where:

GM = Gross Margin (N/ha)

TR = Total Revenue from sales of fluted pumpkin leaves and seeds (N)

TVC = Total Variable Cost, including cost of seeds, fertilizer, labour, pesticides and transportation.

A positive gross margin indicates that fluted pumpkin farming is profitable, while a negative gross margin suggests losses.

#### Cost-Benefit Analysis

A benefit- cost ratio (BCR) was computed to assess the economic efficiency of fluted pumpkin farming as follows:

$$\text{BCR} = \text{TR}/\text{TC}$$

Where:

BCR= Benefit-cost ratio

TR = Total Revenue (₦)

TC = Total Cost (TVC + TFC) (₦)

#### Profit Function

A profit function in economics is typically represented as the difference between total revenue (TR) and total cost (TC). For agricultural production, such as fluted pumpkin farming, the profit function can be expressed as:

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

Where:

$$\text{TR} = P \times Q \text{ (N)}$$

P is the price per unit of output (e.g., the price of fluted pumpkin in N)

Q is the quantity of output produced (e.g., the number of bundles of harvested fluted pumpkin leaves and seed pods).

$$\text{TC} = \text{TFC} + \text{TVC} \text{ (N)}$$

TFC is the Total Fixed Cost, which does not change with the level of output (e.g., land rent, equipment).

TVC is the Total Variable Cost, which varies with the level of output (e.g., seeds, fertilizer, labour costs).

#### Regression Analysis

A multiple regression model was used to identify the socioeconomic factors influencing the profitability of fluted pumpkin farming. The ordinary least square technique of multiple regression is as specified:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

Where:

Y = Profitability (Net Farm Income in ₦)

X<sub>1</sub> = Age of farmer (years)

X<sub>2</sub> = Education level (years of schooling)

X<sub>3</sub> = Farm size (hectares)

X<sub>4</sub> = Farming experience (years)

X<sub>5</sub> = Cost of labour (₦)

β<sub>0</sub> = Constant term

β<sub>1</sub> - β<sub>5</sub> = Coefficients of independent variables

e = Error term

The regression model was estimated at a 5% significance level (p < 0.05).

## RESULTS AND DISCUSSION

### Cost and Returns on Fluted Pumpkin Production

The cost and returns in naira per hectare of fluted pumpkin production is as presented in table 1. The cost elements identified in the study area were fixed cost (Depreciation on assets land rent) and variable cost (Pesticide, Manure, Chemical fertilizer, Labour and seeds). The cost structure revealed cost of labour as the most critical cost element with a value of N82, 571.00. This could be as a result of the several operations that culminate in pumpkin production such as land preparation, planting, staking, pruning, fertilizer/ manure/ pesticide application and harvesting.

On the flip side, the result revealed low investments in manure (N14, 996.00) and pesticide (N9, 167.00). The use of chemical fertilizer fell below the recommended quantity of 160kg per ha), indicating either an access constraint or an existing knowledge gap regarding the impact of chemical fertilizer on productivity. The average cost per hectare of fluted pumpkin production was N218, 854.00, this is suggestive of the absence of integrated farming practices that are capable of tremendously reducing production cost.

Furthermore, the revenue elements were sale of vegetable and pumpkin seeds. The average revenue per hectare of fluted pumpkin in the area was N444, 657.00 while the gross margin was N248, 049.00 implying that fluted pumpkin production is a profitable venture. Several authors have upheld the profitability of the fluted pumpkin venture and the cost effectiveness of adopting integrated farming practices. Olawale and Adepoju (2023) investigated the cost structures of small-scale fluted pumpkin farming in Southwest Nigeria and maintained that land preparation, seeds, and fertilizers were the largest contributors to production costs, the study also revealed that farmers who utilized integrated pest management and organic fertilizers recorded lower variable costs and a 25% higher profit margin compared to those using conventional inputs.

Ibrahim & Edet (2024) in the study of cost and returns of fluted pumpkin production in Akwa Ibom State, Nigeria, found labour, inputs (seeds, fertilizers), and irrigation as primary cost elements and computed average cost of N130,000 per hectare and a gross margin of ₦110,000. Ogundele and Ekpo (2023) obtained an average cost of production of ₦120,000 per hectare, with a gross margin of ₦90,000 in a related study in southern Nigeria while Adeola and Omowunmi (2024) upheld that fluted pumpkin farmers operating on less than 2 hectares had modest profit margins, but those who implemented drip irrigation and composting techniques achieved up to 40% higher profits due to improved yield and cost-efficiency.

**Table 1: Cost and Returns in Naira Per Hectare of Fluted Pumpkin Production**

<b>Revenue</b>	
Sale of vegetable	311,260.00
Sale of seeds	133,397.00
<b>TOTAL REVENUE</b>	<b>444,657.00</b>
<b>Cost OF Production</b>	
Cost Of Seed/ Planting Material	37,484.00
Fertilizer	36,219.00
Manure	14,996.00
Pesticide	9,167.00
Transport	16,171.00
Labour	82,571.00
<b>TOTAL VARIABLE COST</b>	<b>196,608.00</b>
<b>Fixed Cost</b>	
Depreciation On Assets	6,053.00
Land Rent	16,193.00
<b>Total Fixed Cost</b>	<b>22,246</b>
<b>Total Cost (TVC + TFC)</b>	<b>218,854.00</b>
<b>Gross Margin (TR – TVC)</b>	<b>248,049.00</b>
<b>Net Income (GM -TFC)</b>	<b>225,803.00</b>
<b>BCR</b>	<b>2.03</b>

Source: Field Survey data, (2025)

#### **Profitability of Fluted Pumpkin Production**

The profitability of the fluted pumpkin enterprise in the study area was measured using key profitability indicators namely Gross Margin, Benefit Cost ratio (BCR) and the Net Income approach as shown in table 1.

The result revealed a positive gross margin of N248, 049.00 indicating that fluted pumpkin production is a profitable business in the study area. The net farm income was achieved by subtracting the computed total fixed cost in naira per hectare from the obtained gross margin, the naira value per hectare of net income was N225, 803.00. The figure appreciated because, most fluted pumpkin farmers in the study area have limited ownership of fixed assets.

The Benefit Cost ratio (BCR) of 2.03 was obtained by dividing the total revenue by total cost. This result implies that for every N1.00 invested in fluted pumpkin production in the study area, farmers get returns of up to N 2.03k. in similar studies, Girei *et al.*, (2017) reported a gross margin of N54,402.80 per hectare, a net income of N35,902.2 and a BCR of 1.54 indicating that pumpkin farming is profitable. Utobo *et al.*, (2022) recorded a margin of N175,335.00 and a BCR of 2.08 in the study of Profitability analysis of dry season fluted Pumpkin production among smallholder

farmers in Okigwe, Southeastern Nigeria while Akanni-John *et al.*(2020), computed Net farm income, BCR and Gross Margin of N228,413.00, 2.65 and N251, 953.00 respectively per hectare of fluted pumpkin production in Ibadan Metropolis, Oyo state Nigeria indicating a relative upward rise in the cost and returns structure for urban based pumpkin production.

#### **Socioeconomic Factors Influencing Profitability of Fluted Pumpkin Farming**

Table 2 shows the means of some selected socioeconomic characteristics of small scale fluted pumpkin farmers in the study area. The mean age was 43 years (64% between 31 and 50 years), with mean household size of 5 persons (83% had household sizes of 4-9), and mean of 12 years of farming experience (63% had over 10 years' experience). Furthermore, the mean farm size was 0.98 hectares (59% cultivated fluted pumpkin on less than a hectare of land) while the mean years of schooling was 13 years. Other findings regarding socioeconomic characteristics were; Gender (60% female), and Marital status (60% married). Majority (56%) relied on personal funds for telferia farming.

**Table 2: Averages of some Selected Socioeconomic Characteristics of Fluted Pumpkin Farmers**

<b>Variable</b>	<b>Mean (Average)</b>	<b>Standard Deviation</b>
Age( Years)	43	11
Farm size ( hectares)	0.98	0.59
Household size ( no. of persons)	5	2
Years of schooling (years)	13	4
Farming experience (years)	12	5

The socioeconomic factors influencing the profitability of fluted pumpkin production were determined using the ordinary least square (OLS) technique of the multiple regression analysis. Three functional forms namely: linear, exponential and semi/ log were fitted in the model. The net income of fluted pumpkin farmers was taken as proxy for profitability while some selected socioeconomic factors namely – age, cost of labour, farming

experience, years of schooling and farm size were the predictors. The exponential model was selected as the lead equation because it had the highest value for coefficient of multiple determination ( $R^2$ ) estimated at 0.48 and implying that 48% of variations in profitability of fluted pumpkin farmers in the study area were accounted for by socioeconomic factors. The result is as shown in table 3

**Table 3: Ordinary Least Square Estimates of the Socioeconomic Factors Influencing the Profitability of Fluted Pumpkin**

Variable	Linear	Exponential
Age (years)	0.3847(0.901)	-0.007(-0.289)
Education (years of schooling)	-0.1010(-1.174)	-0.036(-0.761)
Farm size ( Hectares)	-0.1767(-1.551)	-1.025(-1.619)
Farm experience	-0.2194(-0.212)	0.084(1.465)
Cost of labour	0.1982*(2.605)	1.451**(3.431)
R <sup>2</sup>	0.42	0.48
F stat	1.52	2.09
N	55	55

Source: Field survey data (2025). += Lead equation, \*\*, \* = Significant at 5%, and 10% respectively. Figures in parentheses represent t-stat

According to the result, only cost of labour (1.4512) was the socioeconomic factor that significantly influenced profitability of the farmers at 5% level of significance implying that increased labour cost is associated with increased profitability in fluted pumpkin production. This implies that if skilled labour is used in pumpkin production, it would lead to more efficient practices and better crop yields but at the instance of a higher labour cost. Also fluted pumpkin require labour intensive best practices like pruning and pest management, making labour input beneficial for profitability. Also, when the focus is over quality control, harvesting or post-harvest handling might also drive labour cost upward but will eventually increase profitability.

## CONCLUSION

Fluted pumpkin farming is a profitable venture in Calabar south Local Government area of Cross River State. The production cost structure reflects significant investment in labour cost and a corresponding de-emphasis on the use of chemical fertilizers and pesticides. Notwithstanding the enterprise reflects a competitive rate of return on investment, signalling potential to offer far beyond food and employment. Investment in skilled labour for fluted pumpkin production despite bearing some cost implications, will drive revenues upward and expand margins. The study therefore recommends that; Fluted pumpkin farmers should endeavour to prioritize labour quality over quantity for productivity and profitability of the fluted pumpkin enterprise. As antidote to the inability of most small-scale farmers in keeping up with standard recommended quantities of chemical inputs, government should through the ministry of agriculture and other relevant agencies, intensify integrated farming-based extension education. This will go a long way in boosting output of resource poor small scale telferia farmers who may not be able to afford inputs owing to cost. Also, Public / Private sector partnership that emphasizes enhanced input delivery with capacity to subsize input cost to fluted pumpkin farmers should be pursued with utmost concern.

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