



COMPARING PROFITS OF ORGANIC AND NON-ORGANIC FLUTED PUMPKIN AMONG SMALLHOLDER FARMERS IN DELTA STATE, NIGERIA

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ABSTRACT

The study was conceptualized to compare profits of organic and non-organic farming technologies among smallholder fluted pumpkin farmers in Delta State, Nigeria. A multistage sampling technique was employed in the selection of location and respondents. The data were collected using structured questionnaire from 240 organic and non-organic smallholder fluted pumpkin farmers. Data obtained was analyzed using descriptive statistics and **enterprise budgeting method**. Results indicated that the profit realized by organic and non-organic (conventional system) fluted pumpkin farmers was ₦561,850 and ₦222,130 per farmer per plot, respectively. The study concluded that organic system of vegetable production was more profitable than conventional system. It was recommended that farmers should concentrate more on organic system of fluted pumpkin production to enable good profit.

Keywords: Farmers; Fluted Pumpkin; Non-Organic; Organic; Smallholder.

INTRODUCTION

Fluted pumpkin (*Telfairia occidentalis*) is among the popular vegetables cultivated in Delta State of Nigeria. The leaves are edible and when consumed it serves as a source of vitamins, minerals and protein. It provides good income to small holder farmers when the edible parts are sold (Olowa & Olowa, 2016). Organic technologies are used by organic farmers to increase yield, while the non-organic farmers make use of chemical fertilizers in growing crops. Vegetable production is mostly practiced among small holder farmers in Nigeria (Ndungu *et al.*, 2013). Farmers at this level have poor resources and are faced with several constraints in the use of modern technologies because of lack of fund. The use of organic technologies and non-organic (chemical fertilizer) depends majorly on the capacity to afford the materials at a reasonable amount, in a large quantity for efficiency (Food and Agriculture Organization [FAO], 2006).

Delta State is comprised of 25 local Government areas (LGAs) which are dominated with large number of fluted pumpkin farmers both for organic and non-organic production. Fluted pumpkin is grown not only for consumption but as a source of livelihood for farmers that produce it. The broad objective of the study was to compare the profits of organic and non-organic fluted pumpkin among smallholder farmers in Delta State, Nigeria. The specific objectives were to: compare the profits of organic and non-organic fluted pumpkin production; and test the null hypothesis (H_0) that there was no significant difference between the profits of organic and non-organic fluted pumpkin production.



MATERIALS AND METHODS

The Study Area

The study was carried out in Delta State which is one of the 36 States of Federal Republic of Nigeria. Delta State was created from the former Bendel State in 1991 with Asaba as its capital city. The State lies between longitude 5°N and 6°45’N East and latitude 5° and 6°30’ North and shares boundaries with Edo State to the South-west, Anambra to the East and Bayelsa State to the south. The State has a population of 4,098,391 by the census figure of 2006 (National Population Commission [NPC], 2006). The State is made up of different ethnic groups, The Urhobos, Igbos, Izons, Itsekiri and The Isokos. It is made up of 25 LGAs with three agricultural zones namely: Delta North, Delta Central and Delta South.

Sampling Technique and Sample Size

The list of registered organic and non-organic fluted pumpkin farmers in the State was obtained from Agricultural Development Project (ADP) of Delta State which comprises of 3,753 (2,330 organic and 1,423 non-organic). A multistage random sampling technique was adopted in the selection of States’ agricultural zones, LGAs, communities and the respondents. In stage one, two (2) agricultural zones were randomly selected from the three (3) zones in the State. These were Delta North and Delta Central. In stage two, three (3) LGAs were randomly selected from each of the two (2) agricultural zones. This gave three (3) LGAs each, giving a total of six (6) LGAs that were randomly selected. Delta north comprised of Aniocha South, Ndokwa West and Oshimili South and Delta Central (Ethiope East, Sapele and Ughelli North). In stage three, four (4) communities were randomly selected from each of the six (6) LGAs. This gave a total of 24 communities. Finally, 10 farmers were randomly selected from each of the 24 communities giving a total of 240 respondents (Table 1) that were selected for the study. Furthermore, 160 respondents were used as sample for the control group (non-organic fluted pumpkin farmers) and 80 respondents were used for the experimental group (organic fluted pumpkin farmers).

Table 1: Sampling Frame and Size Selection Plan of the Study

ADP Zone	LGAs	Communities	Sample Frame	Sample Size
Delta North	3	3(4)	24 (5)	120
Delta Central	3	3(4)	24 (5)	120
Total	2 6	24	240	240

Method of Data Analysis

Enterprise budgeting method was the statistical tool used for the study. The enterprise budgeting method used in the determination of enterprise profitability is given as:

$$NR/NI = TR - TC$$

$$GM = TR - TVC$$

where;

NR/NI = Net returns/Net income

TR = Total revenue (Q.Pq = Quantity of output multiply (.) by its unit price)

TC = Total cost (TVC + TFC)

TVC = Total variable cost (Xi.Pi = quantity of variable inputs x unit price of the inputs)

TFC = Total fixed cost (Annual depreciation values of fixed cost items and rental value of land)

GM = Gross margin.



RESULTS AND DISCUSSION

Costs and Returns of Non-organic Fluted Pumpkin Production

The result of data analysis on the profitability of non-organic fluted pumpkin production in the study area is presented in Table 2. It could be seen from the Table 2 that the average total variable cost per hectare was ₦438,480; the total fixed cost was ₦200,101 and total cost was ₦638,581. The gross margin per hectare was ₦823,725. The return from pods was ₦519,000 and return from leaves (bunches) was ₦743,205, hence the total revenue was ₦1,262,205. The net return/profit was ₦623,624 while net return on investment was 0.98.

Table 2: Costs and Returns of Non-organic Fluted Pumpkin Production (Pooled Data)

Item	Quantity	Unit Price (₦)	Total Cost/Revenue (₦)
Variable cost			
Planting materials	250	620	155,000
Fertilizers	10	12,431.3	124,313
Hired labour	20	3,003	60,060
Irrigation	5	9,466.6	47,333
Transportation cost	-	4,216.7	42,167
Communication cost	-	900	9,607
Total variable cost			438,480
Fixed cost (annual depreciation values):			
Land (rent)	4 plots	6,796.5	27,186
Wheel barrow	2	6,078	12,156
Irrigation equipment	2	3,666.5	7,333
Machete/Cutlass	4	1,075	4,300
Hoe	11	500	5,500
Shovel	3	1,837	5,511
Basket	5	183	915
Watering can	4	300	1,200
Bicycle (rent)	5	3,000	15,000
Motorcycle	1	131,000	131,000
Total fixed cost:			210,101
Revenue:			
Pod (kg)	100	5,190	519,000
Leaves (bunches) kg	200	3,716.025	743,205
Total Revenue			1,262,205
Total production cost			638,581
Gross Margin			823,725
Profit			623,624
NROI			0.98

Note: NROI = Net return on investment.

Source: Field survey, 2020

Still in Table 2, the net return on investment of 0.98 meant that the farmers returned ₦0.98 per ₦1.00 invested in the business; an indication that non-organic fluted pumpkin production proved a profitable enterprise in Delta State, Nigeria. This result agrees with the report of Olowa and Olowa (2016) who reported that the total cost and gross margin of fluted



pumpkin production were ₦219,850 and ₦442,500, respectively. Ayoola (2014) also reported fluted pumpkin production as being profitable with greater economic efficiency.

Difference between Mean Profits of Organic and Non-organic Fluted Pumpkin Production

The results (Table 3) showed that the mean profit realized by organic fluted pumpkin farmers in Delta State was ₦561,850 while that of non-organic (conventional system) was ₦222,130. A mean difference of ₦339,720 was computed. The result of One Sample test (Table 3) indicated a significant difference between the means in favour of organic fluted pumpkin production, implying that organic fluted pumpkin production was more profitable than non-organic in Delta State.

This result is in line with the findings of Atoma (2015) who revealed that organic farming practices increase profitability in all crops especially vegetable than conventional system. Ekwerugbe (2019) reported that vegetable crops production is profitable on average of ₦155,500/hectare with net return to total cost ratio of 0.64. The study revealed that vegetable was profitable. This indicated that organic vegetable production is a profitable venture for smallholder farmers.

Table 3: Mean Profits of Organic and Non-organic Fluted Pumpkin Farmers

Technologies	N	Mean	Std. Deviation	Std. Error Mean
One-sample Statistics				
Organic	80	561,850.6958	261565.0186	16889.8233
Non-organic	160	222,130.6958	227556.8846	10386.5032
Technology	T	Df.	Sig. (2-tailed)	Mean difference
One-Sample Test				
Organic	19.335	79	0.000	561,850.6958

Note: N = number of respondents; T = Test; Df = Degree of freedom.

Source: Field survey, 2020

Results of Hypothesis Test

Table 4 presents the results of test of hypothesis (Ho) that there is no significant difference between the mean profits of organic and non-organic (conventional system) fluted pumpkin producers. The result of Table 4 reveals that there is a statistically significant difference in the mean profit of organic fluted pumpkin production and non-organic (conventional system) of fluted pumpkin production in the study area at 1% probability level. The result indicates that the difference between the mean profit in organic farming technology and non-organic farming technology was not statistically different at 1% probability level (Table 4). The mean profit in sub-set two which comprises organic and non-organic technology was also not statistically significant at 1% probability level.



Table 4: Result of test of Ho

Variable	Mean	N	Std. Deviation	Std. Error Mean				
Paired samples statistics:								
Pair 1 Non-organic	207248.00	239	151596.947	9805.991				
Organic	326824.63	239	262173.846	16958.616				
Variable	N	Correlation	Sig.					
Paired samples correlations:								
Pair 1 Non-Organic & Organic	239	.462	.000					
Paired Differences								
	Mean	Std. Deviation	Std. Error Mean	95% confidence interval of the difference		T	Df.	Sig. (2-tailed)
				Lower	Upper			
Paired samples test:								
Pair 1 Non-organic-organic	-119576.6283	234451.703	15165.420	-149452.225	-89701.030	-7.885	238	.000

***Significant at 1% probability level.

Source: Field survey, 2019.

CONCLUSION AND RECOMMENDATIONS

The findings revealed a mean profits of organic fluted pumpkin in Delta States was ₦561,850 and non-organic was ₦222,130. It was therefore, concluded that organic fluted pumpkin production was more profitable in the study area. Organic fluted pumpkin production was a profitable enterprise and non-organic fluted pumpkin production was also profitable though less profitable than the organic in the study area. It was recommended that the farmers should form cooperative societies to enable them pull their resources together, exchange ideas on latest and appropriate technologies, obtain inputs and credits at cheaper rates, adopt better marketing strategies and thus make more profit.

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