Comparative Analysis of Profits of Organic and Non-organic Fluted Pumpkin Production in Rivers State, Nigeria

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KEYWORDS

Non- organic, Profit, Organic, Vegetable, Production

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ABSTRACT

This study examines the profits of organic and non-organic farming among small holder fluted pumpkin farmers in Rivers State. A multistage sampling technique was employed in the selection of location and respondents. The data were collected from 240 organic and non-organic small holder fluted pumpkin farmers. The primary instrument used for data collected was structured questionnaire. Data obtained was analyzed with Enterprise budgeting method and Analysis of Variance (ANOVA). Results indicated that the average profit realized by organic fluted pumpkin farmers in Rivers State was N 280,570, while the average profit realized by non-organic was N101, 050. The result of Analysis of Variance 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. The mean profit in subset two which comprises organic and non-organic technology was also not statistically significant at 1% probability level. The study suggested that extension agents should train farmers frequently for easy adoption of the technology.

INTRODUCTION

Fluted pumpkin (*Telfairia occidentalis*) is cultivated across the tropics of West Africa where production remains very vital in Nigeria (Ndubueze-Ogaraku, 2017). The fruit pod on full maturity weighs about 15kg with longitudinal lines on the surface. It is propagated by seeds which are sown directly on a plain land or mounds**.** Planting on mounds helps to control drainage and prevents the root from being water logged. Two to three seeds are planted directly in the soil in case of failure of germination and also ensures greater output (Echioda, 2018).

The first set of leaves and shoot can be harvested after a month of planting and may be collected every 2-4 weeks (Anyanwale and Abiola., 2008). The crop is a widely used vegetable consumed by millions of Nigerians (Okpashi *et al*., 2013). It belongs to Cucurbitaceae Family and originated from West Africa. It is mainly cultivated in South-Eastern and South- South Nigeria (Ayoola, 2014).

Fluted pumpkin is one of the leading green leafy vegetables in Nigeria. There are about 700 species which are spread all over many parts of the world (Odiaka, *et al*., 2008). It is a tropical vine leafy vegetable and develop fruits for food and finally generates income across Africa (Adebisi-Adelani, *et.al.* 2011; Ndubueze-Ogaraku, 2017). The plant tolerates drought and can sustain its life in the root system for many years. The crop is a creeping plant that grows well if staked with bamboo sticks. It grows well in tropical humid condition and requiring full sunlight of about 6 hours per day. The more the solar energy received, the greater the

harvest. The soil requires a pH of 6.5 to 7.5 that is slightly acidic and slightly alkaline. It further requires adequate, slightly mulched, shaded fertile soil that drains well to become perennial (Idowu *et al.* , 2007).

The seeds are subsequently harvested when matured and a good portion of them are consumed, while the left over are dried and stored for the next planting season. Care should be taken when preserving any portion of the plant. The leaves are highly perishable and lose nutrient and moisture content when stored improperly. The losses can be reduced when harvested leaves are stored in a cool dry place with sealed polyethylene bags (Echioda, *et.al.* 2018).

Fluted Pumpkin could be used in various ways; the seeds are used as propagative materials, eaten roasted, boiled or ground to paste as soup thickener. The leaves are rich in Mg, Fe and fibers and are used as food supplements (Ndubueze-Ogaraku, 2017). The seed has a good amount of amino acids 93.7% which contains higher levels of most essential amino acids. Potassium and Sodium are higher in fluted pumpkin seed than in soya bean seed, this indicates that fluted pumpkin seed cake is good for healthy foods and the seed oil serves as oil for making margarine. The oil content makes it a potential source of raw material for the vegetable oil industries in Nigeria. The fruit and pulp of fluted pumpkin which constitute 64% of whole fresh fruit weight can be used as feed stuff for livestock. Fluted pumpkin generates income to small scale farmers (Ndubueze-Ogaraku, 2017). It has a high medicinal value which can be compared with conventional drugs.

In Nigeria the level of use of organic technology among the small scale vegetable farmers are still very low and at early stage Ubokudom and Idiong (2016).

Okonkwo-Emegha and Isibor, (2021) reported in their work on constraints of Organic Farming Technology among Small Scale Vegetable Farmers in South-South Zone of Nigeria reported that the major challenges faced by the farmers was insufficient fund, prince instability, poor transportation system and lack of awareness on new technology.

Adeoye (2022) examined the profitability and efficiency of vegetable production in Ogun State, he stated that the factors affecting vegetable production were planting materials, education, storage facilities, access to market and instability of price.

Despite the nutritional value and economic benefits that fluted pumpkin provides to its consumers and producers, yet there are few research on the profits of organic and non-organic vegetable production in Rivers State. Hence, the focus of this study is to examine the profits analysis of organic and non-organic production in Rivers State.

The broad objective of this study was to analyze the profits of organic and non-organic vegetable production among small holder farmers in Rivers State. The specific objective was to compare the profits of organic and non-organic fluted pumpkin production in the study Area.

METHODOLOGY

The Study Area

Rivers State is a state in the Niger Delta region of southern Nigeria (Old Eastern Region). The territory had once been referred to as oil Rivers protectorate, a name derived from its central role in the oil trades of the last two centuries. First, the trade in palm oil and then crude oil. It is accountable for over 48% of crude oil produced on-shore in the world. The State is bounded on the South by the Atlantic Ocean, on the North by Anambra, Imo and Abia States, the East by Akwa Ibom State and the west by Bayelsa and Delta State. Rivers State, which is in the Niger Delta, has topography of flat plains with a network of rivers and tributaries. With a tropical climate, numerous rivers and vast areas of arable land, the people of Rivers State have lived up to their tradition of agriculture, especially fishing and farming, commerce and industry. The state has 23 local government Areas boasts of four degrees warding institutions, two refineries, a petro-chemical plant, fertilizer plant and a liquefied natural gas plant. The state has an estimated population of about 6.5 million people who have a rich cultural heritage. The state covers a total of 11,077 square kilometers land area and is bordered to the South by the Atlantic Ocean, to the North by Anambra, Imo and Abia State, to the east by Akwa- Ibom State to the West by Bayelsa and Delta States. The State features many mangrove swamps. The state rainfall is seasonal, variable and heavy. The total annual rainfall deceases from about 4,700mm on the coast to about 1,700mm in extreme north of the State. The mean annual temperature for the state is 260c. The hottest months are February to May. Relative humidity is high in the state throughout the year and decreases slightly in the dry season.

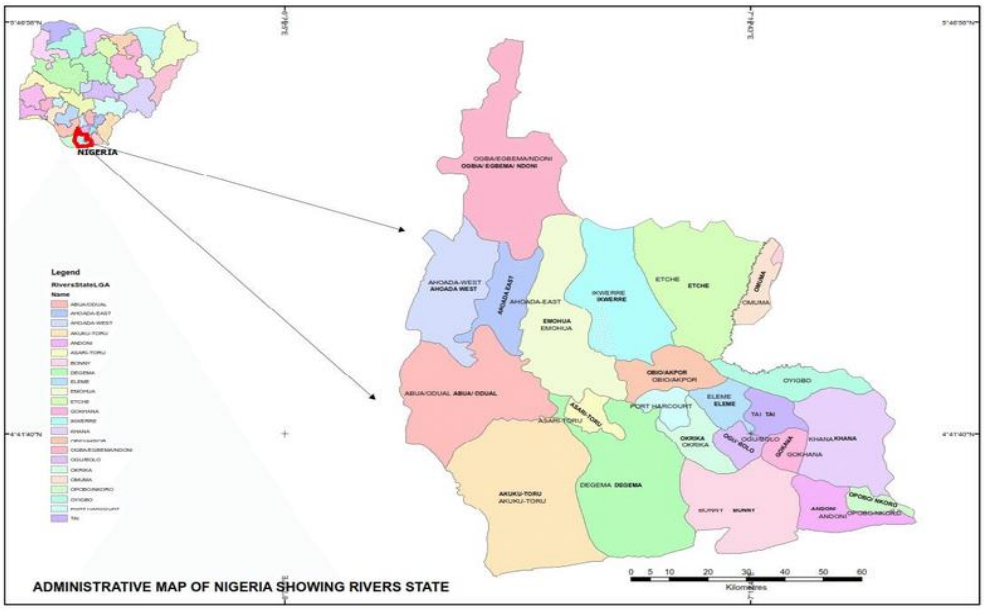

Figure 1: Polotical map of Rivers State, Researchgate.net, 2024

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 Rivers State which comprises of 5,783 (2,860 Organic and 2,923 non-organic).

A multistage random sampling technique was adopted in the selection of Agricultural zones, LGAs, communities and the respondents.

In **stage one**, two agricultural zones were randomly selected from the three (3) zones in the State. These were zone I and zone III.

In **stage two**, three LGAs were randomly selected from each of the two agricultural zones, giving a total of six LGAs that were randomly selected. For zone I (Ikwere, Port-Harcourt and Oyigbo) were selected, for zone II (Omuma, Ohoada East and Ohoada west) were selected.

In **stage three**, four communities were randomly selected from each of the six (6) LGAs. This gave a total of 24 communities.

In stage four, 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, 120 respondents were used as sample for the control group (non-organic fluted pumpkin farmers) while 120 respondents were used for the experimental group (organic fluted pumpkin farmers).

Data Collection

Data for this study were derived from primary sources which include the use of structured questionnaire, personal interviews, structured questionnaire was used for literate farmers and interview schedules for the illiterate farmers. All the copies of the questionnaires were administered to fluted pumpkin farmers. The questionnaire was just one section:

Section A: Comparing the profit of organic and non-organic fluted pumpkin production.

Validity

The instrument was subjected to both validity and reliability test. Content and face validity was done by experts in the field of Agricultural Economics.

Reliability

The Cronbach's Alpha correlation technique was used to ascertain the reliability of the instrument.

Mathematical Expression/Model Specification

MODEL 1

Cost Function

Cost function is specified as:

$$\boldsymbol{Tc = \sum X_i P_i + Fc} \text{ ..... (1)}$$

Where Tc = Total cost X_i. $P_i$expenditure on ith

Input…, Fc=fixed costs.

MODEL 2

Profit Function

Profit function is specified as:

$$\pi = TR - TC$$

$$\pi = Q.P_q - (\sum X_i P_i - FC) \text{ ..... (2)}$$

Where
π = Net profit
TR = Total Revenue
TC = Total cost
Q = Quantity of output
P_q= Unit Price of Output.

MODEL 3

Enterprise Budget Analysis Model

NP = (TR – TVC) – TFC..... (3)

Where;
NP = Net Income or Net Returns in Naira (₦)
TR = Total Revenue in Naira (₦)
TVC = Total Variable Cost in Naira (₦)
TR –TVC = Gross Margin in Naira (₦)
TFC = Total Fixed Cost in
Ho was tested using the test statistics in ANOVA

RESULTS AND DISCUSSION

Difference between the profit of organic farming technology and non-organic technology (conventional system) of fluted pumpkin production in the three states.

The results showed that the mean profit in Rivers state in organic fluted pumpkin production were ₦ 280,570, while the mean profit of non-organic (conventional system) were ₦101,050 with the mean difference of ₦ 109,800. The result showed that organic technology in fluted pumpkin production is more profitable in Rivers State. Organic producers had profit above non- organic with ₦179,520. The bar chart shows the picture of the profitability. This result is in line with the report of Gavino, (2015) who reported that organic vegetable production is more profitable than non-organic (conventional).

Table 1. Organic farming technology of fluted pumpkin production (average profitability in Rivers States)

S/N	Items	life span	Quantity	Unit Price (₦)	Total Cost
	Fixed Cost				
i.	Machete/ cutlass -2		5	1,400	7,467
ii.	Equipment for irr. -2		3	11,222	33,667
iii.	Land	-	4 plots	10,889	47,186
	Shovel -		4	1,378	5,511
	Basket -		4	522	1,915
	Hoe		5	1,270	5,111
	Watering can -		2	1,400	5,800
	Wheel barrow-		1	9,911	15,156
	Bicycle -		2	14,167	26,802
	Total fixed cost	-			148,615
	Variable cost				
	Planting material/ seed		115 pods	257	29,931
	fertilizer -		24bags	3,140	74,763
	Hired Labour		5 Mandays	-	9,667
	Irrigation		-	-	7,339
	Transportation		-	-	8,333
	Communication		-	-	3,167
	Total Variable Cost				133,200
	Total Cost				281,815
	Revenue / Returns				
	Pods(Kg)		219	1,000	219,000
	Leaves (bunches) kg		203	1,694	343,385
	Total Revenue				562,385
	Gross margin				429,185
	Profit				280,570

Source: Field Survey, 2024.

Table 2. Difference between the profit of organic farming technology and non-organic technology (conventional system) of fluted pumpkin production in three states

One-sample Statistics				
Technology	N	Mean	Std. Deviation	Std. Error Mean
Organic	120	2046894.4587	272387.7541	69874.6532
Non-organic	120	107534.6589	655421.7512	69862.7584
One-Sample Test				
Technology	T	Df	Sig. (2-tailed)	Mean difference
Organic	19.234	119	0.000	211894.4587
Non-organic	22.127	119	0.000	104589.6589

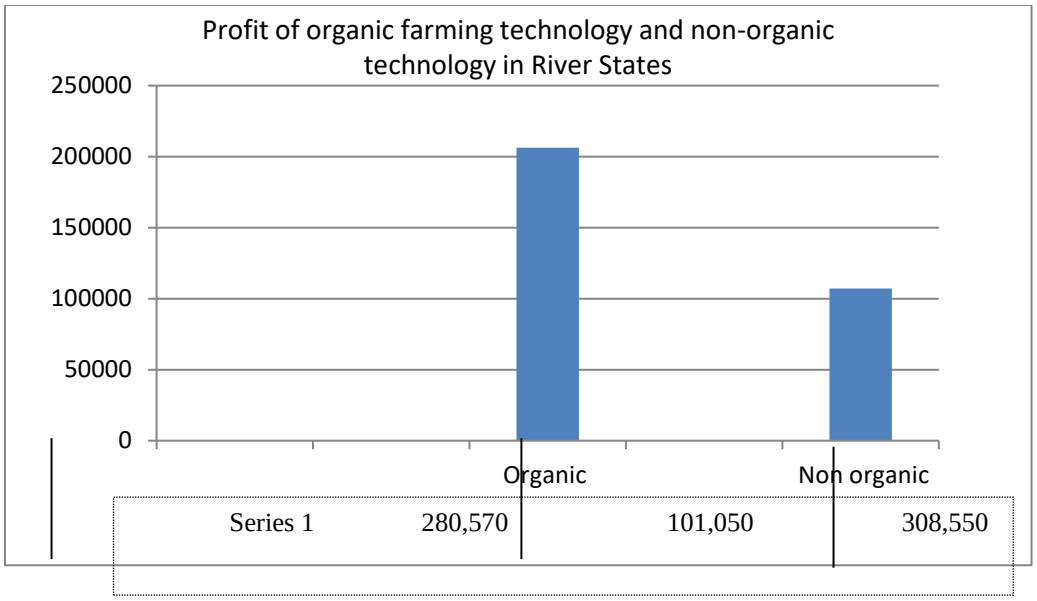

Figure 1 Result of test of Ho1: there is no significant difference between the mean profits of organic and non-organic (conventional system) fluted pumpkin producers

The result 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. The mean profit in subset two which comprises organic and non-organic technology was also not statistically significant at 1% probability level

Table 3. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Non-Organic	207248.00	119	151596.947	9805.991
	Organic	326824.63	119	262173.846	16958.616

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Non-Organic and Organic	239	.562	.000

Paired Samples Test

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	NonOrganic Organic	--119576.628	234451.703	15165.420	-149452.225	-89701.030	-7.885	238	.000

Source: Field survey, 2021. ***Significant at 1% probability level.

CONCLUSION

The findings showed a mean profits of organic fluted pumpkin in Rivers State was ₦ 280,570 while non-organic (conventional system) was ₦101,050. A mean difference of ₦ 109,800 was computed. The result of One Sample test indicated a significant difference between the means in of organic fluted pumpkin production, implying that organic fluted pumpkin production was more profitable than non-organic in Rivers State.

RECOMMENDATIONS

i. Organic materials should be provided for the farmers for more awareness about the technologies and health benefits of organic fluted pumpkin to improve the farmers output, sales and profit.

ii. Extension agents should train farmers frequently for easy adoption of the technology.

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