

A Comparative Study on Fluted Pumpkin Production in the Niger Delta, Nigeria

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Abstract

The study compared the differences in the fluted pumpkin production in Rivers and Akwa Ibom States, Nigeria. The study described the socio-economic characteristics of the farmers and estimated the differences in level of profit achieved in the fluted pumpkin production in the study area. A simple random sampling technique was adopted in the selection of 340 respondents. Data was collected using personal interview, observations, structured questionnaire and farm records. Descriptive statistics, net income model and z- test were the analytical tools used. The results showed that majority of the respondents were females with 64.4%. The gross margin in Rivers State farm was ₦89,063.06 with a net profit of ₦84,609.91 while the gross margin in Akwa Ibom State was ₦65,224.75 with a net profit of ₦61,963.52. The result indicated a z- statistic value of -283.174, with a p value of 0.000, implying that under a two tailed test, the mean difference in the net profit between Rivers and Akwa Ibom farms varied significantly at 1 percent level. Therefore the null hypothesis that there is no significant difference between the net profit of fluted pumpkin production in the floodplain areas of Rivers and Akwa Ibom States was rejected.

Keywords: comparative, fluted pumpkin, production, Niger Delta, Nigeria

1 INTRODUCTION

Fluted pumpkin is cultivated across lowland humid tropics of West Africa including Ghana and Sierra Leone (Bologi, 2012). Fluted pumpkin production remains entrenched in Nigerian agriculture and forms an important condiment in the national diet (Ibekwe and Adesope, 2010). Amongst the different foods, production and consumption of fluted pumpkin is very important and generate high income for the farmers. Fluted pumpkin (*Telferia occidentalis*) is one of the leading green leafy vegetables in Nigeria. It takes a very important place in the population diet because of its affordability and the nutrients it provides. The crop is often grown and consumed in rural, urban and peri-urban areas in Nigeria. It is produced mainly by small-scale farmers, who earn their living from it using limited farm inputs. Fluted pumpkin is the most important and extensively cultivated food and income generating crop in many parts of Africa (Adebisi-Adelani, *et. al.*, 2011). Fluted pumpkin farmers could make an important contribution to the national food supply where a healthy and expanding market gardening industry exists. It becomes a safeguard against the lowering of health standards necessary for productive output in an expanding economy (Tyndal, 1998).

Vegetables are essential components of human diets since they contain important nutritional compounds necessary for human survival. Vegetables, which are rich sources of vitamins, minerals, carbohydrates, protein and dietary fibers are important to the human diet. A balanced diet should contain 250-325g of vegetables and the average human requirement for vegetable is 285g/person/day for a balanced diet (Attavar, 2000). Fluted pumpkin leaves and seeds also have medicinal values (Bologi, 2012). According to him, researches carried out on the medicinal values of fluted pumpkin leaves indicated that “fluted pumpkin possesses anti-inflammatory (painkiller), antibacterial, erythropietic, anti cholesterolemia (prevents the build up of cholesterol and antidiabetic (treat diabetes mellitus by lowering glucose levels in the blood) activities. He emphasized that *Ugwu* leaves could be a useful therapy for hypercholesterolemia through reducing oxidative stress and cholesterol levels.

Fluted pumpkin (*T. occidentalis* extract) could also be used as an alternative, longer-term, plant food-based supplementation strategy for iron deficiency anemia treatment (Natural Health, 2011). Some scientists have proposed the use of fluted pumpkin in the treatment of anaemia, also extracts of fluted pumpkin helps to maintain the blood level (Natural Health (2011). The leaves and seeds are the edible parts of the plant and are used in everyday meals by incorporation into soups and stews.

Agricultural production is the major activity of the rural people of Rivers and Akwa Ibom States and small-scale farmers dominating the farming population. The farm sector has been the backbone of the economy since independence, employing more than 70 percent of the country’s population. Small farmers dominate the sector and provide the bulk of the nation’s domestic food supply (Kebbeh, *et. al.*, 2003). The nation Agriculture sector is characterized by a large number of the small-scale farmers scattered over wide expanse of land and holdings ranging from 0.05-3.0 hectares per farmer, low capitalization and a low yield per hectare (Ukeje, 2006).

He explained that the sector’s performance has improved in recent years; it is still described as one with a great deal of unrealized potential. According to him, out of 70 million hectares of land classified as agricultural land in the country, only about 42 million hectares of this is currently under permanent either crop or pasture.

This leaves about 28 million hectares of land for arable farming. Irrigation remains underexploited; while most of the nation's agricultural land is transverse by perennial or annual rivers, only about 10 percent of such area is presently under irrigation, corresponding to one percent of cropped land (Oladapo, 2007).

The smallholder farmers control a vast proportion of the productive agricultural resources in Nigeria (Abang and Agom, 2004). They have also been characterized by a low level of resource utilization, low levels of productivity, low returns to labour and a low level of capital investment (Olayide and Heady, 2006). The level of profitability of fluted pumpkin production in the floodplain area of the Niger Delta Nigeria has not been adequately estimated. Also not much study has been conducted in the area to ascertain if production in the floodplain is profitable. It becomes imperative that the study is designed with the broad objective of comparing the profitability of fluted pumpkin production in Rivers and Akwa Ibom States, Niger Delta Nigeria. Specifically the study examined the socio-economic characteristics of fluted pumpkin farmers in the study area, estimated the cost and returns of fluted pumpkin production in the study area and identified major constraints to fluted pumpkin production in the study area

H_{01} = The profit level from fluted pumpkin production in Rivers State is not different from Akwa Ibom State.

2 METHODOLOGY

2.1 Study Area

This research was carried out in Rivers and Akwa Ibom States of the Niger Delta, Nigeria. The states are among the 36 states of Nigeria. The states in the Niger Delta are; Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Ondo, Imo, Rivers States, with an area of 112,000 sq. km, a population of 27 million people, 185 LGA's, about 13,329 settlements (Ichite, 2015). The Niger Delta region is situated in the southern part of Nigeria and bordered to the south by the Atlantic Ocean and to the East by Cameroon; it occupies a surface area of about 112,110 square kilometres (Welch, et al; 1977). It represents about 12% of Nigeria's total surface area and it is estimated that by the beginning of 2006 its population will be over 28 million inhabitants. The Niger Delta covers 20,000 km² within wetlands of 70,000 km². The floodplain makes up 7.5% of Nigeria's total land mass. It is the largest wetland and maintains the third-largest drainage basin in Africa (Welch, et al; 1977).

2.2 Population of the Study

This research was carried out in Rivers and Akwa Ibom States of Nigeria; the states are parts of the 36 states of Nigeria among the oil rich states in Niger Delta region of Nigeria with a population of 9,119,924 million people having 4,656,228 males and 4,444,539 females (NPC, 2006).

2.3 Sampling Techniques

Data for the study were collected using a combination of multi-stage random sampling technique. The choice of the study area was purposive because of the high activity of fluted pumpkin production floodplain area. Selection of the fluted pumpkin farmers in the sample area was through simple random sampling of the farmers from the 479,170 farming families in Rivers State (RSADP Annual Report, 2009) and 360,000 farming families in Akwa Ibom State (Akwa Ibom State Agricultural Development Annual Report, 2000). The first stage of the sampling procedure was the compilation of the list of fluted pumpkin floodplain farmers by the enumerators.

The first selection process was choosing Local Government Areas (LGAs) from each of the agricultural zones of the state. In Rivers State, the selection was carried out by choosing the 3 agricultural zones. Emuoha LGA, Gokana LGA and Tai LGA were selected in zone 1; Abua/ Odual LGA was selected in Zone 2 while Ahoada West LGA and Ogba/ Egbema/ Ndoni LGAs were selected in Zone 3 making a total number of six local government areas in Rivers State. The next stage was the random selection of three (3) communities from each local government area giving a total of 18 communities in Rivers State. Three agricultural zones were randomly selected from the six agricultural zones in Akwa Ibom State. These were Abak, Uyo and Etinan agricultural zones. Ukanafun Local government Area and Abak Local Government Area were chosen in Abak zone; Etinan Local Government Area and Nsit Ubium Local Government Area were chosen in Etinan zone while Uyo Local Government Area and Ibiono Local Government Area were chosen in Uyo zone. The next stage was the random selection of three (3) communities from each Local Government Area giving a total of 18 communities. 170 farmers were selected from each state giving a total of 340 respondents.

2.4 Instrument for Data Collection

Well-structured questionnaire containing relevant questions such as type, quantity of fluted pumpkin produced, per unit price, cost of labour, transportation and amount realized from sales were asked. Interview and personal observation were used to obtain relevant information from the respondents.

2.5 Sources of Data Collection

Primary data was collected using well-structured questionnaire, personal observation and interview to obtain relevant information from farmers while secondary data was collected from journal, textbooks, internet and publications.

2.6 Methods and Techniques of Data Analysis

Objective 1 was analyzed using descriptive statistics why objectives 2 was achieved using the

Enterprise Budget Analysis Model

Net Income Model

$$NP = (TR - TVC) - TFC \quad \text{eq 1}$$

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 Naira (₦)

Cost Function Estimation Model for Fluted Pumpkin Farm

$$TC = TFC + TVC \quad \text{eq. 2}$$

Where

TC = Total Cost in Naira (₦)

TFC = Total Amount on Depreciation on Fixed Assets in Naira (₦)

TVC = Total Variable Cost in Naira (₦)

Revenue Estimation Model

$$TR = TP \times P \quad \text{eq 3}$$

Where

TR = Total Revenue in Naira (₦)

TP = Total Output of Fluted Pumpkin in Kg

P = Price per Kg of or Fluted Pumpkin in Naira (₦)

Hypothesis 1 was tested using the following model using Z – Test.

Z Test compares means of two populations. Z test assumes normal distribution under null hypothesis. It is performed on a large number of data or on a population data. The score determined by Z test is called "Z score". Z score can be approximated when population standard deviation of a large data is given.

The Z-test statistic according to Daniel, 1999 was stated as follows:

$$Z = \frac{(\bar{x} - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\delta_1^2 / n_1 + \delta_2^2 / n_2}}$$

Where \bar{x}_1 = sample mean of group one

\bar{x}_2 = sample mean of group two

μ_1 = population mean of group one

μ_2 = population mean of group two

δ_1^2 = population standard deviation of group one

δ_2^2 = population standard deviation of group two

n_1 = number of observation of group one

n_2 = number of observation of group two

Hypothesis

$$H_0 : \mu_1 = \mu_2$$

$$H_A : \mu_1 \neq \mu_2$$

Decision rule: If z- Calculated ie z estimated is greater than (>) the critical value which is 1.9600 for a two tailed test, then the null hypothesis will be rejected, but if otherwise accept the null hypothesis. The rule is applicable for all two tailed in z-statistics.

3 RESULTS AND DISCUSSION

3.1 The result of the socio-economic characteristics of fluted pumpkin farmers in the study area

Table1 Socio-economic characteristics of fluted pumpkin farmers in the study area

Sex in number	Frequency	Percent
Male	121	35.6
Female	219	64.4
Age in years		
15-20	8	2.6
21-30	69	20.3
31-40	120	35.3
41-50	87	25.6
51-60	45	13.2
60& above	11	3.2
Household size in person		
1-5	139	40.9
6-10	136	40
11-15	56	16.5
16-20	8	2.3
21 &above	1	0.3
Education		
Higher degree	10	2.9
First degree	13	3.8
NCE/Diploma	31	9.1
Secondary	110	32.4
Primary	139	40.9
Non formal education	37	10.9
Farming experience (years)		
1-5	68	20
6-10	122	35.9
11-15	85	25
16-20	33	9.7
21-25	9	2.6
26-30	9	2.6
30 & above	14	4.1
Farm size in hectare		
< 0.4ha	147	43.2
0.4-0.9	67	19.7
1-1.4	44	12.9
1.5-1.9	13	3.8
2-2.4	43	12.6
2.5-2.9	3	.9
3 & above	23	6.8
Total	340	100

Source: Field Survey, 2010

The result in Table 1 presents the socio-economic characteristics of the farmers which indicates that 35.3% of the farmers were in the age bracket between 31-40 years, the age bracket of 41-50 years was 25.6 % while the age range of 15 -20 years was 2.6%. The result also shows that about 64.4 % of the farmers were females while 35.6% were males. The sex of an individual can influence the type and quality of work carried out by the individual. Vegetable is usually seemed as the women crop in the study area. The production and harvesting activities is not tedious when compared with tuber crop like yam. That could explained why women dominated the farming population.

The finding on the family size of the respondents shows that majority of farmers in the study area had a family size between 1-5 and 6-10 members constituting 40.9% and 40% respectively only 0.3% of the respondents had between 16- 20 persons. A farmer's level of education is expected to influence his ability to adopt agricultural innovations and make decisions on various aspects of farming. The study found that most of the respondents were able to attain primary level of education constituting 40.9% of the population. 32.4% of them acquired secondary education while only 15.8% of them were able to acquire tertiary education. Since

about 89.1% of the farmers had some form of formal education, it is implied that the participants were not likely to have much difficulty in understanding and adopting modern agricultural technologies and innovations.

Farming experience generally correlates with acquisition of improved skills in agricultural production. The result shows that 35.9% % of the farmers had been practicing farming in the floodplain area between 6 -10 years while only about 2 % of the farmers had spent between 1- 5 years. The result clearly shows that the farmers are not new entrants in fluted pumpkin production in the floodplain farming. The result further found that majority of the farmers about 43.2% and 19.7% had a farm size which is less than 0.4ha and between 0.4-0.9ha respectively indicating that these farmers were small scale farmers.

Table 2: Profitability of Fluted Pumpkin Production in Rivers and Akwa Ibom States

Type		Rivers State	Akwa Ibom State
Variables	<i>Items</i>	<i>Amount in Naira(₦)</i>	<i>Amount in Naira(₦)</i>
Variable costs	Amount spent on planting materials	23040.56	70615.59
	Amount on Fertilizer/farm in ₦	2050.30	339.54
	labour expenses	79248.20	22610.59
	Transport expenses	3593.83	1338.50
	Total Variable Cost (TVC)	107932.90	94904.22
Fixed Costs	Total Depreciation	458.18	2076.07
	Rent on land/annum	374.86	315.48
	Total Fixed Cost(TFC)	833.04	2391.55
Revenue	Total Revenue (Qi)	196995.96	160,128.97
<i>Gross margin less</i>		89,063.06	65,224.75
<i>5% tax on gross margin</i>		4,453.15	3,261.24
Net income		84,609.91	61,963.52

Source: Field Survey, 2010

3.2 The result on the profit level of fluted pumpkin production in both Rivers and Akwa Ibom States floodplain farms as presented in Table 2 indicated that the mean revenue realized in Rivers State farms was ₦84,609.91, total variable cost of production was found to be ₦107,932.90 and mean fixed cost was ₦833.04. Gross margin was estimated at N89,063.06 during the production cycle and net profit was ₦84,609.91. The total revenue in Akwa Ibom State was estimated at ₦160,128.97, total variable cost was ₦94,904.22, mean fixed cost was ₦2,391.55 while gross margin was estimated at ₦65,224.75 and net profit was found to be ₦61,963.52. The finding is in consistency with the study by (Okeke *et. al*, 2006) on the profitability of dry season vegetable farming in Jos, Plateau State which shown that a gross margin of ₦102,740.00 per hectare was realized having a gross revenue of ₦171, 200.00 with a total variable cost of ₦68, 460.00. The study of Afolabi (2010) supports the finding that the profitability analysis of Fadama farming indicated that an average farmer incurred a variable cost of ₦37,524.66 but earned average revenue of ₦67, 544.4 and that an average farmer earned a gross margin of ₦30, 019.74 per annum suggesting that fadama farming is a profitable venture in the study area. It means that both Rivers and Akwa Ibom states fluted pumpkin farmers were operating their farms profitably.

However, the mean profits recorded in Rivers State appeared to be higher than those of Akwa Ibom state farmers. This could be associated with higher demand supply gap of fluted pumpkin in the more urban state of Rivers State. Even though Akwa Ibom consumers have been known to relish consumption of vegetables in their varied meals more than Rivers State households do, the population density of Rivers State when compared to Akwa Ibom state could serve as incentive for higher prices by Rivers State fluted pumpkin farmers, a situation capable of increasing their profit level *ceteris paribus*.

Table 3 Z- test of Net Profit inn Fluted Pumpkin Farms in Rivers and Akwa Ibom States

	<i>Rivers Net Profits Pumpkins (₦)</i>	<i>Akwa Ibom Net Profits Pumpkin (₦)</i>
Mean	84609.91	61,963.52
Known Variance	405534	980821
Observations	170	170
Hypothesized Mean Difference		0
Z		-283.17
P(Z<=z) one-tail		0
z Critical one-tail		1.64
P(Z<=z) two-tail		0
z Critical two-tail		1.96

Source: Field Survey (2010) using Stochastic Frontier 4.1C Software, and SPSS

3.3 The result in Table 3 shows the Z- test value of differences in the mean net profit levels of fluted pumpkin farms in Rivers and Akwa Ibom States. The result indicated a z- statistic value of -283.174, which

had a p value of 0.000, implying that under a two tailed test, the mean difference in the net profit between Rivers and Akwa Ibom farms varied significantly at 1 percent level of statistical significance. Therefore the null hypotheses that stated that *There is no significant difference between the Net Profit of fluted pumpkin production in the floodplain areas of Rivers and Akwa Ibom States* was rejected and therefore the alternative hypothesis stated a significant difference between the net profit level of the fluted pumpkins in the two states was accepted.

Table 4: Problems by Floodplain Fluted Pumpkin Farmers in the Study Area

Types of Problem	Frequency	Percentage
Rapid weeds growth	253	16.8
Scarcity of labour	111	7.4
High price of labour	201	13.3
High losses of the fluted pumpkin leaves to flooding	117	7.7
Low price of the product during the period	186	12.3
Inadequate storage facilities for the product	282	18.7
Insufficient capital	280	18.5
High transportation cost	80	5.3
Total	1510**	100

**Multiple Responses

Source: Field Survey, 2010

3.4 The result on Table 4 shows problems of fluted pumpkin production in the floodplain of the Niger Delta Nigeria. The result indicated that inadequate storage facility for the storage of the products accounted for 18.7 percent of the problem, scarcity of labour was 7.4 percent, high losses of fluted pumpkin leaves to flooding accounted for 7.7 percent, insufficient capital was 18.5 percent, rapid growth of weed accounted for 16.8 percent, high price of labour was 13.3 percent, low price of the product during the flooding period was 12.3 percent and high cost of transportation accounted for 5.3 percent. It is evidenced that inadequate storage facilities, insufficient capital, rapid growth were major problems of producing fluted pumpkin in the study area.

The study concludes that women dominated fluted pumpkin production in the Niger Delta floodplain farms and the production venture was profitable but the level of estimated profit in the two states varied significantly. Therefore, women are advised to improve their income earning by producing fluted pumpkin in the floodplain farms.

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