PERI-URBAN FARMING FOR IMPROVED INCOME: CASE OF FLUTED PUMPKIN PRODUCTION IN SABON GARI LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA.

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ABSTRACT

The study assessed peri-urban farming for improved household income in the case of fluted pumpkin production in Sabon Gari Local Government Area of Kaduna State, Nigeria. The objectives of the study were to determine the profitability of pumpkin leaf, determine the factors that influence the profitability and identify the constraints the producers faced. Purposive sampling was used to select 2 wards from the 11 wards in the area due to concentration of fluted pumpkin production in the area. Three peri-urban towns were then selected from each ward using random sampling technique. Twenty (20) fluted pumpkin farmers from each town were randomly selected. This gave a total of 120 respondents. Interview schedule was used for data collection. Descriptive statistics, gross margin and multiple regression analysis were used for analysis. A gross margin of ₦16,480 and a return per investment (RNI) of ₦ 1.98 were realized by the farmers in a year. The results of the regression analysis indicate that sex (β = -85131.925, $p < 0.01$), marital status (β = -67562.489, $p < 0.01$), household size (β = -2402.679, $p < 0.05$) and years of experience (β = 31825.687, $p < 0.01$) were the socio-economic factors that significantly influenced the level of profit from pumpkin production. The results also showed that about 32% of the respondents encountered the problem of inadequate rainfall, another 32% also reported financial constraint and 21% perceived low productivity as a problem. It was concluded that fluted pumpkin production in peri-urban area was profitable though producers faced some production constraints.

Keywords: Fluted pumpkin, peri-urban farming, profitability

INTRODUCTION

Despite the high oil revenue, agriculture is still one of the most important sectors of the Nigerian economy. Agriculture contributes over 40% of Nigeria's GDP, employs about 70% of the Nigerian population and produces about 80%of the food needs (Aye, 2013). Agriculture is predominantly carried out in the rural areas as their major source of livelihood. This is because the rural dwellers mostly practice farming to feed themselves, their families and they sell out their produce to settle their domestic needs. However, peri-urban dwellers are now actively involved in farming around their houses and backyards for household income supplementation and better nutrition.

Peri-urban agriculture is one strategy where recent research suggests that food insecurity could be tackled (Mougeot, 2005). Peri-urban farming has been shown to be an important source of food and a critical food "insurance policy" for poor peri-urban households (Mougeot, 2005). Peri-urban farming also affects household nutrition as it provides a source of fresh, locally grown crops that meets the

micronutrient requirements in poor households' diets (Food and Agriculture Organization (FAO, 2001). Among crops grown under peri-urban farming, vegetables have always taken the lead.

Fluted pumpkin (*Telfairia occidentalis* Hook F.*)* locally known as *Ugwu* is a common vegetable crop cultivated across lowland humid tropics of West Africa including Ghana and Sierra Leone (Bologi, 2012). The leaves and seeds are the edible parts of the plant and are used in everyday meals by incorporation into soups and stews. Waheed and Ayodele (2016) noted that it is one of the most popular vegetables grown in southern Nigeria for its leaves as important sources of protein, vitamins and minerals when consumed. They further noted that apart from the nutritional benefit, it provides an appreciable income to small scale farmers. Ibekwe and Adesope (2010) also revealed that fluted pumpkin production remains entrenched in Nigerian agriculture and forms an important condiment in the national diet. 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, peri-urban and urban areas in Nigeria. It is produced mainly by small-scale farmers, who earn their living from it using limited farm inputs. The vegetable also has important health and medicinal benefits. Bologi (2012) cited a research paper published in Natural Health (2011) that the medicinal values of fluted pumpkin leaves have anti-inflammatory properties (painkiller), anti-bacterial, erythropietic, anti-cholestrollemic (prevents the build-up of cholesterol) and anti-diabetic (treat diabetes mellitus by lowering glucose levels in the blood) activities.

Though fluted pumpkin was originally grown in southern part of the country, in the last two decades its production has increased tremendously in the northern part of the country, cultivated even in dry season with use of local irrigation system. However, in spite of the aforementioned social, economic and nutritional benefit of the vegetable, there is dearth of information on pumpkin leaf production in the study area. The study therefore intends to fill the knowledge gap on peri-urban production of pumpkin leaf.

METHODOLOGY

The study was conducted in Sabon Gari Local Government Area of Kaduna State of Nigeria. Sabon Gari is located in the Northern Guinea Savannah Zone of Kaduna state. The area lies within latitude 11^{o}12' N and longitude 7^{o}8' E with two distinct dry and wet seasons. The rainfall extends from April to October and average annually between 100 to 1000mm with a mean temperature ranging from 27.20 ^{o}C to 35 ^{o}C in the month of April. Purposive sampling was used to select 2 wards (Sabon Gari and Bassawa) from the 11 wards in the area due to concentration of fluted pumpkin production in the area. This was followed by random selection of three peri-urban settlements from each ward and finally 20 fluted pumpkin farmers from each settlement. Interview schedule with the aid of questionnaire was used for data collection. Descriptive statistics (mean, frequency and percentage), gross margin and multiple regression analysis were used for the study. Due to non-return of 18 questionnaires only 102 were used for analysis.

Description of Models

Gross Margin Analysis

The model is expressed as:

GM=GI - TVC…… (1)
where:
GM= Gross Margin (N/ha)
GI= Gross Farm Income (N/ha)
TVC= Total variable cost (N/ha)
Returns per naira invested (RNI) will be obtained by dividing the gross income (GI) by the total variable cost (TVC)
Therefore,
RNI = GI/TVC…….....(2)
where:
RNI = returns per naira invested
GI and TVC as defined above.
Decision rule:
RNI>1, it implies the farm is profitable
RNI=1, it implies farmer operating at breakeven point
RNI<1, it implies the farmer is at loss

Multiple Regression Analysis

The model is explicitly specified as:
$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \ldots B_6X_6 + u$…….(3)
where:
Y = Profit from sale of Fluted Pumpkin Leaves (₦)
X_1 = Sex
X_2 = Marital status
X_3 = Educational level
X_4 = Household size
X_5 = Years of experience
X_6 = Farm size
β_0 = Constant
β_1 - β_6 = standardized partial regression coefficients
u = error term

RESULTS AND DISCUSSION

Socio-economic characteristics

The results in Table 1 show that there were more women (59%) involved in pumpkin leaf farming than men in the study area, and more (51%) of them are married. The result corroborates findings of Nwosu *et al.* (2012), Edet *et al.* (2014) and Obinaju and Asa (2015) who stated that there are more women involved in pumpkin leaf production than men and that majority of them were married. Only a small percentage (14%) of the farmers were without any form of education while different proportions have one form of education or the other indicating that the farmers were literate and could have positive influence on level of profit. The implication of this high literacy implies that farming information from extension agents and other sources could be better assimilated, processed and put to practice.
Majority (80.4%) of them have household of size greater than 5 people though a greater proportion (46%) of this were in the range of 6 to 10 persons with about half (50%) of them having modest years of experience of between 6 to 10 years. The distribution of the household size could enhance production efficiency if the household provide the farm labour and if the input is optimally utilized. Household sizes have been noted to affect family labour available for farm work and other household activities. Therefore, the relatively large household size could be an important input for unpaid labour. This was affirmed by Nwosu *et al.* (2012) who recorded a positive and significant relationship between household size and output realized from pumpkin production. In the same vein, experience is capable of impacting positively on pumpkin production.

TABLE 1: SOCIO-ECONOMIC CHARACTERISTICS OF FLUTED PUMPKIN FARMERS (N=102)

Variable	Frequency	Percentage	Mean	Std. Dev.
Sex				
Male	42	41.2		
Female	60	58.8		
Marital status				
Married	52	51.0		
Otherwise	50	49.0		
Educational Level				
No formal	14	13.7		
Adult education	10	9.8		
Primary	34	33.3		
Secondary	24	23.5		
Tertiary	20	19.6		
Household size				
1-5	20	19.6		
6-10	47	46.1		
>10	35	34.3	8	11.657
Years of Experience				
1-5	48	47.1		
6-10	51	50.0		
>10	3	2.9	7	4.391

Output in Bunches

Results in Table 2 shows the output in bunches obtained by the farmers in the study area. About 32% of the farmers had an output of 51 – 100 bunches per annum, an average of 29% each had 101 – 150 and 151 – 200 bunches per annum. On the average, 114 bunches/farmer were recorded as output in a year. The output realized was low as compared to other studies (Goler and Ibrahim, 2017; Edet *et al*., 2014). This thus leads to low profit as revealed in Table 3.

TABLE 2: DISTRIBUTION OF RESPONDENTS BY OUTPUT IN BUNCHES OBTAINED BY THE FARMERS (N=102)

Output	Frequency	Percentage %
0-50	26	8.8
51-100	30	32.3
101-150	24	29.4
150-200	22	29.5
Mean = 114 bunches		

Gross margin analysis

Results in Table 3 shows the gross margin analysis of the pumpkin farming among the farmers per annum in the study area. The variable cost includes: cost of labour (₦156,000), cost of seeds (₦560), cost of

inorganic fertilizer (₦3,000) and cost of organic fertilizer (₦5000). Cost of labour accounted for the highest (94.8%) percentage of cost incurred while cost of seed was the least (0.34%). The total variable cost incurred was ₦164,560. On an average, the respondents produce 114 bunches of fluted pumpkin leaf per annum at an average cost of ₦2,860. This gave a gross income of ₦326,040. The gross margin attained was ₦161,480 and therefore a return per invested (RNI) of ₦ 1.98. The implication is that fluted pumpkin leaf production in the study area is profitable and shows that for every ₦1 invested, 98k was obtained as profit. However, in comparison, findings of similar separate studies in fluted pumpkin production by Edet *et al.* (2014) and Obinaju and Asa (2015) both in Akwa-Ibom State shows that even though fluted pumpkin production in Sobon Gari LGA is profitable, the profitability is low when compared to the results of the above-mentioned authors that revealed RNI of ₦2.64 and ₦2.42 respectively. The low profit realized could be due to the effect of lower yield obtained as a result of lower rainfall usually recorded in the northern part of the country as against high rain obtained in the south. It could therefore be deduced that with optimum irrigation, higher yield and consequently, higher profit could be realized from pumpkin production in the study area.

TABLE 3: **GROSS MARGIN ANALYSIS**

Items	**Quantity**	**Unit price (₦)**	**Total (₦)**	**Percentage contribution (%)**
Number of labour employed (man)	2	1500/week/man	156,000	94.80
Quantity of seed used (per seed)	70	8	560	0.34
Quantity of inorganic fertilizer (tiers)	6	500	3000	1.82
Quantity of organic fertilizer (100kg bag)	2	2500	5000	3.04
Total Variable cost			**164560**	**100**
Gross income				
Bunches of pumpkin leaf	114	₦ 2860	₦ 326040	
Gross margin			**₦161480**	
Return per naira			₦ 1.98	

Multiple Regression Analysis for Factors Influencing Profit from Pumpkin Production

The results of the multiple regression analysis of the influence of some variables on household profit of fluted pumpkin are shown in Table 4. The coefficient (0.871) of the multiple determination (R^2) indicated that about 87.1% of variation in profit of fluted pumpkin leaf was explained by variables included in the model, implying that the explanatory variables had a significant influence on the profit and that the regression has very high explanatory

power. The adjusted R^2 was 0.846 which confirms the influence of the explanatory variables on the profit and implies that the independent variables considered determined profit by 84.6% while the other 15.4% remained unexplained or could not be controlled by the farmer. The model was well fitted to the data since the F-ratio value (19.085) was highly significant ($P<0.01$). This implies that the joint effects of all the included variables influence the profit of the farmers and the regression result was statistically reliable. The results of the regression analysis indicate that sex, marital status, household size and years of experience significantly influenced the level of profit from pumpkin production (Table 4).

Sex of the farmers had a negative coefficient (-85131.925) that was significant at 1% level of probability. The result indicates that when more male farmers are involved in pumpkin leaf production, less profit will be realized. A possible reason could be that most peri-urban farms are located close to or around households where women can easily tender to such farms while concurrently attending to other household needs. On the other hand, men go out to work and most times do not come back until much later in the evening. Therefore, women have more time for the farms and thus, ceteris paribus more profit.

Marital status also had negative coefficient (-67562.489) and was highly significant ($p<0.01$). This means that married farmers make less profit as compared to their unmarried counterpart. The result is contrary to what is expected as marriage is considered a sign of responsibility (Ango *et al.,* 2011) and that individuals who are married are more settled and in a better position to concentrate on their income activity. It is thus expected that married individuals would have more output and higher profit.

The coefficient of household size was significant at the 5% level and its significance is negative. This implies that it has an inverse relationship on the profit of the farmers. This means that farmers with larger households recorded lower profit than farmers with smaller households. This finding is contrary to past studies. Nwosu *et al.* (2012); Edet *et al.* (2014)) that reported significant and positive influence of household size to profit from pumpkin production. It is expected that since pumpkin production is labor intensive, large household sizes would imply available labor for production. The possible reason for the unexpected finding could be that farmers do not make appropriate use of their family members for farm production but rather prefer to hire labour. Larger household could mean more mouth to feed without a corresponding reduction in labour cost, thus, lower profit.

The coefficient (31825.687) of years of experience was very significant ($p<0.01$) and positively signed. This implies that it has a direct relationship on the profit of fluted pumpkin leaf farmers. The more experienced farmers recorded higher output than the less experienced farmers. The result conforms to past study Anozie *et al.* (2017). Experienced farmers are perceived to better understand and processed new farming information from extension agents (best cultural practice, appropriate herbicide/chemical etc.) and other sources and hence, improves upon their efficiency and output. They are also known to be early adopters of new farming techniques.

TABLE 4: MULTIPLE REGRESSION ANALYSIS FOR FACTORS INFLUENCING PROFIT FROM PUMPKIN PRODUCTION

Variable	Coefficient	Std. Error	T-value
Constant	164922.263	122584.664	1.345
Sex	-85131.925	18878.801	-4.509***
Marital status	-67562.489	17925.530	-3.769***
Educational level	-10848.523	17697.067	-0.613
Household size	-2402.679	969.299	-2.479**
Years of Experience	31825.687	6566.048	4.847***
Farm size	7298.773	40982.630	0.178
R^2	0.871		
Adjusted R^2	0.846		
F-value	19.085***		

***= significant at 1%, **= Significant at 5%, *= Significant at 10%, ns = not significant

Production constraints faced by fluted pumpkin farmers

Results in Table 5 shows the constraints faced by fluted pumpkin famers during production. The problem of inadequate rainfall and financial constraints were both ranked 1st by the respondents as constraints. These were followed by low productivity as a problem, while the lowest ranked constraint was poor storage facilities. The result agrees with past findings of Nwosu *et al*. (2012); Ndubueze-Ogaraku (2017) on fluted pumpkin production. These constraints could limit the yield obtainable from the vegetable production and subsequent profit.

TABLE 5: DISTRIBUTION OF FARMERS BASED ON CONSTRAINTS ENCOUNTERED.

Constraints	Frequency	Percentage*	Rank
Poor rainfall	38	31.67	1
Financial constraint	38	31.67	1
Low productivity	25	20.83	3
Pests	21	17.5	4
Poor storage facilities	20	16.67	5

*Multiple responses

CONCLUSION AND RECOMMENDATIONS

It could be concluded that fluted pumpkin production in peri-urban areas was profitable though producers faced some production constraints. Sex, marital status, household size and years of experience significantly influenced the level of profit from pumpkin production. It was therefore recommended that individuals should embrace its production for improved household income. Also, individuals or the Institute for Agricultural Research under the Agricultural Engineering sub-unit should make localized, fabricated prototypes (that could be multiplied by investors) of irrigation system that would ease and reduce the problem of inadequate

rainfall availability. Farmers are also advised to form cooperatives in order to access affordable credit to ease financial constraint.

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