

## Determinants of Profitability Difference among Fluted Pumpkin and Green Amaranth Vegetable Marketers in Enugu State Nigeria

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### Abstract

Profitability in green amaranth and fluted pumpkin vegetables is of core essence among various marketers who also produce them. Profitability contributes to persistent variation in poverty and food insecurity among the marketers. Understanding the factors affecting the profitability among the actors in the marketing of the most common vegetable crops and the underlying socio-economic factors influencing it presents a veritable approach in the transformation of vegetables in Nigeria. In view of the aforementioned, the study assessed the profitability difference of selected vegetable marketers in Enugu State, Nigeria. The study specifically described the socioeconomic characteristics of the vegetable marketers; determined the profitability in the marketing of fluted pumpkin and green amaranth; compared the profitability in the marketing of fluted pumpkin and green amaranth; analysed the factors affecting the profitability among marketers of fluted pumpkin and green amaranth; determined the factors constraining the marketers' profitability of these vegetables. A total of 120 respondents were sampled from the area, comprising of 60 green amaranth marketers and 60 fluted pumpkin marketers. The data generated were analysed using descriptive and inferential statistics. The profitability analysis of fluted pumpkin and green amaranth marketers revealed that a gross margin of ₦25,210.0 was made by the fluted pumpkin marketers and ₦23,572.0 was made by the green amaranth marketers per month. The results of the analysis of factors affecting profitability among the fluted pumpkin marketers and green amaranth marketers revealed five variables to be significant viz: household size (-7.9043 and -7.3153), gender of the household head (0.372203 and 0.3948026), access to credit (-2.8746 and -3.0151), machinery access (8.16172 and 8.018447) except for farm size (0.1244789) which was significant for only fluted pumpkin marketers.

**Key words:** Profitability, Vegetable marketing, Gross margin analysis, Fluted Pumpkin, Green amaranth

### Introduction

Profitability in green amaranth and fluted pumpkin differs among various marketers some of who also produces them. The differences in profitability contribute to persistent variation in poverty and food insecurity among the marketers (Snoxell & Lyne, 2021). These variations have created heterogeneity among smallholders from subsistence, few semi-subsistence, intermediate, semi-commercial, and commercial farmers based on the level of participation in the output market for profit maximization. Understanding the factors affecting the profitability among the actors in the sale of green amaranth and fluted pumpkin and the underlying socio-economic factors influencing it presents a veritable approach in the transformation of farmers into commercial farmers in Niger

A wide range of characteristics and different handling methods that contributes to profitability differences exists in the literature. According to Anthonio & Akinwumi (2020), its unique characteristics such as the high perishability, the price, and yield volatility over the production year, together with the changes in demand could lead to variation in insecurity and losses faced by the vegetable growers and marketers. In the same vein, Adenuga, Fakayode, and Adewole (2018) described the marketing of

vegetable as a multifarious phenomenon as a result of the perishability and bulky nature of vegetables. This shows why significant and heavy losses are faced by marketers along the vegetable value chain. As stated in Ibeawuchiet *al.* (2015), there is no exact knowledge on how much food is lost between harvest and consumption but these vary with the nature of handling methods used by the marketers. It is however important, as posited in Oyeniran (2018) the losses in vegetables and fruits from the rural areas where it is produced up to the town where they are mostly marketed are as high as fifty percent. These losses have been perceived to arise during transportation, storage, and marketing of the products (Oyeniran, 2018). This makes studies in vegetable marketing very crucial in the country today, as an efficient marketing system will help reduce the increasing rate of postharvest losses. Other constraints to marketers include, non-availability of credit, low product price, storage facilities, perishability of goods to mention but a few impact negatively on marketers' gross margin.

In Enugu State, there have been concerns over the years regarding the promotion of these vegetables and how increased production and consumption of leafy vegetables can make an important contribution to improved nutrition, profitability, and income of

smallholders. Due to the important role vegetables play in the human diet, economy and the environment, there is a universal recognition to develop a system of vegetable marketing in Nigeria and this has led to a rise in demand, particularly in urban areas, which has created opportunities for local smallholder farmers to improve their income and family nutrition (Oyeniran, 2018). The marketing of vegetable is gradually developing as many people develop an interest to engage in vegetable enterprise especially as market intermediaries and thereby, assist in the process of distribution. Current literature in Nigeria and sub-Saharan Africa shows that previous studies have not sufficiently dealt with the profitability difference across vegetable marketers in Enugu state (Garnett, 2015; Idah, Ajisegiri&Yisa, 2017; Oyeniran, 2018). Other Studies on vegetable marketing have accumulated considerable evidence on the effect of input markets such as on market orientation of farmers including costs of input such as fertilizers, improved seed, herbicides, and extension guidance and their effects on profitability (Bernard *et al.*, 2017). Many authors have also worked on output market such as the effect of high transaction costs on the commercialization of smallholder farming as well as costs of storage facilities and access to credit (Anyiro, & Emerole, 2013, Bernard, 2003; Daramola, 2017; Gamel, Ahmed, & Kereem, 2006); Joshua, 2015). This difference in profitability among vegetable marketers differs even among smallholders in sub-Saharan Africa and Enugu state and this could have resulted in unequal access to input and output market within the state. This study intends to fill the gap by examining the determinant of profitability difference among fluted pumpkin and green amaranth marketers in Enugu state.

Filling this gap is necessary because none of these works focused on determinants of profitability difference among marketers in Enugu state, so the work contribute to policy intervention that will enhance production and marketing of green amaranth and fluted pumpkin that are lagging in Enugu state. Against this backdrop, the following research questions will be answered:

- i. What are the socio-economic characteristics of fluted pumpkin and green amaranth marketers?
- ii. What is the profitability of marketing these vegetables?
- iii. Is there a statistically significant difference in profitability between green amaranth and fluted pumpkin marketers?
- iv. What are the factors affecting profitability among these marketers?

## 2.0 Research Methodology

### 2.1 Study Area

The study area for this research is Enugu state, Nigeria. The state is one of the five states in the South-East geopolitical zone of Nigeria. Enugu state was selected purposively because: (a) the majority of the rural dwellers in this state engaged in small-scale farming, (b) the state is regarded as the capital and policy-making seat of the South-east geopolitical zone (Ekwe, 2014). Enugu state has a population of about 3,267,837 (Nigerian Bureau of Statistics, 2016). The state is divided into six Agricultural Zones [AZs], three

out of these zones was selected based on the similarities in soil characteristics and by extension meteorological properties. The zones selected include Enugu zone, Awgu zone, and Nsukka zone. The state is in a tropical rain forest zone, with a mean daily temperature of 27°C and monthly rainfall of 18mm. In recent times, the state has experienced a dramatic deviation from the regular rainfall pattern with a difference of 281mm of precipitation between the wettest and driest months in the year. The average temperature increase is estimated at 0.3°C per decade (Nwiro, 2012). The topography is undulating with an elevation between 1,700m and 2,900m above sea level (Ocmr, 2006).



**Figure 1: Map of Enugu state showing sampled zones (Source: Nwibo&Okorie, 2013).**

The main vegetable crops in the state are fluted pumpkin, green leaf, waterleaf, okra, tomatoes, garden egg, cucumber, and red pepper among others. Food crops grown in the state are yam, cassava, maize, cocoyam, and different livestock resources include, poultry, goat, pigs, and cattle which are reared mostly on intensive/semi-intensive and extensive bases by smallholder farmers (Enete, 2014).

### 2.2 Sampling procedure

The population for the study comprises of fluted pumpkin and green amaranth marketers in Enugu State. The study covered three out of six agricultural zones of the state. A multi-stage sampling technique was employed to select 120 marketing households to be surveyed. In the first stage, the three agricultural zones (AZs) of the state were purposively selected based on the predominance of vegetable marketers. In the second stage, two Local Government Areas (LGAs) within each of the three zones were randomly selected, making six LGAs. In the third stage, two communities were purposively selected from each of the selected LGAs, making

12 communities. This purposive selection was done based on the fact that the selected communities were highly involved in the production and marketing of vegetables. In the fourth stage, ten marketing household heads (5) fluted pumpkin marketers and 5

green amaranth marketers) was randomly selected, making a total of 120 vegetable marketers. Summary of the sampling procedure and the selected areas are presented in Table 1.

**Table 1: Sampling procedure and the selected areas**

AZs	LGAs	Communities	Household Heads
Awgu	Udi	Egede	10
		Affa	10
		Ihuezi	10
		Amabdim-Olo	10
		Nsukka	10
		Lejja	10
Nsukka	Igbo Eiti	Ohodo	10
		Aku	10
Enugu	Nkanu East	AmaNkanu	10
		Amagunze	10
		Akwuke	10
		AmechiUwani	10
	Enugu South		
3	6	12	120

Source: Ihuba, Odii, &Njoku (2013).

**2.3 Method of data collection**

For this study, primary data were used. Quantitative data sourced through household surveys of 120 marketing household heads using pretested semi-structured questionnaires. The questionnaire was structured to generate data that would suitably realize the specific objectives of the research. The primary data obtained include data on the socio-economic characteristics of the farmers such as gender, age, marital status, farm size, education, marketing experience, income, etc.

**2.4 Methods of data analysis**

To realize the objectives of the study, a number of statistical tools were employed in analyzing data obtained for the study. Data for the study were analysed using both descriptive and inferential statistics. Objective I was achieved using simple descriptive statistics such as mean, percentages and frequency distribution. Objective ii was realized by employing the enterprise budgetary technique. Objective iii was achieved using independent t-test while Objective iv was analysed using ordinary least square (OLS) multiple regression model.

**Model specification**

**OLS multiple regression**

The OLS regression model was employed to assess the determinant of profitability among the fluted pumpkin and green amaranth marketers. The form of the multiple regression analysis is explicitly expressed:  $Y = b_0 + b_1X_1 + \dots + b_{20}X_{20} + u$

Where Y is the profitability (Naira)

$X_1$  to  $X_{20}$ ; are the explanatory variables,

$b_1$  to  $b_{20}$  are the parameters of estimation, and;

e is the stochastic disturbance or error term

The OLS multiple regression model is implicitly stated as:

$$Y_1 = f(X_1, X_2, \dots, X_{20})$$

$$Y_2 = f(X_1, X_2, \dots, X_{20})$$

Where;

- $Y_1$  = profitability of the fluted pumpkin marketers
- $Y_2$  = profitability of the green amaranth marketers

**Human capital**

- $X_1$  = Household Size (number of household members)
- $X_2$  = Gender (female =1, male =0)
- $X_3$  = Education (number of years spent in school)
- $X_4$  = Farming experience (number of years spent in vegetable farming: pumpkin/Amaranth)

**Asset capital**

- $X_5$  = The cultivated area owned (hectare)
- $X_6$  = Access to Machinery (Yes=1, No=0)
- $X_7$  = Non-farm income (Naira)

**Institutional Factors**

- $X_8$  = Distance to the market (km)
- $X_9$  = Distance to the asphalt road (km)
- $X_{10}$  = Access to storage facilities (Yes=1, No=0)
- $X_{11}$  = Access to credit (Yes=1, No=0)
- $X_{12}$  = Farm size (hectare)

**Extension contacts**

- X<sub>13</sub> = On-farm demonstration (Yes=1, No=0)
- X<sub>14</sub> = Attendance to training (Yes=1, No=0)
- X<sub>15</sub> = Access to extension worker (Yes=1, No=0)
- X<sub>16</sub> = frequency of extension visit (number of times visited)

- X<sub>17</sub> = Access to water irrigation (Yes=1, No=0)
- X<sub>18</sub> = Use of inorganic fertilizer (Yes=1, No=0)
- X<sub>19</sub> = Use of organic manure (Yes=1, No=0)

**Farmer/marketer behaviour**

- X<sub>20</sub> = Occupation interest (Yes=1, No=0)

**Access to plant's nutrients**

**The independent T- Test**

The independent t-test was used to actualize objective (v). The independent T-test analytical tool was employed to compare the profitability of the green amaranth and fluted pumpkin marketers. Independent sample treatment test (T-test) was employed according to Ezeh and Anyiro (2013), Eze (2007), Emeroleet al. (2009) and Nwaobiala (2010) as

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad n_1 + n_2 + 2 \text{ degree of freedom} \quad \text{..... (1)}$$

Where

- t = Independent t-statistic.
- $\bar{x}_1$  = Mean profitability of the fluted pumpkin
- $\bar{x}_2$  = Mean profitability of the green amaranth farmers
- S<sub>1</sub><sup>2</sup> = variance profitability of the fluted pumpkin
- S<sub>2</sub><sup>2</sup> = variance profitability of the green amaranth farmers
- n<sub>1</sub> = number of fluted pumpkins marketers
- n<sub>2</sub> = number of green amaranth marketers

**3.0 Results and discussion**

**3.1 Socio-Economic Characteristics of Respondents**

The socio-economic characteristics of the vegetable marketers considered in this study were sex, age, marital status, level of education attained, household size, marketing experience, access to extension service, cooperative society membership, and secondary occupation.

**Table 2: Distribution of vegetable marketers according to their socio-economic characteristics**

Parameters	Fluted pumpkin Marketers (60)		Green amaranth Marketers (60)	
	Frequency	Percentage	Frequency	Percentage
<b>Age (years)</b>				
Less than 20	2	3.3	6	10.0
21-40	24	40.0	10	16.7
41 - 60	32	53.3	30	50.0
61 and Above	2	73.3	14	23.3
<b>Mean</b>	41.5 years		39.2years	
<b>Marital status</b>				
Married	34	56.7	32	53.3
Single	12	20.0	22	36.7
Widowed	10	16.7	4	6.7
Divorced	4	6.7	2	3.3
<b>Household size</b>				
Less than 4	20	33.3	4	6.7
5 - 8	36	60.0	50	83.3

8 and above	4	6.6	6	10.0
<b>Mean</b>	7 persons		6 persons	
<b>Educational Attainment</b>				
No formal education	34	56.7	48	80.0
Primary education	18	30.0	6	10.0
Secondary education	6	10.0	4	6.6
Tertiary education	2	3.3	2	3.3
<b>Marketing experience (years)</b>				
Less than 6 years	42	70.0	12	20.0
6 – 10 years	8	13.3	42	70.0
11 – 15 years	6	10.0	4	6.7
16 years and above	4	6.6	2	3.3
<b>Mean</b>	4years		4years	
Male	6	10.0	14	23.3
Female	54	90.0	46	76.7
<b>Access to extension service</b>				
Access	32	53.3	46	76.7
No access	28	46.7	14	23.3
<b>Cooperative society membership</b>				
Member	36	60.0	58	96.7
Non-member	24	40.0	2	3.3
<b>Secondary Occupations</b>				
Crop farming	12	20.0	18	30.0
Agro-processing	4	6.7	4	6.7
Trading	2	3.3	10	16.7
Artisan	16	26.7	2	3.3
Livestock farming	10	16.7	12	20.0
Civil servant	4	6.7	4	6.7
Commercial motorcyclist	9	15.0	8	13.3
Fishing	3	5.0	2	3.3

**Source: Field Survey Data, 2021**

The result of the socio-economic characteristics of vegetable marketers in Enugu state is presented in Table 2. The results show that the majority (90.0%) of the fluted pumpkin marketers were females while (76.7%) of the green amaranth marketers were also females. This shows that it is females that dominate the marketing of the commodities in the study area. This may be due to certain beliefs and gender roles, whereas while the males engage actively in the production, the women usually take up more of the marketing activities. Therefore, the cultural setting of the area allows for gender-stereotype in vegetable marketing. The result shows that female gender of vegetable marketers households may be conditioned to a particular type of work along the agricultural food chain. The study also revealed that 56.7% of the fluted pumpkin marketers were married, while 20.0% were single. Also, 53.3% of the green amaranth marketers were married, while 36.7%

were single. The mean household size was 7 persons per household for fluted pumpkin marketers and 6 for green amaranth marketers. For both vegetable marketers, about one-third of the respondents have family sizes greater than the average number. While high household size could be an incentive for increased land cultivation (especially where all members are adult and participate in farming activities), this is in consonance with the findings of Orgaraku and ogbona (2016) and Osayinlusietal (2016) who recorded a household sizes of between 6 and 10 persons.

The mean age of the respondents was 41.5 years for the fluted pumpkin marketers, while that of green amaranth marketers was 39.2 years. This indicates that relatively young and middle-aged persons were involved in both green amaranth and fluted pumpkin marketing. This finding is in line with that of Haruna (2008)

respondents within the young productive age bracket are likely to be involved in marketing of vegetables.

Marketers' experience is expected to have a considerable effect on profitability (70.0%) of the fluted pumpkin marketers have less than 6 years experience in marketing, while a little below this percentage of the green amaranth marketers have spent 6 to 10 years in green amaranth marketing. A mean of four years experience for both green amaranth and fluted pumpkin marketers of vegetables means that not a large number of them has been in this business for fairly a long time. This finding is similar to the results of Ihenacho (2000) who found the average agricultural years of experience of marketers to be four years. The result from this study affirmed that of Haruna(2008) that the low marketing experience could be because the marketers also engage in other activities such as rain-fed agriculture, crop farming, agro-processing, trading, artisan, livestock farming, civil service, and commercial motorcycling. This occupation diversification may perhaps be as a result of high risks and uncertainties associated with the marketing business. The marketers took to diversification to minimize shock from the effect of unpredictable income from marketing.

The results of the analysis show that over half of the respondents (56.7%) of the fluted pumpkin marketers and 80.0% of the green

amaranth marketers do not have formal education. About 30.0% of the fluted pumpkin marketers had only primary education, while 10.0% of the green amaranth marketers have attended primary education. Also, 56.7% and 80.0% of green amaranth and fluted pumpkin marketers respectively had no formal education. This research support the findings of Osayinlusi (2016) and UgbaJah (2013) who observed low literacy level in Ekiti state and AnambraState respectively, marketers low level of education can reduce profitability as marketers may not have needs to access market strategies so as to enhance production and marketing needs.

Greater proportion (76.7%) of the green amaranth marketers reported that they did not have access to agricultural extension services, while 53.3% of the fluted pumpkin marketers do not have access to extension agents. Similarly, almost all (96.7%) of the green amaranth marketers belonged to one form of cooperative society or another while 60.0% of the fluted pumpkin marketers belonged to cooperative societies. The implication of this result is that marketers who had no access to extension service would not be well equipped with information and innovations for better marketing practices which might be advantageous in improving their profit. The findings also indicate that marketers in the study area would take advantage of the benefits assumed to accrue to cooperative societies such as group marketing, pooling of resources, and profit maximization.

### 3.2 Profitability in the marketing of fluted pumpkin and Green amaranth

To determine the profitability of fluted pumpkin and green amaranth, the study estimated the costs and returns for the two vegetables. The net income analysis is presented below:

Items	Fluted Pumpkin (₦)	Green Amaranth (₦)
<b>Revenue</b>		
Average quantity sold ( per month)	8 bags	8 bags
Price per bag	6,500.0	6,400.0
Total revenue (per month)	<b>52,000.0</b>	<b>51,200.0</b>
<b>Variable Cost Items</b>		
Amount purchased ( per month)	22,120.0	22,880.0
Water	199.0	154.0
Labour Cost	1,319.0	1300.0
Transportation cost	2,876.0	2920.0
Market dues	276.0	374.0
<b>Total Variable Cost</b>	<b>26,790.0</b>	<b>27,628.0</b>
<b>Fixed Cost Items</b>		
Rent	1,253.33	1,253.33
Sales display tables	192.75	120
Basins	190.0	180.0

Miscellaneous (Bins,bags,baskets)	650	650
<b>Total fixed cost</b>	2,286.08	2,203.33
<b>Gross margin (TR-TVC)</b>	25,210.0	23,572.0
<b>Net income ( GM-TFC)</b>	22,923.92	21,368.67

**Source: Field Survey Data, 2021**

As presented in Table 4.2 above, a gross margin of ₦25,210.0 was made by the fluted pumpkin marketers and ₦23,572.0 was made by the green amaranth marketers per month. When the fixed cost items were depreciated and subtracted from the gross margin, the net income was ₦22,923.92 for the fluted pumpkin marketers and ₦21368.67 for the green amaranth marketers per month. The implication, based on this result is that fluted pumpkin and green amaranth marketing were profitable ventures and that there is no considerable level of difference in profit between green amaranth and fluted pumpkin vegetable marketers

**3.3 Profitability comparison between the marketing profitability of fluted pumpkin and Green Amaranth**

An Independent t-test was used to determine whether there was a statistically significant mean difference between the net income of Fluted pumpkin and green amaranth marketers as shown in Table 3. An insignificant difference was observed. The insignificance of the independent t-test analysis result generally entails that there is no significant difference between the net income of fluted pumpkin and green amaranth marketers.

**Table 3: Independent T-test comparing the mean Net income of fluted pumpkin and Green Amaranth marketers**

Parameters	Mean	Std. Error	Std. Deviation
Fluted pumpkin	11903.6	264.6849	1473.703
Green Amaranth	10751.3	272.7718	1518.729
Diff	1152.3	16.2316	90.37374

**t = 1.0911; Pr(|T| > |t|) = 0.2839; P > 0.05; df=59**

Having obtained a t-statistic of 1.0911 as presented in Table 4.6, with the corresponding p-value of 0.2839 which is insignificant at 95% confidence level, the study concludes that the mean difference between the net income of the fluted pumpkin and green amaranth marketers has no significant different. The study, therefore, accept the null hypothesis that there is no statistically significant difference between the net income of the fluted pumpkin and green amaranth marketers and reject the alternate hypothesis

**3.4 Determinants affecting profitability among the fluted pumpkin and green amaranth marketers**

Table 4.7 shows the results of the analysis of factors affecting profitability among the fluted pumpkin marketers, green amaranth marketers. Out of the twenty variables included in the model, five variables were significant (household size, gender of the household head, access to credit, machinery access and farm size) both for the green amaranth marketers and the fluted pumpkin marketers except for farm size which was significant for fluted pumpkin marketers only. The five variables were found to be positively related to profitability.

Using the linear functional form in both cases as the lead equation, the R-Squared values of 0.9247 and 0.9282 shows that 92% of the

variation in profitability of the fluted pumpkin and green amaranth marketers was as a result of the combined effect of variation in the socioeconomic characteristics of the respondents. The coefficient of household size for the fluted pumpkin and green amaranth equation was found to be -7.9043 and -7.3153, respectively. This result implies that a unit increase in the household size of the marketers reduces the profitability of the marketers by -7.9043 and -7.3153 for both the fluted pumpkin and green amaranth marketers respectively. In other words, marketers with a lower number of persons in their households will tend to have a higher profit.

Gender was positively associated with the profitability. This was found to be statistically significant at 1% level of significance. The parameter estimates show that a unit increase in number of females in the marketing business will increase profitability of fluted pumpkin and green amaranth by 0.372203 and 0.3948026, respectively. This result was in line with Vassalos (2013) who found that “Strengthening the abilities of smallholder farmers in developing countries, particularly women farmers, to produce for both home and the market is currently a development priority. In many contexts, ownership of assets is strongly gendered, reflecting existing gender norms and limiting women’s ability to invest in more profitable livelihood strategies such as market-oriented

agriculture. Yet the intersection between women's asset endowments and their ability to participate in and benefit from agricultural interventions receives minimal attention".

The coefficient of access to machinery was positive and significant. The study found that a unit increase in access to machinery boosted profitability of fluted pumpkin and green amaranth by 8.16172 and 8.018447, respectively. This showed that those marketers that have access to machinery for processing their produce before sale always have the tendency to make more profit. This finding is in line with Okey (2021), that resource-poor smallholders in developing countries often lack access to capital goods such as farm machinery and as such could not boost their profitability. Enabling adequate access through machinery services can thereby significantly contribute to food security and farm income.

Access to credit was negative and statistically significance at 1% for both fluted pumpkin and green amaranth marketers, this shows that a unit decrease in access to credit reduced profitability of fluted pumpkin and green amaranth by -2.8746 and -3.0151 respectively. This result corroborated the findings by Ekong (2003) who opined that access to credit is a very strong factor that is needed to acquire or develop any enterprise; its availability, therefore, will have a negative effect on profit efficiency. The estimated coefficient of Farm size was positively significant at 10%, this result shows that a unit increase in farm size increases profitability by 0.1244789. This implies that as vegetable farmers plough more land or bring more land into cultivation, there will be more yield. The F- statistic ratio was statistically significance at 1% level of significance for both the fluted pumpkin and green amaranth marketers. The study, therefore rejected the null hypothesis that the socio-economic characteristic of the respondents did not significantly affect their profitability

**Table 4: Regression analysis result on the determinants of profitability difference**

	Fluted pumpkin marketers			Green amaranth marketers		
	Coefficient	Std. Err.	T-value	Coefficient	Std. Err.	T-value
<b>Human capital</b>						
Household size	-7.9043***	2.203773	-3.59	-7.3153***	2.306066	-3.17
Gender	0.372203***	0.0721966	5.16	0.3948026***	0.0727981	5.42
Education	0.7830967	0.5051842	1.55	-0.0045618	0.0347736	-0.13
Farming experience	0.01001352	0.2326089	0.43	0.0755686	0.2388816	0.32
<b>Asset capital</b>						
The cultivated area owned	0.6154223	0.4129595	1.49	0.6070935	0.4257566	1.43
Machinery ownership	8.16172***	0.9505553	8.59	8.018447***	0.9748899	8.22
None farm income	0.8503402	0.9624559	0.88	0.9701139	1.153132	0.84
<b>Institutional Factors</b>						
Distance to the market	-0.6145392	.9329859	-0.66	-0.5158678	0.9635223	-0.54
Distance to the asphalt road	0.5135927	.9857118	0.52	0.7484709	1.018032	0.74
Access to storage facilities	-2.752287	2.897105	-0.99	-2.937306	2.979692	-0.99
Access to credit	-2.8746***	0.9595734	-2.99	-3.0151***	0.9854244	-3.06
Farm size	.1244789*	0.2637492	0.47	0.1428941	0.2897888	0.49
<b>Extension contacts</b>						
On-farm demonstration	0.275106	0.5082933	0.54	0.3452475	0.5329601	0.65
Attendance to training	-0.7661769	0.449276	-1.71	-0.6594588	0.4570354	-1.44
Access to extension worker	5.848286	4.356563	1.34	5.743962	4.52383	1.27
Frequency of extension visit	0.1597108	0.5229688	0.31	0.1485583	.5781446	0.26
<b>Plants Nutrients</b>						
Sufficient water irrigation	7.68006	0.0000159	0.48	2.85006	0.0000161	0.18
Use of inorganic fertilizer	-0.0813504	0.5513249	-0.15	-0.2931627	0.6106912	-0.48
Use of organic manure	0.0712124	0.3703229	0.19	0.1286766	0.4023604	0.32
<b>Farmer behavior</b>						



Occupation interest	-4.511626	5.170059	-0.87	-4.00696	5.330432	-0.75
	F ratio= 11.93			F ratio = 9.34		
	Prob> F = 0.000			Prob> F = 0.000		
	R-squared = 0.9247			R-squared = 0.9282		
	Adj R-squared = 0.8889			Adj R-squared = 0.8964		

\*\*\*, \*\* and \* indicates significance at 1%, 5% and 10% respectively

Source: Field survey, 2021

#### 4.0 Conclusion

Understanding the factors affecting the profitability among the actors in the marketing of the most common vegetable crops and the underlying socio-economic factors influencing it presents a veritable approach in the transformation of vegetables in Nigeria. The study concludes that majority of the fluted pumpkin and Green Amaranth marketers were females, married with fairly normal household sizes, were middle-aged, young, and vibrant with fairly good marketing experience but with little or no formal education. A good proportion of the selected vegetable marketers did not have access to agricultural extension workers although they belonged to one form of cooperative society or the other. The budgetary analysis of fluted pumpkin marketers and green amaranth marketers revealed the selected vegetable enterprises as profitable business ventures and that there were no significant differences in the net income of selected vegetable marketers. The study also concludes the following factors (viz: household size gender of the household head, access to credit, machinery access and farm size) to have significantly affected profitability of vegetable marketers. The constraints faced by vegetable marketers includes: inadequate storage facilities, high cost of transportation, high storage losses, lack of equipment and poor market. Based on the findings of this study, the following recommendations were made:

- i. The federal government should provide vegetable storage facilities for vegetable marketers to ensure that wastages are minimized.
- ii. Vegetable Commodity marketers can be organized to buy up unsold produce from these marketers to reduce wastages.
- iii. The marketers can also form groups and cooperatives to provide storage equipment in common where each member can access and store their produce at a subsidized amount.
- iv. Transportation networks and good road networks should be developed as these marketers complained of losses as a result of bad road and inefficient transportation system from the farm to the market.

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