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Marketing Outlet Choice and its Determinants Among Smallholder Leafy Vegetable Farmers in Akwa Ibom State, Southern Region of Nigeria

Nijerya'nın Güney Bölgesindeki Akwa Ibom Eyaletindeki Küçük Yapraklı Sebze Çiftçileri Arasında Pazarlama Satış Noktası Seçimi ve Belirleyicileri

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MARKETING OUTLET CHOICE AND ITS DETERMINANTS AMONG SMALLHOLDER LEAFY VEGETABLE FARMERS IN AKWA IBOM STATE, SOUTHERN REGION OF NIGERIA

ABSTRACT

The study identified preferred marketing outlets and their determinants among leafy fluted pumpkin (leaf gourd) farmers in the southern region of Nigeria. Two hundred and fifty farmers were selected using purposive and multi-stage random sampling techniques. Descriptive statistics and a multinomial logit model were used to analyze the information collected. The results of the socioeconomic characteristics showed that the majority of farmers were women, relatively young, educated and of medium household size, but had low social capital. The study identified contract sales, direct sales to the local market and sales through middlemen/agents as the preferred marketing outlets. Also, farmers' age, farming experience, years in social organization, household size, years of formal education, farm income, household expenditure, access to agricultural extension service, agricultural information sources, farm size and the distance from the farm gate to the point of sale were significant determinants of direct sales on the local market relative to the base category. In addition, social organization membership, years of formal education, farm income, non-farm income, household expenditure, farmer gender, sources of agricultural information, farmers' age, household size, farm size, taxes, and the distance from the farm gate to the point of sale were significant determinants of middleman/agent option. For increase efficiency in the choice of marketing outlets among leaf gourd farmers, efforts should be directed towards improving their literacy level, building social capital, reducing taxes paid in the local market, providing a good road network and strengthening agricultural extension services in the region.

Keywords: Marketing Outlet, Fluted Pumpkin, Leafy Vegetable,Rural Farmers, Choices, Nigeria.

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NİJERYA'NIN GÜNEY BÖLGESİNDEKİ AKWA IBOM EYALETİNDEKİ KÜÇÜK YAPRAKLI SEBZE ÇİFTÇİLERİ ARASINDA PAZARLAMA SATIŞ NOKTASI SEÇİMİ VE BELİRLEYİCİLERİ

ÖZ

Çalışma, Nijerya'nın güney bölgesindeki yapraklı kabak (yaprak kabak) çiftçileri arasında tercih edilen pazarlama satış noktalarını ve bunların belirleyicilerini belirledi. Amaçlı ve çok aşamalı rastgele örnekleme teknikleri kullanılarak iki yüz elli çiftçi seçildi. Toplanan bilgileri analiz etmek için tanımlayıcı istatistikler ve çok terimli logit modeli kullanıldı. Sosyoekonomik özelliklerin sonuçları, çiftçilerin çoğunluğunun kadın olduğunu, nispeten genç, eğitimli ve orta hane büyüklüğüne sahip olduklarını ancak sosyal sermayelerinin düşük olduğunu gösterdi. Çalışma, tercih edilen pazarlama satış noktaları olarak sözleşmeli satışları, yerel pazara doğrudan satışları ve aracılar/acenteler aracılığıyla yapılan satışları belirledi. Ayrıca çiftçilerin yaşı, çiftçilik tecrübesi, sosyal organizasyonda geçen süre, hane büyüklüğü, örgün eğitim yılı, çiftlik geliri, hane halkı harcamaları, tarımsal yayım hizmetine erişim, tarımsal bilgi kaynakları, çiftlik büyüklüğü ve çiftlik kapısı ile noktaya olan mesafe Satışların oranı, temel kategoriye göre yerel pazardaki doğrudan satışların önemli belirleyicileriydi. Ayrıca sosyal kuruluş üyeliği, örgün eğitim yılı, çiftlik geliri, tarım dışı gelir, hane halkı harcaması, çiftçi cinsiyeti, tarımsal bilgi kaynakları, çiftçinin yaşı, hane büyüklüğü, çiftlik büyüklüğü, vergiler ve çiftlik kapısına uzaklık satış noktasına kadar olan mesafe, aracı/acente seçeneğinin önemli belirleyicileriydi. Yaprak kabağı yetiştiricileri arasında pazarlama noktası seçiminde verimliliğin artırılması için çabalar, onların okuryazarlık seviyelerinin iyileştirilmesine, sosyal sermayenin oluşturulmasına, yerel pazarda ödenen vergilerin azaltılmasına, iyi bir yol ağının sağlanmasına ve bölgedeki tarımsal yayım hizmetlerinin güçlendirilmesine yönlendirilmelidir.

Anahtar Kelimeler: Pazarlama Mağazası, Yivli Kabak, Yapraklı Sebze, Kırsal Çiftçiler, Seçimler, Nijerya.

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1. INTRODUCTION

Leafy fluted pumpkin *(Telfairia occidentalis)* is one of the popular vegetable crops commonly grown and consumed in the southern region of Nigeria (Ifeoma et al., 2008; Akpan et al., 2018; Akpan and Okon, 2019). Leafy fluted pumpkin production has enormous economic benefits for resource-poor farmers. The crop serves as a means of complementing family income and provides a sustainable livelihood for many unemployed women in the rural and peri-urban areas of the

southern region of Nigeria (Oluwasola, 2015; Oluwalana et al., 2019; Akpan et al., 2023). Leafy fluted pumpkin production has advantages compared to similar leafy vegetable farming operations in terms of general acceptance, lower set-up cost, short gestation period, high resistance to pests and diseases, and wide nutritional diversity, as well as year-round cultivation (Udoh and Akpan, 2007; Oluwalana et al., 2019). The medicinal composition of leafy fluted pumpkin is rich and is known to contain: carbohydrates, protein, fat, fiber, ash and moisture, etc. (Orhuamen et al., 2012; Samson and Isaac 2019; Akpasi et al., 2023; Auwal et al., 2023). The cultivation of leafy fluted pumpkin has been integrated into urban agriculture and its production has become one of the most preferred components of home gardening among urban dwellers in the southern region of Nigeria (Samson and Isaac 2019; Akpan et al., 2013). Sustainability of small farms such as leafy fluted pumpkin (leafy gourd) production is crucial to meet the nutritional needs of consumers and also achieve food self-sufficiency in the southern region of the country (Akpan and Okon, 2019; Akpan and Monday, 2021; Akpasi et al., 2023). Efficient marketing of agricultural products is one of the agricultural activities that guarantees sustainable production among smallholder farmers in developing countries (Borsellino et al., 2020). An efficient food marketing system is fundamental to achieving food security, rural poverty reduction and a sustainable rural agricultural system (Wong et al., 2017; Woodhill et al., 2022). Agricultural marketing systems are known to create employment opportunities, generate income for participants, and expand the production scale of smallholder farmers (Akpan, 2010; Geza et al., 2021; Christiaensen et al., 2021). Despite the essential role that the marketing system plays in agricultural production, small-scale producers have sometimes faced difficult marketing decisions (Kamara et al., 2019; Pawlak and Kołodziejczak, 2020). The difficulties in farmers' marketing decisions are sometimes due to the attempt to minimize transaction costs, the existence of depilated marketing infrastructures, including the existence of obscure marketing roles and regulations, among others (Pham and Huynh, 2020). According to Xaba and Masuku (2013), the low bargaining power of smallholder farmers is often due to inadequate market information, poor access to credit and predatory contractual arrangements, among other factors. These anomalies sometimes created opportunities for naive small farmers to be exploited in marketing processes. Due to the inability of most rural farmers to advance the marketing processes of their products, most of them are price takers (Ncube, 2020; Achille et al., 2020; Abokyi, et al., 2020). This situation has contributed to the persistence of poverty and poor resources among rural farmers in developing countries. Therefore, any attempt to make farmers price makers in the marketing system is an effective way to improve the income of smallholder farmers in developing countries in Africa (Zhu et al., 2022). This starts with introducing or adopting appropriate marketing outlets or opportunities that provide optimal benefits to participants. The choice of a distribution/marketing channel depends, among other things, on the social and economic factors of farmers, ease of access to points of sale, profitability and transaction costs.

Given the dynamics of the economic environment and consumption over time, as well as the farm environment, the sustainability of small-scale producers is a key issue in most developing countries, including Nigeria (Osuji et al., 2022). Choosing the appropriate marketing outlet is one of the main components of successful marketing of agricultural products, as the different marketing outlets are characterized by different advantages and cost implications. Making effective marketing decisions is a challenge for leafy fluted pumpkin (leaf gourd) farmers due to issues such as perishability, bulkiness of products, and low value addition. Additionally, the majority of these farmers are women who are resource poor, have moderate literacy levels, and limited socialization. Moreover, the production environment is marked by rising rural poverty and income inequality, while the demand for wage labour is inelastic (Akpan et al., 2011; Emegha-Okonkwo et al., 2019; Utobo et al., 2020; Obiesie et al., 2020; Akpan et al., 2022; Igbinidu and Egbodion, 2023). Therefore, the choice of marketing channel is extremely important and defines the sustainability of any agro-enterprise. Henceforth, identifying the marketing outlets, their use and the factors influencing their use among leafy vegetable farmers are key considerations of this study.

Given the importance of this marketing problem for smallholder farmers in developing countries, a large body of literature has provided insights into various dimensions of the choice and determinants of marketing channels in small agribusinesses. For example, Magogo et al. (2015) investigated the determinants of market choice for African native vegetables among the agropastoral in Kenya. The results of the logistic regression showed that the choice of distribution point in the study group was influenced by the quantity of vegetables sold, the distance to the local market, the gender of the farmers, the educational level of the household head, family size, level of value added, agricultural experience, off-farm income and marketing or transaction costs. Additionally, Geoffrey et al. (2015) in Kenya, studied factors influencing the choice of pineapple marketing outlets in Kericho County. The results of the multinomial logit model showed that gender, group marketing, quantity of pineapple, price information sources, contractual marketing and vehicle ownership significantly influenced the choice of pineapple marketing outlets. Emana et al. (2015) identified factors that influence the decisions of potato producers in Ethiopia on the choice of marketing channel. The result of the multinomial logit model showed that farming experience, distance to the nearest market, market information sources, quantity of potatoes sold, post-harvest value added and farmers' bargaining power are significant factors influencing the choice of sales markets. In Ethiopia, Dessie et al. (2018) found that wheat farmers' age, years of formal education, access to credit, number of animals kept, off-farm income, and farmers' total land size significantly influenced their market channel choice. Wosene et al. (2018) analyzed determinants of market outlet choice among smallholder pepper producers in Ethiopia. The multivariate probit model indica-

ted: the amount of pepper produced, experience, extension contact, education, bargaining power, value creation, distance to the market and animal husbandry had a statistically significant influence on the choice of sales outlets. Adugna et al. (2019) examined the market choice decision and its impact on the income and productivity of smallholder vegetable producers in the Lake Tana Basin in Ethiopia. The result of multivariate probit regression showed that farmers' age, distance to the nearest market and sources of market information significantly influenced the choice of farm-gate sales; while the age of farmers and the education level of farmers influence sales in the local market. Getahun et al. (2020) identified factors influencing market choice of TEF producers in Dendi District, Ethiopia. The empirical results showed that the educational level of the household head, household size, livestock, land area, distance to the nearest market and current market prices for TEF significantly influenced the choice of market outlets of TEF producers. Samuel and Malgwi (2020) in Nigeria showed that consumers' age, gender, education level, household size, distance to nearest market and their weekly expenditure have a significant association with the likelihood of choosing to buy from the farm; home/kiosk purchasing, and roadside outlets for fresh leafy vegetables. Dube et al. (2021) examined the determinants of market outlet choice among smallholder vegetable and fruit producers in Ethiopia. The results of the study showed that the distance from the farm gate to the point of sale, livestock size, socialization, gender and access to agricultural extension services influence the choice of market outlets among vegetable and fruit producers. Berhanu and Atinafu (2022) in Ethiopia found that farmers' age, education, access to market, access to market information sources, access to transportation services, and access to credit services are important factors in pineapple market choice. Ozkan et al. (2022) examined the determinants of market outlet choice and their resulting impact on the welfare of small-scale vegetable and fruit producers in Ethiopia. The results showed that farm distance from main roads, livestock ownership, access to extension services and cooperative membership influenced smallholder farmers' decisions regarding market outlet choice. Arumugam et al. (2022) identified farmers' socioeconomic determinants of market outlet choice for African indigenous vegetables (AIVs) in Zambia. The results of the multinomial logit model showed that farmers' gender and membership in the cooperative group were among the main determinants of market channel choice. Chekol and Mazengia (2022) examined factors influencing garlic producers' market selection decisions in Ethiopia. The results showed that access to extension services, market information sources, the quantity of garlic sold and farm experience had a significant negative association with consumer outlet choice. Adams et al. (2022) identified determinants of the sales market decisions of rural farmers in northern Ghana. The results showed that socialization, storage facilities, access to financial services, knowledge of sustainable intensification, access to guaranteed markets, availability of quality market services and distance to the production market influence the choice of farm-gate sales. Ketema and Lika (2023)

examined the determinants of market choice of smallholder wheat producers in Ethiopia. Using multinomial logistic regression, the study identified farmers' gender, age, education, year of participation, nearby market, nearby road and quantity produced as significant determinants of farmers' choice of outlet.

Available literature indicates that despite the importance of vegetables to the majority of Nigerians, information on the determinants of vegetable marketing outlets in Nigeria is sparse. In recent years, too, there have been changes in the country's macroeconomic environment, which have affected the purchasing power of consumers and the production decisions of farmers in a variety of ways and have had corresponding consequences. For example, there is an increase in poverty, an increase in post-harvest losses, a lack of integration of product prices within the region, increasing income inequality among farmers and malnutrition among rural dwellers, who make up the majority of vegetable producers in the country (Haddabi et al., 2019; Kehinde and Favour, 2020; Morgan and Fanzo, 2020; Igwegbe and Metu, 2021; Ogundele, 2022; Mukaila and Egwue, 2022). Therefore, the economic environment of the country has influenced the social and economic behavior of farmers. This justified the need to re-evaluate the available literature to adapt it to current realities. Again, appropriate marketing decision is crucial for farmers' income generation, which is an essential prerequisite for tackling rural poverty. Therefore, it is very important and necessary to update the development of vegetable farmers' ability to make efficient market decisions as the country intensifies its efforts to increase agricultural production and exports. To achieve this objective, the study was specifically designed to assess the social and economic characteristics of leafy fluted pumpkin (leaf gourd) farmers, identify their most preferred marketing channels/outlets and assess factors influencing the choice of their preferred marketing channel/outlets in the Southern Region of Nigeria.

2. RESEARCH METHODOLOGY

2.1. Study Area and Sample Size Selection

The study was conducted in Uyo and Eket agricultural zones of Akwa Ibom State in the Southern Region of Nigeria. The State is located in the coastal region and has six different agricultural zones. Other agricultural zones in the State are: Oron, Ikot Ekpene, Abak and Etinan. Eket Agricultural Zone consists of seven (7) local government areas namely: Eket, Mkpat-Enin, Ikot Abasi, Unna, Esit Eket, Ibeno and Eastern Obolo while Uyo Zone consists of Uyo, Uruan, Ibesikpo Asutan, Ibiono Ibom and Itu consists of local government areas. The State lies in the tropical zone, characterized by thriving rainforest vegetation that supports a wide range of vegetable crops including fluted gourd or pumpkin, waterleaf, carrot, garden egg, tomato, okra, pepper, melon, bitter leaf and *Amaranthus* species among others.

The Cochran (1963) technique of sample size selection was employed. Given the large population of small-scale vegetable farmers (i.e. *Telfairia occidentalis* or leafy fluted pumpkin farmers) in the study areas, the representative sample was obtained using the Cochran (1963) formula shown in equation 1.

$$V_x = \frac{z^2\rho(1-\rho)}{D^2} \quad (1)$$

Where V_x represents the estimated sample population of leafy fluted pumpkin farmers in the study area; Z depicts the 95% confidence interval (1.96); is the percentage of leafy fluted pumpkin farmers in the total population of vegetable farmers (estimated at 80%) in the study areas; D denotes the absolute error at 5% probability level of type 1 error. The estimated representative sample was obtained as demonstrated in equation (2):

$$S_n = \frac{(1.96)^2 0.80(1-0.80)}{(0.05)^2} = 246 \quad (2)$$

The total of two hundred and forty-six leafy fluted pumpkin farmers were estimated for the study. For the purpose of equality in distribution of respondents across the study areas, the sample size was scaled up to two hundred and fifty.

2.2. Sampling Technique and Method of Data Collection

A multi-stage sampling technique was used to select leafy fluted pumpkin farmers in the study area. In the first stage, a purposive sampling technique was used to select four local government areas in Eket and Uyo agricultural zones of the State. A total of eight (8) local government areas were used in the study. The essence of using purposive sampling technique in this stage was to target and capture heavy production areas within the zones. In the second stage, high production intensity areas were identified within the local government areas, and the predetermined number of villages were randomly sampled as shown in Table 1. The next phase was a random sampling of the predetermined number of leafy fluted pumpkin farmers in each of the selected villages. A total of 250 (two hundred and fifty) leafy fluted pumpkin farmers were randomly sampled and used for the study.

Table 1. Distribution of respondents

Sample Areas	No. of Villages	Farmers per Village	Total Sampled	Percentage of Total
Itu	6	10	60	24.00
Uyo	5	10	50	20.00
Ibesikpo Asutan	4	8	32	12.80
Uruan	3	6	18	7.20
Mkpat Enin	5	5	25	10.00
Ikot Abasi	5	5	25	10.00
Onna	5	5	25	10.00
Eket	3	5	15	6.00
Total	**36**		**250**	**100.00**

Source: computed by the authors.

A cross sectional information were obtained from the sampled leafy fluted pumpkin farmers. The basic instrument of data collection was a structured questionnaire complemented by focus group discussion with some farmers' groups and key informants in the chosen villages. The questionnaire contains information on socioeconomic features of farmers, marketing decisions and other relevant information needed for the study.

2.3. The Conceptual Framework and Data Analysis

The study's conceptual framework was based on the theory of consumer behavior, which posits that vegetable farmers are rational decision-makers. According to this theory, rational consumers seek to maximize their utility by choosing the best option from a range of possibilities. Similarly, rational farmers will always opt for a technique or technology that offers the highest utility or satisfaction compared to other alternatives. When faced with multiple choices, a rational farmer will select the option that provides the greatest level of utility. While the farmer's preferred option is considered a latent variable, the utility derived from selecting that option is not directly observable but is reflected in the decision-making process. This study suggests that the satisfaction a rational farmer gains from choosing a specific option of technology is proportional to the likelihood of selecting that option from the available choices. Assuming that U is the utility a farmer receives from using the option and W is the available options, then the behavior of a rational farmer can be represented in equation (3):

$$V_i = \begin{Bmatrix} A\ if\ U_{max}(W_1) > U_{max}(W_2) > U_{max}(W_3) \\ B\ if\ U_{max}(W_2) > U_{max}(W_1) > U_{max}(W_3) \\ C\ if\ U_{max}(W_3) > U_{max}(W_1) > U_{max}(W_2) \end{Bmatrix} \quad (3)$$

This means that option "A" is preferred if the benefits derived from it are greater than those of the remaining options. Therefore, Zi is said to represent the latent variable or probability that explains the farmer's behavior in selecting various available marketing options. Furthermore, let "K" denote the explanatory variable that influenced the farmer's option choice. Then "ϑ" are the coefficients of the explanatory variables, while ε is the random error term. Therefore, the farmer's behavior can be further simplified as in Equation (4).

$$\begin{Bmatrix} Z_1 = \varphi_1 + \vartheta_1 K_1 + \varepsilon_1 \\ Z_2 = \varphi_2 + \vartheta_2 K_2 + \varepsilon_2 \\ Z_3 = \varphi_3 + \vartheta_3 K_3 + \varepsilon_3 \end{Bmatrix} \quad (4)$$

The expression indicates that each probability option is a function of a set of independent variables. The explanatory variables (Ki) are assumed to be uncorrelated with the error term ε for each option. The error terms in each alternative are assumed to be independently distributed, hence the independence of irrelevant alternatives (IIA) hypothesis. The above structural form is the similarity of the multinomial logit model structure and the reason why it is the preferred model in the study. The multinomial logit model has errors that are independent and identically distributed. The model produces more stable results when the independence of irrelevant alternatives (IIA) assumption is met (Kropko, 2008). In the given model, the "sale by contract" option was considered as the base category and all logits are made relative to the base category.

The information collected from leafy fluted pumpkin farmers were analyzed in line with the specific objectives of the study. The descriptive tests including means and standard deviation were used to analyze the socio – economic characteristics and marketing outlets options of leafy fluted pumpkin farmers in the study area. The determinants of the use of a particular marketing outlet in comparison with a base category outlet by leafy fluted pumpkin farmers was analyzed using the Multinomial Logit Model (MLM).

2.4. Determinants of Marketing Outlets Option for Small Scale Vegetable Farmers

A multinomial Logit model was estimated to identify the determinants of marketing outlet choice among vegetable farmers. Following Gujarati and Porter (2011), a generalize multinomial Logit model is expressed as thus:

$$\pi_{ij} = P_r(Y_{ij} = 1) = \frac{e^{\alpha j + \beta_j X_i}}{\sum_{j=1}^{n} e^{\alpha j + \beta_j X_i}} \quad (5)$$

The sales through contract arrangement is used as the base category category and all the other Logit are made relative to the base category. Then the multinomial Logit model is specified as follows:

$$\pi_{ij} = P_r(Y_{ij} = j/x) = \frac{exp(x_i \alpha_j)}{1 + \sum_{k=1}^{n} exp(x_i \alpha_k)} \quad for\ j = 1, 2. \ldots, k-1 \quad (6)$$

Where $Y\ ij$ =1 if a farmer chooses alternative j (j =1, 2 and 3). Where j=1 (sales by contract agreement); j=2 (sales directly in the local market); j=3 (sales to middlemen or agents). The βs are a set of coefficients associated with each alternative; while X is a set of explanatory variables that determine the respective probability. The dependent variable $(\pi\ ij)$ represents the probabilities with which a farmer chooses alternative 1, 2 or 3. If a farmer has three alternatives available, the sum of the three option probabilities is as follows:

The set of explanatory variables (X's) that defined equation 6 are given in table 2.

Table 2. Description of explanatory variables

S/n	Variable	Symbol	Unit	Expected Sign
1	Age of a farmer	AGE	Express ın years	+ve, or=ve
2	Marital status	MAR	A dummy: 1 for married, 0 otherwise	+ve, or=ve
3	Farming experience	EXP	Express in years	+ve, or=ve
4	Socialization of farmers	SOC	Year(s) of membership in social organization	+ve, or=ve
5	Household size	HHS	Number in household	+ve, or=ve
6	Years of formal education	EDU	Express in years	+ve, or=ve
7	Hectare of land own by a farmer	HLA	Express in hectares	+ve, or=ve
8	Non-farm income (monthly)	NFI	Express in Naira	+ve, or=ve
9	Farm income of a farmer (monthly)	FAI	Express in Naira	+ve, or=ve
10	Household expenditure (monthly)	HHE	Express in Naira	+ve, or=ve
11	Farmer's gender	GEN	Dummy (1 for female, 0 otherwise)	+ve, or=ve

12	Tax paid in the local market	TAX	Express in Naira	+ve, or=ve
13	Access to extension	EXT	Number of time(s) in a planting season	+ve, or=ve
14	Sources of agric. information	SAI	Number of times in a planting season	+ve, or=ve
15	Access to credit	CRE	Express in Naira	+ve, or=ve
16	Distance from the farm to market	DIS	Dummy (1 for far, 0 otherwise)	+ve, or=ve

Source: Prepared by the authors. Note, dependent ratio=Children less than 15 years plus adult greater than 65 years divided by the household size.

Explicitly, the multinomial logit model is expressed as shown in equation 8:

$$P_r = \beta_0 + \beta_1 AGE_1 + \beta_2 MAR_2 + \beta_3 EXP_3 + \beta_4 SOC_4 + \beta_5 HHS_5 + \beta_6 EDU_6 + \beta_7 HLA_7 + \beta_8 NFI_8 + \beta_9 FAI_9 + \beta_{10} HHE_{10} + \beta_{11} GEN_{11} + \beta_{12} TAX_{12} + \beta_{13} EXT_{13} + \beta_{14} SAI_{14} + \beta_{15} CRE_{15} + \beta_{16} DIS_{16} + U_i \quad (8)$$

3. RESULTS AND DISCUSSION

3.1. The Summary of some Characteristics of Vegetable Farmers

The summaries of selected socioeconomic characteristics of fluted pumpkin farmers (leaf gourd farmers) are presented in Table 3. The results showed that the majority (62.40%) of leaf gourd farmers are women. As reported by Emegha-O-konkwo et al. (2019), Obiesie et al. (2022) and Akpan et al. (2023), the dominant female population in vegetable farming essentially serves to complement household income generation. The average age of leaf gourd farmers of 42.03 years indicated an active farming population. The marital status of leaf gourd farmers shows that about 57.20% of farmers are married. The average agricultural experience of 4.54 years suggests that vegetable farming is a transitional or temporary agricultural venture popular among married women in the southern region of Nigeria. Additionally, socialization among pumpkin farmers averaged 2.45 years. As Osuji et al. (2022), Akpan et al. (2023) and Igbinidu, and Egbodion, (2023) claim, the ability of vegetable farmers in the region to generate social capital is low. As reported by Akpan et al. (2022), a good level of socialization would facilitate farmers' access to production and market information and promote cooperation among members. An average household size of 4.00 members per household was found among fluted pumpkin farmers in the region. This indicates a deterioration in families' labour capacity, which is likely due to the increasing awareness of the need for rural farming families to have a small family size and the improvement in human capacity development of rural farming households in the region. The results also showed that vegetable farmers in the region have acquired an average

of 11.45 years and at least 6.00 years of formal education. The finding confirms the fact that in the southern region of Nigeria, vegetable cultivation is largely carried out by educated farmers. The result also showed that vegetable farmers' access to agricultural extension services is poor, with an average of 0.324 times per farming season. It was also found that vegetable farmers in the region have access to multiple agricultural information sources. The result showed that at least every vegetable farmer has access to a source of agricultural information. This shows that vegetable farmers are educated and exposed to innovations.

Table 3. Summary Statistics of variables

Variable	Mean	Min.	Max.	Std. Dev.	C.V.	Skewness
Farmer's age	42.032	24.000	70.000	11.842	0.282	0.841
Marital status	0.572	0.000	1.000	0.496	0.867	-0.291
Farming experience	4.544	1.000	22.000	3.500	0.770	2.641
Socialization	2.448	0.000	23.000	4.234	1.730	2.423
Household size	4.000	1.000	9.000	1.882	0.610	0.633
Education	11.476	6.000	30.000	3.379	0.294	1.162
Farm size	0.177	0.001	0.940	0.217	1.229	1.666
Non-farm income	34952	0.000	120000	28926	0.828	1.143
Farm income	27729	2400	142200	23166	0.835	2.976
Household expenditure	59806	15000	165000	28676	0.479	1.393
Gender of a farmer	0.624	0.000	1.000	0.485	0.778	-0.512
Tax paid by farmers	273.60	0.000	1000	267.970	0.979	0.825
Access to extension	0.324	0.000	3.000	0.880	2.716	2.512
Sources of agric. information	2.036	1.000	5.000	1.027	0.504	0.730
Distance to the market	0.712	0.000	1.000	0.454	0.637	-0.936
Access to credit	39568	0.000	200000	24029	0.607	1.623

Source: Computed by authors.

About 71.20% of vegetable farmers attested that the distance from the farm gate to the local market was long. The finding indicates a deterioration of rural infrastructure in the study areas. The average monthly non-farm income (₦34, 952) of vegetable farmers was found to exceed the farm income (₦27,729), indicating increasing income diversification among them. Average household expenditure of ₦59, 806 was reported among vegetable farmers in the region. This result shows that most vegetable farmers in the region relied heavily on both farm and non-farm income sources to meet their family expenses.

3.2. The Marketing Outlet for Vegetable Farmers

The study has identified the top three marketing outlets preferred by vegetable farmers in the study area. The distribution of the frequency and respective percentages of these marketing outlets can be found in Table 4. The findings reveal that the majority (52.00%) of vegetable farmers (leaf gourd farmers) prefer to sell their leafy vegetables directly in the local market. This aligns with expectations, considering the perishable nature of leafy vegetables. Due to limited resources, rural farmers often lack the means to process these vegetables to prolong their shelf life. Consequently, many farmers opt to harvest their leafy vegetables as needed, selling them in the local market to quickly generate income for their families. Unfortunately, this approach often results in the undervaluation of leafy vegetables, as observed in the field.

Table 4. Marketing outlets for vegetable farmers

Marketing channel	Frequency	Percentage
Sales through contract arrangement	52	20.80
Sales directly in the local market	130	52.00
Sales to middlemen/agents	68	27.20
Total	250	100.00

Source: Field survey (2023).

The result also revealed that about 27.20% of farmers preferred choosing the distribution outlet of middlemen or agents/wholesalers. This option is often characterized by lobbying, advance payments and sometimes the provision of farm inputs to farmers to entice them into an agreement with the middlemen or agents/wholesalers (Opata, 2018). The introduction of this option may provide relief to leafy vegetable farmers' income needs in the short term, but is likely to prove exploitative in the longer term.

However, direct selling through contractual arrangements was the least preferred option among the main options available to leafy vegetable farmers. The result showed that only 20.80% of leafy vegetable farmers entered into direct contractual agreements with buyers. This agreement is most often made before the start of a planting season, while some come into effect during the harvest season. However, this type of marketing outlet is common among farmers who need to resolve financial issues before the planting season begins. The majority of farmers who preferred this marketing option did not enter into contractual agreements voluntarily, but are often forced by situations beyond their financial control (Opata, 2018; Musara et al., 2018).

3.3. Determinants of the Preferred Choice of Marketing Outlet Among Leafy Vegetable Farmers

The results in Table 5 show the multinomial logit estimates for the given marketing outlet selection equation. The chi-square estimates revealed that the likelihood ratio statistics are highly significant ($p < 0.0001$), indicating that the reported models are capable of explaining vegetable farmers' behavior in choosing their preferred marketing outlets. The diagnostic statistics also yielded a pseudo R^2 of 0.664, indicating that 66.40% of the variability in the probability of occurrence of the dependent variable was attributable to the explanatory variables. Note that the coefficients of each explanatory variable in the multinomial logit do not represent the marginal influence or slope coefficient of the explanatory variable on the dependent variable (the probability of choosing a marketing channel). Additionally, all results and interpretations of the multinomial logit estimates are reported relative to the based category. This implies that the probability of occurrence or behavior of a particular variable is explained relative to the reference or base category. The selection of the base or reference category (sale through contract arrangement) was influenced by the increasing prevalence of contractual arrangement sales among vegetable farmers in the region. This marketing channel has developed in response to the persistent poverty faced by vegetable farmers and is seen as a way to alleviate poverty for low-income farm households. Therefore, to interpret the multinomial logit model, the post-estimated marginal effect coefficients, which indicate the change in the probability of using a particular marketing channel due to a change in the explanatory variables, were used.

The results presented in the last column of Table 5 are Variance Inflating Factor (VIF) estimates used to test the nature of collinearity among the specified explanatory variables in the model. The results showed that there were no significant multicollinearity problems in the explanatory variables in the estimated model. The estimated VIF for each independent variable was greater than one but less than the threshold of 10. The result implies that the explanatory variables had their true signs and the estimated standard error was not inflated due to multicollinearity.

3.4. Determinants of the Choice of Direct Sales in the Local Market Outlet (Sale Through Contract Arrangement Option as a Based or Reference Category)

"Note that all explanations are made with respect to the reference category." The result shows that the age of leafy vegetable farmers has a significant positive association with the probability of choosing direct sales in the local market compared to the contract sales option. This means that as the age of farmers' increases by one unit, the probability of preferring direct sales in the local market to contract sale increases by 0.0025. The reason for the result could be that older or elderly vege-

table farmers are culturally connected to their local markets and would therefore prefer a direct sell in the local market to a contractual arrangement. The finding corroborates Dessie et al. (2018), Adugna et al. (2019), Samuel and Malgwi (2020), Berhanu and Atinafu (2022), Ketema and Lika (2023).

The slope coefficient of vegetable farmers' years of farming experience has a significantly positive relationship with the choice of direct sales in the local market. This means that a 1.00% increase in farming experience would likely result in a 0.033% increase in the probability of using direct sales in the local market option instead of contract sales. The increasing experience of vegetable farmers has to do with the conservative nature of farmers, which often stems from cultural affiliation. Therefore, it might be difficult for them to switch from their usual marketing option compared to the contractual agreement option. The result aligns with the contributions of Magogo et al. (2015), Emana et al. (2015), Wosene et al. (2018), Chekol and Mazengia (2022).

Likewise, the socialization or membership in a social organization coefficient (at 1% level); household size (at 1% level); and years of formal education (at 5% level) showed a significant positive association with the likelihood of direct sales in the local market by vegetable farmers relative to the contract sales. The result revealed that a one unit increase in years of membership in social organizations, household size, and years of formal education increased the probability of choosing direct selling in the local market by 0.0045, 0.0007 and 0.0059 respectively, compared to contract sales.

Table 5. Multinomial estimates on direct sales in the local market option (Sale through contract arrangement option as a based category)

Variable	Direct Sales in the Local Market Option					
	Coefficient	Std. Error	t-test	Slope	Prob.	VIF
Constant	3.1126	1.0926	2.8488***	-	0.0044	-
Farmer's age	0.0055	0.0025	2.2067**	0.0025	0.0338	2.687
Marital status	0.5632	0.4269	1.3191	0.0906	0.1871	1.251
Farming experience	0.2787	0.0795	3.5080***	0.0333	0.0005	1.639
Socialization	0.0256	0.0034	7.5553***	0.0045	0.0000	1.229
Household size	0.5139	0.1396	3.6824***	0.0007	0.0000	1.992
Education	0.0039	0.0019	2.0285**	0.0059	0.0404	1.277
Farm size	-0.6284	0.3571	-1.7597*	-0.1009	0.0815	1.164
Non-farm income	4.38e-06	9.56e-06	0.4588	7.68e-07	0.6464	1.319
Farm income	1.12e-05	3.07e-06	3.6446***	2.84e-06	0.0001	1.511
Household expenditure	1.90e-05	8.08e-06	2.3543**	3.72e-06	0.0186	1.306

Gender of a farmer	-0.5286	0.4750	-1.1128	-0.1123	0.2658	1.185
Tax paid by farmers	-0.0002	0.0009	-0.2117	-0.00002	0.8324	1.303
Access to extension	0.3577	0.2147	1.6661*	0.0599	0.0957	1.307
Sources of agric. information	0.1812	0.0466	3.8884***	0.0113	0.0000	1.231
Distance to the market	-0.0381	0.0199	-1.9146*	-0.0121	0.0476	1.171
Access to credit	-8.79e-06	7.99e-06	-1.0999	-1.66e-06	0.2714	1.051
	Sales to Middlemen/Agent Option					
Constant	4.5625	1.2602	3.6205***	-	0.0003	-
Farmer's age	-0.0678	0.0286	-2.3722**	-0.0032	0.0177	2.687
Marital status	0.6087	0.4522	1.3461	0.1089	0.1783	1.251
Farming experience	0.0316	0.0118	2.6865***	0.0268	0.0054	1.639
Socialization	0.1580	0.0408	3.8725***	0.0067	0.0001	1.229
Household size	-0.0439	0.0135	-3.2580***	-0.0628	0.0009	1.992
Education	0.1350	0.0700	1.9286*	0.0044	0.0538	1.277
Farm size	-0.6220	0.2709	-2.2959**	-0.1278	0.0214	1.164
Non-farm income	2.71E-05	9.23E-06	2.9394***	3.21e-07	0.0033	1.319
Farm income	3.33E-05	1.09E-05	3.0576***	2.95e-06	0.0022	1.511
Household expenditure	3.30E-05	9.65E-06	3.4182***	3.22e-06	0.0006	1.306
Gender of a farmer	1.02252	0.5159	1.9818*	0.1263	0.0475	1.185
Tax paid by farmers	-3.24E-05	0.0000	-2.9164***	-0.00004	0.0040	1.303
Access to extension	-0.407854	0.2680	-1.5218	-0.0624	0.1281	1.307
Sources of agric. information	0.6838	0.2768	2.4699**	0.0028	0.0135	1.231
Distance to the market	-0.3323	0.1872	-1.7752*	-0.0086	0.0752	1.171
Access to credit	-1.41E-05	8.88E-06	-1.5854	-1.18e-06	0.1129	1.051

Log likelihood	-187.435	Pseudo R^2	0.6636
No. of cases 'correctly predicted	205 (82.00%)	LR chi2(32)	134.20***

Source: Data from 2023 planting season in the study area. *, **, and *** represent a significance at 10%, 5% and 1% respectively.

In most rural communities in the region, farm products are sold mostly in groups or unions in community/local markets. Therefore, ties can easily be formed between vegetable farmers in the local market, making it difficult for them to adopt alternative marketing options such as the contractual arrangement. Additionally, increasing household size will incentivize cheap labor, allowing them to bring their bulky leafy vegetables to the local market with less effort. Prolonged formal trai-

ning for vegetable farmers would improve their intellectual and managerial abilities to access other channels and make decisions concerning market opportunities. Hence, the choice of direct sale in the local market by vegetable farmers in the region is boosted by increase in farmers' years of formal education relative to the contract sale option. A similar result was reported by Magogo et al. (2015), Dessie et al. (2018), Wosene et al. (2018), Getahun et al. (2020), Samuel and Malgwi (2020), Dube et al. (2021), Berhanu and Atinafu (2022), Ozkan et al. (2022), Arumugam et al. (2022), Adams et al. (2022) and Ketema and Lika (2023).

In addition, the marginal effects of farm income (at the 1% level), household expenditure (at the 5% level), access to agricultural extension services (at the 10% level) and the number of agricultural information sources (at the 1% level) have a significant positive influence on the likelihood of vegetable farmers using direct sales in the local market outlet instrad of choosing contract sales option. The results imply that a unit increase in farm income, household expenditure, access to extension services and the number of farm information sources would produce a small increase in the probability of choosing direct sales in the local market by 2.84e-06, 3.72e-06, 0.0599 and 0.0113 respectively. The increase in household spending could tempt vegetable farmers to seek immediate intervention through quick sales in the local market rather than considering a contractual arrangement. Additionally, expanding extension services would expose vegetable farmers to new technologies that would likely increase production and create a local market in production areas. Furthermore, expanding agricultural information sources would likely increase vegetable farmers' ability to analyze a particular marketing outlet and enhance efficiency in marketing decision. While a continued increase in vegetable farmers' income would likely mean continued use of the option of local market sales compared to contractual outlets. The finding is substantiated by Magogo et al. (2015), Geoffrey et al. (2015), Emana et al. (2015), Wosene et al. (2018), Adugna et al. (2019), Samuel and Malgwi (2020), Dube et al. (2021), Berhanu and Atinafu (2022), Ozkan et al. (2022), Chekol and Mazengia (2022).

On the contrary, the slope coefficients of farm size (at the 10% level) and the distance from the farm gate to the local market (at the 10% level) showed significant negative relationships with the probability of using direct sales in the local market relative to the base category. The result suggests that vegetable farmers' chance of exploiting direct sales in the local market decreases as farm size increases and the distance from their farms to the point of sale in the local market increases. More specifically, an increase in farm size and distance from the farm to the local market would result in a decrease in the probability of using direct sales by 0.1009 and 0.0121, respectively. As farm size increases, production would increase, potentially exceeding demand capacity in the local market. Due to the perishable nature of leafy vegetables, excess production would likely result in post-harvest losses and a decline in farm income. To avoid this situation, vegetable farmers would prefer

contract selling, where bulk purchasing is improved and farmers' risks are drastically minimized. Furthermore, increasing the distance between the farm gate and the point of sale at the local market would likely increase the transaction costs associated with marketing the leafy vegetables and reduce farmers' income. To avoid this situation, farmers would prefer the contractual sales option which reduces the marketing cost compared to the local market sales option. The result is reported by Magogo et al. (2015) validated; Emana et al. (2015), Dessie et al. (2018), Adugna et al. (2019), Getahun et al. (2020), Samuel and Malgwi (2020), Samuel and Malgwi (2020), Dube et al. (2021), Ozkan et al. (2022), Adams et al. (2022), Ketema and Lika (2023).

3.5. Determinants of the Choice of Sales to Middlemen/Agent Outlet (Sale Through Contract Arrangement Option as a Based or Reference Category)

"Note that all explanations are made with respect to the reference category." The empirical results showed that the age of vegetable farmers (at the 5 percent level), household size (at the 5 percent level), and farm size (at the 5 percent level) have a significant negative correlation with the probability of selecting the middleman/agent instead of contract sales or reference category. The result revealed that an increase in the age, household size and farm size of the vegetable farmer leads to a decrease in the probability of using middlemen/agents as an alternative market by 0.0032, 0.0628 and 0.1278, respectively. Increasing age of vegetable farmers would likely be associated with reduced farmer mobility. Therefore, older farmers would likely prefer a less cumbersome option and accordingly choosing a middlemen/agent is less preferred to a contractual arrangement option. Furthermore, an increase in household size would increase household expenditure, a situation that is sometimes best resolved through contractual arrangements for a prepayment system. Increasing the size of farms, on the other hand, leads to economies of scale, which is likely to lead to an increase in farm production. A continuous increase in farm output will trigger off-taking arrangement which is often best propelled through contractual arrangement. The findings are substantiated by Magogo et al. (2015), Dessie et al. (2018), Adugna et al. (2019), Getahun et al. (2020), Samuel and Malgwi (2020), Berhanu and Atinafu (2022), Ketema and Lika (2023).

Likewise, the coefficients of taxes paid in the local market and the distance from the farm to the local market have a significantly negative association with the probability of using the middlemen/agent relative to the choice of contractual arrangement. These results suggest that a 10% increase in taxes paid and distance to market would result in a decrease in the probability of choosing the middleman/agent option by 0.0004 and 0.086 units, respectively. Increase in tax and the distance between the farm gate and the point of sale at the local market would increase vegetable farmers' overall transaction costs and reduce farmers' income.

To avoid this situation, vegetable farmers would probably prefer the contractual arrangement option over the middleman/agent option. The results are confirmed by Magogo et al. (2015), Emana et al. (2015), Adugna et al. (2019), Samuel and Malgwi (2020), Dube et al. (2021), Ozkan et al. (2022) and Adams et al. (2022).

On the contrary, experience in vegetable cultivation (at 1% level), socialization (at 1% level), and years of acquiring formal education (at 10% level) have a significant positive relationship with the probability of using the middlemen/agent marketing outlet relative to the contractual sale option. The result suggests that increasing farmers' experience, year of socialization, and year of schooling by approximately 0.027, 0.007, and 0.004 units would lead to an increase in the probability of using the middleman/agent option instead of contractual sale option. Increasing farming experience strengthens farmers' conservative attitude and increases evaluation capacity, making them more likely to stick with their current marketing option rather than a given alternative option. Longer membership in social organizations would lead to stronger bonds between farmers and buyers and ensure better information and understanding between farmers and buyers. This situation would likely make it more difficult for farmers to give up their preferred option over an alternative option such as the contractual arrangement. While the number of years of formal education improves vegetable farmers' ability to access and process marketing information among alternative outlets. Therefore, educated vegetable farmers would prefer the middleman/agent option over the contractual arrangement option. The result corroborate Magogo et al. (2015), Emana et al. (2015), Dessie et al. (2018), Wosene et al. (2018), Getahun et al. (2020) Samuel and Malgwi (2020), Dube et al. (2021), Berhanu and Atinafu (2022), Ozkan et al. (2022), Arumugam et al. (2022), Chekol and Mazengia (2022), Adams et al. (2022), Ketema and Lika (2023).

Furthermore, the empirical results showed that non-farm income (at the 1% level), farm income (at the 1% level) and household expenditure (at the 1% level) have a significant positive correlation with the probability of choosing the option of the middlemen/agent rather that the contractual arrangement option. The results suggest that as farm income, non-farm income and household expenditure increase, the probability of using middlemen/agents increases accordingly. The results are consistent with the results of Magogo et al. (2015), Emana et al. (2015) and Dessie et al. (2018).

Similarly, the vegetable farmer's gender or being a female farmer (at the 10 percent level) and sources of agricultural information (at the 5 percent level) have a significant positive relationship with the probability of using middlemen/agent marketing option instead of the contractual arrangement outlet. The results indicate that women farmers preferred the "middleman/agents" marketing option over the contractual arrangement option. Vegetable farmers' improved access to

agricultural information also favors the choice of middleman/agent option compared to the contractual sale option. The results are consistent with Magogo et al. (2015), Geoffrey et al. (2015), Emana et al. (2015), Adugna et al. (2019), Samuel and Malgwi (2020), Dube et al. (2021), Berhanu and Atinafu (2022), Arumugam et al. (2022), Chekol and Mazengia (2022), Ketema and Lika (2023).

4. CONCLUSION

Agricultural products marketing is an essential tool for sustainable agricultural production and crucial to achieving the Sustainable Development Goals (SDGs) now and in the future. Sustainable vegetable production plays a key role in reducing rural poverty and achieving the Federal Government of Nigeria's food self-sufficiency policy. Therefore, removing all obstacles to sustainable production of vegetables (e.g. leaf gourd) is extremely necessary and unavoidable, especially since the agricultural sector is the country's preferred investment destination. Based on these facts, the study identified three key marketing outlets (namely: contract sales, direct sales in the local market and sales through middlemen/agents) utilized by the leafy fluted pumpkin (leaf gourd) farmers in the southern region of Nigeria. However, the study confirmed that direct sales in the local market (52.00%) is the most preferred marketing channel by leafy fluted pumpkin farmers in the region. Analyzes of the social and economic characteristics of leafy fluted pumpkin farmers revealed that women dominated the sub-sector. The majority of vegetable farmers were relatively young, experienced, educated, married, and had an average household size of four members. Social capital formation among the majority of leafy vegetable farmers was poor, although with increasing preference for non-farm income-generating activities.

The empirical results generated from the multinomial logit regression estimates revealed the determinants of the choice of marketing option preferred by leafy vegetable farmers in the region. The positive significant determinants of choosing direct sales in the local market with contract sales as the base category were: farmers' age, agricultural experience, years in social organization, household size, years of formal education, farm income, household expenses, access to agricultural extension services and sources of agricultural Information. On the contrary, the farm size and the distance from the farm gate to the point of sale in the local market were identified as significant negative determinants of the choice of direct sales in the local market compared to the reference category. Similarly, the middleman/agent option was positively and significantly influenced by farm experience, social organization membership, years of formal education, agricultural income, non-agricultural income, household expenditure, farmer gender and agricultural sources information determined. On the other hand, it was shown that the age of farmers, household size, farm size, taxes paid in the local market and the distance

from the farm gate to the point of sale in the local market have a significant negative influence on the choice of middlemen/agents outlet. Based on these findings, the leafy fluted pumpkin (leaf gourd) farmers are recommended to improve their levels of formal education and build social capital to increase efficiency in selecting their marketing outlets. This could be achieved through adult education programs organized in rural areas. Reducing the taxes paid by farmers in the local market and providing a good road network in rural areas to bridge the distance between the farm gate and the point of sale in the local market will also improve the decision making in choosing marketing outlets for leafy vegetables farmers in the Region. Providing numerous agricultural information sources and strengthening agricultural extension services in the region are key to efficient decision-making in selecting marketing outlets among vegetable farmers. Furthermore, moderation of farmers' household sizes are prerequisites for efficient marketing decisions among leafy vegetable farmers in the region.

Conflict of Interest

Authors declared no conflicts of interest.

Ethics

This study does not require ethics committee approval.

Authors Contribution Rates

Design of Study: GEE(%60), SBA(%40)

Data Acquisition: GEE(%50), SBA(%50)

Data Analysis: GEE(%40), SBA(%60)

Writing Up: GEE(%50), SBA(%50)

Submission and Revision: GEE(%50), SBA(%50)

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