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Market Orientation Strategies for Root and Tuber Crop Production among Smallholder Farmers in Southeast, Nigeria

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Abstract
Root and tuber crop has gained prominence due to its ability to adapt to production ecologies and yield minimal external inputs. In particular, cassava, yam, and cocoyam cultivars have immense potential to improve household income, food security, and nutrition in sub-Saharan Africa. However, farmers need strategies to prosper in the root and tuber crop business for increased sustainability. Therefore,the study was conducted in two States to ascertain the market orientation strategies of root and tuber crop farmers and to analyze levels of market orientation among farmers in the areas studied. Data for the study were collected with the aid of a structured questionnaire.A multi-staged randomized sampling procedure was used to select 192 respondents. Data were analyzed using simple descriptive statistics such as frequency and percentages, and means. The result showed that in Abia State, farm gate markets have the highest percentage (approximately 64.6%).The result of the study revealed that farmers at the farm gate sell their root and tubers in large quantities (94.8% for Abia and 85% for Enugu). However, in the distribution of forms, by which root and tuber crops are marketed indicated that farmers at the farm gate and village market sell their produce in raw and processed forms (79% and 66.7% respectively). The results also showed a mean market orientation score of 0.026 (cassava), 0.10 (yam), 0.001 (cocoyam), and 0.31(cassava), 0.26 (yam), 53.12 (cocoyam) for Abia and Enugu, respectively, indicating that the Enugu farmers were more market-oriented than their Abia counterparts. The results showed that Abia State farmers allocate an average of 4.15ha, 0.87ha, 0.06ha of land for cassava, yam, and cocoyam production. In contrast, in Enugu State, an average of 5.121ha, 1.24ha, 1.43ha of land were also allocated to cassava, yam and cocoyam production. About 29% of the farmers specialize in cassava, yam, and cocoyam production in Abia State, and in Enugu State, 40% specialize in cassava and cocoyam production only. The result showed that in Abia State, market orientation on yam and cocoyam was low; this may be probably due to land allocated to these crops. The strategies adopted by farmers include; selling at farm gate, village, urban and wholesale markets respectively. The farmers in the study areas indicated that their major market places for the root and tuber crops were farm gate and urban market for Abia and Enugu states farmers. However, other strategies employed by farmers for the marketing of their root and tuber crops were, selling in large quantity, use of improved seeds, better storage methods, advertisements and other marketing channels. The pooled result revealed that the major strategies farmers used in their their produce is selling in large quantity. Thefore, the result indicates that in Abia State, market orientation on yam and cocoyam was low; this may be probably due to land allocated to these crops. The study recommends that the land use act be reviewed and made more operational to serve the interest and ambition of smallholder farmers who are into commercial cassava production for available employment opportunites in the sub-sector.

Keywords: Strategies, market orientation, Root, Tuber, Farmers, Nigeria

Introduction

Southeast agro-ecological zone of Nigeria produce and market root and tuber crops such as cassava (*Manihot esculenta*), sweetpotato (*Ipomea batatas*), yam (*Dioscorea spp*), ginger (*Zingibar officinale*), cocoyam (*Xanthomas and Colocasia spp*), potato (S*olanum tuberosum*) and other minor root crops like Turmeric (*Curcumin longa*), Rizga and Hausa potato.The growing utilization of root and tuber crops in the expanding markets depends critically on price competitiveness relative to other commodities. The concept of market orientation has been used more widely in the manufacturing sector (e.g. the food industry) to refer to the extent to which a producer use knowledge about the market (especially, customers and prices), as a basis to make decisions on the three basic economic questions of what to produce, how to produce and how to market (Berhanu and Moti, 2010). Market

orientation in agriculture could be defined as the degree of allocation of resources (land, labour and capital) to the production of agricultural products that are meant for exchange or sale (Berhanu and Moti, 2010). Several studies have also demonstrated that the degree of market orientation is a significant determinant of competitive advantage (Gebhardt *et al*., 2006). Root and tuber crops provide a substantial part of the world's food supply and are also important sources of animal feed and industrial products. On a global basis, approximately 45% of root and tuber crop production is consumed as food, with the remainder used locally as feed (Chinaka *et al*., 2013).Arguments have been advanced in literature suggesting that market orientation may have a strong or a weak effect on business performance depending on environmental conditions such as market turbulence and competitive intensity (Kirca *et al*., 2005). Therefore, the study aims to contribute to the body of knowledge by investigating the market orientation strategies of root and tuber crops in Southeast, Nigeria.

Methodology

The study was carried out in Abia and Enugu States, located in South-East zone of Nigeria. The two States are located in tropical rain forest zone with humid climate.Multistage random and purposive sampling techniques were adopted in the selection of respondents. Two States out of five States in the Southeast Geo-Political zone were purposively selected for the study. The two states were made up of 17 Local Government Areas (LGAs) each. In the second stage, two agricultural zones per State were randomly selected. They were; Umuahia and Ohafia for Abia State, Enugu North, and Enugu East for Enugu State giving a total of four agricultural zones. In the third stage, four LGAs were selected randomly from each zone viz; Umuahia North, Umuahia South, Ikwuano and Bende LGAs for Abia zone, Nsukka and Udenu North LGAs for Enugu North, Isi-Uzo, and Enugu East, giving a sample of eight LGAs. In the fourth stage, one community was randomly selected from each LGA, giving eight communities. One village was selected from each community making it a total of eight villages. Finally, twenty-four cassava, yam, and cocoyam farmers were randomly selected from the villages. This selection gave a total of 192 respondents for the study. Household's market orientation index (MOI_j) was estimated from the household land allocation pattern thus;

$$MOIi = \frac{\sum \propto kLik}{LiK} \ldots.(1)$$

Where; MOI_i = market orientation index of the farmer $_i$, Lik = area of land allocated to k e.g. cassava for farmer $_i$, L_i = the total land area, operated by farmer $_I$,

$\propto_k$ = (marketability index) proportion of root and tuber crops sold e.g proportion of cassava sold and specified thus;

$$\propto k = \frac{Si}{Qki} \ldots.. (2)$$

Where; $\propto_k$is the proportion of crop k sold, S_i = total amount produced, Q_{ki}= aggregate over the total sample households in the farming system.

Market orientation strategies were examined using descriptive statistics to identify strategies and marketing channels adopted by farmers in the sale of their produce.

Results and Discussion

Distribution of the marketing outlets where root and tuber crop farmers sell their produce

Distribution of respondents based on the available market, market orientation strategies, and forms by which their produce was sold are represented in Table 1. Results show that in Abia State farm gate markets have the highest percentage (64.58%) where the root and tuber crop farmers sell their produce, in contrast, the village market ranked second (40%). The percentage of farmers who marketed their produce in urban areas was 21%, and wholesale was least (9%). This finding may be due to transportation/road constarints linking rural areas where the bulk of agricultural production is done to the city markets where the products are consumed. In Enugu, the root and tuber crop sale was high (67%) in the urban market, followed by farm gate (64%). This may be because Enugu has more accessible road to urban markets in addition to production in large quantities.The result of the pooled data showed that farm gate marketers (61%) ranked highest. This result agrees with David and Madu (2014), who noted that root and tuber crops are traditionally grown and marketed at the farmgate.

Strategies Employed by farmers for the sale of root and tuber in the market

Results in Table 2 indicates that majority (94%) and (85%) of the root and tuber crop farmers in Abia and Enugu States reported that they produce and sell root and tubers crops in large quantities respectively. FAO (2020) noted that globally, Nigeria is ranked first in production some root and tuber crops like cassava, yam, and cocoyam, although, Nigerian farmers are the least in terms of earnings from these crops. About 91% of the farmers use improved seed strategies in Abia. In comparison,improved seed scored low (52%) in Enugu, storage method 69% for the root and tuber especially cocoyam and yam.The use of better storage methods implies that when the crops are harvested, the farmer preserves (stores) the surplus to avoid post-harvest losses and to ensure even sale and distribution of the crops probably all year round. The use of improved seeds (69% in pooled result) shows that improved seeds also aid farmers in higher production for the market and increased revenue for the farmers. This use of improved seeds usually increases farmers' income and increases the quantity produced for the market. Roots and tubers may not necessarily need adverts (35%) for theirmarketing, but their processed products (cassava starch, cassava and yam flour, yam and cocoyam chips, etc.) may need advertisement.

Forms root and tuber crops are marketed

Distribution of forms root and tuber crops are marketed are represented in Figure 1. The pooled result shows that all (100%) root and tuber crop farmers in both states marketed their products in raw and processed forms. About 17.9% of the farmers marketed their products only in raw forms, while only 9.9% marketed their products in processed forms. Marketing their products both in processed and raw forms indicates that the farmers are partly producing for market and partly market orientated. Cassava peel can be used to cut down the cost of production and lead to an active and sustainable development in livestock production (Apata and Babalola, 2012).This result agrees with the earlier result of Nanbol and Namo (2019). They reported that the majority of root and tuber crops produced in Nigeria are marketed both in raw and processed forms, and generally, fresh root and tuber crops dominate the market.

Level of market orientation among root and tuber crop producing households in Southeast, Nigeria

The results show a mean market orientation score of 0.026 (cassava), 0.10 (yam), 0.001 (cocoyam), and 0.31 (cassava); 0.26 (yam), and 53.12 (cocoyam) for Abia and Enugu respectively, indicating that farmers in Enugu were more market-oriented than their counterparts in Abia. The results show that Abia farmers allocate an average of 4.15ha, 0.87ha, 0.06ha of land for cassava, yam, and cocoyam production. In contrast, in Enugu State, an average of 5.121ha, 1.24ha, 1.43ha of land were also allocated to cassava, yam and cocoyam production respectively. This findngs may be as a result of area cultivated with these root and tuber crops compared with large total area held for agricultural activities. It could also be attributed to increased land size, which increases the potential to produce a higher marketable surplus for the market hence an increase in market orientation among farmers with large land holdings. Adenegan *et al.*(2013) noted that the trend of market orientation is a method of accessing the smallholder farmers' participation in the output market so that the objective of small-holders agricultural commercialization can be justified.

Distribution of farmers, based on the type of root and tuber crop produced

Figure 2 indicates that 29% of the farmers specialized in cassava, yam, and cocoyam production in Abia. On the other hand, in Enugu, 40% specialized on cassava and cocoyam production only. The pooled result illustrate that cassava, yam, and cocoyam (35%) were the major root and tuber crops produced by farmers in Southeast, Nigeria.This result is in line with the earlier findings of Chukwu *et al*. (2008), who noted that cassava, yam, and cocoyam are important cultivated staple energy sources, second to cereals, generally in tropical regions in the world.

Conclusion

The strategies adopted by farmers include; selling at farm gate, village, urban and wholesale markets respectively. The farmers in the study area indicated that their major market places for the root and tuber crops were farm gate and urban market for Abia and Enugu. However, other strategies employed by farmers for the marketing of their root and tuber crops were, selling in large quantity, use of improved seeds, better storage methods, advertisements and other marketing channels. The pooled result revealed that the major strategies farmers used in their their produce is selling in large quantity. However, the result indicates that in Abia State, market orientation on yam and cocoyam was low; this may be probably due to land allocated to these crops. Therefore, the study recommends that the land use act should be reviewed and made more operational to serve the interest and ambition of smallholder farmers who are into commercial cassava production for available employment opportunites in the sub-sector.

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Table 1: Frequency distribution of the marketing outlets where root and tuber crop farmers sell their produce. (n=192)

	Marketing Outlet	Frequencies	Percentage (%)	Rank
	Farm Gate Market	62	64.58	1st
Abia	Village Market	39	40.63	2nd
	Urban Market	21	21.88	3rd
	Wholesale Market	9	9.38	4th
Enugu	Urban Market	65	67.71	1st
	Farm Gate	62	64.58	2nd
	Village Market	59	61.46	3rd
	Wholesale Market	57	59.38	4th
Pooled	Farm Gate	119	61.98	1st
	Village Market	98	51.04	2nd
	Urban Market	86	44.79	3rd
	Wholesale Market	71	36.98	4th

Source: Field Survey, 2019

Table 2: Distribution of Strategies Employed by farmers for the sale of root and tuber crops in the market

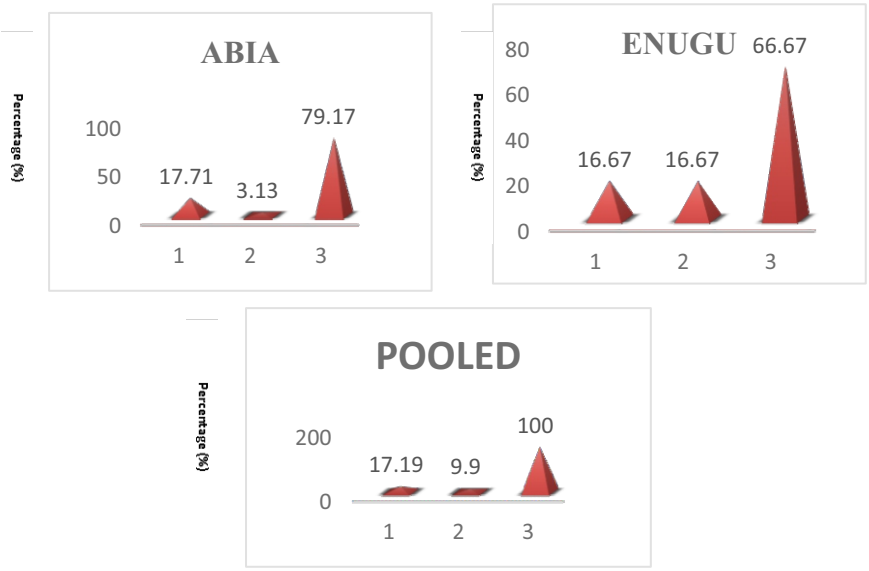
	Strategy Employed	Frequencies	Percentage (%)	Rank
	Large Quantity	91	94.79	1st
Abia	Improved Seed	88	91.67	2nd
	Better Storage	5	5.21	3rd
	Advertisement	5	5.21	4th
	OtherMarketing Channel	4	4.17	5th
Enugu	Large Quantity	82	85.42	1st
	Better Storage	67	69.79	2nd
	Other Marketing Channel	65	67.71	3rd
	Advertisement	50	52.08	4th
	Improved Seed	50	52.08	5th
Pooled	Large Quantity	173	90.10	1st
	Improved Seed	134	69.79	2nd
	Better Storage	72	37.50	3rd
	Advertisement	69	35.94	4th
	Other Marketing Channel	55	28.65	5th

Source: Field Survey, 2019

Table 3: Level of Market Orientation among Root and Tuber Crop Producing Households in South East, Nigeria

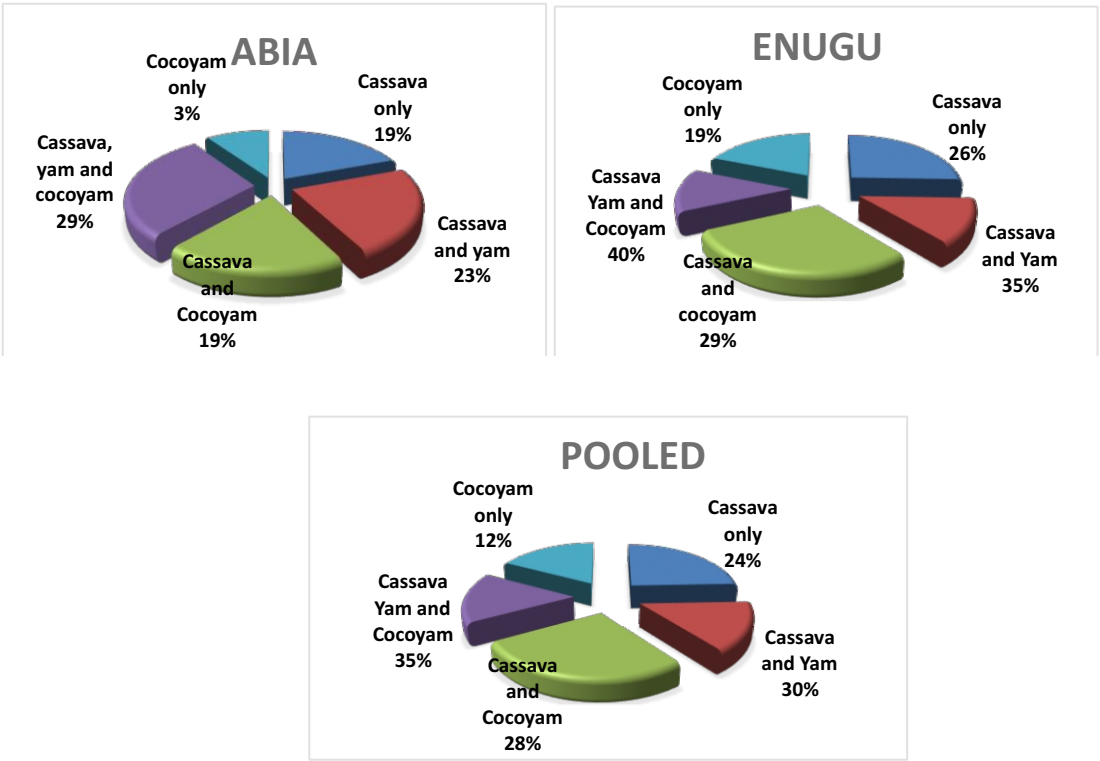
Variable Description	Mean	Std. dev.	Minimum	Maximum
Abia				
Cassava				
Total farm size (ha)	4.154167	3.067381	0	20
Area cultivated cassava (ha)	3.110417	1.860531	0	7.9
Quantity of cassava sold(kg)	743.5417	611.7429	0	3500.00
Quantity of cassava consumed (kg)	285.5208	206.9674	50	1500.00
Quantity of cassava given as gift(kg)	70.41667	46.47957	0	200
MOI	**0.026**	**0.031**	**0**	**0.18**
Yam				
Area cultivated yam (ha)	0.8760417	1.362949	0	8
Quantity of yam sold(kg)	142.5521	335.9073	0	2000
Quantity of yam consumed (kg)	88.33333	188.2742	0	800
Quantity of yam given as gift(kg)	30.72917	64.28956	0	350
MOI	**0.10**	**0.27**	**0**	**1.75**
Cocoyam				
Area cultivated cocoyam (ha)	0.0608333	0.3103705	0	2.2
Quantity of cocoyam sold(kg)	19.07292	101.0851	0	700
Quantity of cocoyam consumed (kg)	6.020833	29.36126	0	200
Quantity of cocoyam given as gift(kg)	2.927083	14.6282	0	100
MOI	**0.001**	**0.01**	**0**	**0.04**
Enugu State				
Cassava				
Total farm size (ha)	5.129167	4.006309	0	20
Area cultivated cassava (ha)	3.266667	2.724959	0	15
Quantity of cassava sold(kg)	2637.302	2424.765	0	9800
Quantity of cassava consumed (kg)	769.2708	843.3295	0	4000
Quantity of cassava given as gift(kg)	253.5417	352.0227	0	2000
MOI	**0.31**	**0.04**	**0**	**0.35**
Yam				
Area cultivated yam (ha)	1.242708	1.171571	0	5
Quantity of yam sold(kg)	18813.54	18275.54	0	70000
Quantity of yam consumed (kg)	3956.771	4979.9	0	24000
Quantity of yam given as gift(kg)	908.3333	1170.058	0	5000
MOI	**0.26**	**1.14**	**0**	**8.57**
Cocoyam				
Area cultivated cocoyam (ha)	1.439583	1.122167	0	5
Quantity of cocoyam sold(kg)	21133.33	15645.69	0	70000
Quantity of cocoyam consumed (kg)	3240.625	3653.364	0	20000
Quantity of cocoyam given as gift(kg)	1143.229	1282.096	0	5000
MOI	**53.12**	**16.89**	**0**	**85.00**
Pooled				
MOI cassava	**0.32**	**0.04**	**0**	**0.35**
MOI yam	**0.26**	**1.14**	**0**	**8.57**
MOI cocoyam	**64.61**	**57.63**	**0**	**85.00**

Source: Field Survey, 2019
MOI = Market Orientation Index



Forms Products are marketed

Source: Survey Data, 2019,1 = Raw, 2= processed, 3 = Raw and Processed
Fig. 1 Percentage distribution of farmers based on forms in which they market their products
Source: Survey Data, 2019



Source: Survey Report, 2019
Figure 2: Percentage Distribution of farmers based on the type of root and tuber crop produced