

DETERMINANTS OF COMMERCIALIZATION OF STAPLE CROPS AMONG SMALL-HOLDER FARMERS IN SOUTH EAST NIGERIA

ABSTRACT

Small holder commercialization is part of an agricultural transformation process in which individual farms shift from highly subsistence oriented production towards more specialized production, targeting markets for input procurement and output supply. The study therefore analyzed the determinants of commercialization of staple crops such as cassava, maize, rice and yam. Data were collected from 408 randomly selected registered farmers using structured questionnaire. These were analyzed using descriptive statistics, household commercialization index and multiple regression analysis. The results show that farmers mean age, education and farming experience were 47 years, 9 years and 17 years respectively. The result also show a mean household size of 8 members, farm size of 1.64ha and income of ₦259, 267.40 per annum. The commercialization index indicates that the extent of commercialization is highest in cassava (57%) and rice (49%). The determinants of commercialization are gender, household size, processing cost and market distance. Favorable indices for commercialization are; high sales of products (2.89), improvement in crop farming and processing (2.85) and relevant policy formulations (2.60). Although, the crops have potentials of being transformed into different products, they are limited to mainly gari (a processed form of cassava) and milled rice for paddy rice. Major challenges identified include inadequate processing and storage facilities and poor access to credit facilities with mean value of 4.82 and 3.83 respectively.

Keywords: Determinants of Commercialization, Small-holder farmers; Staple crops; Household commercialization index.

1. INTRODUCTION

Commercialization is the movement from subsistence production to a market based system of production [1]. This is achieved by using improved technologies to enhance input use and produce transformation,

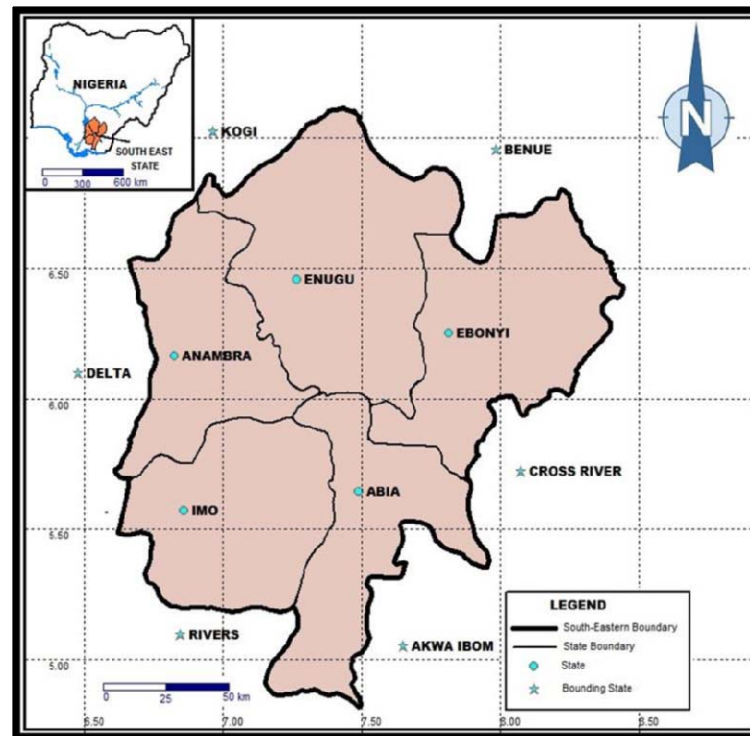
thereby raising the value and cash earning capacities of the enterprises. Hence rural production becomes increasingly integrated into the output market [2]. Commercialization is therefore aimed, not only at increasing production and marketed surplus but also at producing high value commodities for domestic and export markets. The production of marketable surplus to staple food over own consumption is the most common form of commercializing peasant agriculture [3]. Although the introduction of yield enhancing technologies coupled with farmers' technical ability in staple crop production generates market surplus and increased income, there is still the need for the production of high value commodities so as to enhance specialization and more increase in income.

To assist small-holder farmers raise their productive capacity, efforts to increase their production must focus not only on increased productivity but also on increased commercial opportunities for farmers to benefit from the increased production [4]. This requires the transformation of produce into competitive forms so as to expand the markets. For instance cassava and rice have wide ranging potentials as confectionaries and flakes respectively but their utilization is largely limited to the production of edible foods. This is probably because the post harvest facilities and value addition capabilities are not efficiently harnessed to produce adequate quantity and quality of products on a sustainable basis. This results in a less than optimum utilization of farm produce while sub regional market advantages are not fully exploited.

Crops with high commercialization potential in South-East Nigeria include cassava, yam, rice and maize [2]. These are staple crops in the area. They have been subjected to yield enhancing and market oriented technologies so as to improve optimum utilization of the produce and ensure food security. To harness these potentials and promote diversification of the products for the markets, it becomes imperative to examine the produce, the extent of commercialization and the determinants of commercialization among small-holder farmers in South East Nigeria.

2. MATERIALS AND METHOD

The study was carried out in South East Nigeria comprising of Abia, Anambra, Ebonyi, Enugu and Imo States. According to [5], they have a population of about 21.32 million people. The area is characterized by small-holder farmers involved mainly in subsistence farming. They are multiple crops producers that cultivate majorly yam, cassava, rice inter-cropped with maize, potatoes and vegetables.



Map of South-East Nigeria

A. Sampling Technique

Multistage sampling technique was used in the selection of different stages comprising; state, agricultural zone, blocks and farmers. Purposive sampling technique was employed in the selection of state, agricultural zone and blocks. This would enhance the selection of areas where the crops are predominantly grown and managed by small-holder farmers. Three states were therefore selected; one agricultural zone from each state and three blocks from each agricultural zone. Proportionate random sampling technique was used to determine the sample size for each state thus [6];

$$n_h = N_h \left[\frac{n}{N} \right]$$

Where n_h = Individual sample size

N_h = Population of each state

n = Total sample size

$N = \text{Total population}$

This is because the population of farmers differ among the different states. The population of farmers was obtained from the list of registered farmers in the different zones. This gave a total of 1207 farmers. Then proportionate random sampling technique was used to select 32 farmers from Abia state, 72 farmers from Ebonyi state and 304 farmers from Enugu state giving a total of 408 farmers

B. Data Analysis

Primary data were collected through the use of structured questionnaire. Data collected were socioeconomic variables, types and quantities of products generated, input and product prices. Data were analyzed using descriptive statistics for socioeconomic factors; Household commercialization Index was used to analyzed extent of commercialization and according to [7] and [8] it is given thus;

$$HCI = \frac{\text{Gross value of crops sales per household per year} \times 100}{\text{Gross value of all crop production per household per year}}$$

The closer the value of HCI to 100 the higher the commercialization of the crops. The determinants of commercialization was analyzed using multiple regression analysis which is implicitly specified thus:

$$HCI = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e)$$

Where

HCI = Household Commercialization Index

X_1 = Age (years)

X_2 = Farming Experience (years)

X_3 = Gender (1 = Male; 0 = Female)

X_4 = Education (number of years spent in formal school)

X_5 = Household Size (number of persons)

X_6 = Farm Size (ha)

X_7 = Credit (₦)

X_8 = Processing Cost (₦)

X_9 = Market Distance (km)

e = Error Term

Potential of commercialization was analyzed using, descriptive statistics and mean value from likert scale with values ≥ 2.5 acceptable while ≤ 2.49 is not acceptable.

3. RESULT AND DISCUSSION

3.1. Socioeconomic factors of the farmers

Table 1 indicates that the mean age of farmers is 47 years. This shows that most of the farmers are still actively engaged in farm production. The mean farm experience of 17 years indicates that they have acquired some experience in farming. Such category of farmers are prone to technology adoption and commercialization. Older farmers are more risk averse. The mean farm size of 1.64ha limits the productive capacity of the farmers to subsistence level. The educational attainment of 9 years implies that the farmers are literate. The literacy level predisposes the farmer to better skills for commercialization. The mean household size of 8 members provides the farmer with additional labour at peak periods.

Table 1. Summary of socioeconomic factors

Socioeconomic Factors	Mean	Standard Deviation	Range
Age	47	10.48	29-59
Farming experience	17	7.43	5-20
Farm size	1.64	0.67	0.5-2.5
Level of education	9	4.89	1-17
Household size	8	4.54	5-26

Source: Field Data (2016)

3.2. Determinants of commercialization

Table 2 shows that the lead equation is double log function based on the highest number of significant variables and high R^2 of 0.664. The value of the R^2 implies that 66% of the variation in HCI is explained by the regression model.

The result show that gender is negatively associated with HCI and the coefficient is significant at 5%. Commercialization of agriculture entails more intensive use of purchased inputs and adoption of improved technologies resulting in more generation of output. Therefore farm production becomes concentrated in the hands of male farmers due to better access to the productive resources. On the other hand, female farmers become increasingly disadvantaged due to less access to such resources. Therefore, a unit

increase in the level of participation by one gender causes a decrease in the value of HCI. Market distance is significant with a positive sign showing that increased level of commercialization improve the quality of the product such that they may be transported over longer distances without spoilage. However, [9] in his study, indicated a negative relationship probably due to high transaction cost and this would influence the quantity of output sold. Household size is significant at 5% with a positive sign. This is necessary to augment labour needed especially during peak periods of farming. [10] Also reported a positive effect that is significant at 5%. In another study, [11] indicated a negative relationship, probably due to increase in household consumption. Processing cost is significant at 1% with a negative sign. The implication is that the higher the processing cost the lower the value of HCI. When the processing cost is high, most of the farmers may not readily process their produce hence, there would be a drop in their extent of commercialization and vice versa. Other variables such as age, farm expenditure, farm size and credit are positively related with HCI but they do not have a significant effect on it.

Table 2. Determinants of commercialization

Socioeconomic Factors	Linear Function	Semi log function	Exponential function	Double Log Function
Age (X_1)	-0.039 (-0.451)	4.653 (0.773)	0.000 (0.210)	0.125 (0.965)
Farm experience (X_2)	0.098 (0.766)	1.712 (0.812)	.003 (0.960)	.033 (0.735)
Gender (X_3)	-5.258 (-3158) **	-7.434 (-1.980)	-0.157 (-3.461) **	-0.163 (-2.029) *
Education (X_4)	0.185 (1.244)	5.159 (1.415)	0.005 (1.200)	0.104 (1.334)
Household size (X_5)	0.041 (0.214)	10.218 (2.028)*	0.000 (-0.162)	0.249 (2.306)*
Farm size (X_6)	-1.047 (-0.888)	3.537 (0.751)	-0.050 (1.544)	0.067 (0.667)
Credit (X_7)	-1.311E-5 (-1.224)	-1.803 (0.426)	-2.731E-7 (-0.935)	0.004 (0.049)
Processing cost (X_8)	-6.570E-5 (-2.382)*	-5.377 (3.117)**	1.475E-6 (-1.959)	-0.106 (-2.854)**
Market distance (X_9)	0.085 (1.401)	0.994 (0.677)	0.003 (1.640)	0.023 (2.719)**
Constant	67.470**	110.88**	4.250**	4.527**

R ²	0.121	0.287	0.113	0.664
F-Ratio	4.167**	2.787**	3.836**	2.488**

Figures in parenthesis are t-ratio

**Significant at 5%*

***Significant at 1%*

Source: Field Data (2016)

3.3. Potentials for Commercialization

This is captured by showing the forms in which the output is marketed in Table 3 and the potentials for commercialization as perceived by the farmers in Table 4.

Table 3 shows the percentage number of farmers grouped into three marketing categories; those that sell all their produce unprocessed, those that sell processed and unprocessed produce and those that process all their produce and sell. The results also show that only 35% of farmers sell processed and unprocessed farm produce which implies that not too many farmers engage in value addition activities that would enhance the marketability of their output thereby limiting their potential for commercialization.

Table 3 Forms of Marketing

Marketing Categories	Percentage
Sell unprocessed produce	57
Sell processed and unprocessed produce	35
Sell processed produce	7

Source: Field Data (2016)

Table 4 shows the perception of farmers on factors that could deter or enhance enabling environment for commercialization. The result indicate that although relevant polices are formulated with evidences of improvement in crop farming, processing and product sales, such improvement seem not to be sustained due to increase in production cost, poor funding, lack of requisite skills and expensive mechanized facilities which are often unavailable and inadequate.

Table 4. Potentials for Commercialization

Factors	Mean	Decision rule
Expensive mechanized facilities	4.82	Accept
Inadequate credit facilities	3.83	Accept
Increased sales of products	2.89	Accept
Improvement of crop farming and processing	2.85	Accept
Relevant policy formulation	2.60	Accept
Increased production costs	2.51	Accept
Availability of fund	1.88	Reject
Adequate processing skills	1.59	Reject

Source: Field Data (2016)

3.4. Extent of Commercialization

Table 5 shows the level of market orientation of cassava, yam, rice and maize in the study area. The market orientation was highest in cassava (57%) and lowest in yam (31%). The work carried out by [8] on socioeconomic determinants of commercialization among small-holder farmers in Abia State indicated that cassava also has the highest ratio. This implies that value addition via processing is highest in cassava.

Table 5. Extent of Commercialization

Crops	Gross value of all crop produced	Gross value of crop sold	HCI
Cassava	259,267.4	148603.77	57
Maize	259,267.4	98507.16	38
Rice	259,267.4	126561.23	49
Yam	259,267.4	81449.36	31

Source: Field Data (2016).

3.5. Crop output by level of processing carried out.

The crop output by level of processing was analysed. The result shows that 53% of cassava is processed into gari, 48% of paddy rice is milled while 47% of maize is shelled. Yam was mainly sold unprocessed.

Table 6. Crop Output by level of processing

Crop	Quantity produced	Major products	%quantity processed
Cassava	274 bags of 50kg	Gari	53
Paddy rice	94 bags of 100kg	Milled rice	48
Maize	40 bags of 100kg	Shelled maize	47

Source: Field Data (2016)

3.6. Challenges to Commercialization

The challenges were rated on a four point Likert scale with a mean score of ≥ 2.50 acceptable while mean score ≤ 2.49 was regarded as unacceptable. The major challenges are inadequate processing and storage facilities and poor access to credit facilities.

Table 7. Challenges to Commercialization

Challenges	Mean	Decision rule
Inadequate processing and storage facilities	4.82	Accept
Poor access to credit facilities	3.83	Accept
Poor road network	2.83	Accept
Establishment of farm association	2.79	Accept
Inadequate processing skills	2.72	Accept

Mean score ≥ 2.50 is acceptable

Source: Field Data (2016)

CONCLUSION AND RECOMMENDATION

An enabling environment is a pre-requisite for the realization of the potentials of commercialization.

However, poor credit facilities and inadequate processing and storage facilities result in the following; few farmers produce process and sell their output in the rural market. This limits the number of products generated and extent of commercialization. There is need to enhance market orientation of these crops

for domestic consumption and export. It is therefore recommended that government should refurbish old facilities, assist farmers produce new ones, set up strategies to facilitate farmers' access to credit while farmers should participate actively in farm associations.

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