

**DETERMINANTS OF DECISION TO PARTICIPATE IN COCOYAM MARKETING AMONG SMALL-HOLDER FARMERS IN ABIA STATE**

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**ABSTRACT**

*This study presents the Estimates of Factors Influencing Decision to Participate in Cocoyam Marketing in Abia State, Nigeria. The specific objectives of this study are to estimate factors influencing the decision to participate in cocoyam marketing in Abia State. Primary and secondary data were used in the survey. The primary data were collected from a random sample of 200 cocoyam marketers in Abia State. The respondents were drawn from rural and urban markets in the agricultural zones of the state. The data were analyzed using probit model. The result shows that values of cocoyam and farm size are positively associated with the probability to sell cocoyam. This probably means that households with large farm sizes tended to produce marketable surpluses and participated in the market as sellers. Moreover, it is possible when the value of the crop was high(1.0%,significant). The coefficients on education and price of cocoyam have positive signs. The result shows that education acquired by the marketers' play a significant role in enhancing members' participation as cocoyam sellers. From the finding, large farm sizes produced marketable surplus and it encouraged sellers participation in the market. Since land is a critical production asset that has a direct bearing on the production of a marketable surplus. The study therefore recommends that farm land should be made available to enhance production and marketable surplus. There is need to encourage farmers to farm to the nearest town since it enhance the probability of the households to participate as sellers in the cocoyam market.*

**Keywords:** Participation, Cocoyam, Marketing, Abia State.

**INTRODUCTION**

*Colocasia esculenta* originated from South East Asia (India or Malasia) and *Xanthosoma Mataffa* originated from tropical America. Cocoyam (*Colocasia* and *Xanthan* spp) belong to the family ara Cece and it is made up of 100 genera and 1500 species. They are stapled food and cash crops for Nigerians (Eke-okoro *et al.*, 2005).Cocoyam farmers were first introduced into Nigeria by Portuguese merchant in the 16th century and are now Nigeria cocoyam by acclimatization, selection and adaptation processes. Cocoyam is mostly produced in Africa and Nigeria by peasant farmers (Knipscheer and Wilson, 1980). Nigeria is ranked the highest producer of cocoyam in the world accounting for 40.0% of total global production (Eze and Okorji, 2003).

Under traditional farming, it is hard to identify cocoyam selling and cocoyam buying households. Smallholder's farmers cultivating cocoyam as part of their enterprises find it difficult to participate in markets because of a range of constraints and barriers reducing incentives for participation. (Makhura *et al.*,2001). Economists have treated the household's decision to participate in markets as a two-step process: first, producing households decide whether to participate (buying or selling) or remain autarkic, then, conditional on participation, how much to buy or sell. (Goetz, 1992). However, when considering a market such as for cocoyam in Abia State, it is important first to acknowledge that not all households are producers. It important to add a third stage of analysis to the traditional market participation model that identifies factors influencing a household's decision, whether or not to produce. (Key *et al.*, 2000 ). Goetz (1992) focuses on the mechanism as to how subsistence

farmers in Africa make market participation decisions given the transaction costs each farmer must incur, and how that mechanism may affect the estimation of market sales response. In developing countries, the rural households are the major participants in the decisions of the volume of sales of the products. Most households get involved in the product transactions and volume decision simultaneously. They effectively pre-commit to a given volume of the product before learning about it. Information about the product is available only when the product arrives the market. This *ex-ante* decision-making effectively gives the traders with whom the household interacts market power. They achieve it by rendering the home's demand (supply) inelastic on new market information (example prices). Also, they discover, leaving poor, and pre-committed households vulnerable to exploitation by shrewd traders.

For households that make marketing decisions sequentially, then they retain greater flexibility once they arrive in a market, making their purchases or sales volume decisions *ex-post* based on new information discovered at the market, thereby reducing traders' capacity to extract much or all of the gains from trade. Longstanding popular assumptions indicate that traders exert market power over sellers and buyers in rural markets (Takeshima, 2008). Key *et al.*, (2000) developed a structural model to estimate structural supply functions and production thresholds for Mexican farmers' participation in the maize market, based on a censoring model with an unobserved censoring threshold. Their model differentiates between the effects of fixed and proportional transaction costs. Holloway *et al.*, (2005) used a Bayesian double-hurdle model to study participation of Ethiopian dairy farmers in the milk market when non-negligible fixed costs lead to non-zero censoring, as in Key *et al.*, (2000) but distinguishing between the discrete participation decision and the continuous volume marketed decision, as in Goetz.Mathur *et al.*, (2001) employed selectivity models to identify factors of market participation involving the two-step estimation similar to Heckman's. Takeshima (2008) used the double hurdle model to estimate elasticity of demand and supply of products. They included on-farm sellers and off-farm sellers model.

Works on household marketing behavior in developing countries thus began from fundamentally different assumptions about the nature of households' market participation choices (Bellemare and Barrett, 2006). Goetz (1992) and Holloway *et al.* (2005) explicitly assume following choice: households initially decide whether or not to participate in the market, and then take a decision on the volume purchased or sold conditional on having chosen market participation. Key *et al.* (2000), by contrast, implicitly modeled the household as making the discrete market participation choice simultaneously with the continuous decision as to volumes purchased or sold. Bellemare and Barrett (2006), allows for the possibility that households could make marketing decisions either sequentially or simultaneously. In their study, they pooled all nine time periods together and treated the dataset as a cross-section.

The motivation for the probit model for market participation comes from the perspective sequencing and jointness of the household's marketing decisions (Bellemare and Barrett, 2006). The model showed that a household's net sales (sales minus purchases) volume spans the real line. Hence, one can partition the continuous market participation outcome into three distinct categories as net buyer (households whose net sales are negative), autarkic (households whose net sales are equal to zero) and net seller (households whose net sales are positive) households. Moreover, these three categories are logically ordered, and since it is informative to distinguish between net buyers and net sellers rather than just lump them together as "market participants," one can estimate an ordered probit participation decision. Ordered probit specification allows the study of fixed and variable transaction costs separately, as do Key *et al.*, (2000). Bellemare and Barrett (2006) used an estimator that converges more readily than does their somewhat more cumbersome likelihood function.

The objectives of the study are to analyze the socio-economic characteristics of cocoyam marketer among Smallholder cocoyam Farmers and to estimate the factors influencing decision to participate in cocoyam marketing in Abia. There is need to know the farmers and marketers expectations. The production decisions can only be made based on farmer’s expectations. This distinction allows the farmer’s information to be updated after deciding whether to produce or participate in the market.

**MATERIALS AND METHODS**

The study was carried out in Abia State Nigeria. The study area lies between latitudes 05° 6’ N and 05° 24’ North of the Equator and Longitudes 07° 18” and 07° 24” East of the Greenwich Meridian. (NPC, 2006) Abia State has a common boundary with other states, namely Imo State in the West, Ebonyi, and Enugu in the North, Akwa Ibom and the Cross River States in the East and Rivers in the South. The state is made up of seventeen Local Government Areas (L.G.As) and has three agricultural zones namely Umuahia, Aba and Ohafia. Cocoyam is one of the staple foods in Abia State and is produced and marketed in all the zones of the state. The study covered two (Ohafia and Umuahia) out of the three agricultural zones in Abia state. The local governments that were involved are Bende, Ohafia, Umuahia North and Umuahia South LGAs. Multi-stage sampling technique was used in the selection of respondents. Two local government areas were randomly selected from each of the two agricultural zones, giving a total of four local government area these local governments are Bende, Ohafia, Umuahia North and Umuahia South LGAs. Five communities were randomly selected from each LGA giving of 20 communities. One market was randomly chosen from each of the chosen the communities. The communities and markets chosen are Osa Ibeku -Ogwumabiri; Ohuhu- Nkwoegwu; Ndume Ibeke- Ahia Eke; Nkwochara- Ori Amaenyi and Isieke in Umuahia North, Olokoror- Ahia Ukwu; Ubakala- Apumiri; Ubakala- Nsirimo ; Afor Ibeji and Umuokpara in Umuahia South, Uzuakoli- Ogumabili; Ozitem- Nkwo Ozitem , Igberer – Nkwo Ebele; Bende- Afo Bende in Bende, Ebem; Asaga; Amaekpu Isiugwu in Ohafia. Ten cocoyam buyers were selected randomly from each chosen community/ market. The samples gave a total number of 200 cocoyam buying households. The primary data were collected through a structured questionnaire. Objective (i) was analyzed using descriptive statistics such as frequency and percentage; and Objective (ii) to estimate the factors influencing decision to participate in cocoyam marketing probit models was used to achieve the objective.

Explicitly the participation market equation is modeled below

$$I_i^{sell\ or\ not} = b^i + b^{iop} x_i^{op} + b_2^{op} x_2^{op} + b_3^{op} x_3^{op} + b_4^{op} x_4^{op} + b_5^{op} x_5^{op} + b_6^{op} x_6^{op} + b_7^{op} x_7^{op} + b_8^{op} x_8^{op} + b_9^{op} x_9^{op} + b_{10}^{op} x_{10}^{op} + b_{11}^{op} x_{11}^{op} + b_{12}^{op} x_{12}^{op} + b_{13}^{op} x_{13}^{op} + b_{14}^{op} x_{14}^{op} + b_{15}^{op} x_{15}^{op} + b_{16}^{op} x_{16}^{op} + b_{17}^{op} x_{17}^{op} + b_{18}^{op} x_{18}^{op} + b_{19}^{op} x_{19}^{op} + b_{20}^{op} x_{20}^{op} + b_{21}^{pr} x_{21}^{pr} + b_{22}^{pr} x_{22}^{pr} + b_{23}^{pr} x_{23}^{pr} + b_{24}^{pr} x_{24}^{pr} + U_i^{op} \dots\dots\dots 1$$

Where;

- X<sub>1</sub> = Farm size (ha);
- X<sub>2</sub> = Value of cocoyam (₦)
- X<sub>3</sub> = Total Income (naira)
- X<sub>4</sub> = Own Tractor/Vehicle dummy (owns tractor = 1; Does not own =0);
- X<sub>5</sub> = Own Motorcycle dummy (owns = 1; Does not own =0);
- X<sub>6</sub> = Own Bicycle dummy (owns bicycle = 1; Does not own =0);
- X<sub>7</sub> = Extension Visits (number);
- X<sub>8</sub> = Educational level (yrs);
- X<sub>9</sub> = Distance to nearest town (Km);
- X<sub>10</sub> = Road condition to nearest town are good dummy (Good =1; Bad =0);

- X<sub>11</sub> = Membership of Cooperatives dummy (Member =1; Not member = 0);
- X<sub>12</sub> = Access to credit dummy (Access =1; No access =0);
- X<sub>13</sub> = Household Size (Number);
- X<sub>14</sub> = Gender dummy (1=female; 0=male);
- X<sub>15</sub> = Age of household head (yrs);
- X<sub>16</sub> = Own a GSM/phone, radio or TV dummy (owns = 1; Does not own =0);
- X<sub>17</sub> = Dependency ratio (the number of household inmates aged between 14 and 17 and above 60 per household member of working age);
- X<sub>18</sub> = Time of Leisure (hrs);
- X<sub>19</sub> = Storage Capacity (kg);
- X<sub>20</sub> = Dummy for risky area;
- X<sub>21</sub> = Native dummy (They take the value ‘1’ if the farmer is native and ‘0’ otherwise.);
- X<sub>22</sub> = Price of cocoyam (₦/kg);
- X<sub>23</sub> = High Yielding Varieties (%)
- X<sub>24</sub> = Crop Transportation Costs (₦/ ton);
- b<sub>1</sub>-b<sub>24</sub> = Coefficients to be estimated;
- U<sub>i</sub> = error term

**RESULTS AND DISCUSSION**

Table1 shows the socio economic characteristics status of the cocoyam buyers in the study area

Table 1: Social Economic Characteristics of the Cocoyam Marketers

Gender	Number of marketer	Percentage (%)
Male	98	49.0
Female	102	51.0
Age (years)		
26-35	19	9.5
36-45	116	58.0
46-55	53	26.0
56-65	12	6.0
Marital status		
Married	176	88.0
Single	8	4.0
Divorced	2	1.0
Widowed	14	7.0
Household Size		
1-2	15	7.5
3-4	50	25.0
5-6	90	45.0
7-8	39	19.5
9-10	6	3.0
Educational Level		
No Formal Education(0-5)	16	8.0
Primary Education (6-12)	42	21.0
Secondary Educat. (12-18)	83	41.5
Tertiary (18-Above)	59	29.5
Total	200	100.0

**Source: Field survey 2014**

Table.1 shows that almost equal proportions of females (51.0%) and males (49%) participating in cocoyam marketing in the study area were female and majority (58%) of

cocoyam marketers are relatively young individuals who are in their youthful age (36-45 years). The result shows that transaction and participation in cocoyam marketing is dominated by married people. This implies that the trade is a source of income to the families from which they meet their basic needs. The result reveals that majority of the respondents (45.0%) had household sizes of 5-6 persons .The result also shows that 92 .0% of the cocoyam marketers had one form of education or another while 8.0% had no formal education. This shows that literacy level was high amongst them and could enhance marketing technology. The level of education has been identified to enhance the marketing efficiency and the ability to evaluate new techniques (Obasi, 1991).

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**Determinants of market participation by Cocoyam Marketers**

A probit model was used to estimate the factors influencing the decision to participation among Cocoyam marketers, The results is presented in Tables 2. The probit result in Table 2 shows that twelve variables comprising household endowment, and characteristics, access to information and interaction factors significantly explained the probability of the households *participating* in the cocoyam market as sellers.These determinants include the value of cocoyam (1.0%), farm size(5.0%), total income(10.0%), education(1.0%), distance to the nearest town(1.0%), household size(1.0%), gender(10.0%), age of the household head(5.0%), time of leisure(10.0%), the price of cocoyam(1.0%), distance from the market(1.0%) and crop transportation cost(5.0%). Values of cocoyam and farm size are positively associated with the probability to sell cocoyam. This probably means that households with large farm sizes tended to produce marketable surpluses and participated in the market as sellers especially when the value of the crop was high. This is anticipated since land is a critical production asset that has a direct bearing on the production of a marketable surplus *ceteris paribus* (Alen *et al.*, 2008). As expected total income had a negative sign implying that households were likely to participate as sellers when income was decreasing. This complements the fact that income raises a household’s purchasing power and increasing income increase her probability to participate as buyer Jagweet *al* (2009).With positive coefficients, education, distance to nearest town; distance from the market and time of leisure tend to enhance the probability of the households to participate as sellers in the cocoyam market.

**Table 2: Comparative Probit Estimates of Factors Influencing Decision to Participate in Cocoyam Marketing in Abia State**

<b>Explanatory Variables</b>	<b>Selling household Coefficients</b>	<b>Buying Households</b>
Constant	1.303 (1.252)	1.364 ((1.229)
Value of Cocoyam	0.007 (0.011)	0.00007 (0.0010)
Farm Size	0.537** (0.149)	-0.917*** (0.243)
Total Income	-0.001 (0.001)	-0.001 (0.001)
Own a Vehicle/Truck	-0.433 (0.287)	-0.754*** (0.281)
Own Motorcycle	-0.244 (0.240)	-0.027 (0.237)

Own Bicycle	0.265 (0.244)	0.060 (0.242)
Education	0.340*** (0.057)	0.044 (0.035)
Distance to nearest town	0.089*** (0.020)	0.094** (0.039)
Good Road condition	-0.265 (0.255)	-0.089 (0.255)
M/ship of coop	0.134 (0.299)	0.302 (.293)
Access to credit	-0.290 (0.461)	0.256 (0.447)
Household Size	0.087*** (0.023)	-0.017 (0.094)
Gender	-0.592* (0.259)	-0.422* (0.256)
Age of HH	-0.043** (0.019)	-0.023 (0.019)
Own GSM/ radio/Tv	0.266 (0.330)	-0.281 (0.333)
Depending Ratio	0.182 (0.135)	0.050 (0.131)
Time of Leisure	0.140* (0.058)	0.145* (0.057)
Storage capacity	-0.006 (0.008)	-0.017* (0.008)
Price of Cocoyam	-0.008*** (0.002)	0.0001 (0.0019)
Distance from/to market	0.008*** (0.001)	0.001 (0.0019)
High Yielding vars	0.0016 (0.001)	-0.007*** (0.0001)
Crop Transportation costs	-0.0017** (0.0001)	-0.008*** (0.001)

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**\*\*\*, \*\*and \* represent significant at 1.0%, 5.0% and 10.0% levels of probability  
Values in parentheses are standard errors. Source: computed field survey (2014)**

The implication of the result is that education acquired by the households plays a significant role in enhancing members' participation as cocoyam sellers. This is because education assists people to identify opportunities for increased profits. This agrees with Gam and Adeoti (2011) who also had a positive sign in their study on market participation and Rural Poverty among farmers in Taraba State, Nigeria. Distance to the nearest town indicates the remoteness or nearness to and the possibility of engaging in other likelihood activities especially white collar jobs rather than cocoyam selling. The positive sign showed that more distant households most likely decided to participate as sellers cocoyam marketing in Abia State, Nigeria.

The size of household showed positive coefficient indicating that increasing household size provides the motivation to participate as a vendor to generate income to be used in meeting up with household need. This result contrasts the findings of Shepherd *et al.* (2011) who had a negative coefficient for household size and attributed it to the failure of the large household to provide marketable surplus due to high dependency ratio (consumption). The negative sign on gender suggests that with increasing female members of a family, they were less likely to participate as cocoyam sellers. This was contrary to *apriori* expectation.

Furthermore, the result reveals that younger household members tend to participate less as sellers. Increasing prices of cocoyam most likely reduce the demand for the commodity and discourage households deciding to participate as sellers in the cocoyam market in the State. On the other hand, increasing the distance to cocoyam market would raise the selling price and most likely encourage households to decide to participate as sellers. As increasing time of leisure encouraged household to participate as sellers. This consolidates the observation advanced by Nwachukwu and Ezeh (2007) in a study on rural development programmes. As expected, the price of Cocoyam and crop transportation costs posted negative coefficients implying that households decline participation as sellers in the face of increasing values of these variables. As constituents of transaction cost price and transportation costs reduce the sellers' incentive to enter into commercial agriculture (Pingali *et al.*, 2005).

On the part of the buying households, result revealed that farm size, total income, ownership of the vehicle, distance to nearest town, gender, time of leisure, storage capacity, high yielding varieties and transportation cost also significantly explained the probability of households to participate in cocoyam markets, as buyers. Apart from a distance to the nearest town, and time of leisure all other determinants of participation in cocoyam marketing as buyer households posted negative influences. This was predicated on the failure of the households in producing a marketable surplus beyond their consumption needs possibly on account of land resource constraint. This observation supports the finding of Shepherd *et al.* (2011) who share a similar opinion on the outcome of their study on determinants of cereal market participation by Sub-Saharan smallholder farmers. Income recorded a negative coefficient and indicates that increasing income propels households less probability of participating as cocoyam buyers. This is not consistent with Jagwe *et al.* (2009) who had a positive sign and averred that income raises a household's purchasing power thereby increasing the probability of participating as a buyer. It, however, confirms that cocoyam in the mind of buyers was inferior and meant for the poor.

Surprisingly, ownership of a vehicle showed a negative influence on the probability of participation. A plausible explanation is that such households did not use their vehicle(s) in their Cocoyam marketing activities. The vehicle (s) may be for pleasure. This result contradicts *apriori* based on the fact that access or ownership of transportation equipment reduces transaction costs, guarantees safe delivery and is therefore expected to influence participation positively. The positive sign of distance to the nearest town could be interpreted as an encouragement to be engaging in other livelihood activities such as white collar jobs and the near the market the better, for it gives them time to participate in other things. More, female household members are expected to participate more likely as buyers especially with increasing availability of leisure time. This was not as recorded by the negative coefficient of gender. This failed to reflect the opinion of Okoye *et al.* (2007) and Azeez and Madukwe (2010) who recorded that cocoyam is a woman's crop with promising economic value and mostly engages women in almost all the stages of its value and distribution chain. In Abia State, increasing number of female household members most likely encouraged fewer women participation as buyers of cocoyam. This is connected to the cultural stigma of regarding cocoyam as food for the poor in the area.

Declining storage capacity as shown by the negative coefficient enhances the chances of participating as a buyer. This was plausible given that buyers could buy and store cocoyam for a while. Perishability tends to increase transaction costs; the households likely participate as buyers rather than as sellers. Jagwe (2011) shared a similar opinion in a related study involving banana markets, another crop with a relatively short shelf life.

More so, transportation costs and high yielding varieties used posted negative coefficients; implying declining transportation costs and high yielding varieties used enhance the chances of participating as buyers. It is important to note that availability of high yielding varieties was the unique variable that influenced the household decision to participate as cocoyam buyer and not the seller. In the face of declining, high yielding varieties of cocoyam's households are akin to participate as buyers rather than as growers/sellers of the crop in the study area. This observation has some policy implications to National Roots Crops Research Institute (NRCRI) and International Institute of Tropical Agriculture (IITA) that have the mandate to improve varieties of roots and tuber crops in Nigeria. They should intensive research efforts to improve on the variety of cocoyam to salvage the crop from extinction. The probit model predicted 69.0% of the observations with a highly significant Chi-Square of 75.921, explains how well the data fit into the regression line.

## **CONCLUSION**

The study showed that participation in cocoyam marketing in the study area is dominated by married people, as the trade is a source of income to the families. The majority of the respondents (45. 0%) had household size of 5-6 persons. It could be said that household size is moderate as such marketers could manage the number of people in their house with ease and participate in the marketing of the crop. The study recommends that individuals should embrace the trade as it is a source income and enhance their livelihood. From the findings, large farm sizes produced marketable surplus. The study therefore recommends that farm land should be made available to enhance production and marketable surplus. It is important to encourage farmers to farm to the nearest town since it boost the probability of the households to participate as sellers in the cocoyam market.

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