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# Market Participation Decision among Smallholder Maize Farmers in Southern Guinea Savannah of Oyo State, Nigeria

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## Abstract

Market participation of smallholder farmers has been a very serious issue in Nigeria, notwithstanding its positive benefits among smallholders' producers towards reducing poverty. This study analyses the market participation decision by maize farmers in southern guinea savannah of Oyo state, Nigeria. Multistage random sampling technique was employed to sample a total of two hundred (200) maize farmers from the southern guinea savannah of Oyo state using a well-structured questionnaire. Data were analyzed using descriptive statistics, household commercialization index, ordinary least squares regression and tobit regression model. Result showed that 58% of the farmers participated in the market with a high commercialization index of 81% (0.81) in the study area. About 56% of the farmers were high commercial farmers, 4.5% were medium and 40.5% were low commercial maize farmers. 85% of the market participants were male headed households and majority of the farmers were educated. Tobit regression result revealed that marital status, annual gross farm income, gender amongst others determines farmers' market participation. OLS result also indicated that the intensity of market participation was positively influenced by the quantity of production, contact with extension agents. The government and other policy makers should increase the marketing knowledge and skill of maize farmers through avenues like extension service, farmers' organization and other means of capacity building.

**Keywords:** Maize marketing, participation decision, smallholder farmers, commercialization.

## INTRODUCTION

Agriculture is the bedrock of every nation, the root cause for this is the role it plays in providing food for the population, job opportunities, export revenue and contribution to the nation's Gross Domestic Product (GDP) (Oparinde and Daramola, 2014). Agricultural sector of Nigerian economy greatly depends on smallholder farmers as they contribute significantly to

food and fibre production (Oparinde and Daramola, 2014). For most economies in Africa, agriculture remains a critical sector for attaining economic growth. Nevertheless, to make a significant contribution to economic growth, the sector needs to be commercialized to enable smallholder farmers to participate in markets. Such participation is expected to have a positive impact on their incomes and thus enhance their livelihoods. Maize, which is one of the worlds' most productive and dominant crops, is grown extensively for both humans and livestock, as a biofuel, and as a crude material in the industry (Britannica, 2021). Maize (*Zea mays*) also called

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corn, a cereal plant belonging to the grass family (*poaceae*) originates from South and Central America and is the most important cereal in the world after wheat and rice (Britannica, 2021). It is widely used to make cuisines like masa, tortillas, sweet corn is boiled or roasted on cobs, creamed, converted into hominy or meal. In addition, maize is also used for popcorn, confections and many manufactured breakfast cereals preparations, fermented into a number of alcoholic beverages, used to produce ethanol a first generation biofuel land Corn oil is used for food (Britannica, 2021). About 80% of maize produced is consumed by man and animals while 20% is utilized in variety of industries processes for production of starch, oil high fructose, corn sweetener, ethanol, cereal and alkaline (Oparinde and Daramola, 2014). Maize is a multipurpose crop because every part of its plant has economic value. Therefore, maize production, marketing and consumption are therefore crucial for both actors in agriculture and the industrial sectors.

Although in Nigeria, maize is one of the ten major crops among Nigerian households as of 2019 (Statistica, 2021). Nigeria produce 43% of maize grown in West Africa (Oparinde and Daramola, 2014). Regardless of how, Philip *et al.* (2009) reported that despite the intervention of the National Agricultural Research Institutes (NARIs) which have made considerable progress in the development of agro-processing equipment, the progress toward commercialization and multiplication of maize is still slow. The small and medium enterprises (SMEs) that are expected to fulfill these roles of commercialization are themselves constrained by poor awareness about the existing shelf life technologies, poor capital base and low capacity to compete with imported substitutes. Furthermore, an estimated 10 percent of the total production of grains are lost or wasted annually through poor storage.

Markets are prerequisites for enhancing agriculture-based economic growth and increasing rural incomes in the medium term particularly for the rural poor households. Subsistence food crop production cannot improve rural incomes without market-oriented production systems. These require the intensification of agricultural production systems, increased commercialization and specialization in higher-value crops such as maize. And these must be built upon the establishment of efficient and well-functioning markets and trade systems ones that keep transaction costs low, minimize risk, extend information to all players and that do not either exclude or work contrary to the interests of the poor especially those living in areas of marginal productivity and weak infrastructure.

Meanwhile, market participation among smallholder farmers has been variously defined in literature as market access, and includes the proportion of output sold in the market (Pradhan *et al.* 2010) or their integration into

value chains (Barrett, 2010). However, recent views of market participation or commercialization have emphasized the degree of engagement with markets, either for input or output (Okezie *et al.* 2012). Hence, Maize production, marketing and consumption are crucial for both actors in agriculture and the industrial sectors contributing greatly to the national income, employment, foods and nutrition in Nigeria (Oyetoro and Okunade, 2012). In the Nigerian context, market participation implies a transformation from subsistence production to engagement with formal markets through reacting to current production and marketing signals and hence becoming a participant in the mainstream economy.

Various authors (Key *et al.*, 2000; Bellemare and Barrett 2006; Alene *et al.*, 2008; Persson, 2009; Egbetokun and Omonona, 2012; Oparinde and Daramola 2014; Gambo *et al.*, 2017;) have used different econometric measures such as truncated regression analysis, chow- test, probit regression, ordered tobit regression among others to assess commercialization and market participation among farmers for various crops and livestock products in different countries. This study becomes relevant due to the dearth of literature regarding market participation among maize farmers in the Southern Guinea Savannah of Oyo state, Nigeria. The fact still remains that there are benefits of market orientation and favourable trends in the commercialization of maize production in the country, since maize production and marketing has potentials for increasing income, reducing poverty, employment generation, enhancing food and nutrition security as well contributing greatly to the national income. From the aforementioned, this study aimed at examining the market participation decision and its determinants among maize farming households in Southern Guinea Savanna of Oyo state.

The specific objectives are to:

- (i) Assess the level of market participation among smallholder maize farmers.
- (ii) Examine the factors influencing market participation decision among smallholder maize farmers.
- (iii) Identify the factors influencing intensity of market participation among smallholder maize farmers.

### **Theoretical Framework**

Most studies on the subject employed similar theoretical models, where the household, as both producer and consumer, decides upon market participation as a means to maximize utility (Barrett, 2010; Heltberg and Tarp, 2002; Goetz, 1992; Key *et al.*, 2000). Our specification of theoretical model is theoretically underpinned by the study of Abdula *et al.* (2007) and Chilundika (2011) which premised market participation on profit maximization. Considering a household that maximizes profits ( $\pi$ ). Suppose the household earns its income from the produc-

tion and possible sell of a crop like maize (M), and from off-farm sources (Y), i.e. both earned and unearned. Production of the crop is a function of services provided by privately held assets including land, labour (both quality and quantity as reflected in education experience), livestock and other productive technologies, reflected in the vector (A). Public goods and services (such as extension services and farmer groups providing inputs and information) represented by the vector (G) may likewise affect output.

When concerned with whether or not a smallholder household participates in the market as a seller, the variable of interest can be represented by the indicator variable  $N_S$  which takes on a value of 1 when the household participates and a value of 0 when it does not. This choice is guided by net returns to market participation. Positive net returns result in participation while negative net returns lead to non-market participation. Transaction costs will determine the net returns from participation, and are therefore fundamental in determining whether a household participates or not.

The household faces a parametric price for the crop (P), and transaction costs,  $t(Z, G, A, Y)$  that may depend on public goods and services (such as broadcast of prices and extension information service) reflected in the vector (G), household specific characteristics (demographics) such as distance to the market, education attainment, gender and age reflected in the vector (Z), its assets like land and labour reflected in vector (A) and its income or liquidity which may be earned or unearned (Y). The households' choice problem can thus be represented as *Maximise  $f(\pi)$ ..... (1)*

*Where  $f(\pi) = PC - t(Z, G, A, Y)$*

Subject to the constraints presented by household characteristics, public goods and services, asset endowments and available cash on the farm.

The factors influencing the participation decision can be classified into two broad categories; public goods and services and specific household characteristics (demographics). These two factors together determine the transaction costs faced by a particular household. Transaction costs are major impediments and determinants of market participation. A market fails when the cost of transaction through market exchange creates disutility greater than the utility gain that it produces (de Janvry *et al.*, 1991).

## **MATERIALS AND METHODS**

### **Study Area**

The study was carried out in the southern guinea savannah of Oyo State, Nigeria. Oyo State is an inland State in South western Nigeria with its capital at Ibadan. It lies within Latitudes 7°3' N and 9°12' N and longitudes 2°47' and 4°23' E. It covers a land area of 32,249 square

kilometres. The southern part of the State which consists of Local Governments in Ibadan fall within the forest zone while Local Governments in Oyo, Ogbomoso, Saki and Ibarapa could be classified as occupying derived Savannah Zone (Southern Guinea Savannah). However, pockets of forest vegetation could be found along the river valleys and streams existing across the State. The Southern Guinea Savannah comprises of the following Local Government Areas; Saki West, Saki East, Irepo, Oorelope, Olorunsogo, Atisbo, Iwajowa, Kajola, Iseyin, Afijio, Ibarapa North, Afijio, Oyo East, Oyo West, OgoOluwa, Ogbomoso south, Ogbomoso North, Oriire, Atiba, Atisbo and Itesiwaju (Oyo State Government, 2019). The study area has an equatorial climate with dry and wet seasons and relatively high humidity with average daily temperature ranges between 25 °C (77.0 °F) and 35 °C (95.0 °F) almost throughout the year (Oyo State Government, 2019). The climate in the State favours the cultivation of crops like Maize, Yam, Cassava, Millet, Rice, Plantain, Cocoa tree, Palm tree and Cashew (Nigerian Investment Promotion Commission - NIPC).

### **Data collection and sampling techniques**

The primary data for this study were obtained through the use of a well-structured questionnaire that is administered through direct interviews to maize farmers in the study area. A multistage sampling procedure was employed for the study. The first stage involves the purposive selection of two zones (Oyo and Saki) from the four zones of the Agricultural Development Programme (ADP) zones of Oyo State. ADP is a national programme organized by the Nigerian government to foster agricultural development. ADP agricultural zones were used because the study focused on rural households whose primary livelihood is farming. The second stage involves the stratification of blocks of each zone. The agricultural zones were Ibadan/Ibarapa (9 blocks), Ogbomoso (5 blocks), Oyo (5 blocks) and Saki (9 blocks). Given the higher population of Saki zone relative to that of Oyo zone, a random selection of three cells from Oyo zone and four cells from Saki zone for the third stage, leading to a total of 14 cells in all. Lastly, the number of respondents that is selected in each zone was proportionate to the population size of the zone, therefore, 80 respondents was sampled in Oyo zone while 120 respondents was sampled in Saki zone making a total of 200 respondents.

### **Analytical Methods**

The analytical tools employed to achieve the objectives of the study were descriptive, household commercialization index (HCI) and regression analysis. Specifically, Ordinary Least Squares (OLS) estimation and Tobit model

estimation procedure was used. Descriptive statistics such as frequency, percentages, means and standard deviation were used to describe the socioeconomic and demographic characteristics of respondents.

### Household Commercialization Index (HCI)

Following Straberg *et al.* (1999), HCI was modified and use to estimate the Maize Commercialization Index (MCI). The formula is presented below;

$$HCI_{im} = \left[ \frac{\text{Gross value of maize sales } ij}{\text{Gross value of all maize production } ij} \right] * 100 \dots\dots\dots(2)$$

Where  $HCI_{im}$  is the  $i^{th}$  household commercialization index for maize, the numerator is the total amount of maize sold by the  $i^{th}$  household in the  $j^{th}$  year ( $j = 2015$  farming season) and the denominator is the total value of output of the maize by the  $i^{th}$  household in the  $j^{th}$  year.

The estimate of the commercial index was used to characterise farmers into low, medium and high commercial farmers. According to Abera (2009), households who sell at most 25% and below are low commercial farmers, those who sell between 26 and 50% are medium commercial farmers and above 50% are high commercial farmers. The closer the HCI is to 100, the higher the level of commercialization in the target households.

### Model Specification for Ordinary Least Square Regression

The ordinary Least Square (OLS) regression model was used to analyse the factors influencing intensity of market participation among maize farmers. Following Adenegan *et al.* (2012).

The model is stated as follows:

$$Y = \beta_0 + \beta_i X_i + U_i \dots\dots\dots(3)$$

$X_1$  = Marital status (Married = 1, Otherwise = 0);  $X_2$  = Household size (persons)

$X_3$  = Annual gross farm income (K);  $X_4$  = Distance of input supply (Km)

$X_5$  = Access to credit (Access = 1, Otherwise = 0);  $X_6$  = Distance of market to farm (Km);  $X_7$  = Distance of farm tarred (Km)

$X_8$  = Quantity of maize produced (Kg);  $X_9$  = Age of household head (years)

$X_{10}$  = Gender (Male = 1, Female = 0);  $X_{11}$  = Years of education (years)

$X_{12}$  = Primary Occupation (Farming = 1, Otherwise = 0);

$X_{13}$  = Membership of social network (Member = 0, Otherwise = 0);

$X_{14}$  = Farm Size (hectares);  $X_{15}$  = Contact with extension agent (Contact = 1, Otherwise = 0);  $X_{16}$  = Maize consumption frequency (number of times).

Where,  $Y$  is Quantity of maize sold (in Kg) and  $X_i$  is a vector of farmer characteristics that are relevant to explaining the decision to participate in the market and the intensity of participation,  $\beta_i$  are the parameters to be estimated and  $U_i$  is the error term.

### Tobit Model Estimation

Tobit Model is applicable when all farmers participated in the market but in reality, not all farmers participate or at the same level in the markets because some farmers may choose not to participate in a particular market due to different factors facing the farmer at that particular time. Therefore, when the OLS regression is estimated excluding the non-participants from the analysis, a sample selectivity bias arises into the model. A Tobit econometric model when applied in determining the factors affecting market participation under *ceteris paribus* is shown below:

$$Y^* = \beta_0 + \beta_i X_i + \mu_i \dots\dots\dots(4)$$

$$Y = 0 \text{ if } y \leq 0, \dots\dots\dots(5)$$

$$y = Y^* \text{ if } y > 0. \dots\dots\dots(6)$$

where,  $Y^*$  = Maize sales Index,  $\beta_i$  = estimated parameter or coefficient,  $X_i$  = the explanatory variables,  $\mu_i$  = error term and is normally distributed with zero mean and constant variance.

The dependent variable  $y$  equals 0 if the latent variable  $y^*$  is below a certain threshold, usually 0. If the values of the latent variable are positive, the dependent variable is equal to the latent variable.

$$Y^* = \beta_0 + x\beta_1 + \mu. \mu / x \sim N(0, \delta^2) \dots\dots\dots(7)$$

$$Y \max(0, y)^* = y^* \dots\dots\dots(8)$$

The latent variable  $y^*$  in equation (7) satisfies the classical linear model assumptions; in particular, it has a normal, homoskedasticity distribution with a linear conditional mean while equation (5) indicates that the observed variable,  $y$ , equals  $y^*$  when  $y^* \geq 0$ , but  $y = 0$  when  $y^* < 0$ .

## RESULTS AND DISCUSSION

### Demographic Characteristics of Maize Farmers

The study accessed household socio-economic characteristics in relation to market participation. The sample of 200 households showed that 116 farmers had participated in the maize market and 84 farmers did not participate. Table 1 highlights the difference in the demographic characteristics between participants and non-participants. The average age among participants was 49.69 years while that of non-participants was 52.23 years. The mean number of years that had been spent in

**Table 1.** Demographic Characteristics of Maize Farmers in Southern Guinea Savannah of Oyo state.

Variable	Participants N = 116		Non-Participants N = 84		t-Value
	Mean	Std.	Mean	Std.	
Age	49.69	9.93	52.23	8.47	1.60
Education	7.33	4.65	6.35	4.81	3.26 **
Household size	7	5	7	3	-0.54

Source: Survey data (2015). \*\*\*, \*\*, \* = significant at 1, 5 and 10 percent respectively

**Table 2.** Gender, Marital Status and Occupation Distribution among Maize Farmers.

Variable		Participants (116)		Non-participants (84)		Chi-Square
		Freq	%	Freq	%	
Gender	Male HH	99	85.34	77	91.67	1.84
	Female HH	17	14.66	7	8.33	
Marital Status	Married	109	93.97	70	83.33	8.60*
	Others	7	6.04	14	16.66	
Primary Occupation	Others	26	22.41	17	20.24	0.14
	Farming	90	77.59	67	79.76	

Source: Survey data (2015). \*\*\*, \*\*, \* = significant at 1, 5 and 10 percent respectively.

**Table 3.** Access to Institutional Factors among Maize Farmers.

Variable	Participants (116)				Non-Participants (84)				Chi-Square
	Yes		No		Yes		No		
	Freq	%	Freq	%	Freq	%	Freq	%	
Access to formal credit	31	26.72	85	73.28	24	28.60	60	71.40	0.08
Access to extension agent	32	27.60	84	72.40	34	40.50	50	51.50	9.43*
Member of social network	61	52.60	55	47.40	44	52.40	40	47.60	6.72

Source: Survey data (2015). \*\*\*, \*\*, \* = significant at 1%, 5% and 10% respectively.

formal school by participants was 7.33 and 6.35 years for non-participants. The mean number of years spent in school was significantly different between the groups at 5%. This indicates that the participants were more educated than non-participants. The average number of household members among the participants and non-participants was 7 persons.

### Gender, Marital Status and Occupation Distribution of Maize Farmers

Gender distribution between participants and non-participants is shown in table 2. About 85% percent of participants and 92% of non-participants were male headed households. This implies there were more male

**Table 4.** Production and Consumption of maize among maize farmers in Southern Guinea Savannah of Oyo state.

Variable	Participants	Non-Participants	t - value
	n = 116 Mean	n = 84 Mean	
Size of land planted in hectares	4.81	6.20	-3.92 ***
Quantity of maize produced in Kg	3227.85	2886.79	0.89
Quantity of maize sold in Kg	3102.5	1665.80	0.05
Quantity of maize consumed in Kg	73.27	115.75	8.61 ***

**Source:** Survey data (2015). \*\*\*, \*\*, \* = significant at 1, 5 and 10 percent respectively

**Table 5.** Output distribution of Maize Farmers in Southern Guinea Savannah of Oyo State.

Variables	Observation (200)	
	Participants (116)	Non-participants (84)
Market participation Proportion	0.58	0.42
Quantity of maize produced (Kg)	374430.6	242490.36
Quantity of maize sold (Kg)	359890	139927.2
Quantity of maize consumed (Kg)	8499.32	9723
Percentage of maize sold (%)	96.12	57.70
Percentage of maize used as gifts, seeds and pest infested (%)	1.61	38.29
Percentage of maize consumed (%)	2.27	4.01
Total quantity of maize produced (Kg)	616920.96	
Total quantity of maize sold (Kg)	499817.2	
Average price per Kg in 2015 (₦)	160	
Total Percentage of maize consumed (%)	4	
Total Percentage of maize sold (%)	81	
Total percentage (% gifts, seeds and pest infested)	15	
<b>Level /Categories of Commercialization (%)</b>		
HCI	81	
High commercial farmers (above 50% sales)	56	
Medium commercial farmers (26 – 50% sales)	4.5	
Low commercial farmers (below 25% sales)	40.5	

**Source:** Survey data (2015).

participants than female participants. The sample also revealed that 93.97 percent of the participants and 83.33 percent of the non-participants are married. The chi-square value of 8.60 showed that there was a significant difference between the marital status of participants and non-participants at 10%. In addition, it was also shown that 22.41 percent of participants do other occupation apart from farming while 77.59 percent of the participant's primary occupation was farming. For the non-participants 79.76 percent of the farmers' primary occupation was farming while 20.24 percent do other jobs.

### Access to Institutional Factors among Maize Farmers

The distribution access to institutional factors among maize farmers is highlighted in table 3. About 27% and 29% of participants and non-participants had access to credit. Similarly, almost 28% and 41% of participants and non-participants had access to extension agents. Access to extension agent was statistically significant between the two groups. This implies non-participants had more access to extension than participants. Furthermore, only 52.6 percent of the farmers who participated in the market



**Table 6.** Regression Estimates for Market Participation and Intensity of Market Participation for Maize Farmers in Southern Guinea Savannah of Oyo state.

Variable	Tobit Regression		OLS Regression	
	$\beta$ -coefficient	Std Error	Coefficient	Std Error
Marital status	-0.188***	0.008	-0.008	0.030
Household size	-0.001	0.000	-0.001	0.004
Annual gross farm income	0.013*	0.006	0.148*	0.076
Distance of input supply	-0.000	0.000	-0.002	0.001
Access to credit	0.013	0.009	-0.004	0.038
Main source of income	0.000	0.003	0.000	0.011
Distance of market to farm	0.000	0.001	-0.000	0.003
Dist. of farm to tarred road	-0.000	0.000	-0.002	0.002
Quantity of Production	-4.96e-07	1.39e-06	0.963***	0.033
Age of Household Head	-0.000	0.000	-0.000	0.002
Gender	0.199***	0.015	0.007	0.057
Level of education	0.003	0.005	0.000	0.020
Primary occupation	0.043***	0.011	0.034	0.045
Mem. of social network	0.006**	0.002	0.001	0.009
Farm size	-0.037***	0.002	0.053	0.036
Cont. with extension agent	0.015*	0.006	0.157*	0.080
Maize consumption freq.	0.002	0.002	0.004	0.008
_cons	0.880***	0.048	-0.049	0.311
Pseudo R <sup>2</sup>	-4.071		R <sup>2</sup>	0.8848
Prob>Chi <sup>2</sup>	0.000		F (17, 180)	81.29
Loglikelihood	289.38		Prob > F	0.0000
			Root MSE	0.2297
			Adj R-square	0.8739

Source: Survey data (2015). \*\*\*, \*\*, \* = significant at 1%, 5% and 10% respectively.

were members of a social network (e.g. cooperative society, farmer's organization and so on) while 52.4 percent of the farmers who also were members of a social network did not participate in the maize market.

#### Maize Production and Consumption among Farmers

Table 4 highlights the production and consumption pattern among maize farmers in Southern Guinea

Savannah of Oyo State. The average size of land planted under maize among participants and non-participant was 4.81 and 6.20 hectares, respectively. The t-value showed that there was a significant difference in the size of land under maize between participants and non-participants at 1%. The mean kilograms (kg) of maize produced among participants and non-participants were 3227.85 kg and 2886.79 kg, respectively. The average quantity of maize sold among participants and non-participants were 3102.5kg

and 2706.51kg, respectively. Also, the average maize consumption among participants and non-participants was 73.27 kg and 115.75 kg per annum, respectively. There was a significant difference between the consumption patterns among the groups at 1%. The result implies that non-participants cultivate more land and consume more maize than the participants. On the other hand, the participants produce and sell more than the non-participants despite cultivating lesser land area.

### **Distributions of Maize Output among Farmers**

The distribution of output shown in table 5 shows that, out of the gross total quantity of maize produced (616921kg) among the respondents (participants and non-participants of maize market). The result revealed a high household commercialization index (81 percent), meaning maize in this region is mainly grown as a cash crop and not a food crop. Following Abera (2009), 56% of the farmers were high commercial farmers, 4.5% were medium and 40.5% were low commercial maize farmers. Hence, majority in this region are high commercial farmers and maize production is important as a source of income among the producers. 81 percent was sold within the production season, 4 percent was consumed. The remaining 15 percent were kept as seeds, given out as gifts and the rest were infested by pests during storage.

### **Factors Influencing Market Participation decision among Maize Farming Households in Southern Guinea Savannah of Oyo State**

The result presented in table 6 shows the output of two models (OLS and Tobit models) estimated. According to table 6, the result shows that variables conform to a priori expectation with appropriate signs. Tobit regression model estimated result highlights the factors that influenced the probability of participation in the maize market among farmers. The model was fitted with 17 variables and 7 of them were significant. Marital status, gender, primary occupation and farm size were all significant at 1%. Membership of social network is significant at 5% while contact with extension agent and annual gross farm income was significant at 10%. Gender of the household head was positively significant in influencing the decision to participate in the maize market at 1%. This implies that farming households with male household head participated more in the maize marketing than the female headed households. This may be due to the facts that male household heads own more land, produce more and market more. This result is in consonance with the findings of (Becker, 1990, Udvardy and Cattell, 1992, Van de Walle, 2013). Primary occupation has a positive coefficient that is significant at 1% level, implying that household whose primary occupation is farming, increases the probability of market participation. In other word, farming households are more

likely to participate in the market. The estimated coefficient for farm size showed a negative relationship with the market participation decision and however it is statistically different from zero at 1%. The negative coefficient was contrary to expectation, and this could be due to reason such as inefficiency in the use of land resources. However, Lunduka *et al.* (2012) reported negative and significant effects of farmland holdings and opened pollinated variety of maize.

As expected a-priori, a significant positive relationship existed between maize market participation and annual gross farm income at 10%. This means that farmers' decision on market entry is significantly related to the amount of farm production. This is due to the fact that households with higher value of produced crop sell higher proportion of their produce and thus, increase the probability to participate in market. This finding is similar to the finding of Gebreselassie and Sharp (2008) as well as Gebremedhin and Jaleta (2010).

Finally, being a member to a social network and contact with an extension agent was significant at 5% and 10% respectively and positively related to market participation. Belonging to a social network allows farmers to market together and reduce costs associated with products reaching the market. It also increases access to information such as production techniques and available markets. This finding is consistent with Chilundika (2011) who found that alliance or being a member to a farmer group was significant and positively influenced market participation.

### **Factors influencing Intensity of Market Participation among Maize Farming Households in Southern Guinea Savannah of Oyo State**

OLS regression estimated results in table 6 highlights the intensity of market participation among maize farmers. Intensity of market participation was measured by quantity of maize sold in kilograms. The result showed a  $R^2$  of 0.8848 and F-ratio that is significant at 1% level. This implies that the explanatory variables jointly explained about 88.5% of the variation in the dependent variable. However, only three of the variables (regressors) were significant. Quantity of production was significant at 1%, annual gross farm income was significant at 10% and contact with extension agent was significant at 10%.

The quantity of maize produced is positively related to intensity of market participation and was significant at 1%. This means that higher outputs increase the likelihood of market participation because it enables households to have a marketable surplus (Mather *et al.*, (2011), Jaleta *et al.*, (2009)). According to Komarek (2010), quantity of output is more significant on the intensity of market participation unlike on the decision to



enter the market.

Furthermore, extension contact was found to have a significant relationship with the intensity of market participation at 10%. This shows that farmers having regular contact with extension agents are more knowledgeable about the advantages of commercialization of maize. Moreover, Siziba *et al.* (2011) observed that extension training and participation in research have positive effects on market participation. Finally, annual gross farm income of the household has a positive relationship with the intensity to participate in the maize market and also significant at 10%. This showed that as the income generated from maize farming activities increases, farmers were able to produce more to increase the intensity of participating in the maize market.

## CONCLUSION AND RECOMMENDATIONS

The study examined maize farming households' market participation decision and the intensity of market participation in the southern guinea savannah of Oyo State. A multistage sampling technique was used to select 200 respondents for the study. The data were analysed using descriptive statistics, Ordinary Least Square regression and Tobit regression model. The study revealed that 58% of maize farmers participated in the maize marketing. The result revealed a high household commercialization index (81 percent), meaning maize in this region is mainly grown as a cash crop and not a food crop. The study further revealed that 52% of the farmers

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were high commercial farmers, 4.5% were medium and 44.5% were low commercial maize farmers in the study area. Hence, majority in this region are high commercial farmers and maize production is important as a source of income among the farmers. The tobit regression result showed that the level of sales and market participation are influenced by marital status, annual gross farm income, gender, primary occupation, membership of social network, farm size and contact with extension agent. Furthermore, the OLS regression revealed the intensity of market participation was positively influenced by the quantity of maize produced, annual gross farm income and contact with extension agents.

In conclusion, in this region maize production is a major source of income to farmers and mainly grown as a cash crop and not a food crop.

Based on the major findings, the following are the possible area of intervention in the study area;

- Farmer organizations and network should be strengthened and awareness campaigns should be conducted to let those farmers who do not belong to any farmer organization join as that increase market participation levels.
- There is need to strengthen the extension system and make them accessible to farmers to enhance market participation and intensity of market participation among farmers.
- There is need to introduction of crop development programmes aimed at encouraging participants and non-participant to utilize land efficiently and improve their productivity.

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