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## Determinants of Market Participation among Women Soybean Farmers in Hawul Local Government Area of Borno State, Nigeria

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**Abstract:** *This study was conducted to analyse the determinants of market participation among women soybean farmers in Hawul Local Government Area of Borno State. Multistage sampling procedure was used to draw data from 182 respondents with the aid of structured questionnaire. The analytical techniques used included descriptive statistics and Probit regression model. The results revealed that the mean age of farmers was 39 years, 67% of farmers were literate with an average household size of 8 persons per household. The mean years of Soybean farming experience was 4 years with farmers having an average of 1.9 hectares of land. Probit model results showed that educational level, nonfarm income, soybean price, credit access, farming experience, cooperative membership and extension visits significantly influenced the likelihood of participation in soybean markets at ( $p < 0.01$ ) while farm size and household size significantly influenced market participation at ( $p < 0.05$ ). Distance to the markets negatively influenced market participation at ( $p < 0.05$ ). The study recommends that women farmers should be provided easy access to markets, market information and productive resources in order to achieve maximum market participation.*

**Keywords:** *Market participation, Women, Soybean, Probit model, Hawul*

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### INTRODUCTION

Market is any setting that allows buyers and sellers to exchange any type of goods and services. It provides a link between the local and global economy, thereby facilitates efficiency in the exchange of goods and services (Heyne *et al.*, 2014). Through access to different markets, farmers are enabled to access inputs and credit, market their produce and access other consumption goods (FAO, 2009).

Agricultural markets are prerequisites for enhancing agriculture-based economic growth and increasing rural incomes in the medium term particularly for the rural poor households (Makhura, 2001). Market-oriented production systems are essential for improving rural

incomes. Therefore, promoting market-orientation among farmer, especially small farmers in developing countries is pivotal for overall economic development and supply of adequate food. This will involve improving the production and marketing processes as well as capacity for income generation among resource-poor farmers (Omiti *et al.*, 2009). This entails the intensification of agricultural production systems and increased commercialization and specialization in higher-value crops which must be built upon the establishment of efficient and well-functioning markets and trading systems (FAO, 2001).

Market participation is important amongst smallholder farmers and can be an effective route in increasing incomes and widen opportunities for employment (Dorward *et al.*, 2003; Machethe, 2004). It is essential for small farmers to transform from low production subsistence farming to high level commercial production to leap from poverty (Siziba *et al.* 2011).

In the developing countries, women farmer's participation in agricultural output markets is not equal to that of their male counterparts. Women farmers are disadvantaged because of unequal distribution of resources as well as cultural barriers. Women farmers are more likely to be autarkic than to be net sellers or net buyers (Bellemare and Barret, 2004). This hinders their participation in markets and reduces the earnings from their production activities (Tiruneh *et al.*, 2001). To this end, increased integration of these women smallholder farmers into markets at local, regional and national levels becomes an issue of paramount importance.

Many policy makers and development economists have emphasized the significance of marketing in agricultural and economic development. Market participation is important to smallholder farmers as it offers them benefit such as improve income and create opportunities for rural employment (Dorward, 2003; Machethe, 2004). Therefore, it is important to identify the factors influencing women farmer's market participation in order to propose appropriate policies that could increase farmer incomes and improve the economy. It was against this background that this study was conducted with the view to identifying the main determinants of women farmer's market participation in Soybean markets in order to recommend appropriate policies that could promote their participation in output markets.

## **METHODOLOGY**

### **The Study Area**

This study was conducted in Hawul Local government area of Borno State. The area is located in the Southern Guinea Savanna agro-ecological zone and lies between latitudes 10° 15'N – 10° 41'N and longitudes 12° 05' E – 12° 34'E. It has a total land area of about 2,098 square kilometres and total population of 120,314 persons of which 60,319 were women (NPC, 2006). The projected population for the area in 2016 was estimated at 158,814 based on an annual growth rate of 3.2 per cent. The area is bordered to the north by Biu LGA, Shani LGA to the south, Kwaya Kusar to the south west and Askira Uba LGA to the south east.

The climate of the area is characterized by moderate temperature ranging between 20 °C to 39°C with mean annual rainfall of 1500mm. The climatic condition of the area is favourable for soybean production. Soybean performs well in the savannah zones where rainfall is more than 700mm (Dugje *et al.*, 2009). Farming is the most important economic activity in the study

area. The major crops grown and traded in the area include maize, cowpea, sorghum, groundnut, soybean, rice and vegetables such as tomato and pepper (Samuel, 2014).

### Sampling Procedure and Data collection

Multistage sampling procedure was used to select respondents for this study. In the first stage, five wards were purposively selected out of the twelve wards in the study area notable for intensive soybean production. These are Kwajaffa Harrang, Marama kidan, Grim danchuba, Shaffa Hizshi and Pama Hutambaya. In the second stage, two communities each were randomly selected from the five wards. In the third stage, proportionate sampling was done to select 25 per cent of women soybean farmers in the earlier selected communities from the sampling frame. A total of 182 respondents were used for the study. The list of soybean women farmers was obtained from the ADP office in the area.

Data were obtained from primary source through the use of structured questionnaire using the interview schedule. Data collected included those on socioeconomic characteristics of the respondents, output levels and prices of soybean.

### Analytical Techniques

Descriptive statistics and probit regression model were used to analyse the data collected. The probit model was used to examine analyze those factors influencing market participation of women soybean farmers. The decision to participate in the market is discrete and it takes a value of 1 or 0. In this study, farmers whose proportion of soybean sales was more than 60% were considered as market participants (considering that the respondents were women and the crop was newly introduced as a cash crop). Thus  $y = 1$  if farmers sales exceed threshold level of  $y$  (60%) and  $y = 0$  otherwise (Von Braun and Immlink, 1994; Goletti, 2005); Ohen *et al.* 2013). The explicit form of the probit model is expressed as:

$$y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \epsilon_i \dots\dots\dots\text{equa 1}$$

Where:

- y = Binary response (defined a 1 if a farmer participates and 0 otherwise)
- $\beta_0$ = Intercept
- $\beta_1$ -  $\beta_{10}$ = Estimated parameters
- $X_1$ = Level of Education (years)
- $X_2$ = Household size (Number of persons in family)
- $X_3$ = Non- farm income (Naira)
- $X_4$ = Access to credits (yes =1, 0, otherwise)

- $X_5$  = Farming experience (years)  
 $X_6$  = Cooperative membership (yes = 1, 0, otherwise)  
 $X_7$  = Extension visits (yes =1, 0, otherwise)  
 $X_8$  = Distance to market (km)  
 $X_9$  = Price of soybean (Naira)  
 $X_{10}$  = Farm size (hectares)  
 $\varepsilon$  = Error term

## **RESULTS AND DISCUSSION**

### **Socio-economic Characteristics of Women Soybean Farmers**

The results of the socioeconomic characteristics of the respondents is shown in Table 1. The result revealed that the mean age of the respondents was 39 years, implying that they are in their active age. They could be able to withstand the rigours of marketing. The majority (68.1%) of the respondents were married. This shows that married farmers have more economic and social responsibilities to meet, hence they could participate more in markets. The mean household size was 8 members. Household size is an indicator of amount of family labour that is available for agricultural activities. This implied the availability of family labour on the farm which could boost production. This also shows that there are many mouths to be fed so demand for food and other consumables is high therefore participation in markets is inevitable where the household would sell to generate income to cater for the needs of its family members.

The result further revealed that 67% of the women farmers were literate having some formal education ranging from primary to tertiary level implying that farmers with formal education tend to be more market oriented, have better access to market information and therefore produce to take advantage of the market environment. The majority (58.8%) of the respondents had from 1 to 5 years of soybean farming experience. The average number of years of farming experience was 4 years. This could be attributed to the fact that prior to the year 2004, the crop was not grown on a commercial level. An intervention project named PROSAB (Promoting Sustainable Agriculture in Borno State) came in 2004 and introduced the crop as a high valued commercial crop. The result showed that the mean farm size was 1.9 hectares. This showed that women farmers in the study area are small scale farmers. This further shows that they could manage their farmlands using household labour for farming activities.

**Table 1: Socioeconomic characteristics of women soybean farmers (n = 182)**

Variables	Frequency	Percentage	Mean
<b>Age of the respondent (years)</b>			
15-20	18	9.9	39
21-30	40	22.0	
31-40	58	31.9	
41-50	41	22.5	
above 50	25	13.7	
<b>Marital status</b>			
Married	124	68.1	
Single	23	12.6	
Divorced	20	11.0	
Widowed	15	8.2	
<b>Educational qualification (level)</b>			
Non formal education	60	33.0	
Primary	70	38.5	
Secondary	47	25.8	
Tertiary	5	2.7	
<b>Household size</b>			
≤ 5	60	33.0	8
6-10	80	44.0	
11-15	30	16.5	
16 and above	12	6.6	
<b>Yield (kg)</b>			
<300	8	4.4	656.4
301-500	32	17.6	
501-700	65	35.7	
701-900	41	22.5	
901-1100	20	11.8	
Above 1100	16	8.8	
<b>Soybean Farming experience</b>			
<5	107	58.8	4
5-10	68	37.4	
11-15	6	3.3	
Above 15	1	.5	
<b>Farm size (hectares)</b>			
<1	1-2	26	14.3
2- 4		76	41.8
4.1-6		66	36.3
above 6		14	7.7

**Source:** Field survey, (2016)

### **Déterminants of Soybean Market Participation**

The result of the probit model is presented in Table 4.2. The ratio statistics indicated by chi-square statistics are highly significant ( $p < 0.000$ ) suggesting that the model has a strong explanatory power. The pseudo  $R^2$  is 0.7175 indicating the specification fits the data well. The coefficient of level of education (0.359) was positive and significant ( $P < 0.01$ ). This means that as the level of education increases, probability of market participation increases. This could be attributed to the fact that educated farmers are more enlightened, they try to make informed decisions that could reduce risks. This is in line with the findings of Makhura (2001) who reported a positive and significant relationship between education and maize producer's market participation.

The coefficient of household size (0.629) was positive and significant ( $P < 0.05$ ) implying that the larger the household size, the higher the probability of participation in markets. This suggests the availability of family labour for farming and marketing activities. Family members could also be a source obtaining information on an also best practices and market information on current prices of soybean in markets from neighbours and friends. This conforms to the findings of Akunbile (1999) that local farmers keep large family sizes for agricultural purposes.

The coefficient of non-farm income (0.004) was positive and significant ( $P < 0.01$ ) influencing the likelihood of market participation. This implied that a unit increase in non-farm income will increase the probability of participation by 0.4 units. This suggests that farmers could use money obtained from other sources such as businesses, salaries, employment into purchase of inputs like seeds, fertilizers and chemicals which are critical for increased market share of produce which will require sales thereby improving market participation.

**Table 2: Probit analysis for determinants of market participation**

<b>Variables</b>	<b>Coefficients</b>	<b>Std. Err.</b>	<b>Z-value</b>
Constant	2.11	0.557	3.79***
Level of education	0.359	0.049	7.31***
Household size	0.629	0.327	1.92**
Non-farm income	0.004	0.001	3.81***
Access to credit	1.153	0.202	5.72***
Soybean price	0.663	0.091	7.31***
Farming experience	0.363	0.089	4.09***
Farm size	1.509	0.742	2.03**
Cooperative membership	0.615	0.21	2.92***

Distance to market	-0.513	0.219	-2.34**
Extension contact	0.671	0.09	3.79***
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Number of observation	182		
Log likelihood=	-22.08		
LR Chi <sup>2</sup> (10) =	112.12		
Prob > chi <sup>2</sup> =	0.0000		
Pseudo R <sup>2</sup> =	0.7175		

Source: Field survey, 2016, Note: \*\*\*, \*\*, are significant at 1% and 5% respectively

The coefficient of access to credit (1.153) was positive and significant ( $P < 0.01$ ) indicating that as the farmers access to credits increase, probability to participate in markets will also increase. The farmers who have access to credits are more likely to participate in the markets. This could be attributed to the fact that with access to credit enables farmers to acquire and adopt efficiency and productivity enhancing technologies. Hence more output for marketing.

The coefficient of distance to the market (-0.513) was negative and significantly related to probability market participation ( $P < 0.05$ ). This means that as distance to market increase, likelihood of participation in markets decreases. Nearness to markets could encourage and increase the likelihood of participation. Farmers living closer to markets could easily convey their produce to markets due to the nearness in distance and can also save on transportation costs by conveying their produce by carts.

The coefficient of soybean price (0.663) was positive and significant ( $P < 0.01$ ) with market participation. This implied that participation in the market increased with an increase in price of soybean. This is plausible as farmers respond to higher prices which increased their marketing margins. This result conforms to the findings of Jaleta *et al.* (2009) that favourable prices influence participation in markets.

The coefficient of farm size (1.509) was positive and significant ( $p < 0.05$ ), implying that as farm size increase, the probability of market participation also increases. This could be due to the role of farm size in boosting total production level and thus surplus produce. Farmers with large farm sizes could allocate certain portion of their land for food and for cash crop production giving them better position to participate in output markets. This is in line with the findings of Martey *et al.* (2012) that farm size increases likelihood of participation in markets.

The coefficient of farming experience (0.363) was positive and significant ( $P < 0.01$ ), meaning that the more the farming experiences of the farmer, the more likely the probability of participation in markets. This could be attributed to the fact that

experienced farmers have accumulated knowledge over the years and are able to forecast prices. The coefficient of extension visits (0.671) was positive and significant ( $P < 0.01$ ), implying that probability of participation in markets increased with increased contacts with extension agents. The likely explanation is that agricultural extension workers are the bridge between research programme and farmers and these interactions provides farmers with the necessary marketing information on issues such as prices, products demand and availability thus encouraging them to participate in the market. This finding is consistent with the findings of (Alene *et al.*, 2008).

The coefficient of cooperative membership (0.615) was positive and significant ( $P < 0.01$ ), indicating that the probability of market participation increases when a farmer is in cooperative associations. Cooperatives help their members in marketing their product at reduced cost by pooling their resources together. The female farmer doesn't need to participate in all aspects of the marketing process.

### **CONCLUSION AND RECOMMENDATIONS**

The study concluded that market participation was positively influenced by the socio-economic variables of the farmers. The farmers are likely to shift from non-participation to market participation with an increase in the level of any one of those variables. However to further increase the level of their participation, the study recommends that Government should provide skills acquisition programmes to enhance women farmer's income especially during off farm season. This income from non-farm source could be channelled into soybean enterprise improving market participation. Since distance to markets was negatively associated with market participation, there is need to invest in roads, rails and other transport networks in order to achieve increased market participation. This could be done by improvement of rural roads to enhance easy access to markets and lower transportation costs. Government should help in facilitation of agricultural services which are institutional such as increasing the ratio of farmer to extension worker, development of financial institutions like microfinance banks that would provide soft loans to farmers and also encourage savings for future use.

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