

## **Crop Farming Households Market Participation in Major Food Markets in Southwestern Agricultural Zone of Nigeria**

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### **Abstract**

The existence of low-cost, well-integrated and efficient rural markets is a key element in agricultural development and welfare economics. In Nigeria as well as other developing countries, many farmers are not linked to the market, they offer little of their produce for sale and this in turn leads to low income from farm activities. There are plethora of studies on food security, food marketing and other food related issues in Nigeria. However, adequate attention has not been given to crop farming households in relation to market participation. A multi-stage sampling technique was employed for the selection of respondents from a random sampling of 3 states in southwestern agricultural zone of Nigeria, and primary data were collected using interview guide. A total of four hundred copies of the questionnaire were administered to selected respondents, out of which 342 copies were retrieved and found useful for analysis. The analytical tools used were descriptive statistics, Net Market Index (NMI) and Probit regression model.

The results showed that the average age of crop farmers in the study area was  $50.9 \pm 16.8$  years and the average farm size was  $1.8 \pm 1.7$  ha. Farming experience was  $21.0 \pm 9.2$  years, average household size was  $7.0 \pm 2.8$ , distance to the nearest market was  $7.7 \pm 9.2$  km and average farm income per month was N10, 631.62  $\pm$  2.3. The result of NMI showed that 57.89% of the crops farming households were net buyers of food in the zone. Also, the factors influencing market participation include access to information on price of commodity, household size, non-farm income, farm size, farming experience and access to extension workers.

It was concluded that above half of the crop farming households were net buyers in various food markets. Therefore, it is recommended that efforts of the government should be geared towards formulating policies that would ensure adequate market linkage by farmers both at the local and national levels.

**Keywords:** Food Market Participation; Farming Households; Net Market Index; Agricultural Zone

### **Introduction**

In developing economies, households depend on agriculture-based livelihoods; these households gain their income through the sale of produce in the markets and use part of the income from sales to acquire food in markets, except where households produce enough amounts of food commodities themselves to meet their needs (WFP, 2009). Generally, increased incomes from crop production for sale in the market lead to increased food consumption and improved nutrition (Pender and Alemu, 2007).

Markets play a basic role in economic welfare. Without effective and responsive

markets that effectively bind the increasingly specialized activities of thousands of widely dispersed producers into an integrated national economy, the improvement in productivity of farmers cannot be achieved. Therefore, without good access to markets, a poor household cannot market its produce, obtain inputs, sell labour, obtain credit, learn about or adopt new technologies, insure against risks, or obtain consumption goods at low prices. Also, it cannot use its scarce resources like land and labour efficiently (Southworth, 1981).

According to Adegeye and Dittoh (1985), market exists whenever buyers and

sellers can be in touch with one another. An arrangement can be made on negotiating on a particular product to be bought by a particular person in a location, and then a market has been established. That is why a consumer in one country can buy a product from another country before ever seeing the product. The most important factors for the existence of markets are that the goods to be sold must exist, there must be buyers and sellers and both must agree on a price. Households could participate in a given market both as sellers and buyers of a specific commodity at different times in the same production year (Renkow *et al.*, 2004). A net seller household of food staples is defined as a household that sells more food on the market either in weight or in value than what they bought on the market for a given season or a year. A net buyer buys more food staples from the market than it sells for a given season or a year. Autarky is a situation whereby the amount of what a household sold either in weight or in value is the same with what it bought in the market for a given season or a year (Renkow *et al.*, 2004). These definitions refer to market positions at any given point in time.

Market could be held daily or weekly and could also be in rural or urban areas and every conceivable commodity, both agricultural and industrial is sold. In Nigeria as well as other developing countries prices are determined by haggling. It is possible to distinguish between types of markets according to agricultural commodities, for instance we have the cattle, sheep and goat markets, foodstuffs market and so on. In Nigeria as well as other developing countries, many farmers are not linked to the market, they

offer little of their produce for sale and this in turn leads to low income from farm activities (OECD, 2008).

A household could participate in a given market both as a seller and buyer of a specific commodity at different times in the same production year (Renkow *et al.*, 2004). This might be common under destitute sales to meet cash requirements and repurchase the same crop type later in the season. Under such cases, unless the net position of households in a given market is considered, analysis of one-side market participation alone may lead to erroneous conclusion and policy implications. Therefore, this study examined the net market positions of farming households for major crops such as maize, cassava, yam, and cowpea.

### Methodology

The study was conducted in the agricultural zones of Southwestern Nigeria comprising 8 States namely Delta, Edo, Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo States (ARCN, 2011; REFILS, 2012). It has a total population of about 27,581,992 (NPC, 2006). The zone is characterized by a typical equatorial climate with distinct dry and wet seasons. The main growing season lasts up to 9 months with two peaks of rainfall in July and September. Rainfall ranges between 1200mm in the northern areas of Ondo, Oyo and Osun States to nearly 2600mm in the coastal areas of Lagos and Ogun States. Average zonal rainfall is 1480mm with monthly temperature of 18°-24°C during the rainy season and 30°-35°C during the dry season. The zone also has four distinct sub-ecologies namely swamp mangrove forest, moist and dry lowland forest, woodland forest and savanna mosaic (FMA&NR,

1997).

A multi-stage sampling technique was employed in the study for the selection of respondents. The first stage was the simple random sampling of three (3) States (Edo, Ondo and Oyo) in Southwestern agricultural zone of Nigeria. The second stage was a random sampling of six (6) Local Government Areas (LGAs) from the selected states. The third stage was proportionate to size sampling of households in the selected LGAs making 400 households for the study. In all, data from 342 households (85.5%) who responded appropriately to the questions asked out of a total number of 400 households interviewed were found useful for analysis.

Primary data were used for this study. They were collected through the aid of

well-structured questionnaire. Data collected included farming households' socioeconomic characteristics, total value of stock at the beginning of season, total value of farm production, expenditure on selected food items, and income of crop farmers.

The analytical tools used are descriptive statistics Net Market Index (NMI) and Probit regression model. Descriptive statistics such as percentage, frequency and mean, were used to describe the households' socioeconomic characteristics and market participation. As proposed by Gabre-Madhin *et al.* (2007), the net market index was used to determine the net market position either as net buyer, net seller or autarky/self- sufficient households. The net market index for either net buyer or net seller is given as:

a) Net seller

$$\% \text{ of sale} = \left[ \frac{\text{Sales}}{V_{\text{stored at the beginning}} + V_{\text{produced during season}}} \right] \times 100 \dots\dots\dots (1)$$

b) Net buyer

$$\% \text{ of purchase} = \left[ \frac{\text{Purchase}}{V_{\text{stored at the beginning}} + V_{\text{produced during season}}} \right] \times 100 \dots\dots\dots (2)$$

Net market index according to Gabre-Madhin *et al.* (2007) is the positive difference between equations (1) and (2) for net seller and positive difference between equations (2) and (1) for net buyer.

A probit regression model was used to identify the determinants of level of market participation. The model follows normal distribution with a homoscedastic error component (Greene, 2007).

$$Y^* = \beta X + \mu \dots\dots\dots (60)$$

$Y^* = 0 \quad Y < 1$   
 $Y^* = 1 \text{ if } 0 < Y < 1$   
 $Y^* = 0 \text{ if } Y = 0, Y =$   
 Market participation  
 index

Where

$Y^*$  = Market participation index transformed to binary value

$\beta$  = vector of parameters to be estimated

$X$  = set of explanatory variables and

$\mu$  = the disturbance term.

$X_i$  = which is a set of explanatory variables included in the model ( where  $i = 1, 2, \dots, 12$ ).

**Market characteristics**

$X_1$  = distance of farm to the nearest market (km)

$X_2$  = access to price information (Dummy: 1 if yes and 0 otherwise)

$X_3$  = access to information on demand (Dummy: 1 if yes and 0 otherwise).

$X_4$  = access to information on product availability (Dummy: 1 if yes and 0 otherwise).

**Household characteristics**

$X_5$  = household size (number)

$X_6$  = gender of the household head (Dummy: 1 if male and 0 otherwise)

$X_7$  = years of formal education of the household head (years)

$X_8$  = non-farm income (naira)

$X_9$  = farm size (ha)

$X_{10}$  = farming experience of the household head (years)

$X_{11}$  = marital status of the household head (Single=1, Married=2, Widow(er)=3, Divorced/Separated=4)

$X_{12}$  = access to extension agents (Dummy: 1 if yes and 0 otherwise)

**Results and Discussion**

**Socioeconomic characteristics of respondents**

Table 1 shows the average values of respondents' socioeconomic characteristics. The mean age is 50.9±16.8 years, and this shows that the farmers are at the peak of their productive years. This agrees with the findings of Zeldes (2005) that farmers are getting old and youths are not willing to farm especially in the rural areas. Also, Omotesho *et al.* (2010) reported that agile youths prefer going to the urban centres to look for white collar jobs and eventually if there is none, they take up casual jobs with Lebanese firms or at worst they venture into riding commercial motorcycle popularly known as “Okada”.

**Table 1: Socioeconomic characteristics of respondents**

Variables	Mean	Std. Deviation	[95% Conf. Interval]	
Age of respondents (years)	50.87	16.82	49.9001	51.8484
Farm size (ha)	1.79	1.73	1.6836	2.8345
Years in farming (years)	20.99	9.20	20.0042	21.9664
Household head's education (years)	6.67	2.12	4.3426	22.6543
Total income (N/annum)	73,637.13	14.58	7281.749	89140.1
Farm income (N/month)	10,631.62	2.32	6076.369	15186.88
Household size (number)	7.0	2.79	6.7623	7.3547
Distance (km)	7.68	9.18	6.634144	8.74531

Source: Data analysis, 2015

The farm size of  $1.8 \pm 1.7$  ha shows that food production in the study area is still in the hands of small scale farmers. According to Jaleta *et al.* (2009), if farmers go into cultivation of large expanse of land and market structure is functioning well then the producing household will benefit greatly in terms of sales and food consumed.

Years spent in farming shows that the farmers were experienced as years spent on the farm was about  $21.0 \pm 9.2$  years. The total income per annum of N73,637.13  $\pm 14.6$  implies that returns per annum is low but if market participation as net seller is encouraged, there is likely to be an improvement. The monthly farm income of N10,631.62  $\pm 2.3$  further shows that if farmers do not engage in off farm work, what they get in a cropping season is very low.

The household size of  $7.0 \pm 2.7$  implies that farming households in the area of study have large household size. The distance of

households to the nearest market of  $7.7 \pm 9.1$  km means that farmers would need to cover a long distance before getting to where they sell their produce.

#### **Farming households' market positions**

Table 2 shows the distribution of farmers according to their market positions in relation to specific crop considered. Oyo State has the highest percentage (67.21%) of farmers who were maize net buyers followed by Ondo State (60.42%) and Edo State (45.25%). This may be possible because agro-ecology in the states differ. Also, for optimization, farmers were expected to produce more at output level of a crop where its marginal expected revenue (MR) is equal to the marginal cost incurred (MC) (Jha and Srinivasan, 1999). On the other hand, Edo State had the highest percentage (54.75%) of farmers who were maize net sellers followed by Ondo (39.58%) State and Oyo State (32.79%), respectively. However, in the southwest

**Table 2: Distribution of Crop Farmers according to Buyers or Sellers in the Market**

Crops	Net buyer				Net seller			
	Edo	Ondo	Oyo	SW	Edo	Ondo	Oyo	SW
Maize	62 (45.25)	87 (60.42)	41 (67.21)	190 (55.56)	75 (54.75)	57 (39.58)	20 (32.79)	152 (44.44)
Cassava	63 (45.98)	61 (42.36)	20 (32.79)	144 (42.11)	74 (54.02)	83 (57.64)	41 (67.21)	198 (57.89)
Yam	43 (31.39)	67 (46.53)	43 (70.49)	153 (44.74)	94 (60.61)	77 (53.47)	18 (29.51)	189 (55.26)
Cowpea	99 (72.26)	107 (74.31)	0 (0.00)	206 (60.23)	38 (27.74)	37 (25.69)	0 (0.00)	75 (39.77)
Others	89 (64.96)	77 (53.47)	32 (52.46)	198 (57.89)	48 (35.04)	67 (46.53)	29 (47.54)	144 (42.11)

Source: Data analysis, 2015. (Values in parentheses are percentages)

agricultural zone, 55.56% and 44.44% were maize net buyers and sellers, respectively. This implies that higher percentage of maize farmers buy more of what they produce in the market. The result also, depicts that maize is a very important staple crop in the study area. This result agrees with the finding of Olarinde and Kuponiyi (2005) that farmers who consume more of the food they produce also buy more of the same produce in the market.

Edo State has the highest percentage (45.98%) of farmers who were net buyers of cassava followed by Ondo State (42.36%) and Oyo State (32.79%), respectively. This is possibly so because Edo State farmers are known to cultivate more of tree crops and banana/plantain than any other crops. On the contrary, Oyo State has the highest percentage (67.21%) of farmers who were net seller. In the zone, only 42.11% of farmers were found to be

cassava net buyer. This means that cassava farmers in the zone buy more than what they sell in the market. This shows that this particular crop is an essential staple for the farming households in the zone.

In yam market, Oyo State had the highest percentage (70.49%) of farmers who were net buyers followed by Ondo State (46.53%). As net seller of yam, Edo State had the highest percentage (60.61%). In the zone, 55.26% of the farmers were net seller of yam. This implies that farmers sell more yam than the quantity they buy in the market. It therefore means that farmers earn more income from sales of yam and it implies that farming households could use this streams of income to buy other items in the market including food.

In the case of cowpea, Ondo State has the highest percentage (74.31%) as net buyer while Oyo State did not participate in the cowpea market either as net buyer or net seller for the period. As net sellers, Edo

State has the highest percentage (27.74%) followed by Ondo State. In the zone, only 39.77% of the farmers were cowpea net seller. Considering the fact that plant protein is very useful to the body and it is relatively available and affordable in the study area, the result implies that the percentage of farming households that bought cowpea in the market was very high. This means that households spend more on buying cowpea in the market, probably because it was not a major crop in the area and as a cheap protein source, hence, the large purchase of cowpea.

It is inferred from the result of the study that although farmers assume different positions in the food market, it is evident that farmers' net sellers' position in a market is used to offset their net buyers' position in other markets.

### Factors Influencing Market Participation of Crop Farming Household

The result in Table 3 showed a log likelihood of -67.56 and a chi-square of 15.34 which are both significant ( $p < 0.01$ ) and Pseudo  $R^2$  (0.79) implying that the model has a good fit. Market information was captured with three variables which are access to information on the price of commodity ( $X_2$ ), access to information on demand for the commodity ( $X_3$ ) and access to information on product availability ( $X_4$ ). Access to information on price of commodity was the only significant variable among the three and it was positively related to the level of market participation. This implied that the probability of participation in the food market is 0.3592 higher for those farmers

**Table 3: Probit Regression Analysis result of Factors Influencing Market Participation**

Variables	Notations	Coefficient	Marginal effect	Standard Error	t-value
Distance	$X_1$	0.0932	0.0109	0.0885	0.95
Accpriceinfo	$X_2$	0.1564	0.3592*	0.0286	1.83
Accinfodd	$X_3$	-0.7341	-0.1967	0.5946	-0.81
Accinfoprдав	$X_4$	0.6456	0.2559	0.8199	-1.27
Hhsize	$X_5$	0.3204	0.1036***	0.9740	3.04
Gender	$X_6$	0.0954	0.0218	0.0095	0.10
Hhedu	$X_7$	-0.4625	-0.054	0.4255	-0.92
Nfar inc	$X_8$	0.0825	0.0109**	0.1716	2.08
Farm size	$X_9$	0.1468	0.0656***	0.4873	3.32
Farming exp	$X_{10}$	0.0837	0.0223***	0.2226	2.66
Marital status	$X_{11}$	0.1268	0.0727	0.0634	0.50
Accexten	$X_{12}$	0.5146	0.2924*	0.8697	1.69
Log likelihood			-67.5600		
Pseudo $R^2$			0.7944		
Chi-square			15.34		

\*\*, \*\*, \* Significant at 1%, 5% and 10% respectively  
Source: Data analysis, 2015.

with access to price of commodity than those without access. This was because increase in access to information on price of commodity would serve as incentive for farmers to participate more in the food market. This result agrees with the findings of the study of Olwande and Mathenge (2011), who found out that one of the important variables that determines market participation in Kenya is farmers' access to commodity price.

Also, household size significantly influenced the level of market participation in the study area. Additional member will increase the likelihood of market participation by 10.36%. It is expected that the larger the household size, the higher the output. Thus, a larger household would have a higher probability of participation in the food market. Traditional agrarian studies showed that household members represent labour resources and are hence posited to be directly related to engagement in agricultural activities. It is therefore logical to expect that a household with large household members can produce more marketable output or store the product for household consumption (Randela *et al.*, 2008). This implied increase in labour force for farming activities and increased tendency to cultivate more farm land. This result is in line with the studies conducted by Makhura (2012) and Randela *et al.*, (2008) which showed that large farming households made use of family labour and cultivate more farmland but the result of this study disagrees with the findings of Gani and Adeoti (2011) that large households do not necessarily have large farms in Taraba State.

Non-farm activities income coefficient was positive and significant but only have

marginal increase probability on the level of market participation in the study area. A similar result was obtained by Randela *et al.* (2008), Gani and Adeoti (2011). The results of the studies conducted by these authors showed that income from non-farm activities increased households' purchasing power in the market in South Africa and Taraba state, Nigeria, respectively.

The marginal effect of farm size was significant and positively related to the level of market participation. This means that a unit increase in the size of farm would increase the probability of farmers' market participation by 0.065. This implies that as farm size of household increases the production levels and the probability of market participation increase (Randela *et al.*, 2008). The marginal effects of farming experience and access to extension workers were significant and positively related to market participation. This implied that a unit increase in years of farming experience would increase the probability of farmers' market participation by 0.022.

### Conclusion

In the study area, results showed that the average age of the crop farmers was 50 years and average household size was seven (7) members. The crop farmers had long years of farming experience as average years spent in farming was 21 years. However, there was low level of education among the farming households' head and the average distance covered by farmers from farm to the nearest market was seven (7) kilometers. In addition, the average farmers' income was as low as N 10,600 per month.

The market position of the farming households vary in different crop markets

in the Southwestern zone. Crop farmers also participated more as net buyers in almost all the food markets considered except cassava and yam markets. The factors affecting crop farming households' market participation were found to be access to information on price of commodity, household size, non-farm income, farm size, farming experience and access to extension workers. It is therefore recommended that government should formulate policies that would make farmers have more access to market that will engender both local and national market integration.

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