A GENDER ANALYSIS OF MAIZE MARKETING BY FARMERS IN OYO STATE

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Abstract

This study investigates the factors determining the volume of sales of maize by farmers in Oyo State from a gender perspective. A multistage sample of respondents was identified and a regression model estimated. The quantity of maize produced, marital status, household size, farm experience are the significant determinants of volume of maize sales by male farmers, while access to non-farm income, membership of farmers' association, access to information, household size and farm experience are the significant factors determining maize sales by female farmers. . The government should expose women farmers to information on potential markets and product prices while encouraging them to embrace family planning methods to control the size of their households.

Keywords: Maize, Gender, Volume Of Sales, Regression Model

1. Introduction

Maize *is* a crop belonging to the grass family (*gramineae*) which originates from South and Central America and is the most important cereal in the world after wheat and rice. In Nigeria, maize is a very important staple food crops, second only to rice. Maize is predominantly used as food in the diet of urban and rural inhabitants but also has vast commercial and industrial uses by agro-based industries through its processing and transformation into corn flakes, flour, baby foods, confectioneries starch and livestock feeds and other products (Oyetoro and Okunade, 2012). Maize contributes about 80 percent of poultry feeds, with implications for protein intake in Nigeria (FAO, 2008). Some of the attributes of maize is its low cost, high yield, significant investment return, ease of processing and adaptability across agro ecological zones (IITA, 2001; Iken and Amusa, 2004). In terms of total production of cereals, maize is exceeded only by sorghum and millet (FAO, 2009). According to Nweke *et al*. (2002) and Nweke (2006), maize contributes about 43 percent of calorie intake and

accounts for 7.7 percent of total cash income of farm households. Nigeria witnessed dramatic improvement in Maize production in the savannah in the 1980s which has been eroded by a variety of factors including low adoption of improved seeds, poor seed quality, little or no use of fertilizers, low investment in research funding, and poor extension services.

The Nigerian government initiated in 2006 a programme to double maize production in the country both for national consumption and international export through promotion of improved agricultural technologies such as fertilizer, hybrid seeds, pesticides, herbicides and better management practices. (USAID, 2006). The government is currently pursuing a Maize 'Green Revolution' aimed at transforming the maize industry, raising production and increasing profitability to enhance food security, create jobs, and mitigate rising global food prices. The plan is to raise Nigeria's annual maize output from current 8 million tons to 20 million tonnes using a number of approaches including speeding up the adoption of innovations in international and national research centres. The maize revolution blueprint also involves deployment of high-yielding and disease-resistant varieties that are adaptable to Nigeria's various agro-ecological zones and drought- and *Striga*-resistant varieties that could address on-farm stresses. Moreover, early, intermediate, and late-maturing varieties with yields up to thrice as much as traditional varieties is also being disseminated to farmers to help them tackle the adverse effects of climate change.

Clearly, the struggle for survival above the poverty threshold by Nigerian farmers can be significantly enhanced by increasing market access and expanding market opportunities. It is increasingly apparent that the broad objective of achieving agricultural productivity and improving household food consumption should be balanced by policies to improve market access (Haggblade, 2004). Thus the question of increasing the market participation of smallholder farmers remains pertinent to improving their welfare (Holloway, *et. al*., 2005).

The broad objective of this paper is to ascertain the determinants of volume of sales among maize farmers in Oyo State. The specific objectives are to:

- Analyse the gender dimension of sales of maize among the farmers, and
- Suggest measures for improving sales by female farmers.

2. Literature Review

The literature on agricultural marketing in Nigeria is voluminous, straddling issues such as gender and ethnic components to marketing, commodity chains and trader-state relations (see Anthonio 1968, Olayemi 1974, and Ariyo 2001). Olayemi (1982) lamented the disproportionate attention placed by governments on policies directed at increasing food

production and virtual neglect of the marketing side of the equation. However, moderating the astronomical cost associated with food marketing or achieving an efficient marketing system especially in the immediate post-harvest period may serve to increasing agricultural production (Ahmed and Rustagi, 1987). The chief conclusion of Ladele and Ayoola (1997) is that food security can be enhanced if the food marketing system is efficient. FAO (1997), submitted that inefficient national and international markets explain the surpluses of food in some regions and shortages in others.

The gender and ethnic dimensions of marketing has produced an interesting body of work. These studies highlight diversity of local cultural contexts in Nigeria and the massive impact of local gender relations on women's participation. Wan (2001) study conducted in Ibadan on supply of a staple commodity to urban markets, highlights its significance both for the urban food economy in general and also for women's incomes and status in particular. Izugbara (2004) reported that micro-lending schemes to women in south-eastern Nigeria increases women's empowerment, particularly through participation in the urban food supply system.

Adubi (1996: 18-19) observed that the Hausas are preponderant in wholesale Markets for cereals in Lagos and that their produce is sold to *Yorubas* and other ethnic groups engaged in secondary wholesale and retail trade, and directly to consumers. The author submitted that access to credit arrangements which is unavailable to others greatly facilitated this dominance. Okali *et. al*. (2001:46-7), concluded that rural producers in south-eastern Nigeria experience difficulties in accessing urban markets due to the fact that market unions in the city do not allow the rural farmer to sell his products directly to consumers, forcing them to sell to the foodstuff unions in the urban market at a much lower than the retail price.

Personalised links also play a role in food marketing (Holtzman *et. al*, 1988). This link or network is shaped by factors such as gender, ethnicity, wealth and age. Poor transportation system and deplorable road networks may force the poorest group of traders to sell in a less profitable but more accessible market. Cultural constraints on mobility may also limit women's ability to take advantage of information about more profitable markets (Porter, 1995). Traders' associations are also a potential forum for sharing market information and their role in this respect has been observed in some detail in Nigeria (Smith and Luttrel, 1994).

3. Material And Method

3.1 Study Area

The study was carried out in Oyo state in the South Western part of Nigeria. Ọyọ State is an inland state in south-western Nigeria, with its capital at Ibadan. It is bounded in the north by Kwara State, in the east by Osun State, in the south by Ogun State and in the west partly by Ogun State and

partly by the Republic of Benin. Oyo State covers approximately an area of 28,454 square kilometers and is ranked 14th by size. The landscape consists of old hard rocks and dome shaped hills, which rise gently from about 500 meters in the southern part and reaching a height of about 1,219 metre above sea level in the northern part. Some principal rivers such as Ogun river, Oba, Oyan, Otin, Ofiki, Sasa, Oni, Erinle and Osun river take their sources from this highland.

The Climate is equatorial, notably with dry and wet seasons with relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25 °C (77.0 °F) and 35 °C (95.0 °F), almost throughout the year. Agriculture is the main occupation of the people of Oyo State. The climate in the state favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew etc. There are a number of government farm settlements in Ipapo, Ilora, Eruwa, Ogbomosho, Iresaadu, Ijaiye, Akufo and Lalupon. There is abundance of clay, kaolin and aquamarine. There are also vast cattle ranches at Saki, Fasola and Ibadan, a dairy farm at Monatan in Ibadan and the state-wide Oyo State Agricultural Development Programme with headquarters at Saki.

3.2 Sources of Data

Data employed for this study was gathered from primary sources. Structured questionnaires and in-depth interviews were used to obtain data on household and respondents' characteristics.

3.3 Sampling Procedure

The sampling procedure adopted for this study is the multi- stage sampling technique. In the first stage, two local governments where maize was widely produced were selected. In the second stage, two villages from each of this local governments based on the intensity of maize production was selected. The third stage was random selection of 60 farmers from each village. Overall, 120 questionnaires were administered but only 110 was valid for analysis.

3.4 Analytical Techniques and Model

The analytical techniques employed in this study are descriptive statistics and regression analysis specifically, ordinary least squares estimation. Descriptive statistics such as frequency distribution table, percentages, means and standard deviation, were applied to the analysis of socioeconomic and demographic characteristics of respondents and their level of market participation.

3.5 Regression Model

This study follows Adenegan *et. al*. (2012) by using the Ordinary Least Square (OLS) to analyze the factors determining the volume of sales by the farmers as per the model:

$Y = \beta_0 + \beta_i Xi\ Ui$

$X_1>0$; $X_2<0$; $X_3>0$; $X_4><0$; $X_5<0$; $X_6<0$; $X_7>0$; $X_8>0$; $X_9>0$; $X_{10}>0$, $X_{11}>0$, $X_{12}>0$; $X_{13}<0$

Where Y is volume of maize sold and X_i is a vector of farmer characteristics that are relevant to explaining the level of market participation, β_0, β_i are the parameters and U_i *is the error term.*

X_1 = Quantity of maize produced (in Kg)
X_2 = Age of the farmer (in years)
X_3 = Level of Education (in years)
X_4 = Sex of the Household Head
(male =1, Female =0)
X_5= Marital Status (married =1, otherwise =0)
X_6= Household Size (in numbers)
X_7= Farming experience (in years)
X_8 = Ownership of farming equipment
(If yes =1, No =0)
X_9 = Land size (in ha)
X_{10} = Access to non farm income
(If yes =1, No =0)
X_{11} = Membership of Farmers' association (If yes =1, No =0)
X_{12} = Access to information (If yes =1, No =0)
X_{13} = Transport cost (in Naira)

4. Results And Discussion

4.1 Socioeconomic characteristics of farmers

The age distribution of the farmers reveals that the farmers' age between 30 and 70 years (Table 1). The mean age is 51 years with a standard deviation of 9.4, which suggests an ageing population. About 52.7 percent of the farmers are aged 50years and above. An ageing population will likely affect productivity in a negative way and reduce volume of sales or market participation.

Table 1: Selected Socioeconomic Characteristics Of Respondents

Age	Frequency	percentage
30-39	13	11.82
40-49	38	34.55
50-59	41	37.27
60-69	17	15.45
70-79	1	0.91
Total	110	100.00
Educational Status		
None	28	25.45

primary	64	58.18
secondary	16	14.55
tertiary	2	1.82
Total	110	100
House hold Size		
1- 10	76	69.09
11 - 20	31	28.18
21 - 30	3	2.73
Total	110	100.00
Years of Farming Experience		
1 t0 10	10	9.09
11 to 20	45	40.91
21 to 30	42	38.18
31-40	13	11.82
>40	0	0.00
Total	110	100.00
Gender		
Male	66	60.00
Female	44	40.00
Total	110	100.00

Source: Field survey, 2013

The educational status of respondents showed that majority of them (58.2 per cent) has primary education, with a standard deviation of 4.7. This means they spent an average of 5 years in school which correspond to junior secondary school education in Nigeria. A higher level of education is desirable to minimise costs of search and screening information and transaction cost in both factor and product market (Matungul *et. al.,* 2001). Most respondents (69.09 per cent) have household size of between 1 and 10. The mean household size is 9.8 with a standard deviation of 4.1. In theory, the larger the household, the lower would be the level of commercialization. According to Laper *et. al.,* (2003), the propensity to participate in the market economy declines with number of household members. The respondents have an average of 20.4 years of farming experience with standard deviation of 7.9. Most of the farmers have been in the occupation for more than 10 years. In general, the expectation is for farmers with higher farming experience to have higher commercialization index, and thus better participation in the markets. The analysis of socioeconomic characteristics of

farmers surveyed in this study shows that 60 percent are male while 40 percent are female.

Other respondents' characteristics shown in Table 2 reveals that 63 per cent of the farmers own land, only 35 per cent have access to non-farm income, 75.45 per cent belong to at least a farmer association and 55.45 per cent have access to information on market location, products' prices and the demand and supply situations.

Table 2: Other respondent characteristics

	Yes	%	No	%	total
ownership of farming equipment	69	62.73	41	37.27	110
access to non-farm income	38	34.55	72	65.45	110
membership of farmer association	83	75.45	27	24.55	110
access to information	61	55.45	49	44.55	110

Source: Field survey, 2013

4.2 Ordinary Least Squares (OLS) Estimation of Market Participation by Maize farmers

The OLS estimation of volume of sales was carried out for all the respondents and also executed for male and female farmers separately to highlight the gender dimension. The dependent variable in the model is the volume of sales of maize by the market participants. For all respondents, the significant factors determining the volume of sales of maize are quantity of maize produced, marital status of the farmer, household size, farm experience and access to information (Table 3). The quantity of maize produced and access to information have *a priori* positive signs, suggesting that the greater the output, the more the sales and farmers with access to information on market location, product prices, demand and supply conditions are also likely to make more sales. Similarly, household size have the expected negative sign, indicating that the larger the household size, the less the quantity of maize offered for sale in the market. There is a negative association between farmers experience and volume of sales which is contrary to expectation, while there is a positive relationship between marital status of the farmer and sales which is also contrary expectation. The adjusted R^2 showed that the explanatory variables explain 77 per cent of the variations in the dependent variable, while the F-statistic of 29.05 shows that the overall fit of the model is significant at zero per cent.

Table 3: Factors Determining Volume of Sales by All Maize Farmers

Dependent Variable: LOG(Y_ALL RESPONDENTS)
Method: Least Squares
Date: 05/17/13 Time: 20:58
Sample: 1 110
Included observations: 110

Variable	Coefficient	Std. Error	t-Statistic	Prob.
constant	-0.257419	2.504498	-0.102783	0.9183
Quantity of maize prod	1.055968	0.316018	3.341482	0.0012
age	0.054070	0.176395	0.306528	0.7599
Years of education	0.007376	0.006679	1.104354	0.2722
Sex of head	-0.010880	0.060805	-0.178929	0.8584
Marital status	0.426874	0.122786	3.476578	0.0008
Household size	-0.575910	0.089440	-6.439098	0.0000
Farm experience	-0.284010	0.076101	-3.732008	0.0003
Ownership of equipment	0.010564	0.067659	0.156136	0.8763
Land size	-0.009138	0.173197	-0.052759	0.9580
Access to nonfarm income	-0.001170	0.079079	-0.014799	0.9882
Farmers association	-0.052181	0.103829	-0.502571	0.6164
Access to information	0.138905	0.064255	2.161768	0.0331
transportation cost	0.053938	0.071759	0.751654	0.4541
R-squared	0.797343	Mean dependent var		7.075218
Adjusted R-squared	0.769900	S.D. dependent var		0.631483
S.E. of regression	0.302914	Durbin-Watson stat		1.726070
Sum squared resid	8.808688			
Log likelihood	-17.22243			
F-statistic	29.05436			
Prob(F-statistic)	0.000000			

Table 4 shows that, for male farmers, the significant determinants of volume of sales at 5% level are quantity of maize produced, marital status of the farmer, household size and farm experience. While coefficients on quantity produced and household size still has their *a priori* signs, those of marital status and farm experience have perverse signs.

Table 4: Factors Determining Volume of Sales by Male Maize Farmers

Dependent Variable: LOG(Y _MALE FARMERS)
Method: Least Squares
Date: 05/17/13 Time: 21:12
Sample: 1 110 IF X4=1
Included observations: 66

Variable	Coefficient	Std. Error	t-Statistic	Prob.
constant	-1.357181	2.927074	-0.463665	0.6448
Quantity of maize prod	0.978787	0.373221	2.622538	0.0114
age	0.380976	0.258239	1.475284	0.1461
Years of education	0.006035	0.008863	0.680859	0.4989
Marital status	0.575714	0.164583	3.498014	0.0010
Household size	-0.534565	0.107528	-4.971400	0.0000
Farm experience	-0.294906	0.094821	-3.110144	0.0030

Ownership of equipment	-0.025498	0.090530	-0.281656	0.7793
Land size	0.073928	0.202077	0.365840	0.7159
Access to nonfarm income	0.177839	0.113598	1.565517	0.1234
Farmers association	0.208828	0.140788	1.483278	0.1439
Access to information	0.109854	0.085008	1.292277	0.2019
transportation cost	0.028382	0.101241	0.280343	0.7803
R-squared	0.826565	Mean dependent var		7.029245
Adjusted R-squared	0.787297	S.D. dependent var		0.643058
S.E. of regression	0.296577	Durbin-Watson stat		1.407346
Sum squared resid	4.661762			
Log likelihood	-6.191321			
F-statistic	21.04919			
Prob(F-statistic)	0.000000			

The OLS regression for female maize farmers shows that marital status is not a significant factor determining the volume of sales, while household size, farm experience, access to non-farm income, membership of farmers' association and access to information are significant determinants of volume of sales by female male farmers. However, the signs on the coefficients of these variables are contrary to expectation; except for access to information.

Table 5: Factors Determining Volume of Sales by Female Maize Farmers

Dependent Variable: LOG(Y-FEMALE FARMERS)
Method: Least Squares
Date: 05/17/13 Time: 21:14
Sample: 1 110 IF X4=0
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
constant	4.631259	4.790409	0.966777	0.3411
Quantity of maize prod	0.626940	0.607003	1.032845	0.3097
age	-0.234876	0.216196	-1.086403	0.2857
Years of education	0.003508	0.009528	0.368215	0.7152
Marital status	0.200824	0.162780	1.233716	0.2266
Household size	-0.655473	0.149705	-4.378433	0.0001
Farm experience	-0.262998	0.117031	-2.247252	0.0319
Ownership of equipment	-0.005722	0.092475	-0.061877	0.9511
Land size	0.232088	0.341288	0.680036	0.5015
Access to nonfarm income	-0.208834	0.106447	-1.961867	0.0588
Farmers association	-0.315741	0.136670	-2.310242	0.0277
Access to information	0.271594	0.103107	2.634085	0.0130
transportation cost	0.010685	0.104645	0.102109	0.9193

R-squared	0.876370	Mean dependent var	7.144177
Adjusted R-squared	0.828514	S.D. dependent var	0.614518
S.E. of regression	0.254478	Durbin-Watson stat	2.355724
Sum squared resid	2.007524		
Log likelihood	5.487034		
F-statistic	18.31243		
Prob(F-statistic)	0.000000		

3. Conclusion

The assessment of determinants of volume of sales by maize farmers in this study shows that several of the hypothesised determinants are significant at the 5 per cent level albeit with mixed signs on their coefficients. The gendered analysis conducted to highlight differences in sales by male and female maize farmers reveals that more factors were significant in determining sales by female farmers compared to male farmers and total respondents, however, the signs on many of the coefficients on the variables are counter-intuitive. It is important to note that factors such as age, ownership of equipment, years of education, land size and transportation cost are not significant in any of the samples. Given the two factors that are significant and correctly signed for female farmers, the government should expose them to information on potential markets and product prices while encouraging them to embrace family planning methods to control the size of their households.

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