GENDER ANALYSIS OF MAIZE PRODUCTION AMONG SMALL SCALE FARMERS IN IFE EAST AND AYEDAADE LOCAL GOVERNMENT AREAS OF OSUN STATE

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ABSTRACT

The paper examined the performance of maize farm households in Ayedaade and Ife East Local Government Areas in Osun State, Nigeria. The paper focused on socioeconomic differences; and costs and returns to production among small scale maize farmers within the gender mainframe. Using a set of pre-tested questionnaire, primary data was collected from 120 respondents in the study area. The analysis was undertaken using descriptive statistics, multiple regression and farm budgetary analyses. Results showed that the average age of 85.40% of male and 89.50% of female farmers ranged between 21-50 years, the male farmers (74.4%) were more educated than their female counterparts (47.4%) and 92.7% of the male farmers cultivated between 1-7 hectares of farm land as against 42.1% of the female farmers in the same category. However, there were no significant differences (except in household size and farming experience) between the socio-economic characteristics of male and female maize farmers. Results also revealed that socioeconomic factors such as age and years of formal education; and quantity of factor inputs such as size of farm land and quantity of fertilizer used were major determinants of the value of maize output in the study area. Generally, maize farming was profitable in the area because the gross margin per Naira invested showed that every N1.00 invested per hectare yielded N2.82 and N5.38 for male and female farmers, respectively.

Keywords: Gender Analysis, Maize Production and Small Scale Farmers.

1.0 INTRODUCTION

Maize is the most important food crop in sub-Saharan Africa (SSA) with more than 50% of all countries assigning over 50% of their cereal crop production area to maize (Deininger and Byerlee, 2011). Over 650 million people in SSA consumed on the average 43 kg of maize per year (FAOSTAT, 2006). In Nigeria for instance, maize is one of the two major crops that occupy about 40% of the total land area under agricultural production, and account for about 43% of the maize grown in West Africa (Smith et al., 1997; Phillip; 2001, Bamire et al., 2010).

Maize production continues to play its traditional role of not only providing food for both man and livestock consumption, raw materials for industries, employment and revenue generation, but also contributes significantly to both the total export earnings and gross domestic product (GDP) of the country (Gusau, 1989; Phillip et al., 2009). Among different income groups, maize is relatively a more important source of both calories and proteins for the poorer proportion of consumers, including HIV/AIDs affected families, who cannot afford more expensive foods, such as bread, milk, or meat (Byerlee and Heisey, 1997; Phillip et al., 2009), Maize production, therefore, is of strategic importance for food security and socioeconomic stability in Nigeria. However, maize production in Nigeria has been characterized by large number of relatively small family operated farms, these small-scale farmers account for about 90-95% of the total food production (Ajakaiye, 1984; Bamire et al., 2010). A typical Nigerian small-scale farmer has been described as one, who cultivates an area of land that ranges between 0.10 and 5.99 hectares of land, using subsistence tools and farm inputs in their farming operation (Olayide, 1986; Zalkuwi et al., 2010). Therefore, the level of farm income generated by these farmers depends largely on availability, allocation, efficiency and also the effect of gender performance on the profitability of maize with the use of factor inputs. This study was undertaken to examine the effects of gender differences on the performance of maize farm households in Ife-East and Ayedaade Local Government Areas of Osun State. The specific objectives were to describe the socio-economic characteristics of maize farmers; determine input-output relationship of maize production; and analyse the profitability of maize production.

2.0 Study Area.

Osun State is one of the 36 States of the Federal Republic of Nigeria. It is located in the Southwestern Nigeria with a total of 30 Local Government Areas (LGAs) and one area office. The State covers an area of approximately 8,602 square kilometers. The major occupation of the people in the State is agriculture which provides employment and income for over 80% of the population (Akinwole, 2011). The State is one of the major producers of maize in Nigeria. The study was carried out in two local government areas of Osun State. These LGAs were chosen because their populations are predominantly farmers growing maize as the major food crop. Women in these LGAs were also involved in farming and were very prominent in maize farming.

3.0 Methods of data collection and sampling technique.

The methodology used in this research includes the use of structured questionnaire to collect information from 120 respondents within the study area. The questionnaire was administered in different areas and small communities numbering about fifteen (15) villages in each of the LGAs. Multistage Sampling Technique was used to select respondents. The selection of the State, the Local Government Areas and the Villages was purposive and based on the prevalence of maize farming activities; the selection of male farmers was on the basis of simple random sampling, while the selection of the female farmers was based on snow-balling techniques. Men farmers were selected at random because of their predominance in the areas, while the women farmers were selected using snow-balling sampling method because of their uneven population with the men farmers.

3.1. Data analytical technique: Descriptive statistics, regression model and budgetary techniques were used to analyze the data. Descriptive statistics was employed in describing the socio-economic characteristics of the farm households.

3.1.1. Regression Model

Regression model was used to determine the input-output relationship within the gender mainstream. The explicit form of the model is given by:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8) \dots\dots\dots 1$$

The double-log function gave the best fit and was chosen as the lead equation on the basis of the number of significant variables, magnitude of R2, F-statistics, standard error and the signs of the parameters. The explicit form of the lead equation is given as:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + U_i \dots\dots\dots\dots\dots 2$$

Where: Y = Value of output in Naira (N), X_1 = Age of respondent in years, X_2 = Years of formal education (years.), X_3 = Farm size (ha), X_4 = Fertilizer in kilogram (kg), X_5 = Quantity of herbicides used in liters, X_6 = Labour in man-days (Family + Hired labour), U_i = Error term, b_0 = Constant, and b_1-b_8 = Regression co-efficient.

3.1.2. Farm Budget Analysis

The Farm budget analysis examined the costs and returns to production of maize in the study area. The gross margin is the excess of returns over variable cost of production. Total revenue was taken as the product of price per unit and quantity of maize crop produced by the farm households. Product was sold at different markets and different prices. However, the average prices were used for computation. Input costs were valued at purchase prices paid by the farmers and the gross margin was calculated using the formula presented in equation (3):

$$GMi = \sum (TRi - TVCi) \dots\dots\dots\dots 3$$

Where: GMi = Gross margin of farmers in naira per hectare,

TRi = Total revenue from maize in naira per hectare (Price x Quantity), and

TVCi = Total variable cost of farmers in naira per hectare.

Using the average gross margin as a measure of profitability, of the farmers' population, we were able to measure and compare the profitability of male and female farmers relative to the population of farmers in the study area.

4.0. Results and Discussion
4.1. Socio-economic characteristics of farmers.

The general socio-economic characteristics of the farmers in the study area are presented in table I below. More than three quarters of the male (85.40%) and female (89.50%) farmers were in the age range of 21-50 years. This indicates that both male and female farmers in the area were young and very active people. The male farmers (74.4%) were more educated than their female counterpart (47.4%), this implies that average farmers in the study area was educated. This should contribute positively to the level of maize production among the farmers (Raphael, 2008).

Generally, most of the farmers were small scale farmers but 92.7% male farmers cultivated between 1-7 hectares of land as against 42.1% of the female farmers in the same category. The size of the farm cultivated among the female famers was due to inadequate access to farm land among the female headed farm households. This affected the level of maize production and hence income generated since land is the major factor of production among the maize farmers. About 89.0% of the male farmers were married with an average household size of 7 members while 68.4% of the females were married with average household size of 7 members. Since financial family responsibility is related to family size, it implies that farmers in the study area had varying degrees of family financial commitments.

Table I: Socio-economic characteristics of farmers.

Variables	Male Farmers		Female Farmers	
	Frequency	Percentage	Frequency	Percentage
Age (years.)				
Up to 20	16	19.5	2	5.3
21-30	15	18.3	15	39.5
31-40	28	34.2	14	36.8
41-50	11	13.4	3	7.9
51-60	6	7.3	3	7.9
Above 61	6	7.3	1	2.6
Total	82	100	38	100
Years of Educational (years.)				
<1	21	25.6	20	52.6
1-5	6	7.3	7	18.4
6-10	19	23.2	5	13.2
11-15	8	9.8	3	7.9
16-20	26	31.7	2	5.3
Above 21	2	2.4	1	2.6
Total	82	100	38	100
Farm Size (Ha)				
<1	5	6.1	19	50.0
1-3	50	61.0	10	26.3
3-5	24	29.3	6	15.8
5-7	2	2.4	3	7.9
>7	1	1.2	0	0.0
Total	82	100	38	100
Mode of Land Acquisition				
Inherited	45	54.9	13	34.2
Gift	5	6.1	2	5.3
Leasehold	29	35.3	22	57.9
Rent	3	3.7	1	2.6
Total	82	100	38	100
Households Size (#)				
1-5	12	14.6	5	13.2
6-10	30	36.6	18	47.3
>10	40	48.8	15	39.5
Total	82	100	38	100
Capital Base				
Savings	55	67.1	25	65.8
Relatives	8	9.8	3	7.9
Coop.	7	8.5	2	5.3
Friends	10	12.2	8	21.0
Banks	2	2.4	0	0.0
Total	82	100	38	100
Membership of Farmers Associations				
(%Yes)	75	91.5	23	60.5

Access to credit facilities among the farmers was largely from informal sources (friends and personal savings). Only 10.9% of the male farmers had access to credit facilities from commercial banks while 5.3% of the female farmers had access to credit facilities from cooperative societies. In the study area, the major source of funds was from farmers' savings which is low. This would affect the level of investment in farm business and maize production in the study area.

4.2. Gender analysis of farmers' socio-economic characteristics

The gender analysis of farmers' socio-economic characteristics is presented in Table

2. The test of differences analysis (t-test) showed that the differences between the ages, years of formal education, farm sizes and amounts paid as rent on land use among male and female farmers in the study area were higher for maize but not statistically significant. However, the observed differences between the households' sizes and years of farming experience were statistically significant higher for male relative to female. This implies that maize farmers in the study area were not socio-economically different (except in their households' sizes and farming experience) regardless of their gender component.

Table II: Gender analysis of farmers' socio-economic characteristics.

Socio Economic Characteristics	Pool	Male Farmers	Female Famers	t-test
Age (years)	46.83 (12.85)	47.5 (13.95)	45.39 (10.10)	0.94
Years of Formal Education (years)	10.03 (4.35)	8.23 (5.55)	5.67 (4.96)	1.23
Household Size (#)	7.00 (2.79)	7.25 (3.12)	6.70 (1.77)	2.53*
Farming Experience (years)	17.03 (11.52)	19.17 (12.23)	12.42 (8.21)	3.56*
Total Farm Size (ha)	10.77 (18.52)	12.43 (21.17)	7.18 (10.79)	1.79
Rent Paid on Land Used (N/ha)	3237.50 (67.41)	3306.09 (7592.33)	3089.47 (4463.89)	0.19

Source: Survey data, 2012. Note: Figures in parenthesis standard deviation; *Indicate significance at 1%.

Household size represents the family labour structure and farm labour availability among farmers. Increase labour availability has been linked with increase productivity and improved farmers' livelihood among the small scale farm households (Miyuki, 2006). Farming experience is also a measure of farmer's ability to make accurate investment decisions and decide on the appropriateness of new technology for efficient production. Thus, these two socio-economic factors are expected to contribute to increase maize production especially among the male headed farm households in the study area.

4.3. Production decomposition by gender

The estimated Cobb-Douglas production function is given in Table 3. The lead equation for male farmers is:

$$Ym = 3134.85 + 4828.88X_1 + 4807.36X_2 + 5974.03X_3 + 9524.15X_4 + 0.62X_5 - 631.92X_6 \quad \text{.....................5}$$

The lead equation for the female farmers is:

$$Yf = 2848.91 + 2883.99X_1 + 1545.24X_2 + 3709.60X_3 + 8.99X_4 - 650.57X_5 - 1498.52X_6 \quad \text{.....................6}$$

Table III: Estimated Cobb Douglas Production Function.

Production Form	Dependent Variables	Constant (b_0)	X_1	X_2	X_3	X_4	X_5	X_6	R^2	Standard Error	F-Value
Male Farmers	Y_m	3134.85 (6.609)	4828.88 (7.315)*	4807.36 (1.065)	5974.03 (1.232)	9524.15 (0.499)	0.62 (25.83)*	631.92 (-0.715)	0.821	244.12	48.19
Female Famers	Y_f	2848.91 (0.369)	2883.99 (1.670)	1545.24 (1.901)*	3709.60 (9.083)*	8.99 (3.80)*	650.57 (-0.182)	1498.52 (-0.043)	0.601	573.56	24.07

Source; Survey data, 2012. Note: Figures in parenthesis are calculated t-ratio; *Indicate significance at 1%.

About 82.1% and 60.1% of the variations in the value of maize produced by male and female farmers, respectively were explained by the factor inputs as indicated by the values of R2. All the variables have positive coefficients except quantity of herbicides among men; and quantity of herbicides and farm labour among female farmers which have negative relationship with the value of output and they did not affect the value of output significantly. The positive coefficients (age and quantity of herbicides among male; and years of education, farm size and quantity of fertilizer used among female farmers) affected the value of maize output significantly. This implies that increase in the quantity of the input would result to increase in the value of maize output. It also means these were the major determinants of the value of maize output among farmers in the study area.

4.4. Profitability decomposition by gender

The costs and returns to maize production by farmers in the study area are presented in Table 4. The average mean yields (kg/ha) were 26743.88, 30560.33 and 18710.93 for the pool, male and female farmers respectively. The result also showed that, on the average, the revenue recorded were N487, 473. 31, N506, 072. 15 and N447, 338. 97 for the pool, male and female farmers, respectively. The result further showed that the total variable cost (TVC) per hectare of maize produced by male farmers was N132, 443. 90, while the average variable cost by female farmers was N70, 118. 00 per hectare. This invariably gave an average gross margin of N373, 628.25 per hectare for male farmers

Table IV. Cost and returns to maize production.

Items	Farmers			t-value
	Pool	Male	Female	
Mean Yield (kg/ha)	26743.88 (1764.959)	30560.53 (2746.72)	18710.93 (3441.14)	18.65*
Total Revenue (₦/ha)	487473.31 (54192.16)	506072.15 (21566.68)	447338.97(10506.56)	20.05*
Total Variable Cost (₦/ha)	112707.50 (19093.95)	132443.90 (56720.69)	70118.42 (11260.07)	9.55*
Gross Margin (₦/ha)	374765.81 (47995.10)	373628.25(51898.29)	377220.55(38887.97)	-0.42
Gross Margin Per Naira Invested (GMNI)	3.33 (19.81)	2.82 (14.68)	5.38 (27.07)	-0.55*

Source: Survey data, 2012. Note: Figures in parenthesis are standard deviation, *Indicate significance at 1%.

and N377, 220. 53 per hectare for female farmers. It is also important to note that female farmers in the study area, on the average, had lower yield and variable costs but higher profit (Gross Margin) per hectare compared to the male farmers because the female farmers were able to process, add more value to their products and also gained more by marketing the product themselves.

The study revealed that, maize farming was generally profitable in the area because gross margin per naira invested (returns to investment) showed that every N1.00 invested per hectare yielded N2. 82 and N5.38 for male and female farmers respectively.

The t-values showed that the observable differences in yield, total revenue and total variable costs between male and female farmers were statistically significant. Although, the female farmers appeared to have made more profit (5.38) than their male counterpart (2.82), the observed differences between their gross margin (GM) and gross margin per Naira invested (GMNI) were not statistically significant at 1% level.

5.0. CONCLUSION

This study concluded that there were no significant differences (except in household size and farming experience) between the socio-economic characteristics of male and female maize farmers in the study area, socioeconomic factors such as: age, years of formal education, and quantity of factor input such as: size of farm land and quantity of fertilizer used were major determinants of the value of maize output among the female farmers, while age and quantity of herbicides used affected the value of maize output among male farmers. Maize farming is generally profitable in the area; therefore the overall effort at increasing the level of profit among maize farmers in the study area should be with an emphasis on increasing the factor inputs such as better access to farm land and fertilizer

especially among the female farmers.

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