

**DIFFERENTIALS IN SOCIOECONOMIC ATTRIBUTES OF MALE AND FEMALE FARMERS AND EFFECTS ON TECHNICAL EFFICIENCY IN FOOD CROP PRODUCTION IN EDO STATE, NIGERIA**

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**ABSTRACT**

*This paper was designed to compare the technical efficiency of food crop farmers along gender line. The stochastic production function, using the Cobb – Douglas functional form was used to estimate and compare the effects of some socio-economic characteristics of farmers on technical efficiency of male and female food crop farmers in the study area. Estimated results revealed that some socio-economic attributes such as education ( $b = -0.195$  and  $b = -0.237$ ), age ( $b = -0.297$  and  $b = -0.051$ ), household size ( $b = -0.216$  and  $b = -0.319$ ) and credit ( $b = -0.023$  and  $b = -0.096$ ) for both male and female food crop farmers respectively, revealed negative relationship with technical inefficiency, indicating that they (variables) decrease technical inefficiency and hence increase technical efficiency of the food crop farmers in the study area. But the coefficient of farming experience ( $b = 0.163$  and  $b = 0.133$ ) was positively signed for both male and female food crop farmers respectively. This shows a positive relationship with technical inefficiency effects, and negative relationship with technical efficiency. The study further revealed the significant differences in the socioeconomic attributes of male and female food crop farmers, resulting in differences in their technical efficiencies in the study area. An enhancement of the respective endowments (socio-economic status), as they affect the sexes for improved technical efficiency was recommended by the researchers.*

**Key words: Gender, Socio-economic attributes, Efficiency, Food crops**

**INTRODUCTION**

One of the major factors responsible for the declining agricultural productivity in Nigeria is the relegation to the background of the contributions of women in the issues of food crop production (Abiola and Omoabugan, 2001). Women farmers have been reported to require time saving technologies for both farming and domestic works to reduce the length of their working day, increase efficiency leading to increased output (Rahman and Usman, 2004) and poverty reduction among the farmers, with enhanced standard of living in the economy (CBN 1998, Van Buren 2001, United Nations 2001, FGN 2004).

According to Jiggins *et al* (1997) and Steunou, (2009), the contributions of women farmers to agricultural production have been marginalized and under-valued in conventional agriculture, economic analysis and policies. Women are the backbone of the agricultural sector, accounting for 60 to 80 percent of agricultural labour and being responsible for 80 per cent of food production (Mgbada, 2000). The presence of women in the farming enterprise is significant. They have been found to do as much work as the men in farming. Women farmers play vital roles in food production, processing and marketing in Nigeria (Ralmah *et al*, 2004). In spite of the important roles women farmers play in agricultural production, it is observed that

research and documentation on their activities is very limited (Ezumah and Didomonica, 1995). It is however very important to try to close the gap between the actual and potential productivity levels of women in the farm. The bridging of actual-potential productivity gap presents one of the most effective means of promoting efficient agricultural productivity, and enhancing an overall economic development. Amaza and Olayemi (2001), observed that food crop farmers carried out their production under conditions involving the use of inefficient tools, unimproved seed varieties, and so on, hence maximum technical efficiency has been elusive to them, particularly the women farmers. Therefore, an increased efficiency in food crop production could lead to an improvement in the welfare of the farmers and consequently a reduction in their poverty status and food insecurity level.

Gender and efficiency analysis usually suggest appropriate interventions required to improve a given system for maximum efficiency actualization. This research therefore is aimed at examining the factors that affect efficiency level of food crop production among male and female farmers. In response to the above, this study answered the following question. Are male farmers more endowed with productive advantages than the female food crop farmers?

The study also tested the following hypothesis:

$H_{01}$ : There is no significant difference in the technical efficiency of male and female food crop farmers in the study area. The relevance of this study at this time of transformation in the country cannot be overemphasized, as both males and female gender must be empowered for economic transformation. This study intends to bring to limelight the socio – economic attributes inherent in both males and female farmers for increased productivity.

## **METHODOLOGY**

The study was carried out in Edo State, which is one of the 36 States in Nigeria, with 18 Local Government Areas. It occupies a total land area of 17,802km, and a population of 3,218,332 million people, consisting of 1,577,871 females and 1,640,461 males (NPC, 2006). A multistage sampling technique was used in the selection of the population for the study. The first stage was the stratification of the study area (Edo State) into three agricultural zones, Edo South, Edo Central and Edo North. The second stage was the random selection of two (2) Local Government Areas from each zone to give a total of six (6) Local Government Areas. The third stage was the random selection of three (3) communities from each of the Local Government Area. This gave a total of 18 communities. These 18 communities made up the farming communities in the area. Finally, 20 food crop farmers were randomly selected from each community so selected, to make a total of 360 respondents. Data for the study were collected using the interview schedule method from the 360 respondents sampled for the study. Data collected were analysed using inferential statistics such as, difference of means and stochastic production function, using the Cobb – Douglas functional form.

In order to determine the socio-economic attributes contributing to the technical efficiency of the food crop farmers in the study area, the farmers' attributes were hypothesised as the technical inefficiency model. The technical inefficiency model ( $U_i$ 's), is composed of vector variables ( $Z$ ) which were hypothesised to affect the technical efficiency of the food crop farmers, and these were assumed to be independent of  $V_i$ <sup>s</sup> such that  $U_i$  is the non- negative truncation (at zero) of the normal  $U_i$ , and variances  $\delta^2$ . Where  $U_i$  is defined by;

$$\ln U_i = \ln b_0 + b_1 \ln z_1 + b_2 \ln z_2 + b_3 \ln z_3 + b_4 \ln z_4 + b_5 \ln z_5$$

Where

- $U_i$  = Technical inefficiency effects
- $Z_1$  = Farmer's years of formal education
- $Z_2$  = Farmers' age (in years)
- $Z_3$  = Household size (number of persons)
- $Z_4$  = Farming experience (in years)
- $Z_5$  = Credit (₦)
- $Z_6$  = Extension Visits (Number of times)
- $b$ 's = unknown scaler parameter estimates.

The Z test was used to compare the mean score of the paired data. This was used to test the significant difference in technical efficiency among male and female food crop farmers. The Z test was used because the sample size was greater than 30 (thirty). The test stipulates that the null hypothesis, ( $H_0$ ), defined as  $H_0: B_i = 0$ , is not significant in explaining the variation in the dependent variable. The decision rule is that  $H_0$  is accepted if Z computed is less than Z tabulated at a given level of significance and the degree of freedom and  $H_A$  is rejected if otherwise.

## RESULTS AND DISCUSSION

The results of the analysis on Table 1 revealed that the income of the male farmers was ₦ 62, 214.31, while that of the female farmers was ₦ 56, 359.15 monthly. This has shown that the male farmers earned more income than the female farmers. The average farm size of the male farmers was 1.06 hectares and that of the females was 0.9 hectares, this is as a result of the inability of the female farmers due to customs and tradition of the people to inherit or own land as a title.

**Table 1: Respondents' Socio-economic characteristics**

Variables (Mean)	Male	Female
Income	₦ 62,214.31	₦ 56,359.15,
Farm size	1.06 (ha)	0.9 (ha)
No of crops grown	3	4
No of plots cropped	2	3
Family size	9	5
Farm experience	19	11

Source: Computed from field data, 2007.

The males grew three (3) different types of crops and cultivated on the average 2 different plots, while the female farmers cultivated 4 different types of crops and cultivates on the average three (3) plots. The number of crops grown and plots cultivated by the women are characteristics of the types of crops they cultivate. These are usually low economic crops, otherwise known as the 'women crops', e.g pepper, tomatoes, vegetables etc. while the male farmers cultivates the yam, plantain, cassava etc, which yields a higher income. The average family size for the male farmers was 9, while that of the female farmer was 5, the males had larger family size because of their polygamous nature. The males were more experienced (19 years) than the females (11 years) in farming. The income of the female farmer is smaller, because the female farmer cultivates smaller fragmented parcels of land, plants ordinarily the food crops, also known as the 'women crops'

The estimates of the parameters as presented in Table 2 reveals that the coefficients of education ( $b = -0.195$  and  $b = -0.237$ ), age ( $b = -0.297$  and  $b = -0.051$ ) and household size ( $b = -0.216$  and  $b = -0.319$ ) were negatively signed for both male and female food crop farmers respectively, indicating that they (variables) decrease technical inefficiency and hence increase technical efficiency of the food crop farmers in the study area. The negative coefficient of education implies that the higher the educational attainment of a farmer, the lower the technical inefficiency and the more the technical efficiency of the farmer. In the same vein, the coefficient of age that was negatively signed had negative relationship with technical inefficiency. This implies that increasing age of the farmer decreases technical inefficiency and improves technical efficiency. This is in conformity with the assumptions of Ogundari and Ojo (2005) that farmers' age affects production efficiency. The negative coefficient of household size obtained, indicates that technical inefficiency decreases as household size increases. This invariably brings about increased efficiency.

**Table 2: Maximum –Likelihood Estimates of Parameters of the Cobb – Douglas Production Function for food crop farmers**

Variables	Male		Female	
	Coeff	t – ratio	Coeff	t- ratio
Constant	-8.054	1.497	2.680	1.552
Education	-0.185	1.182	-0.237*	2.486
Age	-0.297*	2.243	-0.051	1.495
Household size	-0.216	1.101	-0.319*	3.118
Farming experience	0.163	1.439	0.133*	4.200
Credit	0.023*	2.195	0.096 *	2.149
Extension visits	-0.843	0.673	0.347	1.270

Source: Computed from field data, 2007; 5 % Level of Significance

Critical t = 1.96

The coefficient of farming experience ( $b=0.163$ ,  $b=0.133$ ) was positively signed for both male and female food crop farmers. This shows a positive relationship with inefficiency effects, implying that the more experienced a farmer is, the higher the technical inefficiency effects, and consequently the less the technical efficiency. This may be as a result of the fact that older farmers are very conservative and are not receptive to new innovations for adoption, which leave them still farming in their own crude ways. This finding however confirms the findings of Esobhawan (2007), who found positive relationship between experience and inefficiency effects. Credit ( $b = 0.023$  and  $b = 0.096$ ) was found to be a significant determinant of technical efficiency, and positively signed for both male and female food crop farmers respectively. This implies that the availability of credit reduces the effect of technical inefficiency in food crop production and increases the probability of being efficient and having higher productivity. It reflects the ability of the farmers to acquire assets for farming activities. The coefficients of education, household size, farming experience and credit were significant socio – economic attributes, for the female food crop farmers at 5 % level of significance, while age and credit were the socio-economic attributes that were significant for the male food crop farmers at 5 % level of significance. The number of contacts the farmers had with extension agents had no effects on the farmers (males and females) technical efficiency in the area of study. This study thus shows that the female food crop farmers were affected by more inefficiency

parameters and socio-economic attributes than the male food crop farmers in the study area.

The Z - test (Z) as shown in Table 3; was used in testing the hypothesis formulated for the study. The null hypotheses, which states that there is no significant difference between the socio- economic attributes of the male and female food crop farmers in Edo State, specifies that the explanatory variables in the male and female model for the inefficiency factors have zero coefficients. ( $z = 0$ ).

**Table 3: Results of the Hypothesis testing for the differences in the socio attributes of male and female food crop farmers.**

<b>Variables</b>	<b>t –cal</b>	<b>t-tab</b>	<b>Decision</b>
Age	11.340	2.786	Reject Ho
Household size	5.581	3.313	Reject Ho
Education	6.232	2.395	Reject Ho
Experience	9.541	2.116	Reject Ho

Source: Computed from survey data, 2007; 5 % Level of Significance

The result on Table 3 shows that the stated null hypothesis, was rejected, but was found to be significant at 5 % level of significance. Thus, the alternative, hypothesis which states that there is a significant difference between the socio – economic attributes of male and female food crop farmers was accepted. It could then be concluded that the explanatory variables in the model contribute significantly to technical efficiency of food crop farmers.

## **CONCLUSION AND RECOMMENDATIONS**

The study found that there exist some differences in the technical efficiency of male and female food crop farmers in the study area. This finding is as a result of the different socio-economic attributes possessed by the sexes. The study revealed that the female farmers had more affected attributes than the male farmers in food crop production. If attention therefore, is given to the female farmers, by economically empowering them, their technical efficiency will be increased and there will be increased and improved production. This will also multiply into higher income for the farmers. The study recommends an enhancement of the respective attributes as they affect the sexes for improved technical efficiency in food crop production. Female farmers should be better empowered in the area of land and capital acquisition for improved agricultural productivity, which is capable of boasting the country's agricultural contribution to the Gross Domestic Product (GDP) of the Nation.

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