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COMPARATIVE ANALYSIS OF WOMEN'S CONTRIBUTION TO FOOD CROP PRODUCTION IN KOGI STATE, NIGERIA

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ABSTRACT

Women in Nigeria form a significant part of the population and are practically involved in agricultural activities. Based on the involvement of women in agriculture and in the rural economies of Nigeria, this study evaluates the contribution of women to food crop production. This is to establish knowledge about what farm inputs these women use in agriculture and how they combine these resources available to them in food production process as regards their efficiency. Four-staged sampling was conducted to survey a sample of 120 farmers (men and women) with the aid of an interview schedule. The data collected were for the 2009/2010 cropping season and analyzed with descriptive tools and stochastic production frontier. The result established that a high level of technical inefficiency exists among the sampled farmers. Age, household size and sex were found to be significant ($p < 0.05$) determinants of technical inefficiency that exists between the sampled farmers. To achieve efficiency in production among women farmers, it was recommended that inputs required, especially land, modern farm implement, accessible capital and extension services should be made available. The women should also be taught the better use of farm inputs to achieve efficiency in food crop production.

Keywords: Food Production, Women, Agriculture, Kogi State, Efficiency

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INTRODUCTION

Agricultural food crop production varies in Nigeria due to the rainfall distribution across the country. Spatial variability is evident in the irregular distribution of rainfall at both short-time scale and average conditions while the temporal variability tends to be greater in the Northern and Southern parts of the country (Olaniran, 1991, Omotosh and Abiodun., 2007). In the South-West for instance, yam, rice, cassava, banana, plantain, maize, cocoa, vegetables, cowpea and so on are predominant. The south-east and south-south zones grow maize, cassava, yam, rice, cassava, oil palm, vegetables, and oranges. They particularly dominate in the production of cocoyam, oil palm and cassava. The northern zone produce millet, guinea

corn, maize, groundnut, rice, wheat, millet, cowpea with soya bean and Benniseed mainly in Benue and Acha mainly in Plateau State (Abdullahi, 2006).

The Nigerian agricultural sector is characterized by a multitude of small scale farmers scattered over wide expanse of land area with small holdings ranging from 0.05 to 3.0 hectare per farm land (Fasasi, 2006). They use rudimentary farm implements. It notwithstanding provide primary means of employment for Nigerians and account for a great number of the labour force (FAO, 2003; World Bank. 2003). These small holder farmers operate at low level of resource input and are constrained by a number of factors which hinders their ability to achieve optimum production (Oluwasola *et. a1*., 2007). Of this percentage of small scale farmers are women and they work extensively like their male counterpart in other part of the developing world.

According to Staudt (1991) women represent half of the world's population and perform nearly 66 per cent of all working hours but receive only one tenth of the income generated and own less than one percent of the property. However, women have been described as the invisible workforce and the unacknowledged backbone of the family and the national economy (Tanko, 1993). This is from the assessment of their contribution which is central and pivotal as seen in the work of Agarwal *et. al.* (1988) where they concluded that women produced 80% of the food earned, 10% of the money income, and own 1% of the assets in any household in developing countries.

Yahaya (1995) also emphasized that women are actively involved in agriculture and that they derive 75% of their income from activities such as provision, processing and marketing of agricultural products or a combination of these practices. Oluwemimo, (1998), portrayed women to put about 70% of their time expended on food production and the FAO (1985) also buttressed the fact that up to 80% of the labour force in all trade including agricultural food production in the West African region are women. This implies that, based on the recent trend of population increase, millions of women work as food producers and in doing this, they contribute a high proportion of the national agricultural food output and also perform their duties in keeping households under proper management.

The participation of women in agriculture have been largely ignored both as a subject as an object of agricultural developmental effort. This has gone a long way in limiting the ability of the country to realizing and achieving its full productive capacity in the agricultural sector. According to the African Farmers (1994), women grow most of African's food and these women lack the essential and critical support needed to maximize these essential roles and even when essential and scarce resources/inputs are made available. They rarely flow to the women in the rural areas. As a result of this, the neglect of women and their constraints still ignored need to be looked into.

Women farmers are greatly affected by both the economic realities and the cultural gender biases ingrained in the African society. Women farmers in the country spend significant portion of their time and energy supporting their livelihood through agriculture, but it is

unfortunate that despite their efforts, they do not have access to training programmes, cannot secure land from government to practice agriculture, always have problems in getting credit and agricultural inputs such as improved seeds like their male counterpart (Fasuyi. 2011).

Women produce more than 50 percent of the food grown worldwide, according to FAO estimates (FAO, 1995). While there is still insufficient gender disaggregated data to give exact figures on women's contributions to agricultural production everywhere in the world, disaggregation of data is increasing. This data, together with field studies, participatory rural appraisal and gender analyses, make it possible to draw a number of conclusions about the extent and nature of women's multiple roles in agricultural production and food security.

This study therefore seeks to find out women's contribution to food crop production, identify the activities in food crop production that women are involved in and analyze the technical efficiency of these farmers in production.

RESEARCH METHODOLOGY

Study Area

The study was carried out in Kogi state of Nigeria. Kogi state is found in the central region of Nigeria. The confluence of River Niger and River Benue is at its capital, Lokoja, which is the first administrative capital of modern-day Nigeria. There are three main ethnic groups and languages in Kogi: Igala, Ebira, and Okun with other minorities.

Kogi State has two distinct seasons in a year: they are the wet and dry seasons. The wet season spans between middle of March and October. While between the months of October and March, the state experience the dry season, during this season the air is dry with temperature missing up during the day. The state has an average maximum temperature of 34.5^0 C and an average minimum temperature of 22.8^0 C and its annual rainfall is between 1016mm and 1524mm.

Kogi state is divided into four zones by the Kogi state Agricultural Development Project in consonance with ecological characteristics, cultural practices and project's administrative convenience. The major food crops cultivated in the state include yarn, cassava, groundnut, cowpea, sorghum, melon, okra, pepper, and some leafy vegetables. Majority of these food crops produces are eaten while some households sell small amount of their crops in the market to earn additional income for the household upkeep. Some households grow cash crops like kola, oil palm, and cashew and so on.

Data Collection

A random selection of zone A was carried out. Zone A comprises of five (5) Local Government Areas. Also, a random selection (using ballot system) of towns and villages was carried out in each of the five local government areas of the zone. Furthermore, there was a

random selection of both male and female farmers with consideration of their proximity to major road. In all, 120 households were sampled but 109 households were analyzed.

Data Analysis

The data collected for the study was analyzed using both descriptive and inferential statistics. The stochastic production frontier was used to test for the efficiency of these respondents with respect to their contribution to agricultural food crop production. This ensures the estimation of the parameters of the production function and the technical inefficiency effects simultaneously. The stochastic production function model is specified in the implicit is

$Y_i = f(X_i, \beta) + (V_i - U_i)$

Where Yi = the output of the ith farm in kilogram (grain equivalent), Xi= quantities of inputs used on the farm, β= unknown parameters to be estimated, Vi= random variables which are assumed to be normally distributed N $(0,\sigma_v^2)$ and independent of the U_i it is assumed and account for measurement error and other factors not under the control of the farmer, Ui = non negative random variables called the technical efficiency effects which are assumed to be half normally distributed N$(0,\sigma_v^2)$ (Aigner et. al. 1997).

The Cobb-Douglas functional form is then fitted as:

$Y=f(X_1, X_2, X_3, X_4)$

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_3 + \beta_4 X_4 + V_i - U_i,$

$InY = \beta_0 + \beta_1 InX1 + \beta_2 InX_2 + \beta_3 InX_3 + \beta_4 InX_4 + V_i - U_i$

Where Y = output of crops (kg grain equivalent), X_1= farm size (Ha), X_2 = hired labour (Man-day), X_3 = family labour (Man-day), X_4 = quantity of seed input (Kg grain equivalent of maize)

The inefficiency model is given as:

$U_1 + \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_3 Z_3 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5$

Where U_i = technical inefficiency, Z_1= age (years), Z_2 = household size (number), Z_3 = sex (dummy), Z_4 = education (years), Z_5 = farming experience (years).

RESULTS AND DISCUSSION

Table 1 shows the summary statistics of both the men and women farmer respondents

The average age of female is 44years while that of male famers is 47 years. Overall, majority of the farmers (40.9% of the male and 49.2% of the female farmers) were between the ages of 41-50 years which are still agile and active. The age distribution among farmers in the study agrees with Ekong (2003) which confirmed that Nigerian farmers are within the age bracket of 40-60 years. Also, the average independent production experience of these women is 17 years. This implies that they have been contributing to crop production through their personal farms almost half of their lifetime. Although, experience in farming is very important and it

depends on years of farming experience but young and active farmers are needed on farms because agricultural production is energy demanding. Furthermore, the female farmers cultivate a meager piece of land averaging at 0.64 hectare. This implies that these women operate on small scale. Furthermore, about 93.2% of the male farmers and 86.2% of the female farmers had a household size of 10 and below. The implication of this therefore is that, hired labour may be used as together with the family labour because the household size will have effect on the number of people in a household to help in farm activities.

With respect to the level of education, 31.8% of the male farmers had tertiary education 41.2% of the female farmers had primary education has the highest level of education. Asiabaka (2002) viewed formal education as means of facilitating farmers and as a means of comprehending farm practices.

The contribution of farmers to agriculture is shown on Table 2.

From Table 2, women contribute mostly to marketing (84.2%) in terms of labour input. Women also contribute 64.1% in planting of the farmlands, 66.7% in processing of processing of farm produce, 50.8% in harvesting, 55.5% in the application of fertilizer and they are seen to contribute least in weeding (6.2%) and land clearing (4.9%) respectively. This can be said to be a result of the tedious job of both clearing and weeding. These two farming activities are typically tagged men's job while women at times gather and burn the trash. Herbicide calibration and application might be the limiting factor resulting in the low 19% participation of herbicide application on the part of these women. Women are also observed to contribute about 33.3% agriculturally productive farmlands. These women use these farmlands as a source of food to the populace. Women also employ 32.8% capital of which they access to ensure agricultural production to enhance their productivity. This is low as compared to the capital employed by their male counterparts.

Table 3 presents the summary of the variables of interest used in the stochastic model. They include the units, minimum values and maximum values for each variables, sample mean and standard deviation.

From Table 3, average output of a farmer per annum is approximately 1013.10kg (grain equivalent of maize). Also, average farm size, hired labour, family labour and seed inputs are 8,700 heaps, 51.89 man-day, 30.18 man-day and 84.06kg (grain equivalent of maize). The higher number of hired labour as compared to the family labour implies that most of these farmers depend mostly on hired labour to do most of their farm works. This also justifies the earlier finding on the effect of the household size on labour use. Households tend to use more of hired labour when there are few family members helping out in agricultural activities. This supports the findings of Ajibefun, Ademola & Obioma (2000) that hired labour contributes 88.0% of the total labour use on farms thus emphasizing its importance in agricultural activities. Hence, considerable effort in terms of family and hired labour are needed.In addition, Ogunsumi and Adetayo (2002) found that farmers used hired labour to supplement

family labour.The availability of labour within families or capital to hire labour, governs the area of land that can be cultivated, the types of crops that can be grown and the farm output.

As shown on Table 4, the efficiency of production was 1.505. This shows that the female farmers did not operate at constant returns to scale (i.e.at the point where the elasticity of production is unity) which is the point where the marginal product of an input is equal to the average product of the input. If a farm is operating at constant returns to scale, it means that the farm has achieved absolute allocative efficiency. Hence, the female farmers were operating at increasing returns to scale. This implies that the farmers had more room for expanding production in line with the study Onyeagocha *et al*. (2010) on poultry farmers.

The analysis of the stochastic production function show the production elasticity of land to be the largest and this shows that land is an important input in the production process followed by seed, family labour and then hired labour. All these variables are significant at most at 5% level. The determinants of technical efficiency such as age and sex are seen to have a positive effect on efficiency that is, they decease inefficiency. The more these female farmers get of age, the better the experience they gather and this result into better agricultural efficiency of production. Likewise, sex of these farmers is seen to contribute to better efficiency such that the men have higher tendency of better efficiency as compared to women.

The estimate of the gamma portrays that there is about 79.5% variation in the output on the part of the farmers. Independent farm ownership/experience and highest level of education attained by each farmer are not significant. The non-significance of the level of education of the determinant of technical inefficiency is similar in findings to Ogundari (2006), Binam *et al* (2004), Rahman (200) and Weiler (1999). Independent farm ownership/experience in this case has a negative effect on technical efficiency although it is not significant.

The minimum estimated technical efficiency is 0.0267, the maximum estimated technical efficiency is 0.746. The mean is 0.18 and a standard deviation of level of input by 82% by adopting the best practices and that approximately 82% of total output is lost as a result of inefficiency in the production procedure.

CONCLUSION AND RECOMMENDATIONS

Despite several limiting factors, women who engage in agricultural crop production have helped in contributing (40.9%) to the food basket of the country. They have strived to keep producing although they have not been able to maximize the use of the farm inputs available to them. The low level of efficiency (approx. 1 8%) shows that about 82% of loss can be alleviated without any expansion in the level of input used. Therefore, the contribution of these women cannot be ignored given the several constraints they encounter.

For Nigeria to experience food security there must be a great intervention to assist and enhance the capacity of these women farmers who are faced with the need to fend for their respective households and by doing this have to farm to provide for their families and also sell some as source of income for sustenance. Based on the research findings, the study

recommends that farm to farm extension services be provided for the women farmers which should be accompanied by ready availability of agrochemicals. Also, the available modern farm implements should be made available at affordable rates and easily accessible to these women farmers.

Furthermore, women farmers should form themselves into cooperative societies through which they can approach finance institutions and even the government as a body to liaise and source for farm inputs on their members behalf. The issue of land tenure should be addressed to allow for larger plots of land be cultivated by these women farmers. Better means of accessing capital should be made available and the credit plan must be flexible to allow for adequate use of the credit facility. Increase in government participation in agriculture by providing for the women through better advisory services and also the review of existing policies that address the improvement of organizations that deal with women that participate in agricultural food crop production.

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APPENDIX

Table 1 Farmer's Socio-Economic Characteristics

Variables	Male Frequency		Female Frequency	
Gender	44	(40.4)	65	(59.6)
Age (years):				
below 30	3	(6.9)	3	(4.5)
31-40	13	(29.5)	21	(32.2)
41-50	18	(40.9)	32	(49.2)
Above 60	10	(22.7)	9	(13.9)
Mean		47		44
Standard Deviation		9.4		7.5
Marital status:				
Single	0	(0)	3	(4.6)
Married	44	(100)	48	(73.8)
Divorced	0	(0)	7	(10.8)
Widowed	0	(0)	7	(10.8)
Family size:				
Under 5	13	(29.6)	16	(24.6)
5-10	26	(63.6)	40	(61.6)
Above 10	1	(2.3)	0	(0)
No response	2	(4.5)	1	(13.8)
Level of education:				
No formal education	2	(4.5)	4	(6.2)
Adult education	6	(13.6)	3	(4.6)
Vocational education	3	(6.8)	5	(7.7)
Primary education	6	(13.6)	32	(49.2)
Quranic education	2	(4.5)	5	(7.7)
Secondary education	11	(25)	16	(24.6)
Tertiary education	14	(31.8)	0	(0)
Independent farm ownership/experience (years):				
1-9				
10-19	9	(20.6)	23	(35.5)
20-29	10	(22)	28	(43.1)
Above 30	16	(36.8)	39	(18.4)
Mean	9	(20.6)	2	(3)
		19.2		16.6

Values in ( ) in percentage
Source: Field Survey, 2011

Table 2: Contribution of Farmers to Agricultural Production per Farm

S/No	Activities	Man-day/Farm	Man-day/Farm	Male (%)	Female (%)
	Labour inputs used in:				
1.	Land preparation	13.6	0.7	95.1	4.9
2	Planting	2.3	4.1	35.9	64.1
3.	Weeding	12.1	0.8	93.8	6.2
4.	Fertilizer application	1.6	2.0	44.4	55.5
5.	Herbicide application	1.7	0.4	81	19
6.	Harvesting	6.3	6.5	49.2	50.8
7	Processing	2.0	4.2	32.3	67.7
8	Storage	3.4	1.1	75.6	24.4
9	Marketing	0.3	1.6	15.8	84.2
10	Total labour Contribution/farm	43.3	21.4	66.9	33.1
11	Land use by farmers (ha)	1.2	0.6	66.7	33.3
12	Capital use by farmers (N)	36,560	17,880	67.1	32.8
13	Output produced/farmer (kg grain equivalent of maize)	1,240	859	59.1	40.9

Source: Field Survey, 2011

Table 3: Summary Statistics for Variables of the Stochastic Frontier Analysis for the Female Farmers

Variables	Units	Minimum	Maximum	Mean	Std. Deviation
OUTPUT/ha	Kg (grain equivalent)	20.000	11938.80	1013.10	1597.57
Farm Size	Hectares	0.3	10.00	0.87	1.31
Hired Labour/Ha	Man-day	0.00	355.50	51.89	47.10
Family Labour/ha	Man-day	0.00	252.88	30.18	33.91
Seed Input/ha	Kg (grain equivalent)	1.20	926.10	84.06	148.31
Age	Years	25.00	63.00	44.88	8.39
Household Size	Number	0.00	11.00	5.04	2.40
Sex	Dummy	1.00	2.00	1.56	0.49
Highest Education Attained	Years	0.00	25.00	6.72	4.12
Independent Farm Ownership/Experience	Years	2.00	45.00	17.65	9.55
N	**109**				

Source: Field Survey, 2011

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Table 4: Elasticity of Production and Return to Scale for the Female Farmers

Elasticities (ε_i)	$^{\varepsilon}$land	$^{\varepsilon}$Hired labour	$^{\varepsilon}$family labour	$^{\varepsilon}$seed input	$\sum\varepsilon_p$ = RTS
Estimates	0.596	0.141	0.175	0.593	1.505

Source: Field Survey, 2011