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Full Length Research Paper

Profitability differential of rice production by male and female farmers in Adamawa State, Nigeria

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A gender-balanced agricultural growth is critical to successful agricultural policy which aims at enhancing food security and thereby attaining the Millennium Development Goals (MDG) in Nigeria. Hence, this study was designed to determine the efficiency of male and female rice-farmers in Adamawa State, Nigeria. Primary data were collected from 378 randomly selected male and female rice-farmers in Adamawa State. The data were analysed using both descriptive statistics, and inferential statistics which include stochastic frontier function and gross margin analysis. The study identified the socio-economic characteristics of both male and female rice-farmers in the area. The results revealed that the Gross Margins for male and female farmers were ₦45,311.24 and ₦38,344.86 respectively indicating that rice production in the area was a profitable venture. However, the male farmers were shown to be operating at a higher level of profitability than their female counterparts. Therefore, government policy should emphasize measures that promote women farmers' access to agricultural resources and services at affordable prices thereby bridging the existing gender gap among rice-farmers in Nigeria.

Keywords: Profitability, Gender, Rice, Production, Gross margin

INTRODUCTION

Women's role in promoting economic growth and social stability continues to be inadequately recognized and under-valued (Mohammed and Abdulquadri, 2011). There is, therefore, the need to identify the contributions of female farmers vis a vis male farmers towards rice production in the country as well as to appreciate the major constraints limiting the efficiency of women in rice production. According to Manasa and Adebayo (2008) the problems facing the famers are gender specific. They reported in the study of assessment of gender factor in production output of cotton farmers in Guyuk Local Government Area of Adamawa State, that there are differences in the accessibility to and the use of factors of production among cotton farmers. The same study further revealed that inadequate supply of inputs ranked first in the problems facing the male farmers, while lack of capital and land acquisition ranked first among the problems facing the female farmers. Adebayo (2010) observed that one of the enormous challenges in the drive to increase food supply to feed the growing population will be to raise productivity and efficiency in the agricultural sector more so that Nigeria's rapid population growth has outstripped the nation's capacity to grow food crops. Daramola (2005) stressed that at the farm-level, much can be done to improve the profitability of domestic rice production through increasing productivity and producing higher value paddy. Rice production in Nigeria has been shown to be profitable venture (Fatoba *et al.,* 2009 and Godwin *et al.,* 2001). Yohanna et al. (2010) used gross margin to establish the profitability of rice production for household food security among small-holder farmers in Yola South Local Government Area of Adamawa State, Nigeria. They estimated the gross margin per hectare to be ₦71, 238 which indicated that the rice farming was profitable in Adamawa State.

However, it is of utmost importance to ascertain the differences in the levels of profitability of rice production by male and female farmers so as to appreciate the significance of gender issues in food crop production in Nigeria. Therefore, in an effort to reach and engage the poor, we must recognize that some issues and

constraints related to participation in farming activities are gender-specific and stem from the fact that men and women play different roles; have different needs and face different challenges on a number of issues and at different levels. The essence of this study therefore, is to identify the specific gender involvement aimed at curbing food crisis and sustain rice production in the country. It focuses on establishing the productivity differentials between the male and female rice farmers.

Objectives of the Study

The main objective of this study is to analyze the Technical Efficiency of male and female rice-farmers in Adamawa State, Nigeria.
The specific objectives include:
i. identifying the socio-economic characteristics of male and female rice-farmers in the study area.
ii. determine the profitability differential in rice farming by male and female farmers.

Study Area

The study was carried out in Adamawa State, Nigeria. Adamawa state is located at the North-eastern part of Nigeria. It shares boundary with Taraba State in the south and west, with Gombe State in the North – west and Borno State to the North. The State has an international boundary with Cameroon Republic along its eastern side. It lies between latitude 7^0 and 11^0 North, and longitude 11^0 and 14^0 East (Adebayo and Tukur, 1999). Adamawa State has a land area of about 38, 741 Km^2 and a population of 3,178,950 people comprising of 1,607,270 males and 1,571,680 females (National Population Commission, 2006). The State is divided into twenty-one (21) Local Government Areas. The State was carved out of the defunct Gongola State on August 27, 1991. The capital of Adamawa State is Yola. The predominant occupations in the state are farming and livestock herding. The main food crops grown in Adamawa state include rice, maize, sorghum, millet, groundnut, cowpea, bambara nut, soya-bean, sweet potato and cassava. And the predominant breeds of cattle kept in the state include Sokoto Gudali, White Fulani, Red Fulani and few exotic breeds. Other livestock reared in the state are goat, sheep, donkey and poultry.

Data collection and sampling techniques

The primary data for this study were collected through the aid of well-structured questionnaires by well-trained enumerators under the supervision of the researcher. Multi-stage random sampling technique was used to collect data for the study. The following Local Government Areas were purposively selected from each of the three geo-political Zones based on their high involvement in rice farming in Adamawa State (as noted by the Adamawa State Agricultural Development Programmes). They include: Mubi-North Local Government Area (Northern zone), Fufore Local Government Area (Central Zone), and Lamurde Local Government Area (Southern Zone). Six (6) wards were randomly selected from each of the Mubi North Local Government and Fufore Local Government; while five (5) wards were selected from Lamurde Local Government to give a sum of seventeen (17) wards. A total number of three hundred and seventy-eight (378) rice-farmers comprising of one hundred and ninety-eight (198) male farmers and one hundred and eighty (180) female farmers were randomly sampled proportionate to the population of rice-farmers in the study area.

Data analysis

The following analytical tools were used:
i. Descriptive statistics: Descriptive Statistics which involved the use of frequency distribution tables, percentages, and means were used to describe the socio-economic characteristics of male and female rice farmers in the study area.
ii. Gross margin analysis
The Gross margin analytical tool was used to determine the profitability of rice production by male and female rice farmers in the study area. Gross margin is the difference between the gross income and the total variable cost of production.
The fixed cost is assumed to be negligible (as peculiar to subsistence farming).
Gross Margin is presented as:

$$\text{Gross margin (GM)} = \sum (Q_{yi}P_{yi}) - \sum (X_{xi}P_{xi})$$

Where,
GM = Gross margin (₦/ha)
Q_{yi} = Output of rice by i^{th} farmer (kg)
P_{yi} = Unit price of rice by i^{th} farmer (₦)
X_{xi} = Input used by i^{th} farmer (kg/ha)
P_{xi} = Unit price of input used by i^{th} farmer (₦)
$\sum$ = summation sign

RESULTS AND DISCUSSION

Socio-economic characteristics of rice-farmers in the study area

The distribution of the age of respondents is presented in Table 1. As revealed in the Table; about 92% of female farmers were within the age-group of less than 30years and 50years; while about 8% were above 50years of age. This implies that most of the farmers

Table 1: Socio-economic Characteristics of Rice-farmers

Characteristic	Female	%
Age		
≤ 30	54	30.00
31 – 40	76	42.22
41 – 50	35	19.44
51 – 60	12	06.67
> 60	03	01.67
Total	180	100.00
Education		
No Formal Education	74	41.11
Primary	36	20.00
Secondary	42	23.33
Tertiary	28	15.56
Total	180	100.00
Marital status		
Single	45	25.00
Married	112	62.22
Divorced	08	04.44
Widowed	15	08.34
Total	180	100.00
Household size		
2 – 4	31	17.22
5 – 7	85	47.22
8 – 10	44	24.44
11 – 13	11	06.11
14 – 16	06	03.33
>16	03	01.68
Total	180	100.00

Source: Field Survey, 2013

participating in the production of rice in the study area were within the active age group. Furthermore, only about 59% of female farmers had one form of education or the other. This suggests that female rice farmers had less access to formal education. The implication of this is that the female farmers would be less equipped with formal sources of information that could improve their productivity. And this agrees with the report of Ojobo (2008) that there exist educational imbalance between men and women in Nigeria which is due to societal traditions and myths that relegate women's education to the background vis-à-vis men. The result further indicated that the percentage of single female farmers in the area was 25% and 62.22% of female rice farmers were married. This shows that the majority of female farmers in the study area were married.

The implication of this was that female farmers have more family challenges to cope with; and this will have resultant effects on their efficiency in rice production. As shown in table 1, the majority of the female farmers in the area had household-sizes of between 5 and 7 (i.e. 47.22%). This means that most of the rice farmers in the study area had a moderately small household size. The implication of this is that the small size of the farmers' households will enable them to give more attention and funds to the farming business since the distraction by family concerns would be less. The result agrees with the findings of Adebayo (2001) that the size of household affects the output of women rice farmers. A large household will normally take much of the attention of the women farmer which reflects negatively on her productivity.

Production variables and agricultural services

Table 2 showed that about 57% of female farmers had farming experience of above 5years. This implies that majority of female farmers in the study area had gotten ample experience in rice farming. According to Alarima et al. (2011) number of years of experience in rice farming influences the adoption of new technologies in rice production among rice farmers in Nigeria. The findings revealed that only about 31% of female farmers acquired land by inheritance, and about 42% acquired farmlands through leaseholds. About 28% depended on

Table 2: Distribution Production Variables and Agricultural Services

Variable	Female	%
Farming experience		
1 – 5	77	42.78
6 – 10	48	26.67
11 – 15	24	13.33
16 - 20	13	07.22
>20	18	10.00
Total	180	100.00
Land Acquisition		
Inheritance	55	30.56
Leasehold	75	41.67
Husband's Land	50	27.77
Total	180	100.00
Farm-size (Ha)		
0.5 – 1	147	81.67
1.5 – 2	29	16.11
2.5 – 3	04	02.22
Total	180	100.00
Access to Credit Facilities		
Yes	09	05.00
No	171	95.00
Total	180	100.00
Access to Extension Services		
Yes	10	05.56
No	170	94.44
Total	180	100.00

Source: Field Survey, 2013.

their husband's land for farming. The implication of this is that gender disparity in terms of land acquisition was prevalent in the area and this will limit the productivity of the women rice farmers. The result in Table 2 also revealed that majority of female farmers (about 82%) were using smaller plots of farm-land; and this will limit female farmers to undertake commercial scale farming because of their restricted access to large portion of land. Manasa and Adebayo (2008) also emphasized the limitation faced by women farmers in undertaking large-scale farming due to their small farm plots. Furthermore, table 2 showed that only about 5% of female farmers obtained credit facilities in one form or the other. This implies that more women farmers were disadvantaged in securing credits facilities in the study area. And this corroborates the findings of Odoh *et.al* (2009) that male farmers have higher access to credit than female farmers due to the ability of male farmers to present collateral in securing loan facilities from banks. Also, the result indicated that limited number of female rice farmers (about 6%) in the area had access to extension services.

Gross margin analysis of rice production by male and female farmers

The result of Gross Margin analysis of rice production by male and female Farmers in the study area is presented in table 3. The result revealed that the Total Variable Cost per hectare (TVC/ha) for male and female farmers were ₦40,902.39 and ₦28,385.62 respectively. Also, the Total Returns per hectare (TR/ha) for male famers was ₦86,213.63 while the Total Returns per hectare (TR/ha) for female farmers was ₦66,730.48. Hence, the Gross Margins for male and female farmers were ₦45,311.24 and ₦38,344.86 respectively. The positive value of the Gross Margin obtained for both groups of farmers is an indication that rice production in the area was a profitable venture. This is consistent with the findings of Yohanna et al. (2010) that rice farming in Adamawa State is profitable. However, the male farmers were observed to be operating at a higher level of profitability than their female counterparts. It implies that male farmers earned more profits from rice production in the study area than the female farmers. This could be due to the limited access the female farmers usually have to resources of production in comparison with the male farmers. This corroborates the results of many previous researches on the role of gender inequalities in agricultural production (Ayoola et al., 2011, Odoh et al., 2009). The result in Table 3 further showed that hired labour contributed the largest share in the total variable cost of rice production in the study area.

The percentage share of hired labour in the total variable cost for male and female farmers were 66.02% and 56.74% respectively. This means that farmers in the area spent the highest amount on labour acquisition.

Table 3: Gross Margin Analysis of Rice Production by Male and Female Farmers

	MALE		FEMALE	
Input	**Variable-Cost (₦)**	**Share in TVC (%)**	**Variable-Cost (₦)**	**Share in TVC (%)**
Fertilizer	1,440,000	12.00	669,800	12.62
Seeds	1,137,000	9.47	651,100	12.27
Transport	545,850	4.55	399,930	7.53
Hired Labour	7,925,450	66.02	3,011.650	56.74
Herbicides	600,250	5.00	353,800	6.67
Empty Sacs	356,300	2.96	221,830	4.17
TOTAL	**12,004,850**	**100.00**	**5,308,110**	**100.00**
Total Farm-size (Ha)		293.5	187	
Total Variable Cost/Ha (₦)		40,902.39	28,385.62	
Total Returns (₦)		25,303,700	12,478,600	
Total Returns/Ha (₦)		86,213.63	66,730.48	
Gross Margin/Ha (₦)		45,311.24	38,344.86	

Source: Field Survey, 2013

Expenses on labour has been shown to rank highest in most farming businesses especially rice production. Adebayo (2001) identified the productive factors which determine the output level of the women rice-farmers to include the amount spent on hired-labour. Moreover, the result showed that the percentage share of hired labour in the total variable cost for the male farmers (66.02%) was higher than that for the female farmers (56.74%). This suggests that male farmers in the study area utilized more hired labour than their female counterparts. Female farmers generally have limited access to funds which would had avail them the ability to engage more hired labour. Thus, women farmers depend largely on family labour thereby restricting their operation to subsistence level. Therefore, gender disparity in labour utilization is revealed as a major challenge of women farmers in the study area. This must have been responsible for the lower level of profitability in rice production by female farmers vis-a-vis male farmers. It corroborates the submission of Adebayo (2007) that the problems facing farmers in Nigeria are gender-specific.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made.

i. Government policy should emphasize measures that promote women farmers' access to agricultural resources and services at affordable prices thereby bridging the existing gender gap among rice-farmers in Nigeria.

ii. The Agricultural Transformation Agenda of the Nigerian government should encompass investing on increasing farmers' access to formal education towards enhancing knowledge and application of new farming technology through short-term extension training programmes.

iii. Farmers should be organized into cluster groups or cooperatives which will aid
their ability in terms of securing collaterals for accessing credit facilities from banks with which they could acquire better and improved farm inputs for rice
production in the rural areas.

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