Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.5, No.3, 2015

Gender Analysis of Income Inequality and Poverty among Rural Households in Nigeria: Evidence from Akinyele Local Government Area, Oyo State

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Abstract
Despite the wide believe that income inequality and poverty differ among the female and male headed households in Africa, very few studies have been conducted to empirically substantiate this. Therefore, this study assessed income inequality and poverty in rural Nigeria from a gender perspective. The study revealed that income was more evenly distributed among the female headed households than the male counterparts in the study area. Although, the male headed households had better access to land for farming, higher income and spent more on food than the female headed households, poverty incidence, depth and severity were higher among the male headed households than the female counterparts. Number of dependants and households size was discovered to significantly increase the probability of falling below the poverty line among the respondents. Access to credit and contact with extension agents had significant poverty reducing effects. Therefore, in order to achieve the desired poverty reduction, it is recommended that more family planning awareness should be created, there should be social security particularly for the female headed households with large number of dependants, constraints limiting farmers' access to credit should be identified and eliminated and finally, the extension system in Nigeria should further be developed in order to increase number of extension visits to the farmers.

INTRODUCTION

Globally, poverty and income inequality have been identified as major limitations to economic development and growth. In Nigeria, poverty and income inequality appear to be a rural phenomenon. For instance, in 2006 the Gini coefficient was 0.5541 for the urban areas and 0.5187 for the rural areas while the national Gini-coefficient was 0.4882 (NBS, 2006). This indicates that there is high level of uneven distribution of income in the country. This situation would be more compounded if there exists disparity in the level of income inequality and poverty among the male and female headed households, this is due to the fact that fact that persistent inequality between men and women constraints a society's productivity and ultimately slows its rate of economic growth. The economy pays for this inequality in reduced labour and productivity today and diminished natural output tomorrow (Awoyemi, 2006). Gender differences in income inequality and poverty status could lead to inefficient allocation of resources and may reduce economic growth. If disparities between men's and women's status in access to resources, control of assets and decision-making powers persist, these will undermine sustainable and equitable development (World Bank, 1995). After all, development policymakers are not only interested in economic growth but also in the distribution of the proceeds of that growth, especially to the poor; majority of who are women.

But it is obvious that little can be achieved except answers are provided to some pertinent questions such as: What is the level of income inequality among the male and female farmers in the study area. What are the depth, gap and severity of poverty by gender in the study area? What are the determinants of poverty among male and female farmers in Akinyele Local Government Area? Therefore, this study assessed the level of income inequality and poverty among male and female farmers in the rural households of Akinyele local government area of Oyo state. Although, many studies have been conducted on poverty in Nigeria (see, World Bank, 1996; Aigbokhan, 1998; Okojie et al.,1999; Omonona and Okunmadewa, 2001; Okumnadewa et al. 2010 and Awoyemi, 2011) but none to the best knowledge of the authors had empirically examined the disparity in poverty and income inequality between men and women, particularly in the rural areas of Nigeria . Hence, this study will bring to lime light the differences in the level of poverty and income inequality among the rural women and men using Akinyele LGA as a case study. The result of this study will also proffer ways to eliminate this disparity and bring gender equity to the rural areas for meaningful growth and development that will be conducive to agricultural productivity in rural Nigeria.

The rest of the paper is organized as follows: section 2 discusses the methodology of the study indicating the area of study, sampling technique method, data collection, and analytical framework and

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estimation techniques. The results and discussion is presented in section 3. Section 4 contains the summary of major findings, conclusion and policy recommendations.

2.0. Methodology

2.1. Study Area, Sampling Techniques and Data Collection

This study focused on Akinyele Local Government Area in Ibadan, Oyo state, Nigeria. Ibadan is the is the largest city in West Africa. Akinyele Local Government Area has an estimated population of 211,359, with approximately equal number of women and men. About 90% of this population generates their primary source of income from agriculture and agricultural related activities such as transportation, marketing, processing (NBS, 2006). The data for this study was primary data collected through multistage random sampling techniques using well-structured questionnaire. The sampling was design to generate a total of 120 respondents. However, after data management, only 106 questionnaires representing 83% were used for the analysis.

2.2. Analytical Framework and Estimation Techniques

The data collected was analyzed using descriptive statistics such as frequency distribution and mean. The Lorenz curve and Gini Coefficient was also used to assess the level of income inequality among the male and female farmers in the study area. The Foster –Greer- Thorbecke (FGT) (1984) poverty measurement was utilized to assess the poverty status of the respondents by gender. In order to empirically determine the socio-economic characteristics of the respondents that determined their poverty status, the logistic regression model was adopted.

2.2.1. Logistic Regression Model

Using the logit model, the probability that a farmer will fall below the poverty line was postulated as a function of some socioeconomic/demographic characteristic and institutional factors. Therefore, the cumulative logistic probability model is econometrically specified as follows:

$$P_i = F(Z_i) = F(\gamma + \sum \lambda_i X_i) = \frac{1}{1+e^{-Z_i}} \quad 1$$

Where P_i is the probability that a farmers will fall below the poverty line or not given Xi; e denotes the base of natural logarithms, which is approximately equal to 2.718; X_i represents the ith explanatory variables; and γ and λ are parameters to be estimated. Hosmer and Lemeshew (1989) pointed out that the logit model could be written in terms of the odds and log of odds, which enables one to understand the interpretation of the coefficients. The odds ratio implies the ratio of the probability (P_i) that a farmer is poor to the probability ($1-P_i$) that a farmer is not poor.

$$(1-P_i) = \frac{1}{1+e^{Z_i}} \quad 2$$

Therefore

$$\frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \quad 3$$

The natural log of equation (3), will give:

$$Z_i = \ln\left(\frac{P_i}{1-P}\right) = \gamma + \lambda_1 X_1 + \lambda_2 X_2 + \ldots\ldots + \lambda_m X_m \quad 4$$

If the disturbance term (U_i) is taken into account, the logit model becomes:

$$Z_i = \gamma + \sum_{i=1}^{m} \lambda_i X_i + U_i \quad 5$$

Equation (3) was estimated by maximum likelihood method. This procedure does not require assumptions of normality or homoskedasticity of errors in predictor variables.

Note: The definition of the variables included in the logistic regression is presented in table 1.

Table 1: Definition of Selected Variables in the Empirical Models

Variable	Definition and Measurement of variables	Expected effect (Sign)
Dependent variable Poor	1 if the household is poor, 0 otherwise	
Independent variables		
Educational background	1 if the household head is educated, 0 otherwise	+
Marital status	1 if the household head is married, 0 otherwise	+
dependants	Number of dependants in the family	-
Age	The age of household head in years	+/-
Household size	Number of persons living in the household	+/-
Farm size	The size of farm land in hectare	-
Main occupation	1 if the main occupation of the household head is farming	+/-
Credit	1 if the household head has access to credit	-
Extension agents	1 if the household head had contact with extension agents	-

2.2.2. Measurement of Poverty

The Foster-Greer-Thorbecke (FGT) (1984) measurement was adopted It combines information on the extent of poverty (as measured by the *Headcount ratio),* the intensity of poverty (as measured by the *Total Poverty Gap)* and *inequality* among the poor. The formula for the FGT is given by:

$$FGT_\alpha = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right)^\alpha \quad (6)$$

Where: z is the poverty line, defined as 2/3 of the mean per capita consumption expenditure N is the number of respondents, H is the number of poor (those with per capita expenditure below the poverty line z), y_i are individual per capita consumption expenditure and α is a "sensitivity" parameter. If α is low, then the FGT metric weights all the individuals with per capita consumption expenditure below z roughly the same. If α is high, those with the lowest per capita consumption expenditure (farthest below z) are given more weight in the measure. The higher the FGT statistic, the more poverty there is in an economy. The FGT measure corresponds to other measures of poverty for particular values of α. For α = 0, the formula reduces to

$$FGT_0 = \frac{H}{N}$$

which is the Headcount ratio, or the fraction of the population which lives below the poverty line. If α = 1 then the formula is

$$FGT_1 = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right) \quad (7)$$

Equation 7 is the average poverty gap, or the amount of consumption expenditure necessary to bring everyone in poverty right up to the poverty line, divided by total population. This can be thought of as the amount that an average person in the economy would have to contribute in order for poverty to be just barely eliminated. While the two above versions are widely reported, a good deal of technical literature on poverty uses the α = 2 version of the metric:

$$FGT_2 = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right)^2 \quad (8)$$

as in this form, the index combines information on both poverty and income inequality among the poor. Specifically in this instance the FGT can be rewritten as:

$$FGT_2 = H\mu^2 + (1 - \mu^2)C_v^2 \quad (9)$$

where C_v is the *coefficient of variation* among those with consumption expenditure less than z, H is the total number of the poor as above, and μ is given by

$$\mu = \frac{1}{H}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right) \quad (10)$$

2.2.3.Measurement of Income Inequality

Income inequality can be measure by using the Gini-coefficient. Following Morduch and Sicular (2002), where income are ordered so that $y_1 \leq y_2 \leq y_3 \leq y_4 \leq y_n$.

The Gini-coefficient is computed as:

$$I_{Gini}(Y) = \frac{2}{n^2 \mu} \sum_{i=1}^{n} \left(i - \frac{n+1}{2} \right) y_i \qquad 11$$

Where:

n=number of observation

μ = mean of distribution

y_i = income of the i^{th} household.

3.0. Results and Discussion

3.1. Socio-economic Characteristics of the Respondents by gender of household head

Table 2 presented the description of the respondents' socio-economic characteristics by gender. The results showed that a large majority of the female headed households (68%) were between the age of 21-40 years. while majority of the male headed households (82%) were between 41-60 years of age. Thus the females were relatively younger than the males and are therefore expected to be more actively involved in production activities that could enhance their income and reduce poverty. Majority of the male headed households (57%) had large family size of about 6-10 persons, while majority of the female headed households (78%) had a household size of between 1-5 person. Although a large household size could also implies that they have enough costless labour for farm activities (Okoedo-Okojie and Onemolease, 2009). Large household size could have a negative effect on household well-being. As expected, there were more singles, widows and divorcees among the female headed households than the male headed households. Less of the females (40%) had agriculture as main occupation compared with the males (63%). This could be as a result of the fact that a large majority of the males (81%) were owners of their farm lands and also had bigger farms than the female counterparts. In addition, the males also spent more hours and days on their farms than the females. Majority of the males (82%) and females (90%) were members of farmers' organizations.

Table 2: Socio-economic Characteristics of the Respondents by gender of household head

Socio-Economic Variables	Male N= 56	Female N=50	Total sample N=106
	percentage	percentage	percentage
Age			
21-40	7.00	68.00	36.00
41-60	82.00	32.00	58.00
61-80	11.00	0.00	6.00
Household size			
1-5	35.70	78.00	56.00
6-10	57.00	22.00	41.00
11-15	7.00	0.00	4.00
Marital status			
Single	2.00	10.00	6.00
Married	83.00	59.00	72.00
Divorced	7.00	16.00	11.00
Widowed	7.00	14.00	11.00
Level of Education			
No formal education	7.00	16.00	11.00
Primary education	30.00	18.00	25.00
Secondary education	28.00	35.00	31.00
OND/HND	28.00	22.00	26.00
University degree	7.00	8.00	8.00
Primary occupation			
Farming	63.00	40.00	52.00
Non-farming	38.00	60.00	48.00
land ownership			
Owns land	81.00	52.00	67.00
Rented land	19.00	48.00	33.00
Farm size (ha)			
0.5-2.4	15.00	28.00	21.00
2.5-4.4	41.00	34.00	44.00
4.5-6.4	35.00	22.00	28.00
>6.4	9.00	6.00	8.00
Hours spent on the farm			
2-5	55.00	61.00	57.00
6-10	43.00	39.00	52.00
>10	14.00	0.00	2.00
Number of days worked/month			
<10	9.00	12.00	10.00
10-20	39.00	51.00	45.00
21-30	51.00	37.00	45.00
Member of any organization	82.00	90.00	85.00

Source: Field survey, 2011

3.2. Test of Mean Difference in Selected variables by Gender

The test of mean difference in some selected variables was carried out in order to examine the disparity among the male and female headed households in the study area. The result is presented in table 3. The results showed that that the male headed households had better access to farm land, had more income and spend more on food than the female headed households. This is expected to have poverty reducing effect on the male headed households.

Table 3: Test of Mean Difference in Selected variables by Gender

Socio-Economic Variables	**Male N= 56**	**Female N=50**	**Total sample N=106**	**Mean Difference**
Average age (years)	51.00	39.00	45.00	12.39***
Average household size (Number)	7.00	4.00	5.00	2.96***
Average farm size (ha)	4.00	3.00	4.00	0.89**
Average hours worked/day	5.74	5.01	5.43	0.72
Income/annum (₦)	89080.00	64625.06	79536.61	24454.94*
Number of days worked/month	21.00	19.00	20.00	2.20
Food Expenditure/month (₦)	43114.05	12960.78	30276.71	30153.27***

Note: ***, **, * Significant at 1%, 5%, and 10% respectively.
Source: field survey, 2011

3.3. Gini Coefficient of the respondents by Gender

The result of the Gini coefficient showed that income inequality was higher among the male respondents than the female counterparts. This implies that income is more evenly distributed among the female respondents than the male counterparts. The results also revealed that the relative contribution of the male respondents to the overall income inequality was 0.3778 while that of the female respondents was only 0.1281. This showed that the male respondents contribute more to overall income inequality in the sampled population than the females.

Table 4: Gini Coefficient of the respondents by Gender

Group	**Gini index**	**Population share**	**Income share**	**Absolute contribution**	**Relative contribution**
Male	0.5469	0.5377	0.6199	0.1823	0.3778
Female	0.3519	0.4623	0.0655	0.0618	0.1281
Population	1.00	1.00	1.00	0.4825	1.00

3.4. Poverty Indices by Gender

The poverty line was computed as 2/3 of the mean per capita consumption expenditure and this gave a poverty line of ₦15022.77/ annum. About 56% and 39% of the male and female headed households were below the poverty line respectively, while 48% were poor in the total population of the respondents. This indicated that poverty incidence was higher among the male headed households. The
Male headed household also had higher depth and severity of poverty than the female counterparts. This could be attributed to the prevailing large household size among the male headed households in the study area.

Table 5: Poverty Indices by Gender

Poverty Indices	**Male N= 56**	**Female N=50**	**Total sample N=106**
Poverty headcount	0.5614	0.3922	0.4815
Poverty Depth	0.2087	0.0956	0.1553
Severity of Poverty	0.0993	0.0355	0.0669

Source: Field Survey, 2011.

3.5. Logit Estimate of the Determinants of Poverty

The result of the logistic regression revealed that the number dependants and household size had significant positive effects on the probability that a household whether male or female headed would be poor. The implication of this is that as any of the aforementioned variables increases, poverty will also increase. This could be the reason why poverty incidence, depth and severity were higher among the male headed households with large family size. The coefficient of main occupation was positive and significant among the male headed households. This showed that poverty is more prevalence among the farmers. In Nigeria poverty is reportedly a rural phenomenon and more prevalent among the farming households (Omonona, 2001; NBS, 2006; Okunmadewa et al., 2010). Access to credit was negative and significant in determining the poverty among the female headed households. This suggests that lack of access to credit will increase the probability that a female headed households will fall below the poverty line. The coefficient of contact with extension agents was negative in all the models; however it was only significant in determining poverty status among the male headed households. This revealed that, since majority of the male headed households were mainly involved in farming, contact with extension agents is highly essential in transferring new yield increasing innovations to the farmers in order to increase household income and thus come out of poverty.

Table 5: Logit Estimate of the Determinants of Poverty

	Male		Female		Total sample	
Variable	**Coefficient**	**Marginal Effect**	**Coefficient**	**Marginal Effect**	**Coefficient**	**Marginal Effects**
Educational background	-0.701 (1.668)	-0.174	-1.325 (2.688)	-0.114	0.4877 (0.833)	**0.121**
Marital status	-1.197 (1.108)	-0.260	-5.179** (2.266)	-0.744	-1.046* (0.556)	-0.254
Dependant	1.163** (0.524)	0.284	4.655* (2.715)	0.550	1.108*** (0.404)	0.277
Age	-0.157** (0.077)	-0.038	-0.235 (0.214)	-0.028	-0.024 (0.044)	-0.006
Household size	0.789* (0.330)	0.193	5.831** (2.557)	0.689	0.777*** (0.256)	0.194
Farm size	0.081 (0.276)	0.019	-0.726 (0.639)	-0.086	0.023 (0.174)	0.006
Main occupation	1.376* (0.806)	0.336	-1.897 (1.939)	-0.224	0.678 (0.524)	0.169
Access to credit	-0.932 (0.800)	-0.213	-3.816* (2.155)	-0.494	-0.603 (0.503)	-0.149
Extension agents	-1.324* (0.789)	-0.307	-3.183 (2.102)	-0.288	-0.601 (0.522)	-0.149
Constant	4.767 (4.261)		-0.314 (5.536)		-1.976 (1.989	
Log likelihood Number of observation LR Chi2 (12) Prob>Chi2 Pseudo R^2	-26.62 55.00 22.12 0.009 0.2936			-9.611 50.00 47.18 0.000 0.7105	-58.01 105.00 29.30 0.001 0.2016	

Note: ***, **, * Significant at 1%, 5%, and 10% respectively. Figures in Parentheses are the standard errors. Source: Field Survey, 2011

4.0. Summary, Conclusion and Policy Recommendations

This study provided a gender analysis of income inequality and poverty in Akinyele LGA of Oyo state, Nigeria. The findings revealed that income was more evenly distributed among the female than the male headed households in the study area. Poverty was also found to be more prevalent among the farming households. However, incidence, depth and severity of poverty were higher among the male headed households than the female counterparts. These findings further corroborated other findings from past poverty analysis in Nigeria. The variables that significantly increase the probability of a household falling into poverty were number of dependants and household size. Poverty is however reduced by marital status, contact with extension agents and access to credit. Therefore, it is recommended efforts should be intensified to create more family planning awareness. It is also essential to create a kind of social security to ease the excessive burden of dependants, particular among the female headed households. Programs that will further improve access to credit should be vigorously pursued and the number of extension visits should be increased.

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