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RESEARCH ARTICLE

Poverty and Income Inequality in Rural Agrarian Household of Southwestern Nigeria: The Gender Perspective

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Abstract:

Introduction:

Poverty is a common phenomenon in the world today, with a vast dominance in Africa, with Nigeria not exempted. This paper analyzes gender perspective of income inequality and poverty among sample of rural households in Southwest, Nigeria. Gini coefficient, Foster-Greer-Thorbecke (FGT) and Logistic regression model was used to assess the objective of the study.

Methods:

The poverty line stands at N15271.83 (\$76.74), with more than half (53.71%) of the male population considered poor while the female poor population stood at 47.22%. However, the study found that income inequality was lower among the male respondents than the female counterparts. A number of explanatory variables were considered, the following - educational years, household size, farming experience, market distance, extension access, credit access and member of social group represent important poverty drivers in the study area.

Results and Conclusion

The study therefore suggests that reducing the number of dependent household members and ensuring ready availability and equal access to institutional facilities, basic amenities, credit facilities, and human capital development of rural households are some measures that could curb the menace of poverty.

Keywords: Poverty, Inequality, Agriculture, Gender, Foster-Greer-Thorbecke, Logistic regression model.

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1. INTRODUCTION

Poverty is a common phenomenon in the world today, with a vast dominance in Africa, with Nigeria not exempted. Poverty is a multidimensional phenomenon and has intensively blighted the developing societies in its several dynamics with adverse impacts on many aspects of human conditions ranging from physical, moral to psychological [1, 2]. There have been a multiplicity of programmes and projects implemented over the years with a view of poverty reduction and alleviation but it appears they have only tinkered the edges rather than address the root causes of poverty. Poverty has continued to deepen in its incidence and severity [3]. Notably, poverty in Africa is

fundamentally a rural phenomenon [4 - 7]. The prevalence of poverty is specifically severe in rural areas – here about 80% of the population lives below the poverty line, with limited social and infrastructural services. The country's poor rural women and men depend on agriculture for food and income [8]. Poverty and income inequality are tightly associated and it has been affirmed that income inequality is an indicator as well as a strong cause of poverty [9]. As a result of the strong relation between income inequality and poverty, reducing income inequality has become a major public policy target for development agencies and national development experts. Also, the recent times have witnessed more emphasis on distributive and shared income rather than exclusive income growth [10].

Gender is an aspect that emphasizes the diverse roles and responsibilities of women and men and how these affect the society, culture, economy and politics. There are major diffe-

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rences that exist between women and men; especially in the quality of life they live, type of work and recognition. Likewise, these differences occur in access to health and literacy level; and in their economic, political and social standing. Inequities arise between male and female basically in access to and control of productive resources which have hindered women's ability to provide food, care, health, and sanitation services to themselves, their husbands, and their children, especially their female children [2, 11]. In the African context [12], female children often face two unpleasant situations; first, they are least preferred or under-represented in the provision of needful household hospitality duty (food, care, shelter, *etc.*). Secondly, as adults they have to deprive themselves in order to make the earlier mentioned provisions for their family members. Women with less influence or power within the household and community are unable to guarantee the fair distribution of food within the household. As a result of their limited access to economic resources, these women are also unable to visit health clinics when their infants and children are sick. The broadening disparities between men and women in accessing and controlling resources is not just unfair to women and their children, but also creates bad economies, causing misallocation of scarce resources, increased healthcare costs, lowered productivity, and poor human development trends [2].

Unfortunately, the contributions of women to the agricultural development are not adequately recognized and men tend to get all attention from policy makers and developers when it comes to the agricultural development. The reason for analyzing the phenomenon of poverty on gender basis hinges on the fact that poverty affects men and women in different ways and it is possible to identify the gender factors that stimulate the chances of individuals experiencing poverty, and how the characteristics of poverty differ for men and women. Also, it is widely believed that poverty varies among the female and male headed household in Africa. It is therefore imperative to substantially establish the gender characteristics of poverty, as only few empirical studies exist hitherto. Gender differences related to income inequality and poverty status could result in inefficient allocation of resources and may in turn inhibit national growth potentials [13]. This is further emphasized in a study which postulate that excess disparities between men and women status in access to resources, asset control and decision-making power will undermine sustainable and equitable development.

In order to vividly examine this issue, some pertinent questions demand a suitable answer, this includes; how does the income of male and female rural farmers in the rural area differ? What determines the poverty status of both male and female rural farmers? What is the extent of income inequality between male and female rural farmers? In addressing the above, this study empirically assessed the level of income inequality among male and female farmers in the south west region of Nigeria, Africa. A similar study is conducted covering a single local government area, however, this study considers a wider view, holistically establish the disparity between male and female farmers and proffer solutions on eliminating the disparities and promoting gender equality in the rural areas for substantial growth and development [14]. In the same manner, the study provides useful insight to the policy makers, especially in the agricultural sector, in the designing programs that are beneficiary to both genders in the rural

communities.

The rest of the paper is organized as follows: in the second section, the methodology of the study was discussed, it indicates the area of study, sampling technique method, data collection, and analytical framework and estimation techniques. The third section presents the results and relevant discussion. In the fourth section, the summary of major findings, conclusion and policy recommendations are presented.

2. METHODOLOGY

2.1. Study Area

This study was carried out in the South-West Nigeria. South-West Nigeria is one of the six geopolitical zones of Nigeria. It has six states (Ondo, Ogun, Ekiti, Osun, Lagos and Oyo State). It falls on latitude 6 to the North and latitude 4 to the south. It is marked by longitude 4 to the west and 6 to the east. The geographical location of South-West Nigeria covers about 114,271 kilometers square that is approximately 12% of Nigeria's total land mass and the vegetation is typically rainforest. The total population is 27,581,992 out of which more than 96% is Yoruba [8]. The major occupation of people residing in this geopolitical zone include farming, trading, food vendor, fish smoking, hair dressing, sewing, carpentry, marketing as well as food processing. Agriculture provides employment for the majority of people with respect to commercial and local livestock production, food crops such as maize, cassava, yam, soybeans, plantain, and melon; tree crops such as cocoa, citrus, and oil palm, cola nut and leafy vegetables such as amaranthus, celosia, waterleaf *etc.* South-West Nigeria is bounded in the North by Kogi and Kwara States, Edo and Delta States in the East, Atlantic Ocean in the south and by Republic of Benin in the west.

2.2. Sampling Procedure/Techniques and Sample Size

The study adopted a multi stage sampling procedure. The first stage involves purposive selection of six local governments from the twenty local governments in Ogun state namely; Ido, Ipokia, Odeda, Olorunsogo, Remo North and Surulere LGAs. The second stage involves random selection of thirteen (13) villages from the six local governments. The selection of the villages was done based on the proportion to size of the local government area; and is represented in the parenthesis as follows: in Ido (Igbonna and Odebode), Ipokia (Idemose, Ifoyintedo and Mogbara), Odeda (Ojebiyi, Orileilugun), Olorunsogo (Igbeti, Tesi-Garuba), Remo North (Gbasemo, Ilara and Jowoje) and lastly Surulere (Pooro). The third stage constitutes random selection of 30 farming households from each of the selected villages, giving a total number of 325 respondents. However, 291 questionnaires were correctly filled and returned out of the 325 administered. The returned questionnaires were used for analysis.

2.3. Analytical Framework and Estimation Techniques

The descriptive statistics was used to analyze the socio-economic data of the respondents. The assessment of income level inequality across the rural farming households in the study area on gender basis was analyzed using Lorenz curve and Gini coefficient while poverty status of the respondents by gender was estimated using the method provided in another study [15]. In a quest to determine the socio-economic status of

respondents that determines the poverty status, the logistic regression model was utilized.

2.4. Logistic Regression Model

The probability that a farmer will fall below the poverty line was defined as function of the socioeconomic characteristics and institutional factors using logit model. Hence the logistic probability model is econometrically defined below;

$$R_i = G(Y_i) = F(\gamma + \sum \beta_l S_l) = \frac{1}{1 + e^{-Y_i}} \tag{1}$$

Where R_i is the probability that the farmer falls below the poverty line or not. γ and β_l are parameters to be estimated. Logit model could be written in terms of the odds and logs of odds which allow quick understanding of the interpretation of the coefficients [16]. The odds ratio simply means the probability (R_i) that a farmer is poor to the probability ($1-R_i$) that a farmer is not poor.

$$(1-R_i) = \frac{1}{1 + e^{Y_i}} \tag{2}$$

Hence;

$$\frac{R_i}{(1-R_i)} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i} \tag{3}$$

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

$$Y_i = \ln \frac{R_i}{(1-R_i)} = \gamma + \beta_1 S_1 + \beta_2 S_2 + \dots + \beta_m S_m \tag{4}$$

If the stochastic term e_i is taken into consideration, then the logit model can be re-written as:

$$Y_i = \gamma + \sum \beta_l S_l + e_i \tag{5}$$

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

Note: The definition of the variables imbedded in the logistic regression is presented in Table 1.

Measurement of Poverty

A number of poverty measurements were adopted in literature [13, 17, 18]. Observably, the p-alpha (P_α) class of poverty measure, is the most popular because α is a policy parameter that can be varied to approximately reflect the poverty ‘aversion’ and also the P_α class of poverty indices is subgroup decomposable [13]. Thus, this study adopted the standard FGT (1984) to generate the poverty profile of the selected farming households. FGT takes the form:

$$P_\alpha(y, z) = \frac{1}{N} \sum_{i=1}^n \left(\frac{Z - Y_i}{Z} \right)^\alpha \tag{6}$$

Where Z = the relative asset poverty line

n = number of the cassava farmers below the poverty line

N = Total number of cassava farmers sampled

Y_i = estimated per capita household income of the th household

$Z - Y_i$ = poverty gap of the th household

$$\frac{Z - Y_i}{Z} = \text{poverty gap ratio}$$

α = poverty aversion parameter, with values: 0, 1, 2

$\alpha = 0$, equation (6) gives the poverty headcount

$\alpha = 1$, equation (6) gives the poverty depth

$\alpha = 2$, equation (6) gives the poverty severity index.

Measurement of Income Inequality

The inequality in income can be estimated by using Gini-coefficient. If incomes are ordered such that $T_1 \leq T_2 \leq T_3 \leq T_4 \leq T_n$, then the Gini-coefficient can be calculated based on the procedure adopted by Morduch and colleagues [19].

3. RESULT AND DISCUSSION

3.1. Estimated Inequality Status of the Households by Gender

The result of Gini coefficient showed that income inequality value for the population was 0.1168. By implication, there is 11.68% income inequality among the rural households in the Southwest rural Nigeria. However, decomposing the inequality status by gender, we found that income inequality was lower (0.4692) among the male respondents than the female counterparts (0.4994), but these may not be very significant. This means that elimination of gender inequality will not reduce total income inequality significantly in the study area. On the contrary, it was observed that the relative contribution to overall inequality was higher among male respondents with a value of 0.7592 while that of the female counterpart was at the other low extreme with a value of 0.0114. This finding is congruent with the study of [13].

3.2. Estimated Poverty Status by Gender

The estimated poverty line based on two-third of the annual mean per capita income in rural households showed that the mean annual per capita income among the rural households was ₦22793.78 (\$114.54) while the poverty line was ₦15271.83 (\$76.74). Without doubt, poverty is a rural phenomenon, 58.89% of the rural households were found to be living below poverty line in the south western region of Nigeria. However, more than half (53.71%) of the male population have incidence of poverty while 47.22% accounted for female population living below poverty line. This is also graphically represented below (Fig. 1). IFAD, 2009 re-reported that over 75 percent of rural dwellers engage in farming activities as a source of livelihood. Therefore, this finding is consistent with the previous studies [13, 20].

Table 1. Household inequality status.

Group	Gini Index	Population Share	Income Share	Absolute Contribution	Relative Contribution
Male	0.4692	0.9035	0.8883	0.0054	0.7952
Female	0.4994	0.0965	0.1117	0.3766	0.0114
Population	0.4733	1.0000	1.0000	0.4733	1.0000

Source: Authors Computation



Fig. (1). FGT Curves for poverty Incidence.

For instance, it has been reported that *male-headed* households that engaged in farming have lower welfare while female-headed households engaged in farming have higher welfare [21]. In relation to depth and severity of poverty, *male-headed* households were well represented as they took a lead above the female headed households (Table 2).

3.3. Logistic Regression of the Determinants of Poverty

Logit regression was used in this study to assess the determinants of poverty among rural households in the study area. This method was adopted in line with other studies by [13, 22 - 25]. From the maximum likelihood estimates of the Logistic regression (Table 3); the results show that the model

(regression line) fits the data reasonably. The result of the analysis revealed a chi square value of 74.18, 22.36 and 73.59 which was significant at 1% ($p < 0.01$). The Pseudo R^2 was 0.16, 0.45 and 0.14, and the log-likelihood was -195.25, -13.77 and -220.62 suggesting strong explanatory power of the model for male-headed households, female-headed households and pooled rural household heads respectively. This also indicates that variation in poverty status is explained by the (maximum likelihood) estimates of the specified explanatory variables, suggesting that the model as specified, explained significant non-zero variations in factors influencing poverty among the rural households in the study area. Interestingly, the model shows a wide variation in the drivers of poverty across

Table 2. Household poverty status.

Poverty Indices	Male N= 337	Female N= 36	Total Sample N=373
Poverty headcount (P_0)	0.5371	0.4722	0.5389
Poverty Depth (P_1)	0.2077	0.1923	0.2117
Severity of Poverty (P_2)	0.1176	0.1090	0.1198

Note. The exchange rate was N199 per US Dollar in 2009. Source: Authors' Computation

Table 3. Estimate of the determinants of poverty by logistic regression.

Variable	Male-Headed Households		Female-Headed Households		Total Sample (Pooled)	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Age of Household head	0.005 (0.768)	0.001	0.001 (0.997)	0.000	0.015 (0.388)	0.004
Education years	0.011 (0.706)	0.003	-0.149* (0.073)	-0.399	-0.021 (0.442)	-0.005
Household size	0.398*** (0.001)	0.098	1.250 (0.187)	0.312	0.337*** (0.001)	0.083
Dependency ratio	-0.382 (0.211)	-0.094	0.009 (0.995)	0.002	-0.111 (0.658)	-0.275
Farming experience	-0.021 (0.102)	-0.005	0.029 (0.818)	0.008	-0.024** (0.050)	-0.006
Farm size	-0.058 (0.613)	-0.014	-0.834 (0.290)	-0.208	-0.101 0.345	-0.250
Family labor	-0.001 (0.997)	-0.000	-1.367* (0.301)	-0.341	0.040 (0.772)	0.010
Market distance	-0.003 (0.868)	-0.001	0.397* (0.094)	0.099	0.008 (0.693)	0.002
Extension access	-0.600* (0.078)	-0.143	-1.508 (0.295)	-0.353	-0.655** (0.038)	-0.156
Credit access	-1.108*** (0.000)	0.262	-0.192 (0.886)	-0.048	-1.058*** (0.000)	-0.251
Road Access	0.044 (0.580)	0.011	-1.412 (0.471)	-0.330	0.036 (0.650)	0.009
Market info	-0.535 (0.267)	-0.127	-1.186 (0.432)	-0.284	-0.578 (0.213)	-0.137
Member of social group	-0.688** (0.015)	-0.165	-0.566 (0.818)	-0.139	0.582** (0.028)	-0.141
Log likelihood	-195.25		-13.77		-220.62	
No of observation	337		36		373	
LR Chi2 (12)	74.18		22.36		73.59	
Prob>Chi2	0.00		0.07		0.00	
Pseudo	0.16		0.45		0.14	

Source: Authors' Computation *, ** and *** indicate significance at 1%, 5% and 10% respectively

the situations considered (for male-headed households, female-headed households and pooled rural household heads). Collectively, educational years, household size, farming experience, market distance, extension access, credit access and Member of social group are the explanatory variables determining poverty among the rural dwellers in the southwest Nigeria.

It has been observed that improved educational attainment has a direct effect on enabling households accessing, assessing and conceptualizing relevant information on technology adoption, improved farming practices, accessing lucrative rural market opportunities and profitable enterprise combination, thus, education remains important in poverty alleviation and income distribution [26]. The coefficient of education measured in actual years of schooling was found to be significant with a negative relationship with poverty. However, only the female-headed households experienced poverty reduction influenced by education. By implication, probability of being poor was reduced by 39.9 percent through an increase in the years of educational attainment. Unsurprisingly, this study is consistent with other studies, which concluded that increase in the educational attainment of the household head have an important impact on reducing the probability that a household is poor [27]. Furthermore, a study conducted in Kenya concluded that lack of education is a factor that accounts for a higher probability of being poor [28].

Household size is an important factor, which can play a role in bringing down the incidences of poverty by reducing the probability of remaining in the poor household category. The increasing family size implies a larger number of dependents on fewer earners and this might lead to fewer earning and lesser per capita consumption [29]. The co-efficient of household size was significant and positively influenced poverty status for male-headed households and the total sample collectively. Results obtained revealed that the likelihood event of being poor was higher with male-headed households that have large households compared to the total sample (Table 3). The larger the household size, the poorer the household is likely to be, because more of the household members will likely be children who are unproductive and yet take a big proportion of household income in terms of school fees, medical bills, food and clothing. Therefore, a unit increase in the size of the rice farming household by an individual increases the probability that the farm households will be poor by 21.75%. Similar finding was obtained in other studies [24, 25, 30, 31].

The regression coefficient for years of farming experience of the household head is 0.024, which is negative significant for the total households sampled for the study while gender disparity in relation to farming experience has no influence. By

implication, additional year of farming experience obtained by the household heads will result in 6 percent decrease in poverty incidence. This could be attributed to the fact that as the years of farming experience increase, the propensity to understand productive agricultural practices increase which could enhance productivity which at the long run increases household income and reduces poverty incidence. Family labour force of the agricultural holding in the context of our study refers to persons who carry out farm work on the holding and are classified either as a holder or the members of the sole holder's family. The coefficient of family labor was found to be significant and negative. By implication, family labor reduces the likelihood of being poor in the study area but was relevant only to the female-headed households. The probable reason for this might be the ability of proper coordination the women possess through constructive persuasion and appealing promises after work done by the household members. Specifically, family labor has the probability of reducing poverty incidence by 34.1 percent.

With respect to the distance to the market, farmers in any households which is located far away from where the resources are being purchased and likewise the receiving markets of the farm products are expected to live below the poverty line due to high transactions costs such as transportation costs, loader cost *etc.*, that is placed as an additional cost on farm incomes and reduces the possible take home of the farmers [32]. The findings of our study were consistent with this assertion as female-headed households were found to have probabilities of being poorer by 9.9 percent if there is a kilometer increase in distance to markets. Contact with extension services provided more access information on market opportunities and interventions, improved agricultural techniques, improved inputs, subsidized farm inputs and other production incentives. These would have a positive relationship on farmers' outputs and their income-generating activities, thereby increasing livelihood diversifications and reducing their poverty level [33]. Poverty incidence will be probably reduced by 26.2 percent and 25.1 percent for male-headed households and the total sample respectively if there is access to extension services. Supportively, the availability of extension services and membership of extension related organizations improved farmers' productivity and profitability and hence poverty reduction [33].

The coefficient of access to credit on reducing the likelihood of a household living below poverty line does not come with a surprise and significant at 1% for both male-headed households and pooled sample. The significant effects of credit access in elevating out and alleviating the households from poverty incidence is accounted by the cushion effects brought about by the funds, which can enhance the purchasing power of the households and possibly give opportunity for livelihood diversification through non-farm activities.

The coefficient of membership of social group is negative and significant at 5 percent for both male-headed households and pooled sample. This result lends credibility to the *a priori* expectation because membership of social group especially farmers association, has many competitive advantages in terms of risk reduction and uncertainty because of effective access to relevant information and to low or no interest credit sources

and other important less subsidized inputs needed to enhance productivity process [34, 35]. Against this backdrop, it could be said that the incidence of poverty is higher among rural household heads that do not belong to any social group [10].

4. CONCLUSION AND RECOMMENDATION

Poverty in Africa has not only grown widespread but intense compared to any other region of the world. With this, redistribution towards the poor will definitely not require only increased income but importantly needs an evolution of policies, plans and framework that will address the acute income inequality by transforming and improving the sources of livelihood and the space where the poor live. Poverty and inequality have been identified as inseparable evil that are highly related with rural households and with feedback impacts which seem indisputable and must be fought together. In a bid to give empirical evidence of poverty incidence and inequalities among rural household in Southwest Nigeria, this study has assessed the gender differential in poverty (captured through incidence, depth and severity) and inequality status. This re-examination discovered that poverty incidence was higher among male population than the female population. whereas, income inequality was less acute among the male respondents than their female counterpart.

Considering the empirical evidence emanating from this study, it was revealed that majority of the rural farming households in the study area were poor and level of income disparity was high. Against this backdrop, this finding underscores the need for restructuring that will improve the livelihood of farmers through agricultural productivity expansion capable of providing both farm and off-farm employment. Also, Consistent awareness on family planning will go a long way in reducing the household size of the rural farming households since there is tendency of being poor with large household size. This will also lead to lower dependence ratio which tends to increase poverty in the region. Credit accessibility is pivotal to poverty reduction, government should therefore show more seriousness in the implementation of agricultural credit schemes with one digit interest rate because farmers in the rural areas could still not have access to agricultural development banks and other related agencies that are located only in the urban areas. By doing this, it will give an avenue to boost food production vis-a-vis reduce poverty.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Not applicable.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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