Evaluating Poverty and Risk Attitude of Maize Farmers in Surulere Local Government Area of Oyo State, Nigeria: A Safety First Analysis Approach

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Abstract: This study examined the effect of poverty on risk attitude of maize farmers in Surulere Local Government Area of Oyo State. A multistage random sampling procedure was used to select one hundred and twenty respondents from the study area; a well-structured questionnaire was used to collect data. The data were analyzed using descriptive statistics, Safety First Analysis, Foster – Greer-Thorbecke (FGT) and regression analysis. The findings showed that majority of the respondents (68.3%) were male and married (69.2%). The majority of the respondents were poor (70%). Most (75%) of the farmers fell under intermediate risk group. Tobit Regression Analysis result showed that the major determinants of the risk aversion of the maize farmers were household size and extension agents' visit. Lastly, it was found that Poverty has no effect on the risk averse of maize farmers in the study area. In view of these findings, it was recommended that; Government should made provision for agricultural extension agents to train and retrain farmers on the production of maize and that Maize Farmers should endeavour to take calculated risk since risk taking increase their productivity.

Keyword: Poverty, Risk Attitude, Maize, Foster – Greer-Thorbecke (FGT), Tobit Regression.

I. INTRODUCTION

The increasing rate of poverty in Nigeria calls for urgent intervention. Despite enormous natural resources poverty situation continue to get worsened. The report of [1] that the country is one of the poorest nations in the world. Rural households are the most affected and according to the [2] the urban slum-dwellers are part of the most deprived group entrapped by this menace. Poor are poor since their assets are not only small in quantity but also in quality. The rate at which farming households are deprived on basic human needs is becoming alarming. The economic implication of this deepens the poverty severity. The National Household Survey conducted in 2010 by National Bureau of Statistics (NBS), shows that 69.0% of the Nigerian population lives in absolute poverty [3]. The recent increase in poverty rate doesn't complement the effort of the past government and the non-governmental organization in poverty reduction.

II. RELATED WORK

Poverty is viewed as a condition of possession of insufficient income or resource [4] or the inability to have basic human needs (clothing, housing, clean and drinkable water and health facility) to sustain as useful. [5] stated that poverty is present when basic capability failure arises because a person has inadequate command over resources, whether through the market or non-market sources. Capability deprivation alone cannot reveal people that are poor in this specific sense. The [6] explain the intricate that could result as a means of taken measuring poverty base on income alone. Failure to capture other resources such as income in kind, assets, subsidy to public service and employment will further give more problem than poverty itself.

Farming happens to be risky most especially low-scale farms, which operate in dangerous conditions in poor countries [7]. The level of poverty among farming households who are the major player in production of food and fibre for the nation has preclude most of the farmers in taking risk. [8] explained the negative perception of taken risk among maize producers in Nigeria in the last decade. The rate has been increasing to some extent and it further plunge this smallholder farmers into more poverty. However, a better knowledge of risk attitude can bring a decisive understanding in analyzing investment or business alternative. Risk attitude can simply take three forms namely: risk averse, risk preferring and risk neutral [9].

Many decisions in agricultural are taken in the terrain of risks and uncertainty [10]. The farmers are unable to takes

actions which will get them off the hook of poverty. The chain of poverty surfaced in many forms but risk aversion is one significant element that is common to many versions in the circle regardless of nationality or environment. Assuming that poor smallholder farmers are risk-averse to certain point that they are improbable to invest their available resources and acquire modern assets as this involves risk taken, then they will remain poor [7]. In as much as poverty forms major problem facing smallholders farmer's production and socio-economic environment, the need for a comprehensive study of poverty and its effects on maize farmers' attitude towards risks is paramount. Therefore, the study evaluate the effect of poverty on risk attitude of Maize farmers.

III. METHODOLOGY

The Study Area: The research work was carried out in Surulere local Government Area (LGA) of Oyo State. The local Government Area has its administrations headquarter in Iresaadu, a town Ogbomoso-Ikirun road, it shares boundaries with Osun State and Kwara States. The main Agricultural products in the area inched Millet, yam, Maize, Cassava, oil palm, Tobacco and Cashew. Smallholder maize farmers in Surulere local Government Area of Oyo State constitute the population of this study. Employing a multi-stage random sampling technique, four cells were randomly selected from the eight cells in the first stage, twelve cluster of maize farmers were selected from the cells and ten (10) maize farmers were randomly picked from each of the cluster, summing up to one hundred and Twenty (120) respondents that were considered for this study.

Method of Data Analysis: Descriptive statistics was used for socio-economic characteristics of the respondents. The study adopted Foster-Greer-Thorbecke (FGT) poverty measure to estimate poverty status of the maize farmers. Equally, Safety first model was used to estimate the risk level of the reaspondent and Regression Analysis was used to determing the drivers of risk**.** The study was based on two major assumptions namely: the randomness of maize production and the relationship between maize output and the inputs as presented by Cobb-Douglas production techniques. The postulated relationship is: $Y = A X_i^{bi} U^e$

Where :

Y = maize output
$i = 1, 2, …,5$
X_1 = farm size (ha)
X_2 = Total labour (man-days)
X_3 = Seed (Kg)
X_4 = Fertilizer (Kg)
X_5 = Herbicide and pesticide (Litre)

Safety First Analysis

$$Ks = \frac{1}{\alpha} \left[1 - \frac{P_i X_i}{P F_i Y_{yi}} \right]$$

Ks = Risk Aversion
α = Coefficient of variation in maize output in Kg

P_i = Price of fertilizer per Kg
X_i = Average fertilizer used
P = Mean of maize output
F_i = Elasticity of production with respect to fertilizer
Y_{yi} = Average maize yield

Foster – Greer-Thorbecke (FGT)

$$Pn = \frac{1}{N} \sum_{i=1}^{q} \left(\frac{\pi - yi}{\pi} \right)^n$$

Where:

π = Poverty line
y_i = Income of the ith person
N = Total sample
n = FGT parameter which takes the values of 0, 1 and 2
$n = 0$ – headcount ratio
$n = 1$ – Poverty depth/gap
$n = 2$ – Severity
q = number of persons below the poverty line

Regression Model
Regression Analysis was used to examine the effects of some selected variables (Poverty indices and socio-economic variables) on risk aversion.

$$Ks = f (V_1, V_2, …….V_n)$$

Where:
Ks = Risk aversion.
V_1= Age (years)
V_2= Educational status (years)
V_3= Household size (number)
V_4= Extension visit (1 for visit and 0 otherwise)
V_5= Poverty index (1 for poor and 0 for non-poor)
V_6= Farm size (ha)
V_7= Association (1 for membership and 0 otherwise)

IV. RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents
The results of the socio-economic characteristics of the maize farmers such as, age, gender, marital status, religion, educational status, household size, monthly income and years of experience are presented in Table 1. Table 1 showed that 26.7% of the respondents are between the ages of 31-40years while only 2.4 percent of them are more than 70years and also 18.3% were less than 30years. The mean age was 45.7years which means that on the average the farmers were still in the active ages and could actively work on their farms. This study agreed with [11] that the maize farmers are in their active age. The majority of the respondents (68.3%) are male while only 31.7% are female. By implication maize planting is dominated by male and it is actively taken over by male farmers and this agrees with [4]. The table also reveals that 69.2% of the farmers are married, 14.2% are single, 10.8% are widowed and 5.8% are divorced/separated. This result implies that majority of the farmers are married and this may be of help in getting good working force.

The table also shows 20.8% of the maize farmers have no formal education, 36.6% have primary education and

26.8% have secondary education while 15.7% have tertiary education. This implies that maize farmers in the study area are able for the adoption of extension innovative programme and viable agricultural practices. This study is in line [4]. Most (47.6%) of the respondents have their household size between 6-10 members, 4.1% have 11-15 members with and 3.2% have 16 or more member while 44.9% have 5 or less household members. The mean household size is 6 persons. This implies that farmers may have access to family labour. This study agrees with [11] Table 1 shows that majority of the respondents 81.4% realize less than ₦20,000 as their monthly income from the sale of maize they harvested while 2.4% realize ₦40,000 and above. The mean income is ₦11,008.30 and average household size is 6 members, it is much likely that the majority are poor. The mean years of experience are 13.6 years. This implies that on the average farmers have spent 13years and above in maize production and therefore have acquired enough experience that will help them in maize production.

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage
Age(years)		
≤30	22	18.3
31-40	32	26.7
41-50	21	17.6
51-60	30	25.1
61-70	12	9.9
Above 70	3	2.4
Mean = 45.7		
Gender		
Male	82	68.3
Female	38	31.7
Marital Status		
Married	83	69.2
Single	17	14.2
Widowed	13	10.8
Divorced/separated	7	5.8
Educational Status		
Non-formal education	25	20.8
Primary education	44	36.6
Secondary education	32	26.8
Tertiary education	19	15.7
Household Size		
≤5	54	44.9
6-10	57	47.6
11-15	5	4.1
≥16	4	3.2
Mean = 6.2		
Monthly Income		
20,000	98	81.4
20,001-40,000	19	15.7
Above 40,000	3	2.4
Mean = 11,008.30		
Years of Experience		
1-10	64	53.5
11-20	35	29.2
21-30	15	12.5
31-40	5	4.1
Above 40	1	0.8

Source: Field Survey, 2015.

Poverty Status of the respondents: Table 2 shows that majority of the respondents (70%) are poor while only 30% are non-poor. This implies that majority of the maize farmers in the study area are living below poverty line. The poverty headcount ratio (P_0) which indicates the proportion of people below the poverty line is 70% which means that 70% of the maize farmers are poor, it also implies that each member of their household is getting below ₦2,145.49 per month. The poverty gap indices (P_1) which measure the depth of poverty is 38% while the severity indices (P_2) which is the sum of the square of poverty depth divided by the member of poor households is 24%. All poverty indices show that poverty is a serious problem among maize farmers in the study area. Though the result conforms to the findings of [3] where more than 78% of the respondents were poor, but it was higher than the incidence of poverty which [5] reported (0.58).

Table 2: Poverty Status

Poverty level	Frequency	Percentage	Poverty line
Poor	84	70.0	2,145.49
Non poor	36	30.0	
Poverty Incidence (P_0) = 0.70			
Poverty depth (P_1) = 0.38			
Poverty severity (P_2) = 0.24			

Source: Field Survey, 2015.

Production Function Estimation: The regression result represented in table 3 was used to determine the estimation of the production in the study area. The result tells the relationship between maize output and input as presented by Cobb-Douglas production techniques.

$$Y = A\, X_1^{b_1} U^e$$

From the result in Table 3, the F-statistic of 4.460 was significant at 1% level of significance, meaning that all the explanatory variables put together explained the variability of maize output. Also, the result showed that four explanatory variables were significant at different levels. These include farm size (X_1), labour (X_2), fertilizer (X_4) and herbicides (X_5). The farm size (X_1) was significant at 1% level and has a positive relationship with the dependent variable. Also, the labour (X_2), fertilizer (X_4) and the herbicides (X_5) were significant at 1% level respectively. All these variables were positively related to the maize output (Y). Therefore, any increase in this variable will equally translate directly into increase in the output of maize production. This outcome conforms to the findings of [12] where the coefficient of labour, cost of herbicide, cost of equipment and planting material were statistically significant.

Table 3: Estimation of the Production Function

Variables	Coefficients	Standard error	t-ratio
X_1 = farm size	1.625	0.623	2.608*
X_2 = labour	1.378	0.295	4.671*
X_3 = seed	0.225	0.487	0.468
X_4 = fertilizer	1.315	0.279	4.717*
X_5 = herbicides	1.368	0.296	4.622*

Intercept	1.913	2.881	0.664
$R^2 = 0.255$			
Adjusted $R^2 = 0.198$			
F $= 4.460*$			

Source: Data analysis, 2015.
Note * = significant at 1% level

Risk Aversion Groups and Poverty Levels: The study employed safety model approach to estimate farmers' attitude towards production risk. Determinants of the risk attitude coefficients (k) and the required estimation of production function were presented in Table 4. According to Table 4, out of the 5% of the respondents that were risk preferred, 4 respondents were poor and 2 were non poor. From the 20% that were low risk averse, 21 were poor and 3 were non poor. Also, 59 were poor and 31 were non poor out of the 75% that were intermediate risk averters. In conclusion, 95% of the respondents were risk averse. This implies that majority of maize farmers in the study area are risk averters. This finding goes in line with that of [4] where about 97.5% of their respondents were risk averse.

Table 4: Risk Avertion Groups and Poverty Levels

Risk Averse Group	Freq	%	Non-poor	Poor
Risk preferred	**6**	**5.0**	**2**	**4**
Mean = -0.355				
Low risk aversion	24	20.0	**3**	**21**
Mean = 0.253				
Intermediate risk	**90**	**75.0**	**31**	**59**
Mean = 0.589				
Total	**120**	**100**	**26**	**84**
Mean = 0.474				

Source: Field Survey, 2015.

Determinants of Risk Attitude.
Table 5 shows the result of Regression Analysis, two variables were significant at different levels and they include household size (V_3) and extension agents visit (V_4). Both household size and extension visit are both significant at 10% and 5% respectively while the rest are not. Household size (V_3) was negatively significant which implies that increase in the household will lead to reduction in the risk aversion. Extension agent visit was also an identified significant determinant of risk attitude. Extension agents visit (V_4) was positively significant which implies that increase in the visit will lead to increase in risk aversion.

The F-statistic of 1.27 was not significant at 10% level of significance [13]; this implies that poverty has no effect on the risk averse of maize farmers in the study area.

Table 5: Determinants of risk Attitude

Variables	Coefficients	Standard error	t-ratio
Age (v_1)	-0.0001	0.0019	-0.055
Education (v_2)	-0.0033	0.0045	-0.740
Household size (v_3)	-0.0117	0.0072	-1.661*
Extension (v_4)	0.1581	0.0636	2.483**
Poverty index (v_5)	0.0211	0.0532	0.392
Farm size (v_6)	0.0115	0.0228	0.504
Association (v_7)	-0.0828	0.0732	-1.133
Intercept	0.5302	0.1068	4.9646
$R^2 = 0.0733$			
Adjusted $R^2 = 0.0156$			
F $= 1.27$			

Source: Data analysis, 2015.
Note * = Significant at 10%, **= significant at 5%

IV. CONCLUSION AND RECOMMENDATIONS

Based on the major findings of this research, the following conclusions were drawn. The majority of the respondents are poor (70%). Poverty has no effect on the risk averse of maize farmers in the study area. The majority of the farmers are also categorize as intermediate risk group and the risk aversion has influence on the technical efficiency of the maize farmers in the study area. The major determinants of the risk aversion of the maize farmers were household size and extension visit. In view of this, this study therefore recommends that; Government should made provision for agricultural extension agents to train and retrain farmers on the production of maize. Maize Farmers should endeavor to take calculated risk since risk taking increase their productivity. Lastly, maize farmers should ensure that they increase their land since it has positive effect on their output.

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