Quest Journals
Journal of Research in Business and Management
Volume 9 ~ Issue 8 (2021) pp: 01-11
ISSN(Online):2347-3002
www.questjournals.org

Research Paper

An Assessment of the impact of Poverty on Households Vulnerability in Some Selected LGA's in Yobe State, Nigeria

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ABSTRACT
This study assesses household degree of vulnerability to poverty in Yobe State, Nigeria. The study used a well-structured questionnaire to obtain the primary data from field survey. A multi-stage sampling technique was employed to select 300 respondents from the three local government areas namely; Damaturu, Geidam, and Potiskum (100 respondents per local government). However, a descriptive statistics for socio-economic characteristics of the respondents, and the Foster, Greer and Thorbecke (FGT) index analysis were used to analyse the incidence of poverty, and the Multinomial logistic regression (mlogit) model was used to analyse the extent and the determinants of vulnerability to poverty in Yobe State. The results reveal that: poverty incidence (head count ratio) in the state is high and stands at 63%. However the degree of vulnerability to poverty stands at 58.7%; the factors that are responsible for vulnerability to poverty in the state include Age, educational status, and household size of the respondents. The research recommends that a provision of safety nets, such as compulsory and free education, health facilities, better housing (low cost), pipe borne water, sustainable environmental sanitation, free or subsidized farm inputs of (hybrid seeds, fertilizers, herbicides, pesticides, insecticides, and farm tools or implements) to the people of Yobe State, in order to build their capacities and increase their incomes, which are essential for poverty reduction and prevention.
KEY WORDS: *FGT Index, Multinomial Logistic regression, Yobe state, Nigeria.*

Received 28 July, 2021; Revised: 10 August, 2021; Accepted 12 August, 2021
Published with open access at www.questjournals.org

I. INTRODUCTION

Poverty is a global phenomenon whose impact is multi-dimensional; it touches the economic, social, political, psychological and physical aspects of human endeavors. And it is found in almost all communities of the world, if poverty were to be sighted as a visible object, it would definitely appear horrific, devastating and unpleasant in all ramifications.

The Millennium Development Goals (MDGs), as developed by United Nations Organization and endorsed by most countries of the world, were aimed at tackling global socio-economic problems. Among the eight goals projected by the MDGs, the most important is the eradication of hunger and extreme poverty. Thus, it is enunciated under three targets as follows: Reduce by half the proportion of people living on less than a dollar a day; Achieve full and productive employment and decent work for all, including women and young people and Reduce by half proportion of people who suffer from hunger.

Interestingly, MDGs projected these eight goals fifteen years ago in 2000, the project time frame has elapsed and it has now being revised and renamed as the Sustainable Development Goals (SDGs) in December, 2015. Though the SDGs would stay up to 2030, the alarming signs, sights and effects of poverty are still everywhere in Nigeria especially in the North-East region: these tend to make SDGs a difficult programme to achieve in Nigeria.

What really matters is the ex-ante risk that a household will, if currently non- poor, fall below the poverty line, or if currently poor, will remain in poverty. And the current poverty level of household may not necessarily be a good guide to the household's vulnerability to poverty in the future. For thinking about appropriate forward-looking anti-poverty interventions (i.e., interventions that aim to go beyond the alleviation of current poverty to prevent or reduce future poverty), the critical need then is to go beyond a cataloging of who is currently poor and who is not, to an assessment of households' vulnerability to poverty (Adepojo et al, 2012).

The fact that various poverty alleviation projects implemented by various governments in the country have not resulted into a significant reduction of poverty raises the concern that the policies are either faulty or are not properly implemented. Nevertheless, it is worth noting that the all the poverty alleviation programmes in the country have been directed to resolving the problem of present poverty (ex-post) while ignoring the aspect of future poverty or vulnerability to poverty (ex-ante). An attempt to reduce the present level of poverty without due consideration to the future level of poverty cannot actually reduce poverty in the country. That has been the case with previous poverty reduction strategies for the country as a whole and Yobe State in particular.

Moreover, various shocks contribute to the level of poverty (especially future poverty level) in the country or the various geo-political regions in the country. A shock of a seemly high magnitude and impact on future poverty levels that has befallen the people of Yobe State is the Boko Haram insurgency. This insurgency has disrupted economic activities, destroyed household assets and maimed a lot of households in the State, suggesting that targeting the present poverty alone without taking into cognizance the fact that shocks of this nature will definitely have serious impact on their future status is likely to leave the people in poverty.

The government so far has been seeing poverty from a single standpoint - which is the point in time Poverty (ex-post) strategy, which in itself neglects the vulnerability to poverty (ex-ante) strategy (that is the current global strategy) for arresting poverty.

This calls for the need to determine how this singular shock and peculiar household nature affect poverty (vulnerability to poverty) in the State. This study would be based on the two Dollar Per day Poverty line (USD $2 per day). Many studies have analysed the point in time poverty (i.e., current Poverty level) in Nigeria and elsewhere. Such studies include: NBS (2011), Okojie, Ogwumike and Alayande (2000), Abayomi (2012), Adekoya (2014). Few studies that have analysed the vulnerability to poverty (i.e. future poverty) in Nigeria include: Osawe (2013), Alayande and Alayande (2014), and Muhammad (2012), Adepoju and Yusuf (2013). None of such studies analysed the vulnerability to poverty neither in North-East Nigeria nor in Yobe State. This leaves a vacuum that needs to be filled for poverty to be properly addressed. Given the need to reduce the impact of poverty on the people in the State, and also considering the fact that poverty alleviation programmes based on ex-post poverty have failed in reducing poverty, suggests that better approaches like basing the policies on ex-ante poverty, may provide better outcomes. An assessment of vulnerability to poverty (i.e. susceptibility to poverty) which is the current phenomenon in poverty studies, in which prevention strategies has more recognition over reduction strategies, necessitate this research. As such, this study attempts to dwell on vulnerability to poverty of households (future poverty) in some selected LGAs in Yobe State rather than on the age long current poverty studies (i.e. point in time poverty: incidence, depth, and severity of poverty). The aim of this paper is to bridge this gap by examining the incidence of poverty in Yobe State, to assess the degree of households' vulnerability to poverty in Yobe State and to examine the determinants or causes of vulnerability to poverty in Yobe state, Nigeria.

The paper is organized into five sections given the introduction as section one. The rest of the paper is organized as follows: Section two presents the literature review. In section three, the methodology adopted for this study is presented. Results and discussions are done in section four and conclusion is drawn in section five with recommendations.

II. LITERATURE REVIEW

2.2 Review of Conceptual Literature

2.2.1 Poverty

Central Bank of Nigeria (CBN, 1999) views poverty as the absence or lack of basic necessities of life including material wealth; the regular flow of wages and income; and the liability to sustain oneself based on the existing resources available. This suggests that when an individual cannot afford such basic needs, he/she is deemed to be poor.

Todaro and Smith (2004) asserts that people who suffer from poverty are often refers to as improvised people. They often suffer from under-nutrition and poor health, little or no literacy, live in environmentally degraded areas, have little political voice, and attempt to earn a meager living on small and marginal farms or in dilapidated urban slums. This seems a good picture of the people this study captures as being poor.

Agbaeze et al (2014) holds that poverty is a complex, multidimensional and hydra-headed phenomenon that has existed from time immemorial and has continued to occupy the centre stage in global affairs. This emphasizes it existence in almost all societies which gives a varied opinion as to its definition.

Kwanga (2015) after a perusal of the tenets of poverty submits that poverty could be viewed as a situation of acute need and inability to meet all the basic necessities like food, clothing, shelter, education and family. This generally means that a household is considered to be poor, when it cannot satisfy any of the above mentioned necessities on a relatively permanent basis.

2.2.2 Vulnerability

McCulloch and Calandinno (2003) view vulnerability as the probability of being below the poverty line in any one year where initially proposed the determination and terms of vulnerability. This presupposes that there is a bench mark and any chances of a subsequent decline are then seen as vulnerability to poverty.

Chaudhuri (2000) and Christiansen and Subbarao (2011) define vulnerability as the ex-ante potential of a decline in future well being or the ex-ante probability of falling below the poverty line at some future date.

Vulnerability is also multidimensional and many households face a number of risks. The risk faced by an individual/household relates to events possibly occurring i.e. with less than certainty. Individuals/households have some a-priori sense of the likelihood of these events occurring without direct control over its likelihood. The lack of direct control over the risk they face in crucial and distinguished it from individuals, households and communities given the risk they face (Christiansen and Subbarao, 2001).

2.3 Review of Empirical Literature

A number of empirical studies have been conducted in relation to point-in-time poverty (i.e. poverty incidence, depth, and severity), but limited studies are available on vulnerability to poverty in developed and developing countries. A review of recent studies on vulnerability to poverty in countries beyond Africa, revealed that; Calixto and Edgardo (2013), Amendola et al (2012), Azami and Imai (2009) and Isabel and Kannet(2006) dwelled on it.

Calvo et al (2005), examines individual vulnerability to poverty in Bangladesh, focusing on deprivation after the veil of uncertainty has been lifted. This paper, introduces the concept of vulnerability as a threat to poverty, with downside risk at its core. The vulnerability measure is defined as an assessment of the magnitude of the threat of poverty, measured ex-ante, before uncertainty is resolved. The welfare-economic foundations are described for desirable properties of a vulnerability measure and assess to what extent some measures used in empirical work abide by them. This paves the way for poverty not to be seen only in the light of the present situation but also from the stand point of how the poverty level is to be affected in the future. This study is particularly of interest as Yobe State witnessed unprecedented attack as a result of Boko Haram insurgency that led to enormous damage to lives and property, thereby affecting the people's livelihood. Thus, poverty has been vulnerable to insurgency in the State.

Isabel and Kennet (2006) propose a simple method to empirically assess the impact of idiosyncratic and covariate shocks on households' vulnerability, which can be used in a wide context as it relies on commonly available living standard measurement surveys. They apply their approach to data from Madagascar and show, that whereas covariate shocks have a substantial impact on rural households' vulnerability, urban households' vulnerability is largely determined by idiosyncratic shocks. Such studies are really lacking for Nigeria making it exceptional difficult to pin point the exact cause of poverty in the country and Yobe in particular. This approach may be helpful in underpinning the level of poverty that has arisen out of one of the shocks that have besieged this State over the past 8 years.

Recent studies on vulnerability to poverty especially in Nigeria, include the works of: Abayomi (2012), Agbaje et al(2013), Osawe(2013), Muhammad (2012), Chiwaula, Levison, Waibe and Herman (2009), Oyekale and Oyekale(2008), Oni and Yusuf(2007), and Alayande and Alayande(2004).

Abayomi (2012) examines factors that influencing households' income shock exposure and coping options in Nigeria. The study analyzed the different forms of shocks that households experienced with some welfare losses. The Core Welfare Indicator Questionnaire (CWIQ) data that comprise of 75,329 households were used. The data were analyzed with simple descriptive methods and Probit regression. The results show that probability of shock exposure decreases significantly ($p<0.01$) with access to improved drinking water, improved toilet, health facility well/borehole, agricultural inputs, agricultural produce buyers, consumer goods, employment opportunities, assets and credit facilities. It was recommended that ensuring that development projects target the poor will assist in reducing their exposure to shock.

Chiwaula, Levison, Waibel and Hermann (2009) studied the role of shocks and risks on the livelihoods of small scale fishing communities of Hadejia-Nguru Wetlands in Nigeria. They estimated income loss in consumption equations to assess the impact on the livelihood in the study area. Their findings identified death of an adult member, drought, and social conflict as important shocks in the area. These shocks are more significant in reducing household food consumption than non-food consumption. Further, the study reveals that farming dependent households suffer more from social conflicts; fishing households suffer more from drought; while the impact of death of an adult member does not depend on household livelihood strategies. Since the shocks that significantly reduce household consumption are not specific to such communities, they conclude that fishing communities do not need special social protection policies but these should not be left out in these programs.

Oni and Yusuf (2007) also analyzed the idiosyncratic and covariate factors that explain expected poverty in rural Nigeria using 1996 national data. Results show that the over-all expected poverty for the country at 0.535 is 1.02 times the observed poverty in 1996. Higher expected poverty is synonymous with northeast, no formal education, farming, older head of household, large household size and male headed

household. This study indicates that North East is highly vulnerable to poverty, but this impact needs to be ascertained specifically for Yobe State.

Girei and Dire (2014) analyse poverty and inequality among farmers in Yola North Local Government Area of Adamawa State of Nigeria, with primary data from field survey. A multi-stage purposive random sampling technique is used in the selection of the 130 respondents for the study, while descriptive statistics is used to analyze the socioeconomic characteristics of the respondents in the study area. The socio- economic information collected was based on gender, age, educational status, and marital status (household characteristics) and poverty line (dependent variable). The results reveal that, poverty is severe due to the non-availability of social facilities like good roads, portable water, health care facilities among others while, the respondents expended most of their earnings on this social services. Adamawa State happens to fall within the same region like and witnessed the same insurgency upheavals like Yobe State. It is expected therefore that such results that prevails in Yola may be applicable in Yobe. However, this study is relatively limited as it used descriptive statistics only, and did not examine the vulnerability of poverty in the State.

Sani, Nasiru, Ba'aba and Kolo (2018) assessed the Incidence, Depth, and Severity of Poverty in Geidam, Yobe State, Nigeria. The paper dwelled extensively on the point-in time poverty (current poverty) and the three (3) components that made it; these are: the incidence of poverty (head count ratio), Depth of poverty (poverty gap) and severity of poverty (poverty gap squared). Using a primary data (from a well structured questionnaire); The study employs a multi-stage random sampling techniques to selects 25 respondents from each of the randomly selected four wards of Geidam local government area namely; Asheikiri, Hausari, Kalgeri/Jororo, and Gumsa. Finally a total of one hundred (100) respondents/households' heads was selected for the study. Descriptive statistics of the respondents, and the Foster, Greer and Thorbecke (FGT) index analysis were used to analyze the incidence, Depth and severity of poverty in the study area.

Oyekale and Oyekale (2008) assessed income shock's and expected poverty dynamics in rural Nigeria using the 2004 National Living Standard Survey (NLSS – 2004) conducted by the National Bureau of Statistics (NBS). They used the 3-stage feasible generalized least square (FGLS) to analyze expected poverty in Nigeria. The variables considered in their estimation were: agricultural input shocks and agricultural production shocks, credit shocks, employment, economic shocks, business shocks and conflict shocks. The results reveal that: high agricultural input price and lack of capital to expand own businesses were experienced by the largest proportion of the households. Also high vulnerability to poverty gained grounds in rural areas than in the urban centres, and States like Jigawa, Kebbi, Zamfara, Yobe, Kogi and Taraba; male headed households, large family size and large number of dependents were among the factors accounting increasing the vulnerability to poverty.

Sani, Nasiru, Abdullahi, Ba'aba and Alhaji (2018) used a multistage random sampling technique to analyse the data obtained from a well structured questionnaires. The analysis of data was done by the use of Foster, Greer, Thorbeck (FGT) poverty index analysis, probit and logit regression models with marginal effects. The study discovered from the FGT index that the incidence of poverty stands at 70.24%, while both probit and logit regression models revealed that the age of household heads and farm size are negatively and highly significant at 1% levels of significance. The Age of household head and farm size revealed an inverse results of (-0.0453868, -0.0774235, -0.0146508) and (-0.2053323, -0.3476851, -0.657922) from the probit, logit and marginal effects results respectively. This means that as these variables increase, so also the households' poverty situation decreases, leading to a down drift of poverty level in the study area. Variables like Gender, Marital Status, Household size; Educational Status, Dwelling type, and Occupational status of the household head are also determinants of poverty in the study area but are insignificant in both models.

From the foregoing review it is clear that there are a lot of literatures on poverty in general but few on the vulnerability to poverty. The situation is worst in Nigeria and particularly in North East and Yobe state. While the works reviewed above provide guides, this study will make attempts in filling in the gaps like absence of such information in an insurgent ravaged State; the use of a sound methodology in assessing the vulnerability situation in Yobe State.

III. METHODOLOGY

3.1 Background of the study Area

The study area is Yobe State which is located in the Northeastern corner of Nigeria with Coordinates of 12°00′N 11°30′E. It was carved out from former Borno State on August 27, 1991.The capital of Yobe state is Damaturu and its Nicknamed as *the Pride of the Sahel*. With Total land Area of 45,502 km2 (17,568 sq mi) and a population estimates of 2,321,591(census, 2006). The state borders the Nigerian states of Bauchi, Borno, Gombe, and Jigawa. It's also borders with Diffa and the Zinder Regions of the Republic of Niger to the north. Because the state lies mainly in the dry savanna belt, the state is hot and dry for most the year, except in the southern part of the state which has a milder climate.

The State consists of seventeen (17) Local Government Areas of: Bursari,Damaturu, Geidam,Bade,Gujba,Gulani,Fika,Fune,Jakusko,Karasuwa,Machina,Nangere,Nguru,Potiskum,Tarmuwa,Yunusari, and Yusufari.

3.2 Sampling techniques and sample size

A multi-stage purposive random sampling technique is to be use for this study. The first stage would involve the selection of the three (3) LGAs out of the 17 LGAs in Yobe State. The second stage was the selection of ten (10) Demarcated Enumeration Areas (EAs) based on the National Housing and Population Census (2006). The third stage was the random selection of ten households in each of the (EA's). This would make a total of three hundred (300) households as respondents which would be use for the study.

3.3 Poverty Gap Index/Ratio and model specification of vulnerability to poverty

The analysis of poverty (incidence of poverty) would be based on the mathematical model developed by Foster, Greer and Thorbecke (1984), known as the FGT model of poverty decomposition. This was adopted to determine the headcount ratio (incidence of poverty), in the study area. The use of the FGT measures required the definition of a poverty line, where this study would be based on the two Dollars Per day per head Poverty line. This measures, consider all individuals whose expenditure per day is less than two dollar per day using the exchange rate of Naira to Dollar (₦ USD $2 per day) in other to capture absolute poor. *A Poverty line* is defined as the monetary cost to a given person, at a given place and time, of reference level of welfare. People who do not attain that level of welfare are deemed poor, and those who do are not (Ravallion, 1998). The Poverty line can be established by using the equivalent expenditure method or the food energy intake method. The FGT measure is an approach to absolute poverty. This measure which subsumes the head count index and the poverty gap is also known as the 'P' alpha (α) measure because it uses a poverty aversion parameter (α). The index measures the average of individual poverty gaps raised to a power (of the value given to the parameter) depending on the degree of poverty. The higher the value assigned to the parameter (α), the greater the weight from incidence to the severity of poverty. The index can be expressed as:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{m} \left(\frac{Z - y_i}{Z} \right)^{\alpha}, \alpha \geq 0 \quad \ldots\ldots (1)$$

Where;
z =Poverty line
m = Number of households below poverty line
n= Number of households in the reference population/total sampled population
y_i= Per adult equivalent expenditure of i^{th} household in time period t or the average income of poor households
α =Poverty aversion parameter
Z- y_i = Poverty gap of the i^{th} household in time period t
$\frac{Z - y_i}{Z}$ = Poverty gap ratio at time period t
α = FGT index and takes the values of 0, 1 or 2.
If Pα is substituted by P0, P1 or P2, then it is used for measuring
Head count (incidence), depth and severity respectively.

The headcount index is obtained by setting the α = 0.
For the purpose of this study, the equations and variables for the estimation are identified as follows, beginning with the mathematical form of the relationship. The multinomial logistic regression model is a categorical multiple dependent variable which is a case specific.

$\mathbf{V_p = f(C_e, H_c, H_a, I_s)}$ ……………………………………………………... (2)

Transforming this into an estimable econometric equation it looks thus;

$V_p = \beta_0 + \beta_1 C_e + \beta_2 H_c + \beta_3 H_a + \beta_4 I_s + \mu_t$ …………………………………….. (3)

Where:
$\mathbf{V_p}$ is vulnerability to poverty ie the dependent variable;
$\boldsymbol{\beta_0}$ is the intercept term, β_1 to β_4 are the regression coefficient,
$\mathbf{C_e}$ is Vector of parameters depicting per capita consumption such as size of annual income, food consumption expenditure, non-food consumption expenditure, source of income.
$\mathbf{H_c}$ is the Vector of observable household characteristics such as: age of household head, household size, gender of household head, marital status, educational attainment of household head, occupation of the household head, residence type.

$\mathbf{H_a}$ represents Household assets owned by the household head and broken down into farm and non-farm assets, like size of farm, business, availability of credit facilities etc.
$\mathbf{I_s}$ is the vector of parameters describing the Insecurity witnessed, such variables will capture losses resulting from insurgency like, loss of food crops and animals, displacement for safety of life, impeded access to markets, schools and health facilities.
$\boldsymbol{\mu_t}$ is the error term.
A-priori expectations for this study are that:
The coefficient (β_1) of consumption expenditure variables (C_e) is expected to have a negative relationship with vulnerability to poverty ie $\beta_1 > V_p$
With respect to household consumption variables (H_c), age, male, single, higher educational attainment, non-agricultural occupations and urban are expected to have a negative relationship with vulnerability to poverty on a-priori grounds, otherwise positive.
From the Household assets variables (H_a), more of non-farm assets, large farm sizes, non-farm assets, availability of credit facilities on a-priori expectations are negatively related to vulnerability to poverty - i.e. $\beta_3>0$.
I_s variables are expected to have a positive relationship with vulnerability to poverty. This indicates that $\beta_4 > 0$.

IV. RESULTS ANALYSIS AND DISCUSSIONS

Table 1: Selected characteristics of respondents

Variables	Frequency	Percent (%)
Gender		
Male	204	68.00
Female	96	32.00
	300	**100.00**
Age in years		
18 to30	131	43.67
31 to 40	86	28.67
41 to 50	46	15.33
51 above	37	12.33
	300	**100.00**
Marital status		
Single	78	26.00
Married	165	55.00
Divorced	28	9.33
Widowed	29	9.67
	300	**100.00**
Educational status		
No formal	78	26.00
Primary	29	9.67
Secondary	60	20.00
Tertiary	115	38.33
Others	18	6.00
	300	**100.00**
Occupational status		
Business	105	35.00
C/servant	110	36.67
Farmer	34	11.33
Retiree	50	16.67
Unemployed	1	0.33
Others	0	0.00
	300	**100.00**
House ownership status		
Owned by household	191	63.67
Not owned by household	109	36.33
	300	**100.00**
Type of dwelling		
Single room	89	29.67
Apartment or flat	112	37.33
Duplex	17	5.67
Whole building	63	21.00
Others	19	6.33
	300	**100.00**
Credit facilities		
Yes	179	59.67

Table 1 cont.

No	121	40.33
	300	**100.00**
Farm size in hectares'		
None	70	23.33
1 to 2ha	106	35.33
3 to 4ha	51	17.00
5 to 6ha	48	16.00
7ha above	25	8.33
	300	**100.00**
Membership of association		
Yes	134	44.67
No	166	55.33
	300	**100.00**
Monthly income (₦)		
10,000 and below	131	43.67
11,000 to 30,000	60	20.00
31,000 to 50,000	55	18.33
51,000 above	54	18.00
Total	**300**	**100.00**

Source: Field Survey (2020).

The socio-economic characteristics in the study based on frequency and percentage (%) of respondents are reflected on Table 1. It indicates that 68% of the respondents are males, while 32% are female, thereby eliminating the fear of gender bias in the responses. The responses indicate that the age brackets of 18 to 30 and 31 to 40 years (active age), constitute the majority of the respondents. The implication is that the respondents in question were of active age and once strike by poverty the future would be devastated. The educational status in the study area revealed that 107 (corresponding to 35.67%) of the respondents had less than secondary school education, while 20% had secondary school education and 38.3% had post secondary school education. The implication is that the respondents in question were fairly educated and could therefore respond better to the study instrument. In the case of the membership of clubs and associations 134 (44.67%) of the respondents are linked with one form of association or the other and this could be of great economic benefit to them. On access to loans and other financial benefits in the study area, 179 (59.67%) of the respondents have access to one form of loan or the other. This makes it easier for them to be empowered. The farm ownership corresponding with its size in the study area revealed that 70 (corresponding to 23.33%) of the respondents had no farm at all, while 76.67% had farmland ranging from 1to more than 7hectres. With little incentive, this could seriously engage the teeming active age in the study area. On monthly income, the study revealed that 191 (corresponding to 63.67%) of the respondents earned ₦30,000 and below, 109 (36.33%) of the respondents earn above ₦31,000. The implication is that the respondents are low income earners and are at risk of remaining poor and vulnerable.

4.4 Foster, Greer and Thorbeck (FGT) Index Analysis

In order to examine the incidence of poverty in Yobe State of Nigeria; FGT index was used to measures the incidence (Head count ratio) of poverty. In doing so, the values of: n, m, yi derived by using FGT index formula:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{m} \left(\frac{Z - y_i}{Z} \right)^\alpha , \alpha \geq 0$$

Where;

z =Poverty line

m = Number of households below poverty line

n= Number of households in the reference population/total sampled population

y_i= Per adult equivalent expenditure of i^{th} household in time period t/the average income of poor households

α =Poverty aversion parameter

Z- y_i = Poverty gap of the i^{th} household in time period t

$\frac{Z - y_i}{Z}$ = Poverty gap ratio at time period t

α = FGT index and takes the values of 0, 1 or 2.

If Pα is substituted by P0, P1 or P2, then it is used for measuring Head count (incidence), depth and severity respectively.

The headcount index is obtained by setting the α = 0.

Here: Pα = Po and Z =$2 per head per day (i.e ₦800 per day).

Table 2: Computation of Values for measuring incidence of poverty in Yobe State

LGAs	n	M	yi (₦)
Damaturu	100	70	12,850.00
Geidam	100	62	14,911.29
Potikum	100	59	12,135.59

Source: Field Survey (2020).

From the computations on Table 2, it is evident that the adult per month average expenditure stands at ₦12850 in Damaturu, ₦14911 in Geidam and ₦12135 in Potiskum. This indicates that: Geidam has the highest average income of poor households than Damaturu and Potiskum respectively. This may be accounted for by the comparative vibrant economic activities in the LGA resulting from the Cattle, Donkey, sheep, goat, cereal and vegetable (i.e. Onion, Pepper) market. Column 3 of Table 2 is translated into Table 3 to capture the incidence of poverty in the LGAs in Yobe State more clearly.

Table 3: Incidence of poverty (%) in three local government Areas of Yobe State

LGAs	Poor	Non-poor
Damaturu	70	30
Geidam	62	38
Potiskum	59	41

Source: Computed from table 2.

Table 3 reveals that in the selected LGAs, the incidence of poverty in Damaturu is highest with a rate of 70%, which is quite high. That of Geidam stands at 62%, while that of Potiskum is 59%. This indicates that Damaturu has the highest incidence of poverty among the three LGAs. The reason for this variance is the fact that as an urban centre, it attracts a lot of youths seeking white collar jobs from the State government. These youths end up without anything to do, as such leave them with little or nothing to spend.
To capture the incidence of poverty in the state, the FGT index is still computed as follows:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{m}\left(\frac{Z-y_i}{Z}\right)^\alpha, \alpha \geq 0$$

where:
α=0 for incidence of poverty
m=191 as captured in the responses as those below $2 per day (₦800) poverty line
n=300 as the total number of respondents
yi=₦13298.3 which is the average income of poor households of the respondents

$$P_0 = \frac{1}{300}\sum_{i=1}^{191}\left(\frac{800-13298.43}{800}\right)^0$$

$$P_0 = \frac{1}{300}(191)(1)$$

$$P_0 = \frac{191}{300}$$

P_0=0.63667× 100%
P_0=63.67%

From the computation, Table 4 is extracted.

Table 4: Values of variables used to obtain incidence of poverty (%) in Yobe State

n	M	yi(₦)	Poor	Non-Poor
300	191	13298.43	63.67	36.33

Source: Field Survey (2020).

Table 4 reveals the poverty incidence for the whole Yobe state. Evidently, the poverty level among the people of Yobe state is high and stands at 63%. This leaves the non poor at 37%. Therefore the null hypothesis which states that there is no incidence of poverty in Yobe State of Nigeria is rejected, in favour of the alternative hypothesis that there is a high incidence of poverty in Yobe State of Nigeria.

4.5 Vulnerability to Poverty Analysis
Here the multinomial logistic regression model was employed to know the degree of households' vulnerability to poverty in Yobe State.

Table 5: Vulnerability to poverty composition

Vulnerability to Poverty	Freq.	Percent	Cum
Stagnant in future consumption pattern	107	35.67	35.67
Deteriorating in future consumption pattern	69	23.00	58.67
Improving in future consumption pattern	124	41.33	100.00
Total	300	100.00	

Source: Author's computation from survey data (2020) using STATA 13.

Table 5 indicates that 35.7% of respondents see stagnation in their future consumption; 23% see a likely deterioration in their future consumption; and 41% see an improvement. Considering that the first and second categories makes up the vulnerable group, it is evident that extent of vulnerability to poverty in Yobe State stands at 58.7%, as against those that are non vulnerable to poverty (41.33%). Going by this, the null hypothesis is rejected and the alternative hypothesis that there is high vulnerability to poverty in Yobe State is accepted. This is indeed a cause of concern. This high vulnerability to poverty may be as a result of the insurgent activity that incapacitated the economic activities in the state.

Furthermore, in order to examine the determinants of vulnerability to poverty in Yobe State. The multinomial logistic regression (mlogit) model with marginal effects was employed to ascertain variables that are significant as the factors responsible to vulnerability to poverty are determine in the study.

Table 6: Result of Marginal Effect from Multinomial Regression Model

Variables	Marginal Effect
Monthly income(min)	-1.66e-06 (0.383)
Monthly food Expenditure(mfe)	-3.32e-06 (0.145)
Occupational status(occ)	-.026392 (0.353)
Age(age)	-.0123515 (0.000)***
Gender(gen)	-.0505584 (0.448)
Household size(hou)	.0234325 (0.001)***
Farm size(siz)	-.0044704 (0.741)
Educational status(edu)	-.0988397 (0.000)***
Membership of association(mem)	.026178 (0.670)
Left LGA due to Boko Haram attack(s) (llg)	.1046452 (0.173)
Access to market and health facilities(amh)	.0948557 (0.128)
Type of losses due to Boko Haram attack(s)(tbh)	-.0154484 (0.439)
obs = 300; lr ch2 (24) = 70.98; prob > chi2= 0.0000, pseudo R^2 = 0.1105	

Source: Author's computation from survey data (2020) using STATA 13.

The table 6 revealed that the factors that are responsible for vulnerability to poverty in Yobe state are: Age of household head, educational status, and household size are significant, do so at 1% level of significance from mlogit model result. Age of household head and educational status had negative relationship which entails an increase in both by one unit reduces the chances of being poor and vulnerable by (1.2% and 9.9% respectively). On household size it has a positive relationship with dependent variable - vulnerability to poverty. This implies that a unit increase in the household size will increase the chances of the households becoming vulnerable to poverty by 2.3%. Variables like Monthly income, Monthly food Expenditure, Occupational status, Gender, Farm size, Membership of clubs and associations, Left LGA due to Boko Haram attack(s), Access to market and health facilities, and Type of losses due to Boko Haram attack(s) are insignificant in the model. Going by this, the null hypothesis is rejected and the alternative hypothesis that there are major determinants of vulnerability to poverty in Yobe State is accepted.

Based on the foregoing analysis, it is evident that the incidence of poverty in Yobe State is 63.7%, which is below the national average. The degree of vulnerability to poverty captured by the future consumption potentials of the people in the State is also high at (58.7%) and leaving the non vulnerable at (41.2%); and also the factors that are determinants to vulnerability to poverty are: Age of household head and educational status had negative relationship which entails an increase in both by one unit reduces the chances of being poor and vulnerable by (1.2% and 9.9% respectively), the household size has a positive relationship with dependent

variable - vulnerability to poverty. This implies that a unit increase in the household size will increase the chances of the households becoming vulnerable to poverty by 2.3%. Other variables measures and found to be insignificant in the model are: Monthly income, Monthly food Expenditure, Occupational status, Gender, Farm size, Membership of clubs and associations, Left LGA due to Boko Haram attack(s), Access to market and health facilities, and Type of losses due to Boko Haram attack(s). Going by these indices, one can conclude that households in Yobe State, Nigeria are vulnerable to poverty.

4.6 Independence of Irrelevant Alternatives (IIA) assumptions:

A stringent assumption of multinomial and conditional logit models is that outcome categories for the model have the property of independence of irrelevant alternatives (IIA). Stated simply, this assumption requires that the inclusion or exclusion of categories does not affect the relative risks associated with the regressors in the remaining categories. One classic example of a situation in which this assumption would be violated involves the choice of transportation mode. (Mc Fadden, 1974).

The 3rd edition of Long & Freese (section 8.4, pp. 407-411) explains the assumption further, and also explains ways of testing it. Long & Freese include tests for IIA in their programs but do NOT encourage their use. They note that these tests often provide conflicting results (e.g. some tests reject the null while others do not) and that various simulation studies have shown that these tests are not useful for assessing violations of the IIA assumption. ***They further argue that the multinomial logit model works best when the alternatives are dissimilar and not just substitutes for one another*** (e.g. if your choices were take your car to work, take a blue bus, or take a red bus, the two bus alternatives would be very similar and the IIA assumption would likely be violated, whether the tests showed it or not). Multinomial logit is not appropriate if the assumption is violated and Solution: Choose categories carefully when doing multinomial logit! (Long and Freese, 2014).

For the purpose of this study the three (3) alternatives are distinct and not substitutes for the dependent variable 'Vulnerability to Poverty'. They are: Stagnant in future consumption pattern; deteriorating in future consumption pattern; and Improving in future consumption pattern.

V. CONCLUSIONS

This study has assessed the household vulnerability to poverty in Yobe state, Nigeria using the data from well structured questionnaires and the results according to FGT index reveal that the poverty level among the people of the state is high and stands at 63%. This leaves the non poor at 37%. The Multinomial logistic regression (mlogit) model was used to analyse the degree and the major determinants of vulnerability to poverty in Yobe state. The study reveals that the vulnerable group stands at 58.7% of the respondents, as against those that are non vulnerable to poverty (41.33%). The result is in conformity with those of Abayomi (2012), Chiwaula and Waibei (2009), Agbaje et al (2013), Oluwatayo (2004), Alayande and Alayande (2004), Adepoju and Yusuf (2013), Oni and Yusuf (2007), Oyekale and Oyekale (2008), and Abimbola et al (2011) who found that vulnerability to poverty in Nigeria is high. The study also revealed that age of household head, educational status, and household size are significant and are the determinants of vulnerability to poverty in the state. Age and educational status had negative relationship which entails an increase in both by one unit reduces the chances of being poor and vulnerable by (1.2% and 9.9% respectively). However, the household size has a positive relationship with dependent variable vulnerability to poverty. These results suggest that household vulnerability to poverty in Yobe State is high and indeed a course for concern.

VI. RECOMMENDATIONS

Based on the results of this study, the research proffers the following recommendations:

- Safety nets such as; compulsory and free education, health facilities, better housing(low cost), pipe borne water, Sustainable environmental sanitation, free or subsidized farm inputs of (hybrid seeds, fertilizers, herbicides, pesticides, insecticides, and farm tools or implements) should be provided to all the people of the State.
- The government should provide microcredit facilities so as to aid their farm and nonfarm jobs.
- Government should equally provide free and compulsory education at all levels.
- The study, suggest further research to dwell on the down trough to cover villages, hamlets and internally displaced persons (IDP's) camps to deeply ascertain the degree of vulnerability in this part of the country (Yobe State).

ACKNOWLEDGEMENT

This research study was sponsored by Tertiary Education Trust Fund (Tetfund), Abuja, Nigeria.

SPONSORED BY:
tetfund
TERTIARY EDUCATION TRUST FUND

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