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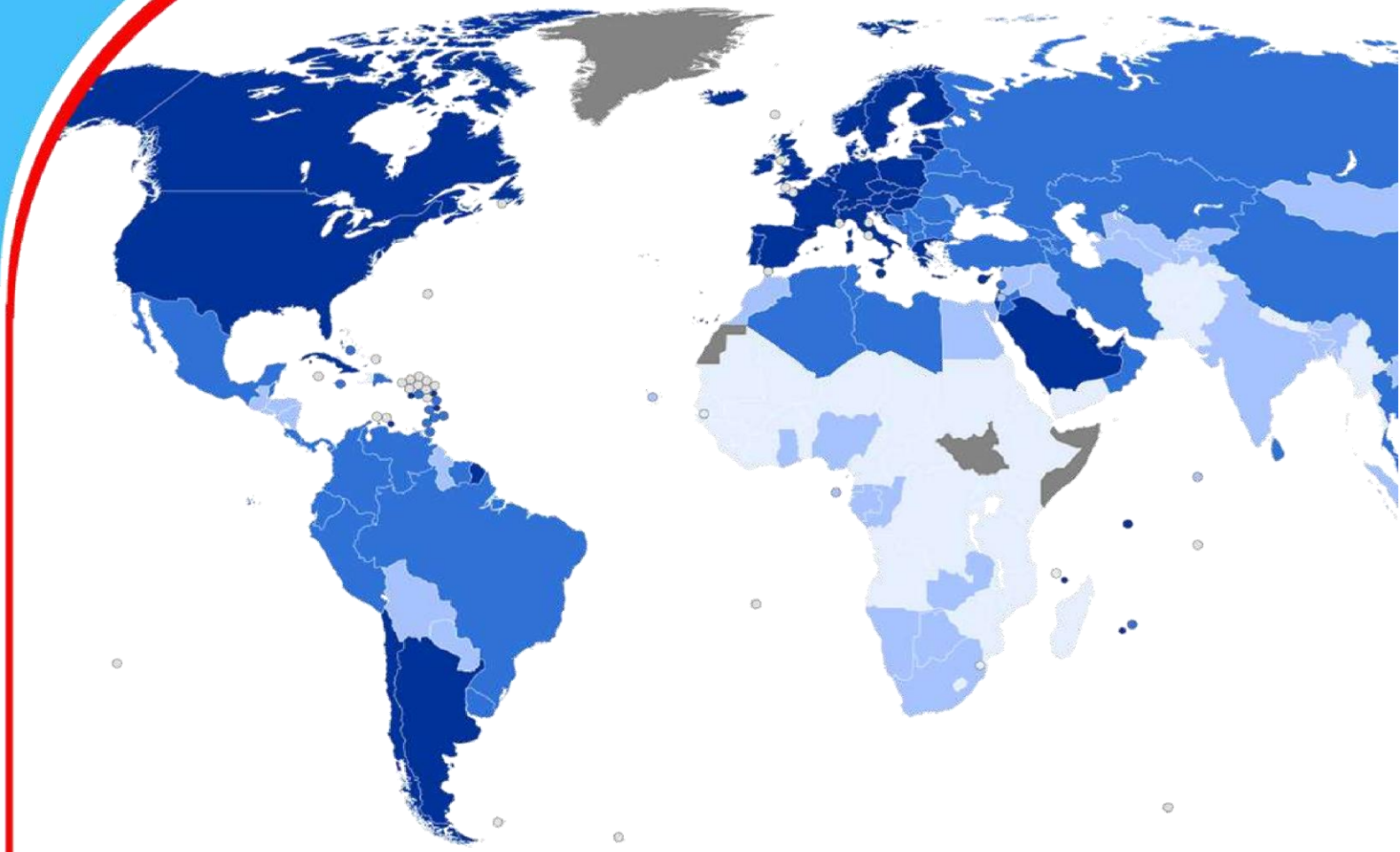

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DETERMINANTS OF POVERTY AMONG FARMERS IN SOUTHERN PART OF BORNO STATE, NIGERIA

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ABSTRACT

Purpose: The study analyzed the determinants of poverty among farmers in Southern Part of Borno State, Nigeria.

Methodology: Using multistage sampling technique, 120 farming households were sampled from 20 villages spread across five Local Government Areas in Southern part of the State. Structured questionnaire was used to obtain data on households' income, expenditure, value of free natural resources and information on the household livelihood-related factors. The data were analyzed using Foster, Greer and Thorbecke (FGT) model and Probit regression model.

Findings: A poverty line of ₦8588.48 was estimated and was enough to provide household with basic requirements per month for existence (food and non-food). Based on the poverty line of ₦8588.48, the FGT measure showed that 64% of the farming households in the study area were poor; the average depth of the poor households from the poverty line was 48%, while 22% of the poor farming households were severely poor. The probit regression revealed that age of the household head (0.083) and number of dependents (0.063) were both positive and significant. On the other hand, education (-0.062), farming experience (-0.069), farm size (-0.097), annual income (-0.061) and access to formal credit (-0.030) were all negative and significant.

Recommendations: The study therefore recommended that there is the need for policy makers and managers of poverty alleviation programmes to identify the poor at community levels so as to direct poverty alleviation programmes and projects towards them.

Key Words: *Poverty, Determinants, Borno State, Farmers*.

1.0 INTRODUCTION

Poverty is a multi-dimensional phenomenon covering economic, social and political dimension (Idakwoji, 2002; Isa and Timothy, 2014). From economic perspective, it implies materials deprivation leading to low income and lack of basic necessities of life such as food, clothes, shelter and health care services. From the social view point, poverty manifest in terms of social inferiority, low status, lack of dignity, insanity, vulnerability and social marginalization. Politically, poverty is manifested in lack of political power, form decision- making and denial of basic natural and political input. Poverty is also the inability of an individual to spend 1.9 dollar daily (World Bank, 2016). Globally, out of 889 million people that fall below the absolute poverty line (living on less than 1.9 U.S Dollar daily), Sub-Saharan Africa has the highest proportion of the poor (43.8%), followed by South Asia (34.8%), East Asia and Pacific (16.5%) and Latin America and the Caribbean, Europe and Central Asia (4.9%) (World Bank, 2017).

Sub-Saharan Africa is home to 27 of the world's 28 poorest countries (World Bank, 2017). Central African Republic with 78% of its population living below the poverty line has the highest poverty level followed by Burundi and Democratic Republic of Congo with 75% and 72% respectively (World Bank, 2017). Nigeria is not exempted from the poverty experienced in SubSaharan Africa. The Nigeria's situation is even described by World Bank (1996) as a paradox. This is because despite the fact that the country is enormously endowed with both natural and human resources, it has retrogressed from being among the richest 50 countries in the early 1970's to become one of the 25 poorest countries in the twenty-first century (Obadan, 2001). In response to the alarming poverty experienced in the country, successive government in Nigeria has formulated policies such as the National Poverty Eradication Programme (NAPEP), Subsidy Re-Investment Programme (SURE-P), Family Support Programme (FSP) and Better Life Programme (BLP) in order to alleviate poverty. Despite these efforts, the poverty level has continued to be on the increase. For instance, the national poverty incidence was 65.6% in 1996 and declined to 54.4% in 2004. However in 2010, the national poverty incidence surged higher to 69% (National Bureau of Statistics, 2011). This increase in poverty profile was as a result of households' socioeconomic characteristics, land degradation, ill-health/diseases (Olowa, 2012).

Households' socioeconomic characteristics such as age, educational status and farm size were found to influence poverty status (Umeh, Ogah and Obanje, 2013). For instance, Age has been found to determine how active and productive the head of the household would be which in turn, affects household productivity and poverty (Dercon and Krishnan, 1996). In addition, the level of education helps farmers to use production information efficiently; as more educated persons acquires information, their level of production increases and poverty reduced (Amaza, Abdoulaye, Kwaghe and Tegbaru, 2009). Thus, households' socioeconomic factors, among others have been identified by development practitioners in developing countries as variables which can be manipulated through policy levers to improve welfare of the poor (Bandabla, 2005).

Like in many part of Nigeria, poverty has been pervasive in Southern part of Borno State (FOS, 2004). To achieve poverty reduction in the study area, it became necessary to empirically

measure the poverty status and examine the determinants of poverty among the farming households. This study therefore aimed at exposing this information.

Objectives of the Study

The objectives of the study were to:

i. Determine the poverty status of the farmers and
ii. Estimate the influences of socio-economic characteristics of the farming households on their poverty status.

2.0 METHODOLOGY 2.1 Study Area and Data Collection

The study was carried out in Southern part of Borno State, Nigeria. It lies between latitudes 10º00` and 11º30` North of the equator and longitudes 11º30` and 14º00` East with a projected population of 1.79 million in 2018 using annual growth rates of 3.6% (National Population Commission, 2006). It shares borders with Gombe State to the South, Adamawa State to the East and Yobe State to the West. The average annual rainfall ranges from 600mm-1200mm and the average annual temperature ranges between 23^0C-37^0C. The vegetation consists of shrubs interspersed with trees and woodland. Agriculture is the major economic activity in the area. The agricultural activities can be categorized into cropping activities and animal husbandry (Amaza, 2016). The major crops cultivated are millet, sorghum, maize, groundnut, wheat, cowpea and soybeans. Vegetables such as onions, pepper, tomatoes and garden eggs are also grown in the area (Ahmed, Eugene and Abah, 2015). The major animals reared include cattle, sheep, goats, pigs and poultry (Amaza, 2016).

Both primary data and secondary information were used for this study. Primary data were collected through administration of structured questionnaire to gather information on socioeconomic characteristics of farmers (such as sex, age, educational level, number of dependents, farming experience, farm size, annual income and access to formal credit) and poverty status related information (such as household income and expenditure). Secondary information were obtained from related publications such as journals, proceedings of annual conferences, text books and relevant websites. A total of 120 farmers were purposively selected from 20 villages spread across five (5) Local Government Areas (LGAs) using multi-stage sampling technique. The sampling frame is a list of functional registered farmers in the selected communities which was obtained from Borno State Agricultural Development Programme (BOSADP).

2.2 Analytical Techniques

A combination of Foster, Greer and Thorbeck (FGT) index, and Probit regression model were used in the analysis. The FGT index was used to determine the poverty status of the farmers while Probit regression model was used to estimate the influences of socio-economic characteristics of the farming households on their poverty status.

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2.2.1 Foster, Greer and Thorbeck (FGT) index

The FGT weighted poverty index was used to determine the poverty status of the farmers. It is a single equation that makes it possible to measure three (3) dimensions of poverty indices mainly: poverty head count (P_0), poverty depth (P_1) and poverty Severity (P_2) but each index puts different weights on the degree to which a household or individual falls below the poverty line. The measure accomplished this through the choice of poverty aversion parameter alpha (α). The larger the α, the greater the weight given by the index to the severity of poverty. The poverty index is defined mathematically as follows:

$$P^{\propto} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^{\propto} \text{----------(3.1)}$$

Where:

α = the FGT index and it takes values 0, 1 or 2 n

= total number of households

q = number of households below the poverty line

Z = poverty line

Y_i = the Monthly Mean per Adult Equivalent Household Expenditure (MPAEHE) of the household in which individual i^{th} lives

In defining the measures, the consumption or household expenditures was arranged in ascending order, from the poorer Y_1, next poorest Y_2... with the least poor Y_q. The FGT index operates as follows:

When α = 0, the FGT is measuring poverty headcount ratio (no aversion to poverty). In other words, it is measuring the proportion of the poor households to non-poor households. Thus,

$$P^{\propto} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^{\propto} = P_0 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^{0} = \frac{q}{n} = H \text{----------(3.2)}$$

When α = 1, the FGT model is measuring the depth of poverty (the headcount times the average expenditure shortfall). It is also called the poverty gap between the i^{th} poor farming household and the poverty line. Therefore, P_1= Headcount × average expenditure shortfall. Thus,

$$P^{\propto} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^{\propto} = P_1 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^{1} = \frac{q}{n} I = HI \text{----------(3.3)}$$

When α ≥ 2, this is called Poverty severity index which measures the squares of the poverty gaps relative to the poverty line. By squaring the gap between the expenditure and the poverty line, more weight is given to the poorest individual than those just slightly below the poverty line. As a result, the expenditure gap ratios of poorer households weigh more importantly in the calculation of P_α than the expenditure gap ratios of less poor households. Thus, P_1= Headcount × average squared expenditure shortfall.

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$$P^{\propto} = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^{\propto} = P_2 = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{(Z - Yi)}{Z}\right]^2 \text{----------(3.4)}$$

Unlike the P_0 and P_1, the P_2 measure is sensitive to the distribution of expenditure among the poor. Here, the P_α is the weighted sum of individual expenditure shortfalls where income gaps themselves are the weights.

Setting a poverty line for measuring poverty can be done using different standards; for instance, the $1.9 provided by World Bank (2016); and the food poverty line of 3000 kilocalories per day for an equivalent adult as recommended by World Health Organization. For this study however, the standard of living of households used in measuring the poverty level in the study area was based on total monthly consumption expenditure (food and non-food expenditure).

The monthly MPAEHE for the sampled households was obtained through the following procedures: The total consumption expenditure (food and non-food) of each household is divided by the number of members in each of the household to obtain individual expenditure or per capita expenditure as used by the World Bank (1996).

Table 1

Nutritional (Calorie based) Equivalent Scales

Age in Years	Male	Female
0-1	0.27	0.27
2-3	0.45	0.45
4-6	0.61	0.61
7-9	0.73	0.73
10-12	0.86	0.78
13-15	0.96	0.83
16-19	1.02	0.77 20
and above	1.00	0.73

Source: FOS 2004.

This was further converted into per adult equivalent expenditure using the scales as contained in Table 1. This was done by multiplying each of the household's per capita expenditure by number of household members that fall in any of the age distribution by sex. The converted per adult equivalent expenditure for each group by age and sex are then summed up for each household to obtain the monthly per adult equivalent household expenditure (MPAEHE).

The MPAEHE of all the households were then ranked and divided into equal increments. For this study, the divisions was based on deciles or 10% increments such that the first decile represents the bottom 10% of the sampled households in terms of consumption expenditure (or presumably the poorest) and the highest or the 10^{th} decile was that increment which represents the highest 10% of the sampled households in terms of consumption expenditure (or presumably the richest). The

MPAEHE of all the deciles were then summed up and divided by ten to get their mean. Two-third of the mean was then computed to arrive at the MPAEHE which served as the poverty line for the study.

2.2.2 Probit Regression Model

Probit regression model was used to analyze the influence of socio-economic characteristics on poverty status. The model is expressed in equation 3.5,

$P=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+ e_i$ ----------(3.5)

Where;

P = Poverty index of households (such that P = 1 if household's expenditure is below the poverty line and P = 0 if otherwise). β_0 = Constant (autonomous poverty)

X_1 = Sex of household head (1 = male, 0 = female) X_2

= Age of household head (years)

X_3 = Years of formal education of household head

X_4 = Number of dependents (Number of un-employed persons in the household)

X_5 = Experience in farming (years)

X_6 = Farm size (hectares)

X_7 = Annual income of household (₦)

X_8 = Access to formal credit (had access = 1, 0 = If other wise)

$\beta_1 - \beta_8$ = Coefficients of the independent variables e_i =

Random disturbances

3.0 RESULTS AND DISCUSSION 3.1 Poverty Status of the Farming Households

3.1.1 The poverty line

To estimate the poverty line, the monthly MPAEHE of the sampled households was arranged by deciles (Table 2). The result shows that the sampled households that fell in the first decile or the bottom 10% survived on an average of ₦4,159.91 per month and their share of the total monthly MPAEHE was 3.23% while those in the last decile spent an average of ₦32,968.07 per month and their share of the total monthly MPAEHE was 25.59%.

Table 2

Distribution of the Monthly MPAEHE by Deciles

1st	4159.91	3.23
2nd	5578.39	4.33
3rd	5862.30	4.55
4th	7124.30	5.53

5th	8127.65	6.31	Deciles
6th	8399.71	6.52	MPAEHE
7th	11143.65	8.65	Exenditure Distribution (%)
8th	18409.40	14.29	
9th	27053.84	21.00	Total
10th	32968.07	25.59	128827.22
Mean	12882.72		
2/3(MPAEHE)	8588.48		

Source: Field Survey, 2018.

The first decile represented the poorest twelve households from the sampled one hundred and twenty households, while the tenth decile represented presumably twelve richest households of the sample. The poverty line of ₦8,588.48 which was the 2/3 of the means of the MPAEHE was located within the twelve households of the seventh decile. This poverty line based on 2018 prices was expected to meet the minimum basic requirements (food and non-food) of household per month in the study area. Thus, any household in the study area with per capita monthly expenditure greater than or equal to ₦8, 588.48 was considered to be non–poor or rich whereas any household with per capita monthly expenditure below ₦8, 588.48 was considered poor.

3.1.2 Poverty profile

The poverty profile of the farming households obtained from the FGT model which includes P_0, P_1 and P_2 are presented in Table 3. The P_0 for the entire farming households was 0.64 which implies that 64% of the farming households were poor or made expenditures below the value of the poverty line (₦8588.48). The proportion of the non-poor farming households on the other hand was 0.36 implying that only 36% of the farming population in the study area can spend up to or above the value of the poverty line. This is consistent with the finding of Alawode, Akuboh and Abegunde (2016) who observed the level of poverty among farmers in Kogi State to be 64.2%.

Table 3

Poverty Profile of the Households

Index	Naira/Percentage
MPAEHE	₦12882.72
Poverty Line (2/3 MPAEHE)	₦8588.48
Head Count Index (P_0)	0.64
Non-poor	0.36
Poverty Gap Index (P_1)	0.48 Poverty
Severity Index (P_2)	0.22

Source: Field Survey, 2018.

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The value of the P_1 was 0.48 implying that an average poor farming household in the study area requires 48% of the poverty line (₦4122.47) in order to escape poverty or to be classified as non-poor. The value of the P_2 which measures the distance of each poor person to one another was found to be 0.22 implying that among the poor households, 22% were severely poor. This shows that the poor households were not equally poor but they vary in their degree of poverty. **3.2 Influences of Socio-economic Characteristics of the Farmers on their Poverty Status**

Result of the Probit regression model is shown on Table 4. The pseudo R-square shows that about 24% of the variability in poverty was explained by the set of explanatory variables of the model. The log-likelihood function (-62.71) and the Chi-square (39.29) were both significant at 1% level, implying that the model was well fitted.The result showed that seven out of the eight listed variables had significant influence on the poverty status of the farming household's head, while only one variable did not influence poverty status. The variables that had significant coefficient were age of the household head, educational level, number of dependents, farming experience, farm size, annual income and access to formal credits. The only variable that was not significant was sex of household head (Table 4).

Table 4
Socioeconomic Factors influencing Poverty Status

Variables	Coefficients	Standard Errors	Z-values
Constant	0.734	0.317	2.32**
Sex	0.019	0.867	0.22NS
Age	0.083	0.796	2.29***
Education	-0.062	0.248	-2.51**
Number of Dependents	0.063	0.171	3.68***
Farming Experience	-0.069	1.163	-2.31**
Farm Size	-0.097	0.375	-2.59***
Annual Income	-0.061	0.231	-2.65***
Access to Formal Credit	-0.030	0.151	-2.00**
LR Chi^2 (8) =	39.29***		
Prob>Chi^2 =	0.0010		
Log likelihood =	-62.71		
Pseudo R^2 =	0.239***		

*** = Significant at 1%; ** = Significant at 5% and NS Not Significant Source: Computed From Field Survey, 2018.

Age of household head (0.083) was positive and significant (P<0.01), implying that one year increase in age of household head result to a probability of an increase in the poverty status of the farmers by 8%. This might be attributed to the fact that older farmers are less receptive to the adoption of farm improved techniques that can increase output and income and consequently

increases poverty. Similar result was reported by Mailumo, Omolehin and Ajala (2015) that age of household head had positive effects on poverty.

The coefficient of education (-0.062) was negative and significant (P<0.05) implying that one year increase in years of schooling by household head result to a probability of decrease in poverty status among farming households by 6%. Increase in the numbers of years schooled will help the farmers adopt innovations that will bring about increased yield and better organization of the farm. All these will reflect on their total income and help households fight poverty. Singh, Singh, Meena, Kumar, Jha and Kumar (2011) also observed that education had negative effects on rural poverty in Jharkhand, India.

Number of dependent persons with coefficient of 0.063 was positive and significant (P<0.01) implying that a unit increase in dependent person in a household result in the probability of increasing poverty status among farming households by 6%. This agrees with the *apriori* expectation because increase in dependent persons poses a threat on households' income, as those that belong to this group does not makes any contribution to farming activities within the household and were depending on the household for their needs. This finding is in line with that of Kwaghe (2005).

The coefficient of farming experience (-0.069) was negative and significant (P<0.05), implying that one year increase in farming experience result in the probability of decreasing poverty status among the farming households by 7%. As farmers gain experience in farming, they adopt improved agricultural technologies and other production related decisions which will boost their output and income and consequently reduces poverty.

Farm size with coefficient -0.097 was negative and significant (P<0.01) implying that a unit increase in farm size result in a probability of reducing poverty among the farming households by 10%. This is obvious because *ceteris paribus* an increase in farm size should result in a concomitant increase in output, and consequently income. Ibrahim and Umar (2008) also observed negative influence of farm size on poverty.

The coefficient of annual income (-0.061) was negative and significant (P<0.01) implying that an increase in income decreased the probability of poverty among the farmers by 6%. This is because higher income tends to bring about welfare improvement hence reduction in poverty levels.

Access to formal credit with coefficient -0.030 was negative and significant (P<0.05) implying that increase in access to formal credit by farmers decreases the probability of poverty among the farming households. This is probably because as farmers gain access to credit, they invest in farming and other income generating activities which in turn increase their income. Teka, Woldu and Fre (2019) also observed credit utilization had a negative influence on poverty among Agro-pastoral Communities in Afar Regional State, Ethiopia.

4.0 Conclusion and Recommendations

The study concluded that majority of the farming households in the study area were poor and socioeconomic characteristics of the farmers had effects on poverty status. Specifically, age and number of dependent persons increased the probability of increasing poverty among the farming households. On the other hand, educational level, farming experience, farm size, annual income and

formal credit decreased the poverty status among the farming households. Based on the findings of this study, the following recommendations were made;

i. There is the need for policy makers and managers of poverty alleviation programmes to identify the poor at community levels so as to direct poverty alleviation programmes and projects towards them and
ii. Households should be encouraged to intensify combination of enterprises and non-farm activities that could generate more income.

4.1 Suggestion for Further Study

The study analyzed the determinants of poverty among farmers in Southern Part of Borno State, Nigeria. The following areas are suggested for further study;

i. Determinants of poverty among non-farming households especially urban dwellers
ii. Effects of ill health/diseases on poverty among farming households and iii.
Effects of ill health/diseases on poverty among non-farming households.

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