

Poverty Status and Dietary Diversity Among Farming Households in Gassol, Taraba State, Nigeria

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Abstract

This study examined the relationship between poverty status and dietary diversity among farming household in Gassol, Taraba State, Nigeria. Simple random sampling technique was employed to select 120 households in the study area from whom data were collected. The data were analyzed using Household Dietary Diversity Score (HDDS); Foster, Greer and Thorbecke (FGT) Index; and Tobit regression model. The result of HDDS showed that 92% of the farming households had low dietary diversity while the FGT result showed that 70% of the farming households were poor. Tobit regression revealed that the coefficients of household size, farm size, household dietary diversity and income from sales of non-agricultural goods were negatively significant; however gender and marital status were positively significant. Based on this, it was established that there is a significant relationship between poverty status and HDDS. This relationship was such that the higher the level of poverty, the lower the dietary diversity of the farming households. This implies that the poorer a farming household is, the lesser their dietary diversity and nutritional intake. This could be attributed to the minimal profit margin obtain by farmers owing to the fact that they mostly sell their farm produce immediately after harvest. Consequent upon this, they remain impoverished and unable to feed well. It is therefore recommended that the shelve lives of these agricultural produce should be enhanced through research. There is also need for the farmers to be educated on the importance of balance diet. Finally, they should be supported with nutritional supplements to improve their health status and consequently their poverty status.

Keywords: Poverty, dietary, diversity, farming, households, Gassol

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1 Introduction

Poverty has remained a global problem that continued to demean human dignity by making life to be degrading (Kwaghe *et al.*, 2009). Poverty experience by Nigerians is pervasive, multifaceted and chronic, affecting the lives of a large proportion of the populace (Kwaghe *et al.*, 2009). The issue of poverty has been a major concern to many nations, particularly the developing countries. Since independence in Nigeria, effort at national and community development has been aimed at reducing poverty and promoting growth. Poverty in Nigeria remains significant despite high economic growth reported in the country. It first started sometimes during the British Empire. Oshewolo (2010) reported that Nigeria is richly endowed and the country's wealth potential manifest in the form of natural, geographical and socioeconomic factors. With this condition, Nigeria rank among the richest countries of the world that should have no business with extreme poverty. Similarly, Nigeria's economic growth rate averaging 7.4% has been reported to be one of the world's highest (NBS, 2013). In spite of this, the country has experienced a massive increase in the level of poverty reported to be 74.2% in the year (Oshewolo 2010). The National Bureau of Statistics presented a grim statistics of Nigeria's population in abject poverty. The report that about 112 million Nigerians actually lived below the poverty line (NBS, 2012). The population of Nigerians in poverty has increased considerably with about 67% of the entire population in 2013 (World Bank, 2013). Consequently, the menace of poverty in Nigeria is an incontrovertible fact which has a concomitant effect of hunger, ignorance, malnutrition, disease, unemployment, poor access to credit facilities and low life expectancy as well as a general level of human hopelessness.

Worldwide, around 925 million people are chronically hungry due to extreme poverty, while up to two billion people lack food security intermittently due to varying degrees of poverty (FAO, 2012). Household food insecurity is directly influence by a low access to food. Consequently households that lack access to food generally have low dietary diversity, indicating deficiency of basic nutrients. Dietary diversity is the number of different foods or food groups consumed by the household over a reference period not regarding frequency of consumption (Hoddinott and Yohannes 2002). It is an outcome measure of food security at the individual or household level. In the present study, dietary diversity refers to the number of food groups consumed over a 24 hours period.

Household dietary diversity is influence by accessibility to food. It is estimated that close to one billion people in the world suffer from hunger and food insecurity - define as not having enough calories to live a healthy life (Nmadu, *et al.* 2014). Nearly the entire undernourished people are in developing countries with worst scenarios in Asia (578 million) and sub-Saharan Africa (239 million) (IFPRI, 2011). In the case of Nigeria, an estimated 61 percent of the people are malnourished (Momodu, *et al.*, 2011).

The number of people in Nigeria who lack access to nutritious foods rich in essential micronutrients such as fruit and vegetable, meat, fish, dairy products and biofortified staple foods is staggering (FAO, 2011). This leads to deficiency in micronutrient such as vitamin A, iron and Zinc and affect the survival, health, development and well-being of billions of people. However, it has been observed that the more food groups included in a daily diet the greater the likelihood of meeting nutrient requirement while monotonous diets, based mainly on starches such as maize and bread have been closely associated with food insecurity and poverty. This study therefore analyzed the relationship between poverty and dietary diversity among households in Gassol Local Government Area, Taraba State.

2. Theoretical underpinning

A search of relevant literature shows that there is no generally accepted definition of poverty. This is because poverty more often than not affects the entirety of human condition including moral, psychological and physical. This makes a concise and universally accepted definition of poverty to be elusive. Little wonder Udusola (1997) reported that poverty like an elephant, is easier to recognize than to define. In simple language, poverty, like beauty, lies in the eye of the beholder (Townsend, 1979, Kwaghe, 2006).

This study recognized the definition of poverty in both absolute and relative terms as observed by Omeiza (2009) where poverty is understood to be a multifaceted concept which manifests itself in different forms depending on the nature and extent of human deprivation. In absolute terms, poverty refers to insufficient or in rare cases, the total lack of basic amenities like food, housing, medical care, education, consumer goods and opportunities. In relative terms, humans are poverty stricken when their homes fall radically below the community average (Omeiza, 2009). This suggests that such a people cannot have what the larger society regards as the minimum necessity for a decent living. A simplified view of the poor is that which is expressed by a poor man in Kenya in 1997 as reported by Narayan, *et al.* (2000) thus: "Don't ask me what poverty is because you have met it inside my house. Look at the house and count the number of holes. Look at my utensils and the clothes that I am wearing. Look at everything and write what you see. What you see is poverty". In line with these definitions therefore, poverty refers to inadequate basic necessities for human survival.

The theoretical base of various researchers were located in the Human Capital Theory made popular by (Amacher, 1986; Schultz, 1960 and 1961; and Tilak, 2002). Human Capital Theory is a welfare economic theory that holds that investments in health, education and skills of citizens is more productive than investment in machines, bridges and tractors. Schultz (1975) asserted that human capital theory not only accounts for the shape of income distribution, but also the unexplained variation in earnings among individuals, regions and subgroups in the society. Amacher (1986); Tilak (1994 and 2005) opined that most low income countries invest very little in Human Capital or the health, education and skills of their citizens. They argued that increase in human capital reduces the level of poverty.

Quite a number of economic researchers (James, 2006 and Lynne, 2002) established that there is a positive link between educational attainment and the economic status of individuals in relation to their regions or countries of abode. This means that people with higher levels of education earn substantially more than those with less. In general, citizens of developed countries with higher proportions of better educated citizens achieved higher standards of living than countries with lower proportions.

The basic physical need approach views poverty in very broad terms such as being unable to meet basic physical needs (food, water, clothing and shelter) requirements of a "meaningful life" (Streeten, 1979 and 2000; Blackwood and Lynch, 1994 and Oluwa, 2012). This idea of poverty as propounded by the above scholars attracted tremendous criticisms. Elements of these basic human needs include food, water, clothing and shelter. Incidentally, these are also the elements of the lowest level of Maslow's hierarchy of needs (Hagarty, 1999). These needs according to Maslow must be satisfied in order to survive and if there is an acute deficiency, he argued the individual will react by directing most of his/her energies towards obtaining the minimum requirement for physical survival. In the event of a failure to secure this minimum, Maslow maintained that it will lead to impaired physical efficiency and eventual death. In the light of this, the World Bank report (1991) based its notion of absolute poverty and it forms the basis for the specification of poverty line.

Adeyeye (2000) observed that this idea of poverty is limiting, in the sense that it cannot form the basis for interpersonal, inter temporal, international and even spatial comparisons. Despite the criticisms, the notion of absolute poverty however remains relevant, especially in areas prone to famine and other natural and man-made disasters. The concept of absolute poverty is also relevant in that it is the type of poverty that policy makers and international development agencies are striving to eliminate. There is uniformity from the foregoing definitions of poverty above. In each case, emphases were laid on basic needs, physical or non-physical needs or even all in some cases.

Information about the individual or household dietary diversity in populations can serve as a simple indicator of food security and poverty status (Azadbakht *et al.*, 2006). Food security entails three important aspects (availability, access and utilization) in the relationship between man and food, necessary to ensure that nutrition

plays its optimum role in human health. Dietary diversity has been positively linked with these three pillars of food security (Hoddinott and Yohannes, 2002). Individual and household access to food has also been shown to be affected by demographic and socioeconomic factors, accounting for variations in diet quality (Kwaghe, 2006). Studies have demonstrated the contribution of dietary diversity to population-level nutrient adequacy in developing countries, with fewer studies considering the value of cultivated and wild biodiversity (Ruel, 2003). It has recently been shown that in a peri-urban area of Dakar, Senegal (in west Africa), dietary diversity is positively correlated with intakes of several key nutrients, specifically Ca, Fe, Zn, vitamin A, vitamin C, thiamin, riboflavin and vitamin B6 (Kennedy, *et al.* 2009). The study in Vietnam, which included adult women, validated the diversity measures against nutrient intake and nutrient density. The findings confirm a positive association between the two measures of diversity and intake of energy and a variety of nutrients. Using a multi-country analysis of data from 10 countries Hoddinott and Yohannes (2002) tested whether household dietary diversity was associated with consumption/expenditure and food security. The results indicate that as income increases people tend to diversify their diet (Torheim *et al.*, 2004). Diversity also significantly improves dietary quality and the likelihood that individuals will meet their daily nutrient requirements, especially with regard to essential micronutrients and it may be a good proxy for greater income/expenditure and food security (Heady and Oliver, 2013).

This paper follows the conventional view of poverty as a result of insufficient income for securing basic foods with the resultant effects as malnutrition, sickness and diseases. The emphasis here is with the individual's ability to subsist and to procreate as well as to command resources to achieve a living (Sen, 2004 and 2005; Amins and Rakodi, 1994). Historically this involves a transition from a situation where subsistence depends upon wages with which to purchase foods.

3 Methodology

3.1 Study Area

Gassol is a Local Government Area in Taraba state, Nigeria. It's headquarter is in the town of Mutum Biyu on the A4 highway. It is located between latitude 8°24' and 8°40'N and longitudes 10°32' and 10°53'E. It has an area of about 5,548km². Based on a population growth rate of 3 percent, the estimated projected population stands at 328,922 (2006 census projected to 2016). The northern border of Gassol is the Benue River, the Taraba River flows north through the area and empties into the Benue. Gassol is one of the eight LGA's of Taraba state whose majority population is the mumuye people. The major crops grown are: Yam, cassava, maize, guinea corn, cowpea, egusi and groundnut.

3.2 Sampling Technique and Procedure.

Farming household constituted the population of this study. There are twelve (12) major villages in the study area (Mutum Biyu A, Mutum Biyu B, Sabongida, Sendirde, Shira, Namnai, Yerima, Tutare, Gassol, Wuryo, Gunduma and Wurojam). Six (6) villages were randomly selected using balloting techniques. In each village a proportionate number (10%) of respondents were selected from the sample frame. Questionnaires were administered to households in the ratio as follows: total of 25 questionnaires were administered in Gassol, 25 in Mutum Biyu A, 20 in Gunduma, 20 in Shira, 15 in Yerima, and 15 in Tutare making the total of one hundred and twenty (120) questionnaires. The distribution was informed by the number of active farming households in the villages.

3.3 Data Analysis.

Primary data was used for this study. Primary data was sourced from a set of well-structured research questionnaire in line with the stated objectives of this work which was administered to the selected households in the study area. Data generated was analyzed using Household Dietary Diversity Score (HDDS); Foster, Greer and Thorbecke (FGT) Index, and Tobit Regression.

3.3.1 Household Dietary Diversity Score (HDDS)

Data on household dietary diversity was collected using 24 hour dietary intake. The information collected on dietary consumption was used to calculate a dietary diversity score (DDS), define as the number of different food groups consumed by family members over 24 hours. Dietary data was collected by means of a validated 24 hours recall which is not quantified. Respondents were visited in their homes during the survey. Both spouses constituted the respondents. The women were involved because they are mostly in charge of cooking meals for households, it is assumed that they have good ability to remember foods eaten (Haggblade, *et al.*, 2007). For this study the twelve (12) food groups recommended by Food and Agriculture Organization of the UN (FAO, 2007) was used to assess household dietary diversity scores (DDS). The 12 food groups are:

1. Cereal.
2. White roots and tubers.
3. Vegetables.
4. Fruits.
5. Beans and pulses.
6. Meat and fish.
7. Fish and other sea food.
8. Pulses, Legumes and Nuts.
9. Milk and Milk products.
10. Oils and Fat.

5. Meat. 11. Sugar / honey
 6. Eggs. 12. Spices, Condiments and beverage.

3.3.2 Foster Greer Thorbecke (FGT) Index.

FGT was used to assess the poverty status of the respondents. The FGT consider poverty as dependent on the poverty gap ratio, and assume as the power of that ratio, thus;

$$pa = \frac{1}{n} \sum_{i=1}^q \left[z - \frac{y}{y} \right] = \frac{q}{n} \sum_{i=1}^0 \left[z - \frac{y}{y} \right] q \quad (1)$$

Incidence of poverty = $\frac{q}{n}$

Where;

Y_i = the average consumption per capita for the 1st household When household are ranked in ascending order of consumption.

Z = the poverty line.

$[Z - Y_i]$ = the poverty gap household 1.

n = the total number of the household below poverty line.

q = the FGT and it takes values as 0, 1,2.

3.3.3 The Tobit Regression

The Tobit model is expressed following Tobin (1958). Tobit decomposition framework examined the relationship between poverty status and the socio – economic factors that influenced poverty among the respondents. The Tobit Model can be mathematically expressed as:

$$V_i = \begin{cases} V_1 = \beta X_i + \varepsilon_i & \text{if } V_1 > V_1^* \\ V_0 = \beta X_i + \varepsilon_i & \text{if } V_1 \leq V_1^* \end{cases} \quad (2)$$

Where:

V_i = the dependent variable, it is discrete when the households are not poor and continuous when they are poor.

$i = 1, 2, \dots, N_i$, where N_i is the total number of poor households.

V_1 = Limited dependent variable, it is the poverty depth/intensity defined as $(Z - Y_i)/Z$, where Z is the poverty line and Y_i is MPAEHE

V_1^* = the poverty depth when the poverty line (Z) equals the MPAEHE (here $V_1^* = 0$)

X_i = vector of explanatory variables

β = vector of unknown parameters

ε_i = independently distributed error term.

The empirical model used for determining socio economic factors that influenced poverty among farming households in the study area was specified as:

$$V_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \varepsilon_i \quad (3)$$

Where:

V_1 = limited dependent variable, it is the poverty depth/intensity

β_0 = constant (autonomous poverty depth)

β_i = vector of unknown parameters

ε_i = independently distributed error term

X_1 = Age of the respondent (years).

X_2 = Gender.

X_3 = marital status.

X_4 = Educational level (years).

X_5 = Household size (numbers).

X_6 = Farming experience (years).

X_7 = Farming size (ha).

X_8 = Part time occupation.

X_9 = Distance to nearest market (km).

X_{10} = Dietary diversity (1 = high DDS, 0 = low DDS)

X_{11} = Income from agricultural products (₦)

X_{12} = Income from non-agricultural product (₦)

4 Result and Discussion

4.1 Food Intake Diversity

Twelve (12) food groups included in the (Household Dietary Diversity Score) were cereals, roots and tubers, legumes and products, meat and product; fish and sea foods; dairy and products, fruits and product, bakery product; fat and oils, poultry and eggs and miscellaneous. These food groups were used to identify food intake quality of households in the study area. Dietary diversity indexes have been shown to be good proxy for calorie intake and nutritional outcomes (Ruel, 2006). The frequency distribution of household dietary diversity index presented in

Table 1 shows that 92% of the sampled household had 0-6 food groups in their diet per day, while 8% of the households had 7-12 food groups in their diet. This implies that most households had low food intake diversity per day due to competing demand on available household income which limits their access to varieties of foods. Also, this result was not unexpected because some of the households do not produce significant share of their own food. Hence they were more exposed to rising food prices which influences their level of food diversity. Household access to food was therefore an important variable in food diversity level in the study area.

Table: 1 Dietary Diversity of Households

Dietary Diversity	Frequency	Percentage
0 – 6	110	91.7
7 – 12	10	8.3
Total	120	100

Source: Field survey 2018

4.2 Poverty profile

The respondents were classified into an exclusive group separated by the line either as poor or non – poor .The poverty line use for this study was calculated from the yearly household expenditure (THE) of sample household. Two third (N52,812) of the yearly THE of the sample households was use as the poverty line. The poverty status category of households included: Poverty head count or incidence (P_0), poverty gap or depth (P_1) and squared poverty gap or security (P_2).

The P_0 for the household was 0.7. This means that 70% of the farming households in the study area were poor. The poverty gap index P_1 was 0.415, this implies that 41.5% (N21, 916.98) of the poverty line was required to bring an average poor individual in the study area to the poverty line. The Poverty index which measures the distance of each poor person to one another was found to be 0.219, P_2 showing that 21.9% of the poor households were severely poor. This indicated inequality in the degree of poverty among poor households.

Table 2: Poverty profile of Households

Poverty profile	Frequency	Percentage
Non Poor	36	30
Poor	84	70
Total	120	100
FGT Food Index		
Poverty incidence (P_0)		0.7
Poverty Depth (P_1)		0.415
Poverty Severity(P_2)		0.291
Poverty Line		
THE	N79218 per annum	
2/3* THE	N52812 per annum	

Note: THE mean Total Households Expenditure

4.3 Relationship between Poverty Status and Household Dietary Diversity.

The Tobit regression model was used to determine the relationship between poverty status and the socio – economic factors that influenced poverty among the respondents in the study area. It measured the parameters of the conditional probability of being poor and the marginal changes in explanatory variables on the poverty status of the respondents. Respondents were classified into poor and non-poor using the poverty line as derived from The Household Expenditure (THE). The regression parameters and diagnostic statistics were estimated using the maximum likelihood estimation (MLE) technique.

Results showed that only six out of the twelve listed regressors had significant influence on the poverty status of the farmers. The Log likelihood function is negative (-52.673) while the Chi- square value is positive and significant. This implies that there is a relationship between poverty status and dietary diversity in the study area. The variables that had significant co-efficients are gender, marital status, household size, farm size, HDDS and income from non-agricultural products. It should be noted that a positive sign on a parameter indicated that higher values of the variable tend to increase the likelihood of being poor. Similarly, a negative value of a co-efficient implied that higher values of the variable would decrease the probability of being poor; all things being poor.

The co-efficient of gender of the household head is 0.339. This implies that relative to the female-headed households, the level of poverty will be reduced by 0.339 for male-headed households, hence having a poverty depth of 0.076 as against 0.415 for female-headed households. This could be attributed to the involvement of male-headed household in different forms of off-farm activities. The co-efficient of marital status of household head is 0.099, implying that the poverty status of household headed by married people will be increased by 9.9% to become 51.4%, while that of households headed by un-married people will remain as 41.5%. The reason for this is married

households tend to have larger household size, which raises the dependency ratio.

Household size was found to have a negative coefficient and significant at 10% level. This means that the larger the household the lower the poverty status, an increase in the household size will probably lead to a reduction in poverty status of the households. Farm size of the households was found to have a negative coefficient and significant at 10% level. This means that farm size is inversely proportional to poverty status that is, an increase in farm size will probably lead to a reduction in poverty status of the households. Non-agricultural income was also found to have negative coefficient and significant at 10% level. The availability of additional income beside agriculture will reduce poverty status of the households. That is, an increase in non- agricultural income will probably lead to a reduction in poverty status.

The Dietary Diversity Score of farming household, had a negative coefficient and significant at 5% level, meaning that an increased in the varieties of foods consumed by households, could lead to a reduction in poverty. Thus, the poorer the farming household is, the lower their dietary diversity score. The effect of dietary diversity on the household might result in low productivity and therefore poverty. This is because the lower the dietary diversity of a farming household the lower their nutritional intake and this might subsequently affect health of the household members which will reduce farming productivity, and thus increase the poverty status of that household (Hoddinott *et. al.* 2006).

Table 3: Tobit Regression showing the relationship between poverty status and dietary diversity among farmers in Gassol

Variable	Coefficient	Std error	T-value
Constant	-0.310	0.262	-1.183
Age	0.009	0.026	0.347
Gender	0.339	0.149	2.274**
Marital Status	0.990	0.568	1.743*
Education	-0.036	0.046	-0.783
Household size	-0.262	0.148	-1.771*
Years of farming	0.019	0.034	0.559
Farm Size	-0.206	0.119	-1.73*
Occupation	-0.111	0.665	-0.167
Market Distance	0.142	0.103	1.379
Dietary diversity score	-2.276	1.01	-2.254**
Agricultural products income	-4.09E-07	1.14E-06	-0.359
Non-Agric products income	-4.09E-06	2.21E-06	-1.851*
Log likelihood function	-52.673		
Prob> chi2	0		
Pseudo R2	0.28		

Source: Analysis of data from Field Survey, 2017

Note: * and ** means significant at 10% and 5% levels of probability.

5 Conclusion

Studies have shown a direct relationship between food insecurity, hunger and poverty. One of the contributing factors to food insecurity is socio-economic status. Limited income causes people to restrict the number and quality of meals they eat, reduce dietary variety, and look for inexpensively processed food. These options are usually low in essential nutrients and high in fats with empty calories.

It is reported that Nigeria's total agricultural output in areas of food production (including livestock and fishing), processing and marketing accounted for about 80% by value. However, in spite of the increase of food to the Nigerian agricultural economy, the food intake in the country is still inadequate in terms of quantity and quality. Food consumption studies assess immediate causes of malnutrition, and food security studies predict the adequacy of household dietary intake and nutritional status. Widespread poverty resulting in chronic and persistent hunger is the biggest problem in the developing countries. In Nigeria, malnutrition is associated to food shortage linked to both quantity and quality of food to provide a balance diet.

The frequency distribution of household dietary diversity index presented in this study shows that 92% of the sampled household had 0-6 food groups in their diet per day, while 8% of the households had 7-12 food groups in their diet. This implies that most households had low food intake diversity per day due to competing demand on available household income which limits their access to varieties of foods. The study found that there is significant relationship between poverty status and dietary diversity. This relationship was found to show that the higher the level of poverty, the lower the dietary diversity of the farming households. Thus, the poorer the farming household is, the lesser their dietary and nutritional intake. To ameliorate poverty and inadvertently improve their dietary and nutritional intake, it is recommended that:

- a. The capacity of farming households be built to take farming as a business through sensible

- management of resources.
- b. Simple ways of adding value to their produce with a view of enhancing their shelf lives should be developed through research. They should also be enlightened on the importance of good and balanced nutrition.
 - c. Both the government and non-governmental organizations should make it a task to provide these rural farmers with nutritional supplements to improve the nutritional intake and consequently make them healthy.

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Abride Biography of First Author

My name is Sunday Mailumo Sambo (PhD). I was born in Bassa Local Government Area of Plateau State, Nigeria, on 15th December, 1974. I joined the Forestry Research Institute of Nigeria in 2002 and posted to the Federal College of Forestry, Jos, as an Assistant Lecturer where I rose through the ranks to a Principal Lecturer. I have a Ph.D in Agricultural Economics from the Ahmadu Bello University, Zaria. I equally had my first and second degrees in the same field from Abubakar Tafawa Balewa University Bauchi, Nigeria. My main areas of research interest spans through Production, Environmental and Welfare Economics with a bias in gender and livelihoods. I have published a text, 25 journal articles (in both international and national journals) and presented almost 30 conference papers where I made useful recommendations. I am presently a member of the Nigerian Association of Agricultural Economists (NAAE), Farm Management Association of Nigeria (FAMAN) and Forestry Association of Nigeria (FAN). I have worked in teams that consulted for some international agencies on production, livelihoods, impact evaluation and adoption of agricultural policies among others.