# Status of Living Standards in Nigeria between 2010 and 2013

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## ABSTRACT

Nigeria experienced a drop in the poverty rate to an average of 56.1% between 1999 and 2007. This could be attributed to the measures taken by the civilian government against administrative corruption, increased domestic and foreign investments and some implemented agricultural policies. These efforts were thwarted by subsequent administrations with devastating effects on the Nigerian population. Despite an average annual economic growth rate of 6% between 2004 and 2010, the incidence of poverty has remained high, increasing from 54.7% in 2004 to 60.9% in 2010. The high rate of poverty in Nigeria has reached alarming proportions. It is in recognition of this that this study analyzes the variations in poverty across the six geopolitical zones of Nigeria, including the rural and urban areas. To achieve this objective, the study analyzes poverty from a non-income approach using the living standards indicators: floor of the dwelling, cooking fuel, lighting, source of drinking water, type of sanitation facility and type of refuse disposal facility. The dataset used in this study is the General Household Survey (GHS-Panel) wave 1 (2010–2011) and wave 2 (2012–2013). The living standards indicators reveal, albeit geographically unevenly distributed, that the majority of Nigerians have low living standards in a number of key areas, across the six geopolitical zones and in both urban and rural areas. The results of the study thus show increases in poverty in most of Nigeria's geopolitical zones and in both the rural and urban areas, despite the years of economic growth preceding the General Household Survey, indicating that growth has not been pro-poor in Nigeria.

## Introduction

Well-being can be defined in several ways. It can be said to mean command over commodities (Watts, 1968). It can be considered as a situation where people are well-off in the sense that they have greater resources than required to meet their livelihood needs (Sen, 1987). It has also been defined as the ability to achieve a precise type of consumption of goods such as clothing, housing and food (Hulme & Mosley, 1996). By contrast, poverty is said to be the lack of either command over goods or a specific type of consumption that

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is seen as equating to a living standard in a society (Watts, 1968). Poverty can also be assessed in terms of powerlessness, insecurity, low self-confidence, deficient nutrition, lack of basic health facilities and low social relations (Alkire et al., 2015). It is generally assumed that having better living standards in place for these factors would result in improvement in the quality of life, health and productivity of people.

In relation to poverty, individuals' or households' well-being can be determined by their ability to obtain sufficient income to meet their daily needs. However, a comprehensive analysis of well-being must go beyond an assessment of poverty and inequality with income measures and must include key indicators of living standards (Leibbrandt, Poswell, Naidoo, Welch, & Woolard, 2006). Among the non-income measures of inequality and poverty are indicators of living standards such as access to telecommunications, a good sanitation system, clean water and uninterrupted electricity. This paper analyzes variations in poverty in the rural and urban areas of the six geopolitical zones of Nigeria, using the following living standards as the non-income measures of poverty and inequality: the type of floor of the dwelling, type of cooking fuel, source of lighting, source of drinking water, type of sanitation facility and type of refuse disposal facility.

## Literature review

### *Multidimensional approach*

Several attempts have been made to analyze poverty in Nigeria (Ajakaiye & Adeyeye, 2001; Ite, 2004; Nguezet, Diagne, Okoruwa, & Ojehomon, 2011; Oshewolo, 2010). Most of these studies used the conventional approach to poverty which considers income as the only determinant (Oyekale, Okunmadewa, Omonona, & Oni, 2009). Boccanfuso, Bosco Ki, and Ménard (2009) note that if the monetary dimension alone is considered in poverty analysis, the assumption would be that both income growth and non-monetary growth have been examined simultaneously. However, it has been observed that this has not always been the case (Klasen, 2008).

Some measures have been used which are different from the conventional approach of measuring income through GDP. These measures fill the gap between using an income approach by measuring poverty using GDP and measuring economic welfare through a multidimensional approach that includes an income approach and a non-income approach. Recent economic studies view poverty from a multidimensional point of view by including the analyzes of human needs which are beyond growth in income (Alkire, Apablaza, Chakravarty, & Yalonetzky, 2017; Chakravarty & Chattopadhyay, 2018; Neubert, 2019).

Several scholars have critiqued the poverty-growth-inequality relationship that has been explored primarily through expenditure/income. Sen (1977, 1992) reinforces other authors' advocacy of measuring poverty from a multidimensional

approach (Dagum, 1989; Hagenaars, 1986). Sen (1983) related poverty to entitlement by recognizing the means by which goods are acquired. According to Sen (1983), poverty is an offshoot of the insufficiency of different attributes which determine a household's welfare. These include access to public services, housing, education facilities and health facilities. From Sen's point of view, a household's welfare is regarded as a multidimensional phenomenon of which income is but one dimension (Streeten, 1981).

Cardozo and Grosse (2009) note that the best-known international indicator that captures multidimensional poverty is the UNDP's Human Development Index (HDI). This indicator combines a longevity variable (measure of life expectancy at birth), education variable (weighted average of the adult literacy rate and school enrollment rates), and living standards (GDP per capita converted to USD using Purchasing Power Parity). The alternative measures of welfare – longevity, education and access to resources – are referred to as measures of quality of life by the HDI.

Different studies have sought to comprehend the various forms of deprivation that households experience (Maggio, 2004). Bossert, Chakravarty, and D'Ambrosio (2009) note that the move from a single dimension of welfare measure to a multidimensional perspective is a long overdue development for measuring inequality and poverty. The OECD (2006) stressed that, as much as higher income serves to support the poor in enabling them to have access to better health care and education, it does not guarantee better human development outcomes. It was further emphasized that without effective policies implemented to address inequality and poverty, the poor may not be able to achieve the desired living standard despite an increase in income (Oyekale, 2015).

Consideration of non-income poverty measures would accommodate intervention and implementation of focused policies that promote a reduction in poverty. In shifting from an income approach to a multidimensional approach, both non-monetary and income measures of poverty serve as good measures of poverty which capture the material deprivation aspects of being poor.

In Africa, especially in Nigeria, there are huge gaps in the literature measuring poverty and inequality using a host of income and non-income indicators. Reviews of the literature on poverty and inequality in Nigeria have shown that most studies on poverty and inequality use the income approach as a measure of poverty and inequality (Garba, 2006; Kneebone & Wilkins, 2019; Maxwell, 1999). This is not sufficient to determine the inequality and poverty levels of a society as the non-income variables play a huge role. Assessing non-income measures would provide a more nuanced and detailed picture of the Nigerian population and the life circumstances under which it lives. Therefore, this study aims to critically address the issue of poverty and inequality from a multidimensional approach, by using living standards as non-income measures to determine the extent of poverty and inequality in Nigeria.

## Non-income measures of poverty and inequality

Despite the dominance as far back as the 20th century of income-based approaches to measure poverty, the multidimensional nature of poverty and inequality cannot be denied and therefore requires consideration in the literature. Since mid-1970, non-income measures of poverty have been in use for empirical analysis. Among many such measures are the basic needs approach, the capability approach and the social inclusion approach. These different approaches necessitated different methodologies which emerged over the years as measures of assessing poverty from a multidimensional approach. Some these include the dashboard approach, composite indices approach, dominance approach, capability approach, fuzzy sets approach, axiomatic approach, counting approach, Alkire-Foster (AF) approaches, the global multidimensional poverty index (MPI) approach and the concept of well-being (living standards approach). Some of these measures are briefly discussed here.

The **Dashboard approach** is a measure of the multidimensionality of poverty levels with the use of unidimensional standards to measure each dimension (Alkire, Foster, & Santos, 2011). This is achieved by the use of dimensional deprivation $P_j$ ($x^j, z_j$). The dashboard indicators, denoted by DI, are a dimensional vector containing the deprivation indices of all d dimensions: $DI = (P_I(\mathrm{x}^1; z_1), \ldots P_d(\mathrm{x}^d; z_d))$. Hicks and Streeten (1979, p. 557) proposed the use of dashboards with consideration of the basic needs approach framework. The indicators for the basic needs must be defined. An example of the use of a dashboard approach is seen with the implementation of the Millennium Development Goals. Here different aspects of poverty have to be evaluated with independent indicators, such as the fraction of children under a certain age (e.g. 6 years) who are underweight, proportion of people living below a certain income amount (e.g. $1 a day), child mortality rate, etc. With these, we can know the dimensions of poverty among certain populations and changes over time. Also, the indicators can be decomposed to show disparities (Alkire et al., 2015). **Composite indices (CI)** are functions that convert deprivation indices into real numbers. The well-known composite indices are the Gender Empowerment Index (GEM) (UNDP, 1995), the Human Development Index (HDI) (Anand & Sen, 1994) and the Physical Quality of Life Index (Morris, 1980). Also among the poverty measurements is the Human Poverty Index (HPI) (Sen & Anand, 1997). The UNDP has published these indices in the Global Human Development Reports for many years. The 2020 measure of poverty and social exclusion is a well-known policy index that uses a union counting approach with three dimensions: material deprivation, income poverty and joblessness (Annoni & Weziak-Bialowolska, 2016). Like the dashboards, composite indices are good at combining diverse data sources and can

capture different population sub-groups. But they do not reflect joint distribution of deprivation. This makes composite indices and dashboards not to be sensitive to the degree of simultaneous deprivations (Alkire et al., 2015). **The capability approach** looks at human well-being in the functional space. Functioning describes the doings and beings of an average member of a society and their reasons for value (e.g. being well nourished, being happy or participating in social life). Therefore, human well-being and poverty are multidimensional in nature. Considering the capability approach, the functioning vectors that an individual can choose are called the capability set. There are several ways in which an individual can choose a certain functioning vector or the capability set. The capability set clearly brings out the contrast in well-being between a starving and a fasting person. For example, one may value the opportunity to participate in political life without choosing it (substantive freedom), and also consider choosing it as very important (process aspect of freedom). It has been pointed out that the capability approach has the limitation of exacting demands regarding data. In fact, several scholars considered it to be inoperative (Comim, 2008; Srinivasan, 1994; Sugden, 1993).

Poverty can be viewed as capability deprivation, i.e. a shortfall in one or several of the functionings deemed relevant and feasible for an individual. The **Alkire-Foster method** has numerous benefits for the evaluation of both poverty-related developments and policy measures. The method is a general framework for measuring multidimensional poverty and is also suitable for measuring other phenomena (Alkire & Santos, 2014). The method is very flexible such that it allows the user to make key decisions in its application such as the selection of a measure's purpose, space, unit of analysis, dimensions, deprivation cutoffs (to determine when a person is deprived in a dimension), weight or values (to indicate the relative importance of the different deprivations), and poverty cutoff (to determine when a person has enough deprivations to be considered poor). The flexibility of the methodology allows for many diverse applications.

The global **Multidimensional Poverty Index (MPI)** was developed by Alkire and Santos (2010) with the use of the UNDP's Human Development Report and it has been reported annually in the Human Development Report since 2010. The MPI consists of ten indicators which are grouped into three dimensions (as outlined in Table 1 below). The index uses nested weights. The weights are distributed in such a way that each dimension reported in the first column receives an equal weight of 1/3 and the weight is equally divided among indicators within each dimension. It should be noted that each education and health indicator receives a larger weight than the standard of living indicators. Any person living in a household who fails to meet the deprivation cutoff is identified as deprived in the indicator.

**Table 1.** Dimensions, indicators, deprivation cutoffs and weights of the global MPI.

| Dimension | Indicator | Weight(w) | Deprivation cutoff (z) |
|---|---|---|---|
| Education | Schooling (Sc) | 1/6 | No household member has completed five years of schooling. |
| | Attendance (At) | 1/6 | Any school-aged child in the household is not attending school up to class 8*. |
| Health | Nutrition (N) | 1/6 | Any adult or child in the household with nutrition information is undernourished**. |
| Standard of living | Mortality (M) | 1/6 | Any child has passed away in the household***. |
| | Electricity (E) | 1/18 | The household has no electricity. |
| | Sanitation (S) | 1/18 | The household's sanitation facility is not improved or it is shared with other households. |
| | Water (W) | 1/18 | The household does not have access to safe drinking water or safe water is more than a 30-minute walk (round trip) away. |
| | Floor (F) | 1/18 | The household has a dirt, sand or dung floor. |
| | Cooking fuel (C) | 1/18 | The household cooks with dung, wood or charcoal. |
| | Assets (A) | 1/18 | The household owns at most one of the following: radio, telephone, TV, bike, motorbike or refrigerator; and does not own a car or truck. |

Source: Alkire and Santos (2010, 2014); cf. Alkire, Roche, Santos, and Seth (2011); Alkire, Conconi, and Roche (2013).
*If a household has no school-aged children, the household is treated as non-deprived.
**An adult with a Body Mass Index below 18.5 is considered undernourished.
***If no person in a household has been asked this information, the household is treated as non-deprived.

Hence, poverty is said to be the lack of either command over goods or a specific type of consumption that is seen as equitable to a living standard in a society. In relation to poverty, an individual or household's well-being can be determined by their ability to meet their daily needs. Well-being measures of inequality and poverty are beyond the income approach and include other indicators of living standards such as access to a telephone, a good sanitation system, clean water and uninterrupted electricity. Poverty can also be assessed in terms of powerlessness, insecurity, low self-confidence, deficient nutrition, lack of basic health facilities and low social relations. With all these in place, there is improvement in the quality of life, health and productivity.

## Data and methodology

### Data source

The study benefitted from Nigeria's General Household Survey-Panel (GHS-Panel) data. The GHS-Panel is the first survey of its kind to be carried out by the Nigeria Bureau of Statistics (NBS). It involves 22,000 households from which a cross-sectional survey is carried out annually in the country. The idea behind the panel is to improve data from the agriculture sector and link it to household behavior. The GHS gets resources from the Harmonized National Living Standards Survey (HNLSS) and the National Agriculture Sample Survey

(NASS). The first wave was carried out in August 2010 (post-planting and post-harvest 2011) and one visit to the full cross-section (post-harvest to panel) was conducted.

## Limitations of data

### Incomplete files and missing variables

Initially, the study intended using the datasets in the three waves (2010–2011; 2012–2013; 2015–2016) in both post-planting and post-harvest, but it was discovered that there was data missing for household expenditure and household assets, respectively in post-planting and post-harvest wave 3 (2015–2016). Furthermore, it was discovered that the datasets for health and remittances were completely missing in post-planting wave 1 (2010–2011) and the remittances dataset was also not available in post-planting wave 3 (2015–2016). Also, there was an aggregate consumption file for wave 3 but the file did not have a household identifier (hhid) and individual identifier (indiv). As such it was difficult to merge the aggregate consumption wave 3 file with aggregate consumption for wave 1 and wave 2 and other files. These constraints led to the study using the datasets available in post-harvest wave 1 (2010–2011) and wave 2 (2012–2013) only.

In spite of these and other challenges with the datasets, the post-harvest datasets for the two waves (wave 1 and wave 2) which were used for the purpose of this study are nationally representative and effectively suited to the purpose of the research.

## Empirical model specification to determine the living standards

A less complicated approach to examining living standards and their distribution is using statistical measures such as mean, median or mode which represents the central tendency and various other measures of dispersion such as the variance or interquartile range. However, there is greater conceptual clarity with the use of the theoretical approach and specifically from the use of social welfare functions which were pioneered by Atkinson (1970). This is the approach that this study uses to analyze the living standards in the six geopolitical zones of Nigeria.

In the case of this study, the living standards (floor of the dwelling, cooking fuel, lighting, source of drinking water, type of sanitation facility, type of refuse disposal facility) are denoted by $x$; where the value of the social welfare is denoted by $w$ and as a decreasing function of all the $x$'s in the population so that:

$$w = v(x_1, \ x_2, \ \dots \ x_n) \tag{1}$$

where $n$ is the population size.

## *Specification of regression model*

A multiple regression analysis is carried out to support the descriptive analysis. The model is specified as follows:

$$log\ (yi/z) = \alpha_0 + \alpha_1 X_i^1 + \alpha_2 X_i^2 + \ldots + \alpha_n X_i^n \qquad (2)$$

Where $z$ is the poverty line, $y_i$ is (per capita) income, the $X_j^n$ are the "explanatory" variables and the $\alpha_j$ are the coefficient that are to be estimated. Grosh and Muñoz (1996) use multiple regression to analyze poverty in Côte d'Ivoire with the log of per capita household expenditure as the dependent variable and the independent variables are the educational level of most educated males, the value of selected household assets and hectares of agriculture land.

A probabilistic regression (Probit) analysis is carried out in this study because the explanatory variable is binary and as such, to identify the key determinants of poverty, a dichotomous variable is computed which indicates whether a household is poor or not. That is, "1" is assigned if a household is poor and "0" if otherwise.

The outcome of the binary variable occurs with a conditional probability on the explanatory variables. The probit regression model is specified as follows:

$$y_i* = X1_i\alpha1 + \ldots + Xn_i\alpha\ n + \mu I \qquad (3)$$

where $y_i\star$ is predictant and $X_1, \ldots X_n$ are the predictor variables.

$X$ represents a vector of poverty and Inequality characteristics $\alpha$ represents a vector of estimated coefficients.

We observe:

$$y = 1 \text{ if } y_i * > 0$$

$$y = 0 \text{ if } y_i* \leq 0$$

Then;

$$\text{Prob } (y = 1) = \phi(X\ \alpha)$$

$$\text{Prob}(y = 0) = 1 - \text{prob}(\text{poor} = 1) = 1 - \phi(X\alpha)$$

Form of the model depends on the assumption about the error term:
Probit model: prob (poor = 1) = $E(Y/Z) = \phi(X`\alpha)$
Where $\phi$ is the cumulative distribution function.

For this study, the endogenous and exogenous variables used in the model are specified as follows:

$$yi/z = f\left(Zn, Sec, Ag, Ag^2, EduYr, DW, CF, San, FD, SL\right) \qquad (4)$$

Mathematically, it can be logarithmically expressed in the model below in order to reflect the hypothesis formulated above:

$$In(y_i/z) = \alpha_0 + \alpha_1 InZn_i^1 + \alpha_2 InSec_i^2 + \alpha_3 lnAg_i^3 + \alpha_4 lnAg_i^{24} + \alpha_5 lnEduYr_i^5$$

$$+ \alpha_6 InDW_i^6 + \alpha_7 InCF_i^7 + \alpha_8 InSan_i^8 + \alpha_9 InFD_i^9 + \alpha_{10} SL_i^{10} + \mu I \quad (5)$$

Where; $z$ is the poverty line, $y_i$ is (per capita) income; Zn = Zone; Sec = Sector; Ag = Age; $Ag^2$ = $Age^2$; EduYr = Education Year; DW = access to Drinkable Water; CF = source of Cooking Fuel; San = type of Sanitation facility; FD = type of Floor of Dwelling in household; SL = Source of lighting; $\alpha_0$ = Intercept; $\alpha_1 - \alpha_{10}$ = Slope or regression parameters; $\mu$ = Stochastic term.

The General Household Survey-Panel (GHS-Panel) wave 1 (2010–2011) is considered as the base year and the poverty line for wave 2 (2012–2013) is determined using the Consumer Price Index (CPI) to adjust the poverty line for changes in the overall price levels within the period, in order to accommodate the changes in the prices of goods on which the poor spend their income. The *per capita poverty line* for this study is ₦66,224.952 and it is determined using the absolute poverty line ₦54,401 (which considered both food expenditure and non-food expenditure using the per capita expenditure approach) from the Nigerian National Bureau of Statistics (NBS, 2010) multiplied by the Consumer Price Index (146.97/120.73), i.e. 54,401.16*(146.97/120.73) = ₦66,224.952 (*per capita poverty line*). Therefore, the *per capita poverty line* is ₦66,224.952 and the *household poverty line* is ₦384,104.72 (66224.952*5.8), where 5.8 is the mean of household size.

### Outcome and explanatory variables

The Nigeria General Household Panel Survey (GHS-Panel) dataset is used for this study. The outcome variable that is estimated is poverty. Poverty is a resultant effect of national, zonal, sector specific, community, household or individual characteristics. The factors that are regressed to determine poverty in this study are zone, sector, age, age squared, years of education, access to drinkable water, source of cooking energy, type of sanitation used in the household, type of floor of the dwelling of the household and source of lighting. All these variables are regressed to determine poverty levels in Nigeria from a non-income approach (living standards) from 2010 to 2013.

*Zone.* There are six geopolitical zones in Nigeria and the zones are each coded as series of dummy variables – North East, North West, South South, South East, South West, and North Central as the reference category.

*Urban* and the *Rural* area based on the location of the household in the enumeration areas (EAs) as defined by the Nigeria Census. The *Urban* area is coded "1" while the *Rural* area is coded "0" and Urban is the reference area. The ages of the household and household heads were reported in the

questionnaire. The household dependency ratio is the ratio of the total number of dependents (children under 15 years and adults aged 65 years and above) to the total number of working age adults (aged 15 to 64) in the household.

Other variables are also regressed. The *source of drinkable water* is categorized into five categories coded as a series of dummy variables. The categories are Pipe-born water, Borehole/hand pump, Well water, River, and Other as the reference category. *Type of cooking fuel* is categorized and coded as a series of dummy variables which are Collected/purchased firewood, Coal/grass, Kerosene, Electricity and Other, with Collected/purchased firewood as the reference category. *Type of sanitation* is another variable that is categorized and coded as dummy variables. The categories are No toilet, Toilet on water, Flush to septic tank/bucket, Latrine and Other. *The floor of the dwelling* is regressed for this analysis and it is coded as a series of dummy variables which are Sand/dirt/straw floor, Mud floor, Cement floor and Other, with Sand/dirt/straw floor as the reference category. And lastly, *Source of lighting* is also categorized and coded as dummy variables. The variables are Firewood, Kerosene, Rechargeable lamp, Generator and Other. All these variables are regressed with probit analysis to predict the odds of reporting low living standards in the rural and urban households within the six geopolitical zones of Nigeria.

The zone and sector are the **regional characteristics** that are included in the empirical model, while the **household characteristics** include the type of floor of the dwelling of the household, source of cooking energy, type of sanitation facility and source of lighting. The **community characteristics** are education and source of drinkable water, while the **individual characteristics** are age and age squared. All these variables form the determinant of poverty that is used for the analysis.

Per capita expenditure was calculated by dividing household expenditure by household size. There are two types of variables in the explanatory variables. They are the *continuous variables* – age, age squared, and education; and the *categorical variables* – zone, sector, source of water, type of cooking fuel, type of sanitation facility, type of floor of dwelling and source of lighting. For instance, the variable might be set to be "1" if the gender of the household head is male and "0" for female. In the case of the zones in the country, each of the zones has its own dummy variable, but one of the zones is left out of the regression to serve as the point of reference. The same process applies to the sector (urban and rural area) and the other categorical variables. The study computed measures of poverty using indicators based on two waves of the General Household Survey (GHS-Panel) dataset, wave 1 (2010–2011) and wave 2 (2012–2013).

## Descriptive statistics

### Dwelling

A dwelling is a basic necessity of life, providing not only comfort, privacy and security but an exchangeable asset and vehicle for investment. On that basis, the standard of dwelling can provide a clear indication of the economic position of people in relation to poverty and inequality. Following the General Household Survey (GHS) wave 1 (2010–2011) and wave 2 (2012–2013), this study has identified "floor of dwelling" as an indicator of living standard. The GHS identified six types of floors of dwellings: sand/dirt/straw, mud, cement, wood, tile and other. Dwellings with floors of cement and tiles are considered superior and more permanent, while floors of sand/dirt/straw, mud and wood indicate informal dwellings. The floors of informal dwellings are more susceptible to damage and do not contribute the value or status of smoothed cement or tiles. Hence, the type of floor is a good indicator of relative poverty and inequality.

Figures 1 and 2 comprise data from both wave I (2010–2011) and wave 2 (2012–2013). Nationally, over 67% of households use cement floors while less than 3% of households use tiled floors in their dwellings. This shows that well over 70% of households in Nigeria live in formal dwellings. Fewer than 30% of households live in informal dwellings, indicated by sand/dirt/straw, mud and wood floors. Nationally, comparing wave 1 (2010–2011) to wave 2 (2012–2013), there is no change in the percentage of households with cement floors – 67%, and a 1% decrease in households with tile floors, to 1.5%. This shows that there was no significant change in households with formal dwellings in Nigeria between 2010–2011 and 2012–2013. Households with mud floors in their dwellings were virtually unchanged and a 1.7% decrease to 7.9% was noticed in households with a sand, dirt or straw floor in their dwellings.
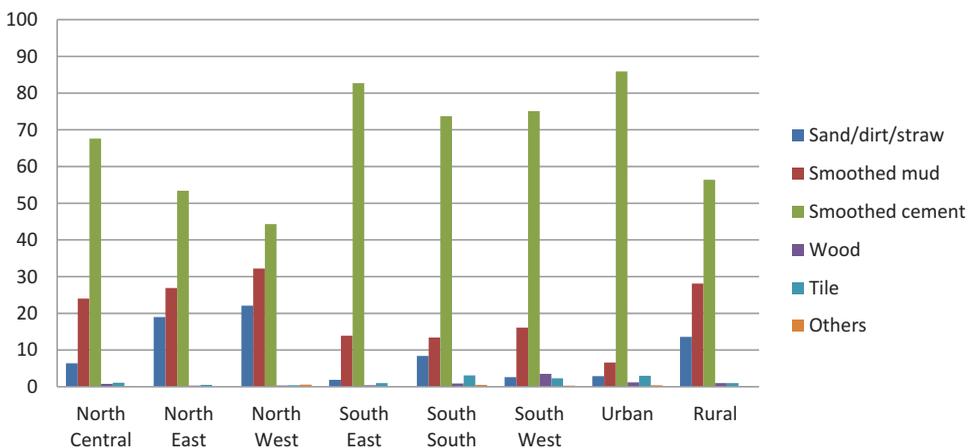


**Figure 1.** Type of floor of dwelling for zone and sector, wave 1 (2010–2011). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.
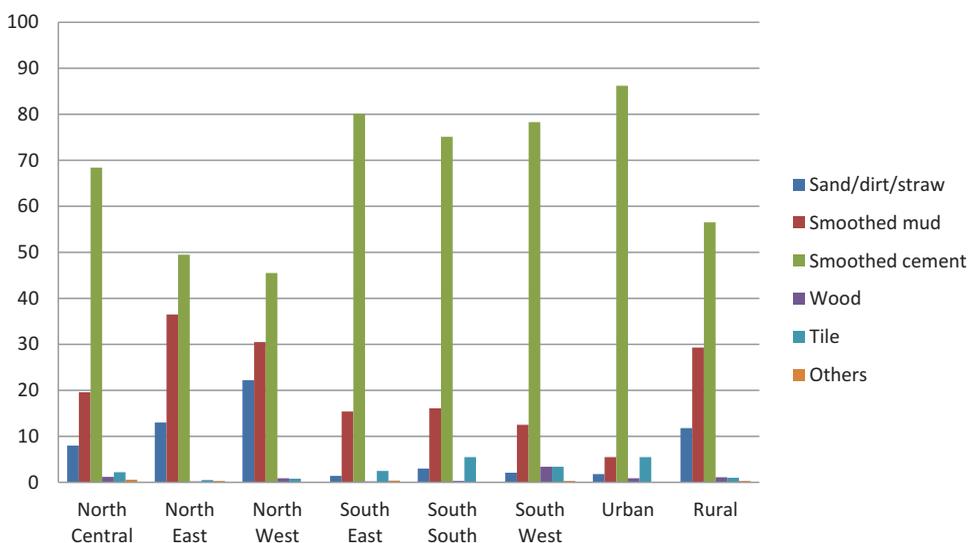
**Figure 2.** Type of floor of dwelling for zone and sector, wave 2 (2012–2013). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

The floors of the dwellings from different zones in the country were analyzed for both wave 1 (2010–2011) and wave 2 (2012–2013). The proportions of the households occupying dwellings with cement floors are almost the same in all the zones when wave 1 (2010–2011) and wave 2 (2012–2013) are compared, with South East having the highest at over 80% of households with cement floors. Households living in dwellings with tiled floors decreased by about 2% to 3.1% in South South, which is the zone with the highest proportion of households living in dwellings with tiled floors. It is interesting that the South East, which has over 50% of its households living below the poverty line in terms of income deprivation, is the zone with the highest proportion of households living in dwellings with cement floors. In South West, South South and North Central over 65% of households live in dwellings with cement floors. On the other hand, the North West zone had over 20% of its households living in dwellings with sand/dirt/straw floors, followed by the North East zone with a decrease of 6% to 13% of households living in dwellings with sand/dirt/straw floors. The preponderance of informal dwellings in the two zones (North West and North East) corroborates the income deprivation level of the two zones, where over 60% of people in the zones lived below the poverty line.

Assessing the rural and urban sectors' data in wave 1 (2010–2011) and wave 2 (2012–2013), it is observed that over 80% of the urban dwellers live in dwellings with cement floors compared with over 50% of rural dwellings with cement floors. The high number of rural households living in dwellings with cement floors was unexpected. On the other hand, it was unsurprising that less than 7% of urban household dwellings had mud floors and over 28% of

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rural household dwellings had mud floors, since traditional dwellings associated with mud floors are predominantly in the rural areas. Only 1% of household dwellings had wooden floors showing that wooden floor dwellings are not common in Nigeria, except for the traditional dwellings of some communities in the South South which are often built over water. The floors of dwellings in households in Nigeria to a great extent portray poverty levels in the country. The large percentage of informal dwelling floors, especially in the North East and North West zones where households predominantly use sand/dirt/straw floors, and the fact that over 60% of the population of people in these zones are below the poverty level, shows that the standard of living of the larger percentage of Nigerians is low by this measure.

## Cooking fuel

In this study, cooking fuel is distinguished from fuel used for lighting. The cooking fuels used are wood, coal, kerosene, electricity and gas. It should be noted that the households' choice of energy for cooking is a function of the cost, availability and effectiveness of the energy source selected. Therefore, the choice of cooking fuel is a good indicator of poverty and inequality.

In Figures 3 and 4, using the dataset in wave 1 (2010–2011) and wave 2 (2012–2013), it is observed that over 60% of the Nigerian population still rely on firewood for cooking fuel as opposed to other sources of cooking fuel. It is quite worrisome that at this stage of development, less than 1% of the Nigerian population use electricity for cooking. Electricity as cooking fuel should not be a luxury but one of the basic necessities that should be available to every household. The same observation applies to gas which 1% of the Nigerian population use as energy for cooking. In 2012–2013, 25%
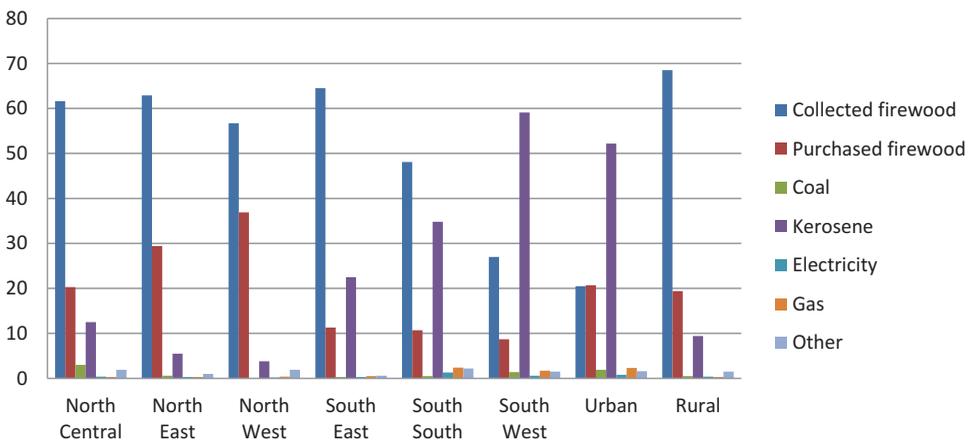
**Figure 3.** Type of cooking fuel for zone and sector, wave 1 (2010–2011). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.
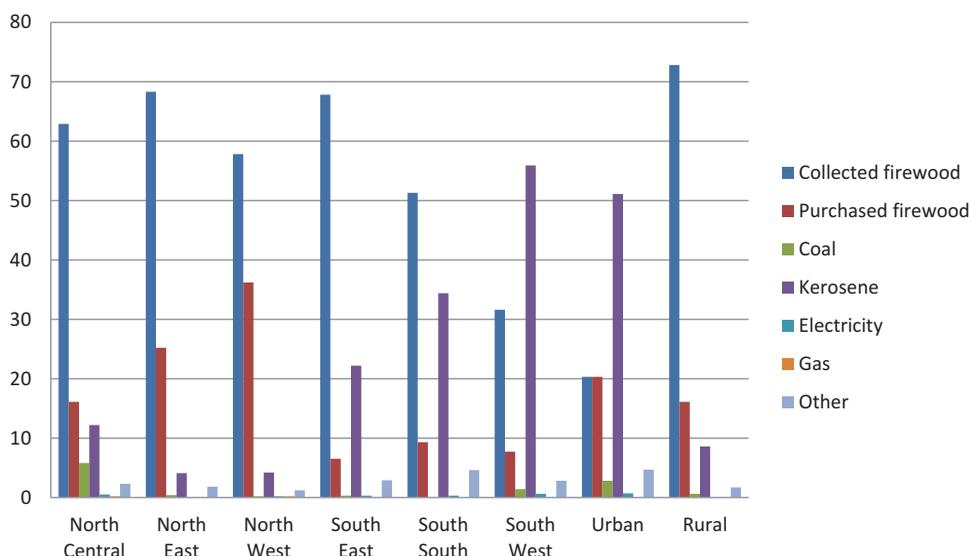
**Figure 4.** Type of cooking fuel for zone and sector, wave 2 (2012–2013). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

of the Nigerian population used kerosene as cooking fuel compared to 51% of the population using firewood as energy for cooking. Cooking fuel is a good indicator of income status and inequality.

Over 70% of the people in the North West, North East, North Central and South East zones, and over 60% of South South, used firewood as cooking fuel in wave 1 (2010–2011) and wave 2 (2012–2013). In South West, less than 40% of the population used firewood as cooking fuel. Over 55% of the population in the South West used kerosene as cooking fuel in wave 1 (2010–2011) and wave 2 (2012–2013), the highest among the zones. Less than 2% of households in South South used electricity as cooking fuel in wave 1 (2010–2011) and wave 2 (2012–2013), which is the highest among the zones. The same was observed in gas as cooking fuel with less than 2% in wave 1 (2010–2011) and wave 2 (2012–2013). These consumption choices reflect the financial constraints of most households and indicate a high level of poverty and inequality across the zones.

Assessing cooking fuel from the rural and urban areas, Figures 3 and 4 show that over 50% of the population in the urban areas use kerosene as cooking fuel as compared to less than 10% of the population in the rural areas in wave 1 (2010–2011) and wave 2 (2012–2013). This shows the financial constraint of people in rural areas as compared to the people in the cities. To buttress this point, it is observed that over 80% of the people in rural areas use firewood as cooking fuel as compared to less than 21% of the urban population. It should be noted that in the urban area, wood is not readily accessible. As such, poorer urban households are forced to use kerosene as cooking fuel. Consequently, the urban poor are especially

vulnerable to fluctuation in the price of kerosene, which can vary greatly with changes in the oil price. The analysis of the choice of cooking fuel, which reflects the financial constraint of households, supports the finding that growth has not been pro-poor in Nigeria.

### Lighting

Electricity is the most desirable source of lighting and is required for the functioning of various household assets such as refrigerators, televisions, radios and computers. It is a necessity of modern life and a steady, reliable supply is crucial to commerce and industry. However, the frequently disrupted electricity supply (blackouts) in Nigeria has made electricity a luxury which is mostly unavailable to the poor. As such, the poor rely on alternative and cheaper sources of energy for lighting, such as firewood, kerosene, rechargeable lamps and generators.

Figures 5 and 6 show a decrease of over 9% to 45.3% of households using kerosene as a source of lighting between wave 1 (2010–2011) and wave 2 (2012–2013). An increase of 2% to 19.2% is observed in households using generators as alternative sources of energy. In Nigeria, generators are fast replacing electricity erratically supplied to households by the national grid. Despite the associated noise and smoke pollution, even the poorer households find means to buy a small diesel generator called "I better pass my neighbor" in an effort to live a decent life. The regimes of President Obasanjo and President Jonathan spent billions of Naira to increase the electricity supply without a significant improvement in supply.

The use of rechargeable lamps as an alternative to electric lighting is increasing with over 20% of the Nigerian population using rechargeable lamps for lighting.
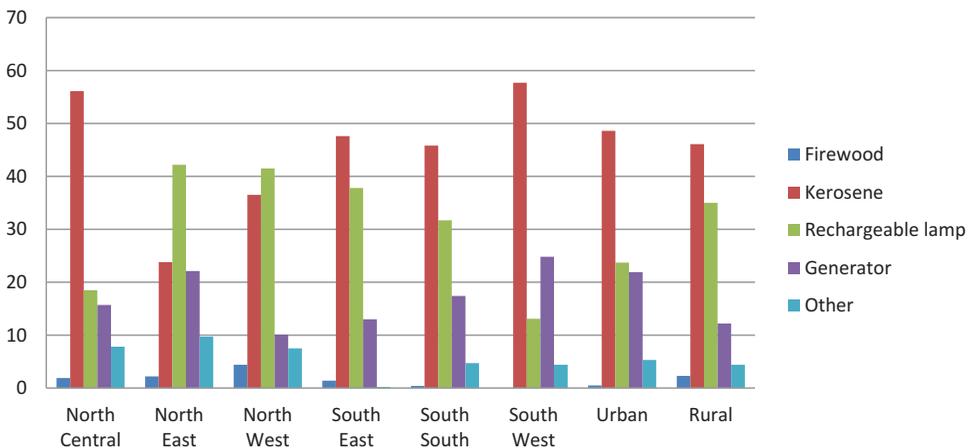


**Figure 5.** Source of lighting during blackouts for zone and sector, wave 1 (2010–2011). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.
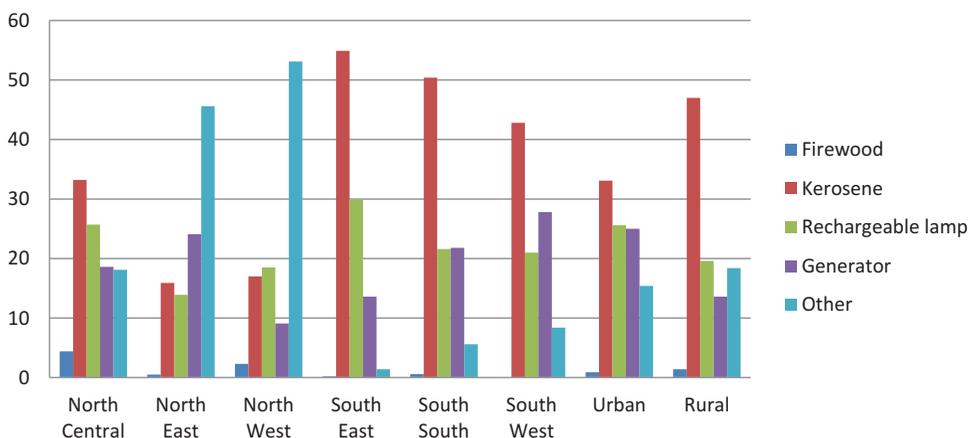
**Figure 6.** Source of lighting during blackouts for zone and sector, wave 2 (2012–2013). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

Looking at other sources of lighting from the various zones in Nigeria, it was observed that there was a 15% and 23% decrease to 42.8% and 33.2% respectively in the use of kerosene as an alternative to electricity in South West and North Central. In South East and South South respectively, increases of 7% and 4% in kerosene use were observed. There was also an increase of 8% in the use of rechargeable lamps in South West. This is quite disturbing as the inference is that the poverty level has worsened to the extent that people are using rechargeable lamps because they cannot afford kerosene for lighting.

In assessing the rural and urban areas, a 6% fall to 42.8% was observed in the population of people using kerosene for lighting and an increase of 2% to 25.6% in the population of people in the urban areas using rechargeable lamps as an alternative lighting source. There is an increase to 25.5% from 4% in the population of people using generators as an alternative energy source for lighting. Use of firewood is less significant with less than 1% in the urban areas and less than 3% in the rural areas using it for lighting.

## *Water*

Water is a fundamental indicator of living standards. Globally, the trend among poorer people is to spend much time daily collecting water of varying quality from different sources, often located a great distance from the home. A clean water supply close to households contributes positively to households' well-being by promoting good health and saving time for productive activities. Put differently, an unstable water supply is a factor in impoverishing people and acts to waste time and energy, contributes to poor health, nutrition and sanitation and disrupts some economic activities.

Figures 7 and 8 show that there was a marked reduction nationally of over 31% to 3.6% in the proportion of households using boreholes and a more than 5% increase to 17.1% in the proportion of households having access to pipe-borne water over the survey period. Disturbingly, there was a more than 12% increase to 43.4% in the proportion of households using river water. The great fall in the proportion of households using boreholes as compared to the increase in the proportion of households using pipe-borne water shows an
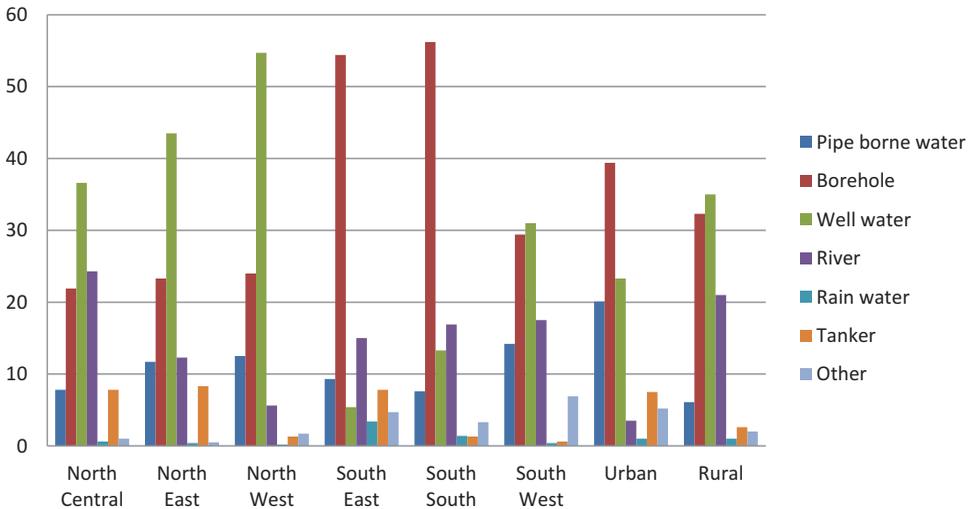


**Figure 7.** Source of drinking water for zone and sector, wave 1 (2010–2011). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.
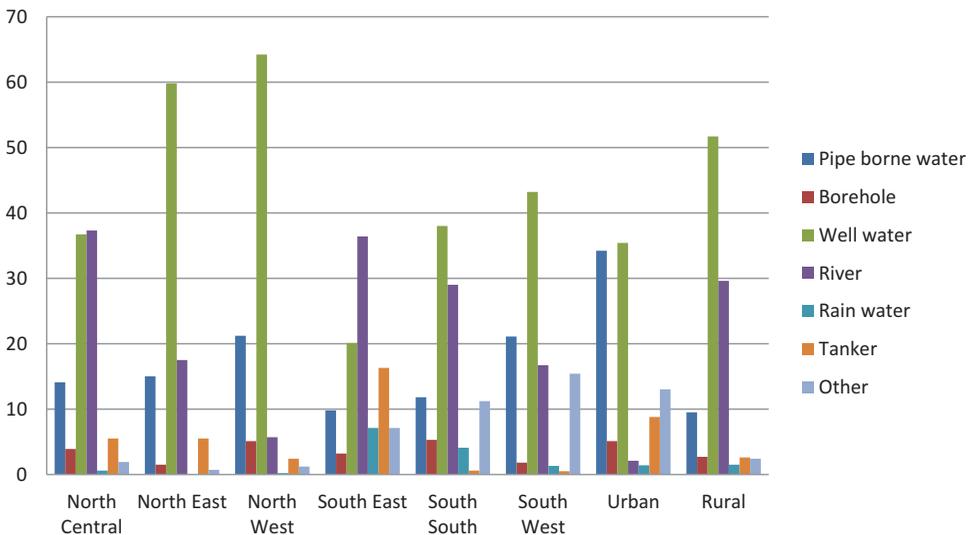


**Figure 8.** Source of drinking water for zone and sector, wave 2 (2012–2013). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

apparent improvement on the part of the federal government in making clean piped water available to everyone.

Considering the availability of water in the six zones in Nigeria, an increase of over 6% to 21.1% was observed in the South West zone from wave 1 (2010–2011) to wave 2 (2012–2013). The North West zone recorded a remarkable increase of 9% to 21.2% which signifies that poorer people in the North West zone have greater access to pipe-borne water. North East, South East, North Central and South South experienced increases of 3%, 1%, 7% and 2% respectively from wave 1 (2010–2011) to wave 2 (2012–2013). These reflect the concerted effort of the federal government to ensure access to water. Despite this, over 60%, 55% and 40% of households in the North West, North East and South West zones respectively still use well water for domestic use.

In addition, an increase of 12% to 34.2% is observed in the proportion of households who have access to pipe-borne water in the urban areas, compared to only a 3% increase to 9.5% in the proportion of rural households with access to pipe-borne water. There was an increase of over 15% to 51.7% in the proportion of households with access to well water in rural areas compared with 35.4% of households that use well water in urban areas. Given the high rate of poverty in rural areas, it is clear that the majority of poor rural people have inadequate access to good drinking water. From the above analysis of access to clean water by households in Nigeria, it is observed that inaccessibility of clean water for domestic use is an indication of a low standard of living as clean water is needed daily in every household and the time taken and distance traveled to get the water are also factors that determine the level of poverty. Therefore, it is obvious that growth has not been pro-poor in Nigeria.

## *Sanitation*

In Figures 9 and 10, it is observed that the proportion of households nationally using latrines is highest, although with a 5% decrease to 45.5% of households surveyed in wave 1 (2010–2011) and wave 2 (2012–2013). A 5% increase to 25.7% is observed in households with no sanitation facility. On the other hand, there is a 2% increase to 18.8% in the proportion of households with flush toilets. Flush toilets are a feature of formal housing. The analysis shows that sanitation facilities in Nigeria are inadequate for most people. Considering the established association of poor sanitation with disease, the fact that fewer than 20% of people nationally have access to a water-borne sewage system has alarming implications, one of which is that the overwhelming majority of both urban and rural poor people are at risk due to poor sanitation.
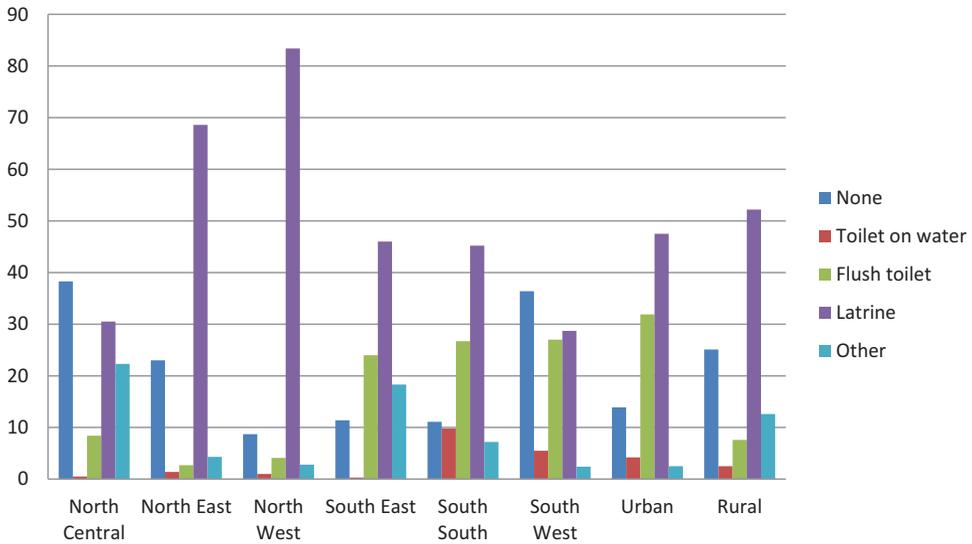
**Figure 9.** Type of sanitation for zone and sector, wave 1 (2010–2011). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.
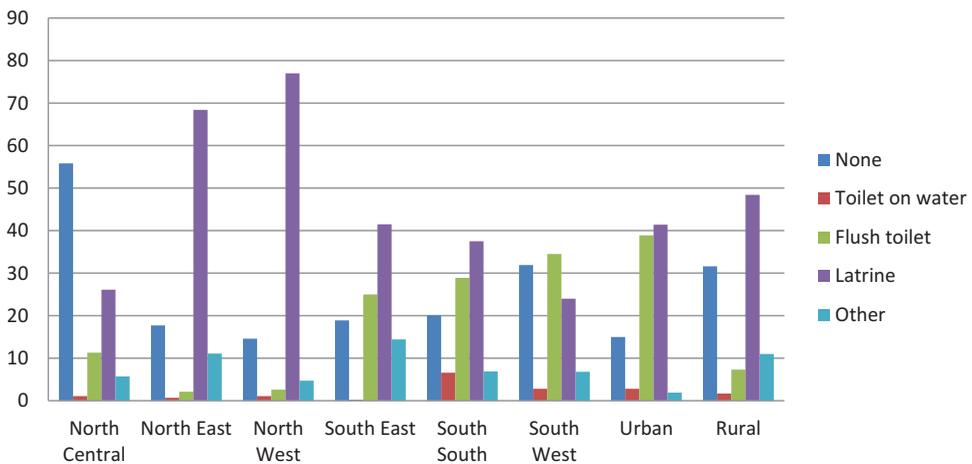


**Figure 10.** Type of sanitation for zone and sector, wave 2 (2012–2013). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

Looking at sanitation facilities in Nigeria in the zones, it is observed that over 65% of households used latrines in North East and North West in both wave 1 (2010–2011) and wave 2 (2012–2013). It is also observed that over 45% of households in the South East and South South zones used latrines as sanitation in wave 1 (2010–2011), with a decrease of 5% and 8% respectively in wave 2 (2012–2013). South West has the lowest proportion of the population using latrines, with a decrease of 4% to 24%. On the other hand, South South and South West have the highest proportion of people using flush

toilets with a 2% and 7% increase to 28.9% and 34.5% respectively. In North Central and South West, 55.8% and 31.9% of people respectively have no sanitation facilities.

In assessing the sanitation facilities for the rural and urban sectors, it is observed that over 40% of households used latrines in both wave 1 (2010–2011) and wave 2 (2012–2013), with a decrease of 60% and 4% in the urban and rural areas respectively. It was also observed that over 30% of households in the urban area used flush toilets compared to less than 8% of rural households. A 6% increase to 31.6% is observed in rural areas in the percentage of households without sanitation facilities as compared to a 2% increase to 15% in the proportion of urban households with no sanitation facilities. One may deduce that the decrease in latrine use in urban areas is related to the increase in the use of flush toilets. This indicates infrastructural development and perhaps increased prosperity in urban areas over the survey period, in sharp contrast to the small decrease in rural latrine use, small increase in flush toilets and the large number of rural households (twice the urban number) that have no sanitation facilities. The lack of decent sanitation clearly correlates to a low living standard among the poor generally and wide inequality between poor and rich, and between rural and urban dwellers, and further buttresses the finding that growth has not been pro-poor in Nigeria.

## *Refuse disposal*

Figures 11 and 12 drawn from the wave 1 (2010–2011) and wave 2 (2012–2013) data, show that refuse disposal in Nigeria is highly inadequate, with a decrease of over 10% to 29.7% from wave 1 (2010–2011) to wave 2 (2012–2013). There is a sharp 18% increase to 23.6% in refuse disposal with household bins collected by the government, perhaps an indication that the government is improving its waste management program. It is also observed that the percentage of households with no disposal facilities was 11.4% in wave 1 (2010–2011) but this decreased by 8% to 2.1% in wave 2 (2012–2013). A tremendous decrease of 31% to 2.6% is seen in the disposal of refuse within the household. The disposal at unauthorized refuse heaps is an ongoing environmental concern.

In terms of the zones, it is observed that in wave 1, North Central had over 18% and South West had over 15% of households with no refuse disposal, which decreased sharply by wave 2 to over 1.9% and 3.9% respectively. This is a welcome development showing that Nigerians are cultivating a culture of proper waste management. This is evidenced in an increase in household bin collection by the government in all zones, especially in the North Central, North East and South West, with over 30%, 25% and 20% respectively. The household private bin collection system has also improved in the South West with a 10% increase to 19.2%. A sharp decrease in the disposal of refuse within compounds in all zones was observed, especially in North Central and North East, with
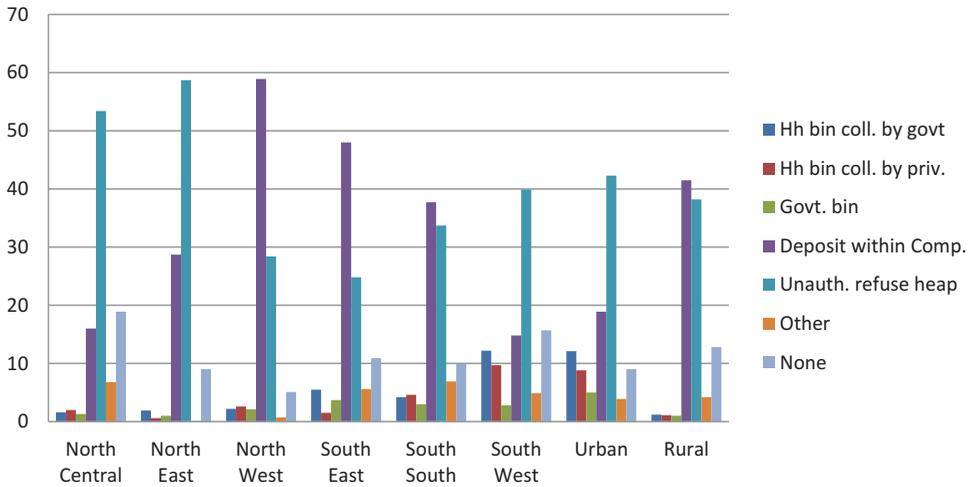
**Figure 11.** Type of refuse disposal for zone and sector, wave 1 (2010–2011). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.
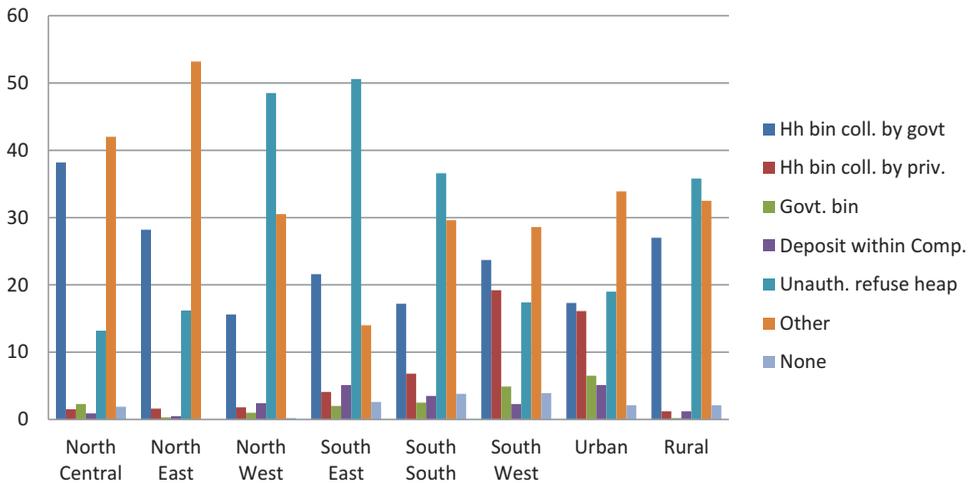


**Figure 12.** Type of refuse disposal for zone and sector, wave 2 (2012–2013). Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

a decrease to less than 1% in refuse disposal in the compound. But the large increase is very disturbing, of over 30% to 48.5% and 50.6% respectively in the proportion of households using unauthorized refuse heaps in North West and South East from 2010 to 2013.

In assessing the disposal facilities from the rural and urban perspectives in the wave 1 (2010–2011) and wave 2 (2012–2013) data, a very sharp fall is observed of over 17% and 39% respectively in urban and rural areas. Refuse disposal by government and private organizations improved by 5% and 26% to 17.3% and 27% respectively in household bins collected. Refuse collection

was more effective in rural areas than in the urban areas. Also positive were decreases in the use of unauthorized refuse heaps of 20% and 3% respectively in the urban and rural areas. It is obvious from the foregoing that disposal facilities in the rural areas lag behind the urban areas, indicating a need to elevate the living standards in the society, especially among the rural poor. The disposal of refuse in unauthorized places in urban and rural areas could be an indicator of a low level of education characteristic of poverty, reflecting a lack of understanding of sanitation and hygiene. It could also reflect a lack of access to government and private refuse disposal facilities.

## Results

Table 2 reports the probit regression results of trends of poverty among households in the six geopolitical zones of Nigeria from 2010 to 2013 using the General Household Survey (GHS-Panel) dataset. Columns two to seven report the estimated parameters of the regression with their standard errors, $z$ score and significance level at 5%.

A multivariate analysis with the zone coefficient indicates that households in all the zones except the South West zone have a higher likelihood of being poor when compared to households in North Central (which is the reference zone). Households in the North West zone have a 16 percentage point higher likelihood of being poor than those in the North Central zone, holding other factors constant. However, households in the South West have a five percentage point less likelihood of being poor than households in the reference group, i.e. North Central zone, all things being equal. In addition, the rural area coefficient shows that households in rural areas have a higher likelihood of being poor compared to households in the urban area, which is the reference area. Rural households have a two percentage point greater likelihood of being poor than households in urban areas, again, all things being equal.

The coefficient on the years of education variable is counter-intuitive and indicates that an extra year of education makes an individual one percentage point more likely to be poor, holding other factors constant. This implies that education is quite insignificant in reducing poverty in Nigeria. A possible explanation could be that the quality of education in Nigeria is so poor that it does not have a poverty-reducing effect. Therefore, years of education do not necessarily translate into a lower probability of being poor.

It is also observed from the regression analysis that, relative to the reference source of water (pipe-borne water), households that use other sources of drinkable water in Nigeria have a higher likelihood of being poor. Households that use rivers as a source of drinkable water are nine percentage points more likely to be poor when compared to the reference group, holding other factors constant.

**Table 2.** Probit regression model of multidimensional poverty in the six geopolitical zones of Nigeria.

| Explanatory variables | Delta-method dy/dx | Std. Err. | z | P > |z| | [95% conf. | Interval] |
|---|---|---|---|---|---|---|
| **Zone** | | | | | | |
| North East | 0.01 | 0.00 | 1.56 | 0.11 | −0.00 | 0.02 |
| North West | 0.16 | 0.00 | 17.0 | 0.00 | 0.14 | 0.17 |
| South East | 0.05 | 0.00 | 8.07 | 0.00 | 0.03 | 0.06 |
| South South | 0.11 | 0.00 | 16.4 | 0.00 | 0.09 | 0.12 |
| South West | −0.05 | 0.00 | −9.39 | 0.00 | −0.06 | −0.04 |
| **Sector** | | | | | | |
| Rural | 0 .02 | 0.00 | 5.63 | 0.00 | 0.01 | 0.03 |
| Age | −0.01 | 0.00 | −12.1 | 0.00 | −0.01 | −0.00 |
| Age squared | 0.00 | 0.00 | 6.62 | 0.00 | −0.00 | 0.00 |
| Years of Education | 0.01 | 0.00 | 5.95 | 0.00 | 0.01 | 0.02 |
| **Source of drinking water** | | | | | | |
| Borehole/hand pump | 0.00 | 0.00 | 1.26 | 0.19 | −0.00 | 0.02 |
| Well | −0.01 | 0.00 | −0.93 | 0.35 | −0.02 | 0.00 |
| River | 0.09 | 0.01 | 8.80 | 0.00 | 0.07 | 0.11 |
| Other | 0.00 | 0.00 | 0.46 | 0.64 | −0.01 | 0.02 |
| **Type of cooking fuel** | | | | | | |
| Coal/grass | −0.13 | 0.00 | −14.9 | 0.00 | −0.15 | −0.11 |
| Kerosene | −0.04 | 0.00 | −9.27 | 0.35 | −0.05 | −0.03 |
| Electricity | −0.12 | 0.02 | −5.18 | 0.00 | −0.17 | −0.07 |
| Other | −0.14 | 0.00 | −15.0 | 0.00 | −0.16 | −0.12 |
| **Type of sanitation facility** | | | | | | |
| Toilet on water | −0.17 | 0.01 | −16.7 | 0.00 | −0.19 | −0.15 |
| Flush to tank/bucket | −0.19 | 0.00 | −26.5 | 0.00 | −0.21 | −0.18 |
| Latrine | −0.11 | 0.00 | −15.5 | 0.00 | −0.12 | −0.09 |
| Other | −0.02 | 0.01 | −2.05 | 0.04 | −0.05 | −0.00 |
| **Type of floor of dwelling** | | | | | | |
| Smoothed mud | 0.08 | 0.01 | 6.38 | 0.00 | 0.06 | 0.11 |
| Smoothed cement | 0.00 | 0.01 | 0.63 | 0.43 | −0.01 | 0.03 |
| Other | 0.01 | 0.01 | 1.08 | 0.25 | −0.01 | 0.05 |
| **Source of lighting** | | | | | | |
| Kerosene | 0.00 | 0.01 | 0.15 | 0.88 | −0.03 | 0.04 |
| Rechargeable lamp | −0.01 | 0.01 | −0.77 | 0.43 | −0.05 | 0.02 |
| Generator | −0.10 | 0.01 | −5.08 | 0.00 | −0.14 | −0.06 |
| Candle/battery/dry cell | 0.01 | 0.02 | 0.63 | 0.53 | −0.02 | 0.05 |

Source: Own calculations using the General Household Survey (GHS-Panel) 2010–2011 and 2012–2013.

The regression analysis further shows that, relative to collected and purchased firewood as cooking fuel in Nigeria, which is the reference group, all other types of cooking fuel used by households in Nigeria are less likely to be correlated with being poor.

Also, it is observed with the regression that a household that uses flush toilets is 17 percentage points less likely to be poor than a household with none (no toilet), holding other factors constant. In addition, a household that uses "flush to septic tank or bucket" is 19 percentage points less likely to be poor than a household with none, holding other factors constant. A household that uses a latrine is 11 percentage points less likely to be poor than a household with none, holding other factors constant. Overall, water-borne sewage is shown to be a privilege of the non-poor in Nigeria. Since the poor are characterized by low

education levels, low access to health care, poor nutrition and an unhygienic sanitary environment as evidenced by the low implementation of modern and adequate sanitation, they are most at risk of disease and illness.

It is also observed that households that use mud, cement and "other" types of dwelling floors are less likely to be poorer than households with sand/dirt/straw as the type of dwelling floor, holding other factors constant. Furthermore, a household with a mud floor is eight percentage points more likely to be poor than a household with a sand/dirt/straw floor, holding other factors constant.

Overall, the findings indicate that living standards show the level of poverty among the poorest people in Nigeria and further suggest that economic growth has not been pro-poor in Nigeria.

## Conclusion

We have analyzed the status of living standards in Nigeria from 2010 to 2013 as reflected in the distribution of access to selected basic goods and services, using the General Household Survey (GHS) wave 1 (2010–2011) and wave 2 (2012–2013) datasets. We specifically paid attention to inequality and poverty in Nigeria from 2010 to 2013 using the living standard indicators: type of floor of dwelling, type of cooking fuel, other source of lighting, source of drinking water, type of sanitation facility and type of refuse disposal facility.

It was observed from the results of the analyses of selected living standard indicators within the GHS datasets for 2011–2013 that a major factor in the deepening of poverty across the six geopolitical zones of Nigeria and the rural and urban areas is poor electricity supply in all the six zones. This is illustrated by the over 40% of the population in North West and North East who relied on rechargeable lamps for lighting in 2010–2011. Large segments of the poor in all zones also depend on the ubiquitous small diesel generators. These expenditures divert income from the poor that could be employed to acquire human capital such as better education and health, which would aid them in escaping poverty.

The study shows that the living standards in the North West and North East zones of the country are lower than in other zones. This is confirmed, for example, in the high rate of latrine use for sanitation with over 65% of the population from these zones using latrines in 2010–2013.

The study found an improvement in the provision of pipe-borne water by the government in almost all the zones, especially in South West, South East and South South. However, a clear disparity was found in that over 55% of the population of the North East and North West zones still rely on well water for their daily use.

It was found that the majority of houses in Nigeria use cement for their dwelling floor, with over 75% of dwellings using cement in South West, South South and South East. The same trend was observed across rural and

urban areas, with 55% of dwellings floored with cement. Incidence of dwellings with mud and sand/dirt/straw – indicators of extreme poverty – is low in all the zones.

The study revealed disturbing evidence of systemic health risk in the form of refuse disposal and poor sanitation in some zones in Nigeria where, for example, over 50% of households in the South East still use unauthorized refuse heaps for their refuse disposal. A drastic fall in refuse disposal in the compound was noticed in all the zones and rural and urban areas, showing an improvement in the sanitation infrastructure with regard to refuse removal and disposal.

The above analysis of the indicators shows that the majority of Nigerians have low living standards in a number of key areas. The distribution of poverty, as indicated by the living standards discussed, is uneven geographically between and within the zones. The study concludes that the poverty trends are similar in substance among the zones but very different in terms of the degree of severity or prevalence and the numbers of citizens affected. In general, the analysis of the GHS data led us to conclude that the living standards indicators (dwelling floor, cooking fuel, lighting, water, sanitation, refuse disposal) show that Nigerians are generally poor. The study demonstrates the usefulness of a multidimensional approach to poverty which reveals the poverty level from not just the income approach, but from the non-income approach (living standards).

## Disclosure statement

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