

# Decadal Changes in Multidimensional Poverty: An Empirical Analysis of Geopolitical Zones in Nigeria

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## Abstract

This study investigates the decadal changes (between 2008 and 2018) in the multidimensional poverty levels in Nigeria. During the decade, multidimensional poverty was reduced in most areas. The results of this study reveal that the most deprived regions in Nigeria are North East and North West and that they are most deprived in the dimensions of education, living standards and health. In conclusion, positive context-based interventions by the government and essential stakeholders can turn the tide of multidimensional poverty in Nigeria.

## Introduction

Poverty is a complex and overarching development issue in nations, especially in developing countries. Previously, countries measured poverty by applying the basic needs approach (BNA), which uses either income (e.g. Nigeria, UK, and Brazil) or consumption expenditure (e.g. India) as proxies for the multiple deprivations that people face (Chambers, 1988). It is useful because it shows the proportion or percentage of the population who find it difficult to escape poverty. Since there is “no monotonic relationship between income (consumption expenditure) and well-being” (Dimri and Maniquet, 2017), monetary poverty measures fail to reveal the extent and character of poverty among the poor. An example of BNA is using two hypothetical individuals who earn similar incomes (or live below the poverty line), but one among them is better (or worse) than the other because they: 1) “lives in another region and faces different prices, 2) has different preferences” (Dimri and Maniquet, 2017); 3) has returns-yielding assets such as land, 4) has been in poverty for a more extended period and 5) has a more prominent family (Rodgers and Rodgers, 1991).

So the assumption of homogeneity among the poor is the major drawback of monetary poverty measures. Due to that, Amartya Sen proposed the capability approach in the 1990s, which is now the basis for the Multidimensional Poverty Index (MPI). Apart from Sen’s work, Narayan’s seminal work – the *Voices of the Poor*, country-based empirical studies, and the indicators of Millenium Development Goals (MDGs) established the multidimensionality of poverty and led to the propounding of the Alkire-Foster method (or MPI) for poverty measurement (Alkire and Sarwar, 2009; Alkire and Foster, 2011a, Narayan et al., 2000). The MPI measures the overlapping deprivations that poor people face simultaneously and captures the heterogeneities among the poor. It gives a broader picture of the character of poverty in any given context.

However, scholars argue that it complements and does not replace the monetary poverty measures (Alkire and Santos, 2010a). Dr Sabina Alkire buttressed this point by likening financial poverty measures to the left eye and MPI to the right eye in a recent YouTube video (Sabina Alkire “National MPIs and Sustainable Development Goals”; (Week 1 Lecture), 2020). She said that just like closing either the left or right eye would inhibit one’s vision and precision in carrying out activities, ignoring the income measure or MPI would lead to a narrow and unclear picture of poverty. However, seeing that income poverty has been covered extensively in the Nigerian poverty literature, this study focuses on the MPI.

## Literature Review (MPI Studies from Nigeria)

Since the advent of the MPI (around 2008 to 2010), researchers from around the globe have tried to operationalise the MPI in different contexts, either with primary data or with different sources of secondary data. In the study area (Nigeria), we found MPI studies conducted at the community, state, regional, and national levels. It was also found that the two studies on the MPI for farmers

and one study that applied the first-order stochastic dominance approach to discussing the MPI. Given the diversity of MPI studies in Nigeria, we carried out a critical and in-depth review of twenty studies that matched the objectives of our research, and we present the key findings of these studies in the subsequent paragraphs.

First, many of the studies reviewed found severe multidimensional poverty – more than 60 percent of the population studied in each case – in their study areas (Aboaba et al., 2019, Ab-Rahim and Mohammed, 2019, Ataguba et al. 2013, Olarinde et al. 2020). Second, about two studies found that between 10 to 13 per cent of the people living above the income poverty line in Nigeria were multidimensionally poor (Ab-Rahim and Mohammed 2019, Ataguba et al, 2013). Third; the 'living standards' dimension was the common source of deprivation among Nigerians living in multidimensional poverty (Aboaba et al., 2019, Ab-Rahim and Mohammed 2019, Aminu et al., 2021, Joshua et al., 2017).

Also, Nigerians living in large households and in households headed by females, young persons, divorced persons, and uneducated persons were more vulnerable to multidimensional poverty (Adeoti, 2014, Akinbode and Ojediran, 2018, Adepoju, 2018, Aminu et al. 2021, Ataguba et al 2013). Households, where the breadwinner was employed in the agricultural sector rural areas or the Northern part of the country, were equally more vulnerable to multidimensional poverty (Adeoti, 2014, Akinbode and Ojediran 2018, Akinyetun 2022, Ataguba et al., 2013). Finally, the reviewed studies suggested that a reduction in family size, an increase in educational level and appropriate distribution of resources amongst the geopolitical zones and between the urban and rural areas can reduce multidimensional poverty in Nigeria (Adeoti, 2014, Joshua et al., 2017, Oyekale and Oyekale, 2013, Oyelaran-Oyeyinka, 2014).

Nevertheless, these studies overlooked the decadal changes in multidimensional poverty among the six geopolitical zones in Nigeria. This aspect is vital because it reveals the differences in the rate at which zones reduce poverty, which is essential for the allocation of resources at the zonal and state level. Based on this research gap, the current study will look into the MPI for the six geopolitical zones of Nigeria given two time periods – 2008 and 2018.

### Objectives

1. To assess the decadal changes of poverty.
2. To compare multidimensional poverty across geopolitical regions in Nigeria.

### Methodology

DHS data set was used to calculate the Alkire-Foster (A-F) poverty index, which is also known as the MPI. For more details on A-F method, see Note 1 in the Appendix.

### Results and Discussion

The MPI for 2008 was 0.296, with 33.3 percent (H) of the regions deprived in 88.9 percent (A) of the poverty indicators. The six areas, North East was the most deprived as it was deprived in six (Maternal Care, Male Education, Female Education, School Attendance, Sanitation, and Drinking Water) out of the nine indicators. The second most deprived region was North West, which was deprived in four (Maternal Care, Female Education, School Attendance, and Sanitation) out of the nine indicators. Least deprived regions were South East and South West, which were deprived in one (Sanitation) out of the nine indicators. The most common source of deprivation was sanitation (100 percent deprivation), which means that all regions were deprived. North East was the only area deprived in drinking water.

The second most common source of deprivation was maternal care (66.67 percent deprivation), as four (North Central, North East, North West, and South-South) out of the six regions were deprived. Maternal health, four areas (North Central, North East, North West, and South-South) were deprived in terms of the use of health facilities for delivery, and two areas (North East and North West) were deprived in terms of delivery with the aid of skilled medical professionals. In terms of education, two (33.33 percent) regions (North East and North West) were deprived. Most common sources of educational deprivation in these two regions were female education and school attendance. Scenario for educational deprivation was worse in North East as the indicator for male education also revealed a state of deprivation. No deprivation detected by the indicators for nutrition, child mortality, and wealth in all regions, which implies that they contributed nothing to the MPI. Among other indicators, sanitation contributed the most (37.54 percent) to the MPI, and male education contributed the least (4.69 percent) to the MPI.

In 2018, the MPI reduced to 0.167 with, 33.3 percent (H) of the regions deprived in 50 percent (A) of the poverty indicators. Results show that the regions which were poor in 2008 (North East and North West) remained poor in 2018 but their intensity of poverty reduced. For instance, North East moved from being deprived in six out of nine indicators to being deprived in three (Maternal Care, Female Education, and School Attendance) out of nine indicators. In comparison North West moved from being deprived in four out of nine indicators to being deprived in three (Maternal Care, Female Education, and Sanitation) out of nine indicators. Also; the two least deprived regions (South East and South West) in 2008 were free of multidimensional poverty in 2018. It was also observed that the most deprived region (North East) reduced their intensity of poverty faster than other regions during the decade. Most common source of multidimensional poverty by indicator was maternal health (66.67 percent), as four out of six regions – North Central, North West, South-South and North East – were deprived of maternal care, followed by sanitation (33.33 percent; North Central and North West), female education (33.33 percent; North East and North West), and school attendance (16.67 percent; North East).

Also, there were slight improvements in the per-indicator deprivation. In 2008, all regions were deprived of sanitation, but in 2018, all regions were non-deprived except North Central and North West. In 2008, North East was not deprived of male education and of drinking water but it remained deprived in terms of school attendance. Also, more women in North East and North West delivered with the aid of a skilled professional in 2018, which made both regions non-deprived by that indicator. Among indicators, maternal care contributed the most (44.36 percent) to the MPI, and female education and school attendance contributed the least (16.63 percent) to the MPI. Meanwhile, nutrition, child mortality, male education, drinking water, and wealth contributed nothing to the MPI.

The values of the annual absolute (percentage) change for the MPI revealed that the MPI reduced by 0.013 (4.36 percent) per annum throughout the decade. Same also shows that A (intensity of poverty) increased by 0.04 (0.44 percent) per annum throughout the decade. No change observed in the headcount ratio during the decade. The finding shows the edge of the MPI has over the headcount ratio, as the reduction in the MPI shows that the poor economic well-being improved during the decade – even though they did not escape poverty. It also reveals the areas (such as maternal care, female education, school attendance, and sanitation) that kept the poor in the poverty trap during the decade. Meanwhile, the headcount ratio does not reveal this improvement. It shows that the proportion of the population (regions) in poverty did not

change over the decade, which tells a partial story of the poverty scenario in Nigeria. Nevertheless, spearman's rank correlation was used to assess the robustness (mild) of the changes in the indicators over time (Alkire and Santos, 2014). The correlation is 0.806, which means that the MPI is highly robust to changes in the indicators over time. So, if there is a government intervention that leads to an improvement in one indicator over time, that improvement would reduce the MPI.

### **Policy Implications and Conclusion**

This study reveals that there is unbalanced economic development among the six geopolitical regions of Nigeria. MPI as a diagnostic tool for identifying the poor and the dimensions in which they are poor and a monitoring tool for tracking the progress of government schemes, and other poverty alleviation programs, we suggest that Nigeria should design her own national MPI. It will help policymakers capture poverty based on our national goals and our spatial context. It will spur the government to act towards bridging the development gap across regions.

Seeing that most regions were deprived of maternal care, we suggest that the government provides low-cost public health services and good and accessible health infrastructure in the most deprived areas. Again, more healthcare facilities should be built and welfare of medical personnel should be improved. Suggestion such as awareness programs on the benefits of utilizing maternal healthcare facilities be given to communities in the most deprived regions using the appropriate communication channels such as radio, television, religious centers and house to house sensitization. Further, we propose that the government provide schemes that encourage students to attend school. Scholarships should be given to children from poor background and the infrastructure of government schools should be improved, this will encourage children to go to school.

Countries like Seychelles, Tunisia and Mauritius where education is compulsory for all citizens from ages of 6 to 18. In Mauritius, government schools have a minimum of 10 computers, textbooks are free to pupils and transportation is free for all students. These schemes provided by the government in the aforementioned countries had improved the literacy level and helped to improve school attendance in these countries. Therefore, we suggest that Nigeria government should provide schemes or adopts some of the schemes of the aforementioned countries to improve the literacy level and school attendance in the most deprived areas.

We also deduce that since the most deprived regions (especially North West) were also the regions that faced the most terrorism issues in Nigeria, the insurgency could be a reason for low school attendance. Thus, we recommend that the government takes strategic actions to curb insecurity in the deprived regions. All regions were deprived in Sanitation in 2008 which contributed most to the MP1. To enhance sanitations in the affected regions, government can construct high-quality toilets with effective sanitation facilities. Also, proper disposal of hospital waste should be put in check since hospital waste has been identified as a challenge which can cause deadly outbreak of diseases in the neighborhood where it is located. Finally, this study identified that female education was lesser in the deprived areas. So, there should be more enlightenment on gender equality and female empowerment in the deprived areas. The government can give incentives for girl child education by subsidizing the fees of the girl child and providing scholarships for first-generation female learners across the nation but especially in the deprived regions.

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## Appendix

### MPI Methodology

The MPI was developed by Alkire and Santos (2010b) for the 2010 Human Development Report (Mare et al. 2022). One strength it has over other measures is that it uses a dual cut-off method to identify the poor, unlike other poverty measures that focus on the unidimensional approach, union approach, and intersection approach (Alkire and Foster, 2011a); it is based on the Alkire-Foster Methodology, which applies “a counting based method to identify the poor and proposes adjusted FGT measures to reflect the breadth, depth and severity of multidimensional poverty” (Alkire and Foster, 2011b). Adjusted headcount ratio (M0), otherwise known as the MPI, is calculated by multiplying the incidence of poverty (i.e., the percentage of the population who are poor; symbolized by H) with the intensity of poverty (that is, the percentage of deprivations suffered by each person or household on average; symbolized by A) – that is, M0: H x A, where:

In the equation above,  $q$  represents the proportion of the population facing multiple deprivations, and  $n$  represents the total population (Rachel, 2021).

$$A = \frac{\sum_{i=0}^n c_i(k)}{q}$$

While the above equation, “ $c_i(k)$  is the censored deprivation score of individual  $i$ , and  $q$  is the number of people who are multidimensionally poor” (Rachel, 2021). Also; we used spearman's rank correlation to assess the robustness of the changes in the MPI indicators between 2008 and 2018. Further calculation on the contribution of each indicator to the MPI using the formula below:

$$\text{Contribution of indicator } i \text{ to MPI} = \frac{w_i C H_i}{\text{MPI}} * 100$$

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$$\text{Contribution of indicator } i \text{ to MPI} = \frac{w_i C H_i}{\text{MPI}} * 100$$

A person is considered to be in multidimensional poverty if they are deprived in at least one-third (that is,  $k = 33.3$  percent) of the weight of indicators (Mare et al. 2022). It means that "if a household is deprived in 20–33.3 percent of the weighted indicators, they are considered Vulnerable to Poverty, if they are deprived in 50 percent or more (i.e.,  $k = 50$  percent), they are identified as being in Severe Poverty" (Mare et al. 2022). The unit of analysis in this study is a region and the unit of identification is household. An area is deprived if at least 50 percent of the population targeted by the indicator falls below the poverty cut-off. After calculating the MPI, we estimated the annual absolute change and annual percentage change in the MPI, H, and A throughout the decade.

$$\text{Annual Absolute Change in MPI} = \frac{M_o(Y) - M_o(X)}{t_y - t_x}$$

$$\text{Annual Percentage Change in MPI} = 100 * \frac{M_o(Y) - M_o(X)}{(t_y - t_x)(M_o(X))}$$

According to [and](#) Mare et al. (2022), there are five ways of determining what dimensions and indicators to include in a nation's MPI. They are: "I) deliberative or participatory exercises, II) enduring consensus, III) theory-base and literature review, IV) convenience and data availability, and V) empirical evidence on people's preferences and behaviors" (Mare et al. 2022). Dimensions and indicators for measuring the MPI in Nigeria were chosen based on consensus (it was adapted from the Global MPI, formulated by consensus), literature review, and data availability. The indicators of the Global MPI that were available in the Nigerian Demographic and Health Survey (NDHS) data were used. If the data for an indicator was not available, we matched the indicators to fit similar indicators that were present in the data set, in some cases, we replaced the indicator (but with the backing of literature).