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Mapping Poverty and Deprivation in Barikin-Sale, Minna, Nigeria

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Abstract- Poverty is a very serious problem facing currently bedevilling a large proportion of the global population. This problem is becoming intensified with the rapid rate of global population growth and unprecedented urbanisation. More worrisome is the fact that this phenomenon has translated into urbanisation of poverty. This study aimed at mapping poverty and deprivation in Barikin Sale neighbourhood of Minna, Nigeria; and the objectives are to obtain the base map of the study area, acquire data on household deprivation in the study area, assess the rate of deprivation in the neighbourhood and produce poverty maps of the study area. Barikin Sale was subdivided into 10 small areas which were termed sub-neighbourhoods which form the units of analysis and mapping. Ten households were randomly sampled from each sub-neighbourhood. Descriptive and inferential analyses were carried out and it was discovered that household deprivation is more obvious at sub-neighbourhoods level than at the general neighbourhood level. Principal component and factor analysis techniques were adopted to measure the marginality index of the residents across the sub-neighbourhoods and the results were used to produce poverty maps for the study area. The study discovered that the residents of Barikin Sale suffer ultra-deprivation in term of adult literacy level. The study recommends that the residents of Barikin sale should be encouraged to enrol in adult literacy classes.

Keywords: Poverty, Deprivation, Urbanisation of Poverty, Poverty Mapping, Households

I. INTRODUCTION

Poverty is a global social and economic problem whose full grasp is difficult to come by. Early poverty assessments focused primarily on the income metrics at the expense of other equally fundamental dimensions. However, in recent times, much effort has been expounded to include other indices of poverty that transcend the economic measure. [1], for instance, advocated the need to measure poverty from the livelihood dimension. As an extension of this, [2] utilised indicators such as adequate access to education, water, housing, communication and sanitation to demonstrate the multidimensionality of poverty. The foregoing indicates the evolution and developments in poverty measurement indicators. However, these measures do not adequately represent poverty; in most cases, they are extremely generalistic. To address this, the poverty mapping technique was developed. Mapping attempts to demonstrate the occurrence of poverty in space and time. The small area estimation method, for example, is capable of econometrically identifying areas of poverty through spatial disaggregation of the occurrence of poverty. The World Bank has consistently adopted this approach to mapping poverty. Similar to the Small Area Estimation, the Multivariate Weighted Needs Index has been applied across different case studies to measure poverty. The problem with the aforementioned approaches, however, is that they are too technical in their application and therefore difficult to produce understandable result. In the same vein, they do not identify the underlying significant but unobserved factors that are responsible for poverty. The factor analysis technique is capable of covering this gap; thus, it is adopted for the present study. Furthermore, most of the poverty measurement studies in Nigeria adopt econometric approaches that are fundamentally mathematical. Therefore, they are difficult to understand by the laymen. Mapping will be a more concise and easily understandable way to represent the menace of poverty as it occurs across different geographic spaces. Notwithstanding this importance of mapping, most poverty assessments in Nigeria have not adopted this approach. An exception to this is the effort made by [3]. However, their study was particularly focused on child poverty and not on poverty generally. This is a fundamental gap in knowledge that this study seeks to cover.

Mapping poverty in urban centres is an indispensable exercise, especially in this century of 'urbanisation of poverty'. Not only will such exercise inform public policy, it is also necessary for guiding business and investment planning. Furthermore, it will provide policy support. In a nutshell, poverty mapping is a creative decision support tool. The need for a study like this, therefore, cannot be overemphasised. Many approaches have been used to elicit the multifarious nature of poverty and the suggestions have been raised to that effect. However, little has been explored on the spatial dimension of poverty occurrence and its impacts in Nigeria. This study therefore attempts to undertake poverty mapping of Barikin Sale in order to cover this gap by adopting the principal component and GIS techniques of poverty mapping.

1.4 Aim and Objectives

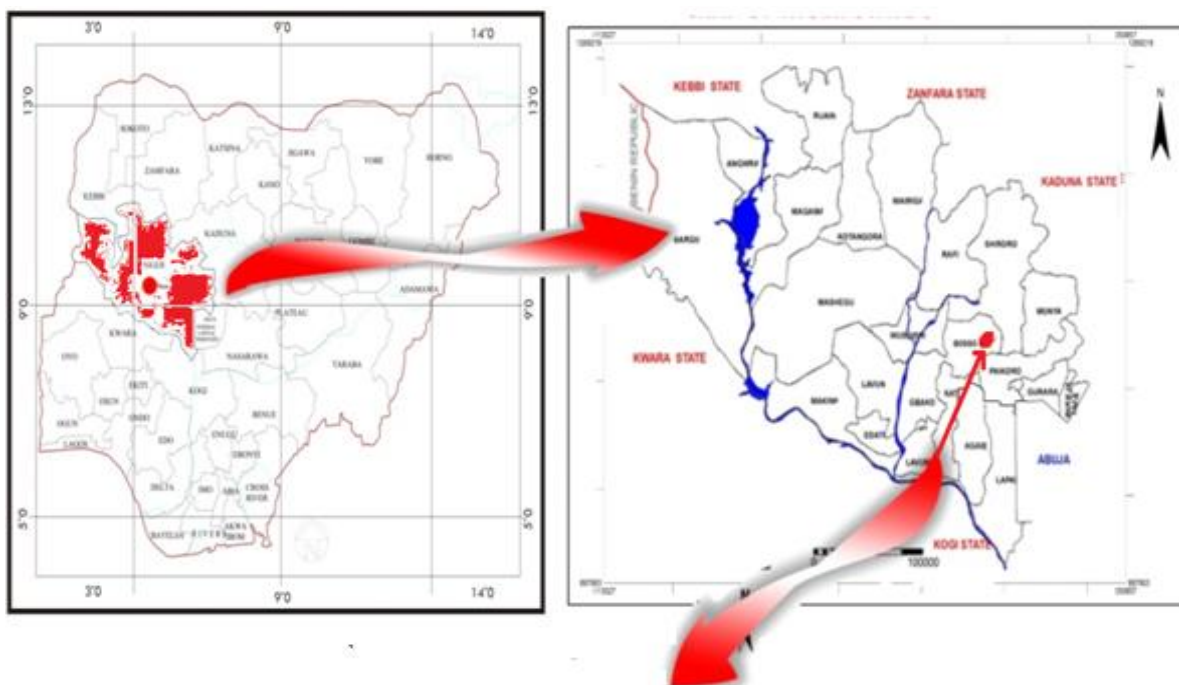
The aim of this study is to undertake the mapping of the multiple dimensions of poverty incidence in Barikin-Sale neighbourhood of Minna. To achieve this aim, the following objectives are set for the study:

- i. To obtain the map of the study area and delineate it into small areas
- ii. To acquire data on household deprivation in Barikin-Sale
- iii. To assess the rate of poverty in the study area using principal component and GIS techniques
- iv. To produce a poverty map of Barikin-Sale

1.7 The Study Area

Barikin Sale is a neighbourhood in the western part of Minna, Niger State, Nigeria. Minna is a misspelling of the Gbagyi word 'Myina' which was the original name, meaning a cottage on the hill top ([4] as cited in [5]). By implication, the original settlers of Minna were on the hilltops of the area. [5] reported that the hills provided secured home for the Gwari settlers, the indigenous owners of Minna and protected them from the invasion from the Nagwamatse led group from Kotangora town; a settlement some 160km away from Minna. He, however, noted that from about 1905 when railway lines reached Minna and when effective colonial occupation started giving security to Minna, residency on hill tops ceased to be a norm.

According to [6], Minna is located on Latitude 9°37' North and Longitude 6°33' East and occupies a land area of about 884 hectares. It is about 145km by road from Abuja, the Federal capital of Nigeria. Minna metropolis has grown to engulf suburb settlements such as Bosso, Maitumbi, Dutsen Kura, Kpakungu, Shango and Chanchaga [7]. The map of the study area is presented in Figure 1.



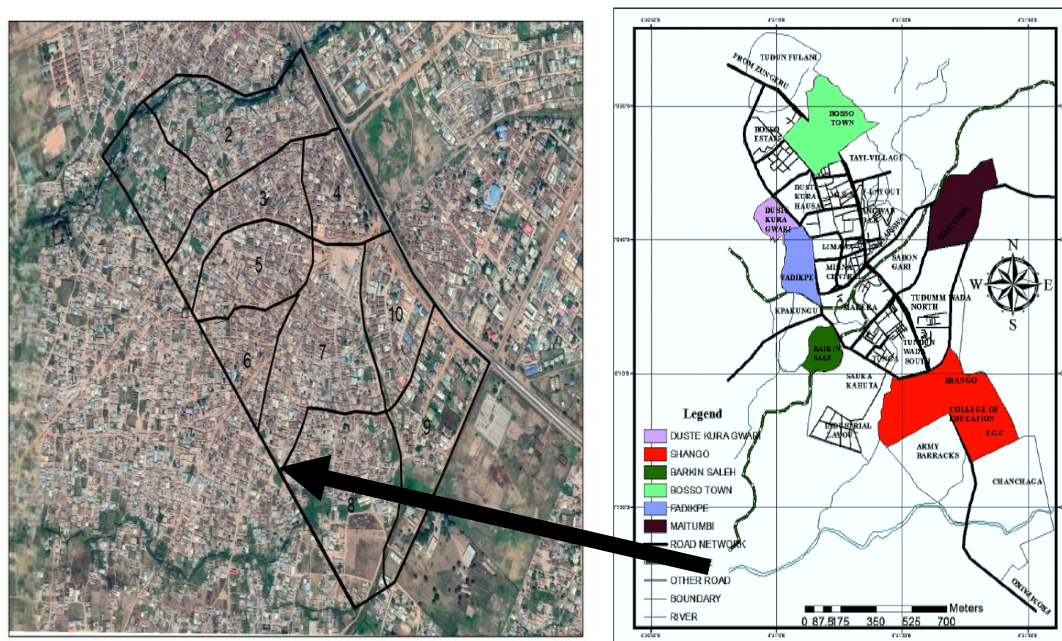


Fig. 1: Location of the Barikin Sale in Nigeria

Source: Author's digitisation (with modifications from [7])

II. METHODOLOGY

The data required for this study were obtained from both secondary and primary sources. The secondary data were basically obtained from publications and they are adequately referenced. The primary data, on the other hand, were obtained through questionnaire administration. For ease of data collection and analysis, the study area was subdivided into 10 sub-units which were termed as sub-neighbourhoods (Figure 1). Ten copies of the questionnaire were administered to each sub-neighbourhood through systematic random sampling technique. Data analysis was done with the aid of Statistical Package for Social Sciences (SPSS) to conduct the principal component and factor analysis, while the poverty maps were produced with the aid of ArcGIS 10.

III. DATA ANALYSIS AND PRESENTATION

The poverty mapping exercise draws considerable lessons from the Principal Component technique which has been consistently applied by the Mexican Government in disaggregating poverty at community level (that is, the PROGRESA Anti-poverty Programme). The neighbourhood was divided into 10 sub-neighbourhoods. The underlying principle is that the index makes reference to 1: the close the calculated index is to 1, the higher the occurrence of the component factor. Consequently, as can be seen in Table 1 the lowest adult illiteracy rate (.00) is recorded in sub-neighbourhood 9, while the highest adult illiteracy rate (.50) is recorded in sub-neighbourhood 3, indicating that acute literacy deprivation is experienced in sub-neighbourhood 3. Therefore, residents of sub-neighbourhood 3 of Barikin Sale are educationally poor. Literacy is a fundamental indicator of the Human Development Index developed by [8]. In fact, [9] argues that the level of education of people defines the level of development of a place. As such, sub-neighbourhood 3 has low level of human development.

High level of water poverty was identified in the study. It was observed that sub-neighbourhoods 4, 8, 9 and 10 experience water stress with marginality index of 0.5. In similar vein (but lesser in intensity), sub-neighbourhood 7 experiences water stress with marginality index of 0.4. Although sub-neighbourhood 3 has the highest marginality index in terms of adult literacy level, it recorded the lowest marginality index in terms of water stress. Water is a very fundamental requirement for the survival of man; as a result, it is included in the United Nations Sustainable Development Goals (SDGs).

In relation to sanitation, it was discovered that households in sub-neighbourhood has a marginality index of 0.4. Only households in sub-neighbourhood 1 have a marginality index of 0.00, and therefore have adequate sanitation. Poor sanitation is a symbol of poverty as well as also a global health problem. One of the major dimensions of HDI is health. Poor sanitation is therefore an affront on health, and can undermine HDI.

Energy is inevitable for human survival. Clean domestic energy source can help in reducing greenhouse gas and consequent global warming. However, when people experience energy poverty, they are likely to increase the ecological footprint of household energy consumption and thereby undermine ecological sustainability. Households in sub-neighbourhoods 2, 3 and 5 record energy marginality index as high as 0.4. Although this marginality index is moderate, it reflects energy justice issues.

Table 1: Principal Component Marginality Index of Barikin Sale

INDICATORS	SUB-NEIGHBOURHOODS (QUARTILES)									
	1	2	3	4	5	6	7	8	9	10
Share of illiterate adults	.20	.20	.50	.20	.10	.20	.10	.20	.00	.20
Dwellings without water	.30	.30	.20	.50	.30	.30	.40	.50	.50	.50
Dwellings without toilet	.00	.30	.40	.10	.30	.30	.10	.30	.10	.30
Dwellings without electricity	.00	.40	.40	.00	.40	.20	.10	.20	.00	.00
Share of organised workers	.30	.20	.10	.30	.20	.20	.30	.30	.30	.30
Share of household size above national average	.70	.70	.90	.60	.70	.70	.60	.50	.60	.50

Source: Author’s Field Survey, 2019

The calculated marginality index based on the quartiles (which has been termed ‘sub-neighbourhoods for clarity) is presented in form of maps. Each of the indicators was mapped using the calculated index to determine the extent and intensity of deprivations suffered by different sections of Barikin Sale. While some neighbourhoods performed relatively well on some indicators, they weighted low on others. However, the sub-neighbourhoods with the highest percentage of dwellings without electricity are found to be clustered close to each other. The poverty maps based on the calculated marginality index using principal component approach are presented in Figures 2-5.

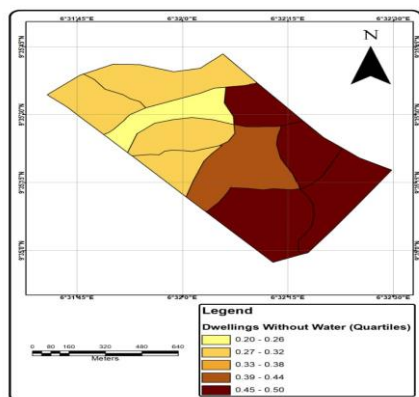


Fig. 2: Share of dwellings without water
Source: Author’s Lab work, 2019

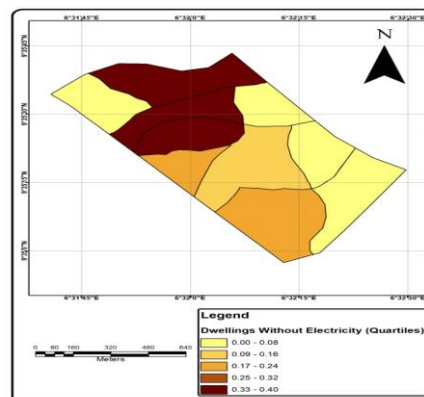


Fig. 3: Share of dwellings without electricity
Source: Author’s Lab work, 2019

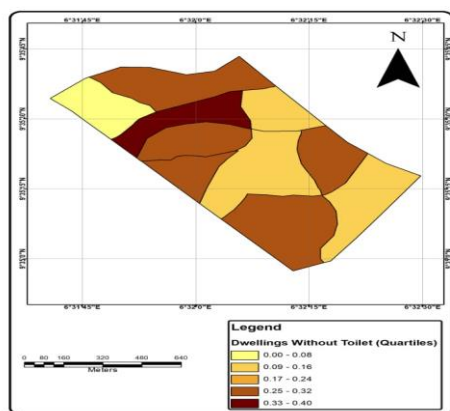


Fig. 4: Share of dwellings without toilet
Source: Author’s Lab work, 2019

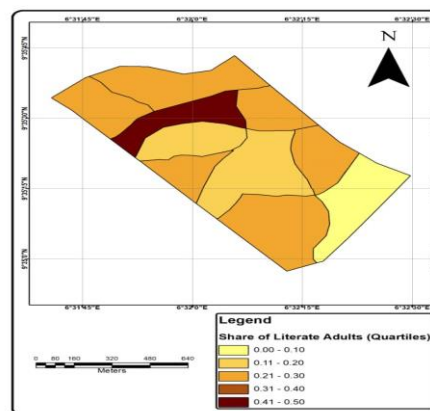


Fig. 5: Share of literate adults
Source: Author’s Lab work, 2019

IV. CONCLUSION AND RECOMMENDATIONS

Poverty is a very serious problem bedeviling almost every nation in the world. However, the intensity and magnitude varies from one place to another. Globally, South-East Asia and sub-Saharan Africa has the largest proportion of their citizens trapped by poverty. Within Africa, poverty in Nigeria is of such magnitude that the country was recently referred to as the 'poverty capital of the world'. This is a very worrisome development which engendered this study to disaggregate poverty at community level using the principal component approach. Through the marginality index calculated from each component at sub-neighbourhood level, poverty maps were generated by applying Geographic Information System (GIS) techniques with the aid of ArcGIS. Geographic Information System plays tremendous role in aiding mapping in general and the mapping of socio-economic indices in particular. By blending the Principal Component and GIS techniques, it was discovered that neighborhoods should be broken up into smaller sub-units in order to understand the internal recesses they encounter in their daily lives. This is because, evidence from this study indicates that generalized mapping of neighbourhoods as a single unit has the potential of hiding some basic truths about the internal stresses that the households face. For example, while overall adult literacy rate was found to be up to 81%, it is important to note that this figure does not cut across the whole of Barikin Sale since up to 50% of the residents in sub-neighbourhood 3 are not formally educated.

Stemming from the findings of this study, it is recommended that subsequent poverty mapping efforts should endeavour to adopt the principal component approach in disaggregating poverty at community level owing to its ability to reveal hidden realities of poverty above other methods. Furthermore, concerted efforts need to be put in place to ensure that the welfare of the residents are taken care of, especially in the area of production and distribution of clean and affordable energy, water and sanitation services to the households in the study area. More so, measures should be put in place to ensure that the free basic education operated in Niger State extends to adult literacy and the adults in Barikin Sale should be encouraged to enroll in adult literacy classes. Having done these, it is believed that the wellbeing of the residents of the study area will be improved significantly. This study did not include the role of religion and culture in intensifying poverty in the study area; thus, further in-depth studies are required to establish this relationship. Finally, this study adopted the principal component technique among a host of other techniques of poverty mapping. Other approaches may yield dissimilar results. Therefore, it is also suggested that other approaches should be applied to measure poverty at the sub-neighborhood level in order to verify the authenticity of the results.

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