Assessment of the Impact of Quality Of Life, Living Conditions and Government Effectiveness on Socio-Economic Development of Some Selected LGAs of Yobe State

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ABSTRACT
This study assessed the impact of quality of life, living conditions and government effectiveness on socio-economic development of some selected local government areas of Yobe state. The objective was to assess the impact of quality of life and living conditions and government effectiveness on socio-economic development of Geidam, Potiskum and Nguru Local Government Areas. The Capability Deprivation Index (CDI) was used on survey data across the selected local government areas. Other indices of deprivation applied includes Education Deprivation Index (EDI), Health Deprivation Index (HDI) and Living Condition Deprivation Index (LCDI).A systematic random sampling and questionnaire method of data collection were used for this study.
The study found the existence of an asymmetry of deprivations across the LGAs in all the dimension indices. However, the intensity of the deprivation varies across the LGAs. For example, the Geidam Local Government Area was found to be extremely deprived not only at the Capability Deprivation Index (CDI) but also at all the three indices of education, health and living conditions. Therefore, the results concluded that the government was ineffective in the provision of social and basic amenities in Geidam Local Government Area. Nguru Local Government Area was found to be moderately effective in the provision of social services to the populace at the CDI benchmark and in all the three dimension indices except in health dimension index where it was reported to have the least deprivation index. Potiskum Local Government Area was the least deprived at the CDI benchmark and as well as in education deprivation index and living condition deprivation index.
KEYWORDS: *education deprivation index; health deprivation index; living condition deprivation index; capability deprivation index; socio-economic development.*

I. INTRODUCTION

The effectiveness of every government can be attributed to the extent at which the quality of life and living conditions of the people are promoted and enhanced. Although, the role of government is seen as the second-best alternative to promoting human welfare, the first-best alternative was to allow the market mechanism to freely intervene in the equitable distribution of public goods.However, from the economic perspective, there is a continuing debates on how to equitably allocate scarce resources in order to promote and improve human welfare taking into consideration, the political, economic, cultural and moral factors (Just, Hueth and Swhmitz, 2004). Several approaches were advanced by welfare economists from the utility based approach, to the resource based approach and most recently to the capability approach. The evolution of these approaches is not far-fetched from the revolutionary trend in finding a workable measurement to human welfare.

Initially, it began with the marginalist approach which is associated with the work of Carl Menger, Leon Walras, and Alfred Marshall. The fundamental contribution of the marginalist approach was the diminishing marginal utility which focuses on consumption theory and it was used as the foundation for measuring welfare by economists up to the early twentieth century. The work of Lionel Robbins in 1932 saw to the emergence of the ordinalist approach which viewed utility as a subjective approach measurable only by

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revealed preference. The ordinalist remarkably works on the marginalist approach to yield a more coherent neoclassical school of economic thought. The renowned work of John Rawls which saw to the publication of a Theory of Justice bred the capability approach developed by Amartya Sen. The capability approach largely focuses on human potentials as a basis for analysing development policy initiative as reported by Stanton, (2007). Recently, the focus of the welfare economists was to ensure the use of an integrated approach that seeks to bring together the various approaches in the context of sustainable development. However, the empirical application of the integrated approach is marred by absence of a workable framework for measuring welfare. Meanwhile, the Millennium Development Goals (MDGs) which stem from the sustainable development initiative of the integrated approach was used by developing countries as a framework for measuring and evaluating public policy.

The experience of developing countries especially in Sub-Saharan Africa including Nigeria regarding the non-attainment of the MDGs led to the readjustment of the policy direction focusing on the Post-Millennium Development Goals (P-MDGs). However, the prospect of the P-MDGs by the developing countries after a downward adjustment appears to be gloomy. This scenario necessitated the establishment of a workable and measurable framework for use by public policy in developing countries.The study of quality of life and living conditions in developing countries focus more on diverse indicators to include healthcare, education, housing and earnings as welfare components. This is in contrast with the developed world whose attention was geared toward happiness and satisfaction as a measure of welfare. It is noteworthy that, in developed countries, indicators such as healthcare, education, and other components are readily available and accessible on demand. The contemporary studies on quality of life especially in developed countries focuses on the growth-centred model from the macro perspective without considering the micro element of human potential in developing countries that are exposed to certain levels of deprivation which require a multidimensional approach to welfare that capture the varying degree of inequalities.

Since the return to democratic rule in 1999, Nigeria's economic growth rose dramatically occasioned by an appreciable rise in crude oil prices in the global market. For example, from 2000 to 2010 Nigeria's GDP annual growth rate averaged 7.71%. However, despite the remarkable rise in economic fortune over the years, there is no significant improvement in quality of life and living conditions of the people across the states and local governments. This is because Nigeria was ranked 158 out of 189 countries which lies among low human development nations (HDI, 2019). To further corroborate the report of the HDI, Nigeria's average annual HDI growth during 2010-2018 was 1.25% only. This is besides the report of the National Bureau of Statistics (NBS, 2020) which depicts that 40.1% of Nigeria's population representing 82.9 Million people live below the poverty line of 376.5 naira per day.

This evidence is an indication of divergence between economic growth and real development since the sustained economic growth trajectory over the years did not translate into improved human development. It is noteworthy that, the abysmal performance of Nigeria in the context of HDI and poverty level represent a macro analysis of the aggregated information which might be difficult to disentangle the extent and pervasiveness of poverty and human development across local government and communities. Even at the state level, there seems to be a concentration of development at the state capital and cities thereby neglecting the local government areas and communities and sometimes the real conditions of living are underreported by survey agencies. Thus, the macro study might suffer from bias and over-aggregation, thereby making it difficult if not impossible to have a representativeness of the economic reality at the micro levels which necessitated this study to be conducted at the local government levels.

This study focuses on Geidam, Potiskum and Nguru local Government Areas of Yobe state. The relative deprivation of Yobe state in the context of human development to the national average makes it imperative to measure the quality of life in the selected local government areas with a view to unravel the true picture of the development pattern at the local government levels in order to determine the appropriate policy direction to be taken. The objective of the study was to assess the impact of quality of life, living conditions and government effectiveness on socio-economic development of the selected Local Government Areas of Yobe state. This study will be of immense significance to policy makers at the local government and community levels on the design and execution of the appropriate policies that affect the quality of life and living conditions of the people at the grassroots. Undoubtedly, the outcomes of this study will help both state and local governments to identify and partner in the provision of essential services and other priority areas in achieving an improved human development. Rest of the paper is anchored on theoretical and empirical literature, methodology, results and discussion, conclusion and policy recommendations.

II.   THEORETICAL AND EMPIRICAL LITERATURE

The inherent weaknesses associated with the traditional approaches (Utility-based approach and Resource-based approach) led to the evolution of the capability-based approach. This approach as a leading alternative premised on an individual's capability to function in a valuable, and of attaining valuable state of

being in achieving valuable functioning (Sen, 1999). The fundamental contribution of the capability-based approach over the traditional theories was its superiority in differentiating between the achievements of end needs, which is decent living conditions over means, which is income per capita.The proponent of the capability-based approach, Amartya Sen, whose brilliant work had been shaped by the ideas of the moral philosophers such as Karl Max, Adam Smith, Aristotle and, John Rawls. The work of Sen was brought to the field of academic discourse in 1979 during a Tanner Lecture on human values. Sen's argument was that basic capabilities is the foundation upon which welfare distribution can be better explained and understood rather than the notion of utility or the Rawlsian index of primary goods. The capability-based approach has an edge over the other approaches by giving an individual the ability to do what they are capable of doing beyond just availability of resources or the utility alone.

The UNDP's 1990 Human Development Report was an important turning point to the capability-based approach to welfare. This is because the report had given credence to human beings as the real wealth of a nation. As such, any expansion of wealth is only a means to an end, the end being the development of human well-being. The report provides three major components. Firstly, it focuses on the capabilities of human beings-meaning those human activities valued by people and the solid reasons behind such valuation. Secondly, it relates to human freedom in practicing a democratic exercise which brought benefits to humans as part of the agent of development. According to Alkire (2010), the third component relates to the principle of justice with emphasis on the poor and less privileged individuals of the society.The UNDP's capability-based approach has unveiled three different but interwoven dimensions that are key to improving the freedom of human's capability test. Firstly, it uses income per capita to measure the standard of living. Secondly, it uses the level of school enrolment and adult literacy as a measure of education and thirdly, it uses life expectancy as a measure of health (UNDP, 1990; 2010)

In the context of welfare, available empirical literature focused on either analysis of welfare or the effectiveness of governance in promoting welfare. A number of empirical evidence examined the social welfare analysis perspective such as Helliwell, Layard and Sachs (2013); Porter, Stern and Green (2013); UNDP (2014); Anyanwu (2012). For example, a study on the global distribution of happiness across countries by Helliwell, Layard and Sachs (2013) using regression and correlation analysis on 156 countries. The study employed Cantril ladder to rank countries based on general level of happiness. The result indicated that the top five most ranked countries are Denmark, Norway, Switzerland, Netherland and Sweden while the lowest five countries are Rwanda, Burundi, Central African Republic, Benin and Togo. The report of the Cantril ladder between the top five countries and the bottom five countries was 7.48.In another study, Porter, Stern and Green (2013) used secondary data on 132 countries by constructing Social Progress Index (SPI) to analyse the overall quality of life across the countries under study. The result of the top 10 countries on the SPI ranking placed New Zealand, Switzerland, Iceland, Netherland, Norway, Sweden, Finland, Denmark, Canada and Australia with scores ranging from 88.24 to 86.10. Whereas the top 10 countries on the bottom low of the SPI ranking were Nigeria, Pakistan, Yemen, Niger, Angola, Sudan, Guinea, Burundi, Central African Republic and Chad with a ranking score between 42.65 and 86.10.

By examining the long term progress on three dimensions of human development, UNDP (2014) used the Human Development Index (HDI) on education, health and standard of living for 187 countries. The report vindicated that there are uneven human development scores across countries of the world. While the HDI world averaged at 0.702, the top three countries with a very high human development are Norway, Australia and Switzerland. The top three countries with a high human development are Uruguay, Bahamas and Montenegro while the top three countries with medium human development are Maldives, Mongolia and Turkmenistan. However, the countries of Nepal, Pakistan and Kenya are reported to be the top three countries with low human development. In Nigeria, the study by Ajakaiye, et. al (2014) used the first order dominance approach on non-monetary multidimensional poverty of deprivation including education, water, health, sanitation, shelter and energy. The study found that the rapid economic growth in the country is not tandem with the amelioration of the incidence of poverty and there was a regional inequality across states with northern regions having the highest worse cases of poverty.

In the context of government effectiveness in improving the quality of life and living conditions, the study by Erhijakpor, (2007) examined the nexus between government effectiveness on education and school enrolment in South Africa, Nigeria, Algeria and Egypt. The study used annual panel regression from 1990-2002. The study found a significant positive relationship between government spending on education and enrolment rates in the countries under study with Nigeria having the highest impact on increasing enrolment in primary and secondary educations. In another strand of literature, World Bank (2011) examined Nigeria's socio-economic improvement occasioned by high economic growth due to a recent significant oil revenue. The study revealed that the relationship between increased government revenue and improvement in socio-economic outcomes is positively low. Also, it was reported that, there was a regional imbalance between the northern and southern parts of Nigeria where the Northern states are comparably worse off. The findings from the relationship between socio-economic spending and the resultant outcomes on socio-economic improvement was weakly correlated.

III.   METHODOLOGY

The methodology used in this study is Capability Deprivation Index (CDI) modified by Ismail, (2018). This index was chosen because of its superiority over other measures of welfare and quality of living conditions. This is because the CDI was designed to capture the salient characteristics of quality of life and living conditions at the micro levels that are peculiar to developing countries. The information to be extracted at the micro level can be a true representativeness of quality life, living conditions and effectiveness of governance at the macro level.The population of this study is the entire population of Geidam, Potiskum and Nguru Local Government Areas. According to the National Population Commission (NPC) 2016, the population of Geidam, Potiskum and Nguru Local Government Areas are projected at 221,000, 290,700 and 213,900 respectively.

The sample size selected for this study is in the spirit of Yamane (1967). Therefore, 399 households were used in each of the three selected LGAs. The selection process was spread across the three senatorial districts of the state. Hence, Geidam was chosen from Yobe East Senatorial District, Potiskum was chosen from Yobe South Senatorial District and Nguru was Chosen from Yobe North Senatorial District. The systematic random sampling technique was used for this study whereby in each of the selected local government areas, the samples are drawn across identified Enumeration Areas (EAs). The sample taken is distributed across wards. The systematic random sampling was used because of its advantages in reducing the sampling bias and to ensure inclusiveness of the settlements in the sample. This study used a questionnaire method of data collection. The questions cover a wide range of demographic, quality of life and living conditions that are relevant for the study.

IV.   RESULTS AND DISCUSSIONS

Socio-economic and Demographic Characteristics of the LGAs

The social, economic and demographic information of the respondents is important in showing the variations in the household pattern with regards to issues surrounding quality of life and living conditions across the selected LGAs. On educational attainment, the information gathered and analysed from Geidam Local Government Area shows that 35% completed secondary education, 50% attended Qur'anic education, 10% attended and completed primary education while 5% have no formal education. In Nguru Local Government Area, the data revealed that 48% of the respondents completed secondary education, 43% attended Qur'anic education, 6% completed primary education and only 3% of the respondent with no formal education. The information obtained and analysed in Potiskum Local Government Area indicated that 50% of the respondents completed secondary education with another 40% attended Qur'anic education, 8% attended and completed primary education and only 2% without any formal education. Figure 1 depicts the educational attainment across the selected LGAs under study.
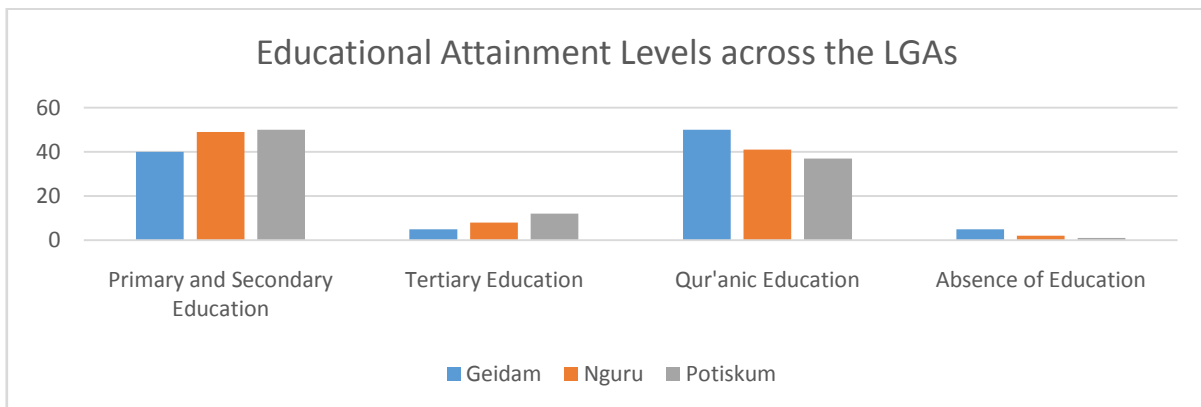

Figure 1: Percentage distribution of the education attainment across the LGAs.

The information gathered on living standard revealed that, in Geidam Local Government Area, 30% of the respondents engaged in business or trading activities, 35% are farmers, 20% are civil servants, 6% engaged in transportation, 1% are teachers or lecturers, 4% are tailors and designer makers, 1% engaged in manufacturing and processing, 2% are retired civil servants and only 1% without employment. In Nguru Local Government Area, data on living condition shows that, 20% of the respondents earned their livings through trading or business activities, 30% of the respondents engaged in farming activities, 25% are civil servants, 8% are in transportation business, 3% engaged in manufacturing and processing, 3% are teachers or lecturers, 5% are tailors and fashion designers, 4% are retired public servants and 2% are unemployed. The data on living standard in Potiskum Local Government Area shows that, 28% are into trading or business making, 26% are

farmers, 22% are civil servants, 9% engaged in transportation, 4% are tailors and fashion designers, 3% are in manufacturing and processing business, 4% are either teachers or lecturers, 3% are retired civil servants and 1% are unemployed. The figure 2 depicts the living standard of the three Local Government Areas.
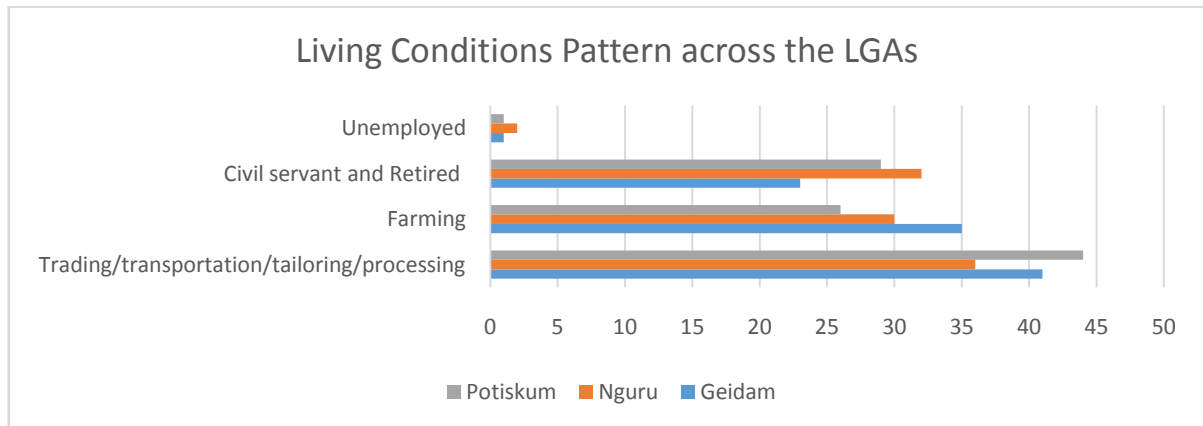

Figure 2. Percentage Distribution of Living Conditions across the LGAs.

In Geidam Local Government Area, the monthly earning levels of the respondents show that, only 2% are without earnings, 30% of the respondents earned below 18000, 40% of the respondents earned between 18,000 – 60,000, 21% of the respondents earned between 65,000 – 100,000, 5% earned between 110,000 – 200,000 and only 2% of the respondents earned above 200,000. The data on earning levels in Nguru Local Government Area indicated that 2% are without earnings, 30% earned below 18,000, 42% earned between 18,000 to 60,000, 20% earned between 65,000 to 100,000, 4% earned between 110,000 to 200,000 and only 2% earned above 200,000. In Potiskum Local Government Area, only 1% are without earnings, 25% of the respondents earned below 18,000, 41% earned between 18,000 to 60,000, 25% earned between 65,000 to 100,000, 5% earned between 110,000 to 200,000 and 3% earned above 200,000. The figure 3 shows the monthly earnings of the respondents across the selected LGAs.
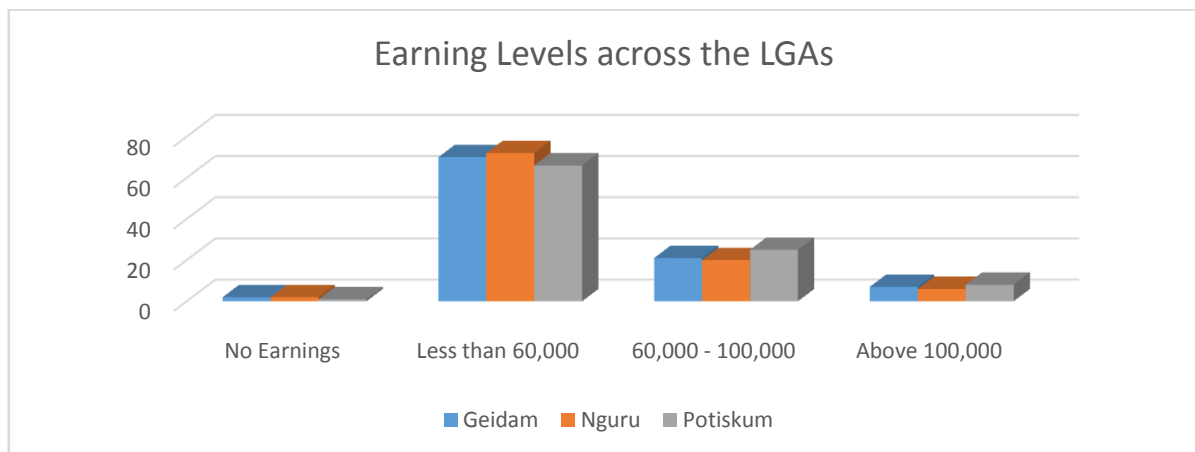

Figure 3. Percentage of Monthly Earnings Distribution across the LGAs

Capability Deprivation Index Estimation across the LGAs
The Capability Deprivation Index (CDI) at the education, health and living condition deprivation dimensions are shown for Geidam, Nguru and Potiskum Local Government Areas in order to understand the differences and the extent of the deprivation across the LGAs for the sake of policy implication and intervention where necessary to improve the welfare of the people.

Education Deprivation Index Analysis across the LGAs
The education deprivation index for the selected LGAs is presented in figure 4. Figure 4 shows that all the selected LGAs have some levels of education deprivation depending on the intensity of such deprivation. For example, Geidam Local Government Areas have the highest levels of education deprivation where households number 9, 7, 16, 17, 26, 33, 45, 46, 66, 89, 90, 241, and 244 are having the highest deprivation index of 1. This is followed by Nguru Local Government Area where households number 108, 130, 213, 223, 264,

342, and 359 are having the deprivation index of 1. Potiskum Local Government Area has the least household numbers (289, 370 and 383) with the deprivation index of 1. These results are indication that, despite the institution of the state of emergency in the education sector in Yobe state, still more need to be done to ensure increase in enrolment and school attainment especially in Geidam Local Government Area where several households are having school age children that are either not enrolled in primary school or households not having children that attend and completed secondary school and tertiary institutions.
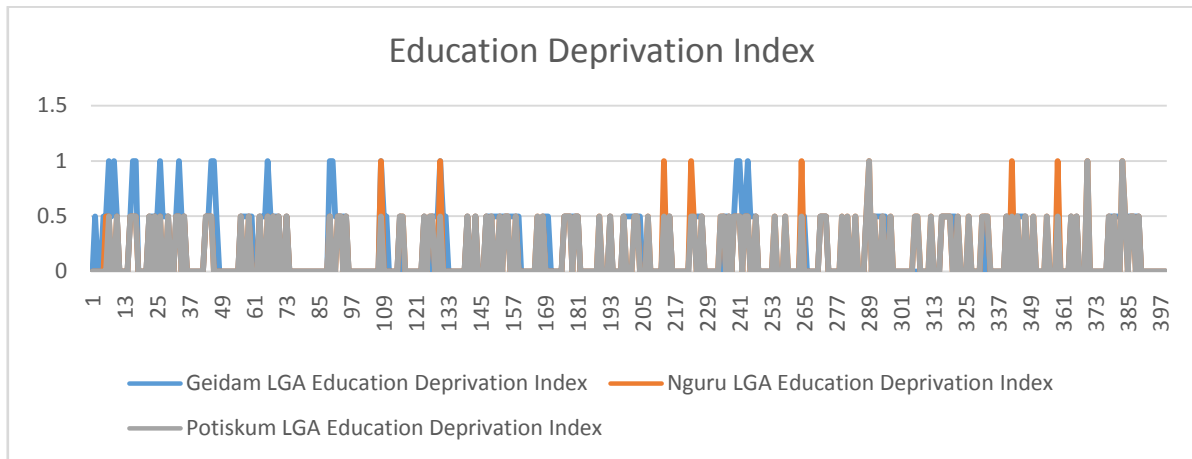

Figure 4. Education Deprivation Index across the LGAs

Health Deprivation Index Analysis across the LGAs

The result for the health deprivation index is presented in figure 5. According to the pattern and direction of the graph, all the three local government areas have varying degrees of deprivation depending on the availability and accessibility of health facilities and health personnel in their LGAs. For instance, due to the presence of a tertiary health facility besides other primary health facilities, Nguru LGA has the least number of health deprivation where only few households are having the health deprivation index of 1. Though, there are numerous cases of health deprivation below the index value of one. This is in contrast with Geidam and Potiskum who are having the largest and the moderate deprivation respectively. In Geidam, for instance, there are eight households (38,39,61,90,9192, 179, 284) that are having the health deprivation index of 1. However, in Potiskum LGA, there are seven households (77, 109, 134, 140, 284, 353,371) that are all having the index value of 1. These results have indicated that there is the need to among other things improve the quality and quantity of both health personnel and equipment in order to reduce the level of health deprivation in the selected LGAs. The results might even be worse if other local government areas in the state are analysed. Therefore, more efforts from the state government and of course from the local government areas are needed in order to redress the health deprivation across their domains.
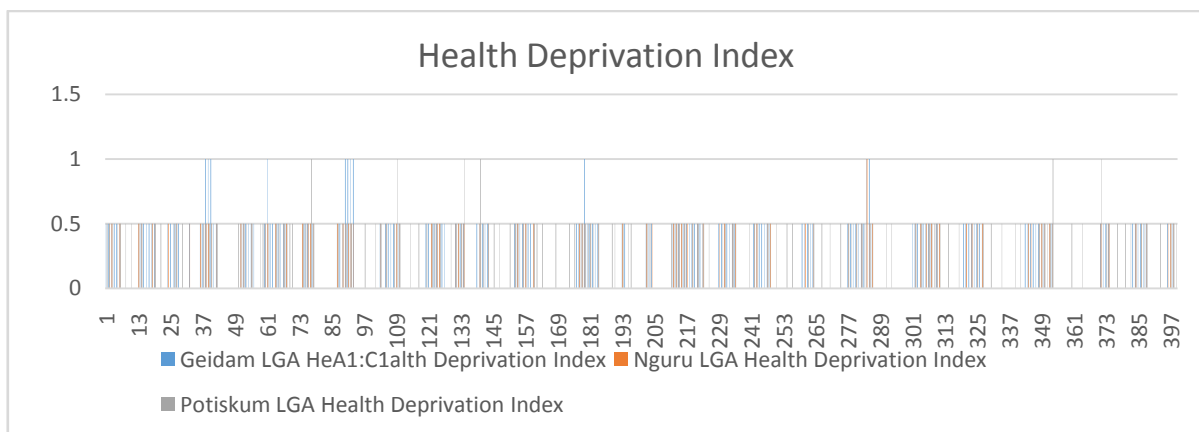

Figure 5. Health Deprivation Index across the selected LGAs.

Living Conditions Deprivation Index Analysis across the LGAs

The living condition deprivation index estimated for the selected LGAs is presented in figure 6. Figure 6 shows that Geidam Local Government Area has the highest level of deprivation in living conditions. For example, there are four households (1,13,49,89) with a deprivation level of 0.875. This is besides other

households with varying higher levels of deprivation. Nguru local government followed by deprivation intensity level of 0.75 for seven households (12,42,49,70,78,91,120) and Potiskum was having the least comparatively with the highest deprivation level of 0.75 for one household (87) and 0.625 for eight households (212,227,237,252,307,360,368,386). The results clearly show that Geidam local government was highly deprived in terms of living standard and this may be partly connected to the activities of the insurgency that have in several attacks looted, vandalised and destroyed several shops, schools, hospital, market, and other means of livelihood of the people. And in some instances, many households were displaced with untold hardship. To address this challenge, the state government and other non-state actors have to increase their effort in providing succour to the people especially with the return of normalcy in Geidam and north east in general.
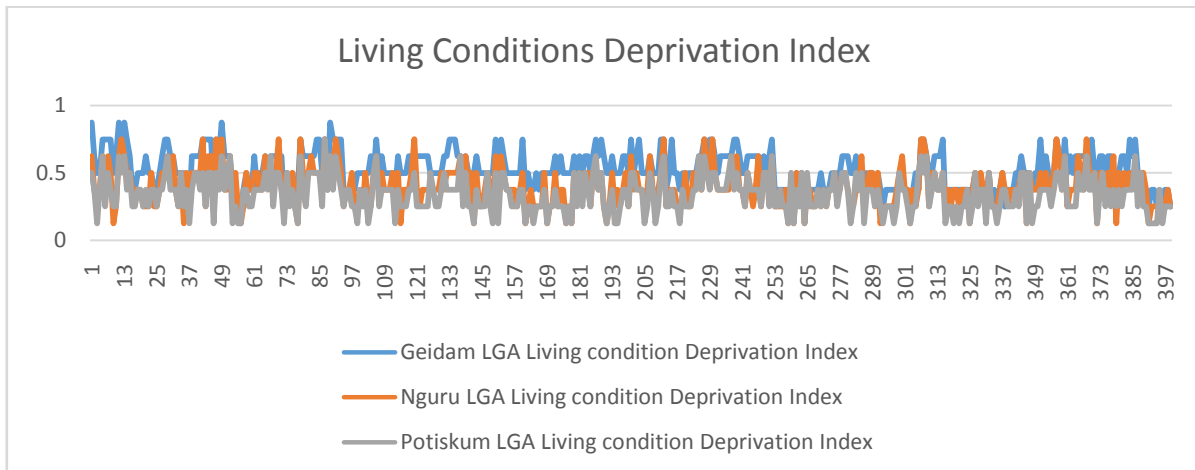

Figure 6. Living Condition Deprivation Index across the LGAs

Capability Deprivation Index Analysis across the LGAs

The capability deprivation index is the summation of all the varying degrees of deprivations in education, health and living conditions. The capability deprivation index provides aggregated deprivation levels of the selected LGAs. Figure 7 depicts the capability deprivation index in which the highest level of household (91) capability deprivation was from Geidam local government with 0.91 capability deprivation index. This is followed by three households (108,179,244) with a higher deprivation level of 0.71. The lowest deprivation level of household 278 in Geidam local government has the value of 0.375. In Nguru local government area, the highest level of deprivation was seen in households 223 and 307 with deprivation values of 0.67 and 0.58 respectively. However, the lowest levels of capability deprivation were recorded in households 164 and (9,295) with deprivation index of 0.04 and 0.08 respectively. In Potiskum local government area, households 44 and 284 have the highest capability deprivation index of 0.67 and 0.625 respectively. However, the lowest capability deprivation in Potiskum local government area were observed in 16 households (46,72,99,113,142,164,191,194,205,218,260,303,335,346,372,394) with a capability deprivation index of 0.04. Comparatively, Geidam local government was highly deprived followed by Nguru local government area. Potiskum local government was the least deprived.
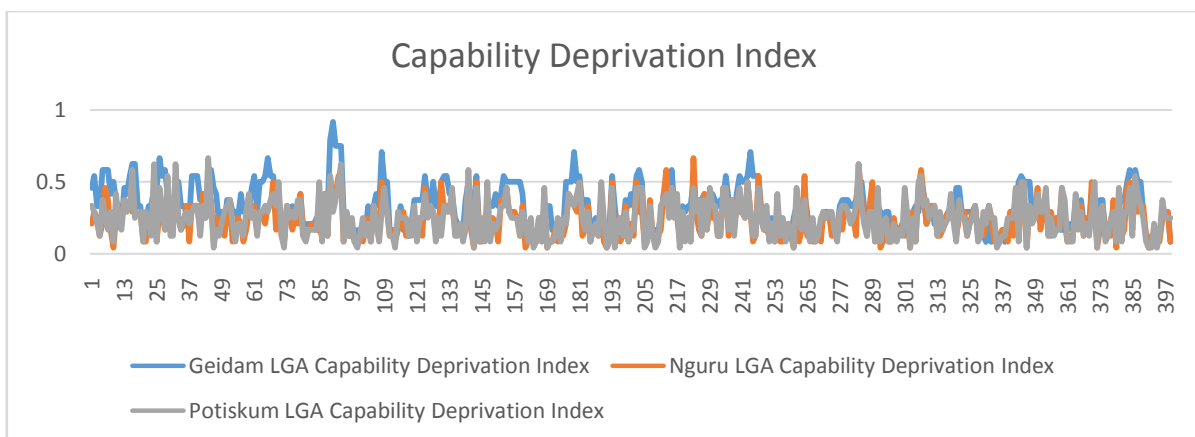

Figure 7. Capability Deprivation Index across the selected LGAs

Analysis of quality of life and government effectiveness across the LGAs

From the foregoing, we can deduce that out of the three selected LGAs, Geidam Local Government was extremely deprived not only at the Capability Deprivation Index (CDI) but also at all the three indices of education, health and living conditions. Therefore, this result shows that the government was not effective in the provision of social and basic amenities in Geidam Local Government Area. Nguru Local Government Area was found to be moderately effective in the provision of its social services to the populace at the CDI benchmark and in all the three dimension indices except in health dimension index where it was reported to have the least deprivation index. Potiskum Local Government was the least deprived at the CDI benchmark and as well as education and living condition indices. This shows that, government is effective in the provision of basic amenities in Potiskum Local Government Area compared to the other two LGAs.

V.   CONCLUSION AND POLICY RECOMMENDATIONS

Having taken a study on the assessment of the quality of life, living condition and government effectiveness in selected LGAs of Yobe state, the study concludes that there exists an asymmetry of deprivations across the LGAs in all the dimension indices. However, the intensity of the deprivation varies across the LGAs. Thorough analysis of the result suggests the categorisation of the deprivation levels into extreme, moderate and least. The study concludes that government attitude towards the provision of social and basic amenities has been identified as the major contributor to the deprivation in all the three dimensions. For example, lack of proper supervisory and monitoring exercises besides absence of qualified teachers had led to the poor enrolment in both primary and secondary schools. The poor enrolment has attendant consequences on the ability of these school children to advance further to tertiary institutions. In health, there is an inadequate manpower coupled with lack of sufficient health facilities. The resultant effects have aggravated the health deprivations index in the selected LGAs. The study also concludes that the deprivation in living conditions in the selected LGAs is mostly accounted for by lack of pipe borne water, erratic power supply, absence of environmentally friendly cooking fuel, unsteady and unreliable jobs/businesses among others. Therefore, the study concludes that lack of government provision, regulatory failure, mismanagement, and absence of proper development planning are the major factors leading to government ineffectiveness in the areas under study. Therefore, the study made the following specific recommendations:

1.   In view of the attendant deprivation in education, governments both at the state and local governments should prioritise both primary and secondary education not only in Geidam Local Government (which is having highly deprived cases) but also in the other local government areas under study. This is because the enforcement of the state of emergency by the state government in the education sector is yielding a little impact.

2.   In terms of health, government policy should be directed towards the provisions of adequate health facilities and health personnel coupled with proper supervision in order to stem the tide of nonchalant attitude to work by some health workers. To do so, government policy should prioritise Geidam Local Government for having the extreme cases of deprivation.

3.   There is a need for the government to come up with a holistic and well planned policy on living conditions especially in the provision of portable drinking water, alternative power source, clean cooking fuel, proper waste disposal system etc. The provision of these services will go a long way not only in improving the living conditions of the people but also enhance the health conditions of the masses. In so doing, the government should make a deliberate plan to prioritise those communities with acute living condition problems.

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APPENDIX 1
CDI Weighing Scheme

The Capability Deprivation Index (CDI) was based on a weighted arithmetic mean which shares the dimension weights according to the number of indicators in each of the three dimensions as shown in table 1.

Table 1: CDI indicators weights

Indicators	Indicators weights	Percentage
School enrolment	1/12 = 0.0833	8.33%
School attainment	1/12 = 0.0833	8.33%
Medication	1/12 = 0.0833	8.33%
Life safety	1/12 = 0.0833	8.33%
Earnings	1/12 = 0.0833	8.33%
Nutrition	1/12 = 0.0833	8.33%
Housing	1/12 = 0.0833	8.33%
Water	1/12 = 0.0833	8.33%
Electricity	1/12 = 0.0833	8.33%
Cooking fuel	1/12 = 0.0833	8.33%
Asset ownership	1/12 = 0.0833	8.33%
Sanitation	1/12 = 0.0833	8.33%
TOTAL	12/12 = 1.000	100%

Source: Ismail, (2018).

Table 2: CDI dimension weights

Dimension	Number of Indicators	Dimension weights	Percentage
Education	2	2/12 = 0.1667	16.67%
Health	2	2/12 = 0.1667	16.67%
Living conditions	8	8/12 = 0.667	66.67%
TOTAL	12	12/12 = 1.000	100%

Source: Ismail, (2018).

Therefore, in the CDI model developed by Hayatu (2017), the dimension index for each deprivation is computed as follows

Dimension Index = Sum of deprivation scores

Total number of indicators ……………………........................1

Hence, the three indicators of education, health and living conditions are calculated as follows

$$EDI = \frac{EDs}{2} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2$$

$$HDI = \frac{HDs}{2} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3$$

$$LCD = \frac{LCDs}{8} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4$$

Where, EDI, HDI and LCD represent the deprivation index for education, health and living conditions respectively. Whereas, EDs, HDs and LCDs denote the deprivation score for education, health and living conditions respectively. To aggregate the deprivation index for education, health and living conditions in order to arrive at the capability index at the aggregate level for each wards is obtained as follows:

$$CDI = w_1(ED) + w_2(HD) + w_3(LCD)$$

Where, w_1, w_2 and w_3 represent the dimension of weight in education, health and living conditions respectively. The CDI value ranges between 0 and 1 representing the absence of deprivation and the highest level of deprivation respectively.