Centre for Research on Settlements and Urbanism

Journal of Settlements and Spatial Planning

Journal homepage: http://jssp.reviste.ubbcluj.ro

Analysis of Spatial Concentration of Community Poverty and Environmental Resource Base in Kwara State, Nigeria

Oluseyi O. FABIYI [1]

[1] *Department of Geographic Information System, Regional Centre for Training in Aerospace Surveys, Obafemi Awolowo University, Ile-Ife, NIGERIA*

E-mail: seyifabiyi@yahoo.com

Keywords: *poverty mapping, poverty indexing, environmental resources, community wealth*

ABSTRACT

A number of approaches have been suggested and used by researchers, academic and experts in development industry to measure, monitor and compare poverty incidence and conditions at the community level in different geographic spaces. Poverty measurement and analysis have dominated the development research field in the last two decades. The paper explores the computation of community poverty index from poverty survey data of the Local Government Areas in Kwara state, Nigeria. It examines the linkages between poverty indices and the environmental resource endowments within the Local Government Areas using satellite remote sensing image data. The results show that there is spatial concentration of poverty in the communities of some local government areas. Higher incidences of poverty conditions are found in the rural communities while urban local government areas are generally well off. We also identify social capital as a major variable affecting the spatial concentration of community poverty among the communities. However, rural communities have more economic enhancement potential for development but high infrastructural poverty, low social capital hindering the utilization of the natural wealth for economic advancement of the communities. Only Ilorin city is a generative urban area and has the potential for enhancing economic well-being of the population while other cities in the states are more parasitic than generative. The study proposes a blending of social capital and infrastructural intervention to enhance economic well-being of the rural dwellers in the study area and elsewhere. We assume that a community may have environmental resources for economic advancement but without adequate social and fiscal infrastructure, resources may remain untapped and may not be deployed for economic advancement of the community members.

1. INTRODUCTION

The term poverty has been subject of various discourses, approaches and contentions engaged by the academia and development experts. Poverty can be considered and measured in relative and absolute terms. A measure of absolute poverty quantifies the number of people below the poverty threshold. It has been adopted by the World Bank and development industry to compare poverty level in different countries. Absolute poverty assumes a common threshold for all countries, cultures, and technological levels. One US dollar ($1) was adopted at some point as the global threshold for measuring poverty. This measurement focused only on the individual's power to consume and it is independent of any changes in income redistribution in a country without corresponding increase in the number of non-poor population. The approach also focuses on few variables that fail to capture other indirect indicators of poverty.

The assumption behind an absolute measure of poverty is that mere survival essentially takes the same amount of resources across the world and that everybody should be subject to the same standards, in case meaningful comparisons of policies and progress are to be made. Measuring poverty by an absolute

threshold has the advantage of applying the same standard across different locations and time periods, making comparisons easier. On the other hand, one of the major setbacks of poverty measures using absolute measurements is that it is arbitrary in some sense; the amount of wealth required for survival is not the same in all places and time periods. For instance the requirement for basic survival in advanced economies is not the same as in rural Nigeria. In some rural parts of Nigeria local population depends on the crude natural resources for survival, which are accessed at little or no cost to households. However, in the counterpart urban areas in Nigeria, households would have to part with a certain percentage of their income to acquire access to most of these resources [1]. This calls for a more realistic approach to poverty measurement, thus the use of relative poverty measurement has been a new approach advanced by researchers.

Relative poverty measurement attempts to classify individual families as poor or not by comparing them to other families within the population. It uses percentage difference between the poorest and the richest household in the population. The pool of households' poverty level is used to classify the poverty level of the population under study. This approach has a major deficiency as poverty measured in relative terms within a given population may classify some rich households as poor in generally affluent population.

However, the measurement of poverty has gone beyond the threshold analysis of poverty on the basis of income alone and also includes access to opportunities for economic advancement and human well-being. This is noted as the quality of life approach to poverty measurement. According to the United Nations declaration that resulted from the World Summit on Social Development in Copenhagen in 1995, absolute poverty is *"a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services"* [15].

The Copenhagen declaration changed the perspective and considerations of poverty measurement, especially in that it emphasizes that poverty should not be measured only in terms of income or consumption pattern alone but by the access to basic human needs at the right quantity and manageable quality. This consideration takes the aggregation unit of poverty beyond household level to community level. Since the Copenhagen declaration in 1995, there have been several attempts to domesticate these indicators in practical terms to measure and monitor poverty among communities, provinces and regions. For instance Davis, B. (2003) explains that poverty is the absence of any two of eight basic needs which include: *Food* – Body Mass Index must be above 16; *Safe drinking water* – Water must not come from solely rivers and ponds, and must be available nearby (less than 15 minutes' walk each way); *Sanitation facilities* – Toilets or latrines must be accessible in or near the home; *Health* – Treatment for serious illnesses and pregnancy must be provided; *Shelter* – Houses must have fewer than four people living in each room. Floors must not be made of dirt, mud, or clay. Others include *Education* – Everyone must attend school or otherwise learn to read; *Information* – Everyone must have access to newspapers, radio, television, computer, or telephone at home; *Access to services* – this include access to a complete panoply of education, health, legal, social, and financial (credit) services [2].

Almost all societies have citizens living in poverty conditions; therefore, classifying communities or provinces into poverty classes is fraught with a number of challenges. When a community is classified as poor because it lacks some basic amenities and other economic opportunities for advancement, it is assumed that poverty can be measured in discrete terms as the items can be enumerated and ranked. However, the reality is that poverty can only be measured on a continuum and can be measured on a continuous scale at most interval scale where there is no zero origin.

To measure poverty on a continuous scale, the use of a pool of poverty indices have been variously applied. Poverty index scores are therefore summed together to classify a community or country as being poor or non poor on a continuous but graduated scale. The scores of the indices are often aggregated on the community level and could be used to compare poverty conditions among different provinces, nations and regions. Poverty is supposedly a function of geography, which can be used to explain geographic concentration of poverty in different parts of a given province country or region. The geography of a place determines the nature, type and quality of economic opportunities available to the population. Therefore spatial analysis and indexing of poverty have become practical approaches to measure poverty and understanding spatial clustering of poverty [1], [3].

The search for geographic associates of poverty and the research on the spatial concentration of poverty brought to the fore the linkage between environment and community poverty. While environmental conditions may influence the economic opportunities available to inhabitants especially in rural communities, the poverty level of the people may also limit their capacity to utilize environmental resources to enhance their economic affluence. The United Nations Development Programme (UNDP), the World Bank, the British Department for International Development (DFID), the European Commission, the United Nations Environment Programme (UNEP) and other development partners have explored the linkages between poverty and environment using spatial analytical techniques (GIS mapping).

Poverty mapping and poverty analysis are carried out with the use of carefully selected poverty - environment indicators, which are used to index spatial concentration of poverty and its interactions with environment at the community level. Poverty-environment indicators are mainly categorized into: *natural resource indicators*, which relate to livelihoods and dependency on natural resources; *environmental health indicators* that address the vulnerability of poor people to environmental related diseases (i.e. those caused by the air pollution, water and other aspects of the environment, and exposure to pathogens); *vulnerability to natural disasters* (i.e. how the poor are affected by natural and man-made disasters like floods, landslides, volcanic eruptions, droughts); and sometimes poverty-housing indicators, which monitor the housing conditions of poor people and how they affect or are affected by their poverty situation [3].

Poverty Environmental Mapping involves thematic and spatial desegregation of poverty – environmental issues based on particular indicators. It introduces the spatial dimension to poverty monitoring and helps analyzing how the poor interact with the environment, presents poverty ecosystem relationships and helps developing strategies to alleviate poverty in developing economies.

Spatial concentration of poverty and environment consider the constraints imposed by the economy, social system and geography on the communities [4], [5], [6].

Local factors such as: climate, soil type, infrastructure, and access to social services change the marginal returns of investments, level of education. Spatial concentration of poverty in a community is linked to economic limitation imposed by the environment (both physical and fiscal) on households in the community [7], [8], [9]. Several studies have confirmed the relevance of geography in the concentration of poverty. For example, empirical studies in China and Bangladesh shows significant effects of geography on the living standards of people in the poor areas [10], [11]. In the USA, studies show that spatial concentration of poverty is a reflection of differences in the economic opportunities [12], [13].

A spatial association between poverty rates and the social and economic characteristics of high poverty areas does not always point to the root causes of poverty. A detailed study of high poverty areas, however, could identify the opportunity structure that attracts and keeps poor people [13]. The geographic characteristics of a place provide certain occupation opportunities to people therefore attracting certain types of labour force to a given area. Some occupation and geographic areas are therefore poverty traps as they can encourage discrimination and exclusion [14].

The aim of the study is to examine the spatial concentration of poverty and identify the relationships between community poverty level and the natural environmental opportunities in the Local Government Areas of Kwara state, Nigeria.

The specific objectives are as follows:

- estimate and index community poverty in Kwara state;
- examine the urban – rural dichotomy of poverty in the study area;
- examine the spatial concentration of community poverty;
- examine the relationship between community poverty and natural agricultural resource endowments.

2. THE STUDY AREA

Kwara State is located in the North-Central geopolitical zone of Nigeria with a total surface of 36,825 km² (14,218.2 sq miles). According to the 2006 National Census the total population of the state is 2,365,353. The state was created on 27th May 1967 when the Federal Military Government of General Yakubu Gowon broke the four regions that at that time constituted the Federation of Nigeria into 12 states.

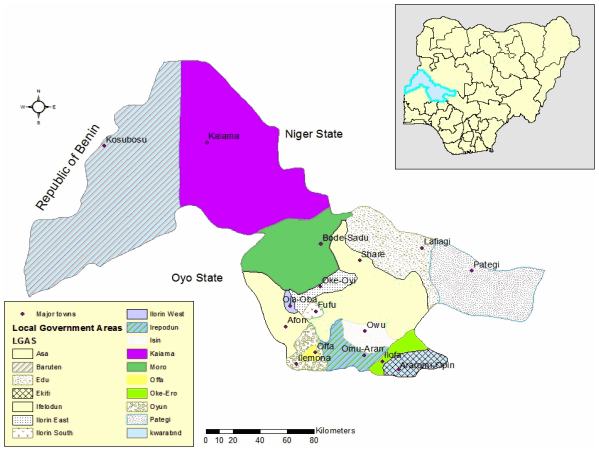

Fig. 1. Kwara state Local Government Areas.

At present, the state has 16 Local Government Areas (LGA) as shown in figure 1, which are: Asa, Baruten, Edu, Ekiti, Ifelodun, Ilorin East, Ilorin South, Ilorin West, Irepodun, Isin, Kaiama, Moro, Offa, Oke-Ero, Oyun and Pategi and these are the aggregation level of data analysis for this study. Kwara State shares common boundaries with Niger and Kogi states to the North and East respectively and with Oyo, Ekiti and Osun states to the South. It maintains an international boundary with the Republic of Benin to the West.

Agriculture is the mainstay of the economy and the principal cash crops are: cotton, cocoa, coffee, kola nut, tobacco, beniseed and palm produce. Although the vast majority of the workforce is occupied in this sector, productivity is low because farmers operate at the level of peasants. In addition, some of the citizens of the state are also artisans while a significant

number of the citizens are also civil servants employed in local, state and federal establishments.

3. METHODOLOGY

3.1. Data sourcing

Three sources of data were used for the implementation of this study, as follows:

Field survey. An assessment of the 144 communities in all the 16 Local Government Areas was conducted through a pretested questionnaire and focus group discussion (FGD). These constitute the major data source for the study. The target audience for the FGD included community leaders, youth groups and market women. The questions asked in the FGD and questionnaire included aspects related to the economic opportunities in the community and limiting factors of geography identified in the community.

Secondary data. The primary data were augmented from previous studies carried out by the Kwara State Community and Social Development Agency. The agency conducted a wide state survey of 481 communities in 2009 on the poverty condition of the communities. The data were sourced and employed in the modelling, indexing and aggregation of poverty at the local government level.

Remote sensing data. LandSat ETM 2003 data was acquired for the entire state to estimate the agriculture resource opportunities in each of the local governments.

3.2. Spatial indexing of poverty

We selected six major indicators based on literature and used them in the community poverty/ wealth classification in the study area. The indicators are the following:

Social capital index. This includes availability and patronage of community association, cooperative society, opportunities for conditional transfer and assistance during disaster and emergencies. Social capital index also relates to the resilience, opportunity and nature of relationships and interactions in the community that enable community members to respond to mishaps, disasters and emergencies and possibly shortfall in income during emergencies. These are made available through several opportunities like town unions, religious associations, tribal and ethnic sub-grouping in the communities. These serve as opportunity for primary affiliation and social capital development.

Educational services index. Access, utilization and quality level of educational services and facilities at nursery, primary, secondary and post secondary levels. It also includes literacy levels of the members of households. The education index is computed from accessibility of community members to nursery, primary, secondary and other post secondary educational services, quality of the facilities and the literacy levels of the members of the communities. It also includes school enrolment, total number of teachers in school and the teacher-student ratio among others.

Health and well-being index, signifying access, utilization, effectiveness and quality of health services in the communities. The health and well-being index relates to the nature characteristics and quality of services provided in case of the primary and secondary health facilities in the communities and local government. It also involves the total number of live births in three months, the number and qualifications of the health workers.

Transport and transportation service index, including the nature, types and quality of roads, drainage culverts, bridges and commercial transportation services available in the communities. Transport infrastructure and services index was computed from the assessment of the transportation infrastructure including urban roads, feeder roads and residential roads, bridges, culverts and motor garages. The index also estimated the ease of getting transportation services; quality and cost of these services were all indexed and summed to compute the transportation index for each local government.

Energy index examines the availability, utilization and quality of energy sources for domestic and industrial use. The sources of domestic energy and for industrial use were examined in each of the communities to compute the index. The total number of households in the community that have access to different sources of energy were also used in computing the index value.

Economic advancement opportunity index showing the availability and quality of economic enhancing facilities in the community, such as: markets, shopping malls, offices, banks, and finance houses. The economic empowerment opportunities index also relates to availability and quality of markets, shops employment opportunity in the trading and industrial sector, security facilities for life and properties and other opportunity for financial exchanges including banks and finance houses. Using detailed data from 481 communities and coarse data from 144 communities the spatial concentration of community wealth was computed and aggregated for the respective local governments in the study area. A unique index value was obtained for each of the six indices and used to map the concentration of wealth and poverty in the study area.

The formulae used for the index is given in the equation:

$$\text{Wealth Index (WI)} = \Sigma Sc_i + \Sigma_{ESi} + \Sigma_{HWi} + \Sigma_{TTi} + \Sigma_{ENi} \quad \text{Eq:1}$$

Where SC = Social Capital, ES = Educational Services, HW = Health and Wellbeing, TT= Transport and Transportation and, EN= Energy.
The coding for computing the index is shown in appendix I.

Data extraction from Remote sensing data. The LandSat ETM 2005 was acquired, processed and land use/land cover classes were extracted from the image.

The woodlot, farmlands, urban built-up bare land and water body were extracted from the image based on un-supervised classification technique. Figure 2 shows the clipped Landsat image mosaics of the study area while figure 3 shows the classified image of the study area.

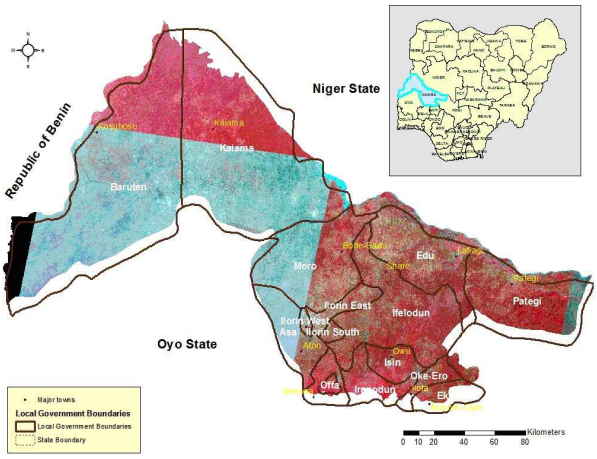

Fig. 2. Landsat image of the study area.

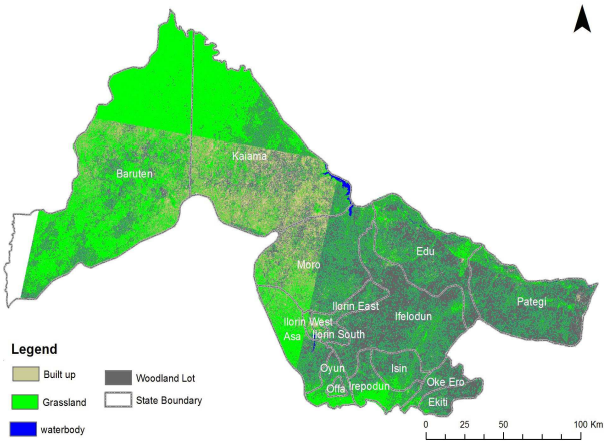

Fig. 3. Land use-land cover classification of the study area.

The total area of woodlot and farmlands were computed for each local government as the available economic resource opportunities observing that the majority of the local population engage in farming and petty trading of farm produce.

Statistical analysis was performed to examine the relationship between wealth index and the natural resource endowment.

3.3. Spatial concentration of poverty in Kwara state Local Government Areas

The results of the data analysis revealed that there is spatial concentration of poverty in some local government areas in the state. There is also rural-urban dichotomy of wealth/poverty among the communities and the Local Government Areas. The results of the spatial indexing of poverty based on the six indices are presented in the following sections:

Social capital classification. The results of the analysis show that there is evident urban bias in the quality and types of social capital in the state. All the urban Local Government Areas such as: Ilorin West, Ilorin South, Ilorin East, Asa and Ifelodun showed very high social capital index as shown in figure 3 (a & b).

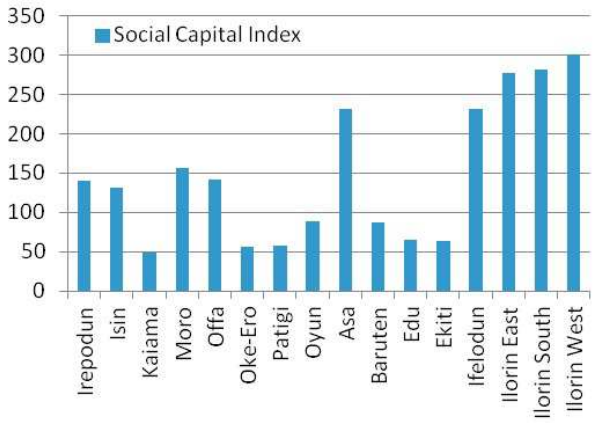

Fig. 3a. Social capital index among the LGAs.

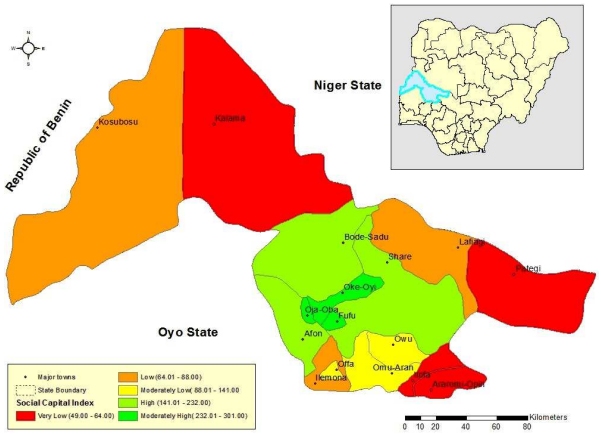

Fig. 3b. Spatial distribution of social capital index among the LGAs.

The figures suggest that the urban Local Government Areas (LGAs) have higher social capital compare to the rural LGAs. There are many social affiliation opportunities in the city including religious groups, town unions and tribal/ethnic unions as compared to the rural settings where most members of the community have less capacity to associate due to the lack of opportunities or low capacity to maintain primary affiliation. Associations necessarily require

commitments of personal resources. The state capital Ilorin registers high social capital opportunities for resource growth among the family members and other form of social affiliations and cleavages. High social capital index revolves around Ilorin (the State capital) and the nearby Local Government Areas, whereas Oke Ero, Patigi and Kaiama register particularly very low Social capital index score.

Educational index. The analysis shows that Ifelodun Local Government has highest education index score followed by the major urban LGAs and Baruten Local Government. Figure 4a and 4b present the spatial distribution of Educational access index among the LGAs.

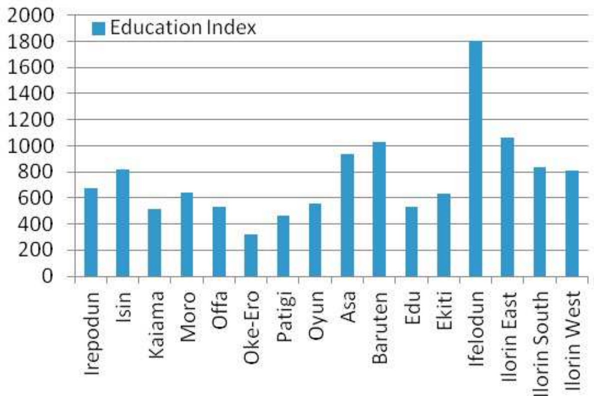

Fig. 4a. Educational access index among the LGAs.

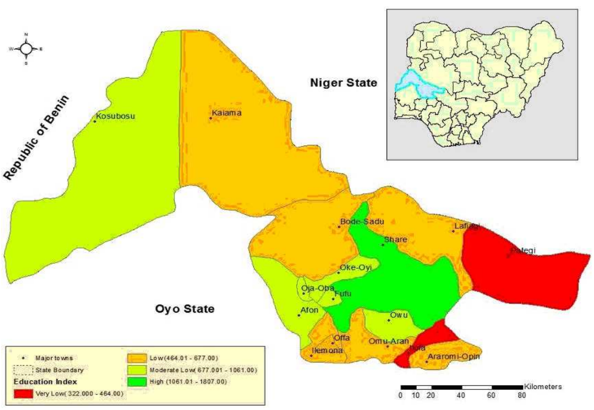

Fig. 4b. Spatial distribution of educational access index among the LGAs.

Ifelodun LGA has got very high education index and this is closely followed by the Ilorin South, Ilorin West and Ilorin East in the study area. Communities in these local governments have many schools, qualified teachers and standard facilities within the schools during the data collection. The Local Government Areas that scored lowest in the education wealth index include Pategi and Oke Ero these being largely rural communities. It is very common that three or four communities share the same secondary or primary school and students and pupils have to travel more than 1 kilometre to attend school.

Health and Well-being Index. Figure 5a and 5b, show that health indices are relatively even in the spatial distribution among the Local Government Areas.

The lowest scores on Health services and well-being index are from Ekiti, Oke-Ero Asa and Offa Local Government Areas. Though Offa and Asa are urban Local Government Areas, they scored very low in health and well-being index. Urban Local Government Areas, such as Ilorin East, Ilorin West and Ifelodun have very high level health access index. Health and well-being index is linked to urban development, yet there are some variations.

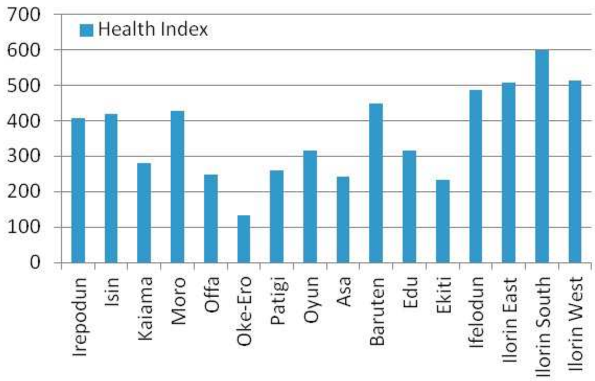

Fig. 5a. Health and well-being index among the LGAs.

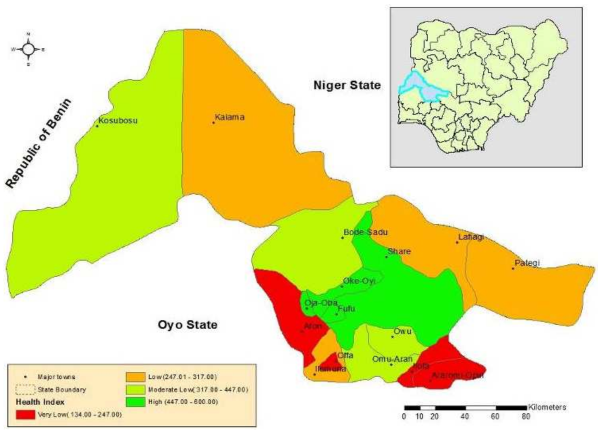

Fig. 5b. Spatial distribution of health and well-being index among the LGAs.

Transport infrastructure and services index. Offa and Oke-Ero Local Government Areas register the lowest Transport service and facility index, as the best transportation network and services are in the capital city, and other figures of LGAs including Ilorin East, Ilorin West, Asa and Ifelodun and the adjoining LGA are shown in figures 6a and 6b.

Energy availability and utilization index. The sources of common energy in the study area include electricity provided by the Power Holding Company of Nigeria and the diesel and gasoline generator sets. Among other sources of energy especially for domestic use and cottage industry we mention wood fuel which is predominant in the rural communities.

Fig. 6a. Transportation services index among the LGAs.

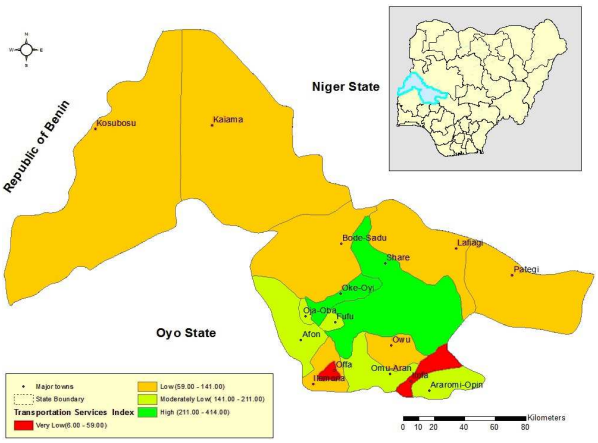

Fig. 6b. Spatial distribution of Transportation service index among the LGAs.

Figures 7a and 7b show that there is high energy facilities in urban Local government Areas compare to rural Local government Areas, for instance Ilorin West, Ilorin South, Ilorin East and Offa ranked high in term of energy use and availability. The worst scores are found in communities located within Asa LGA.

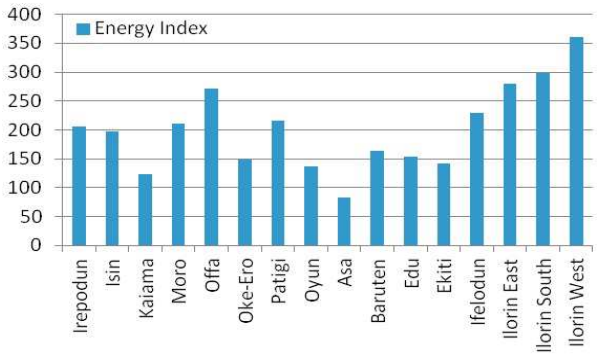

Fig. 7a. Energy utilisation index among the LGAs.

Energy facilities and utilisation index also showed that urban LGAs including Ifelodun, Offa, Ilorin East, Ilorin South and Ilorin West have high percentage of energy facilities including electricity and power generators for domestic and industrial use.

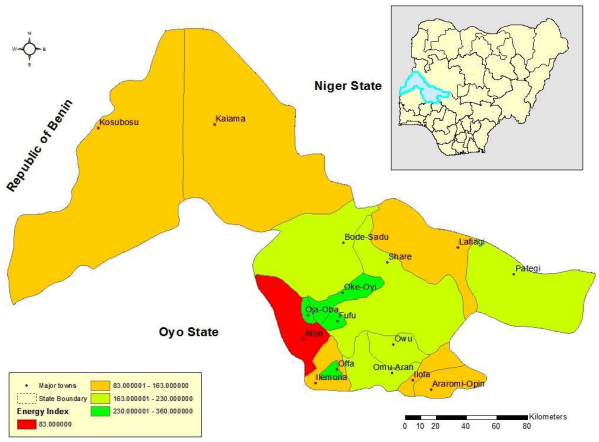

Fig. 7b. Spatial distribution of energy access and utilisation index among the LGAs.

Economic empowerment opportunities index. The leading LGAs in terms of economic opportunities are the urban LGAs in the capital city including Ifelodun, Ilorin West, Ilorin East and Ilorin South. Baruten, Moro and Irepodun also scored high in the economic empowerment opportunity index. Figure 8a and 8b show the spatial distribution of the Economic index in the study area.

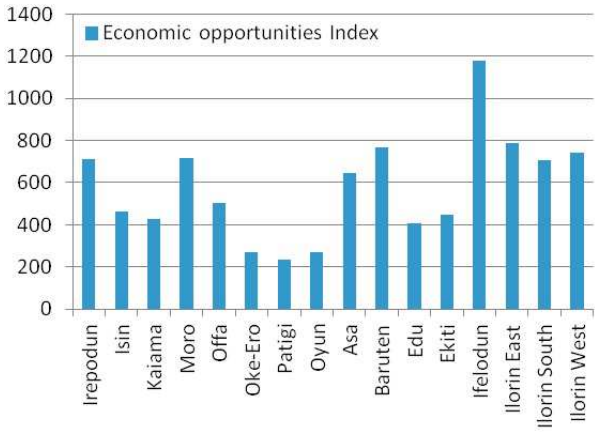

Fig. 8a. Economic empowerment index among the LGAs.

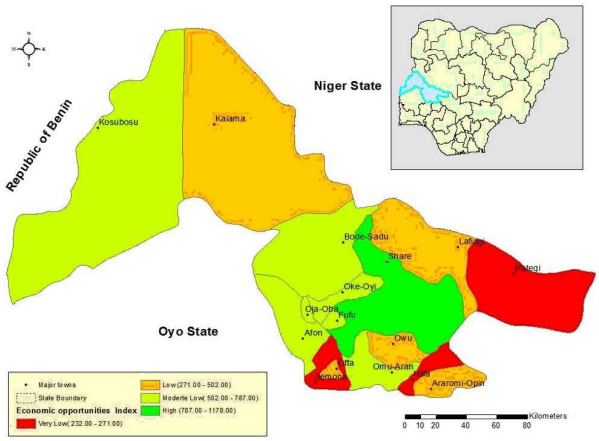

Fig. 8b. Spatial distribution of economic empowerment opportunities index among the LGAs.

Spatial Ranking of Wealth indicator among LGAs. The indicator's scores for each of the local governments were computed and ranked among the Local Government Areas. The average wealth indicators for the six indices show that Ifelodun was ranked highest in term of wealth level, which is the richest local government, while Oke-Ero was ranked lowest in terms of wealth indicator, in order words the poorest local government in the study area.

Generally most of the local Government areas in the study fall between rich and moderately well-off area in terms of wealth, while six LGAs are particularly low in wealth index including Oke-Ero, Patigi, Ekiti, Oyun, Offa and Kaiama. These LGAS should be particularly targeted for intervention purposes.

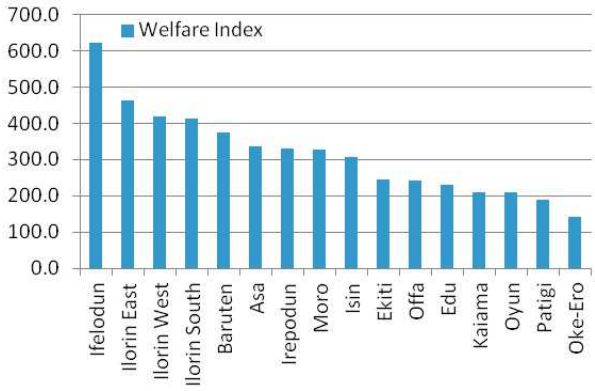

Fig. 9a. Wealth index ranking of economic empowerment opportunities index among the LGAs.

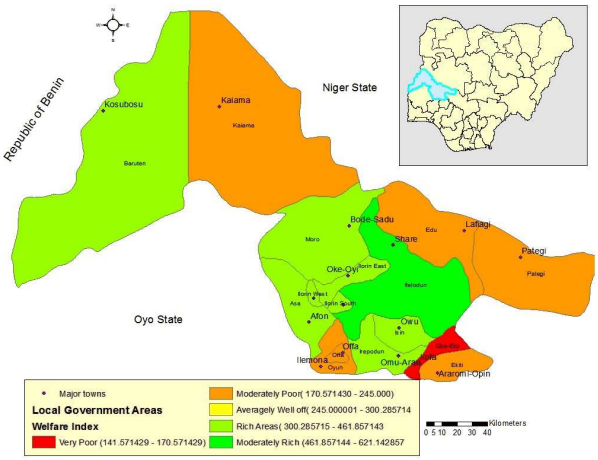

Fig. 9b. Spatial distribution of wealth index among the LGAs.

Figures 9a and 9b show that manny poor communities are found Oke-Ero, Patigi, Oyun and Kaiama Local government areas while many rich communities can be found in Ifelodun, Ilorin East, Ilorin West and Ilorin South LGAs.

The spatial analysis of poverty and environment. The results of land use/land cover resources available to each local government areas showed that most rural local governments have large area extent except for Oke-Ero local government area, and most of the LGAs are rich in deciduous woodland and farmland/fallow land. There are few urban Local Government Areas which include Ilorin West, Ilorin East, Ilorin South, Offa and Asa.

The urban local governments have high percentage of the land area as impervious surface and built-up area. Most of the urban LGAs in Nigeria have small area size and these small areas are largely built-up which makes them have high percentage of impervious surface. The built-up area and the rich agricultural land have immense potential to transform household economy if the required infrastructures are put in place and the communities can be stimulated to advance their economic frontiers. The relationship between indices was examined in a spearman correlation analysis using the areas for each land uses in the LGAs and the poverty indices.

The results show that there are generally weak relationship between poverty indices and the environmental resources. The average wealth index has a weak negative relationship with urban land area in LGAs (0.136), Woodlot in LGAs (0.084) and Grassland in the LGAs (0.029) (see appendix II).

The low correlation between community poverty index and natural resources suggests that though the economic opportunities abound in the LGAs, they are not yet contributing to the economic well-being of the communities. This is a reflection of the generally low capital index values in almost all the rural medium settlements in the study area.

Though most of the adults in the communities (75%) participate in agricultural businesses, large expanse of lands are either left to fallow or are not cultivated for the purpose of farm input. Low levels of transport services index, social capital and education in most of the communities have impact on the communities' capacity to utilize the natural resources potential to improve their wealth status.

Interventions in the transport sector such as: providing good quality roads and buses and lorries and trucks for evacuating farm produce (transport index), farmers cooperative and other improvements on the primary affiliation among the communities (Social capital) and community market and market outlets (economic opportunity index) will enhance the capacities of the rural communities to utilize the natural resources in the communities to improve the wealth indices. The correlation analysis also showed that apart from the three local governments that make up Ilorin, other urban areas are not generative. Most of the medium urban areas in other Local Government Areas are more parasitic rather than being generative, which explain why the wealth indices in Offa, Isin and Oyun are low.

4. DISCUSSION AND CONCLUSION

The incidence of poverty has spatial components. Rural communities have higher forms of community poverty as they register low levels in social capital index, education index, health status index, transportation index and energy index. They also have low capacities to convert the available natural resources into wealth due to entrenched poverty. It confirms the parlance that poverty begets poverty. Due to household and community poverty conditions, the capacity to move up in the economic ranking is constrained. The availability of natural endowment does not necessarily translate into wealth without corresponding intervention to enable communities escape poverty trap and develop their economic potential.

Cities could be more productive if there were deliberate efforts to improve social capital index through encouragement of primary affiliation across religious line, neighbourhood association, community development organization, township union among others. The social capital index has the capacity to generate huge resources to improve the wealth indices of the members and their communities as a whole. The principle of anomie is punctuated by the fact that there are different forms of affiliation and sub-grouping in the cities within the study areas. Anomie concept postulated that people in urban areas meet as strangers, relate as businesslike and are not committed in an emotional relationship. However in the study area there are different community, religious, ethnic and language linkages and affiliations where the groups care for members and relate as families.

It is evident that these associations generate resources which could be used for wealth development for members and for communities. There are also remittances to the rural communities from this community association in cities which also help to improve community wealth in the rural areas.

REFERENCES

[1] **Fabiyi, O. O.** (2007), *Regional analysis of poverty and resource accessibility in Nigeria.* Journal of Geography, Environment and Planning. Vol. 3 (2), pp. 124-134.

[2] **Davis, B.** (2003), *Choosing a method for poverty mapping*. *Rome:* Food and Agriculture Organization of the United Nations.

[3] **Garadi. A., Twesigye-Bakatsa, C.** (2005), *Poverty- Environment Indicators and Policy Options for Possible Intervention under the PRSP***,** report of Pilot Project on Poverty-Environment Mapping submitted to UNDP.

[4] **Crump, Jeff R.** (1997), Teaching the Political Geography of Poverty, *Journal of Geography*, Vol. 96, No. 2, pp. 98-104.

[5] **Ravallion, M.** (1996a), *How Well Can Method Substitute for Data? Five Experiments in Poverty Analysis,* The World Bank Research Observer, Vol. 11, No. 2, pp. 199-221.

[6] **Ravallion, M.** (1996b), *Issues in Measuring and Modelling Poverty,* The Economic Journal, Vol. 106, September, pp. 1328-1343.

[7] **Jazairy, I., Alamgir, M., Panuccio T.** (1992), *The State of World Rural Poverty, An Inquiry into Its Causes and Consequences*, New York University Press for International Fund for Agricultural Development, New York.

[8] **Miller, S. M.** (1996), *The Great Chain of Poverty Explanations,* in Poverty: A Global Review, *Handbook of International Poverty Research*, Else Øyen, S.M. Miller, and Syed Abdus Samad, eds., Scandinavian University Press and UNESCO Publishing, Oslo.

[9] **Chambers, R.** (1997), *Whose Reality Counts? Putting the First Last*, Intermediate Technology Publications, London.

[10] **Jalan, J., Ravallion, M.** (1997), *Spatial Poverty Traps*, Workshop on Emerging, Issues in Development Economics, The World Bank, Washington, D.C., July 1997.

[11] **Ravallion, M., Wodon, Q.** (1997), *Poor Areas, or Only Poor People?*, Policy Research Working Paper 1798, The World Bank, Washington, D. C.

[12] **O'Regan, K., Wiseman, M.** (1990), *Using Birth Weights to Chart the Spatial Distribution of Urban Poverty, Urban Geography*, Vol. 11, No. 3, pp. 217-233.

[13] **Nord, M., Luloff, A. E., Jensen, L.** (1995), *Migration and the Spatial Concentration of Poverty, Rural Sociology*, Vol. 60, No. 3, pp. 399-415.

[14] **Leyshon, A.** (1995), *Missing Words: Whatever Happened to the Geography of Poverty, Environment and Planning*, Vol. 27, No. 7, pp. 1021-1028.

[15] *** **United Nations** (1995), World Summit for Social Development Programme of Action. Chapter 2. Eradication of Poverty, Copenhagen. Available online at: http://www.un.org/esa/socdev/wssd/text-version/agreements/poach2.htm

Appendix I:Coding for Poverty Indexing in Kwara state, Nigeria.

Category	Variable	Index Range
Social capital	Available community association	Yes 1; No=0
	Occupation Type	Farming =1; Trading = 2; Driving = 3; Artisan =4; Civil service = 5; Others = 6
	Distance to HQ	Less than 50 km =5; Bet 51-100 =2; Bet 101-200 =1 More than 200 = 0
Education	Nursery School	0 = 0; 1-5 = 2; 6- 10 = 5; Above 10= 7
	Secondary School	0 = 0; 1-2 = 2; 3- 5 = 5; Above 5= 7
	Post-secondary School	0 = 0; 1-2 = 2; 3- 5 = 5; Above 5= 7
	School Furniture	Yes = 1; No = 0
	Condition of School structure	All strong =5; Some strong= 3; Some weak= 2; All weak = 0
	Availability of School structure maintenance arrangement	Yes= 1; No=0
	Availability of teachers quarters	Yes =1; No= 0
	Average Popn per class	10-20= 5; 21-30 = 4; 31-40 = 3; 41-50 = 2; 51- 60 = 1 Over 60 =0
	Ave Dist to school	Less than 1km = 5; Bet 1.2km – 5 km = 3; More than 5km = 0
	Pupil Enrolment	Less than 100= 1; Bet 101- 200 = 2; Bet 201- 300= 3; Bet 301-400 = 4; Bet 401- 500 = 5; Bet 501 – 600 = 6; Bet 601-700 = 7; Bet 701- 800 =8; Bet 801-900= 9; Above 900= 10
	N0 of Qualified teacher	Less than 10= 1; 11-20 = 2; 21-30=3; 31-40=4; 41-50 = 5; Above 50= 6
	N0 of unqualified teachers	Above 50=1; 41-50 = 2; 31-40 = 3; 21-30 = 4; Less than 30= 5
	Pupil Teacher Ratio	1/20 = 5; 1/30 =4; 1/40 = 3; 1/50=2; More than 1/50 = 1
	Availability of water within school	Yes= 1; No = 0
	Source of Water within school	Motorized = 5; Hand Pump Borehole = 4; Hand pump well = 3; Concrete well Covered = 2; Concrete well; Open =1; Open well =0; Rain harvest= 0
	Availability of Toilet within school	Yes =1; No= 0
	Categories of Toilet Users in school	Teachers Only =1; Teachers & Pupils = 2; Pupils only = 3
	Availability of Incinerators in school	Yes = 1; No = 0
Health	Health facilities in the communities by Types	Dispensary = 1; Rural Health Centre = 1; Clinic & maternity = 2; Basic Health Centre = 2; General Hospital = 3
	Ave Trav Distance to Health Service	Less than 1 Km = 5; Bet 1-5 km =2; More than 5 km = 1
	Total Successful Life birth in 3 months Health institutions	More than 50= 5; 31- 50 = 3; 21-30 = 2; Less than 21=1
	N0 of Doctors	10 and Above= 10; 9=9; 8=8; 7=7; 6=6; 5-5; 4=4; 3=3; 2=2; 1=1; 0=0
	N0 of Pharmacist	10 and Above= 10; 9=9; 8=8; 7=7; 6=6; 5-5; 4=4; 3=3; 2=2; 1=1; 0=0
	N0 of Nurse/Midwives	10 and Above= 10; 9=9; 8=8; 7=7; 6=6; 5-5; 4=4; 3=3; 2=2; 1=1; 0=0
	N0 of CHOs	10 and Above= 10; 9=9; 8=8; 7=7; 6=6; 5-5; 4=4; 3=3; 2=2; 1=1; 0=0
	N0 of CHEWS	10 and Above= 10; 9=9; 8=8; 7=7; 6=6; 5-5; 4=4; 3=3; 2=2; 1=1; 0=0
	No of Health Record Officer	10 and Above= 10; 9=9; 8=8; 7=7; 6=6; 5-5; 4=4; 3=3; 2=2; 1=1; 0=0
	Source of Water within Health facilities	Motorized = 5; Hand Pump Borehole = 4; Hand pump well = 3; Concrete well Covered = 2; Concrete well; Open =1; Open well =0; Rain harvest= 0
	Nearest water source	Motorized = 5; Hand Pump Borehole = 4; Hand pump well = 3; Concrete well Covered = 2; Concrete well; Open =1; Open well =0; Rain harvest= 0
Transport	Average Dist to water source	Less than 1km= 5; Bet 1.2km – 5 km = 3; More than 5km = 0
	Availability of Feeder roads	Yes = 1; No = 0
	Condition of Feeder roads	Functional = 1; Not functional = 0
	Availability of Township roads	Yes = 1; No = 0
	Condition of Township roads	Functional = 1; Not functional = 0
	Availability of Bridges on roads	Yes = 1; No = 0

Electricity	Condition of Bridges on roads	Functional = 1; Not functional = 0
	Availability of Culverts s on roads	Yes = 1; No = 0
	Condition of Culverts on roads	Functional = 1; Not functional = 0
	Electricity Suply	PHCN Regular = 5; PHCN Not regular = 3; Personal generator = 2
	N0 of Pple using Electricity	Over 1000 = 5; 500-999 = 4; Less than 500=1
	N0 of SME using PhCN Electricity in Community	Over 20 = 5; 10 – 19 = 4; Less than 10= 1
	N0 of SME using Petrol /diesel in Community	Over 20 = 5; 10 – 19 = 4; Less than 10= 1
	Availability of Multi-purpose centre	Yes = 1; No=0
	Availability of market stall	Yes = 1; No=0
	Availability of Skill Acquisition centre	Yes = 1; No=0
	Availability of security post	Yes = 1; No=0
	Availability of Information Centers	Yes = 1; No=0
Socio Economic	Total male Poor	More than 10,000 = 1; 90,000 – 99,999= 2; 80,000- 89999 = 3; 70,000 – 79999 = 4; 60,000 – 69999 =5; 50,000 – 59999 = 6; 40,000 – 49999 = 7; 30,000 – 39,999 =8; 20,000 – 29,999 = 9; Less than 10,000 = 10
	Total Female Poor	More than 10,000 = 1; 90,000 – 99,999= 2; 80,000- 89999 = 3; 70,000 – 79999 = 4; 60,000 – 69999 =5; 50,000 – 59999 = 6; 40,000 – 49999 = 7; 30,000 – 39,999 =8; 20,000 – 29,999 = 9; Less than 10,000 = 10
	Total Illiterate Male	More than 10,000 = 1; 90,000 – 99,999= 2; 80,000- 89999 = 3; 70,000 – 79999 = 4; 60,000 – 69999 =5; 50,000 – 59999 = 6; 40,000 – 49999 = 7; 30,000 – 39,999 =8; 20,000 – 29,999 = 9; Less than 10,000 = 10
	Total Illiterate Female	More than 10,000 = 1; 90,000 – 99,999= 2; 80,000- 89999 = 3; 70,000 – 79999 = 4; 60,000 – 69999 =5; 50,000 – 59999 = 6; 40,000 – 49999 = 7; 30,000 – 39,999 =8; 20,000 – 29,999 = 9; Less than 10,000 = 10
Natural / Environmental Resources	Erosion	No= 1; Yes= 0
	Presence of Forest reserve	Yes =1; No= 0
	Presence of Shelter Belt	Yes =1; No= 0
	Presence of Drainage	Yes =1; No= 0
	Water catchment	Yes =1; No= 0
	Presence of People using different types of toilets in Community	VIP = 5; Pit late= 4; Bucket lat=1; Bush =0
	Social Assistance or Insurance Workfare group	Yes =1; No= 0
	Social Assistance or Insurance Free waiver	Yes =1; No= 0
	Availability of Scholarship	Yes =1; No= 0

Appendix II: Correlation Coefficient of poverty index and Environmental resources.

		Social capital Index	Econ Opp Index	Tot Wealth Index	Built up area	Woodlot	Grassland
Social capital Index	Pearson Correlation	1	.706**	.784**	-.324	-.413	-.292
	Sig. (2-tailed)		.002	.000	.220	.112	.273
	N	16	16	16	16	16	16
Econ Opportunity Index	Pearson Correlation	.706**	1	.955**	-.003	.126	.145
	Sig. (2-tailed)	.002		.000	.990	.642	.592
	N	16	16	16	16	16	16
Tot Wealth Index	Pearson Correlation	.784**	.955**	1	-.136	.084	.029
	Sig. (2-tailed)	.000	.000		.615	.757	.915
	N	16	16	16	16	16	16
Built up area	Pearson Correlation	-.324	-.003	-.136	1	.292	.743**
	Sig. (2-tailed)	.220	.990	.615		.272	.001
	N	16	16	16	16	16	16
Woodlot	Pearson Correlation	-.413	.126	.084	.292	1	.263
	Sig. (2-tailed)	.112	.642	.757	.272		.326
	N	16	16	16	16	16	16
Grassland	Pearson Correlation	-.292	.145	.029	.743**	.263	1
	Sig. (2-tailed)	.273	.592	.915	.001	.326	
	N	16	16	16	16	16	16

**. Correlation is significant at the 0.01 level (2-tailed)