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Poverty Mapping: Potential Application In The Analysis Of Spatial Distribution Of Poverty In Ekiti State, Nigeria

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Abstract: ***The aim of poverty mapping is to estimate geographically the determinant of lack of well-being at area unit level with disaggregated socio-economic or other type of data. Its output is an estimate of poverty pockets and inequality distribution across the state which can be visualized by maps to enhance communication of the results. The aim of this study is to use poverty maps to analyse the spatial distribution of poverty in the state by comparing the poverty factors of years 2000 and 2009. The poverty variables for the two years were subjected to factor analysis resulting to only five poverty factors. The results were then mapped out using a geographic information systems analytical tool called 'map overlay'.***

Polygon-in -polygon feature method was used. The two years were overlaid and the differences were shown according to the five basic parameters. The level of unemployment was increasing and very high in all the local government areas but highest in the state capital and the peripheral urban centres. Access to infrastructural facilities has been on the increase especially in the state capital while the sordid state in other parts of the state has hampered education, health, transportation and industrial development. The nutritional value has been on the decline in most local government areas with a relative improvement in the state capital. Assets created by the communities through their various development associations have increased tremendously at the localities while at the state capital, less assets are being created. Lastly, there is high dependency rate in the localities compared to Ado and Ikere local government areas. It was recommended that the government and donor agencies can use the findings as the basis of allocating the necessary infrastructure resources to alleviate or reduce the level of poverty in the state.

Keywords: Map-overlay; Poverty incidence; Polygon-in-polygon; Geographic information systems; Unemployment; Infrastructural facilities; Nutritional values; Assets creation; Dependency rate and regionomics.

I. INTRODUCTION

There is no general agreeable definition of poverty but it has been one of the fundamental social problems confronting human race since the existence of man on the planet Earth. Poverty being heterogeneous with multi- dimensional links to problems of hunger, illiteracy, diseases, child and maternal mortality is a fundamental challenge facing Africa as well as the rest of the World in the 21st century. Poverty can be seen as an unacceptable deprivation in human well- being that can consist of low monetary income and low consumption levels as well as social deprivation such as risk, vulnerability etc.

According to the 2008 poverty profile of Nigeria released by National Bureau of Statistics, it was observed that the national poverty rates were as follows: 28.1% (1980); 46.3% (1985); 42.76% (1992); 65.6% (1996); 54.4% (2004) and 48.5% (2008). Poverty incidence in the country recorded increases between the period 1980 and 1985, and between 1992 and 1996. The results also show appreciable decrease in poverty rates between 1985 and 1992 and between 1996 and

2008. Even, with the drop in poverty in poverty rates, the population in poverty has maintained a steady increase from 17.7million in 1980 to 68.7million in 2004 and 75.2 million in 2008.

Mapping poverty analysis contains maps which provide detailed description of the spatial distribution of poverty and inequality in a country. It combines individual and household (micro) survey data and population (macro) census data with the objective of estimating welfare indicators for specific geographic area as small as village or hamlet. Recent advances in Geographic Information Systems (GIS), databases and computer aided software engineering make poverty mapping possible, where data can be presented in the form of maps and overlaying interfaces for cross- comparisons.

However, GIS on its own is a computer-based tool for mapping and analyzing spatially referenced data. Ian Heywood et al, (2011), explained how GIS can facilitate the understanding of spatial aspects of social and economic development as follows:

* relating socio-economic variables to natural resources and physical world;

* providing a tool for targeting interventions and monitoring impacts at various scales over wide areas;

* put planning and research technology into the public domain to enrich and enhance access to information, to promote discussion and improve understanding of conflicting view points.

However laudable any poverty alleviation program is, its success will depend on being able to answer these questions: 'who are the poor?' and 'where are they to be found?'. Unfortunately, there are no reliable statistical records directly defining the distribution of the poor in space (Akinyemi, 2001). This is where GIS would be of utmost usefulness since it helps to relate results of poverty measures to their actual geographic location. The motive of mapping deprivations is to show their typology in space and maybe, in time for various purposes, mainly for addressing poverty. However, in any conditions, households develop various compensatory strategies in the face of deprivations. This explains the rationale for mapping households coping mechanisms along with their multiple deprivations. This will give opportunity to target the real need of people and improve effectiveness in building better living conditions for the poor.

From the literatures, it has been shown that Ekiti state is not immune to poverty. For example, the amalgams of the poor state of infrastructure informed Ajumobi, (2004:32) to comment that Ekiti state is lagging behind in social and economic advancement due to many years of total neglect by the past administrations. Even, the urban centres including the state capital are not immune from the pangs of poverty as shown by irregular and epileptic supply of water and electricity. The housing conditions are very deplorable to the extent that most structures lack basic services like water, bathrooms, toilets, kitchens and waste disposals.

Since most literatures have not been able to resolve the 'where' question of the poor and that data on poverty can be captured from disparage sources, it will therefore fall within the purview of using mapping techniques to show the location of these poor and compare their level of deprivations over a period of two different years. This paper therefore dwelled on making mapping as a tool to target the poor and aim at assisting decision-making process and further act as a geo-database for other researchers.

II. THE STUDY AREA

Ekiti State, carved out of old Ondo State, was created on 1st October, 1996. Ekiti state has a population of about 2, 384,212 (NPC, 2006). The region under study is located between latitudes 7^0 35" and 7^0 39"north of the equator and longitudes 5^0 11" and 5^0 15" east of the Greenwich meridian. Ekiti state is located in the tropical climate with distinct wet and dry seasons (Adebayo, 1993: 11). It lies South of Kwara and Kogi States as well as East of Osun State. It is bounded in the East and in the South by Ondo State.

The State is mainly an upland zone. It rises above 250metres above the sea level. It lies within the areas underlain by metamorphic rocks of the basement complex. It has a generally undulating land surface with a characteristic landscape that consists of old plains broken by steep-sided-out- crops dome rocks that may occur singularly or in groups (Bankole, 2006:8). Such rocks are common sights at Ado Ekiti, the state capital, Efon- Alaaye, Ikere- Ekiti and Okemesi - Ekiti. The State is dotted with rugged hills. The notable ones among them are Ikere- Ekiti hills in the southern part, Efon-Alaaye hills in the western boundary and Ado- Ekiti in the central part.

The State enjoys tropical climate with two distinct seasons. These are the rainy season (April-October) and the dry season (November- March). Temperature ranges between 21^0c and 28^0c with high humidity. The tropical maritime air mass and the Tropical continental air mass blow in the rainy and dry (harmattan) seasons respectively. Tropical forest exists in the South, while Guinea Savannah occupies the northern peripheries.

III. RESEARCH METHODS

Data for this study were collected from primary and secondary sources. The primary sources included observation, oral interview and administration of questionnaires. A well structured questionnaire was used to elicit the required information from households in the various communities and at the local government headquarters of each LGA within the State. A total of 800 copies of the questionnaire were administered. Multi-stage sampling technique was used in the selection of the households from which a questionnaire each was administered. In each LGA, 50 copies of the questionnaire were administered while 10 copies of same were administered in each community that was purposively selected.

The secondary sources of information included published and unpublished materials. The map of Ekiti State was downloaded from Google Earth @ 2008 version 4 thereby representing the spatial data while the processed poverty indicators for the two years respectively represent the attribute data. The map was digitized and geo-referenced using UTM projection. About 790 copies of the questionnaire were retrieved and analyzed using Microsoft SPSS and the result for

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the two years were separately subjected to factor analysis to partition the experimental variables into factors that actually influenced poverty.

IV. RESULTS AND DISCUSSIONS

To compare the results of the two years, a very powerful GIS analytical tool called 'map Overlay' was applied. Map Overlay relates to super imposing of one feature layer or coverage over another in order to examine the spatial relationship between the features in the layers of consideration (Fabiyi, 2001). Map overlay represent the combination of several spatial data sets (points, lines, polygons), creates a new output vector data set, visually similar to stacking several maps of the same region. These overlays are similar to mathematical Venn diagram overlays. A union overlay combines the geographic features and attribute table of both inputs into a single new output. An intersect overlay defines the area where both inputs overlap and retains a set of attribute fields for each. A symmetric difference overlay defines an output area that includes the total area of both inputs except for the overlapping area.

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.758	31.316	31.316	3.182	26.518	26.518
2	2.585	21.544	52.860	2.492	20.767	47.286
3	1.826	15.216	68.076	2.099	17.492	64.778
4	1.171	9.758	77.834	1.567	13.056	77.834
5	0.516	4.298	86.434	1.032	8.600	86.434

Source: Field work, 2012.

Table 1: Extraction Method: Principal Component Analysis For 2000

Table 1 shows the results of Poverty variables that were partitioned into five poverty factors using Principal Component analysis for the year 2000 while table 2 explains the results for the year 2009.

Component	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.758	41.106	41.106	4.182	36.118	36.118
2	3.221	26.845	67.951	3.492	29.100	65.218
3	2.462	20.517	88.468	1.908	15.908	81.126
4	0.998	1.425	89.893	0.567	4.724	85.850
5	0.871	0.998	90.891	0.132	1.099	86.949

Source: Field work, 2012.

Table 2: Extraction Method: Principal Component Analysis For 2009

THE OUTPUTS OF THE VARIOUS OVERLAYS ARE EXPLAINED AS FOLLOWS

(1). Differences in the level of Unemployment: There had been a general rise in the level of unemployment in the State since years 2000 to 2009. The level of unemployment has been very high in nearly all the LGAs except Moba, Efon and Ekiti East. This might have been due to rural migration to urban centres especially, the State capital. Generally, there is always increase in the number of unemployed graduates as the State has very weak industrial base cum low level of infrastructural facilities that could have driven industrial growth.

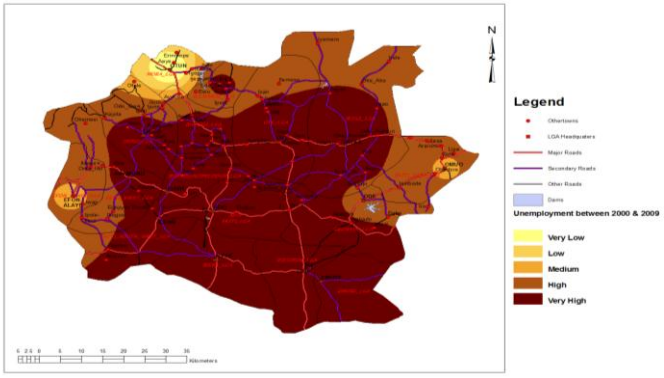
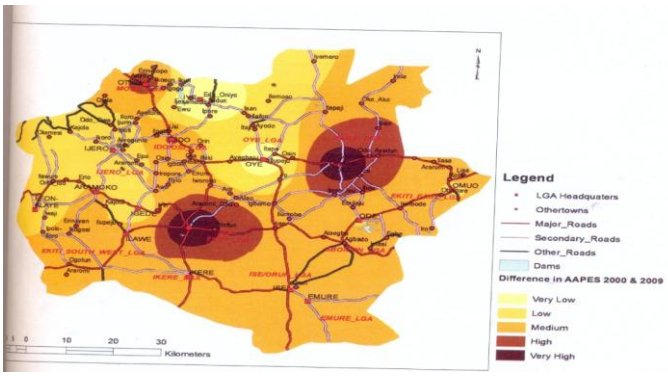


Figure 1: UNEMPLOYMENT BETWEEN YEARS 2000 AND 2009

Source: Poverty Mapping Output.

(2) Differences in Access to Infrastructural facilities: It can be deduced that a lot of attention has been centred on the State capital in the provision of infrastructural facilities relative to other parts of the State. Ikole metropolis however enjoyed the same government patronage. This trend has not been very encouraging as level of poverty have been accentuated by this sordid state of infrastructure. The industrial base is hampered, education, health and transportation are all in bad shape. For any meaningful economic and structural development, there is need for the government to increase the provision of necessary infrastructural facilities.



Source: Source: Poverty Mapping Output.

Figure 2: INFRASTRUCTURAL FACILITIES BETWEEN YEARS 2000 AND 2009

(3)Differences in the level of nutritional value: Nutritional value is high in Ado and part of Efon LGAs. It has been seen to be comparatively low in most part of the State. The need to eradicate or reduce the numbers of stunted and under-nourished children becomes imperative. Most homes

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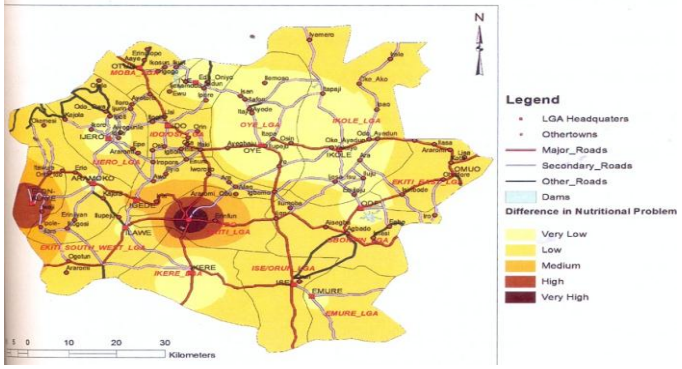
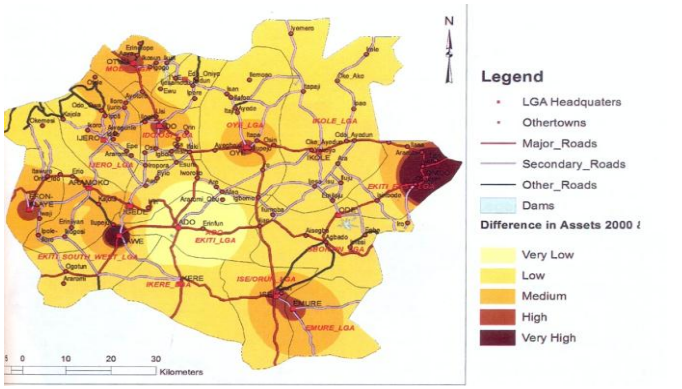
depend on starchy food a lot as the basic staple food. This is corroborated by the fact that the State is an agrarian one where yams, cassava, coco-yams are produced profusely. Some rural dwellers do not see any reason for the children to consume beans, meat, milk and eggs as these are seen as luxury. All these show the endemic level of poverty that are rampant amongst a high percentage of the population.



Source: Poverty Mapping Output.

Figure 3: NUTRITIONAL VALUE BETWEEN 2000 AND 2009

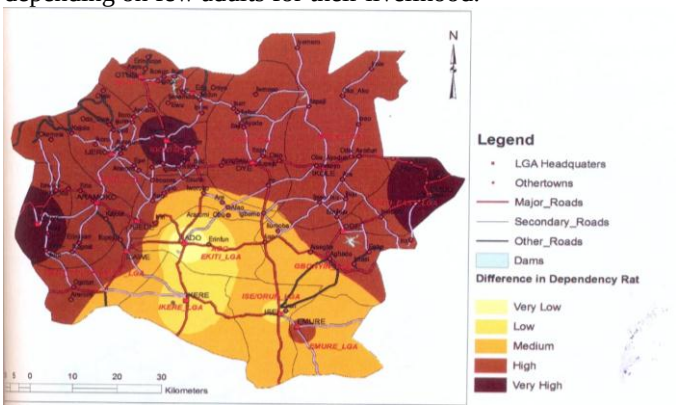
(4) Difference in assets created: The level of assets created by Community Development Associations/Organisations, (CDAs), in the State only improved in the localities at the expense of the State capital. A lot of developmental projects are being left to the hands of both the State and Local governments in the State capital. This was typified by low participation of the real indigenous Ado communities in developmental programmes. In most of the LGAs, the long absence of the State government participation in their developmental programmes have forced the rural communities to take their development strides into their own hands. Most CDAs in the rural have been waxing stronger and stronger to improving their assets bases. No wonder, every community in the State has declared a specific day of the year as 'their day' with the sole aim of raising funds for the development of their various communities. All the sons and daughters, both at home and abroad (diasporas) are conscious of the importance of individual or group contributions to the developmental wellbeing of their members. Fund raised in the process are targeted at improving the social lots of the communities.



Source: Poverty Mapping Output.

Table 4: ASSETS CREATION BETWEEN YEARS 2000 AND 2009

(5) Differences in the level of Dependency rate: The dependency rate has been very low comparable to the State's average in Ado and Ikere LGAs. The reason for this may be adduced to the fact that these LGAs housed the higher institutions of the State like Ekiti state University, Federal Polytechnic, Ekiti College of Education. The level of education remain the catalyst to reducing the number of children per family .Majority of the civil servants equally reside here too. In most LGAs, there is high level of dependency rate. The economic mainstay of the State is purely agriculture which employed large percentage of the population, the love for many children is still rampant in the rural communities. This explains why more children are depending on few adults for their livelihood.



Source: Poverty Mapping Output

Figure 5: DEPENDENCY LEVEL BETWEEN 2000 AND 2009

V. CONCLUSION AND RECOMMENDATIONS

The results of the analysis clearly showed that the level of poverty in Ekiti State is increasing; the poor population has less access to infrastructural facilities and education, health, transportation facilities are all in a state of comatose especially in most rural areas. Dependency rate is increasing, assets creation by the various Community Development Associations is going down while unemployment level is increasing at alarming rate.

It is however recommended that the State government should create a department of regionomics as a unit under the State's planning and budgets. Regionomics specialises in the applications of GIS to develop location- efficient solutions for infrastructure development, urban service delivery and poverty alleviation. This department would in no small measure help to use poverty mapping to facilitates implementation of location-efficient poverty alleviation policies and further assists in understanding the factors that entrench poverty through trend analysis. Apart from the fact that poverty maps improve visualisations which in turn enhance the understanding of decision makers and other stake holders, regionomics remain a GIS-based expert decision support systems that enable urban gate keepers to manipulate urban data to deal with issues of space and economic development. The results of this research work can be used to guide both the governments (State and local) and donor agencies in allocating intervention funds and the types of the intervention.

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