

DEVELOPMENT CLUSTERS IN THE EASTERN NIGER DELTA, NIGERIA

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Abstract

This study examined the spatial distribution of selected socio-economic facilities in the 72 Local Government Areas (LGAs) of Eastern delta, Nigeria with a view to determine if the development pattern in the area is clustered or dispersed in space. A set of socio-economic variables that served as indicators of development were collected from various sources. These were analyzed using the gini index and the non-hierarchical cluster analytical technique. The cluster analysis result showed that both developed and deprived areas co-exist in space and the pace of development follows a discernable pattern of clustering in space within and among the different LGAs in the region. Four levels of clustering representing highly deprived, deprived, privileged, and highly privileged clusters were identified. Out of the 72 LGAs studied in the region, 44 are classified as highly deprived, 21 were deprived, 2 privileged while 5 LGAs were found in the highly privileged cluster. The paper recommends that a conscious and a deliberate effort aimed at addressing the observed spatial inequality in the Eastern delta region of Nigeria. Encouraging the growth of the region is one way of ensuring that the continuous exploitation of oil and gas resources may go on unhindered. To achieve this requires fostering social inclusion, increasing the capacity of people in decision making process, which will in turn engender the capacity of the people to live in harmony.

Key words: *Eastern delta, Development clusters, Inequality, Polarization, Spatial exclusion, Balanced growth, Region*

Introduction

An intriguing aspect of world's development is the fact that as the world makes substantive progress in socio-economic growth, these progress manifests unequally across regional boundaries translating into observable spatial and regional disparities in economic activities, incomes and social indicators. Unequal growth among

regions and at varying scales is also widespread. Spatial inequality though manifest in all societies, is more pronounced in the less developed economies of the world. It is for this reason that Mabogunje (1980) and Kirby (1982) described spatial inequality as not only a mark of underdevelopment, but stumbling block to true human welfare to the extent that, it creates privileged groups

of individuals on one hand and deprived ones on the other.

Okafor (2004) notes that regional problems derive from geographical unevenness either in the distribution pattern of development, or in the conditions that engender development. In many cases, socio-economic differences are linked to long standing unequal relation of power between advantaged and lagging regions, and institutional weaknesses within the latter. Thus, spatial inequality is a dimension of overall inequality, which has added significance when spatial and regional divisions align with political and ethnic tensions to undermine social and political stability (Venables, 2005). More so, regional convergence and 'catch up' appears to be elusive when actors in the advantaged regions control the assets, decision-making, policy formulation processes, on which lagging regions depend.

A cursory look at Nigeria's development pace, shows that the issue of inequality has been significant and infact on the increase. With such effort aimed at the exploitation of the nation's resources on the ascendancy, the accompanying increase in the gross domestic product (GDP) has however not engendered even growth among the various regions of the country. The recognition of the imbalance in development in the postcolonial Nigeria led to deliberate efforts aimed at reducing spatial inequality in the nation's development and are contained in the various National Development Plans (1975-1980). For example, the Second National Development Plan (1970-1974) aptly stated 'a situation where some parts of the country are experiencing rapid growth while other parts are lagging behind can no longer be tolerated' (FGN, 1970).

The thrust of the second national development plan therefore, was to establish Nigeria as a united, strong, self-reliant and egalitarian society. The Third and fourth National Development Plans also aimed at 'establishing the country firmly as a just and egalitarian society putting premium on the need to reducing inequalities in inter personal incomes and promoting balanced development among the various communities in the different geographical areas of the country.

Past efforts by government aimed at developing the delta region, the Eastern Niger delta inclusive includes: the setting up of Niger Delta Development Board (NDDDB) in 1961. Oil Mineral Producing Areas Development Commission (OMPADEC) in 1992; Niger Delta Development Commission (NDDC) in 2000; and the creation of ministry of Niger-Delta in 2008. In spite of these efforts by government, wide disparities in development outcomes in the Eastern delta persist.

In most instances, development outcome in the delta do not correspond with the enormous wealth in the region leaving the people in deplorable state, with no access to basic facilities of life such as safe drinking water, electricity, and roads. More worrisome is that the people of the region are socially excluded in the decision making processes in the country. It is this acts of social exclusion that sometimes precipitates restiveness and violence among the youthful population who feel that the region have been highly deprived and short changed in the development process and sees conflict as a strategy to address deprivation. Unfortunately, sustained conflict in the region has also reduced the pace of development resulting to a drag on the region's economic performance. The

present study therefore x-rays the spatial distribution and clustering of selected indicators of development (health and educational indicators) among the 72 LGAs in the Eastern Delta region of Nigeria with a view to highlighting if there is any discernible pattern in their distribution.

Study Area

The eastern Delta is part of the Niger-delta region and is located in the south-south Nigeria. Its coordinates are 5°19'20.40" N 6°28'8.99" E in Degree Minutes Seconds (DMS). It is comprised of the eastern and central section of the coastal South-South Nigeria. Administratively, the Eastern delta includes Rivers, Akwa-Ibom and Cross River States (see fig 1). This area of delta is heterogeneous with several ethnic groups co-habiting. Major ethnic groups and tribes includes the Ikwerres; Ibibos; Annangs; Ogonis; Kalabaris; Ndonis;

Okirikas, Ogbas, Etche, Ekpeye and Ndoki among others.

The natural delta of the Niger River is a vast sedimentary basin. The deltaic deposits comprise mainly medium to coarse unconsolidated sands, silt, clay, shale, and peat. The delta is mostly a flat, low-lying swampy basin criss-crossed by a dense network of meandering rivers and creeks. The eastern delta region is extremely important, not only to Nigeria, but to the whole world due to its oil reserves. The region produces immense oil wealth and has become the engine of Nigeria's economy accounting for the bulk of Nigeria's foreign earnings. With the exploration and exploitation of oil resources spanning over four decades, Oil and gas from the region accounts for 90% of the nation's export earnings. In spite of all its oil wealth, the region however, remains extremely deprived in physical, environmental and socio-economic terms.

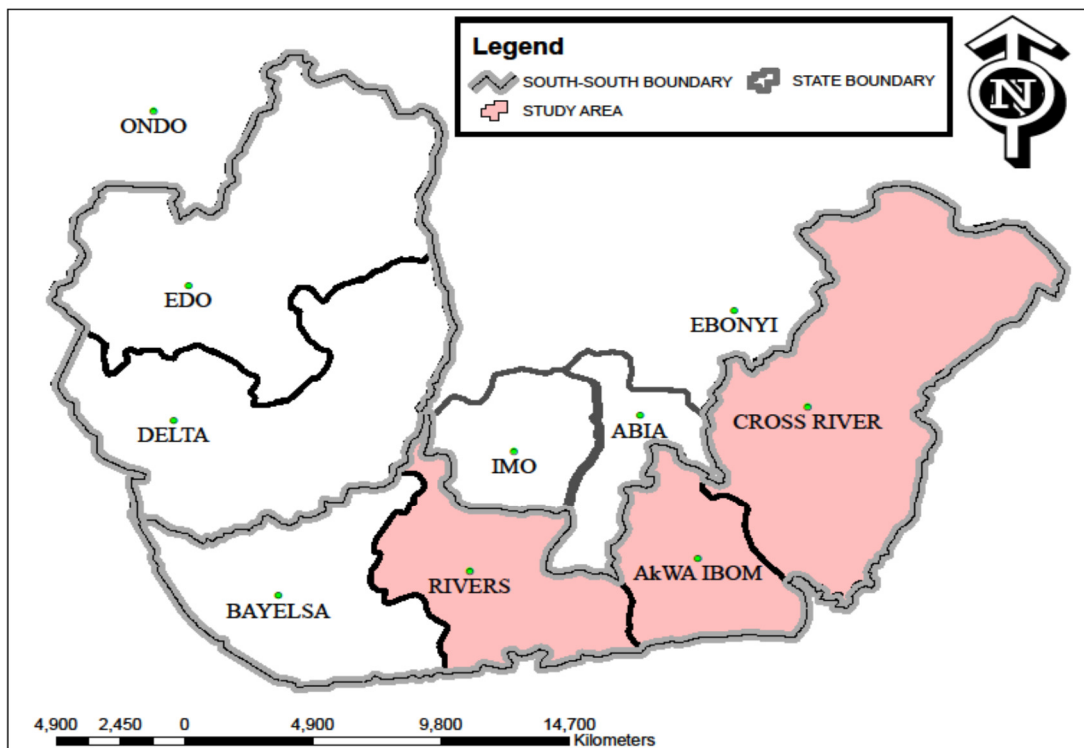


Fig. 1: Eastern Delta Region Administrative

Conceptual Orientation/Literature review

There exist quite a substantial number of development models which try to explain why there is uneven development in space and how convergence in regional growth could be achieved over time. The aggregate growth theory (international trade, sector, and export theories) argues that, the development of a region 'may result from either endogenous or exogenous factors or a combination of both'. These models have been criticized given their over reliance on trade as the only factor accounting for regional development (Omuta and Onokerhoraye, 1994).

The failure of spatial equilibrium models to address the persistence of under-developed localities in both developed and developing countries led to the emergence of the polarized regional development models. These models opine that socio-economic development have been historically characterized by increasing geographical concentration both at global level and within single countries as a result of the uncontrolled actions of powerful polarizing and centralizing forces inherent in the development process itself. Prominent among these theories, is the theory of cumulative causation pioneered by Myrdal (1957) and Hirschman (1958).

Myrdal's cumulative causation model was based on the forces operating in a free market economy. According to him, 'forces in the market normally tend to increase rather than decrease the inequalities between regions. The implication of this is that once a region, by virtue of some initial advantages moves ahead of others, it maintenance this lead by attracting more activities to itself

through backwash effect (Myrdal) and polarization effect effect (Hirschman). The theory has it that, with the setting in of diseconomies of scale, development will spread (Myrdal) or trickle down (Hirschman) to other regions.

Furthermore, Perroux (1955) formulated the growth-pole model in an abstract economic space. For Perroux 'growth does not appear everywhere at the same time, but manifest in points or poles of growth with variable intensities. Growth then spreads by different channels and with variable terminal effects for the economic space to which centripetal forces are attracted and with time, centrifugal forces are emanated throughout the field of influence of activities constituting the pole' development (Omuta and Onokerhoraye, 1994).

Perroux constructed his model based on an abstract 'economic space' devoid of any geographical constraints. However, it is evident that growth does not take place in a vacuum but within a geographic area. Boudeville (1966) however translated Perroux growth pole into growth-centre meaning a propulsive industry located in the urban centre, or simply put, the geographical clustering of economic activity. According to Omuta, and Onokerhoraye (1994) with the setting in of diffusion, existing pattern of population, concentration, will lead to the transformation of the space-economy.

The export-based theory by North (1955) put forward that, the development of a region is a function of the ratio of its basic and non-basic activities. The input-output model traces the movement of goods in terms of input-output linkages and value creation among sectors or regions. While the concept argues that

increase in regional income is determined by increase in export earnings. The neo-classical theories suggest that, given a free economy, growth potentials will even-out among regions. The inability of the aforementioned theories to adequately explain the wide development gap existing among regions in space led to the emergence of normative planning theories.

Normative planning theories recognize that all forms of knowledge are socially constructed. It accepts that values are not predetermined but are established in the communicative process itself. The examination of what planners do has revealed the role that planners can play in facilitating or hindering such communication (Innes, 1995). Of these theories, those associated with communicative planning theory take centre-stage. The original work on communicative planning theory was by Habermas (1987) who noted that if the processes of planning are inclusive, empathetic, and open, and if existing power between participants can be neutralized then, the outcome of such a process could be considered valid. The communicative planning theory believe so much in the civil society as a potent source of democracy and as well, a vehicle for putting pressure on the state to act responsively. The inability to always have consensus within a society with diverse expectations is however a major setback of the communicative planning theories.

Sandercoak (1998) opposed the idea of universal citizenship noting that, the society is fragmented by identity (such as sex, race and ethnic groupings), and that the role of the planner is to recognize the various groups in the planning process. This means that in the distribution of societies' resources, what constitute

justice may be culturally specific. Planning in this context must link knowledge to action, to empower the oppressed and marginalized regions, to resist exploitation and the denial of their authenticity (Sandercoak, op cit). Fainstein (2000) inquisition into the normative planning theory ushered in the just city theory which shares some identity with Marxist thinking. She argued that planning should aim at achieving redistribution, equity and justice.

Fainstein (2000) argues that justice requires dampening of sentiments based on group identity, greater commitment to common ends, and identification of institutions and policies that offer broadly appealing benefits. Accepting that the society is structured by groups rather than class, her concern is less with planning which aims to valorize and promote the claims (material and non material) of these groups, rather than with how groups can benefit from the redistributive planning. For Fainstein (op cit), just processes do not necessarily produce just outcomes as opined by Habermas but, that the 'substantive content' or the impact of planning decisions should be judged as well as their impact on equity. A major setback of the just city planning theory is on how redistribution and equity will play out and whose duty it is to judge what is just or what is not

Most studies on spatial pattern of development (Enoh, 1981; Adeyemo, 1999; Igwe, 2002) concentrated on individual states in the region. There has not been any study of this sort that focuses on the entire eastern delta region. This constitutes a gap that the present study intends to fill by examining whether the distribution selected socio-economic indicators of development among the

LGAs in the region mimics a discernable pattern using the LGAs as unit of analysis.

Methodology

The data for this study were obtained from both primary and secondary sources. The primary data were collected through questionnaire administered in the study area to selected heads of households. Regular visits were carried out to ascertain what is on ground. The secondary data were sourced from Published government statistics from the different states that make up the study area. These data were obtained mainly on selected indicators of development considered relevant for this study.

The selected indications of developments which are mainly educational and health related include;

- number of publicly owned primary schools per ‘000 population; 2018
- number of publicly owned secondary schools per ‘000 population 2018
- primary school enrolment,2018
- secondary school enrolment, 2018
- number of qualified teacher’s to primary school pupils, 2018
- number of qualified teacher’s to secondary school pupils; 2018
- number of maternity centres/‘000 population, 2018
- number of hospitals/‘000 population, 2018
- number of doctors/‘000 population,2018
- number of nurses/midwives/‘000 population, 2018
- number of hospital beds/’000 population, 2018
- number of maternity beds/’000 population, 2018

- number of pharmacist/‘000 population, 2018

In other to determine the performance of each local government areas on the selected indicators of development, the gini-co-efficient was calculated for each local government area. The Gini co-efficient of spatial variation measures the performance or variation of the chosen variables among observation or the cases. It compares the percentage share of an item by the different areas against their percentage population or distributional criterion.

The co-efficient equation is given as:

$$G_x = \frac{1}{2} \sum_{i=1}^N (x_i - p_i) \dots\dots\dots 1$$

Where:

G_x = Gini co-efficient

X_i = the percentage of the value of variable in the state shared by LGA i

P_i =the percentage of total population in the state shared by LGA i

(Where, population is assumed to be the distributional criterion).

Since spatial patterns of areas is better appreciated by attempting a classification of areas in which members of same group are similar, cluster analysis was used to classify the LGAs into distinct groups based on their performance on each of the indicators using the LGAs as aerial units of analysis. The non-hierarchical grouping technique uses the Euclidean proximity in a pre-dimensional vector space. The cluster analysis attempts to produce optimum clustering for a given number of clusters, regardless of the previous stages in the analysis (Abumere, 1978). The cluster analysis uses distance similarity matrix observations in the different groups. Distance (similarity) matrix is

calculated using the Pythagorean Theorem, while the distance between any two points is defined as:

$$D_{ij} = \sqrt{\frac{\sum_{i=1}^n (s_{mi} - s_{mj})^2}{n}} \dots\dots\dots 2$$

Where:

s_{mi} and s_{mj} are the scores for the i th and j th observation respectively,

n = the total number of variables used in the multivariate groupings.

The calculated gini-values for all the variables further served as data input for the cluster analysis. Both the gini coefficient and cluster analytical techniques have all been proven to be effective in the study of spatial inequality and have been applied in previous studies such as Abumere, (1978); Enoh (1981); Smith, (1979); Ogbuozobe (1994); and Arokoyu and Weje (2015). However, in a study such as this, one major challenge is that of generating appropriate variables for measuring socio-economic development since ‘development’ is a nebulous concept, deciding on its constituents may involve the risk of applying subjective values as to what is, and what is not relevant. (Adebisi, 1998). In this study, however, the choices of socio-economic indices were based on such conditions as the appropriateness of the variables and the availability of the data covering the selected variables all the LGAs in the study region.

Results and Discussion

Table 1 shows the calculated aggregate gini-values on each socio-economic indicator for each LGA. From the table, it is evident that there exists spatial inequality between and among the

various LGAs in the study area. The gini result indicates that high level of disparity in growth between and among the various LGAs in the delta. While some LGAs have more than their fair share of the facilities studied (Calabar municipality, $G=23.98$; Calabar south, $G=22.91$; Eleme, $G=17.59$; Abu/Odual, $G=1.44$; Akamkpa, 14.76 ; Yale, 15.54 among others) others are practically less privileged as in the case of Ukanafun, $G=0.46$; Essien Udim, $G=0.94$; Mbo, $G=0.39$; Nsit Ibom, $G=0.20$; Ini, $G=0.57$; Okobo, $G=0.64$.

The gini result also shows that all the states in the eastern delta have their fair share of inequality in all the variables studied even though the inequality problem are more entrenched in some states (Akwa-Ibom) in the region. The wide gini-value between and among LGAs in the eastern delta further exposes the very high development gap among LGAs in the region. To determine if the distribution of our selected socio-economic indicators follows a discernible pattern, cluster analysis was carried out using the gini results as input and the result is as shown in table 5.2. The cluster result revealed that the distribution of development among the LGAs in the eastern delta region follows a discernable pattern of clustering. As evident in the result, forty-three (44) LGAs in the eastern delta (representing 61%) are in the highly deprived development clusters, twenty one (21) LGAs, representing (29%) were in the deprived development clusters, two (2) LGAs representing 3% falls within the privileged development clusters, while five (5) LGAs representing 7% of the total LGAs studied falls within the highly privileged cluster.

Table 1: Calculated Gini-coefficient for LGAs in the Eastern Delta Region, Nigeria
(Data input for cluster analysis)

| LGAs | Aggregate gini Values | LGAs | Aggregate gini Values |
|----------------------|-----------------------|---------------|-----------------------|
| Asaritoru | 1.49 | Oron | 2.08 |
| Bonny | 1.10 | Oruk Anam | 2.26 |
| Emohua | 2.01 | Ukanafun | 0.46 |
| Etche | 2.31 | Udung uko | 1.71 |
| Gokana | 1.61 | Uruan | 1.07 |
| Ikwerre | 1.43 | Calabar south | 22.91 |
| Khana | 3.05 | Etung | 0.85 |
| Obio/Akpor | 4.64 | Ikom | 11.27 |
| Ogba/Egbema/Ndoni | 1.32 | Obaniliku | 11.85 |
| Ogu/bolo | 0.95 | Esit Eket | 3.26 |
| Okrika | 1.47 | Essien Udim | 0.94 |
| Omuma | 0.73 | Etim Ekpo | 1.00 |
| Opobo/Nkoro | 1.73 | Etinan | 1.95 |
| Onna | 1.04 | Ibeno | 1.20 |
| Ahoda East | 1.25 | Yala | 15.54 |
| Ahoda West | 1.74 | Obubra | 7.93 |
| Akuku-Toru | 1.44 | Obudu | 6.71 |
| Andoni | 1.90 | Yakurr | 8.49 |
| Ibesikpo Asutan | 1.92 | Mbo | 0.39 |
| Ibiono Ibom | 2.76 | Mkpat enin | 1.25 |
| Ika Annang | 0.30 | Nsit Atai | 0.57 |
| Ikono | 1.80 | Nsit Ibom | 0.20 |
| Oyigbo | 0.94 | Nsit Ubium | 0.73 |
| Port Harcourt | 13.29 | Obot Akara | 0.87 |
| Tai | 2.25 | Okobo | 0.64 |
| Abak | 1.51 | Odukpani | 1.89 |
| Eastern Obolo | 1.18 | Ogoja | 8.92 |
| Eket | 3.73 | Bekwarre | 4.30 |
| Biase | 8.52 | Ikot Abasi | 1.20 |
| Boki | 6.99 | Ikot Ekpene | 5.51 |
| Calabar Municipality | 23.98 | Ini | 0.90 |
| Urue Offong Oruko | 0.34 | Itu | 1.52 |
| Uyo | 2.86 | Akpabuyo | 22.92 |
| Abi | 5.52 | Bakassi | 3.14 |
| Akamkpa | 14.76 | Eleme | 17.59 |
| Abua/Odua | 14.44 | Degema | 9.94 |

Table 2: Development Clusters of LGAs in Eastern Delta obtained from the Cluster Analysis

| Category | Areas in the group | Cluster Distance | Remarks |
|------------|--------------------|------------------|----------|
| 1 | Abak | 0.02 | |
| | Eastern obolo | 0.32 | |
| | Esit Eket | 0.50 | |
| | Essien Udim | 0.75 | |
| | Ika Annang | 0.22 | |
| | Ikono | 0.27 | |
| | Ikot abasi | 0.73 | |
| | Ikot ekpene | 0.93 | |
| | Itu | 0.11 | |
| | Nsit ubium | 0.75 | |
| | Obot Akara | 0.18 | |
| | Onna | 0.55 | |
| | Oron | 0.01 | |
| | Uruan | 0.75 | |
| | Uyo | 0.01 | |
| | Abi | 0.70 | |
| | Akamkpa | 0.18 | |
| | Bekwarra | 0.75 | |
| | Biase | 1.12 | |
| | Ikom | 0.30 | |
| | Obubra | 1.60 | Highly |
| | Odukpani | 0.45 | Deprived |
| | Ogoja | 0.28 | LGAs |
| | Yakurr | 1.82 | |
| | Obio/Akpor | 0.33 | |
| | Ogba Egbema/ Ndoni | 0.63 | |
| | Ogu bolo | 0.47 | |
| | Okrika | 0.10 | |
| | Omuma | 0.32 | |
| | Opobo/nkoro | 0.21 | |
| | Oyigbo | 0.67 | |
| | Tai | 1.61 | |
| | Bonny | 0.23 | |
| | Degema | 0.37 | |
| Eleme | 0.82 | | |
| Emohua | 0.42 | | |
| Etche | 0.27 | | |
| Gokana | 0.68 | | |
| Ikwerre | 0.64 | | |
| Akuku-Toru | 0.28 | | |
| Ahoda west | 0.17 | | |
| Andoni | 0.16 | | |
| Asari-Toru | 0.60 | | |

| Category | Areas in the group | Cluster Distance | Remarks |
|------------|--------------------|------------------|------------------------|
| 2. | Bakassi | 0.33 | Deprived LGAs |
| | Okobo | 0.36 | |
| | Etim Ekpo | 0.50 | |
| | Etinan | 0.67 | |
| | Eket | 0.36 | |
| | Ibeno | 0.71 | |
| | Ibesikpo asutan | 0.48 | |
| | Ibiono ibom | 0.39 | |
| | Ini | 0.91 | |
| | Mbo | 0.91 | |
| | Mkpat Enin | 0.71 | |
| | Nsit Atai | 0.36 | |
| | Nsit ibom | 0.33 | |
| | Oruk Anam | 0.18 | |
| | Ukanafun | 0.33 | |
| | Udung uko | 0.33 | |
| | Urue offong/ Oruko | 0.41 | |
| Boki | 0.33 | | |
| Etung | 0.33 | | |
| Yala | 0.33 | | |
| Ahoda east | 0.11 | | |
| 3 | Calabar municipal | 0.40 | Privileged LGAs |
| | Calabar south | 0.40 | |
| 4 | Akpabuyo | 1.33 | Highly Privileged LGAs |
| | Obanliku | 0.28 | |
| | Obudu | 1.70 | |
| | Khana | 0.49 | |
| | Port Harcourt | 1.16 | |

An interesting picture revealed by the cluster analysis above is that most of states have all their LGAs falling into either the highly deprived or deprived clusters (as in the case of Akwa-Ibom State). Only a few LGAs in Rivers and Cross-River States were grouped into the privileged and highly privileged clusters. This revelation is worrisome especially when considered that most of LGAs in the Eastern Delta States are oil producing. Figure 2 is the map generated from the cluster analysis.

The privileged status of only seven (7) LGAs in the privileged cluster (i.e. privileged and highly privileged clusters) may be traced to the socio-economic and

cultural characteristics of these areas. For example, some of these LGAs (Port-Harcourt, Calabar-South, Calabar-Municipal, Khana, Obudu, Obanliku and Akpabuyo) have in the past served as higher order settlements (regional headquarters) providing essential services to settlements within their-sphere of influence. The higher order services provided by these settlements thus exacted much centripetal force pulling both human and socio-economic facilities to it, thereby leading to accelerated industrialization and rapid influx of people in to the area. The influx of people and firms into these areas further led to the provision of socio-

economic facilities needed to meet the needs of the ever-bourgeoning population. All these in turn gave rise to greater inequality and deprivation among the other LGAs. The results of this - supports

the dual theory propounded by Boeke (1954) which opines that within the space economy of a developing nation there is the tendency for privileged and lagging areas to co-exist.

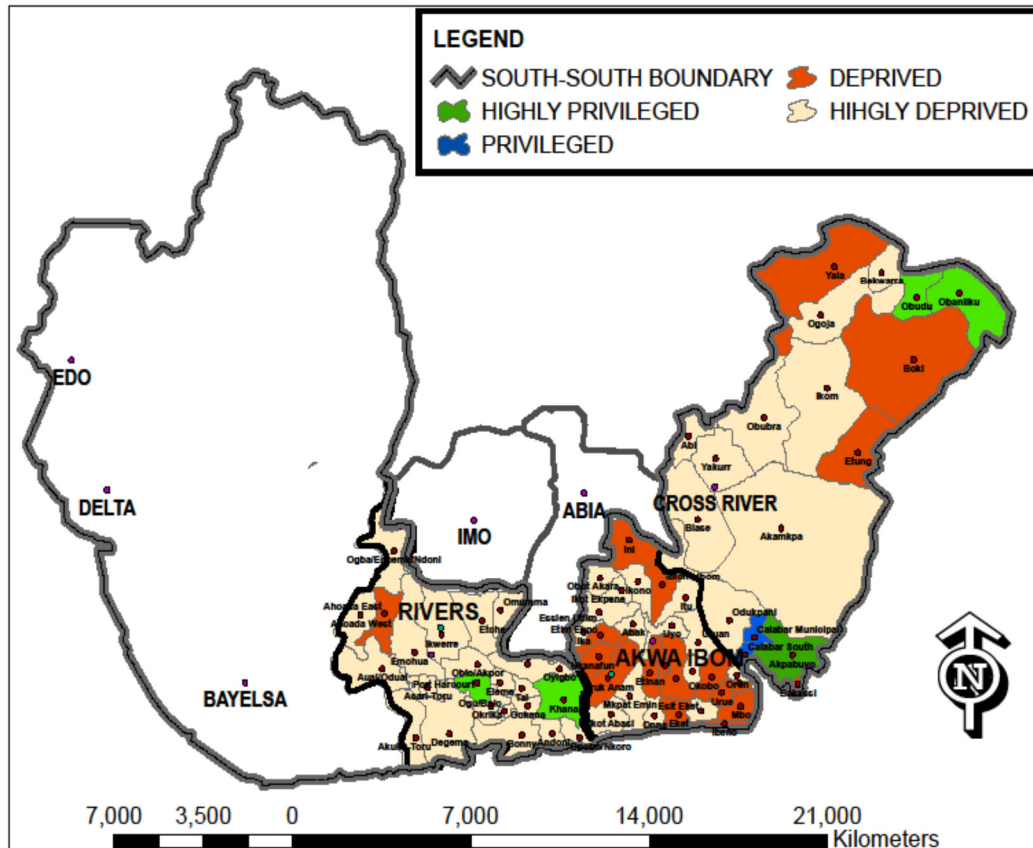


Fig 2: Eastern Delta Region showing LGAs in their Respective Clusters

Conclusion

Growth by its very nature do not take place everywhere in space at the same time. Places due to their peculiar characteristics or endowment may take initial advantage and thus grow more than other areas around it. This initial advantage may further act lead to the concentration of growth in response to centripetal forces inherent in the development process itself. Unequal growth among regions in space brings a drag in the social economic and political development of an area concerned. Thus,

one of the objectives of planning is to ensure that there is convergence in growth between and among points in space. The present study x-rayed the spatial distribution of selected indicator of development in the eastern Niger delta with a view to determine if development pattern in the area occur in any discernible pattern. The results show that while there is unequal growth among the various LGAs in the region, the distribution of development is clustered in space.

The seeming unequal growth in the eastern delta if not checked portends

serious development challenge in the area and the country at large as it may exacerbate conflict in the area with attendant negative impacts on the economy of the country. Encouraging the growth of the region is one way of ensuring that the exploitation of oil and gas resources continues on unhindered. This is important as the region at least for now, provide the major source of foreign earnings for the country. To achieve this requires fostering social inclusion, increasing the capacity of people in decision making process, which in turn will engender the capacity of the people to live in harmony.

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