

Analysis of Inequality, Poverty and Sustainable Development of Delta State, Nigeria

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This paper analyses the trends of inequality and its implications on the sustainable development of Delta State, Nigeria with a view to understanding the variation in inequality over space. A stratified sampling technique was adopted. Inequality was measured based on Gini co-efficient index from (2004-2016), while poverty categories (non-poor, transient poor and chronic poor) were measured using \$1.25 and \$2.00 thresholds. A Gini co-efficient of 0.4650 was recorded for Delta State in (2004), 0.4698 in (2010), 0.33609 in (2012/13) and 0.34268 in (2015/16). There were 343 (41.5%) chronic poor households in Delta South, 283 (33.3%) in Delta Central and 180 (22.2%) in Delta North, while 147 (21.6%) households in Delta South, 116 (12.7%) in Delta North and 103 (11.3%) in Delta Central were transient poor. One-Way ANOVA significantly explained the spatial variation in distribution of inequality and poverty among households at ($p < 0.05$). Water source ($F=24.786$), distance to water source ($F=18.509$), improved sanitation ($F=15.973$), road length ($F=9.468$) and household size ($F=7.398$) were important predictors of spatial variation of inequality and poverty. This paper recommends that government at all levels should invest more in livelihood development, improved income distribution at the bottom and access to opportunities is key to reducing inequality and enhancing sustainable development of Nigeria.

Keywords: Spatial inequality, poverty trends, sustainable development, Delta State, Nigeria

Introduction

Reducing inequality is one of the 17 global goals that make up the 2030 agenda for sustainable development (UNDESA, 2015). In Nigeria economic inequality has reached extreme levels, income inequality grew from 40% in 2003 to 43% in 2009. The richest Nigerian earns 8,000 times more than what the poorest 10% of Nigerians spend on average for their basic consumption in one year. Regional inequality translates to higher rates of poverty especially, in north-western states of the country like Sokoto, where 81% of the population is poor, while poverty incidence is lower at 34% in Niger state (OXFAM, 2017). Inequality matters in its own right and it is key to reducing poverty. Poverty can be reduced through increase in income, through changes in distribution of income, or through a combination of both (Naschold, 2002). Litchfield (1999); Osahon and Osarobo (2011) posited that inequality implies dispersion of a

distribution, whether one is considering income, consumption or some other welfare indicators.

In Nigeria, it is clear that the top 10 percent of the population captures most of the growth while people at the bottom are being left behind Asu (2013). High levels of poverty and inequality are detrimental to people's quality of life and life opportunities and to countries' growth and security (Ravallion, 2009; CPRC, 2009; Hulme, 2010; Stewart, 2010; Ostry *et al.*, 2014). Inequality is a challenge to the eradication of extreme poverty and tends to reduce the pace and durability of growth (UNICEF *et al.*, 2014; Ostry *et al.*, 2014). Inequalities have been discovered to hinder social cohesion and increase the risk of violent conflict (Stewart, 2010; UNDP, 2013). Kabber (2010) and World Bank (2013) discovered that inequalities have resulted in the poorest people including women, young and older people, persons with disabilities, indigenous peoples and rural

populations making less progress towards achieving the development goals.

Income inequality is a global problem which requires a global solution. Without reducing inequality, meeting the SDG 1 to eliminate poverty in all its forms will be impossible. The evidence is clear: there will be no end to extreme poverty unless governments tackle inequality and reverse recent trends (OXFAM & DFI, 2017). The effect of inequality does not vary with the level of income, the relative importance of inequality for reducing poverty is greater in the poorest countries. The World Bank posited that by 2030 almost half a billion people will still be living in extreme poverty (Lakner, Negre & Prydz, 2014). Within the development discourse, studies on inequality such as (Aigbokhan, 2008; Babatunde, 2008; Adigun *et al.*, 2011; Osahon & Osarobo, 2011), largely focused on the socio-economic determinants of rising income inequality patterns. Moreover, studies by the International Monetary Fund (IMF) discovered that income inequality (as measured by the Gini coefficient, which is 0 when everybody has the same income, and 1 when one person has all the income) negatively affects growth and its sustainability (Berg and Ostry, 2011; Ostry, Berg & Tsangarides 2014). In addition, income inequality hampers the pace at which growth enables poverty reduction, and higher inequality makes a greater proportion of the population vulnerable to poverty (Ravallion, 2004). It is against this background that this paper focuses on the trends of inequality and its implications for sustainable development of the coastal communities of Delta State, Nigeria. The hypothesis that inequality is significantly determined by spatial factors was proposed for this study. Apart from this introductory section, conceptual clarifications are presented in section two, while inequality and poverty profile of Nigeria is presented in section three, and some poverty reduction strategies adopted in Nigeria in section four. The study area and research methods are discussed in section five, while the results and discussion of findings are presented in section six. Section seven is the conclusion.

Conceptual clarifications

This section provides clarifications on inequality, poverty, sustainable development, and sustainable livelihood approach to poverty and inequality studies which are very central to this paper.

Inequality

The concept of inequality which means unfairness often manifests in form of inequitable distribution and skewed income distribution. Inequality implies dispersion of income, consumption or other welfare attributes. Inequality is often studied as part of the broad analysis of poverty and welfare. Thus, inequality is a broader concept than poverty because it is defined over a whole distribution (Litchfield, 1999). Income inequality may be considered in relation to a number of interrelated factors such as education, occupation, expenditure pattern, public health, regional, ethnic and political differences. The Gini coefficient is most frequently used measure of inequality, the extent to which income distribution and consumption expenditure (Deinne & Ajayi, 2019).

Poverty

The global economic and poverty landscape has changed with our understanding of what development and poverty are all about (OECD, 2015). Different thresholds could be used to measure poverty. The income or absolute poverty threshold, relative poverty measures based on consumption or body mass index and multidimensional poverty index which measures a range of deprivations such as poor health, lack of education, inadequate living standards, lack of income, violence, disempowerment (Alkire and Santos, 2010; Deinne & Ajayi, 2019). Many people also remain vulnerable to a range of factors such as unemployment, sickness, social exclusion and insufficient resources during old age which threatens to re-impoverish the people in future (OECD, 2012a).

Sustainable development

Sen (1999) defined development as a tool which enables people to reach the highest level of their ability. On the other hand, development has resulted to inequalities between individuals and states, whereby a large number of the world's inhabitants are mired in poverty, especially in Africa. The term development in international parlance includes the need and means by which to provide better lives for people in poor countries. It includes not only economic growth but also human development, providing for health, nutrition, education and a clean environment. Some

constraints on development are high economic poverty, hunger, high mortality rates, unsafe water supplies, poor education systems, corrupt governments, war and poor sanitation these constraints create poverty traps and cycles that must be broken for countries to develop (UNDP, 2003). Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs (United Nations General Assembly, 1987, p. 43). The philosophy of sustainable development can be interpreted in many different ways but driven by a particular need and finding better ways of doing things both for the future and present generation promoting personal wellbeing, social cohesion and inclusion and creating equal opportunity. (Brundtland Commission 1987; Cerlin, 2006; Stoddart, 2011; Deinne & Ajayi, 2019) provided a broad description which does not limit the scope of sustainability, the explanation touches on the importance of intergenerational equity. The overall objective of sustainable development is the long-term stability, integration of the economy, environment and social concerns in order to address the needs of future generations (Stoddart, 2011).

Sustainable livelihood approach to poverty and inequality studies

The livelihood approach is an actor-oriented perspective in development studies, including economic and development geography. Livelihood studies were brought to the centre stage of development studies in the late 1990's and the beginning of the new millennium, when the sustainable livelihood framework was promoted by the Department for International Development (DFID) and (DE HAAN, 2012). Sustainable livelihood encompasses people's assets (natural, physical, human, financial, social and information) and the complementary building blocks for their livelihoods is central to this study. Livelihood assets provide both a proxy for absolute poverty and a broader poverty measure (Erenstein, 2009). Chambers and Conway (1992) discovered that "a livelihood comprises the capabilities, assets and

activities required for a means of living". This approach remains an instrument for the investigation of poor peoples' livelihoods while visualizing the main factors of influence which can be understood by qualitative and quantitative analysis at the local or communal level, regardless of where (i.e. which sector or geographical space,...) these factors occur. The sustainable livelihood is multi-dimensional, comprehensive and people-centred (Chang and Tipple, 2009). The livelihood assets are classified under the five building blocks of physical asset/natural asset - shelter, energy, accessibility, sanitation and safe water, health care; social asset -membership of co-operative society, family support, relationship, friendship; financial asset -access to credit, loans, regular flow of money, savings and remittances; human asset -knowledge, good health, skills, leadership (Deinne & Ajayi, 2019).

Inequality and poverty profile of Nigeria

Inequality and poverty profiles are discussed in this section to better position the focus of this paper in Nigeria.

Inequality profile of Nigeria

The inequality profile presented in Table 1 showed that inequality has a spatial dimension, the trend of Gini co-efficient recorded for the geo-political zones of Nigeria from 2004-2016. The Gini-index increased between 2004 and 2010 and between 2012/2013 and 2015/2016 respectively. At the national level, Gini index increased from 0.4296 to 0.447. This rising pattern of inequality is replicated in urban and rural areas as well as in South-South, South-East, North-East and North-West geopolitical zones respectively. At the state level, a Gini co-efficient of 0.4650 was recorded for Delta State in (2004), 0.4698 in 2010; 0.33609 in 2012/13; and 0.34268 in 2015/16.

Table 1: Inequality Profile of Nigeria (2004-2016)

Location	Gini Index		Gini Index	Gini Index
	2004	2010	Wave 2 (2012/2013)	Wave 3 (2015/2016)
National	0.4296	0.447	0.36188	0.38702
Delta State	0.4650	0.4698	0.33609	0.34268
Urban	0.4154	0.4329	0.34604	0.36772
Rural	0.4239	0.4334	0.34907	0.37787
S/South	0.3849	0.434	0.32998	0.36926
S/East	0.376	0.444	0.32416	0.40612
S/West	0.4088	0.4077	0.37673	0.36968
N/Central	0.4459	0.422	0.37634	0.35599
N/East	0.4114	0.4468	0.36902	0.41417
N/West	0.4028	0.4056	0.36367	0.35178

Source: Computed from National Bureau of Statistics (NBS);
 General Household Survey Panel Data Wave 2 (2012/2013) & wave 3 (2015/2016);
 Aigbokhan, (2017). Figures for 2004 & 2010 are from NBS Press Briefing Report, Abuja

Poverty profile of Nigeria

The information on poverty profile of Nigeria presented in Table 2 from (1980-2010) revealed that the Nigeria’s poverty rate was 27.2% in 1980 for a population of 17.1 million people. The percentage of Nigerians in poverty moved up to 43% of 39.2 million people in 1992. By 2010, 69% of 170 million Nigerians representing 112.5 million are below the poverty line. An analysis of poverty in Nigeria in Table 3 reflects a huge dichotomy between the poverty rates in the states of the north-central, north-east and north-west with range between 67% and 69% respectively, while the states in the south-east, south-south and south-west range between 27% and 43% (NBS, 2010). The percentage of the extremely poor living below \$1.25 a day was 6.2 percent in 1980 the proportion increased to 29.3 percent in 1996 and then reduced to 22.0 percent in 2004 before increasing to 38.7 percent in 2010. The picture was quite different for the moderately poor living below \$2.00 a day. The moderately poor rose between 1980 and 1985 from 21.0 percent to 34.2 percent, followed by a decrease between 1996 and 2004 from 36.3 percent to 32.4 percent, and even declined further to 30.3 percent in 2010. On the other hand, the percentage of non-poor decreased from 72.8 percent in 1980 to 53.7 percent in 1985 but rose to 57.3 percent in 1992. The non-poor further declined in 1996 to 34.4 percent but rose to 43.3 percent in 2004 and then reduced to 31 percent in 2010 (HNLSS, 2010).

Table 2: Poverty profile of Nigeria (1980-2010)

Poverty Headcount of Nigeria (1980-2010)			
Year	Poverty Incidence (%)	Estimated Population (Million)	Population in poverty (Million)
1980	27.2	65	17.1
1985	46.3	75	34.7
1992	42.7	91.5	39.2
1996	65.6	102.3	67.1
2004	54.4	126.3	68.7
2010	69.0	163	112.47
Dynamic Poverty of Nigeria (1980-2010)			
Year	Non poor	Moderately poor	Extremely poor
1980	72.8	21.0	6.2
1985	53.7	34.2	12.1
1992	57.3	28.9	13.9
1996	34.4	36.3	29.3
2004	43.3	32.4	22.0
2010	31.0	30.3	38.7

Source: NBS (2010)

Table 3: Percentage incidence of poverty by zones (1980-2010)

Percentage Incidence of Poverty by Zones (1980-2010)						
Geo-political zones	1980	1985	1992	1996	2004	2010
North Central	32.2	50.8	46.0	64.7	67.0	67.5
North East	35.6	54.9	54.0	70.1	72.2	76.3
North West	37.7	52.1	36.5	77.2	71.2	77.7
South East	12.9	30.4	41.0	53.5	26.7	67.0
South South	13.2	45.7	40.8	58.2	35.1	63.8
South West	13.4	38.6	43.1	60.9	43.0	59.1

Source: NBS (2010)

Poverty reduction strategies in Nigeria

Some of the poverty reduction strategies adopted in Nigeria include The National Accelerated Food Production Program and the Nigeria Agricultural and Cooperative Bank (1972), Operation Feed the Nation (1976), Green Revolution (1979), Directorate of Food, Roads and Rural Infrastructure (1986), National Directorate of Employment (1987), Family Support Program (1993), National Poverty Eradication Program (2001), National Economic Empowerments and Development

Strategy (2004). Others are Nigerian Vision (20: 2020), Transformation Agenda (2011), Subsidy Reinvestment and Empowerment Programme (SURE-P) (Ogunjiuba, 2014), Youth Poverty Alleviation Program (YouWin) (2013) and Empowering Nigerian Youths for Prosperity-N-POWER (2017).

However, most of these anti-poverty policies and programmes have not yielded the desired results because they were mere declarations without concerted efforts, inconsistency, instability,

corruption, poor leadership, ethnicity or social inclination, and lack of political will and weak institutional capacity for economic management and coordination. All the poverty alleviation initiatives in Nigeria since independence have yielded very little fruit, and were mostly not designed to alleviate poverty, these poverty alleviation initiatives lacked clearly defined policy frameworks with proper guidelines for poverty alleviation, lacked coordination among different levels of government, suffered from political instability, political interference, macroeconomic truncations, lacked continuity, and are riddled with political deception, corruption and distasteful looting. The poor quality of governance is, therefore, a major obstacle to development and poverty reduction initiatives in Nigeria (UNDP, 2010).

Study area and research method

The study area and methodology adopted in this paper are presented in this section.

Study area

Delta State lies approximately between longitude 5°00' and 6°.45' East of the Greenwich meridian and latitude 5°00' and 6°.30' North of the Equator. Delta State relief varies from the north to the south and from the hinterland to the coast. It is highest at Agbor and Ubulu-Uku with an elevation of 110m and lowest at the coast with elevation of 23.8m above sea level (see Fig. 1). The choice of the study area is based on the fact that despite being one of

the main source of oil exports for the country, this region suffers from poor infrastructure, sanitation, access to healthcare, and educational opportunities, difficulty in satisfying household needs as well as inadequate investment in development (Deinne & Ajayi, 2019). Environmental degradation from oil exploration and exploitation contributed to a number of these problems. NBS 2010 report indicates that among the states in Nigeria, Delta State has one of the highest levels of unemployment representing 20.8 percent of the population. This implies that as unemployment increases livelihood, poverty and wellbeing decreases, more persons fall into poverty and experience inequality. Livelihoods in the greater part of Delta State are constantly being exposed to the impact of environmental pollution as a result of oil exploration causing a great loss in flora and fauna, a major source of livelihood for the indigenous people. Specifically, farming and fishing practices have been lost to environmental degradation. Therefore, it is not possible to discuss sustainable livelihoods in Delta State without referring to the impacts of oil extraction on the environment which have significantly increased in recent years due to pollution, deforestation and constant discharge of effluents and wastes from oil operations onto land, into mangrove and freshwater swamps, and into the sea and have destroyed arable and fertile farmlands with further alteration on the ecosystem and livelihoods.

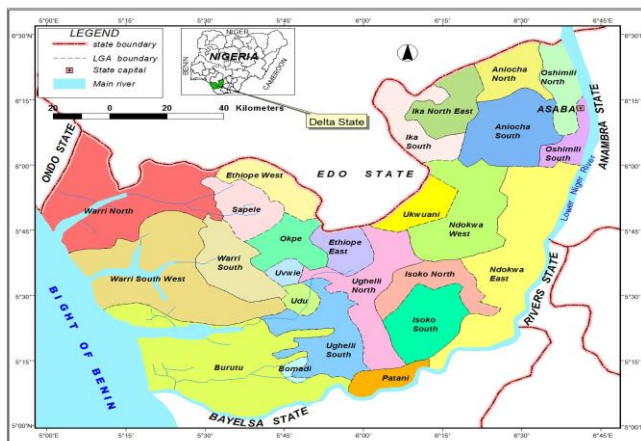


Figure 1: Delta State
Source: Ministry of Land, Survey and Urban Development Delta State

Research methodology

Data collection procedure

Primary and secondary data sources were utilized for this study, made up of a cross-sectional survey involving questionnaire administration, while data used for inequality analysis was derived from (NBS, 2010) and the reported Gini co-efficient of (2004 and 2010) based on National Living Standard Survey (NLSS), General Households Survey Panel data wave 2 (2012/2013) and wave 3 (2015/2016).

$$\frac{Z \text{ values}^2(pxq)}{e^2}$$

$$\frac{1.96^2(50x50)}{2^2}$$

$$\frac{3.841 (2,500)}{4}$$

$$= \frac{9,604}{4}$$

$$= 2,401$$

Sampling technique

A survey research design involving a stratified sampling technique involving three stages was adopted. In the first stage, Delta State was purposively selected due to its diversity and prevalence of inequality presented in the National Living Standard Survey (NLSS) and the General Households Survey Data sets of (2012/2013) and (2015/2016). In the second stage, an urban centre was randomly selected in each of the 25 local government areas across the three senatorial districts of the state. In the third stage, a structured questionnaire divided into three sections: (I) Socio-demographic characteristics of respondents, (II) Measures of inequality and (III) Causes of Poverty, was administered systematically to household heads at every 10th house interval after the first house was randomly determined along major streets in each urban centre using table of random numbers.

The sample size used for this research was further increased by 5% to account for non-response or recording error.

$$n+5\% = 2,401 + 5/100$$

$$2,401 + 120$$

$$= 2,521$$

Sample size

A sample size of 2,521 was statistically determined using level of confidence approach and based on 1991 projected population (see Table 4).

Using the level of confidence approach, the sample size was computed thus:

$$\frac{Z \text{ values}^2(pxq)}{e^2}$$

Where; 1.96 = z values of 95 percent level of confidence

$$P = 100\% - q$$

$$q = 100\% - p$$

e = allowable error in the estimate

n = sample size

Sample size computation:

Table 4: Sample Size of Selected Communities

S/N	LGA	Selected Communities	1991 Population	2006 Population	Projected Population	Sample
1	Aniocha North	Issele-ukwu	60,998	104,711	130,598.21	64
2	Aniocha South	Ogwashi-ukwu	107,034	140,604	175,364.87	86
3	Burutu	Burutu	167,648	209,666	261,500.74	128
4	Bomadi	Bomadi	108,494	86,644	108,064.59	53
5	Ethiope West	Oghara	105,861	203,592	253,925.11	125
6	Ethiope East	Abraka	113,929	200,792	250,432.87	123
7	Ika North East	Owa	126,560	183,657	229,061.66	113
8	Ika South	Agbor	109,204	162,594	202,791.35	100
9	Ndokwa East	Ashaka	75,578	103,171	128,677.48	63
10	Ndokwa West	Abbi	182,827	149,325	186,241.92	91
11	Okpe	Orerokpe	268,488	130,029	162,175.46	80
12	Oshimili South	Asaba	49,725	149,603	186,588.65	92
13	Oshimili North	Ibusa	.....	115,316	143,825.03	71
14	Sapele	Sapele	142,652	171,888	214,383.06	106
15	Patani	Patani	.....	67,707	84,445.88	41
16	Ughelli North	Ughelli	166,029	321,028	411,605.29	197
17	Ughelli South	Ewu	139,748	213,576	273,835.96	131
18	Ukwani	Obiaruku	26,277	120,390	150,153.46	74
19	Udu	Aladja	54,206	143,361	183,809.97	88
20	Uvwie	Effurun	123,610.	191,472	238,808.73	118
21	Warri North	Koko	90,893	137,300	171,244.04	85
22	Warri South	Warri	235,750	303,417	378,429.36	187
23	Warri SouthWest	Ogbe-Ijoh	.....	116,681	145,527.49	72
24	Isoko North	Ozoro	111,919	144,155	179,793.77	89
25	Isoko South	Oleh	150,836	227,712	284,008.17	140
Total			2,590,491	4,098,391	5,111,617.01	2,521

Source: Authors’ Computations from the National Population Commission (NPC, 1991) and National Bureau of Statistics (NBS, 2012)

Measures of inequality

Inequality was measured using the Gini coefficient for 2004 and 2010 based on National Living Standard Survey (NLSS), General Households Survey Panel data wave 2 (2012/2013) and wave 3 (2015/2016) respectively. Poverty thresholds of \$2.00 and \$1.25 per day were used to classify households into (non-poor, transient poor and chronic poor). (GIS 10.1) was adopted to analyze the spatial distribution, while analysis of variance was used to examine the variations in the distribution of inequality and household poverty. The Likelihood of reducing inequality was determined using multinomial regression (Odd Ratio $e(\beta)$).

Results and research findings

The spatial patterns of poverty and the determinants of household poverty are discussed here.

Distribution of poor households

Figure 2 presents the distribution of poor households, while household poverty in nearby locations is similar to one another. Furthermore, chronic poverty among households in Delta State, therefore, tends to be spatially concentrated, rather than evenly spread this distribution of poor households corroborates Tobler’s (1970) assertion that everything is related to every other thing but near things are more related than distant things. At the senatorial district level, a significant proportion of the chronic poor representing (41.5%) of sampled households are from Delta South Senatorial Districts, (33.3%) in Delta Central and (22.2%) in Delta North. The chronic poor are concentrated in Delta South and Delta Central respectively, this pattern implies the presence of deprivations in access to basic amenities, inability to afford the basic needs and limited opportunities

which restricts the likelihood of reduction of poverty in the communities studied.

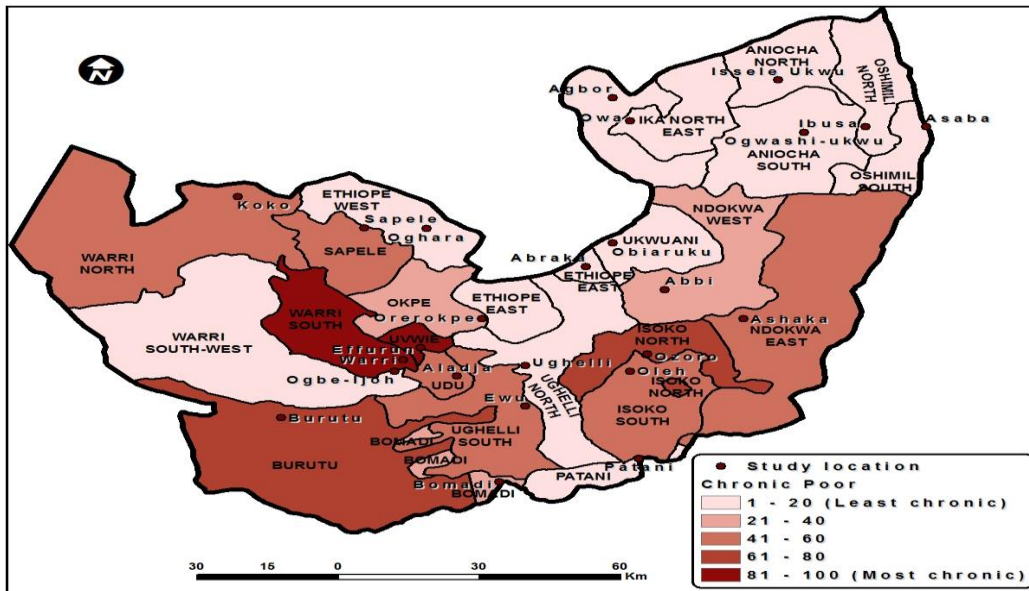


Figure 2: Spatial Pattern of Chronic Poor

Figure 3 presents an uneven distribution of transient poverty pattern across local government areas of Delta State. At the senatorial district level, the transient poor or moderately-poor constitute (21.6%) of sampled households in Delta South, followed by (12.7%) in Delta North and (11.3%) in Delta Central. The transient poor are not

homogeneously spread across Delta north, Delta central and Delta south respectively partly due to variation in household economics, income, employment, geographic access to opportunities and good roads.

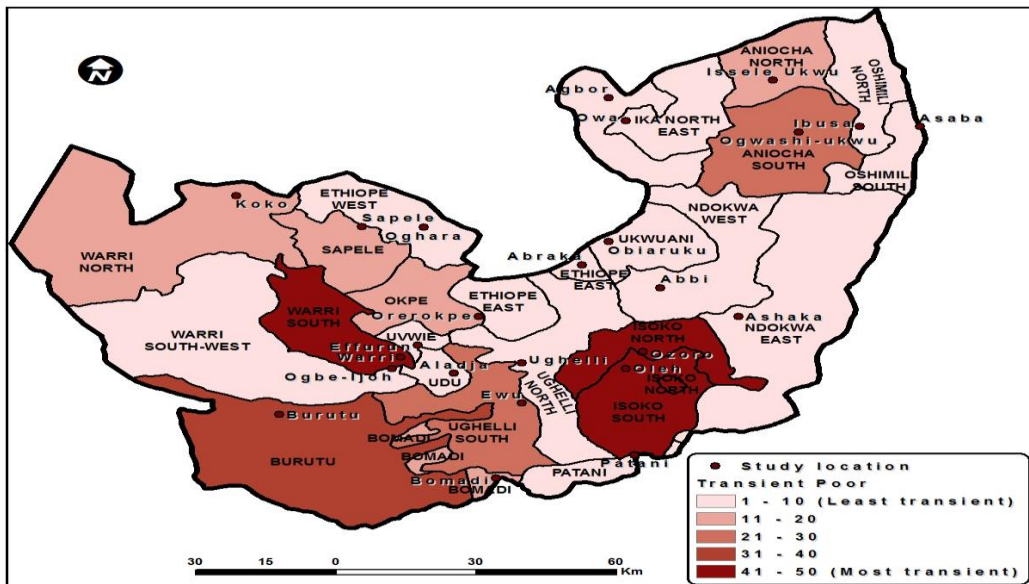


Figure 3: Spatial Pattern of Transient Poor

Determinants of household poverty and inequality levels

Table 5 showed that dynamic poverty and inequality varies over space with the spatial characteristics of the households specifically: household size and composition, accessibility, location, sanitation, water source and distance to water source. One-way analysis of variance on the following spatial factors: water source, distance to water source, improved sanitation, accessibility,

household size and location yield F values of (F=167.680), (F=24.786), (F=18.509), (F=15.973), (F=9.468) and (F=7.398) respectively which are significant at 0.001 level. The result of the one-way analysis of variance revealed that the variation in the distribution of household poverty and inequality in Delta State is significantly influenced by spatial factors.

Table 5: Spatial variation of household poverty and inequality

Variables		Sum of squares	Df	Mean square	F	Sig.
Source of Water	Between Groups	735.117	23	31.962	24.786	0.001
	Within Groups	3219.886	2497	1.290		
	Total	3955.004	2520			
Distance to Water Source	Between Groups	637.168	23	27.703	18.509	0.001
	Within Groups	3737.316	2497	1.497		
	Total	4374.484	2520			
Improved Sanitation	Between Groups	1127.343	23	49.019	15.973	0.001
	Within Groups	7662.807	2497	3.069		
	Total	8790.240	2520			
Accessibility/Good Road	Between Groups	35.822	23	1.557	9.468	0.001
	Within Groups	410.738	2497	0.164		
	Total	446.561	2520			
Household Composition	Between Groups	4.882	23	0.212	7.398	0.001
	Within Groups	71.642	2497	0.029		
	Total	76.524	2520			
Location	Between Groups	901.149	23	39.180	167.68	0.001
	Within Groups	583.453	2497	0.234		
	Total	1484.602	2520			

Source: Authors Analysis, 2020

Table 6 presents the results of the final model, in which Exp (B) is the exponentiated beta or the odds ratio. Multinomial regression was adopted to test the hypothesis that the likelihood of reducing inequality is significantly determined by socio-spatial factors: (gender, age at marriage, own tenure, ownership of asset, livelihood loss, household size, employment status, remittances, road length, health status and availability of mineral resources). The result of the odd ratio for the poor households reveals that: gender of household heads is (1.0) times more likely to influence inequality, while households' livelihoods are (1.9) times likely to influence reduction of inequality, employment status of household heads was (1.1) times more likely to influence reduction of poverty and inequality, road length, health status of household heads and availability of mineral resources were (1.6), (1.0) and (1.2) times more likely to influence

reduction of inequality. Whereas households that depend on remittance and financial assistance are about (0.7) times less likely to reduce inequality levels. In other words, they are (0.7) times more likely to remain in poverty with increased inequality.

Moreover, the strength of the relationship was also determined using (Nagelkerke's R square, Cox and Snell R square). The Nagelkerke R square values provide an indication of the amount of variation in the independent variables described as pseudo R square. The distribution reveals the R values of 0.257 and 0.299 respectively which suggest that between 25.7 percent and 29.9 percent of the variability is explained by the set of variables used in the model. Goodness of fit was also assessed through the Pearson and Deviance chi-square tests, with *p* values greater than 0.05 signifying a better fit for the model.

Table 6: Final Model of Likelihood of Reducing Inequality

	POVERTY THRESHOLD	B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
	Intercept	2.521	627.330	0.000	1	0.997			
Poor	[Sex=1]	0.033	0.136	0.059	1	0.808	1.034	0.792	1.349
	[Owner=1]	-0.031	0.157	0.038	1	0.846	0.970	0.713	1.319
	[OWNASSET=1]	-0.446	0.136	10.819	1	0.001	0.640	0.491	0.835
	[EXP#LOSS=1]	0.642	0.186	11.895	1	0.001	1.899	1.319	2.735
	[HHEMLOYED=1]	0.126	0.550	0.053	1	0.818	1.135	0.386	3.332
	[HHRECEIVE=1]	-0.321	0.138	5.446	1	0.020	0.725	0.554	0.950
	[ROAD=1]	0.482	0.150	10.274	1	0.001	1.619	1.206	2.173
	[ILLHEALTH1=1]	0.000	0.872	0.000	1	1.000	1.000	0.181	5.523
	[MINERALS=1]	0.140	0.236	0.354	1	0.552	1.150	0.725	1.825
	Intercept	14.229	1.165	149.062	1	0.000			
Non-Poor	[Sex=1]	0.077	0.135	0.329	1	0.566	1.080	0.829	1.408
	[Owner=1]	0.445	0.147	9.215	1	0.002	1.561	1.171	2.081
	[OWNASSET=1]	-0.214	0.135	2.532	1	0.112	0.807	0.620	1.051
	[EXP#LOSS=1]	1.033	0.177	34.031	1	0.000	2.809	1.986	3.975
	[HHEMLOYED=1]	1.466	0.544	7.265	1	0.007	4.330	1.492	12.571
	[HHRECEIVE=1]	-0.512	0.137	14.017	1	0.000	0.599	0.458	0.783
	[ROAD=1]	-0.301	0.155	3.797	1	0.051	0.740	0.546	1.002
	[ILLHEALTH1=1]	-1.881	0.917	4.202	1	0.040	0.152	0.025	0.921
	[MINERALS=1]	-0.135	0.237	0.327	1	0.567	0.873	0.549	1.389

Model Fitting Criteria: 2Log Likelihood; (3634.094 -2886.024), Chi-Square = 748.071, df =44, Sig.= 0.05

Chi-Square Goodness-of-Fit: Pearson (2702.180), Deviance (2333.301), df =2096, Sig. = 0.05

Pseudo R-Square (R²): Cox and Snell = (.257= 25.7%), Nagelkerke = (.299=29.9%)

Conclusion

The findings in this paper reveal that the distribution of poor households in nearby locations is similar to one another within the neighbourhoods. The distribution of poverty among households in Delta State, therefore, tends to be spatially concentrated, rather than evenly spread. At the senatorial district level, poor households are concentrated in Delta South and Delta Central respectively, this pattern implies the presence of multiple inequalities in access to basic amenities, inability to afford basic needs and limited opportunities which restricts the likelihood of reducing inequality. Poverty levels and inequality experienced is significantly influenced by the following socio-spatial determinants: gender, age at marriage, own tenure, ownership of asset, livelihood loss, household size, employment status, remittances, road length, health status and availability of mineral resources.

Moreover, being a male head of household or female head of household and availability or non-availability of mineral resources does not say a household cannot be poor, it is the ability of the household to be psychologically prepared to take

advantage and utilize opportunities at their disposal to enable them reduce the poverty and inequality levels and move out of poverty and contribute to sustainable development of the society. This paper recommends that government at all levels should invest more in livelihood development, improved income distribution at the bottom and access to opportunities and infrastructure are key to reducing inequality and enhancing sustainable development of Nigeria.

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