Spatial Variation in the Level of Awareness and Application of Climate Change Policies and Laws in Enugu State South East, Nigeria

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ABSTRACT

This study, spatial variations in the level of awareness and application of climate change laws and policies were assessed in Enugu State. Four local government areas – Enugu municipal, the seat of government; Uzo Uwani; Awgu and Nkanu East local government areas were selected for study. A total of 368 respondents were interviewed using structured questionnaire and oral interactions. The data collected were analyzed using both descriptive and inferential statistics. The results were shown using tables, graphs and charts. Data analysis using the Pearson's Correlation Coefficient showed an inverse relationship between responses and distances from the local government area (r = -0.640) indicating that awareness decreased with distance from the state Capital at Enugu (Enugu State). In Enugu municipal, 95.42% of the people were found to be aware of climate change. In the same vein, the following percentage of respondents were found to be aware of climate change events – Uzo Uwani 7.24%; Nkanu East 61%; Awgu 74.94%. Chi-square statistical method was used to test the hypothesis which states that "there is spatial variation in the level of awareness and application of climate change laws in Enugu State" and the hypothesis was accepted. With respect to the application of the laws, it was discovered that executive orders were used to meet with the climate change challenges as the National Assembly had not passed any Climate Change Act. The study concluded that there was the need to embark on a state wide citizenship education program, particularly in the rural local government areas to prepare the citizens for any events of the future

Introduction

1.1 Background of the Study

The earth is a system made up of other sub-systems (Christopherson, 2006). We have the soil – rock systems, vegetation, water, atmospheric system etc. on the human side we have the transport system, settlement system, cultural system etc. Both the physical system and the human system constitute the earth system (Norton, 2010). Several studies have shown that the earth has never been stable in all of its history, but undergoing changes (Norton, 2010). The earth's atmospheric systems also experience these changes from time to time based upon the fact that life on earth is conditioned by the state of the earth's climate system, changes in the earth's climate system brings about changes in the mode of life and living of all organisms on the earth including man.

Climate change according to IPCC refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC, n.d).

Climate change is defined in this study as the change in the state and dynamics of the earth's atmospheric system. The change is manifested in the departure of the values of the observed climatic variables from their former values (Odjugo, 2007). The variables that are most important indicators of climate change are temperature and precipitation. The entire process of climate change hinges on the increase in the mean global temperature over a period of time (Ekwezuo, 2015). This global temperature increase is called global warming which will in turn affect the pattern and velocity of the global wind system (humidity, cloud cover and wind speed) (IPCC, 2007; 2013). The change ultimately affects all the life cycles on earth which depend on the supply of moisture and heat from the sun.

Past climates change regimes which had occurred on the earth had no consequences for mankind except to the extent of shaping the earth's landscape as the current global population and civilization now sees and uses it. These earlier episode have provided us the platforms of our present existence. Mankind is now faced with the unfolding of another phase of climate change which produces variation in the earth's physical systems and largely drive and regulate the mode of human existence upon the earth. The already occurring and predicted effects of climate change demand and required responses from the global population if mankind will not be annihilated or nearly annihilated by the expected profound changes that may occur as consequences of climate change.

The earliest organized responses to observed quirky behavior of the global climate commenced in countries where the result of observations had produced the scientific communities and governments in these countries to look more closely at the atmosphere. The conflation of research results caused the convening of the first conference on global climate change was held in Berlin in 1995. The next stage of investigation consisted of steps to find out the causes and dynamics of climate change, this next step was

taken by the convening of the Inter-Governmental Panel on Climate Change (IPCC). The panel issued its first report in 2001 (IPCC, 2001) containing explanations on the scientific basis of climate change. Before 2001, the United Nations had put up the United Nations Framework Convention on Climate Change (UNFCCC), (UNFCCC, 2005). In the various advanced countries of the world, national agencies became increasingly devoted to observing the trend in the climate of nations and their regions. In the United Kingdom, the Hadley Centre for Atmospheric Research UK carries out research on climate change while the National Center for Atmospheric Research oversees climate research in the United States of America.

The result from the various national and global bodies pointed towards the industrialized countries being responsible for the emission of green house gases into the earth's atmosphere and causing global warming and ultimately climate change. Further computer – aided analysis identified carbon monoxide and chlorofluoro carbons such as trifluoromethyl sulphur pentafluoride (SF_5CF_3) (Fawehinmi, 2007). These findings implicated man via the effluent gases and gases from burning organic fuels as the main culprit causing climate change. The damaging action of man was traced to the manufacturing plants of the world's economically advanced countries that accounted for more than 85 percent of the finished goods consumed in the world (UNEP, 1992).

Statement of the Research Problem

The economically and technologically advanced countries initially denied their roles in inducing climate change by relying on the records of earlier global climate change episodes to claim that the current climate phenomenon was a natural cycle as had been advanced by Milankovich (1941). Their main grouse was that the demands upon them to reduce the Green House Gases emitted from their factories and plants translated to a reduction in quantum and varieties of the goods they manufactured and finally resolved into a surrender of their earnings, dominance and standards of living. These advanced countries needed extra persuasion based on verified and verifiable scientific data to be drawn to the discussion table as to how mankind can save the earth by not damaging the umbrella of safety that shields the earth from the destructive rays of the sun.

An examination of the Nigeria's Climate Change Bill shows that there is a program for education, information dissemination of technical information and support in respect of climate change (FG – NASS, 2001). This provision is very important because it is the capacity for adaptation to and mitigation of climate change consequences that enable populations to survive the impacts of climate change.

The legislation structure in the country envisages that other states would formulate and pass their own policies and laws on climate change. It appears that it is only Lagos State alone that has made and is applying its own laws due to the sensitivity of its environment in respect of flood hazards that occur there. It is a known fact that knowledge of a thing is a basic requirement for using or relating it to any such phenomenon (Thomas, et. al., 2015). Where knowledge exists it is relatively easy to react to certain phenomena and

the contrary is true. This is why the problem of this study is formulated around the study of the awareness of and application of climate change law and policy in Enugu State. The following questions were posed as a means of guiding the study:

i.   Are there institutions that have been assigned the dissemination of climate change information?
ii.   Are the organs of government of Enugu State and the people aware of climate change and its effect as a subject matter?
iii.   Are there officially stated responses by the government and people of Enugu State to adverse climate change effects in the state?
iv.   What percentage of the population of the people are aware of, and follow /apply any state policies to climate change related problems in various parts of Enugu?

Hypothesis

 "There is spatial variation in the level of awareness and application of climate change laws in Enugu State".

Study Area

Location and Size

Enugu State was created out of the old Anambra State in 1991. It lies between longitudes 6º 30´E and 6º 55´E; and latitudes 5º 15´N and 7º 15´N. It consists of seventeen (17) local government areas with a total of 3, 267,837 persons. The population consists of 1,596,042 males and 1,671,795 females. It has an area of 7,161 square kilometers (NPC, 2006). See figures 1.
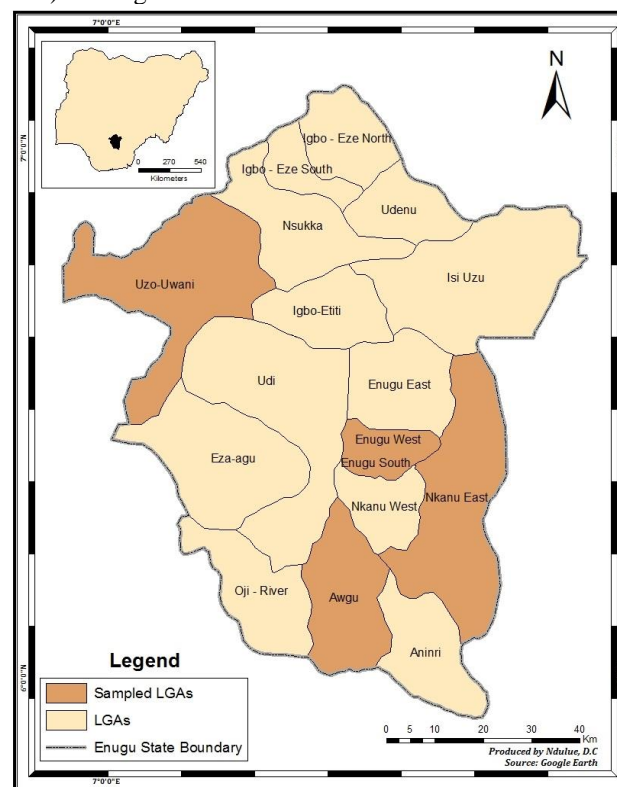

Fig 1: Enugu State Showing Sampled Areas.
Source: Cartographic Unit, Department of Geography Unn, 2018.

Climate, Relief and Geology

The climate of the state falls within Koppen's Af which is relatively wetter south in Oji River, Awgu and Aninri local government areas to the relatively drier northern parts at Uzo Uwani, Igbo Eze North, Igbo Eze South and Isi Uzo local government areas (Enugu State Ministry of Chieftaincy Affair, 2016). Mean temperature is 26ºC.

The relief of the state consists of the western plains, formed on the Imo – Clay – Shale with a mean elevation of 65 metres. This plain is drained by the Do, Obima and Ishe rivers. Eastwards from the western plain, the topography rises on a steadily increasing gradient to a central cuesta and attains a mean elevation above mean sea level of 482 metres. See plate 1.

Plate 1: Showing the Eastwards Side of the Cuesta
Source: Authors Fieldwork, (2018)

This central elevation is formed from an uplift of a section of the land west of a series of fault line created by the Maastrichtian – Santonian Orogenic Cycle. The uplift occurred by the plutonic intrusion of magma into the sub layers of marine sediments from the Mt. Cameroon magma reservoir (Murat, 1970; Ugwueze, 2000). The uplifted materials vary from soft sandstone layers in the northern section from Enugu Ezike to Ekwegbe in the northern half while in the southern portion it consists of large massive fractured sandstone blocks (Aneke, 2007). In the section south of Enugu Ngwo between Udi and Akpugo, the block is tilted backward at angle 3º - 5º of the horizontal plane. The scarp face is more defined in this section. See plate 2.

Plate 2: Showing the Scarp Face of the Cuesta
Source: Authors Fieldwork, (2018)

This central block is widest in Nsukka Local Government Area where it measure 50 kilometres and narrowest in the section covering Oji River and Awgu Local Government Areas (37 kilometres). The stratigraphic succession of the cuesta consists as follows: the Imo Clay shale (Mamu Formation, Enugu – Awgu Shale) beneath overlaid immediately above by the false – bedded sandstones (Ajalli Formation) and Enugu. Awgu sandstone which is blocky, massive and fractured on which rests the Upper Coal Measures – a layer of laterite with indurations which form domey round topped and flat topped residuals. In the Nsukka section the residuals are separated by a network of dry valleys with mean width of 1.10 kilometre. In the southern section the elevations are separated by narrow stream valleys occupied by perennial head streams of the Oji – Mamu river systems (Ofomata, 1975; 1978; Ebisemiju, 1977). This central elevation is the most settled in the state. East of the central elevation and the scarp face, the relief consists of a section of the Cross River plains serrated by vary many east to southeast flowing streams which take their source from the foot of the scarp (Ofomata, 2001).

Soils and Vegetation

The soils on the elevation are ferralitic soils rich in iron derived from the laterization processes on the sandstone substrate. The sandstone are coarse to medium coarse and are porous allowing precipitation on the cuesta top to infiltrate downwards to the sandstone – shale interface and for the infiltrating water to issue as contact springs (scarp foot springs). The soils on the plains vary from gravelly sandy loam on the talus slope immediately beneath the scarp face to sandy clay and sand clay loams on the toe slope of the plains proper (Njoku, 2013; Ndulue, Ayadiuno and Mozie, 2020).

The vegetation of the state is densest in the south and on the plains particularly along stream courses and lowlands and

consists of grasses on the hill slopes. The plants consists of woody plants such as the Iroko (*Milicia exelsis*), and anthropic plants such as Mangoes, Guava etc. Cultivated plots are mainly of the *Manihot spp* (Cassava), Coco yams, vegetables etc, especially in the rainy/farming season (Uzozie, 1975; Ndulue, Ayadiuno and Mozie, 2020). Grass species consists of the *hyparrhemia spp*., Elephant grass, Spear grass (*Pennistum spp*) etc.

Population and Economic Activities

The population distribution in the state is presented on a local government area basis from data obtained from the National Population Commission database (NPC, 2006 – 2011 accessed on 21 March 2018). The population distribution is contained in Table 1 below:

Table 1: Population Distribution in Enugu State.

LGAs	Population	Area	Pop. Density
Aninri	136,221	364km²	505.2/km²
Awgu	**197,292**	**330km²**	**597.1/km²**
Enugu West	**277,119**	**383km²**	**976.8/km²**
Enugu North	242,140	106km²	3,084/km²
Enugu South	**198,032**	**67km²**	**3,990/km²**
Ezeagu	170,603	633km²	363.8/km²
Igbo-Etiti	208,333	352km²	865.2/km²
Igbo-Eze North	258,829	293km²	1,192/km²
Igbo-Eze South	147,364	158km²	1,259/km²
Isi-Uzo	148,597	877km²	228.7/km²
Nkanu East	**153,591**	**795km**	**260.8/km²**
Nkanu West	147,385	225km²	884.0/km²
Nsukka	309,448	1,810 km²	863.0/km²
Oji-River	128,741	403km²	431.3/km²
Udenu	178,687	248km²	972.6/km²
Udi	238,305	897km²	358.6/km²
Uzo-Uwani	**127,150**	**855km²**	**200.1/km²**

Source: NPC (2006 - 2011) and Authors computation (2018).

Please Note: Highlighted Local Governments Areas are Sampled Areas

Materials And Methods

Research Design

The aim and objectives of the study directly influences the methodological pathways to achieving both aim and objectives. The general rule is that the research method must enable the fulfillment of the aim via the achievement of the objectives and the acceptance or rejection of the hypothesis of the study.

Type and Sources of Data

The data used in this study include primary and secondary data. Primary data used was obtained from direct field observation, measurements, photographs and oral interviews. While the secondary data that was used include maps, Library data, online data, published and unpublished articles and textbooks.

Sampling Technique

It is not possible for the qualified respondents in every part of Enugu State to be examined. As such, certain representative, local government areas were chosen for the study out of the seventeen (17) local government areas in the state. The basis of the selection was the political division of Enugu State into senatorial zones. Three of these zones exist in the state namely the Nsukka (Enugu North), Enugu East (Nkanu - Awgu) and Enugu West (Udi – Oji River) Senatorial districts. From each of these zones, one local government area was selected on the basis of the occurrence of climate change disasters from 2000 to 2018. In this respect, Uzo Uwani (Enugu North), Nkanu East (Enugu East) and Awgu Local Government Area (Enugu West) were selected. Enugu West and Enugu South that made up the municipality were also selected for sampling. Each of these local government areas has experienced climate change disaster within the period of the study. For example Uzo Uwani and Nkanu East experienced floods in 2012 while Awgu had experienced rainfall induced landslide in 2008 and 2010 also within the period. Enugu urban, the capital zone was also sampled as the central areas of the study were the political, administrative and economic control mechanism of the state resides.

Selection of the Respondents

The issue of climate change is now a common matter but it appears to be so only to selected groups. The study was design to elicit information from two sides, viz: the state government officials at the state level in certain ministries that were selected such as Ministry of Agriculture, Works, Urban and Regional Planning, Health and Education. The inclusion of the state Ministry of Health was to see if there is a policy of citizenship education as a measure to containing climate change as it is done in the developed countries (Wikipedia, 2017). Thus, respondents were identified as follows: In the selected ministry – the permanent secretary and two other directors, one section head whose schedule of duty is relevant to the subject of study making a total of five (5) top officers in each ministry giving a total of twenty-one (21) state officials at state level. At the local government level the same pattern was repeated with the Head of Personnel, six (6) supervising counselors in three (3) local government areas making a total of eighteen (18) officers.

In each of three (3) local government areas, three (3) communities that had suffered climate change disaster were identified making a total of nine (9) communities, Enugu the capital city was purposively chosen as a tenth location for sampling. From each of the communities, fifteen (15) respondents were chosen making forty-five (45) respondents

per local government area and a total of one hundred and thirty-five (135) respondents. In Enugu, respondents were randomly chosen to span the age range from twenty-five (25) years to sixty (60) years and covering the literate (50%), semi-literate (30%) and illiterate (20%) on an equal 50 – 50 bases between the sexes. A total of eighty (80) respondents were randomly interviewed with the act of recorders in randomly allotted points inside Enugu. A total of three hundred and eight (368) respondents were examined in all.

Method of Data Collection

The copies of the questionnaire were applied on a face – to – face basis in a six month period from July to December 2017. The physical contact eliminated loss of copies of the questionnaire and greater and deeper probes of the respondents outside the questions on the questionnaire. The local language (*Igbo*), Queen's English and the *pigeon* English were used in the exercise for effective interaction.

The Questionnaire Survey

One hundred and thirty five (135) copies of structured questionnaire were constructed as the tool of data collection since the study is based on field work, questionnaire survey and direct field observation in the study areas. The questionnaire scored 78% on Cronbach's Alpha Index added to the dry test run of its contents before it was approved for application to the respondents. The outcome of the dry test ran were satisfactory and so the later copies of the questionnaire were reproduced for use during the field work.

Data Analysis Results And Discussions

The data collected were analyzed using both descriptive and inferential statistics, translated to frequencies and percentages and the results as analyzed were shown using tables, graphs and charts. Inferences were made from the responses, for example the level of awareness of climate change in urban settings and rural settings were compared using Pearson's Correlation Coefficient statistics (Anyadike, 2009). The Chi-square statistical method was used for testing of the hypothesis.

Level of Awareness of Climate Change Policies in Enugu State

In this section, the level of awareness by the solicited respondents is reported. It has been stated in the earlier part of this study that knowledge is a basic tool for meeting and overcoming climate change associated problems in any part of the world (Muttarack and Pathisiri, 2013). While the government and people in the advanced nations have taken time and expended resources, there is yet no certain data on how far the people and government of Nigeria have gone in this direction. Most of them became aware of what climate change could bring from the news media and the social media. The source of information showed that the availability of smart phones as a means of information is not in doubt amongst the above average salary earners. The use of smart phones was followed by radio – read news bulletins

and to some extent newspapers. The urban poor were still largely unaware of what climate change means or being aware of the laws neither did they know about how relevant information can help them. Thus we found a situation that suggested a high tendency of timely and appropriate response in favour of the rich vis-à-vis the poor. The levels of awareness obtained in the various parts of Enugu State are shown in Tables 2 below:

Tables 2a: Number of Respondents interviewed

Sampled Area	Number of Respondents interviewed				Total	Mean
	Head of Personnel	Supervisory Counselor	Farmers and Artisans	Others (FGD)		
Enugu Municipal	1	6	10	70	87	21.75
Nkanu East	1	6	60	30	97	24.25
Awgu	1	5	57	34	97	24.25
Uzo Uwani	1	6	10	70	87	21.75
Total	**4**	**23**	**137**	**204**	**368**	**92**
Mean	**1**	**5.75**	**34.25**	**51**	**92**	**23**

Source: Authors Computation (2018)

Table 2c: Respondents Level of Awareness (%)

Sampled Area	Respondents Level of Awareness (%)				Level of Awareness (%)
	Head of Personnel	Supervisory Counselor	Farmers and Artisans	Others (FGD)	
Enugu Municipal	100	100	95	100	95.42
Nkanu East	100	66	20	18.5	61
Awgu	100	100	33	15	74.94
Uzo Uwani	100	23	9.45	6.5	7.24

Source: Authors Computation (2018)

Tables 2b: Awareness Level of Climate Change Policies in Enugu State

S/No	Official Respondent	Frequency	Level of Awareness (%)
Zone 1 Enugu Municipal			
1	Head of Personnel	1	100
2	Supervisory Counselor	6	100
3	Selected Respondents (FGD)	55	95
4	Farmers and Artisans	25	100
Total Number of Respondents		87	
Zone 2 Nkanu East (Amurri)			
1	Head of Personnel	1	100
2	Supervisory Counselor	6	66
3	Selected Respondents (FGD)	60	20
4	Farmers and Artisans	30	18.5

Total Number of Respondents	97	
Zone 3 Awgu LGA (Awgu)		
1	Head of Personnel	1	100
2	Supervisory Counselor	5	100
3	Selected Respondents (FGD)	57	33
4	Farmers and Artisans	34	15
Total Number of Respondents	97	
Zone 4 Uzo Uwani (Adani)		
1	Head of Personnel	1	100
2	Supervisory Counselor	6	23
3	Selected Respondents (FGD)	55	9.45
4	Farmers and Artisans	25	6.5
Total Number of Respondents	87	

Source: Authors Fieldwork and Computation, (2018)

Fig 3: Graphical Representation of Respondents in Enugu South
Source: Authors computation (2018)

Fig 4: Graphical Representation of Respondents in Nkanu East
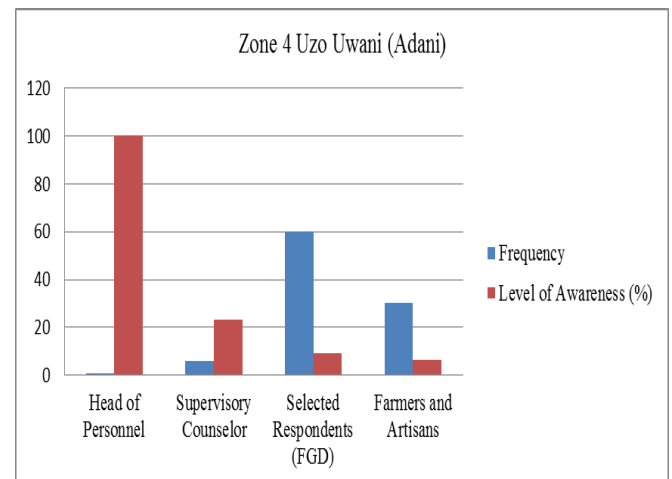Source: Authors computation (2018)

Fig 5: Graphical Representation of Respondents in Awgu LGA
Source: Authors computation (2018)

Fig 6: Graphical Representation of Respondents in Uzo Uwani
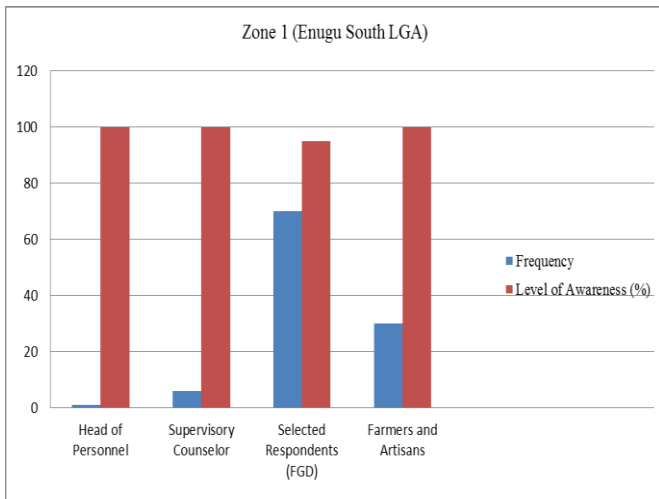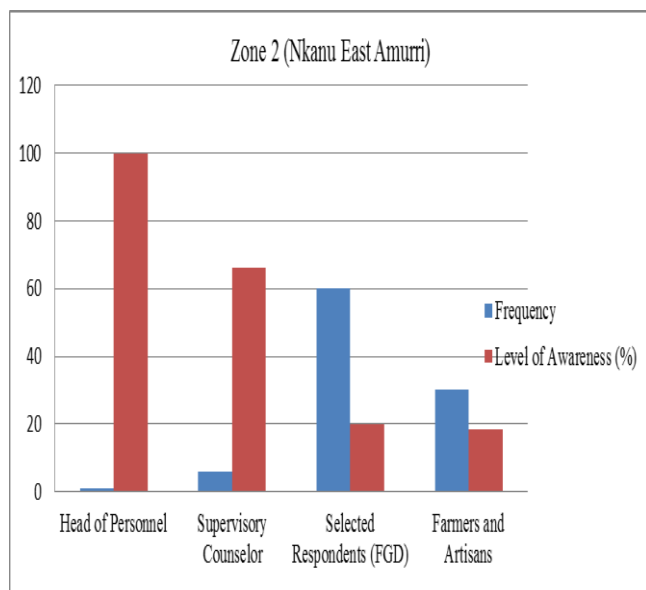Source: Authors computation (2018)

With respect to the tables 2 above, the top personnel management officials in Enugu South said that they were fully aware of what climate change was all about by virtue of their social and educational status. They had access to information from the internet (social media), radio, television etc. the six (6) supervisory councilors who also were graduates of Universities and Polytechnics said they were fully aware of climate change and its effects. They made specific reference to the 2012 floods in Nigeria. 95 percent of the respondents that were randomly interviewed in the area were aware of the subject – matter of climate change. Once again there appeared to be a relationship between the awareness level, education and the type of work the respondents were doing. The office workers and teachers were aware, while the artisans and such other workers were not aware of climate change.

Within Enugu the persons engaged in various farming activities such as poultry rearing had more awareness of the 75% scored by that group. Enugu scored a mean of 88% with respect to other zones, Nkanu East scored 61%, Awgu Scored 74.94% and Uzo Uwani scored 37.24%. The spatial pattern of awareness was discerned as follows: The

awareness of the respondents to climate change was seen as follows: In Enugu South (Enugu) zone, a high percentage of awareness was recorded (95.42%). This very high score is explained by the environment of work and habitation of the respondents. 99 percent of the respondents were graduates of higher institutions. Only one respondent had an Ordinary National Diploma (OND) from the Uwana Polytechnic Afikpo in Ebonyi State. The respondents said that they read newspapers or such information from their hand – held global system for mobile (GSM) phones. They also receive information from their television sets. Above all these respondents were receiving salaries that could enable them to indulge in information collection and evaluation in respect of climate change and other political events in their surroundings.

In Nkanu East Local Government Area at Agbani, the level of respondents obtained was 61%. The top official was sound. He lived in Enugu and come to work from there. The other officials who are indigenes of the local government area were not so familiar with subject – matter of climate change. The respondents who were fully aware of the topic were all graduates of one University or the other and had access to information from their phones, radio, newspaper or television sets etc. They agreed that climate change was a global problem and also recognized the effects of the recent floods in the area from Agbani towards the low lying area of Amurri, Nkerefi, Akpochi etc on the plains of the Idodo River. They also commented on the losses of rice crops by the farmers in the study area.

In Awgu Local Government Area, a mean level of 49.74% was observed. Awgu town and the surrounding communities are predominantly rural. Hence, majority of the top officials live in Enugu the capital city. They come to work on selected days in Awgu. They are reached by phones if and when there are scheduled activities. They showed a lower awareness to climate change even though events around them such as landslide and increased leakages of water from the rocks should prompt them. A mean awareness level of 49.47% was recorded. The pattern observed is that of greater level of awareness at the very top end less than usual at the lower levels. Within the ordinary people awareness was 15.30% down from 100% at the top where the officials were fully educated and had access to information. The observed difference between the responses by the top officials and the lower rung respondents is explained by education and the social status of the respondents.

The lower result from Awgu with respect to its distance from Enugu the capital city is that it has no influencing institution unlike Nkanu East that has the Enugu State University of Science and technology at Agbani and the Renaissance University also in Agbani. The influence of the two Universities and other institutions can be seen as causing the difference in the levels of awareness observed in the two areas. The influence of the higher institutions translate to greater educational opportunities and greater level of modernity on the area as against Awgu Local Government Area which has a pre-dominantly rural and less educated population. The counselor for Mmaku community estimated that they had 85% rural population in his ward and that it could be more.

In Uzo Uwani Local Government Area, the mean level of awareness of the people to climate change and its effects dropped to 27.24%. See figure 7.
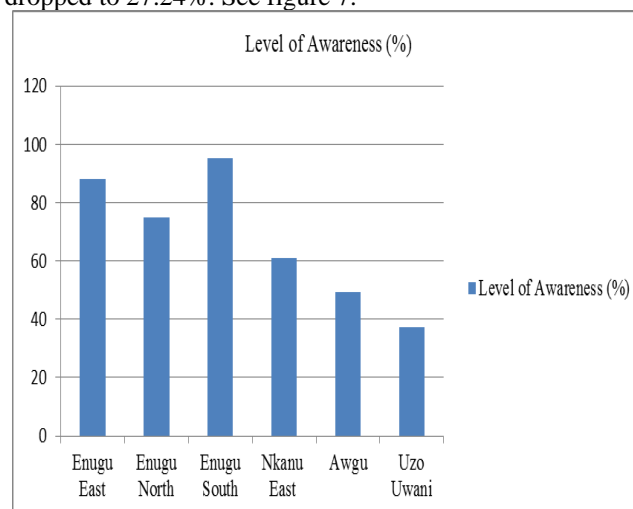

Fig 7: Graphical Representation of Level of Awareness to Climate Change
Source: Authors Computation (2018)

Uzo Uwani Local Government Area remotely removed from Enugu and Uzo Uwani. Its headquarters is in Umulokpa which is accessible from the 9th mile corner on a modern road. A respondent from Adaba the next community to Umulokpa who is a retired staff of the Enugu State Ministry of Finance said that the people were very largely farmers. It was on one of the Mondays in 2017 August that the respondents were interviewed. No top official or even the middle level officers were in the place. The mass of the people live with their families in their communities where they engage in full time farming and trading. The student's visit to Adani the other sizeable community in Uzo Uwani showed that attention was on rice cultivation by the people. The respondents talked of the floods called 'iji' but had no idea of the cause of the floods *'iji'*. They appear to have started adjusting to the new normal by cultivating their food crops slightly earlier and after the floods they do a follow – up cultivation of rice which they keep in their nurseries.

The spatial pattern of awareness to the phenomenon of climate change observed is that the highest level of awareness was observed in Enugu South in the capital city of Enugu, Enugu State Nigeria. The relationship is that, the farther away the local government area of observation from the capital city, the less level of awareness. A correlation coefficient of distance – decay junction model was calculated using the Pearson's Coefficient of Correlation (Anyadike, 2009) to obtain a coefficient of – 0.640, which is a negative correlation.

In the light of the visible influence of educational levels as a major factor of the awareness, it was reasoned that level of education connotes reasonable employment, reasonable payments, and access to information and high levels of awareness of the educated respondents to climate change information. The role of education in disaster preparedness was carried out in a seminal paper by Muttarack and Pathisiri, (2013). Their findings was that the more educated a people about climate change hazards the better prepared they were to meet with the emergencies of the situation and the lower the effect of such emergencies on the educated

population. Awareness comes from the reception of information (Muttarack and Pathisiri, 2013). Information was change or modification of attitude and response to an existing or anticipated event. The better a person is educated, the more aware he or his group is. It has been established that awareness or education is important in the building of resilience and reduction of vulnerability of persons and groups in their response to climate change (Frankenberg, et. al., 2013). The implication of the inter – group and intra – group disparity in the awareness of the respondents observed in this study will be discussed in the summary of this research as it holds a grave implication for the survival of the masses in Enugu State from climate change hazards. This findings directly suggests that the people in general and the people in the rural area are in particular should be put under a region of tutelage about environment hazards before it is too late.

Test of Hypothesis

 "There is spatial variation in the level of awareness and application of climate change laws in Enugu State".
Apart from mere description of the data collected, some useful explanations, inferences and deductions were done by subjecting the stated hypothesis at 5% level of significance to Chi-Square Statistical analysis and the result is presented in table 3 below.

Tables 3: Chi-Square Tests

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1104.000[a]	21	.000
Likelihood Ratio	1019.225	21	.000
Linear-by-Linear Association	.021	1	.883
N of Valid Cases	368		

a. 8 cells (25.0%) have expected count less than 5. The minimum expected count is .95.

Source: Authors Computation in SPSS Version 25 (2018)

The result presented in Table 3 revealed the level of awareness and application of climate change laws in Enugu state. It was found that the Pearson Chi-Square Value = 1104.000, df = (21) and the Chi-Square test is significant with P-Value at .000. Since P-value is less than 0.05 level of significant, therefore the hypothesis is accepted which states that *"there is spatial variation in the level of awareness and application of climate change laws in Enugu State".*

Existence and Application of Climate Change Laws in Enugu State

The study also captured the issue of the existence of extant laws is considered and followed up with the provision of the answer as to whether in the face of the unfolding climate change any new pieces of legislation have been passed to help the government and the people of Enugu State to meet with the exigencies of climate change in the state.
At the least level the student investigated into the attitude of the government of Enugu State and her population whether there are measures put in place to ameliorate the harshness

of climate change. In such state as Lagos State, the effects of climate change as in the widespread annual floods had brought down the reality of climate change to the people and government of Lagos State, and steps have been put in place to contain the problems stunting from the laws made on tree planting, clearance of waste, construction of drainage ways for free flow of floods etc.
This inquiry is carried out from three perspectives namely the perspectives of some of the members of the government in Enugu State who are placed in positions of trust and authority as makers of the laws in the State House of Assembly, as leaders of the judiciary in the State Justice Ministry, officials of government agencies who are expected to apply any existing or new laws that affect the environment.
Key Informant Interviews were used in this exercise and the results are presented:
The student was able to interview the following persons – some Commissioners in the government of Enugu State, members of the State House of Assembly and some of the knowledgeable persons (directors) in the ministries of Urban Planning, Agriculture, Health and Works in Enugu State.

The Extant Laws of the Environment

 The fundamental law that underlies all the other environmental laws is section 20 of the 1999 Constitution of the federal Republic of Nigeria as amended. The section provides as follows:
"That State shall protect and improve the environment and safeguard the water, air and land, forest and wild life in Nigeria". There is also guarantees in the constitution for the security and welfare of the people of Nigeria as the primary purpose of government at section 14(b), a dynamic economy for the prosperity of the people at section 1b of the constitution and other Acts and Laws of the states of the country which deal with the general and specific aspects of the protection and enhancement of the lives of the people in Nigeria.
It is observed that scholars and authorities have stated that climate change and its effects come largely from the activities of man (IPCC, 2007). This claim is to be interpreted as meaning that the wrong use and management of the natural resources that are available to man is largely responsible for climate change and its consequences. This assertion expands the scope of events that occur and affect the people when climate related hazards occur. Since climate change has its roof in atmospheric pollution and the alteration of the relation quantity of the gases that constitute the atmosphere in favour of the Green House Gases (GHGs) the Petroleum Act (1969) is first considered.

Environmental Impact Assessment Act (1992)

According to Mozie (2009) and Uchegbu (2002a), this Act is nation – wide and is Nigeria's response to the outcomes of the United Nations Conference on Environment and Development also called the Bruntland Report (1986). The Act called E. I. A. Act provides for a pre – development evaluation of every intended project as to its impact on the environment including the people, the atmosphere, water, air, land and vegetation (Uchegbu, 2002a). The E I A Act

provides that all the activities on the environment conform to policies that safeguard the people and their environment under the doctrine of "*control*" such that land use types in any part of the environment results from an interaction of the needs of the people and the environmental standards contained in the relevant Act or policies (Mozie, 2010). The Petroleum Act is now almost replaced by the Petroleum Industries Governance Bill which is yet to be signed into law by the Senate and the House of Representatives (UN - NASS).

Urban and Regional Planning Act (1988)

This Act regulates town planning practice in Nigeria. The essence of urban and regional planning is to assure that the physical structures on the landscape are situated in the proper places relative to other existing structures and other structures planned for in future (Uchegbu, 2002b).

Land Use Act (1978)

The land use Act was promulgated in 1978. It nationalizes all lands and places then under the control of the governors of states in the states and under the control of Local Government Chairmen in the local government. This Act places land in the public domain and gives the government the right to allocate land to any beneficial use and to revoke the grant of any piece of land all in the public interest. It complements the EIA Act and the Urban and Regional Planning Act because it provides for the government of a state being aware of and approving any intended use of the land in any place through the grant of Certificate of Occupancy. There are the Statutory Certificate of Occupancy which lasts for 99 years and is renewable in the urban areas and the Customary Right of Occupancy in the rural areas issuable by the local government chairmen. Information on the Land Use Act was supplied by Town Planner Ugwu of the Nsukka LGA, Urban and Regional Planning Office (Ugwu, 2017).

National Oil Spill and Drilling Regulatory Agency (NOSRA) 2004

Because oil spills are popular in the Niger Delta and oil reserve has been identified in parts of Enugu State, this Act was itemized by the Enugu State Ministry of Environment under the headship of Chief Fidel Ayogu, the Honourable Commissioner for Environment. The Act which may later be found to be accommodated in the Petroleum Industries Governance Bill (PIGB) creates a special regulatory agency to take charge of all oil field practices by oil companies in Nigeria. It is meant to protect the environment by up-grading the oil field practices in Nigeria to the international standards of safety.

National Emergency Management Agency (NEMA) Act (2000)

This Act created the agency as the sole emergency management agency of the Federal Government of Nigeria. The agency has acquired personnel, equipment and expertise from within and outside Nigeria. It has the capacity to use modern technology to cause would be population to adjust out of danger and to also provide post – disaster recovery support (NEMA, 2017). The agency is linked to the global network of satellites for environmental disaster monitoring, search and rescue operations through the National aerospace Research Development agency (NARSDA) at Abuja. Upon the creation of NEMA Enugu State and other states in the Federation also enacted laws that gave birth to the State Emergency Management Agency – the Enugu State Emergency Management Agency (ENSEMA).

National Environmental Standards and Regulations Enforcement Agency (NESREA) Act (2007)

This Act created NESREA to control the inflow of hazardous goods into the country. The hazardous goods are mainly chemicals and electronics. The chemical wastes could upon wrong storage or handling generate other harmful substances such as dangerous gases that could be fatal to persons. The latest case reported by Nkwopara (2016) is that of harmful waste material from which harmful gas was evolved and killed seven (7) persons in Nnewi Anambra State. Such cases have been reported in Lagos from sewage and solid waste dump sites. There also has been the case of soot from the petroleum processing plant that affected Port Harcourt in July 2018 (Nkwopara, 2016).

National Climate Change Commission Bill (2009)

This Act is Nigeria's effort to join and comply with the protocols, conventions and agreements of the global climate change order of domesticating climate change legislation to suit the local environment, economics and politics following Nigeria's subscription to the various global climate change agreements. The Bill remains in the legislative houses without being passed as some controversies attended it.

Application of Climate Change Laws and Policies

In Enugu State there is no policy on tree planting as a response to climate change as against what obtains in Lagos. Discussions with some Key Informants in the ministries of Environment, Lands and Urban Development, Water Resources and Agriculture led this student to make a finding that the current effects of climate change do not manifest on a large scale in Enugu State and may account for relatively mute approach and response to climate change challenges in the state.

With respect to the responses from the members of some of the seven (7) legislators reached in the course of this research, five (5) out of the legislators showed good familiarity with the issue. The members representing Nkanu East, Aninri and Uzo Uwani clearly remembered the difficulties that their people encountered during the 2012 rainy season floods but said that the reaction of the state government was through the ENSEMA and the executive orders of the State governor.

The response stimulated from the information from the affected population through the family heads to the chiefs and the councilors. The councilors went on to reach the chairmen of the local government councils who confirmed the disaster information often by speaking to the traditional

leaders of the affected communities. Modern telephony and picture technology makes it possible for the relevant information to be captured by camera phones and transmitted to relevant persons and authorities.

The local government chairmen with the councilors then reach out to the commissioners and stakeholders in the affected local government areas and then approach the leaders of the executive and legislative arms of the state government. The Governor of the state upon receipt of the documented evidence reaches out to the relevant departments of the Federal Government which respond as they deem it appropriate by mobilizing personnel, equipment and even funds as they did after the nation – wide 2012 floods, when funds were distributed to the states to help them cope with the burden of post – disaster resettlement of their citizens.

Pre and post disaster responses

If examples are to be drawn from the advanced countries of the world such as the United states of America, there are specific laws and policies that cause the government and her agencies to issue pre – disaster warnings, followed by evacuation of the would – be victims to safer places and finally the embarkation upon post – disaster rehabilitation and other measures to rehabilitate the affected citizens.

Conclusion And Recommendation

This study presents ample facts that Nigeria has not "*left the ground*" in terms of containing climate change adaptation and mitigation by not having passed its Climate Change Commission Act since 2003. There is a line of thought that the passages of the law which may have a negative impact on the Petroleum Industries Governance Bill (PIGB) will affect the revenue generation power of the country and *ipso facto* the economic development of the country. Enugu State is part of Nigeria. The only laws in Enugu are the Enugu State Waste Management Authority Law and the Enugu State Emergency Management Agency Law all of which are operated via direct or indirect executive orders from the State Governor. The inverse relationship between the levels of awareness of climate change laws and the applications of the laws points to the potentially higher risks to which the rural dwellers and the poor people in the state are exposed. This political and ecological variation calls for a remedy by way of state – wide citizenship hazard response education. The inability of the local people to predict and prepare for emergencies such as the land slide in Ugwueme calls for a revision and reading of points by the government to addressing the creation of hazard monitoring and prediction units in the State Ministry of Environment. On the sum, the current state of awareness of climate change and the dangers associated with it must be of great concern because the environment system is dynamic and can change its state slowly as not to be noticed until the danger comes on very quickly as to force a disaster upon the people at short notice. Whichever way a new state – wide hazard reduction plan, it must start especially by teaching the pupils in the primary and secondary schools up to the universities. The reaction of the people in the city of Abuja to the earth tremor provides a good ground for this program to start now (Premium Times, 2018).

The paper therefore recommends that Enugu state under the present executive leadership and political structure should recognize and apply any existing climate change laws by way of domesticating any law made by the National Assembly into the body of laws in Enugu State through the State House of Assembly. As events stand at the national level, there is yet no platform on which Enugu State can make any direct climate change laws but to rely on the pre – existing pieces of legislation made by the National assembly already in force.

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