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PUBLIC PERCEPTION OF CLIMATIC RISKS AND USE OF LEGISLATIVE MEASURES IN MITIGATING CLIMATIC VARIATION IN RIVERS STATE, NIGERIA

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ABSTRACT

This study examined public perception of climatic risks and the use of legislative measures to mitigate climatic variation in Rivers State. The research assessed the knowledge and perceptions of climatic risks with detailed community policy and decisions towards climate change mitigation. A total of one hundred structured questionnaires used for this study were administered to at least four respondents in each local government in the State. Data collected were analysed using descriptive statistics. The results of socio-demographic characteristics showed that 50% of the respondents were male while 39% where females. In the findings, 40.1% of respondents were between 48-57 years, 27.3% were 38-47 years, 21.6% were 28-37 years old, respondents were mostly matured people in terms of age and education, 89.2% had tertiary education and 5.4% were secondary school leavers. Field observation revealed that 100% of the respondents had knowledge of climate change phenomenon and most of them (35.1%) sourced their information from television, but 94.6 % believed in the phenomenon while 5.4% do not believe. The study also shows that 94.6% agreed on global climate change risks, while only 86.5% agreed of the risks in Rivers State. The field study discovered that climate change risks manifested itself through flood, erosion, low agriculture, global warming and health related issues in the State. Observation showed that Federal government (91.9%) is responsible for taking appropriate actions to curb the drivers of the climate change than the State by imposing strict penalties on climate change defaulters. It also revealed that the ordinary citizens at Local Government level would be effective in the mitigation strategy through sensitization campaign. The study recommended government to get into grave action with defaulters of environmental laws in the State while engaging in rugged sensitization campaign to enlightened public on climatic risks.

Keywords: Climatic risk, Legislative, Federal, Government, State

INTRODUCTION

Public opinion in matters of climate change is crucial as perceptions of its causes, consequence and risks vary. Again, policy legitimacy also differs at all stages of policy making processes. Issues such as interest, politics and institutional factors somehow imbibe some legitimate political responses to the phenomenon. Climate change if not well address, will affect most physical and economic systems of the society. Adaptation and mitigation are two prominent means of responding to the threats. Adaptation which is adjusting in relation to change in climate condition will reduce the potential adverse effect of climate change. The aim is to reduce the associated risk through adequate measures. It may be a short term means of planning for tangible long term strategy. Mitigation focuses on reducing the sources and augments the sinks.

This is taking appropriate actions to curb the drivers of the change. Changes in physical, biological and human systems in relation to climate drivers have stronger evidence. Evaluation of evidence on observed changes related to climate change is made difficult because the observed responses of systems and sectors are influenced by many other factors (Capstick *et al*., 2015). Non climatic drivers can influence systems and sectors directly or indirectly through their effects on climate variables such as reflected solar radiation and evaporation. Socioeconomic processes, including land use change (e.g., agriculture to urban area), land cover modification (e.g, ecosystem degradation), technological change, pollution, and

invasive species constitute some of the important climatic drivers (Akpan and Gobo 2011). The accumulated evidence some years back indicated that those effects are linked to the anthropogenic component of global warming.

There are abundant evidence on the observed changes in sea-level, losses of coastal wetlands and mangroves with increasing damage from coastal flooding in many areas. The changes in climate is affecting natural and human, there is warming of surface water that affects coral reefs leading to mass bleaching, coral mortality and loss of fisheries (Gobo *et al*., 2006). Issues of climate change in Niger Delta have been manifested in various sectors. The perils of environmental degradation by human activities in the coastal zone have been written expressively by many researchers both inside and outside the country. Evaluating from the Nigerian Environmental Survey Team (NEST) sectors for climate change analysis in Nigeria, some high sensitive area have already manifested evidence of climate change vulnerability (IPCC 2007). The low lying wetland ecosystem is experiencing the associated disaster such as flooding of the low level coastline environment. Some activities of common multinational oil industries in the area with their outdated operation techniques have worsen the problem by emission of greenhouse gases like methane, carbon, dioxide, nitrous oxide among others. These GHGs from oil exploration and exploitation influence land use changes and possible increase atmospheric temperature leading to earth warming (Konya *el al*., 2005; Akpan and Gobo 2011). This also constitute to removal of forest cover in the region. The consequences are sea level rise, deforestation, loss of biological resources, erosion, salt water intrusion, irregular rainfall pattern and humidity, smothering of crops, food insecurity, thunderstorm, extreme weather conditions, etc. (Akpan and Gobo 2011; Capstick *et al*., 2015).

The phenomenon has increased rate of pest and diseases epidemic, hindered livestock production and reproduction, as well as storage of some food stuffs like tubers, fruits, and vegetables. Others are decimating of forest density and floristic richness with rapid disappearance of most popular indigenous species. In addition, poor nutrient cycling may influence crops and trees development. A global assessment shows that anthropogenic warming has discernible influence on many physical and biological systems (Capstick *et al*., 2015). Despite that human activity such as technology, food, ~~and~~ transportation and population growth are key drivers of anthropogenic climate change (Akpan and Gobo 2011), there is still not much legal action on the defaulters. This study is the first to quantitatively attempt to assess the knowledge and perceptions of climatic risks in the State. The based scientific data on public perception of climatic risks will provide strategy direction for government, to make detailed community policy and decisions towards climate change mitigation and also address the place of legislative measures in mitigating climatic variation in Rivers State.

MATERIALS AND METHODS

Study Area

The study was conducted in Rivers State. The State is bounded on the South by the Atlantic Ocean, North by Imo, Abia and Anambra States, to the East by Akwa Ibom State and to the West by Bayelsa and Delta States. The total Area of the State is 11,077km square with a population of 5, 185,400 (NPC, 2006) and geographically located between the coordinates of 4^0 45^1N 6^0 50^1E / 4.750^0 N 6.833^0 E. The major vegetations are: Mangrove forest Coastal Vegetation; Freshwater swamp forest and lowland rainforest with mean annual rainfall of 2500mm, relative humidity of 75% and temperature of 28 oC.

Experimental Design

Proportional sampling method with one hundred (100) respondents was randomly selected across the State. At least four respondents came from each Local Government Area (LGA) within the twenty-three LGA in the State. To obtain evidence based empirical data, structured questionnaires were administered on public perceptions of climatic risks and use of legislative measures in mitigating climatic variation in Rivers State. Copies of the questionnaires were administered to draw out information on subject matter.

Data Analysis

Collected data were analysed using descriptive statistics analysis and presented in form of frequency and percentage distribution table and bar charts of the public perception of respondents on the climate change phenomenon.

RESULTS

Socio-demographic characteristics data of respondents

The socio-demographic characteristics of the respondents shown in Table 1 showed that more

than 58% of the respondents were male and 42% were female. The age distribution of respondents showed that 40% of respondents were between 48-57 years old, 22% were between 38-47 years old, 27% were between 28-37 years old, only 11% were 18-27 years old. The result also revealed that 89% of the respondents had tertiary education and 11% had secondary education.

Knowledge of Climate Change information by respondents in Rivers State

From Figure 1, 100% of the respondents had knowledge of climate change phenomenon in the State. But 94.6 % believed in the phenomenon while 5.4% do not believe on climate change issue.

Source of climate change information by respondents in Rivers State

Figure 2 shows that 35% sourced their climate change information from Television, 22% got information from newspapers and 18% did not respond to this section, 11% got informed through conversation with peoples, 8% got their idea through internet, 3% were told through radio and 3% just know on their own.

Table 1: Socio-demographic characteristics Respondents

Variables	Frequency	Percentage
Gender		
Male	58	58.00
Female	42	42.00
Total	**100**	**100**
Age range		
18-27	11	11.00
28-37	27	27.00
38-47	22	22.00
48-57	40	40.00
Total	**100**	**100**
Educational Qualification		
Tertiary	89	89.00
Secondary	11	11.00
Total	**100**	**100**

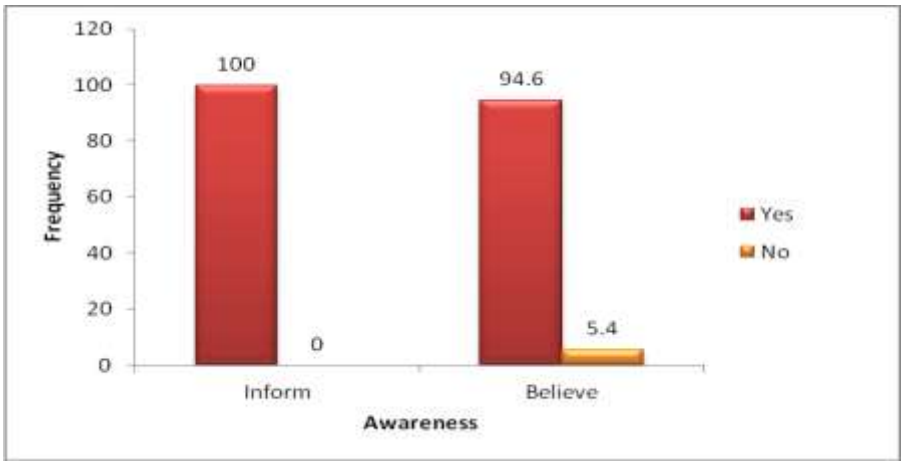


Figure 1: Awareness of climate change among respondents on climate change perception in Rivers State

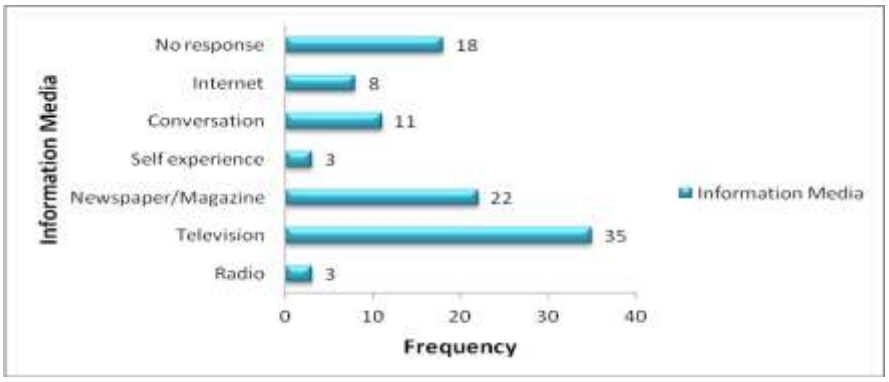


Figure 2: Medium of information on climate change by respondents on climate change perception in Rivers State

Evidence of climate change in Rivers State

From bar chart on evidence of climate change by respondents in Rivers State (Figure 3), 37.8% reported occurrence of natural disaster as indicator of climate change, 29.7% give their proof from climatic variation, 21.7% point out to scientific reports and 10.8 did not state their view. This revealed that people of Rivers State have been observing abnormal natural disaster and unusual weather changes which they attributed to changes in climate in their area.

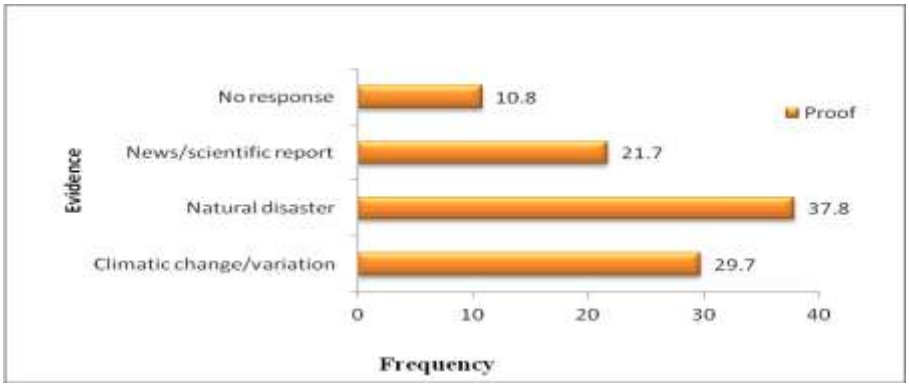


Figure 3: Evidence of climate change by respondents on climate change perception in Rivers State

Climate Change risks perceptions in Rivers State

Figure 4 below showed that 94.6% of the respondents agreed on general (global) climate change effect, said "Yes" while 2.4% disagreed, with a "No". In respect to Rivers State, 86.5% of the respondents responded "Yes" while 13.5% reported "No" to climate change effect in the State. The reality of climatic change effects was notably perceived by most (94.6%) respondents who agreed on general climate change risks, while only few (2.4%) disagreed. Meaning there are general risks regarding climatic variation, but only 86.5% of the respondents perceived to the said risks in Rivers State (Figure 4). The general report on the effect of the phenomenon was quiet different from the study area effect. From the study, 94.6% agreed on effects in the general (global) scale and 86.5% in Rivers State.

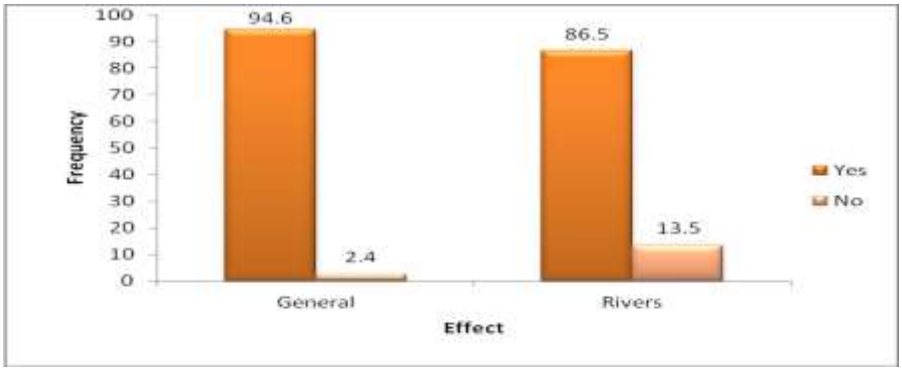


Figure 4: Effect of climate change by respondents on climate change perception in Rivers State

Effects of climate change in Rivers State

From figure 5, 32% of the respondents pointed to flooding/ erosion as effect of climate change in the State. While 30% of the respondent perceived health related problems, 19% respondents each reported effect on low agricultural productive and global warming. From the study (Figure 5), it is real that climate change is an environmental problem that manifested itself in Rivers State through flood, erosion and health related issues, other effects are low agriculture and global warming in the study area.

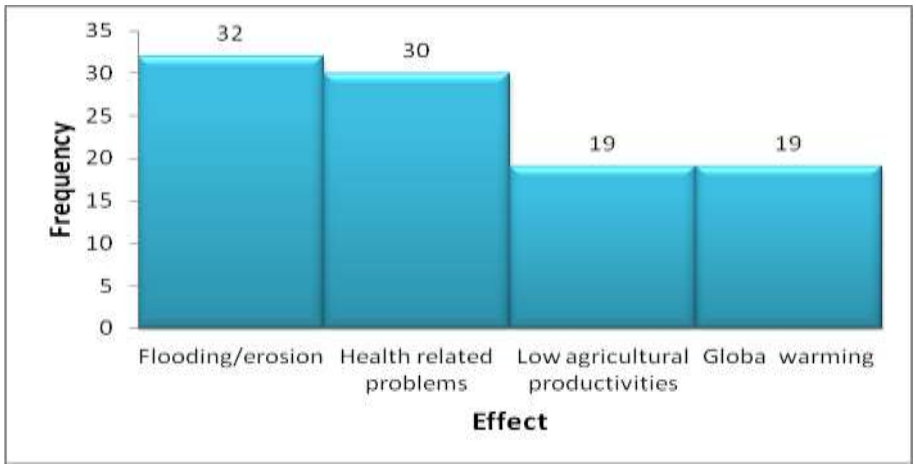


Figure 5: Evidence of climate change effect by respondents on climate change perception in Rivers State

Responsibility of climate change mitigation in Rivers State

From Figure 6 below, 89.2% of the respondents indicated "Yes" to climate change mitigation measure in Rivers State, while 2.7% indicated "No" and 8.1% did not indicate their stand on this. On who is responsible of climate change mitigation in Rivers State, 91.9% of the respondents said "Yes" it is the duty of government, while 5.4% responded with "No", 2.7% did not affirmed their view. The perception of people that believe on mitigation measures was high, compared to those who do not believed on the means of reducing the sources and augments the sinks of climate change. Either they do not have idea of the mitigation measure or they did not believe in the efficacy, (figure 6). Again, more people (91.9%) perceived that mitigation of climate change is the duty of government, believing that government is responsible for taking appropriate actions to curb the drivers of the change in the State.

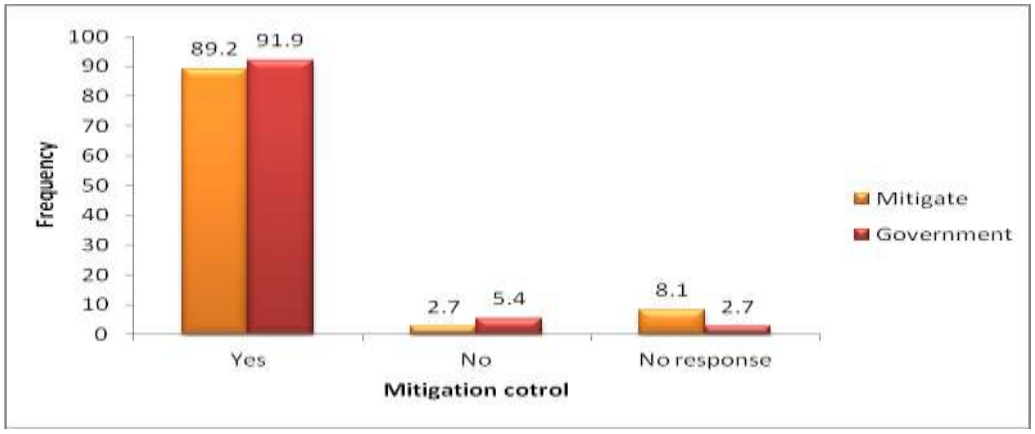


Figure 6: Responsibility of climate change mitigation by respondents on climate change perception in Rivers State

Means of government intervention on climate change mitigation in Rivers State

On means of government intervention on climate change mitigation in Rivers State, Figure 7 below, 37.8% of respondents suggested promulgation of law, 35.2% indicated prompt enforcement of law while 27% of the respondents did not state their view.

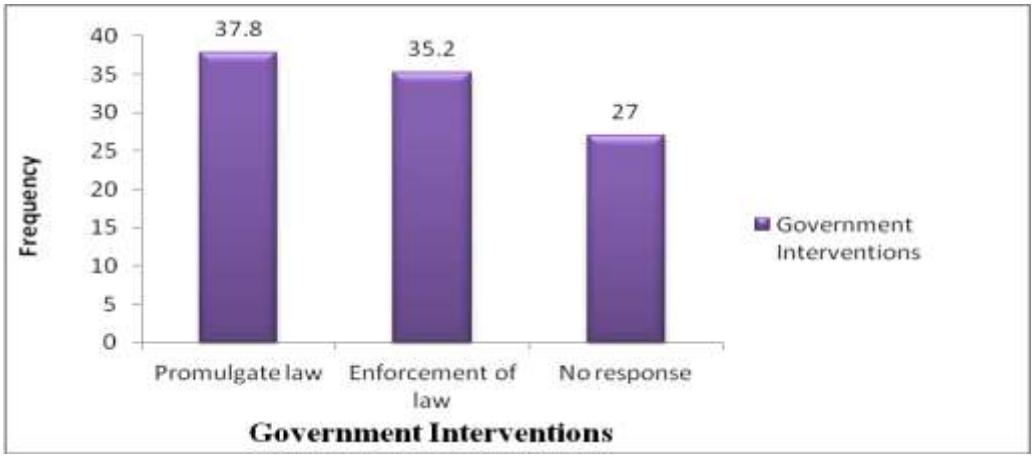
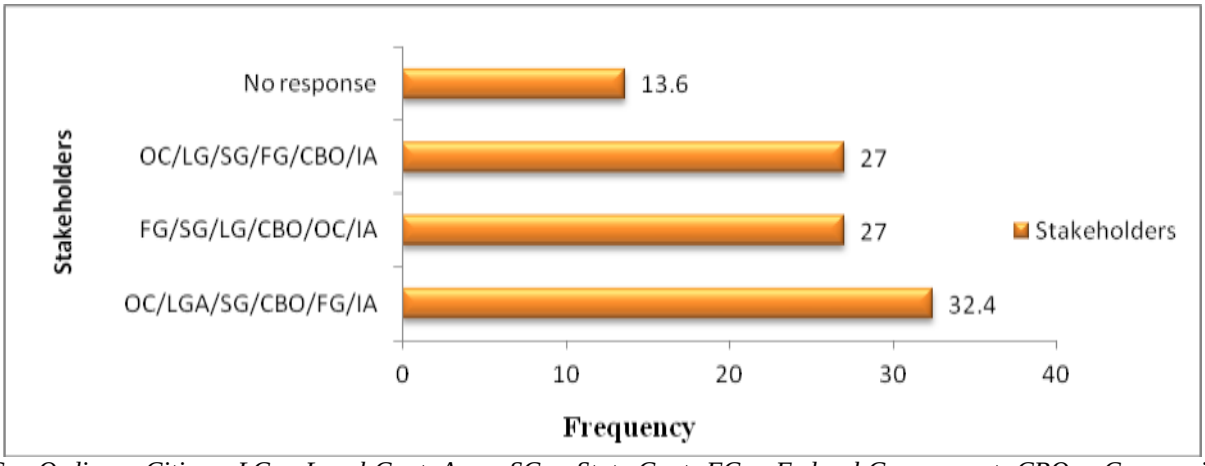


Figure 7: Means of government intervention on climate change mitigation by respondent perception in Rivers State

Mitigation flow within climate change stakeholders in Rivers State

From Figure 8, 32.4% of respondents suggested that mitigation of climate change should beginning with ordinary citizen (OC) through Local government area (LGA) to State Government (SG), connecting with community base organization (CBO) to Federal government (FG) and ends with International organization (IO). About 27% were in view that it should start with FG through SG, to LG, CBO, OC and terminate at IO. Also 27% stated that it should start from OC through LG, SG, FG, to CBO and ends with IO. And 13.6% did not air their views for undisclosed reason.



Key: *OC = Ordinary Citizen; LG = Local Govt. Area; SG = State Govt; FG = Federal Government; CBO = Community Based Organisation; IA = International Agencies; NGO = Nongovernmental organization*

Figure 8: Mitigation flow within climate change stakeholders by respondents in Rivers State

Legislative measures on climate change mitigation in Rivers State

From Figure 9, perception of people showed that 56.8% suggested Federal legislative and 16.2% saying ´No', while 48.7% were in support of State legislative with 13.5% disagreeing. On which of the legislative is effective between Federal and State, investigation from Figure 10 indicated perception of people as follows, 54.1% supported effectiveness for Federal legislative and 45.9% were not in supporting of this. Again 51.4% agreed on effectiveness for State legislative while 48.6% were not in support of it too. Although both Federal and State legislative were identified ways of controlling climate change, but higher number of people suggested that Federal level have more power to control the menace than State by 2.7%, from this, legislative responsibility from the Federal is not far different from that of the State level as far as this climate change study is concern.

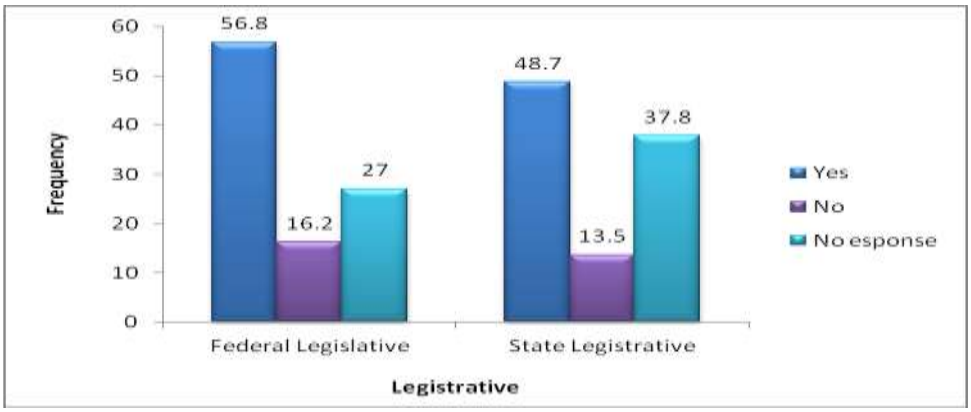


Figure 9: Legislative options for climate change mitigation by respondents in Rivers State

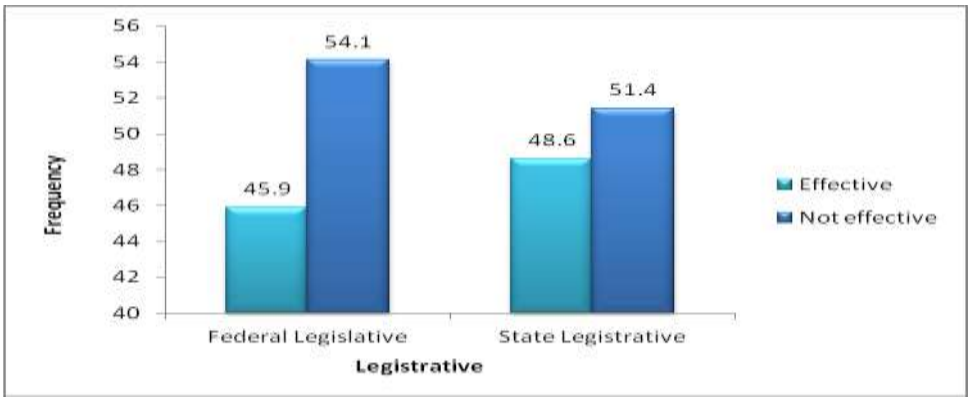


Figure 10: Effectiveness of legislative options for climate change mitigation by respondents in Rivers State

Effectiveness legislative measures for climate change mitigation in Rivers State

On how to make the legislative more effective, 32.4% stood for strict penalties, 29.7% said prosecuting defaulters, 24.4% suggested more sensitization campaign and 13.5% for promulgating law (Figure 11).

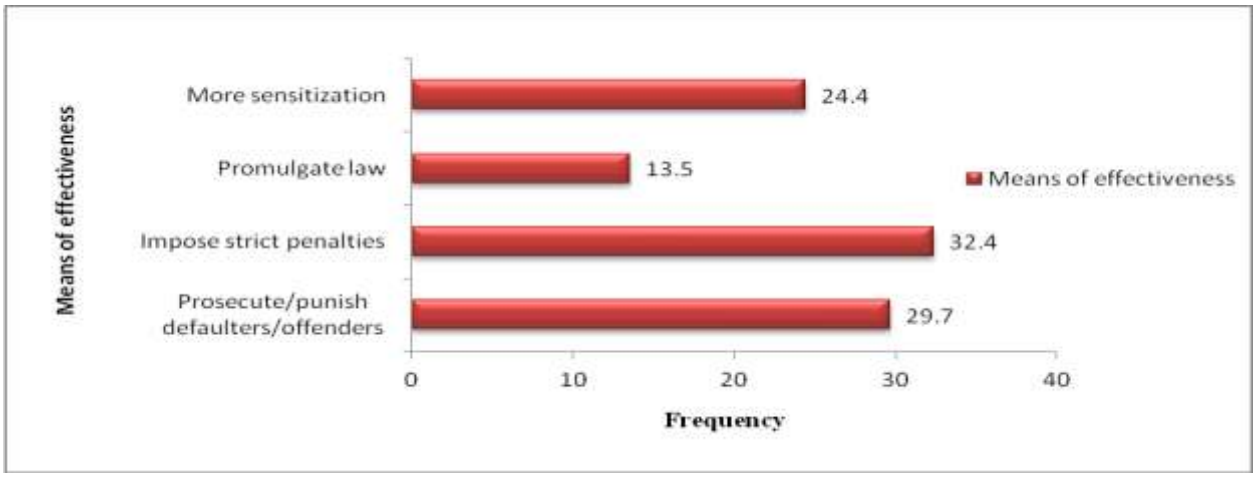


Figure 11: Means of legislative effectiveness for climate change mitigation by respondents in Rivers State

DISCUSSION

The socio-demographic characteristics of the respondents in percentages on the issue of climate change in Rivers State revealed that majority of the respondents in this study were men. Most respondents (89%) were graduates that mean the respondents know exactly what they were actually talking about. Education is significantly associated with knowledge of climate change according to Kabir *et al*., (2016). The study further revealed that majority of the responds

came from well mature mind in terms of age, an indication of the authenticity of our result.

To ascertain people's idea about climate change in the research, perception of the respondents about the understanding of climate change was questioned and the results came out 100% according to Figure 4. This is contrary to Kabir *et al.,* (2016) who reported that people knowledge of climate change in Bangladesh was average but their perception and awareness of the impact is high. This means all the respondents have heard of climate change before or have pre knowledge of climate change in the study group. From the 100%, about 94.6 % believed in the phenomenon while 5.4% do not support the idea of climate change. The study suggested that public is well informed of the climate change but not all respondents believed in it. Some people have different idea about the change in climate in this study, unlike a study in Bangladesh that reported high understanding leading to its impact on their health sector (Kabir *et al.,* 2016).

Television with 35.1% ranked the highest among the means of media in publicizing climate change phenomenon in Rivers State. This is followed by newspapers and allied media in creating more public awareness about the climate change. From this study, respondents got informed through documentaries which are discrete to reports from Kabir *et al.,* (2016) and Combest, *et al.,* (2012) who noted that awareness of climate change in countries like Bangladesh, Nepal, United States of America, Philippines came from the health impact.

The investigation revealed that people of Rivers State have been observing abnormal natural disaster and unusual weather changes which they attributed to changes in climate in their area. This is in conformity with numerous scientific reports that listed evident of climate change in Nigeria to includes increase in temperature, changes in rainfall pattern, loss of biodiversity, rise in sea levels, flooding and submersion of coastal land and loss of fresh water resources in Southern areas, while the Northern part experiences drought and desertification (Akpan and Gobo 2011; Gobo *et al*., 2006; Ebele and Emodi, 2016; Duru and Emehumah, 2016; Dioha and Emodi, 2018 and Haider, 2019).

This investigation revealed that there is actual effect of climate change in a global scale and is in Rivers State as well. Drawing our inference from the study, climate change is a global problem that manifested itself through flood, erosion and health related issues, other effects are low agriculture and global warming in the study area. This investigation supported Jocelyn, (2020) that reported climate change as a global issue that affects local communities, cities, nation and international scales. Reports from other experts observed that climate change in Nigeria is linked to unpredicted rainfall variation that make it difficult for farmers to produced. This according to their studies resulted in food insecurity due to crop failure and decline crop yield (Combest, *et al.,* 2012; Ebele and Emodi, 2016; Kabir et al., 2016; Ogbuabor and Egwuchukwu, 2017; Haider, 2019). Others effects are low economy, threatened health sector, loss of water resources, loss of human settlements and biodiversity (Combest, *et al.,* 2012; Capstick *et al*., 2015; Kabir *et al.,* 2016; Abraham and Fonta, 2018).

According to Ogbuabor and Egwuchukwu, 2017 risks of climate change such as salinity, sea rise, flooded farmland, prolong dry spells and sand dunes are common in Nigeria. Others effects are sand dunes encroachment which has covered 25,000 to 30, 000 hectares in Yobe State (Ogbuabor and Egwuchukwu, 2017). The associated risks affect livestock production and cultivation of most rain-fed crops in the country. Another report by BNPCC, (2011), stated that livelihood in coastal areas that involve fisheries are been affected as climate change is said to influenced nature and characteristics of freshwater resources. Challenges emerge due to severe storm, salinity, adverse weather condition, sea rise among others coastline area (Gobo *et al*., 2006; Akpan and Gobo 2011; Combest, *et al.,* 2012; Kabir *et al.,* 2016; Abraham and Fonta, 2018). These reports supported the result of the study which observed flooding/ erosion, low agricultural productive, health related problems and global warming as effects of climate change in Rivers State. The influenced of climate change on fisheries production which is a major food and a key source of protein in the State revealed that climate change posed mal nutrition and loss of livelihood in rural communities in the State. This harmonized with Amadi and Udo, (2015) and Ogbuabor and Egwuchukwu, (2017) who observed challenges in forestry sector increase in

air pollution, impact in economy sector, mal nutrition and infectious diseases as effects of climate change in Nigeria. According to Haider, (2019), due to climate change Nigerian economy sector will loss 2-11% of their GDP by 2020 and this can rise to 6-30% in 2050 if mitigation and adaptation is absent.

The study observed that mitigation of climate change is the duty of government, believing that government is responsible for taking appropriate actions to curb the drivers of the change in the State. On means of government intervention on climate change mitigation in Rivers State, the study suggested promulgation of law and enforcement of law. The study further revealed that environmental laws are relevant avenue to reduce climate change issue in the State. The result obtained from his research showed that mitigation flow is best if it started from the grassroots (OC) to the higher stakeholders (FG and IA) at the top. This agreed with Jocelyn, (2020) who suggested that addressing climate change requires action by all people. Again, UNFCCC, (2020), reported that local cities and communities around the world have been solving their climate problem in the absence of national and international policy. Although both federal and state legislative were identified ways of controlling climate change in this research, but high suggestion emerged from the Federal level than State. This is in line with UNFCCC, (2020), report on climate change that government at various levels should develop plans on how to reduce associated risks of climate change.

Results in this study suggested that Federal legislatures are to impose strict penalties on climate change defaulters and again prosecute and punish defaulters and offenders of the law rather than promulgating more laws. Meaning that environmental laws in regard to climate change are already enough to solve problem on ground but are not strictly effective. In order hand, climate change laws (environmental laws) and policy are not effective in the Federal and State levels. Investigation also shows that sensitization campaign is much needed than the promulgate laws in the study area.

CONCLUSION

Despite the increasing awareness of climate change, human still finds it difficult to avoid interference with the Earth system while engaging in their daily activities. The study was carried out to assess public perception of climatic risks and use of legislative measures in mitigating climatic variation in Rivers State, Nigeria. The findings of this study have revealed that respondents from Rivers State have knowledge of climate change in the State. The observed risks includes, flood, low agriculture, erosion and health related issues in the State. According to the study, government is in a better position to mitigate climate change through promulgation and enforcement of laws. Investigations from the study further showed that Federal legislative is more effective than the State. The result suggested that imposing strict penalty as well as persecution of defaulters as means of law enforcement by the government. The research also stated sensitization campaigns as the alternative means of mitigating climate change in Rivers State. The findings provide important insights into what people think and believe from their experience at the grassroots level in the State. Moreover, investigation obtained suggested ordinary citizen at grassroots will enhance reduction of climatic risks than the international agencies. In order words, a healthy environment begins at individual levels than government.

Recommendation

The study recommends citizens of the State to be more patriotic to nature by abiding to laws and regulations guiding the State. Moreso, Federal and State Governments should step up sensitization campaigns, enforce environmental laws as well as prosecute defaulters.

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