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Assessment of Climate Change Awareness among Secondary School Teachers in Ebonyi State, Nigeria

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Abstract
Climate change is an area that is currently in dire need of a wide range of publicity especially among teachers in secondary schools. This is because teachers' awareness of Climate Change may result to multiplier effects where families and communities benefit when students share what they have learned especially in relation to causes, adaptation and mitigation. The study was therefore carried out to assess the extent of climate change awareness among secondary school teachers in Ebonyi State. The researcher employed survey design for the stud. Three research questions and three null hypotheses guided the study. A 24 item self made questionnaire titled ""Climate Change Awareness Questionnaire" (CCAQ) were administered to a sample of 300 teachers from eight secondary schools from communities with visible impacts of climate change in Ebonyi State. The researcher employed purposive and random sampling methods in drawing the sample. Mean ($\bar{x}$) score was used to answer the research questions while t-test of difference between two means of independent samples was used to analyze the hypotheses. The findings revealed that the extent of awareness on the causes, impacts and adaptation/mitigation strategies of climate change among the secondary school teachers in Ebonyi State is very little. Based on the findings, the researcher recommended mainstreaming climate change throughout secondary education system in Ebonyi State among others.
Keywords: Climate change, awareness, teachers, students, Ebonyi State, School Administration
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Introduction

Climate change is one of the most crucial environmental issues facing the world today. This is evidenced by the spate of conferences, campaigns, reports and researches on climate change in the last 20 years (Agenda 21 of Rio declaration, 1992, Intergovernmental Panel on Climate Change (IPCC), 2001, Copenhagen, 2009, international conference on climate change and Education for Sustainable Development, 2020). Climate change is a change in the statistical distribution of weather elements and which is sustained for up to a decade or more (Nwankwo and Unachukwu,2012). In other words, it refers to changes generally either directly or indirectly by human activities as well as natural occurrences. It is often seen to be natural or human- induced. Onyali, Ezeugbor, and Okoye, (2015) remarked that natural phenomena are as a result of responses to changes in the global energy balance. On the broadest scale, the rate at which energy is received from the sun and the rate at which it is lost to space determines the equilibrium temperature and climate of earth. This energy is then distributed around the globe by winds, ocean currents and other mechanisms to affect the climates of different regions. On the other hand, the general consensus is that human actions are the major cause of climate change. Survey of numerous peer-reviewed papers in scientific journals has found that 97.1% agreed that climate change is mainly caused by human activities. According to Ohwo, (2015) the survey considered the works of some 29,000 scientists published in 11,994 academic papers. The survey showed that out of the 4,000-plus papers that took a position on the causes of climate change, only 0.7% or 83 of those thousands of academic articles disputed the scientific consensus that Climate Change is the result of human activities. This goes to show that the role of man as a potential agent of climate change cannot be ignored. Moyinoluwa, (2013) noted that the earth is getting warmer because people are adding heat trapping gases to the atmosphere; mainly by burning fossil fuels and these gases are called greenhouse gases. Amanchukwu, Amadi-Ali and Ololube, (2015) observed that many families in Nigeria still burn their waste in the backyard, sending plumes of smoke wafting among the surrounding palm trees. Other factors include land use ozone, depletion, animal agriculture, blocking water ways and deforestation which are also of concern in the roles they play – both separately and in conjunction with other factors.

Edo and Osuji, (2016) observed that Changes resulting from climate variations bring with them several challenges with significant negative impacts on educational activities. A typical example is when there is intensity of cloudy atmosphere that reduces visibility, high temperature, green house gases (GHG) emission which result from human activities, flooding, torrent rain accompanied with thunder storm and whirlwind which affect school activities. Findings from the research of Akuegwu, (2012) indicates that climate change effects resulting from excessive heat had a significant relationship with teaching and learning processes in any

educational set-up. When the weather is extremely hot, it may result to bodily discomfort, a state that cannot lead to adequate teaching and learning processes. During harmattan period, the whirlwind with its spurious dust and spiral movement often blow sand, stone and dust into the classroom hence disrupting learning processes too.

Climate change impact is further seen in heavy rain fall with thunder storm that often disrupt academic activities. Also, during rainy season, there are cases where the classroom is always flooded hence haul teaching and learning. Similarly, Climate Change emanating from windstorms and rainstorms has significant relationship with teaching and learning. This outcome may be explained from the perspective that windstorms and rainstorms are accompanied by violent winds; thunder and lightning that can blow away roof tops of buildings and destroy other school property, and so render classroom teaching, learning productivity and administrative responsibilities redundant. The above episodes are clear manifestation that climate change is not just an environmental, scientific or technological concern, but that it also impacts on education with particular references to teaching and learning practices.

Studies have shown that Climate Change requires certain measures to checkmate risk and disaster that accompanies it. For instance, one of the measures is adaptation. Adaptation in this context implies the capacity to understand the effects of climate change. Adaptation is relevant for all climate sensitive domains including a education **(**Edo and Osuji (2016), Enhancing adaptive capacity is a way of reducing vulnerabilities and promoting sustainable improvement in teaching and learning activities. Mitigation on the other hand is used to check the impact of climate change. Mitigation refers to measures that may either reduce the increase in green house emissions or increased terrestrial storage of carbon (Oladipo, 2010). Although many adaptive strategies can be developed to contend the negative impacts of climate change; adjustments are possible in practice within the limits of available income and technology. However, Ohwo (2015) observed that the capacity to adapt is dynamic and influenced by economic and natural resources, social networks, entitlements, institutions and governance, human resources, and technology. Unfortunately, these basic requirements are poorly provided in Nigeria and the study area in particular.

Several studies have been carried out on the science of climate change, which include the causes, impacts, mitigation and adaptation strategies on every facet of human endeavour, however, Nwankwo and Unachukwu, (2012) observed that majority of the teachers are not aware of the causes, impacts and mitigation strategies of climate change on educational practices. Besides Ekpo and Ekpo (2011) observed that sex has an effect on level of climate change awareness among school teachers. According to them male teachers exhibit more climate change awareness than their female counterparts. On the other hand McCright, (2019) remarked that climate change impacts are different between genders because of vulnerabilities. They argue that women are more vulnerable to climate change as they have less access to education and information that would help them to manage climate-related risks. This therefore forms the bane of this study.

Objectives of the Study

The purpose of the study was to investigate the Climate Change Awareness among Secondary School Teachers in Ebonyi State, Nigeria. Specifically, the study determined:

1. the extent secondary school teachers' are aware of the causes of Climate Change in Ebonyi state
2. the extent teachers' are aware of the impact of climate change on secondary education in Ebonyi State
3. the extent teachers' are aware of the mitigation and adaptation strategies for Climate Change impacts in secondary schools in Ebonyi State

Research Questions

The following research questions guided this study:

1. What is the extent of secondary school teachers' awareness of the causes of Climate Change in Ebonyi state?
2. To what extent are teachers' aware of the impact of climate change on secondary education in Ebonyi State?
3. To What extent teachers' aware of the mitigation and adaptation strategies for Climate Change impacts in secondary schools in Ebonyi State?

Methodology

The study was conducted in Ebonyi State, Nigeria. The choice of the area is because Ebonyi State is among the riverrine areas in Nigeria that yearly feels the impact of Climate Change. Descriptive survey design was adopted for the study. The population of the study comprised 3,052 teachers comprising 1,740 males and 1,312 females in the 226 public secondary schools in the state (source: Ebonyi State Secondary Education Board (EB-SEB)). Purposive and random sampling techniques were employed for the study. The researcher liaised with Ebonyi State Emergency Management Agency (EB-SEMA) to get information on the communities with visible impacts of Climate Change in the state. Purposive random sampling was adopted in selecting 8 public secondary schools in the 8 autonomous communities with visible impacts of Climate Change. The researcher focused on those autonomous communities and randomly selected 340 teachers made up of 180 males and160 females that formed

the sample for the study. Data for this study was collected using the "Climate Change Awareness Questionnaire" (CCAQ). The instrument was a modified 4 point Likert type questionnaire that was made up of two major parts: Part I of the instrument explored the personal data of the respondents while part II explored the extent of awareness of the respondents on the causes, impacts, and mitigation strategies of climate change. The reliability of the questionnaire was determined using Cronbach alpha in which an alpha of 0.88 was obtained. Simple mean and standard deviation were used to answer the three research questions while the 3 null hypotheses were tested using t-test of difference between means of independent samples at an alpha level of 0.05.

Results

Research Question 1:

What is the extent of secondary school teachers' awareness of the causes of Climate Change in Ebonyi state?

Table 1: Extent of teachers' awareness of the causes of climate change that affect secondary education in Ebonyi state

S/N	Climate change is caused by:	Mean ($\bar{x}$)	S.D	Decision
1	Blockage of water ways in and around the school premises	2.25	0.53	LE
2	Cutting trees around the surrounding school premises	1.26	0.23	VLE
3	depositing waste materials into the waters ways around the school premises	2.oo	0.21	LE
4	Burning waste materials in the school premises	2.29	0.18	LE
5	Building houses along the school waterway	2.00	0.16	LE
6	Divine providence (act of God)	3.00	0.26	VGE
7	Bush burning	2.42	0.24	LE
8	Industrialization	2.13	0.32	LE
Grand mean		**2.16**		**LE**

Summary of Table 1 shows that out of the eight (8) identified items, only item 6 (Divine providence /act of God with highest mean rate of 3.00) was rated as strong factor (Great Extent) that cause climate change in the state. The result shows the teachers' awareness on the causes of climate change is low as the grand mean of 2.16 in the table indicates that the teachers opined that all the identified items contribute to a little extent in causing climate change in the secondary schools.

Research Question 2:

2.To what extent are teachers' aware of the impact of climate change on secondary education in Ebonyi State?

Table 2: extent of teachers' awareness of the impact of climate change on secondary education in Ebonyi State

S/No	Climate change leads to :	Mean ($\bar{x}$)	S.D	Decision
1	Flooding that prevents students from attending school	2. 21	0.32	LE
2	Rise in river that wash away school buildings as well as our homes	2.12	0.37	LE
3	Excessive wind that blows away school roofs	1.84	0.24	VLE
4	Whirlwind that contribute to low performance by the students during examination	2.16	0.28	LE
5	Airborne and water borne diseases that make students and teachers fall sick	2.51	0.31	GE
6	Rise in temperature /excessive heat that make teachers and student uncomfortable in school	2.53	0.11	GE
7	Rainstorm with awful thunder and lightning that prevent Teachers and students from coming to school	1.88	0.25	VLE
8	Poverty leading to non payment of fees by parents	1.82	0.33	VLE
	Grand mean	2.13		LE

Summary of result on impacts of climate change as presented on table 2 shows that items 5 and 6 yielded mean values above 2.50 which indicate that the respondents agree to a great extent that those items occur as a result of climate change, while they believe that items 3, 7 and 8 contribute to a very little extent on the impacts of climate change as the items yielded mean values less than 2.50. This section yielded a grand mean score of 2.13 which is lower than the 2.50 benchmark for acceptance. Therefore, in line with the decision rule, the finding reveals that the respondents' awareness on the impacts of climate change is to a little extent.

Research Question 3:

3To what extent teachers' aware of the mitigation and adaptation strategies for Climate Change impacts in secondary schools in Ebonyi State?

Table 3: extent teachers' are aware of the mitigation and adaptation strategies for Climate Change impacts in secondary schools in Ebonyi State**.**

S/No	The impact of climate change can be lessened by :	Mean ($\bar{x}$)	S.D	Decision
1	Climate change education	2.26	0.26	LE
2	Public enlightenment	2.42	0.24	LE
3	Reforestation	2.13	0.23	LE
4	Enforcing the laws e.g. prohibiting dumping of refuse into the river	2.00	0.16	LE
5	Planting trees and greening of environment	2.64	0.18	GE
6	Individual knowledge and adherence to climate change policies	2.56	0.21	GE
7	Political will	2.18	0.24	LE
8	Sanctioning the defaulters of climate change laws	2.26	0.23	LE
	Grand mean	2.35		LE

Summary of findings as presented on Table 3 above indicates that the respondents agree to a great extent that climate change can be lessened by items 5 and 6 only, as the items had means above 2.50 while the rest of the items had means less than the accepted criterion which is 2.50. The grand mean of 2.35 as yielded in this table which is less than the 2.50 benchmark indicates that the respondents agreed to a little extent that all the identified items will lessen the impacts of climate change

Discussion of Findings

The summaries of data on Tables 1, 2 and 3 with grand means of **2.16;** 2.13 and 2.35 respectively revealed that the items in the questionnaire were not regarded as strong factors on the causes, impacts and adaptation/mitigation strategies of Climate Change. By implication, it means that the respondents' awareness on the causes, effects and mitigation strategies of climate change that affects secondary education in Ebonyi State is generally low. The limited knowledge of respondents was clearly revealed by the high mean responses in item 6, on Table 1, indicating that the respondents believe that divine providence (act of God) is one of the major causes of climate change. This is in clear contrast to the scientifically proven human induced causes of climate change such as adding heat trapping gases to the atmosphere mainly by burning waste materials, blocking water ways in and around the school premises, etc. This goes to confirm the observations of Amanchukwu, Amadi-Ali and Ololube, (2015) that many teachers and students of secondary schools in Nigeria dispose their waste by burning them in the school field thereby sending plumes of smoke wafting among the school surroundings. Other practices of concern include blocking waterways near and around the school compounds with wastes; lack of climate friendly practices such as planting flowers and trees around the school premises and cutting trees that grow around the school premises without planting new ones. This is because of the roles they play – both separately and in conjunction with other factors to cause climate change. This is a clear ignorance. Ohwo (2015) equally opined that human actions are the major causes of climate change.

Test of hypotheses one and three on Tables 4 and 6 equally reveals that both male and female respondents share a common view on the causes and mitigation strategies of climate change. This response pattern is not surprising because according to Odafivwotu, (2015) most Nigerians are very religious people. Certain natural processes they do not understand are easily explained off as divine providence.

The outcome of this study is in consonance with that of Ekpo and Ekpo (2011) who found that public attitude on climate change is mixed with ignorance, apprehension and confusion. In a related study, Ogunseemi and Ibimilua, (2016) observed that many people have no clear understanding of the meaning, causes or effects of climate change. However, this poor understanding is not restricted to Nigeria. Rather **Odafivwotu**dr (2015) noted that errors in assessing the causes of climate change are global in nature.

Results of hypothesis two indicate that male and female teachers show significant variation in their extent of awareness on the impacts of Climate Change on secondary educations, thereby highlighting that gender was an important factor affecting climate change awareness among teachers. Uduak and Ekpo, (2011) in their study found that male teachers tend to have more knowledge of climate change awareness than their female counterparts. A possible reason for the differences between male and female teachers may hinge on the fact that both groups are essentially exposed to sources of information on climate change differently. Male teachers listen more to news, have more access to internet services and buy newspapers more frequently which probably gives them wider access, knowledge and information on various climate change issues in different parts of the world. The finding also supports the outcome of earlier studies by Patel and Patel, (1995) who reported that sex has an effect on level of climate change awareness among school teachers.

Conclusion

It can be concluded from the findings of this investigation that the extent of awareness on the causes, impacts and mitigation strategies of climate change among secondary school teachers in Ebonyi State of Nigeria is very low. Climate change is a phenomenon that will affect every aspect of our lives, but most especially the academic

activities in our secondary schools. In the educational sector, teachers can play an important role in educating the students about climate change, related issues and solutions. This cannot be possible when the extent of teachers' awareness on the issue is generally low. This therefore necessitates the need for introducing climate change programmes into education reforms because putting into practice viable solutions depends on well informed populace.

Recommendations:

Based on this findings of this study, the researchers recommends as follows:

1. Mainstreaming climate change throughout secondary education system in Ebonyi State can be one of the most important and effective means of developing capacities for addressing the climate crisis. This is because teachers' knowledge of Climate Change may result to multiplier effects where families and communities benefit when students share what they have learned especially in relation to causes, adaptation and mitigation.
2. Secondary school administrator should adopt climate friendly practices such as planting trees, flowers etc around the school premises to reduce the impacts of Climate Change.
3. Policy for proper adaptation and mitigation of climatic effects that require policy makers and resource users on the educational system to share information and support for positive changes that should reduce the impacts of Climate Change should be introduced in our secondary schools.
4. Government should develop a comprehensive and coordinated education and outreach programmes for schools teachers through conferences and seminars to train teachers on issues of climate change and the danger it poses to human development in order to help raise the awareness among the female teachers.

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