

**TEACHERS' KNOWLEDGE OF CLIMATE CHANGE IMPACTS IN SECONDARY
SCHOOLS IN
RIVERS STATE, NIGERIA.**

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ABSTRACT: *The concern of the study was to investigate into secondary school teachers' knowledge of climate, its impacts and mitigation strategies. Stratified and simple random sampling techniques were used in selecting the respondents for the study. The instrument for data collection was a questionnaire named Teacher Climate Change Knowledge Question (TCCKQ). The questionnaire was structured by the researchers and validated by experts. The findings revealed that teachers have the knowledge of climate change impacts on man, animals, their environment, as well as the different mitigating strategies. Revealed also is the disparity between teachers' knowledge of climate change in urban and rural secondary schools. The implication of the findings is that success of climate change education depends on the knowledge of the teacher on the subject. It is recommended that climate change education be introduced into the teacher training institutions and regular training and workshops be organized for teachers.*

KEYWORDS: Teachers', Knowledge, Climate Change, Secondary Schools, Rivers State, Nigeria.

INTRODUCTION

The challenge facing the entire human race is the problem of climate change and its impacts on man, animals, plants and their environment resulting to health, economic and social consequences. This challenge bedeviling the whole of human race is mainly caused by human economic activities such as fossil burning (greenhouse gases), aerosols, changing land surface, water vapour etc and natural causes are interaction between the atmosphere, ocean and land change and the amount of solar energy reaching the earth, solar radiation, earth's orbits, mountain building and continental drift and volcanic eruptions (climate change fact sheet N.D, p.1, Moyinoluwa, 2013, p.22 and National Weather Service's 2007).

Asthana and Asthana (2012) affirm that the impacts of climate change includes unhealthy environment that reduces agricultural productivity, such as crop, animals, fishes. This the scholars say will result in food scarcity, poverty and consequently mal-nutrition, leading to ill health,

morbidity and outbreak of infectious diseases, increase in cases of cataract of the eyes, skin diseases and cancers, increase in the growth of insects and pest that is a threat to human health, increase in waterborne disease (typhoid and cholera), airborne diseases such as pneumonia, poliomyelitis, tuberculosis, measles and diphtheria, neonatal tetanus and pertussis. Litus (2012) also adds that climate change causes rising temperature, droughts and desertification, heavy precipitations, flooding, rising sea level, extreme weather events such as cyclones, floods and droughts leading to mal-nutrition, waterborne diseases as diarrhea and vector-borne diseases as malaria, drowning, severe mental and physical trauma.

In attempt to address these problems, the United Nations Framework Convention on Climate change (UNFCCC) was held in June, 1992 with 154 nations in attendance and in December, 1997 in Kyoto Japan, 160 nations also met. Decisions reached in these meetings were to reduce human activities that produce greenhouse gases, in that, it is human activities that enhance greenhouse effects, which has the potentials to warm the planet at the rate that has never been experienced before. Therefore, there is the need for man to be enlightened on this issue as well as proffer solution to it.

In 1992, Nigeria joined other committee of nations to find ways to mitigate the effects of climate change. As a result the Federal Government in May 1996 asked all oil companies to stop gas flaring into the atmosphere, as well as development of gas turbans as an alternative power supply for the nation. Other mitigating measures adopted by Nigeria according to Dede 2005 are introduction of compact fluorescent bulbs, improved kerosene stoves, use of natural gas instead of fuel oil in the cement industry, improved electrical appliances and reduction in the use of wood stoves. Asthana and Asthana (2012) stress that the following mitigation measures should be adopted:

1. Avoiding or minimizing practices which pollute the environment as burning of firewood, consuming more electricity;
2. Promotion of green cover by planting trees, flowers and grasses;
3. Reduction in the use of fuel which in turn reduces the release of carbon-dioxide;
4. Environmental education. Spread of the awareness of the effect and problems facing man because of the environment and the roles each one can play to reduce its adverse effect.

Schools has been an effective vehicle for information transfer and the teacher is the most effective means of transferring knowledge to the younger generation and families. The teacher who is the most effective tool for transferring climate change knowledge to these people must first be informed on what climate change is. The question now is, are the secondary school teachers well informed about what climate change is, it causes, impacts and how to reduce its impacts. This situation justifies and makes it imperative to carry out an investigation on secondary school teachers' knowledge of climate change impacts in Nigeria.

Statement of Problem

There has been alarming fear in the heart of environment experts on the rate at which the temperature of the earth changes. This has brought about climate change, causing diverse degree of damage to man, animals, plants and their environment. This has made nations to meet to agree

on how to reduce the human activities that has been identified as a major cause of climate change. Despite all the measures adopted, there seem to be no improvement on extreme weather changes, hence the clamour for more proactive measures. It becomes pertinent therefore, to investigate into teacher knowledge of climate change impact as a measure for creating awareness of the problem. This is so because; teachers are identified as agents of knowledge transfer to the younger generation. The element of the problem borders on the knowledge of the teacher on climate change causes, impacts and its mitigation measures.

Research Questions

1. What is the level of teachers' knowledge of the impacts of climate change in Rivers State?
2. What is the level of teachers' knowledge of climate change mitigation?

Hypotheses

1. There is no significant difference in the knowledge of climate change by teachers in urban and rural schools.

METHODLOGY

The design for the study was the descriptive survey and the population comprised 3300 teachers in public secondary schools in Rivers State. Stratified random sampling and simple random sampling were used to draw 337 teachers used for the study. The instrument for data collection was the questionnaire named Teacher Climate Change Knowledge Questionnaire (TCCCKQ) which had 25 items that were validated and whose reliability co-efficient stood at 0.79. Mean was used to answer the research questions and T-test statistics was used in analyzing the hypotheses at 0.05 level of significance.

RESULTS

The mean weightings of the responses from the questionnaire were computed, interpreted and presented in tables.

Research Question 1: What is the level of teachers' knowledge of the impacts of climate change?

Table 1
Impacts of Climate Change

S/No	Assessed Variables	Mean	Remark
Environment			
1.	Temperature	2.6	Positive
2.	Drought	2.5	Positive
3.	Desertification	2.5	Positive
4.	Flooding	2.4	Negative
5.	Precipitation	2.6	Positive
6.	Rise in sea level	2.5	Positive
7.	Land sliding	2.5	Positive
8.	Volcanic eruptions	2.5	Positive
Man			
9.	Airborne diseases (Tetanus, tuberculosis, diphtheria, polio, measles, pneumonia etc)	2.5	Positive
10.	Severe heart problems	2.5	Positive
11.	Waterborne diseases (typhoid, cholera, diarrhea)	2.5	Positive
12.	Severe mental and physical trauma	2.5	Positive
13.	Eye problem	2.5	Positive
14.	Malnutrition/famine	2.6	Positive
Animal			
15.	Lack of animal farming	2.6	Positive
16.	Loss of land for agriculture	2.5	Positive
17.	Extinction of some animal species	2.5	Positive
18.	Increase in vector related diseases	2.5	Positive
Criterion mean 2.5			

Eighteen variables were examined in Table 1 to assess the level of teachers' knowledge on climate change impacts on man, animals and the environment. The mean scores of the variables examined ranged between 2.4 to 2.6. Judging from the criterion mean of 2.5, it is evident from the data analyzed that; some teachers' have knowledge on the impacts of climate change on man, animals and the environment.

Table 2
Mitigation Strategies

S/No	Assessed Variables	Mean	Remark
1.	Political will	2.5	Positive
2.	Climate change education	2.6	Positive
3.	Public enlightenment	2.6	Positive
4.	Enforcing the laws	2.6	Negative
5.	Reforestation	2.6	Positive
6.	Planting of trees and greening of the environment	2.6	Positive
7.	Individual knowledge and adherence to climate change policies	2.6	Positive
Criterion Mean 2.5			

In Table 2, seven variables were examined to assess climate change mitigation strategies. From the variables examined, the mean ranged between 2.5 to 2.6. Judging from the mean and the criterion mean of 2.5, it is evident that teachers have knowledge about climate change mitigation strategies.

Hypotheses Testing

1. There is no significant difference in the knowledge of climate change impacts by teachers in urban and rural schools.

Table 3

T-test of Difference on the Knowledge of Teachers in the Urban and Rural Schools on the Impacts of Climate Change

	Mean	SD	N	D	T.Cal	T.Crit	Sig. Level
Urban	2.8	0.42	169	335	2.99	1.955	0.05
Rural	2.6	0.29	168				
Total							

Table 3 revealed that at degree of freedom of 335 and level of significant of 0.05, calculated T-value of 2.99 and Table T-value of 1.9955. The calculated t-value is greater than the table t-value; we reject the null hypotheses and state that there is significant difference in the knowledge of teachers' in urban and rural schools on climate change impacts.

DISCUSSION OF FINDINGS

The study revealed that some teachers' have knowledge that climate change impacts on the environment (temperature, drought, desertification, flooding, precipitation, rise in sea level, land sliding and volcanic eruption), man (tetanus, tuberculosis, diphtheria, polio, measles, pneumonia etc) and animals (lack of animal farming, loss of land for agriculture, extinction of some animal species and increase in vector related diseases). This result corroborates Litus (2012) contribution on the impacts of climate change. These impacts are rising temperature, drought and desertification, heavy precipitations, flooding, rising sea level, mal-nutrition, diarrhea malaria etc.

The study shows also that some teachers have knowledge about how climate change impacts can be mitigated. Which can be done through political will of the leaders, environment/climate education, public enlightenment, law enforcement, reforestation, planting of trees and greening of the environment and individual knowledge and adherence to climate change policies. These findings are in tandem with the findings of Asthana and Asthana (2012), that the mitigation measures of climate change includes avoiding practices that pollute the environment, promotion of green cover by planting trees, flowers and grasses, reduction in the use of fuel and environment education.

Also revealed is the disparity on the knowledge of teachers' in urban and rural schools on climate change impacts

The probable reasons for these results could be because teachers who are in the school system were used for the study. They were able to say accurately their knowledge of climate change impacts and possible mitigation measures. This is because they are educated and can be informed about the happenings around them.

These findings have far reaching implications on how the activities that result in climate change can be addressed and how the effects can be mitigated. In that education has been the vehicle through which the society had effected various desired changes in the past and the teacher has always played a major role in situation like this. Therefore, to tackle the issue of climate change teachers is important and this will require the training and re-training of teachers already in the school system, introduction of environment education in various teacher training institution and the change of curriculum to include climate or environment education. This is the reason for which Litus (2012), said that lack of teacher knowledge of climate change will remain a barrier to effective climate change education.

CONCLUSION

No living thing can exist without the support of its environment, meaning that the environment of every living thing is important for its survival. What ever that affects the environment causes harm to all the living things living in it. The change in the temperature of the climate affects man, animals, plants and their environment that is a support system to them. Therefore, this problem should be tackled headlong by all because all suffer from these impacts. One way of doing this is to look at the knowledge of the teachers about this climate change and its impacts as the teacher is the fulcrum on which the education system hinges and the education system in turn determines the state of a nation.

RECOMMENDATIONS

The following recommendations were made from the study:

1. **Introduction of environment education in the teacher education system.** The curriculum should include environment education as to equip the teachers and their class children on how to be environment friendly and to know the consequence effect of climate change on them. To achieve this curriculum review is required.
2. **Organize workshops.** Regular workshops, seminar, conferences should be organized for teachers as regards climate change and its impacts and ways these impacts can be mitigated. This will help the teachers to be informed about new findings on climate change, its impacts and mitigation and how to transfer same to their class children.
3. **Regular in-service training.** Regular in-service training should be organizes for teachers to keep them abreast with the research finding on climate change and other issues of life.

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