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ASSESSMENT OF SECONDARY SCHOOL SCIENCE TEACHERS' KNOWLEDGE OF CLIMATE CHANGE IN THE SOUTH EAST NIGERIA, FOR INCLUSION IN THE SECONDARY SCHOOL CURRICULUM.

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ABSTRACT: *The study assessed the Secondary School Teachers' knowledge of climate change in the SouthEast Nigeria, for its inclusion in the Secondary School curriculum. The study adopted a survey design with a sample size of 1100 respondents drawn from the five states of the South East Nigeria. Five research questions and one null hypothesis guided the study. The instrument for data collection was a questionnaire containing sixty one (61) items, which was subjected to reliability test using Cronbach Alpha statistics. It yielded a coefficient index of 0.83. Mean and Standard deviation were used to answer the research questions, while t-test statistics was used to test the hypothesis. The results of the findings showed that the secondary school science teachers in the SouthEast Nigeria possess high level awareness and knowledge of topics on climate change, it effect on human beings, animals, plants, environment and the causes. Also there was unanimous agreement by the Secondary School Science teachers that climate change studies should be included in the secondary school curriculum. Based on the findings the following recommendations were made: Nigeria Government should develop syllabi on climate change and include it in the secondary school curriculum, train and retrain Secondary School Science Teachers, and develop Teachers' guide books. The researchers equally recommended that Government of Nigeria can adopt or adapt the contents of Climate Change highlighted in this study.*

KEYWORDS: secondary school, teacher, climate, climate change and curriculum.

INTRODUCTION

In Nigeria, Secondary School is classified into two levels; viz: Junior Secondary School and Senior Secondary School. The Junior Secondary School which is also known as, upper basic education covers from Junior Secondary School three (JSS3), while the Senior Secondary School covers from SSS1 to SSS3. The minimum qualification of teachers in each of this level of secondary education is defined by the Federal Republic of Nigeria (2004). It stipulates that the minimum qualification for teaching should be Nigeria Certificate in Education (NCE) for Junior Secondary Schools and Primary Schools and Bachelor's degree or its equivalent for Senior Secondary School. Teachers are basically trained in two ways; namely pre-service training and in-service training/programme. Pre-service training is the training the teacher receives in the institutions of higher learning prior to his or her

employment as a full time teacher. While in-service training is the course of studies the teacher receives while in the service or on the job. The teachers constitute the pivot of any school system, because the success of any system of education depends to a large extent on the teachers' qualifications, qualifies and commitment to duties. Teachers are saddled with the responsibilities of implementing the curriculum in the classroom among other things. Therefore if the climate change studies are to be introduced, it will become imperative that the secondary school teachers be assessed on their knowledge of issues of climate change.

Climate is the typical weather conditions in a particular area (Della, 2005). It is also the average weather conditions over a period of years (European Commission of Environment, 2001). Climate changes if factors that influence them fluctuate. According to United Nations Environmental Programme and the World Meteorological Society (UNEP & WMS, 2011), the Earth's temperature is a balancing act, which depends on the balance between energy entering and leaving the planet system. The Green house effect causes the atmosphere to retain heat and changes in the sun's energy affect how much energy reaches the Earth's system. Equally, the change in reflectivity affects how much energy enters Earth's system. These factors have caused Earth's climate to change. It is on record that both natural and human factors change Earth's climate. Before human beings started exploring the resources on earth, changes in climate resulted entirely from natural causes, such as change in Earth's orbit, changes in Solar activities or Volcanic eruptions. Since the Industrial Era began, human beings have had increasing effect on climate particularly by adding billions of tons of heat trapping green house gases to the atmosphere. Most of the observed warming since the mid-20^{th} century is due to human – caused green house gas emissions (UNEP and WMS, 2011).

Green house gases (GHGs) like water vapour (H_20), Carbon dioxide ($C0_2$), and methane (CH_4) absorb energy, slowing or preventing the loss of heat to space. In this way, GHGs act like a blanket, making Earth warmer than it would have been. For instance human activities, such as the burning of fossil fuels, and changes and land use, release large amount of carbon to the atmosphere causing Co_2 concentrations in the atmosphere to rise. Therefore, Co_2, CH4, nitrous oxide (N_20) and others are the sources of the recent trend in climate change. Those other factors include Oceanic circulation, Biotic processes, Variation in Solar radiation received by Earth, Volcanic eruptions and Human- induced alterations of the natural world. This later effects are currently causing global warming. Climate change is often used to describe human specific impacts on Earth.

In Nigeria, there have been several report on how to mitigate the effect of climate change. For instance the Sahara desert had encroached into the arid regions of Maiduguru, Sokoto and Kano States in Northern Nigeria causing drought, diseases, increased crop pests, more death of human beings and animals. Equally, Lake Chad is drying up and being taken over by heaps of sand. The Niger and Benue Rivers are naturally filled up with sand, which is seriously affecting navigation and import activities. This situation made the Federal Government of Nigeria in 2014 to embark on dredging of the River Niger to enhance navigation and import activities. Also they are serious ecological challenges in other parts of Nigeria, such as increases flooding, soil erosion, land and water pollution at the Delta and Port Harcourt areas, due to crude oil spillage from oil wells. Gas flaring is a constant phenomenon which emits $C0_2$ into the atmosphere and pollutes the whole environment and the entire country.

They are thousands of major and minor mining and excavation activities taking place in Nigeria without proper laws and polices guiding its operations and the environment. Even the

health of the worker are not protected. Our environment especially at the South East Nigeria is filled with littered wastes from houses, industries, companies, market and business centers. These of course promote the green house gas emission. All these impact negatively and by extension promote climate change which is currently a national and global challenge. Also volcanic eruptions occur at the Mambilla Plateau–Jos in Northern Nigeria.

It is based on this premise that the researchers were prompted and spurred to carry out this research study, in order to include climate change studies in the curriculum. Curriculum is a planned guided experiences and intended learning outcomes formulated through the systematic reconstruction of knowledge and experiences, under the auspices of school…[Tanner and Tanner in Mkpa,2003]. It is pertinent that the Secondary School Science Teachers be assessed on their knowledge of the following subject matters of climate change:

Concept of climate and climate,Global warming and Ozone depletion, Carbon dioxide emission, Green house gas effect and heat trapping, Ocean acidification, and sea level rising. Others include; explaining the element of climate change; General and ultimate causes of climate change with specific reference to Nigeria and Africa; Analyze the impact of climate change on environmental, biological and social system; Compare climate change mitigation and adaption strategies (macro and micro) in the light of Environmental, Economical, Political and Ethical impact in Nigeria, Africa and the world.

It is also expected that the secondary school teachers should teach the concepts of deforestation and desertification in Nigeria and Africa and the remedial measures; understand how to use climatic data collected as an evidence to justify claims relating to climate, climate change and mitigation.

The European Commission on Environment (2011),listed some of the measures to be taken to maintain clean environmental sustainability to include:

- Bringing used glasses to a designated collection centre including bottles sort out papers, card, boards, plastics and empty cans from the wastes and dispose properly. The commission suggested that the best measure is to recycle the Aluminum, Cans and Plastic materials.
- Reuse of shopping bags. That is to use a strong bags for shopping, instead of accepting disposable type each time one goes to market.
- Recycle the organic waste or compost it in the garden.
- Offices, Printing and Publishing Companies should dispose waste papers properly
- Not littering the environment, and disposing wastes with care.
- The use of public transportation as a way to keep emission low and the use of energy from the sun and wind to power the cities. It is worthy of note that in Nigeria, there is no designed Environmental Education and Climate Change Studies taught in the Secondary School. This could be largely due to non-inclusion of the “Climate Change” studies in the Secondary School Curriculum. The authors observe that it is a serious mistake on the part of both the government and all the stake holders in the Education subsector, bearing in mind the current and observable consequences and negative impact of climate change on Aquatic lives, Human health, Life stock, Farming activities, Crops, Inhabitants of desert region, Ocean current and so on.

Purpose of the Study

The major purpose of this study was to assess the Secondary School Science Teachers’ knowledge on Climate Change and its inclusion in the Nigeria Secondary School Curriculum

in the South East Nigeria. Specifically it sought to determine the Secondary School Science Teachers': 1 awareness of the concepts and issues of climate change.
2. Knowledge of the topics on climate change
3. Knowledge of the impact of climate change
4. Knowledge of the causes of climate change.
5. Agreement for inclusion of climate change topics[syllabi] in the secondary school curriculum Nigeria.

Hypothesis

The hypothesis was tested at 0.05 significant level.

H_O1: There is no significant difference in the mean ratings of Male and Female south east secondary school teachers for the inclusion of "climate change studies" in Nigeria secondary school curriculum.

Research questions

The following research questions guided the study.

1. What is the level of secondary school science teachers awareness of the concepts and issues of climate change.
2. To what extent do secondary school teachers possess the knowledge of topics on climate change.
3. How knowledgeable are secondary school teachers on the impact of climate change.
4. What is the level of secondary school science teachers' knowledge of the causes of climate change
5. To what extent do the secondary school science teachers agree for the inclusion of climate change topics [syllabi] in the secondary school curriculum in Nigeria.

Scope of the study

The study focused on the Assessment of secondary school science teachers' knowledge of climate change, for inclusion in the secondary school curriculum. The areas of assessment include awareness and knowledge of Global warming Ozone depletion; topic on climate change, impact (effect) and causes of climate change. These areas of assessment were drawn from the literature reviewed.

The respondents for the study were drawn from the secondary school science teachers from the South East States of Nigeria. The reason for the choice of science teachers was because "climate change" involves all aspects of sciences, such as, chemistry, biology, physics, Agricultural science, geography mathematics and integrated science. All these sciences are taught in the secondary schools by the science teachers. Equally the reason for the assessment and the agitation for the inclusion of climate change in the secondary school curriculum is because, in Nigeria the secondary school students are at the age bracket of (12 to 17) years and constitutes about 42% of the population. It is therefore believed that if a course on climate change is introduced and taught at that level, it will have a positive multiplier effects which will go a long way to enhance its mitigation in Nigeria and by extension, in Africa at large.

Curriculum is like a template containing all the knowledge, skills and attitudes which the society imparts to her citizens through her school. Therefore the knowledge of climate change, the skills and attitudes to mitigate it should be imparted to the citizens through the secondary schools by putting the course or programme on climate change in the secondary

school curriculum. The moment issues of climate change are organized and arranged as a body of knowledge and taught in the secondary schools in Nigeria, then the nation will be hopeful of curbing some natural and human-induced disasters.

Design of the Study

The research design used for the study was descriptive survey design. A descriptive survey design seeks to describe the what, how, or why something is happening. Ali (2006) describe a survey research design as a descriptive study which uses samples of an investigation to document, describe and explain what is in existent or non-existent on the present status of phenomena being investigated.

The descriptive survey research design was appropriate for this study because data were collected from a sample of the population (respondents) for the study. This research was in line with this design, as it sought to find out the extent of secondary school science teachers' awareness and possession of knowledge on topics of climate change and the impact for inclusion in the Nigerian secondary school curriculum.

Population of the Study

The population of the study was 2200 science teachers in secondary schools in the five (5) South East States of Nigeria. The States and the number of Science Teachers are; Abia – 422, Anambra – 434 Ebonyi – 307; Enugu – 515 and Imo – 522.

Sample and Sampling Techniques

The sample size of the study was 1,100 Secondary School Science Teachers. This size was drawn using 50% which is appropriate in order to cover the five states adequately. The proportionate stratified random sampling technique was used to select the number, which stood at Abia State-210; Anambra State–215; Ebonyi State-155; Enugu State–260 and Imo State –260.

Instrument for Data Collection

The Data were collected through a self–developed questionnaire, titled "Assessment of Secondary School Science Teachers' knowledge on Climate Change Studies and inclusion in Nigerian Secondary Schools Curriculum – (ASSSTKCCSN). The questionnaire was designed to generate responses and then employ statistical analysis of its responses. The instrument contained 65 items drawn from the four purposes of the study, and made provision of sex by the respondents to enable the researchers to classify data according to gender. It also provided a rating scale numbered 1 to 4, corresponding to; Strongly disagree (SD = 1), Disagree (D = 2), Agree (A =3), Strongly Agree (SA = 4), or very Low (VL = 1), Low (L = 2), High (H=3) and Very High (VH = 4).

Validity of Instrument

The drafts of the instrument were submitted to give (5) experts for face and construct validity. Two from the field of Measurement and Evaluation, two from science education and one from English Language. The experts made amendments on the drafts in terms of items structure, test format, appropriateness and clarity of items. After the validation four (4) items were dropped, remaining sixty one (61) items.

Reliability of Instrument

The final instrument made up of 61 items was subjected to test of reliability using Cronbach Alpha statistics. A reliability co-efficient of 0.83 was obtained which showed that the instrument was consistent and suitable for the study.

METHOD OF DATA COLLECTION AND ANALYSIS

The researchers administered the questionnaire with the help of research assistants to the selected Secondary School Science teachers. The data collected were analyzed using mean and standard deviation for the research questions while t-test statistics was used to test the null hypothesis at 0.05 level of significance. Any means score below 2.50 is regarded to be low while those from 2.50 above are regarded to be high.

RESULTS

The results of the analysis of the data collected for the study were presented in tables according to each research question.

Research Question 1:

What is the level of awareness of Secondary School Science teachers on the concepts and issues of climate change.

Table 1 Mean results of Secondary School Science Teachers of the issues of climate change

S/N	Items: You are aware of:	VH	H	L	VL	$\bar{X}$	SD	INT
1.	Global warming and Ozone depletion	255	395	280	170	2.7	1.63	HLA
2.	Green house emission	600	400	70	30	3.4	1.85	HLA
3.	Deforestation and Desertification	475	350	150	125	3.1	1.75	HLA
4.	Ocean Acidification and sea level rising	110	240	420	30	2.1	1.45	LLA
5.	Acid rain	225	250	325	300	2.4	1.53	LLA
6.	Gas flaring	175	430	270	225	2.5	1.58	HLA
7.	Volcanic eruption	400	375	125	150	2.8	1.68	HLA
	Grand mean					2.71	1.64	HLA

From the results in the table 1 above, all the items except items 4 and 5 had mean value 2.5 and above, which is High Level Awareness (HLA). The grand mean of 2.71 and standard deviation of 1.64 is also within the range of high level awareness.

Research Question 2

To what extent do Secondary School Science Teachers' possess the knowledge of topics on climate change.

Table 2: Mean results based on Secondary School Science Teachers' knowledge of topics on climate change

S/N	Item Topics are:	VH	H	L	VL	$\bar{X}$	SD	INT
1.	Concept of climate and climate change	275	375	230	220	2.6	1.6	H
2.	Green house gas emission, and effects.	300	290	250	260	2.5	1.60	H
3.	Ocean acidification and sea level rising.	230	290	320	260	2.4	1.56	L
4.	Global warming and Ozone depletion, causes, effects and remedies.	235	335	260	270	2.5	1.60	H
5.	Deforestation and desertification, causes and effects	360	340	175	225	2.8	1.66	H
6.	Gas flaring	310	300	255	235	2.6	1.61	H
7.	Acid Rain	260	265	325	250	2.4	1.56	L
	Grand mean					2.54	1.59	

The results in table 2 above, revealed that only items 3 and 7 had a mean of 2.4 each, which is rated as low (L) possession of knowledge by the Science teachers. While all other five (5) items had means of 2.5 and above which is interpreted a High (H) possession of knowledge. Equally the grand mean is 2.54 and standard deviation of 1.59, which is also within the range of high possession of knowledge by Secondary School Science teacher on topics of Climate change in Nigeria.

Research question 3

How knowledgeable are secondary school science teachers on the impact of climate change.

Table 3: Mean and standard deviation of Secondary School Science Teachers knowledge on impact/effect of climate change.

S/N	Items: knowledge of the following Effects:	VH	H	L	VL	$\bar{X}$	SD	INT
1.	Ozone layer depletion and Intense Solar ray on Earth surface	325	300	250	225	2.6	1.63	H
2.	Death and Extinction of Aquatic lives: fishes, reptiles, animals and sea plants.	260	340	280	220	2.5	1.60	H
3.	Drought/water loss in oceans and seas.	340	310	220	230	2.6	1.64	H
4.	Fresh water pollution and lack of portable water	505	520	55	20	3.4	1.83	H
5.	Poor crop yield and increase crop pests.	325	360	215	200	2.7	1.65	H
6.	Increase human cancer and diseases.	275	340	250	235	2.5	1.61	H
7.	Desert encroachment	400	350	200	150	2.9	1.70	H
8.	Environmental and Air pollution	460	340	125	175	3.0	1.72	H
9.	Low National GDP and increase poverty	170	330	350	250	2.3	1.50	L
10.	Earth quake, erosion and volcanic eruption	225	425	315	135	2.6	1.63	H
	Grand mean					2.7	1.64	H

Based on the results of the table 3 above, all the items except item 9 had mean value of 2.5 and above which is high knowledge on the impact of climate change by the secondary school science teachers in Nigeria. Also the grand mean is 2.7 and standard deviation of 1.64, which is equally within the region of high knowledge.

Research question 4

What is the level of secondary school science teachers' knowledge of the causes of climate change.

Table 4: Mean and standard deviation of Secondary School Science Teachers' knowledge on causes of climate change (Global warming)

S/N	Items on knowledge of causes:	VH	H	L	VL	$\bar{X}$	SD	INT
1.	Constant bush burning	505	425	75	95	3.2	1.79	H
2.	Burning of fossil fuels like, coal and oil	400	450	160	90	3.0	1.74	H
3.	Green house gas emission	600	250	100	150	3.1	1.78	H
4.	Increased littering of Refuse wastes	250	350	275	225	3.5	1.59	H
5.	Gas flaring	725	175	75	125	2.3	1.83	H
6.	Natural change in Earth's Orbit	135	290	300	375	2.1	1.47	L
7.	Oceanic circulation (acidity)	225	375	280	220	2.5	1.59	H
8.	Volcanic eruption	400	450	150	100	3.0	1.74	H
9.	Variation in Solar radiation	325	300	225	250	2.6	1.62	H
10.	Industrial, Mining and Space Activity	410	440	150	100	3.0	1.74	H
	Grand mean					2.8	1.68	H

From the results in the table 4 above, all the items except items 5 and 6 had mean value of 2.5 and above which is level knowledge of the secondary school science teachers on the causes of climate change. The grand mean of 2.8 with standard deviation of 1.68 is also within the range of high level knowledge.

Research question 5

To what extent do the secondary school science teachers agree for the inclusion of climate change topics (syllabi) in the secondary school curriculum in Nigeria.

Table 5: Mean results of Secondary School Science Teachers responses for inclusion of climate change topics (syllabi) in the secondary school curriculum.

A	Items: Topics are:	VH	H	L	VL	$\bar{X}$	SD	INT
1.	Concept of climate and climate change	990	110	-	-	3.9	1.97	A
2.	Green house gas emission illustration	1005	95	-	-	3.9	1.97	A
3.	Ocean acidification and sea level rising	775	325	-	-	3.7	1.92	A
4.	Global warming and Ozone depletion	200	900	-	-	3.1	1.78	A
5.	Deforestation and desertification	1100	-	-	-	4.0	2.0	A
6.	Acid rain	510	490	100	-	3.3	1.83	A
7.	Gas flaring	410	540	150		3.2	1.79	A
8.	Erosion, Earth Quake and volcanic eruption	1100	-	-	-	4.0	2.0	A
B.	General and specific causes of climate change							
9	Man's industrial, mining and agricultural activities.	1000	100	-	-	3.9	1.97	A
10.	Deforestation and bush burning constantly	1100	-	-	-	4.0	2.0	A
11.	Burning of fossil fuels like Coal, oil, etc.	1100	-	-	-	4.0	2.0	A
12.	Green house gas emission	600	500			3.5	1.88	A
13.	Gas flaring and CO_2 from steam engines	560	540			3.5	1.87	A
14.	Increase littering and dumping of refuse waste	1050	50			3.9	1.98	A
15.	Natural change in Earth's Orbit	420	680			3.3	1.83	A
16.	Variation in solar radiation	415	500	185		3.2	1.79	A
C.	Effect of climate change on:							
17.	Human Health (increase disease)	525	505	70	-	3.4	1.84	A
18	Aquatic lives (Death and Extinction of fishes etc)	1100	-	-	-	4.0	2.0	A

19	Soil and farming activities	1100	-	-	-	4.0	2.0	A
20	Increase crop pests and poor yield	525	575	-	-	3.4	1.86	A
21	Fresh and portable water National Gross Domestic products	325	425	200	150	2.8	1.68	A
D.	Mitigation strategies to adopt	SA	A	D	SD	$\bar{X}$	SD	INT
22	Use of solar, wind and hydro sources of energy	300	360	225	215	2.6	1.63	A
23	Green house forestation exercise	1005	95	-	-	3.9	1.97	A
24	Proper burying and disposal of wastes	960	140	-	-	3,8	1.96	A
25	Encourage bio-engineering and bio fuel	950	-	150	-	3.7	1.93	A
26 27	Recycle organic wastes and make compost. Making laws and policies to guard the environment for sustained mitigation	1100	-	-	-	4.0	2.0	A
		1100	-	-	-	4.0	2.0	A
	Grand mean					3.61	1.90	

Note: More topics could be added in due course. However, based on the results of table 5 above, all the items (topics on climate change) had mean values of above 2.5 and the grand mean of 3.61 with standard deviation of 1.90. These data indicated that all the items were unanimously and over whelming agreed for the inclusion in the secondary school curriculum in Nigeria.

Table 6: t- test analysis of mean rating between Male and Female Secondary School Science Teachers for inclusion of "climate change studies" in Nigeria secondary school curriculum.

Gender	N	$\bar{X}$	SD	DF	t-cal	t-crit
Male	570	3.82	1.69			
Female	530	3,50	1.87	218	1.88	1.96

The analysis of the results in table 6, showed the mean values of males and females on their agreement for inclusion of climate change studies in the Nigeria secondary school curriculum. The males had mean value of 3.82 and standard deviation of 1.69, while the females had mean of 3.50 and standard deviation of 1.87. The t-cal had 1.88 while t-crit was 1.96. Therefore, the analysis showed there is no statistical significant difference between the male and female secondary school science teachers for inclusion of "climate change studies" in Nigeria secondary school curriculum. Their responses are unanimous.

FINDINGS

In view of the analysis of the data obtained, the results indicated that;

(i) The South East Secondary School Science teachers in Nigeria, possess high level awareness of issues on climate change, such as Global warming, Ozone depletion, Green house gas emission, Deforestation and desertification, among other items listed. This conclusion was drawn based on the mean ratings and the grand mean which were found to be above 2.5. However a low level awareness was found in items 4and 5 of table 1, which is on Ocean acidification and Sea level rising, and Acid rain. These do not in any way nullify their high level awareness recorded.

(ii) The Secondary School Science teachers in the South Eastern Nigeria, possess high knowledge of topics on climate change. This is evident in the overall grand mean of 2.54 as shown in table 2, which then nullifies items 3 and 7 which recorded low knowledge.
(iii) The South East Secondary School Science Teachers in Nigeria have high knowledge of the impacts (effects) of climate change, irrespective of item 9 in table 3 which had low knowledge. Based on the grand mean of 2.7, it is therefore concluded that the Secondary Schools Science Teachers have high level knowledge of the impact (effects) of climate change in South East Nigeria.
(iv) The Secondary School Science Teachers, in the South East Nigeria, possess high level knowledge of the causes of climate change, with virtually all the items having mean of 2.5 and above, except item 6 of table 4, which had mean of 2.1, translated to low level knowledge. However, the conclusion was drawn from the grand mean of 2.8 which showed that the Secondary School Science Teachers in the South East Nigeria, possess high level knowledge of the causes of climate change.
(v) The South East Science teachers in Nigeria overwhelmingly agreed for inclusion of Climate Change (Syllabi) topics in the secondary school curriculum in Nigeria. This conclusion was drawn based on the mean ratings and the grand mean which were found to be above 2.5.
(vi) There was no significant difference $P>0.05$ between the mean ratings of the Male and Female South East Nigeria Secondary School Science teachers for inclusion of "climate change Studies" in Nigeria Secondary Schools' Curriculum.

RECOMMENDATIONS

According to the findings of this study, the researchers recommend the following:
1. Nigerian Government should develop and include Climate Change Syllabi, as a body of knowledge in the secondary school curriculum .
2.Nigerian Government should retrain the Secondary School Science Teachers on the issues and topics of climate change in order to make up for their low knowledge in some topics as discovered in the study.
3. The Government should equally set up Curriculum Development Experts, headed by the Nigerian Education Research and Development Council (NERDC) to development Teaching-Guide books for Secondary School Science Teachers on Climate Change Studies.
4. The Climate Change Topics and Contents as highlighted in this study can be fully adopted or adapted with modifications.
5. Government, Non-Governmental organizations and Institution of Higher Learning should jointly mount campaigns and practical approaches for the teaching of climate change in Nigerian Secondary Schools.

CONCLUSION

The results of the findings of this study have educational implications, upon which the following conclusions were drawn.
The Secondary School Science teachers, in the South Eastern part of Nigeria were rated on a maximum mean value of 4.0 and a minimum mean value of 2.5. Therefore based on their grand means which are as follows; level of awareness of climate change had 2.71; knowledge of climate change topics had 2.54; knowledge of impact (Effect) of climate change had 2.7 and the causes of climate change had 2.8; the researchers conclude that the secondary school science teachers are operating at an average level and not high level. In this case, there should

be an intensive training and retraining for them. Equally they should be involved in the workshops or seminars for the modification of the climate change contents (syllabi) and in the development of the teachers' teaching guide books

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