

Awareness and Attitude of Secondary School Biology Teachers and Students on Climate Change Adaptation in Awka Education Zone of Anambra State.

Eugenia, Udegbumam & Onyegegbu, Nkadi

Department of Science Education, University of Nigeria Nsukka

E-mail: Gebbyson@Gmail.Com

Abstract

The study investigated the awareness and attitude of biology teachers and students on climate change adaptation. Four research questions and two null hypotheses guided the study. Adopted descriptive survey research design as employed. The sample consisted of 464 respondents (68 Biology teachers and 396 SSII Biology students) drawn from six (6) public secondary schools using simple random sampling technique. Two instruments were used for data collection namely: Climate Change Adaptation Awareness Questionnaire (CCAAQ), and Attitude to Climate Change Adaptation Questionnaire (ACCQ). The instruments were trial tested and using Cronbach Alpha Formula yielded internal consistency reliability index of .96 and .97 respectively. The data collected were analysed using mean and standard deviation for research questions while the null hypotheses were analysed using t-test at 0.05 level of significance ($P < 0.05$). Findings showed that biology teachers and students' awareness and attitude level on climate change adaptation were low. There was no significant difference in biology teachers and students awareness and attitude towards climate change adaptation by school location. This study has implications on the teachers and students for awareness creation and building interest on climate change and adaptation in secondary schools.

Keywords: Climate Change, Adaptation, Awareness, Attitude, Biology, Students and Teachers

Introduction

Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions, or in the distribution of weather around the average conditions. It is one of the greatest challenges that confront man and societies today. Climate is the measure of the average pattern of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle counts and other metrological variation in a given region over a long period of time (Howell, Capstick & Whitmarsh, 2016). Climate is the statistics (usually, mean or variability) of weather, usually over a 30-year interval (Baede, 2015). Climate change is a fundamental element of the environment that causes alteration in an ecosystem if its variation becomes erratic. The shift resulting from climate change affects elements of an entire environment, which makes climate change a global issue, but at various levels of impact (Ikehi, Ifeanyieze & Ugwuoke, 2014). It could mean changes in climate overtime, including regional or global temperature changes and the increased prevalence of extreme weather conditions. There are four schools of thought about climatic change. One finds evidence that the world is entering the next Ice Age; another has confidence that the earth is getting warmer; a third believes that there has been no significant change in historical times, and the fourth is agnostic in such matters (Leiserowitz, Smith & Marlon, 2011). In the past century, global surface temperature increased by about 1.4°F. In the past quarter- century, according to satellite measurements, the lower atmosphere warmed by 0.22- 0.34 °F per decade equivalent to 2.3°F per century (Baede, 2015). This well documented warming trend could result from several factors that influence the earth's climate, some of which are natural, such as changes in solar radiation and volcanic activity.

Others, particularly the release of certain gasses to the atmosphere and land- cover changes, are anthropogenic (Hannah, Lovejoy & Schneider, 2005).

There are a variety of potential causes for global climate change, including both natural and human- induced mechanisms. Science has made great strides in determining which potential causes are actually responsible for the climate change that occurred during the twentieth century. This has provided evidence that greenhouse gases released to the atmosphere by human activities are one of the main causes of contemporary global warming which leads to climate change (Hall & Wreford, 2012). Change in climate is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and is observed over time. The natural processes are the astronomical and the extra-terrestrial factors. The astronomical factors include the changes in the eccentricity of the earth's orbit, changes in the obliquity of the plane of ecliptic and changes in orbital procession; while the extra- terrestrial factors are solar radiation quantity and quality among others (Anyadike, 2009). On the other hand, the anthropogenic factor in climate change involves human activities that either emit large amount of greenhouse gases into the atmosphere that depletes the ozone layer or activities that reduce the amount of carbons absorbed from the atmosphere (Akpodigaga 2010). The human factors that emit large amounts of greenhouse gases include industrialization, burning of fossil fuel, gas flaring, urbanization and agriculture. Other human activities that reduce the amount of carbon sinks are deforestation, alterations in land use, water pollution and agricultural practices. The human factors have been proven to be responsible for the on-going unequivocal climate change (Intergovernmental Panel on Climate Change (Odjugo, 2009). According to Cline (2007) climate change is caused by the accumulation of greenhouse gases in the lower atmosphere. The global concentration of these gases is increasing mainly due to human activities, such as combustion of fossil fuels, which release carbon dioxide and deforestation which leads to reduced forests that remove carbon from the atmosphere. Climate change is often used to describe any kind of change in climate that may be natural or human- induced, (Union of Concerned Scientist, (UCS), 2002).

Climate change phenomenon has serious deleterious consequences for the earth in the form of significant variations in regional climates, recurrent droughts, excessive heat waves, windstorms, killer floods, sea rise and increase in diseases (Ekpoh&Ekpoh, 2011).Climate change is already beginning to transform life on earth, for example around the globe seasons are shifting and sea levels are rising, there are higher temperatures, changing landscapes, wildlife exposure risk, increased risk of drought, fire and floods, stronger storms and increased storm damage, more heat- related illness and disease and economic losses (Ekpoh&Ekpoh, 2011).Change in climate impacts the natural systems (ecological systems, hydrology and water resources, coastal systems) and the human society at large (including human health, settlements, food and fibre production, industry, energy and infrastructure thus impeding the achievement of sustainable development (Mauricio, Federico & Garcia, 2013). The IPCC's 2007 climate change report gives the following climate related impacts for Africa: By 2020, between 75 and 250 million of people are projected to be exposed to increased water stress due to climate change. By 2020, in some countries, yields from rain- fed agriculture could be reduced by up to 50%. Agricultural production including access to food, in many African countries is projected to be severely compromised. This could further adversely affect food scarcity and exacerbate malnutrition. African countries are therefore among the most vulnerable to the impacts of climate change (Odjugo, 2012).

Africa is already the hottest continent but once climate change impact becomes stronger, temperatures will be even hotter and drought is likely to threaten already inadequate food supply

(Himeidan, 2007). As climate change threatens Africans, health, homes and the natural resources upon which many depend to survive, begins to face urgent crisis. For people struggling with the challenges posed by climate variability, environmental degradation and poverty, climate change represents a tipping point (Igwebuike&Dorsu, 2010). It is likely to alter the transmission patterns of disease such as malaria, increased incidences of cholera and meningitis. Mosquitoes, which carry many diseases, are very sensitive to temperature changes. Warming of their environment within their viable range boosts their rates of reproduction and the number of blood meals they take, prolong their breeding season, and shorten the maturation period for the microbes they disperse. Also, health threats such as diarrhoea, asthma and stroke affect more people when temperature rises (Igwebuike&Dorsu, 2010). Developed countries experiencing the impact of climate change are working out strategies to combat its effect and African countries, including Nigeria should not be left behind.

The climate change situation in Nigeria is not far from what the developed countries are experiencing. There are noticeable consequences of climate change in Nigeria, such as intense thunder storms, widespread floods and incessant droughts (Ekpoh&Ekpoh, 2012). Persistent droughts and flooding, off season rains and dryness have sent growing seasons out of cycle, in a country dependent on rain fed agriculture and hydropower. The agricultural sector contributes some percentage of the Nigerian Gross National Product and majority of the rural populace are employed in this sector. Climate deteriorations causes devastating socioeconomic consequences, which would manifest in food security challenges, damage to infrastructure and social dislocation. Considering the strong nexus between climate change and development, Nigeria is highly at risk in the area of food and nutrition, poverty and hunger reduction, and most importantly economic development. For these reasons Nigeria's efforts and actions must be informed by these realities.

A study on regional evidence of climate change in Nigeria showed that temperature is steadily increasing especially from the 1970's between 1901-1935 and 1936-1970 climatic periods (Odjugo, 2010). The temperature anomaly shows that climate change signal is stronger as from the 1970's. The rate of temperature increase is higher in the semi-arid region than the coastal areas of Nigeria. The current available evidence shows that Nigeria, like most parts of the world is experiencing the basic features of climate change. Desertification process is advancing southward and there is the potential submerge of the 853 kilometres stretch of coastline along Atlantic Ocean (Ogali, 2012). Former Common Wealth Secretary General, Chief Emeka Anyaoku noted that Nigeria is not immune to the disastrous effects of climate change despite the fact that it is not prone to natural disaster such as earthquakes, typhoons or massive floods. Nigeria is contributing significantly to the carbon dioxide emission through the gas flaring that has been going on in oil producing Niger Delta regions. Changes in processes, practices and structures to moderate potential damages or to benefit from opportunities associated with climate change adaptation can be achieved through proper climate change adaptation education to enlighten the citizenry about the dangers and possible ways of mitigating the impacts of climate change. Adaptation to climate change is the adjustment in natural or human system in response to actual or expected climatic stimuli or their effect which moderately harm or exploit beneficial opportunities (IPCC, 2007). Adaptation seeks to lower the risk posed by the consequences of climate change. It is a practical step to protect countries and communities from likely disruption and damage that will result from effect of climate change. Examples of adaptation measures include: using scarce water resources more efficiently; adapting building codes to future climate conditions and extreme weather events; building flood defence and raising the levels of dykes;

developing drought-tolerant crops; choosing tree species and forestry practices less vulnerable to storms and fires; and setting aside land corridors to help species migrate (Ozor, 2010). Proper adaptation measure could help to minimise the adverse effects or to take advantage of any beneficial effects of climate change. Adapting to the changes has consequently emerged as a solution to address the impacts of climate change that are already evident in some regions (Ogali, 2012). This is because awareness and quality of knowledge on existence and issues relating to climate change adaptation could reduce the impact of the phenomenon.

Awareness of climate change could help students and other individuals become scientifically and ecologically literate citizens, who can describe, explain and predict natural phenomena using sound ecological thinking, capable of full participation in a democratic sustainable society. The level of awareness on the impact of climate change could lead people to engage in activities that reduce the problems of climate change. Adequate knowledge and awareness of the effects of climate change will help make communities to join forces in reducing the vulnerability of societies to climate related risks both now and in the future (Oruonye, 2011). According to Mauricio, Federico and Garcia (2013) analysis of a global survey finds that more than a third of the world's adults have never heard of climate change. For some countries, such as South Africa, Bangladesh and Nigeria, this rises to more than two-thirds of the adult population. The study says that education is the "single strongest predictor" of public awareness of climate change. Improving basic education and public understanding of climate change are vital to garner support for climate action. IPCC (2013) recorded that the awareness rates in developing countries were much lower. For example, 47%, 25% and 21% adults from Philippines, India and Nigeria respectively said they were aware of climate change. The lowest levels of awareness was recorded for Nigeria. This poor awareness level of Nigerians could be as a result of the attitude of her citizenry toward climate change adaptation.

Attitude towards adaptation to climate deals greatly with adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects which moderates harm or exploits beneficial opportunities. Attitude to climate change adaptation is the way of thinking and acting towards adjustment to the impact of climate change. Therefore, climate change attitude means the way of thinking and acting by individual towards the issue of global climate change. It is the feelings and concerns an individual could have regarding climate change.

In spite of the efforts, through school instructions to promote awareness and attitude towards environmental problems particularly climate change, it appears that the programme is not yielding the desired result (Egbuna-Ojukwu, 2016). This is because, people (including those who passed through the instructional programme in school) seem to have continued perpetuating actions such as bush burning, deforestation, burning of fossil fuel like petrol, coal, and crude oil which contribute to climate change. It is worthy of note that as these human actions that contribute to climate change continue, so shall the consequences of climate change continue to face human beings on earth.

Climate change adaptation is an area that is in dire need of publicity to help the public make informed decisions in its adaptation and mitigation. The level of awareness and attitude of learners about climate change therefore needs to reflect that complexity and be multi-dimensional and multifaceted, rather than focusing only on single variables such as carbon dioxide emissions. Above all, awareness and attitude towards climate change adaptation is the practical enlightenment which can help learners deal with uncertainty whenever the menaces of climate change occur. To ensure adequate adaptation and mitigation of the harmful impacts of

climate change to our society, there is need for adequate knowledge of climate change. Hence the need to determine the awareness and attitudes of secondary school Biology students and teachers on climate change adaptation in Awka Education Zone of Anambra state.

Research Question

The following research questions guided this study

1. What is the awareness level of secondary school biology teachers and students on climate change adaptation as measured by their mean rating?
2. What is the attitude of secondary school biology teachers and students on climate change adaptation as measured by their mean rating?
3. What is the awareness level of biology teachers and students on climate change adaptation by school location as measured by their mean rating?
4. What is the attitude of biology teachers and students on climate change adaptation by school location as measured by their mean rating?

Hypotheses

Hypotheses were formulated to guide the study and were tested at 0.05 level of significance

H₀₁: There is no significant difference in the awareness level of biology teachers and students on climate change adaptation based on school location

H₀₂: There is no significant difference on the attitude of biology teachers and students on climate change adaptation based on school location.

Method

The design of the study is survey design. Specifically, it employed a descriptive survey design. The study was carried out in Awka Education Zone of Anambra State. The population of the study comprised all the 68 Biology teachers and 3,958 SS II Biology students in sixty- one 61 public secondary schools in Awka Education Zone. (Statistics Unit Post Primary School Service Commission (Awka Zone), (2018).The sample for the study consists 464 respondents made up of 68 Biology teachers and 396 SSII Biology students drawn from six (6) public secondary schools in Awka education zones in Anambra State using simple random sampling technique (balloting without replacement).The following instruments were used for data collection: Climate Change Adaptation Awareness Questionnaire (CCAAQ), and Attitude to Climate Change Adaptation Questionnaire(ACCQ).

The internal consistency reliability of the instruments was established using Cronbach Alpha Formula and they yielded internal consistency reliability index of .96 and .97 respectively. The researcher and the research assistants administered and collected back the copies of the instruments on the spot. This was done to ensure maximum return of the instrument. The data collected from the research questions were analysed using mean and standard deviation, while then null hypotheses were analysed using t-test at 0.05 level of significance ($P < 0.05$). Based on the four-point scale, a criterion mean score of 2.50 was used as the benchmark for decision taking. Therefore, any item that has mean rating below 2.50 were rejected while the items have mean of 2.50 and above were accepted.

Results

The results of the data analysis are presented and interpreted in the sequence of the research questions and hypotheses guiding them.

Secondary School Biology Teachers and Students Awareness level on Climate Change Adaptation

Research Question 1: What is the awareness level of biology teachers and students on climate change adaptation as measured by their mean rating?

Table1: Mean and standard deviation (SD) on Biology Teachers and Students Awareness of climate change adaptation

S/N	Item statements	X_1	SD	Decision
1.	Establishing weather monitoring equipment on school compounds to forecast events in the atmosphere	2.01	.70	Disagree
2.	Knowledge of routine measure of water levels	2.21	.86	Disagree
3.	Strengthening early warning sign	2.13	.79	Disagree
4.	Creating awareness among the citizenry	2.07	.78	Disagree
5.	Switching to early maturing varieties of crops	2.13	.79	Disagree
6.	Tree planting and reforestation	2.23	.84	Disagree
7.	Building of sea banks	2.35	.93	Agree
8.	Encouraging recovery of by- products and scraps for reuse	2.31	.88	Agree
9.	Encouraging recycle of waste materials	2.44	.99	Agree
10.	Planting trees that thrive on erosion lands eg Bamboo tree	2.62	.95	Agree
11.	Decrease the use of old cars	2.53	.98	Agree
12.	Conservation of the remaining forest	1.96	.76	Disagree
13.	Restraining the use of air conditioner	1.87	.72	Disagree
14.	Proper disposal of waste in the environment	1.85	.72	Disagree
15.	Increased use of wind energy	1.82	.67	Disagree
16.	Awareness campaign on climate change	1.85	.70	Disagree
17.	Mapping of risk and disaster areas	1.83	.73	Disagree
18.	Formation of climate change clubs in schools and localities	1.86	.73	Disagree
19.	Mounting awareness campaigns through the radio and television on climate change adaptation	1.81	.77	Disagree
20.	Sticking to master plans of towns and cities	1.93	.89	Disagree
21.	Stop dumping of refuse in the drains	2.03	.97	Disagree
22.	Ensure that drains are cleared regularly	1.98	.89	Disagree
23.	Making policy and programmes that provide opportunities for the displaced communities to earn livelihood	1.90	.87	Disagree
24.	Construction of dykes to stop water flooding in low area of land	2.11	.84	Disagree
25.	Construction of embankments to keep water back against pollution of the wetland	2.10	.85	Disagree
26.	Construct fish ponds in the flooded areas	2.01	.79	Disagree
27.	Explore other livelihoods other than agriculture	1.81	.73	Disagree
28.	Switch to other crops that can tolerate floods and heavy rainfall	1.78	.73	Disagree
29.	Provision of relief materials from good spirited individual and government	1.71	.70	Disagree
30.	Free medicine from government to flood victims	1.69	.71	Disagree

31.	Rehabilitation of destroyed infrastructure by government	1.80	.79	Disagree
32.	Helping people in evacuation areas	1.87	.84	Disagree
33.	Construction of surface dam	1.85	.86	Disagree
34.	Control burning of bushes	1.87	.84	Disagree
35.	Proper timing of tree planting activities	1.94	.89	Disagree
36.	Introduction of drought resistant plant species	1.94	.87	Disagree
37.	Planting early maturing varieties of crops and vegetables	1.91	.87	Disagree
38.	Use of direct seeding method, which requires less water	1.78	.79	Disagree
	Cluster Mean	1.99	.51	Disagree

Data in table 1 showed that items 7-11, with item statements in no.7: building of sea bank X1 2.35 SD .93, no. 9: encouraging recycling of waste material X1 2.40 SD.99 item11: Decrease the use of old cars. X1 2.53 SD. no.98 etc had mean rating above the mean cut off point of 2.50 while items 1, 2, 3, 4, 5, 6, 12-38, with item statements of item no.1: establishing weather monitoring equipments on school compound to forecast events in the atmosphere X1 2.01 SD.70, item no.2: knowing the routine measure of water cycle X1 2.01 SD70, item no.3: strengthen early warning sign X1 2.13 SD.79 etc had mean rating below the cut off point of 2.50. With the cluster mean score of 1.99. It showed that the students and teachers had low awareness level on climate change adaptation

Secondary School Biology Teachers and Students Attitude level on Climate Change Adaptation

Research Question 2: What is the attitude of biology teachers and students on climate change adaptation as measured by their mean rating?

Table2: Mean and standard deviation (SD) on Biology Teachers and Student's attitude on climate change adaptation.

S/N	Item statements	X	SD	DECISION
39.	I do not think that proper environment management could stop the impact of climate change	1.75	.76	Disagree
40.	I am worried at the rate of flooding because it increases the effect of climate change.	1.73	.75	Disagree
41.	I always ask questions on Climate change adaptation strategies	1.69	.68	Disagree
42.	I predicate in planting of trees on open fields in order to check the incidence of erosion	1.70	.70	Disagree
43.	I believe that harnessing climate change impact will bring about safe environment.	1.74	.76	Disagree
44.	I am seriously concerned with the problem climate change may bring	1.68	.75	Disagree
45.	I am working hard to educate my friends about Climate change adaptation	1.64	.70	Disagree
46.	I have joined Climate change adaptation awareness club in my school to help.	1.70	.77	Disagree
47.	There is nothing I can do about Climate change adaptation that will make a meaningful difference.	1.80	.88	Disagree

48.	I am spreading the news of Climate change	1.70	.77	Disagree
49.	I have heard of climate change adaptation before	1.75	.79	Disagree
50.	I do not like to listen to news related to Climate change adaptation	1.71	.79	Disagree
51.	I believe that the problem of Climate change adaptation will be easy to handle.	1.80	.84	Disagree
52.	I am spreading news of Climate change adaptation within my area.	1.86	.85	Disagree
53.	I don't mind engaging in any activity to ensure proper climate change adaptation	2.35	.94	Agree
54.	Climate change adaptation will benefit only those who caused it	2.48	.96	Agree
55.	I think non adherence to Climate change adaptation strategies will make a lot of people to lose their job	2.59	.90	Agree
56.	I always plant trees to help reduce the rate of Climate change	2.67	.84	Agree
57.	I will be happy if the issue of Climate change is taken more seriously in my school.	2.65	.88	Agree
58.	I do not think I can do any meaningful thing to make difference about climate change	2.63	.84	Agree
59.	I am preparing myself to manage the effects of Climate change	2.69	.87	Agree
60.	I read any available information on Climate change	2.74	.87	Agree
61.	I read any available information on Climate change adaptation .	2.76	.91	Agree
62.	I encourage my friends to stop bush burning to prevent Climate change.	2.76	.91	Agree
63.	I will like the government to make an environmental laws against anybody who will cause climate change	2.75	.95	Agree
64.	I do not think that the climate is changing	2.74	.95	Agree
65.	I do not feel threatened about the problems caused by Climate change e.g flooding, erosion.	2.67	.95	Agree
66.	I try to manage my classroom to avoid climate change effect.	2.70	.93	Agree
	Cluster Mean	2.19	.54	Disagree

Data in table 2 showed that items 39-52 with item statement in no.39: I dont think that proper environment management could stop the impact of climate change $X1.75$, $SD.76$, no. 49: I have heard of climate change adaptation $X 1.75$ $SD.79$. 50: I do not listen to news related to climate change adaptation $X 1.71$ $SD .79$, no.52 : I am spreading news of climate change adaptation within my area $X1 .86$ $SD .85$ etc had mean rating below the mean cut off point of 2.50 while items 53- 66 with item statement in no.60: I read any available information on climate change $X 2.76$ $SD .87$ no. 61 I read any available information on climate change adaptation no.66: I try to manage my classroom to avoid climate change effect $X 2.70$ $SD .93$

had mean rating above the cut-off point of 2.50. With the cluster mean score of 2.19. It showed that biology teachers and students had poor attitude towards climate change adaptation.

Secondary School Biology Teachers and Students' Awareness Level on Climate Change Adaptation by School Location

Research Question 3: What is the awareness level of secondary school biology teachers and students on climate change adaptation by school location as measured by their mean rating?

Table 3: Mean and standard deviation (SD) on biology teachers and students climate change adaptation awareness by school location.

Location	Number	Mean	Standard deviation
Rural	281	2.04	.51
Urban	183	1.93	.52

Data in Table 3 revealed the awareness of biology teachers and students on climate change adaptation by school location which shows that teachers and student in rural area had a mean score of 2.04 while those in urban area had a mean score of 1.93. Based on the mean cut off point which is 2.50, it indicates that both rural and urban areas have low awareness of climate change adaptation, although those in urban area had higher mean rating.

H₀₁: There is no significant difference in the awareness level of biology teachers and students on climate change adaptation based on school location.

Table 4: t-test analysis on significant difference in the mean rating of biology teachers and students awareness of climate change adaptation by school location

Location	N	Mean	SD	T	DF	Sig	Decision
Rural	281	2.04	.51	1.07	462	.488	NS
Urban	183	1.93	.52				

An independent sample t- test was conducted to compare the mean ratings of rural and urban area biology teachers and students on awareness of climate change adaptation. The result showed that there was a significant difference in the mean rating for rural (R= 2.04, SD= .51) and urban (U=1.93, SD= .52), $t(462) = 1.07$, $p > .488$ two tailed. The null hypotheses were therefore; not rejected indicating that there was no significant difference in the mean rating of biology teachers and students by school location on awareness of climate change adaptation.

Secondary School Biology Teachers and Students' attitude level on Climate Change Adaptation by School Location

Research Question 4: What is the attitude of biology teachers and students on climate change adaptation by school location as measured by their mean rating

Table 5: Mean and standard deviation (SD) on influence of school location on biology teachers and student's attitude towards climate change adaptation by school location.

Location	Number	Mean	SD
Urban	281	2.26	.54
Rural	183	2.10	.52

Data in Table 5 on attitude of biology teachers and students in climate change adaptation by school location which shows that teachers and student in urban area had a mean score of 2.26 which is higher than those in rural area which had a mean score of 2.10. Based on the mean cut off point of 2.50, it indicates that both teachers and students in rural and urban senior secondary biology students had low attitude towards climate change adaptation.

H₀₂: There is no significant difference in the attitude of biology teachers and students on climate change adaptation based on school location.

Table 6: T-test on difference in the mean rating of biology teachers and students on attitude towards climate change adaptation by school location

Location	N	Mean	SD	T	DF	Sig	Decision
Urban	281	2.26	.54	1.55	462	.798	NS
Rural	183	2.10	.53				

An independent sample t- test was conducted to compare the mean ratings of rural and urban area biology teachers and students on their attitude towards climate change adaptation. The result showed that there was a significant difference in the mean rating for rural (U= 2.26, SD= .55) and urban (R=2.10, SD= .53), $t(462) = 1.55$, $p > .798$ two tailed. The null hypotheses were therefore; not rejected indicating that there was no significant on difference in the mean rating of biology teachers and students on attitude towards climate change adaptation by school location

Discussion

Biology teachers and student's awareness off climate change adaptation

Result of the study showed that the students and teachers had low awareness level on climate change adaptation. The result of this finding could be as a result of the fact that the biology teachers and students were not exposed to adequate instructions regarding climate change adaptation or because they paid a lazier affair attitude towards the instructions given to them. It could also be because they do not listen to news on television or radio jingles or read newspapers where climate change awareness and strategies on climate change adaptation are been showcased or because they do not have access to internet materials to read and be aware of climate change adaptations. As a result of these reasons, they have low awareness on climate change adaptation. The finding is in line with Ishaye and OObaje (2008) who found out in a study in senior secondary schools in Jema local government are of Taraba State that the students possess low awareness of climate change adaptation. Similarly, Nzeadibe, Egbule, Chukwuone and Agu (2011), and Ozor (2009) also found out that people possess low awareness of climate change in their respective studies. These findings that have continued to show low climate change awareness among young Nigerians particularly those in secondary schools could be as a result of the fact that the relevant subjects like Geography, Biology, Chemistry, Agricultural Science, Economics, Social studies and Primary science have not been effectively used to promote issues that borders on changing global climate.

Biology teachers and student's attitude towards climate change adaptation

The result of the study showed that biology teachers and students had poor attitude towards climate change adaptation. This finding could be as a result of ignorance of some strategies on climate change adaptation or because the respondents feel that it is not their business to ensure positive attitude towards their environment and this makes them to show nonchalant about it. It

could be that they are not exposed to materials on climate change adaptation. This finding supports Oruonye (2011) who found out that the tertiary institutions student's possessed poor attitude towards climate change adaptation. Ishaya and Obaje (2008) also found out that secondary school students in Jema, Kaduna State, possessed poor attitude to climate change adaptation. This statement is based on the evidence of their findings that showed that people showed poor attitude towards climate change. Invariably, it could be argued that the student's low awareness to climate change adaptation influenced their attitude towards climate change adaptation. Corroborating the above, Omotosho (2007) and Intergovernmental Panel on Climate Change (IPCC, 2007) noted that people's continuous exhibition of poor attitude towards climate change is rooted on their inadequate awareness or knowledge of the causes and effects of climate change. The knowledge or awareness of climate change adaptation no doubt will affect their attitude towards climate change adaptation.

Biology teachers and student's awareness and attitude towards climate change adaptation by school location

The result of the study showed that Biology teachers and students in rural and urban areas have low awareness of climate change adaptation, although those in urban area had higher mean rating, test of hypothesis showed that there was no significant difference in the mean rating of biology teachers and students on awareness of climate change adaptation by school location. The low awareness and poor attitude towards climate change adaptation especially for those in rural area could be as a result of poor information about climate change and its adaptations provided to them. The findings supported Chinedu (2008) and Ofoebe (2009) who found that location has no significant different on student's environmental awareness and attitude in Owerri and Okigwe education zones respectively in Imo State. Discussing on the influence of location on student's awareness and attitude, Oruonye (2011) stressed that the level of under development of the rural areas in Nigeria could affect the quality of learning resources available in rural schools. Ishaya and Obaje (2008) argued that location of school may not affect student's awareness and attitude towards climate change adaptation since they derived their instructional content from the same curriculum.

Conclusion and Recommendations

This study's findings on awareness and attitude of secondary school biology teachers and students on climate change adaptation showed low level. Senior secondary teachers and students in urban areas had higher awareness and positive level on climate change adaptation issues than those in rural area. However, though there was no significant difference in their mean rating of teachers and students in urban and rural areas on the level of awareness and attitude on climate change adaptation issues. In other words location had no influence on biology teachers and students' awareness and attitude levels on climate change adaptation issues. When issues on climate change adaptation are neatly and sequentially infused in the secondary school biology curriculum, and using innovative approaches in teaching them, it will not only increase the awareness levels but will motivate and increase the interest of teachers and students irrespective of their locations. Secondary school curriculum planners should infuse more Climate Change contents that could help the teachers and students to understand the causes and effects of climate change as well as the necessary adaptive measures to take, into the relevant subjects more especially in senior secondary schools Biology. Also, Education stakeholders and Non-Governmental Organizations should help by organizing workshops, seminars and conferences for teachers and students to expose them to correct and adequate knowledge of climate change

adaptation issues. This will enhance their level of awareness and attitude towards climate change adaptation.

Educational Implication of the study

The findings of this study have implications to curriculum planners, science teachers particularly the biology teachers and biology students, educational administrators and textbook writers. To curriculum planners, it shows that the current biology curriculum is not adequate in addressing the environmental issues in our society, hence there is need to infuse some of these issues into the curriculum to create awareness about climate change adaptation.

The findings of the study showed that Biology teachers and students have low awareness and poor attitude towards climate change adaptation. Therefore, there is need for adequate enlightenment programme for teachers and students to get them informed on the best practices towards ensuring adequate environmental management and be able to adapt well in cases of climate change occurrences. The finding of this study has implication also for school administrators. The school administrators can organize workshops and seminars for teachers on the need to integrate climate change adaptation into their teaching and learning using topics that lend themselves to environmental issues.

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