ASSESSING THE SENIOR SCHOOL STUDENTS' KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO CLIMATE CHANGE: IMPLICATIONS FOR CURRICULUM REVIEW AND TEACHER PREPARATION

Folajogun V. Falaye & Eugenia A. Okwilagwe
Institute of Education, University of Ibadan, Ibadan, Nigeria.

Abstract: *Changes in weather patterns result in devastating natural disasters that affect human beings and the environment. Ironically, climate change is man induced. This study investigated the knowledge, attitude, and practices of 1,103 senior school students on climate change and related issues. The study also determined the influence of students' age, gender, religion, subject affiliation, and parents' education levels on students' knowledge, attitudes, and practices. A questionnaire was employed to collect data; descriptive and inferential statistics were used for data analyses. Findings indicated that knowledge of climatic change issues is slightly low among students, while their attitude is slightly favorable. They engage in practices that do not entirely predispose the environment to devastating effects, especially flooding. Apart from gender, all other independent variables significantly differentiate students' knowledge, while seemingly mothers' educational level influences student practices. Therefore, teachers need to be sensitized on the level of students' knowledge, attitudes, and practices that are related to climate change and be adequately prepared to update students' knowledge of climatic issues.*

Key words: Climate change, KAP, parents' educational level, flooding

Introduction

Evidence shows that climate change is experienced all over the globe. Climate change is defined as a change in the state of the climate that can be identified and measured by changes in the mean and/or variability of its properties (Intergovernmental Panel on Climate Change, [IPCC], 2007). Climate change can persist over a long time, usually over decades and much longer and leads to extremes of weather conditions such as temperature, wind, rainfall, and humidity (Ayoade, 2003). The consequences of climate change impact the environment, health, agriculture, and transportation. Heat waves and wildfires have made life unbearable for both the human population and wildlife. This situation is particularly precarious in the hot regions of the world.

In Nigeria for instance, climate change is already exerting negative effects on the landscape. Nigerians are experiencing dry spells, high temperatures, off season rains, drought, and flooding. Lake Chad in northeast Nigeria is shrinking. Since 1960, Lake Chad has shrunk by 95% of its size (Awake, 2009). The Sahara desert in the northern part of Nigeria is expanding to all directions at an annual rate of 1-10km (Odjugo & Ikhuoria Isi, 2003; Yaqub, 2007). Subsistence farming, which provides staple foods for the people, is being threatened. Perhaps one of the biggest threats of climate change is hydroelectric power generation. Nigerians experience seasonal reduction in the amount of electricity generated annually due to drought conditions which are getting worse. This reduction has implications on industrial development in Nigeria. Southern Nigeria, however, is experiencing increasing rainfall and getting wetter leading to flooding. Major cities such as Lagos, Ibadan, Benin, Warri, Port-Harcourt, Calabar, and those along major water ways like Lokoja have experienced flooding after heavy rains causing loss of human lives, livestock, and property.

Incidences of flooding are not only limited to the south; the northern part of Nigeria has also been hit by floods in states such as Sokoto, Niger, Jigawa, Yobe, Borno, Taraba, and Kebbi. Apart from the serious impact of floods on agriculture and displacement of inhabitants and destruction to property, floods also threaten the health of the populace by exposing them to cholera, diarrhea, malaria, and other water-borne diseases (Bagir, Sobani, Bhamani, & Bhani, 2012; Oyakale, 2013; Watson, Gayer, & Connolly, 2007). This impact is so because according to UNESCO, developing countries (of which Nigeria is one) are disproportionately affected by natural disasters because they lack resources, infrastructures, and disaster-preparedness systems (Watson et al., 2007).

Climate change is known to be caused by two basic factors: (a) bio-geographic factors, which include natural forces, and (b) anthropogenic factors, which are made up of human activities. Human activities which cause climate change either emit large amount of greenhouse gases into the atmosphere through bush burning, gas flaring, and industrialization, thereby depleting the ozone layer, or through human activities that reduce the amount of carbons absorbed from the atmosphere (Odjugo, 2001). Prominent among human activities that reduce the amount of carbon absorbed from the atmosphere are deforestation, agricultural practices, and other unhealthy changes in land use.

Research and scientific evidence continue to grow pointing to the increasing changes in the climate and the attendant devastating effects (Apata, 2012; Odjugo, 2001; Olaniyi, Ojekunle & Amujo, 2013; Yaqub, 2007; Young, 2006). Furthermore, scientists are unequivocal that the primary cause of global warming is human activities (Odjugo & Ikhuoria Isi, 2003; Yaqub, 2007). Also, researchers have reported that level of awareness as well as some socio-demographic variables influences attitudes and practices (Akpan & Falaye, 2009; Falaye, 2006, 2009; Okobia, Bunker, Okonofua, & Osime, 2006). Previous studies indicated that young school students are strongly in support of actions designed to prevent the impact of human induced global warming. Young women are more concerned about their environment than the males. Social background was also found to be important in determining environmental attitudes (Tranter & Skrbis, 2011). Students in tertiary institutions showed interest in issues relating to climate change and are willing to participate in measures that will help mitigate climate change (Bruindres et al., 2007). The teachers who teach these students need to be highly informed too as previous studies indicated; although in some categories, teachers are not aware of climate change (Ekpoh & Ekpoh, 2011; Hegde, Murthy, Shalini, & Sandeep, 2012; Ochieng & Koske, 2013).

The secondary school geography curriculum along with other subjects such as physics, basic science, agricultural science, and social studies have contents that address climate change covered under topics like climate change, global warming, or environmental hazards. However, the scope and depth of coverage vary from subject to subject. Dealing with issues relating to students' knowledge that is the cognitive domain is the primary focus of these subjects and the teachers, but in particular attitudes and practices are neither included nor are they properly dealt with in the curriculum (geography curriculum implementation inclusive). There is also the dearth of relevant reading materials that cover these aspects. This is attested to by Ekpoh and Ekpoh (2011) in their survey of teachers' awareness of issues on climate change in the city of Calabar, Nigeria.

Therefore, this study assessed the knowledge of, attitudes towards, and practices of students in regard to climate change. Findings from this study will reveal the level of awareness of the students about

climate change and its impact, and act as a guide to be used to bridge the gap in students' knowledge in order to improve their attitudes and modify their behaviours appropriately.

Purpose

The purpose of this study was to find out what senior secondary students understand about climate change, their attitudes toward issues of climate change, and their practices, it will form a good standing point to build strategies aimed at mitigating the impact of climate change on the people and the environment. The research questions were as follows:

1. What is the level of the knowledge, attitudes, and practices of senior school students in regards to climate change?
2. Are there statistically significant differences in students' knowledge, attitudes, and practices based on their gender, age, religion, subject affiliation, and parents' level of education?
3. Is there any significant difference in the knowledge, attitudes, and practices of students who offer geography and those who did not?

Method

In this study which adopted survey research through the use of a structured questionnaire, students' knowledge of climate change was measured in terms of their understanding of issues on global warming and its impact on the environment and living things while their attitudes measured students' predisposition towards different strategies that could be used to ameliorate the negative impact of climate change. Students' practices captured the practical application of the knowledge of climate change (in terms of their daily reactions/responses) to issues or activities that they perform, come in contact and/or making informed positive choices and taking decisions.

Participants

The research participants were 1,103 senior secondary school (SSII) students from Ibadan Metropolis. Ibadan is the capital of Oyo State, Nigeria.

Instrument

One questionnaire was designed for data collection (contact author for copy). The questionnaire consisted of four sections. Section A included the socio-demographic information about the students. Sections B, C, and D had items on knowledge, attitudes, and practices related to climate change respectively. The section B had 10 multiple choice questions and 10 true/false items totaling 20 knowledge items. In section C, there were 10 attitudinal items rated on a 4-point Likert scale of strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD). While section D consisted of 20 multiple items measuring student practices. The instrument was content validated to ensure that items measured what they were intended to measure. To pilot the instrument, it was administered to 100 SS II students from two schools in the Ibadan Metropolis who were not involved in the study. The obtained Cronbach's alpha 0.87 signified that the instrument was valid and reliable.

Data Collection and Analysis

The data for the research were collected using the validated questionnaire with the help of research assistants. The participants gave their consent before participating in the study. For the knowledge subscale, each correct answer attracted 1 mark, and incorrect answer was scored 0. Each attitude statement was rated on a 4-point Likert scale with positive items marked as SA = 4, A = 3, D = 2, and SD = 1, and negative items scored in a reverse order (SA = 1, A = 2, D = 3, & SD = 4). Similarly, for the items measuring students' practices, each item measuring favorable

environmental practice was scored 1 and 0 for the unfavorable practice. The data were analyzed using descriptive statistics: frequency counts, means, median, modes, standard deviation, and inferential statistics: *t*-test and analysis of variance (ANOVA). Scheffé post-hoc was used to detect significant differences among groups.

Results

Effects of Participants' Demographics

About 70% (n= 765) of the participants were aged between 15 and 17 years, while those aged below 15 years and above 17 years are about 13% (n= 139) and 18% (n=199) respectively. Slightly over half 54.94%, (n=606) were males, and 45.06% (n=497) were females. Less than three-fifths, 55.58% (n= 613) were Christians, over two-fifths, 43.24% (n= 477) were Muslims, while only 1.18% (n=13) practiced the traditional religion. About two-fifths, 41.89% (n=462) studied science subjects, followed by arts (29.19%; n=322), while the remaining 28.92% (n=319) studied commercial subjects. The majority of their parents had a senior school certificate as the highest educational qualification held (father – 31.91% and mother – 33.82%). Some parents had a doctorate degree (father – 5.89%; mother – 3.45%), while others had no education at all (father – 6.89 %; mother – 8.98 %). On the whole, participants' fathers had higher educational qualifications than their mothers.

Table 1
Descriptive Statistics of Students' Scores on Knowledge, Attitudes, and Practices

Variables	Mean	Median	Mode	Std. Deviation	Min	Max
Knowledge	9.15	9.00	9.00	2.62	1	17
Attitudes	24.95	25.00	25.00	3.80	13	38
Practices	29.30	30.00	32.00	4.02	18	38

Table 1 shows the descriptive statistics of students' scores on the knowledge, attitudes, and practices. The minimum score on knowledge of climate change was 1 and the maximum score was 17. According to the scores (M = 9.15; SD = 2.62), the knowledge of climate change is slightly low among the students. Students' attitudes to climate change, with mean score of 24.95 and standard deviation of 3.80, was favorable. In terms of practices, with a maximum of 38 scores and a minimum of 18, a mean score of 29.30 and standard deviation of 4.02, the students engaged in practices that do not seriously predispose the environment to hazards of climate change.

Table 2
T-*test of Students' Knowledge, Attitudes, and Practices by Gender*

	Gender	N	Mean	Std. Deviation	Df	*t*	Sig
Knowledge	Male	606	9.07	2.649	1100	-1.103	.784 NS
	Female	497	9.25	2.584			
Attitudes	Male	606	24.80	3.679	1100	-1.458	.145 NS
	Female	497	25.14	3.929			
Practices	Male	606	29.54	4.067	1100	2.181	.029*
	Female	497	29.01	3.935			

* = significant at P< 0.05; NS = not significant at P< 0.05.

Table 2 shows no significant differences in students' knowledge of and attitudes toward climate change on the basis of their gender; whereas, there was a significant difference in their practices (t = 2.181; p < .05). Post hoc analysis revealed that male students obtained higher mean scores in items that measured practices (M = 29.54; SD= 4.07) than the female students (M = 29.01; SD= 3.94).

Secondary students at junior and senior schools participated in the study, and by virtue of their age differences, they were categorized into three groupings (i.e., younger than 15 years, 15-17 years, older than 17 years). As shown in Table 3, there was a significant difference in students' knowledge of climate change among the different age groups ($F_{(2, 1100)}$ = 4.58; p< 0.05); whereas, there were no significant differences in the attitudes and practices of students in different age groups. Scheffé post hoc test shows that students above 17 years of age scored significantly higher in knowledge than those between 15 and 17 years and those below 15 years.

The table shows a significant difference in knowledge of students on climate change on the basis of their religion ($F_{(2, 1100)}$ = 11. 82; p< 0.05). However, no significant differences in their attitudes and practices were found. Scheffé test indicates that students who are Christians obtained significantly higher scores in knowledge than those who practice traditional or Islamic religions.

Table 3
ANOVA of Knowledge, Attitudes, and Practices and Students' Demographics

Source		Sum of Squares	Df	Mean Square	F	Sig.
Age						
Knowledge	Between Groups	62.417	2	31.209	4.576	.010*
	Within Groups	7501.900	1100	6.820		
	Total	**7564.317**	**1102**			
Attitudes	Between Groups	5.750	2	2.875	0.199	.819NS
	Within Groups	15872.892	1100	14.430		
	Total	**15878.642**	**1102**			
Practice	Between Groups	2.390	2	1.195	0.074	.929 NS
	Within Groups	17760.865	1100	16.146		
	Total	**17763.255**	**1102**			
Religion						
Knowledge	Between Groups	159.125	2	79.562	11.819	.000*
	Within Groups	7405.193	1100	6.732		
	Total	**7564.317**	**1102**			
Attitudes	Between Groups	33.787	2	16.893	1.173	.310 NS
	Within Groups	15844.855	1100	14.404		
	Total	**15878.642**	**1102**			
Practice	Between Groups	10.696	2	5.348	.331	.718 NS
Subject Affiliation						
Knowledge	Between Groups	410.665	2	205.333	31.574	.000*
	Within Groups	7153.652	1100	6.503		
	Total	**7564.317**	**1102**			
Attitudes	Between Groups	21.481	2	10.741	.745	.475 NS
	Within Groups	15857.161	1100	14.416		
	Total	**15878.642**	**1102**			
Practice	Between Groups	25.163	2	12.581	.780	.459 NS
	Within Groups	17738.092	1100	16.126		
	Total	**17763.255**	**1102**			

Father's Level of Education		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Knowledge	Between Groups	262.841	6	43.807	6.576	.000*
	Within Groups	7301.476	1096	6.662		
	Total	**7564.317**	**1102**			
Attitudes	Between Groups	163.674	6	27.279	1.903	.077 NS
	Within Groups	15714.968	1096	14.338		
	Total	**15878.642**	**1102**			
Practice	Between Groups	277.122	6	46.187	2.895	.008 *
	Within Groups	17486.133	1096	15.955		
	Total	**17763.255**	**1102**			
Mother's Level of Education						
Knowledge	Between Groups	316.624	6	52.771	7.980	.000*
	Within Groups	7247.693	1096	6.613		
	Total	**7564.317**	**1102**			
Attitudes	Between Groups	233.421	6	38.904	2.725	.012 NS
	Within Groups	15645.221	1096	14.275		
	Total	**15878.642**	**1102**			
Practice	Between Groups	522.398	6	87.066	5.535	.000*
	Within Groups	17240.857	1096	15.731		
	Total	**17763.255**	**1102**			

* = significant at P< 0.05; NS = not significant at P< 0.05

Subject affiliation significantly differentiated student knowledge of climate change ($F_{(2, 1100)} = 1.57$; $p < 0.05$) as shown in Table 3. However, there were no significant differences in their attitudes and practices with respect to their subject affiliation. This finding is similar to the trend observed with respect to students' attitudes and practices and their religion. Post hoc test reports that arts and commercial students have significantly lower scores in knowledge of climate change than their science counterparts.

Apart from attitudes, student knowledge ($F_{(6, 1096)} = 6.58$; $p < 0.05$) and practices ($F_{(6, 1096)} = 2.90$; $p < 0.05$) were significantly differentiated by their father's qualification (see Table 3). While students whose fathers have first degrees obtained significantly higher scores in knowledge of climate change than other groups of students, those whose fathers had no formal education reported significant better practices than other students.

Also, Table 3 indicates that student knowledge ($F_{(6, 1096)} = 7.98$; $p < 0.05$), attitudes ($F_{(6, 1096)} = 2.73$; $p < 0.05$), and practices ($F_{(6, 1096)} = 5.54$; $p < 0.05$) were significantly differentiated by their mother's educational qualifications. Post hoc analysis shows that students whose mothers obtained first degree performed significantly better in knowledge and practices than other students.

Performances of Geography and Non-Geography Students

Specifically, the researchers were interested in finding out if significant differences existed in the scores on knowledge, attitudes, and practices of students who enrolled in geography and those who did not. As indicated in Table 4, findings reveal significant differences in knowledge ($t = 4.23$; $p < 0.05$) and practices ($t = -2.13$; $p < 0.05$) but no significant difference in their attitudes toward climate change. It also shows that geography students performed better ($M = 9.47$; $SD = 2.72$) than the non-geography students ($M = 8.81$; $SD = 2.47$).

Table 4
Statistics Comparing Geography and Non-Geography Students

	Students	N	Mean	Std. D	*t*	Df	P-value
Knowledge	Geography	565	9.47	2.717	4.237	1101	0.000*
	Non Geography	538	8.81	2.472			
Attitude	Geography	565	24.96	4.092	0.018	1101	0.986 NS
	Non Geography	538	24.95	3.461			
Practice	Geography	565	29.05	4.033	-2.128	1101	0.034*
	Non Geography	538	29.57	3.982			

* = significant at P< 0.05; NS = not significant at P< 0.05.

Discussion

The results of this study indicate that knowledge of issues related to climate change is low among students, while their attitudes are slightly favorable. This finding is similar to Okobia et al.'s (2006) study that reported poor knowledge but positive attitude of Nigerian women towards breast cancer. A significant difference in students' knowledge of climate change among the different age groups is reported in this study, indicating that knowledge of climate change increases with students' ages. This finding is in line with that of Falaye (2009). On the other hand, no significant differences in attitudes and practices were found. Therefore, it means that students' knowledge of climate change has not influenced their attitudes and practices. This manner of findings is not surprising as the curriculum and teachers do not emphasize the teaching of these behaviours and concepts. It is, therefore, not easy for students to translate what is learnt to other related situations.

Gender did not differentiate students' knowledge and attitude towards climate change, but it did with respect to their practices. Usually knowledge and attitude influence behaviour, but in this case they did not. Significant differences in students' practices must have been due to other variables. Religion and subject affiliation significantly differentiated students' knowledge of climate change but not in their attitudes and practices. Christians obtained significantly higher scores in knowledge than those who practice traditional religion or Islam. Also, students who enroll in arts and commercial subjects have significantly lower scores in knowledge of climate change than the science students. Issues related to climate change are scientific in nature; therefore, the higher mean score of science students in knowledge of climate change is understandable. In addition, students from homes where fathers have little or no education reported significantly better practices than those from educationally advanced homes. This finding could be traced to practices that are influenced by the family socio-economic status. Students from affluent homes tend to pay little attention to issues of environment because their parents can afford to employ extra hands to assist at home. However, students from low socio-economic background have the tendency to pay more attention to environmental issues because they themselves engage in many activities at home and beyond with a view to maximize the available little family resources.

In the same vein, students who enrolled in geography obtained significantly higher scores in knowledge and practices than those who did not enroll in geography. Climate change is one of the major concepts of secondary school geography. Exposure of students to climatic geography gives them an advantage over non-geography students. Furthermore, geography is regarded as more of a science

subject than arts. Unfortunately, knowledge of climate issues did not translate to positive attitudes and favorable practices in this case. It is speculated that this result is from a lack of curriculum planning for imparting such behaviour as earlier indicated. It further confirms the generally held view that attitudes and behaviors are not easily changed. Similar to Anable, Lane, and Kelay's (2006) view, this study tends to confirm their finding that there is no consistency between attitudes and behaviours as people generally expect. Anable et al. maintain that there are motivators of human behaviour and extremely complex barriers to behavioural change.

Similar to the findings of Akpan and Falaye (2009), parental level of education significantly differentiated students' knowledge and practices in this study. Further still, while their mother's level of education differentiated students' attitudes to climate change, their father's level of education did not. Students whose parents obtained first degrees significantly scored higher in knowledge of climate change than other groups of students. While, students whose fathers had no formal education reported significantly better practices than other students, students whose mothers obtained first degree significantly engaged in better environmentally friendly practices than other groups of students. In certain cultures mothers predominantly take care of the environment, and while doing the chores, they socialize their children to do the same.

The Nigerian government needs to take a cue from other countries like Japan, Canada, and Australia among others by creating better awareness of climate change and how students and the populace can respond to climate changes and management of disasters. Such responses can mitigate the negative impacts of such changes on the population. For example, international responses to climate change include institution of solar schools in Australia, eco-schools in Japan, making provincial policies in Canada, and disaster reduction risk management mainstreamed into the curriculum in Asia and Madagascar (UNESCO Bangkok, 2012). Introducing climate change concepts into the school curriculum with a view to improving ecological literacy about global warming issues facing humankind is needed globally (Ontario Ecological Literacy Resource, 2011-12). This way students and the general populace will be equipped with knowledge and skills to respond positively to the challenges and opportunities that changing climate brings our way.

The findings in this study spell implications for curriculum review, teacher preparation, and government proactive action. First, school geography curriculum should be updated to incorporate issues on attitude change and practices. This addition will ensure that the affective and psychomotor domains of learning are achieved. In order to improve ecological literacy about global warming issues facing humankind (Ontario Ecological Literacy Resource, 2011-12), the curriculum of other school subjects should be reviewed to include issues of climate change, attitudes, and practices of good behaviour towards the environment irrespective of subject affiliation. All students should be exposed to issues of climate change with a view to increasing awareness and positive practices because issues of climate change affect everybody in the society. The stark realities of the impact of climate change and the current global awareness being created by the world leaders makes it imperative to galvanize all efforts to protect the earth and make it conducive to live in. Second, with the inclusion of relevant topics/contents/concepts in the school curriculum, training and re-training programmes for teachers should be embarked upon to bring them up-to-date with the what, how, and why of these issues.

Conclusion

Climate change is not only caused by natural forces, human activities are known to fuel impact of climatic change. This study assessed students' knowledge, attitudes, and practices related to climate change, even though attitudes and practices were not entirely poor, their knowledge of climate change was below average. With the reported devastating impact of climate change on the environment, agriculture, water resources, and even health, peoples' awareness of climate change must be improved. Students are better used as change agents if their knowledge base is enhanced. It is on this note that topics on climate change should be integrated into the secondary school curriculum, while teachers should be prepared through training to handle this new content.

References

Akpan, E. P., & Falaye, F. V. (2009). Parental educational background and supportiveness in students' preference for technical and vocational education. *Nigerian Journal of Applied Psychology, 10*(2), 109–122.

Apata, T. G. (2012). Effects of global climate change on Nigerian agriculture: An empirical analysis. *CBN Journal of Applied Statistics, 2*(131), 31–50.

Anable, J., Lane, B. & Kelay, T. (2006). *An evidence base review of public attitudes to climate change and transport behavior* (Final Report). For the UK Department of Transportation. Retrieved from http://www.pdfwww.china-up.com:8080/international/case/case/1457.pdf

Awake! (2009, January). Are we running out of water? *Awake!* pp. 3–7. The Watch Tower Bible and Tract Society: The Jehovah's Witnesses. Retrieved from http://wol.jw.org/en/wol/d/r1/lp-e/102009001

Ayoade, J. O. (2003). *Climate change*. Ibadan, Nigeria: Vantage Publishers.

Baqir, M., Sobani, Z. Bhamani, A., Bhani, N. S. et al., (2012). Infectious diseases in the aftermath of monsoon flooding in Pakistan. Asian Pac. J. of Trop/Biomed; 2(1), 76-79. doi: 1016/5221-1691(11)60194-9

Bruinders, V., Canavan, K., Johnstone, S., Mabuza, M., Mattushak, P., & Spencer, J. (2009). Global warming: An assessment of knowledge, attitudes, and practices at Rhodes University (Final Report, Group 3), pp. 1–37. Retrieved from http://www.ru.ac.za/media/rhodesuniversity/content/environment/documents/Enviro%20Sci%20project%Gp%203%2009-10-16.pdf

Ekpoh, U. I. & Ekpoh, I. J. (2011). Assessing the level of climate change awareness among secondary school teachers in Calabar municipality, Nigeria: Implications for management effectiveness. *International Journal of Humanities and Social Science, 1*(3), 106–110.

Falaye, F .V. (2006). Numerical ability, course of study and gender differences in students' achievement in practical geography. *Research in Education, 76*, 33–42.

Falaye, F. V. (2009). Age and gender differences in students' attitudes towards social studies. *Ife Journal of Theory and Research in Education, 12*(1), 37–47.

Hegde, S. S., Murthy, M. S., Shalini, C. N., & Sandeep, K. R. (2012). Awareness of global warming among school teachers in coastal Karnataka. *Indian Journal Preventative and Social Medicine, 43*(4), 383–388.

Intergovernmental Panel on Climate Change [IPCC]. (2007). *Climate change 2007: The fourth assessment report.* Retrieved from http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf

Ochieng, M. A., & Koshe, J. (2013). The level of climate change awareness and perception among primary school teachers in Kisumu Municipality, Kenya. *International Journal of Humanity and Social Science, 3*(2), 174–179.

Odjugo, A. O. P. (2001). Global warming and food production: A global and regional analysis. *African Journal of Environmental Studies*, *2*(2), 85–91.

Odjugo, A. O. P., & Ikhuoria Isi, A. (2003). The impact of climate change and anthropogenic factors on desertification in the semi-arid region of Nigeria. *Global Journal of Environmental Science, 2*(2), 118–126.

Okobia, M. N., Bunker, C. H., Okonofua, F. E. & Osime, U. (2006). Knowledge, attitude and practice of Nigerian women towards breast cancer: A cross-sectional study. *World Journal of Surgical Oncology, 4*, 11-20. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1397833/pdf/1477-7819-4-11.pdf

Olaniyi, O. A., Ojekunle Z. O. & Amujo, B. T. (2013). Review of climate change and its effect on Nigeria ecosystem. *International Journal of African and Asian Studies - An Open Access International Journal*, *1*, 57–65.

Ontario Ecological Literacy Resource (2011-12). *Connections to climate change: Through rich performance tasks in grade 10 science (Applied and Academic)*. Retrieved from http://www.ontarioecoschools.org/wp-content/uploads/2014/11/5EN_Science_10FIN.pdf

Oyakale, A. S. (2013). Impact of flooding on the health of coastal fishing folks in Epe division of Lagos state, Nigeria. *Journal of Human Ecology*, *44*(2), 183–188.

Tranter, B., & Skribis, Z. (2011, November-December). Attitudes towards global warming, climate change and other issues among young Queenslanders. Paper presented at The Australian Sociological Association Annual Conference, Newcastle, Australia. Paper retrieved from: http://artsonline.monash.edu.aurlives/files/2013/05/Pes-76492-Tranter-fl.pdf

UNESCO Bangkok. (2012). *Education sector responses to climate change: Background paper with international examples.* Retrieved from http://unesdoc.unesco.org/images/0021/002153/215305e.pdf

Watson, J. T., Gayer, M., & Connolly, M. A. (2007). Epidemics after natural disasters. *Emerging Infectious Diseases*, *13*(1), 1–5.

Yaqub, C. N. (2007). Desert encroachment in Africa: Extent, causes and impacts. *Journal of Arid Environment, 4*(1), 14–20.

Young, J. (2006). Black water rising: The growing global threat of rising seas and bigger hurricanes. *World Watch, 19*(5), 26–31.

Authors

Folajogun V. Falaye, Ph.D., is a professor of the social sciences education and educational evaluation at the University of Ibadan, Ibadan, Nigeria. She has over 30 years of teaching and research experience at the secondary school and university. She teaches the social sciences courses and qualitative evaluation. She has published widely.

Eugenia A. Okwilagwe, Ph.D., is an Associate Professor in the Institute of Education, University of Ibadan, Ibadan, Nigeria. She holds a B.Ed. in geography, M.Ed. in Curriculum and Instruction, and Ph.D. in Educational Evaluation. She has a 16 years teaching and research experience at the tertiary level of education.