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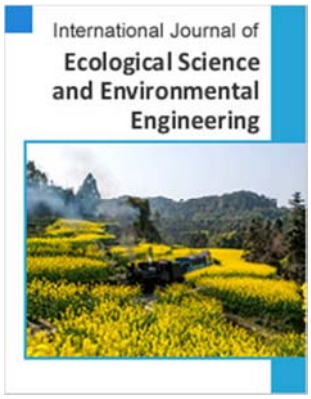

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The Risk to Public Health and Wellbeing Posed by Global Warming: A Comparison of Institutional Perceptions in the United Kingdom and Nigeria

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Abstract
This study determined the perceived risk of global warming to public health and well-being and evaluated institutional responses to the risk between two higher educational establishments: The University of Birmingham, United Kingdom (UoB, UK) and the Usmanu Danfodiyo University Sokoto, Nigeria (UDUS, NG). A structured questionnaire was used to collect data from 39 respondents in the two institutions among staff with the institutional roles relating to global warming. Respondents were assessed on their level of awareness, risks perceptions, degree of concern, risks judgment of the public health risks posed by global warming and the willingness to participate in mitigating global warming. Data entry and analysis was done using SPSS 19. The Wilcoxon Mann-Whitney Test and the Chi-Square Test of statistics were employed to assess significance of observed differences between respondents. Results with statistical significant differences between the two institution include institutional judgment; institutional willingness to participate in global warming mitigation. The Nigerian higher institution had higher judgment of risks and degree of concern to public health and well-being posed by global warming than the UK higher institution. However, the UK higher institution respondents were more willing to partake in the mitigation of global warming than the UDUS, NG.

1. Introduction

The publics' perceptions on the risk to public health and well-being posed by global warming was formerly the primary concern of climatologists', but today it is a common discussion even in popular culture [18]. The Intergovernmental Panel on Climate Change, IPCC report (2007) placed global warming in the forefront of environmental risks [11]. The public health risks posed by global warming include: (i) Increase in natural hazards (e.g. flood, drought) leading to food shortages and starvation and decrease in the standard of living; (ii) increase in the rates of serious diseases; extreme weather conditions; (iii) migration for better weather; (iv) economic losses and (v) sea

level rise among others [14, 16, 26]. These risks are one of the most controversial topics in the field of science [18]. The anthropogenic increase in Carbon dioxide emissions (CO_2e) since the beginning of the Industrial Revolution seems to be what intensifies these risks as it is the main significant interruption operating on the Earth's climate structure, hence causing global warming [12, 16, 26]. To succeed in mitigating these public health risks posed by global warming, public perceptions are very important as it is the foundation of every effective policy. In line with this, global efforts have being made to design different policies to address the causes of global warming [11]. For instance, the Kyoto Protocol Initiative, where nations meet often to discuss CO_2e; and set binding target for each nation on the amount of CO_2 it should cut down, is an example of global effort [26]. In addition, [12], suggested that this political action concerning climate change (i.e. the Kyoto protocol) which leads to an increased information on climate change is responsible for the increased global use of renewable energy from the annual 3% yearly in 1990 to 15% per year in 2010 among others.

Several other developed nations have also demonstrated their commitment towards mitigation of global warming. For example, In 2006 the governments of the United States, Japan, South Korea, Australia, China and India launched 'the Asia-Pacific Partnership on Clean Development and Climate' initiative which shares and develop new technologies considered to save energy with the minimal rate of CO_2e [15]. So also, the United Kingdom UK has recently legally committed itself to reducing the emission of the Greenhouse gases (GHGs) by launching the Climate Change Bill, in March 2007 [15]. By this bill, the UK government is committed to two binding cuts: a 26 to 32% CO_2 reduction in the year 2020 and 60% to 80% in the year 2050 [15]. This was also extended to the UK higher institutions of learning, as the Department for Education and Skills gave the Higher Education Funding Council for England (HEFCE) the duty of maintaining a sustainable enhancement and also to reveal this in the capital financial support allotment for universities. Hence, UK universities are mandated by the HEFCE to cut carbon emission and a target of not less than 43% by 2020/21 was given to them. So also, Capital Investment agenda enjoins Universities to have plans for carbon management [27].

Similarly, various efforts in Nigeria have been carried out in order to mitigate these effects of global warming. Example of such efforts include, the deadline for cessation of gas flaring that was set before the 3rd December, 2012, by the National assembly with stringent penalties meted on non compliance [30]. Additionally, the Petroleum Industry Bill (P.I.B), with the nation's policy makers for consideration [30]. At the 2016 World Future Energy summit at Ahbu Dhabi, and the 21st United Nation Climate Change Conference at Paris, France, COP21, the Nigerian President (Muhammadu Buhari) reaffirmed Nigeria's readiness to work with the United Arab Emirates and rest of the world in a collective effort to mitigate the effects of climate change [29].

It is alarming to say that an area of interest that has received less attention but yet is a key player for policy makers is the higher institutional perceptions of public health and well-being risks posed by global warming. In this light, it is important to understand the different factors influencing institutional and individual perceptions towards public health and well-being risks posed by global warming for various reasons. Firstly, private and institutional perceptions will help policy makers involve in designing new policies or reforming the existing ones and do a risk assessment for the risks as seen in numerous studies [6, 22, 25]. [10] and [13] emphasized the importance of public perceptions to Policy makers as enacting new policies and risk management regulations are subject to public reviews and submissions in a democracy. It will improve the understanding of institutional and private perceptions about global warming and may also help management systems on responses and policies of natural hazards [23]. Secondly, perceptions may instigate more planning and research initiatives geared towards addressing global warming either in Nigeria or the UK; as it is evidently seen how public perceptions have influenced hazards policy from different researches [3, 5, 28]. Thirdly, higher educational establishments could influence global policy makers in the fight against global warming. And findings from this research may enhance partnership between the two higher institution of learning in respect to perceptions, awareness level and the commitment to fight the risks as clearly seen how the governments of the United States, Japan, South Korea, Australia, China partner to launch the Asia-Pacific Partnership on Clean Development and Climate' initiative [15].

It is also important that higher institutions make emergency responses to forestall these risks and ensure sustainability for the future generations to avoid economic losses from diverting resources budgeted for other purposes to long term replacement of damaged infrastructures and short term damages [14]

Finally, Previous research have shown that level of awareness, perceived risk, judgment of risks, degree of concern and the willingness to participate in attenuating and adapting probable negative effects it poses, influences perceptions of risk posed by global warming [1, 2, 8, 17, 21]. Thus, assessing these factors will help researchers in understanding the advantages of each of these factors and relating same to other factors such as demographic factors, environmental experience and location in determining the institutional and individual perceptions towards global warming. Therefore, this research determined the perceived risk of global warming to public health and well-being and evaluated institutional responses to the risk for two higher educational establishments (i.e. UoB, UK and UDUS, Nigeria).

2. Methodology

The participants of the study are the university management staff mandated with the responsibility for policy making and advising the universities on issues that have to do with environmental management. This chapter is divided into

3 main parts. Study design, questionnaire (developing, piloting and administrating) and statistical analysis.

2.1. Study Design

This comprises of the research strategy, ethical procedure, Research assistant, questionnaire development and pilot study employed.

2.1.1. Research Strategy

Different types of research strategies in approaching any research; ranging from action research, surveys, experiment, archival, ethnography and grounded theory were enumerated [20]. These approaches are classified into two main groups: quantitative and qualitative [4, 20]. (See Table 1).

Table 1. *Differences between qualitative and quantitative methods of research.*

S/No.	Quantitative approach	Qualitative approach
1.	Deductive way of forming theories or hypothesis	Inductive in nature
2.	Surveys	Discussion with focus group or detailed interviews
3.	Involves standardized and numerical data	Word or text based data
4.	Takes a short time to analyze and can be generalized	Requires more time, more difficult and not easily generalized
5.	Options are fixed (close-ended)	Open ended response options (unstructured)
6.	Uses statistical tests (e.g. SPSS) to analyze data	Does not requires statistical tests
7.	Have a lot of options across different cases, but less in-depth	More in-depth but a limited information across cases.

The strengths of the quantitative approach include: it gives room for a wider study, higher chances of a more accurate results and faster to implement and analyze the data. The shortcomings of the quantitative approach include: a higher probability of having a low response rate, a lack of detailed information and challenges in handling complex situations [20]. The quantitative method was therefore adopted as the most suitable approach for this research for the following reasons;

a) It was deemed difficult to get policy makers or staff of the Universities in a focus group discussion because of the busy and planned nature of their work.
b) The study necessitated collecting structured information from a significant group.
c) A rather sufficient and sizeable dataset was required in order to generalize the study findings.

2.1.2. Permission of Research and Ethical Procedure

In line with the UoB, UK rules and regulations guiding post graduate research, the research was approved with a completion of the University Hazard and Risk Assessment (HRA) form detailing the possible risks associated to the research.

2.1.3. Research Assistant

A tutor of the UDUS, Nigeria was selected as a research assistant for this study. His competence and knowledge of the university terrain, and being part of the university staff, made it easy for the researcher to obtain all necessary data. A detailed package that included the researcher name, contact details (phone number and email address), supervisor's name, the aim and objectives of the research and the procedures in data collections was used by the researcher. Any queries resulting from the data collection were fed back to the researcher for which responses were provided by email and telephone in order to ensure completion and avoidance of errors in the dataset. Questions were formed in the English.

2.1.4. Questionnaire Development

The *level of awareness* section comprises of 2 questions. Question 1 addresses the individual general knowledge about the causes of global warming while question 2, the knowledge of the human activities aggravating it. This aspect attempts to address the level of awareness between the respondents from the two institutions in Nigeria and the UK.

Question 4 of *Individual's risk perception* measures individual knowledge on public health and well-being risks posed by global warming by enumerating the potential public health risk while 5, measures if the respondent thinks he/she is at risk or not; by enumerating and personalizing the same. This part attempts to address the objective determining the perceptions of risk to public health and well-being posed by global warming between individuals in the UK and Nigeria. On the part of the *willingness and commitment* of both institutions towards mitigating the effects of global warming; there are two questions). The first question, listed some measures of carbon reduction, to address if there are any management initiatives or policy in place by the universities towards mitigating the risk of global warming. And the second question allows the respondent to rank the risk according to their institution's interests and priority, using a list of priorities that could be of interest to any higher educational institution. This is done by listing various emergency plans to alleviate the impact of global warming risk, should such environmental change(s) occur.

2.1.5. Pilot Study

Having developed the questionnaire, a pilot study was conducted with a total of 10 respondents, 5 each from each of the study centers. This was carried out to ensure that the questions address the objectives and to ensure adequacy. Feedback from the research assistant suggested that the word "mitigation" should be defined to avoid misunderstanding, which was changed accordingly.

2.2. Administering Questionnaire

Emails were sent to the focus group for appointment. Reminders were sent by email in situations where no response were obtained. In the meeting, a copy of the research aims and objectives plus the significance of the research was provided to the respondent followed by the

questionnaires. Completed questionnaires from UDUS were sent to the researcher by courier service for analysis. For UDUS, Nigeria, a letter was sent to the Chairman, Conservation Committee. Followed-up calls were made to the head of the committee.

2.3. Statistical Analysis

2.3.1. Sample Size and Error of Margin

The sampling technique, error of margin and sample size determines the validity and reliability of studied which involve polls. In opinion studies, the sample size is directly relative to the extent of differences in the public opinion rather than insisting on the total size of the population [19]. This implies that, if in a population size of 1000, an individual has an opinion which is different from another in that population, there is need to sample the whole 1000 individuals in a poll study. However, if all in individuals in the population have the same opinion, a sample size of 1 is a true representative of the study.

Procedures in selecting participants and the sampling technique should make sure that the sample collected is a true representative of the whole population. In survey research, this is achieved by sampling randomly and sampling individuals with some specific features through the use of email addresses, office addresses etc for each peculiar study [31]. This method is adopted for this current research. Error margin is how accurate the views of those individuals surveyed reflect the general population. As the sample size increases, the margin error decreases; from fourteen in a sample size of fifty to ten in a sample size of hundred [19]. See Table (2) for details.

Table 2. *Approximate sampling tolerances (at a 95% confidence level).*

Survey Sample	2,000	1,500	1,000	900	800	700	600	500	400	300	200	100	60	50
Margin Error	2	3	3	3	3	4	4	4	5	7	6	10	12.63	14

(Source: Public Agenda, 2011: http://www.publicagenda.org/pages/best-estimates-guide-sample-size-and-margin-error).

Following that, a total of 60 participants were involved in this study. 30 respondents were approached for each institution (identified to be part of these groups as seen in Table 4). The suggested error margin of a sample size of 60 is +/- 12.63. The margin error is also backed by 95% confidence level. And the implication of this is such that, to ask each question in the questionnaire 100 times, the outcome for 95 times would be within the 10% points of the first response. Expectation of not less than 50% feedback is associated to surveys involving questionnaires [7]. 50% of the total questionnaire survey used in this study was 30, hence satisfies statistical analysis's thumb rule which suggested that samples size should be a minimum of 30 to apply the central limit theorem [24].

2.3.2. Data Analysis

Upon collection of completed questionnaires from respondents, they were all coded with numerical values in alignment with [20]. Coded data were then entered into SPSS19.0 software programme for data analysis and analyzed accordingly. By means of a descriptive statistics and inferential statistics, data were extensively explored to determine the trends and general pattern of perceptions. As applicable to most categorized data, the non parametric test was carried in the analysis as it was assumed the data were not distributed normally [20]. Some questions from the questionnaires are ordinal scales while others are nominal. Wilcoxon Mann-Whitney Test was used for the ordinal data analyzing the non parametric hypothesis tests. For the nominal data, descriptive statistics were employed to assess the data and the Chi-Square Test was also used to test for statistically significant relationships.

3. Results

This section is divided into individual and Institutional perceptions. In addition, background statistics are presented for the analysis dataset used. The first section, the individual aspect, contains findings showing level of awareness; risk Perceptions and the willingness and commitment to mitigating the risk of global warming. The second section addresses willingness and commitment towards mitigating the effects of global warming on the institutional basis.

3.1. General Statistics

3.1.1. Number of Respondents

Table 3. *Individual respondents by location.*

Location	Total sent out	Total returned	Percentage (%)
UoB, UK	30	18	30
UDUS, NG	30	21	35
Total	60	39	65

A total of 39 respondents completed and returned the questionnaires and the same were used for analysis.

3.1.2. Individual Levels of Awareness

This part presents responses for the individual levels of awareness on global warming and its dominant causes.

Table 4. *Individual levels of awareness of global warming.*

S/No.	Which of the following comes to your mind each time global warming is mentioned?	Percentage Responses (%)				Chi-square (p-value)
		UoB, UK		UDUS, NG		
		Yes	No	Yes	No	
1.	Emission of GHGs from human activities	94.4	5.6	76.2	23.8	0.115
2.	Climate change	94.4	5.6	76.2	23.8	0.115
3.	The earth will get warmer	83.3	16.7	61.9	38.1	0.138
4.	Rise in sea level	88.9	11.1	57.1	42.9	0.028*
5.	Destruction of carbon sink/reservoir e.g. forest;	67.7	33.3	19.0	81.0	0.000*
6.	Lack of carbon foot print;	61.1	38.9	4.8	95.2	0.000*
7.	Greenhouse effect.	11.1	88.9	57.1	42.9	0.028*

Note: * = Chi-Square Test showing statistically significant relationship ($p<0.05$)

Respondent levels of awareness of global warming were tested. Table (8) shows that the majority (94.4%) of the respondents from the UoB, UK chose "Emissions of GHGs from human activities" and "Climate change". Compared to respondents from UDUS NG, majority (76.2%) chose the same. A *p value* of 0.115 (95% confidence level) was obtained showing the difference is NOT statistically significant between the individuals between the two institutions. In addition, feedback from the UoB, UK respondents showed that only few (11.1%) chose "Greenhouse effect" while few (4.8%) from UDUS NG, chose Lack of carbon foot print. *p values* (0.000 and 0.028) (95% confidence level) were obtained showing the difference among individuals between the two institutions is statistically significant. See Figures (1) and (2) for further details.

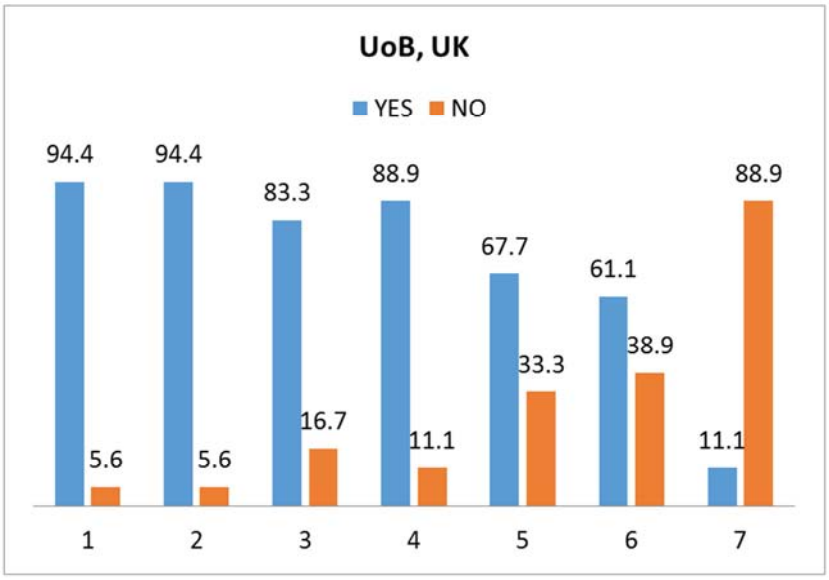

Figure 1. *Responses on knowledge about global warming (1).*

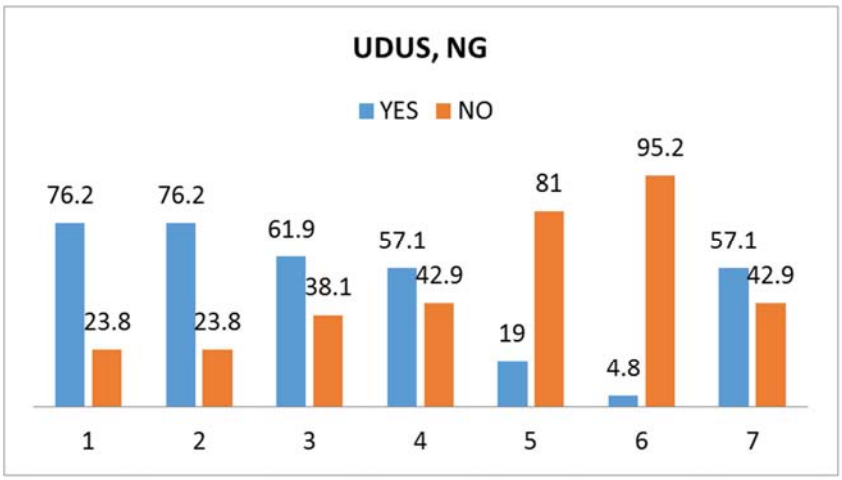

Figure 2. *Responses on knowledge about global warming (2).*

Table 5. *Individual responses on the dominant causes of global warming.*

S/No.	Which of the following do you think are the dominant cause(s) of global warming?	Percentage response (%)				Chi-Square (p-value)
		UoB, UK		UDUS, NG		
		Yes	No	Yes	No	
1.	Industrial activities (i.e. emissions of pollutants from industrial activities);	88.9	11.1	76.2	23.8	0.303
2.	Deforestation (from agricultural activities);	77.8	22.2	76.2	23.8	0.807
3.	Transportation (People driving their cars);	83.3	16.7	57.1	42.9	0.077*
4.	Burning of fossil fuels (i.e. oil and coal by utilities for energy);	94.1	5.9	66.7	33.3	0.039*
5.	The use of air conditioners by people to cooling their homes/offices;	27.8	72.2	19.0	81.0	0.519
6.	The depletion of the ozone layer (i.e. the upper atmosphere);	33.3	66.7	61.9	38.1	0.757
7.	Destroying insect pest using chemicals	88.9	11.1	0.0	100	0.117
8.	Spraying of cans using aerosols.	0.0	100	4.8	95.2	0.348

Note: * = Chi-Square Test showing statistically significant relationship ($p<0.05$)

Respondents were tested on the dominant causes of global warming. Table (9) above shows that a majority (94.1%) of the respondents from the UoB, UK chose "burning of fossil fuels" while majority (76.2%) of respondents from the UDUS, Nigeria reported "Industrial activities (i.e. emissions of pollutants from industrial activities)" and "Deforestation from agricultural activities". Furthermore, no (0.0%) respondents from UoB felt "Spraying of cans using aerosols" is a dominant cause of global warming. In contrast, respondents from UDUS, Nigeria rather felt it is "Destroying insect pest using chemicals" that was not a major (0.0%) for the same. The *p-value* 0.039 (95% confidence level) showed that the difference among individuals between the two institutions is statistically significant. Figures 3 and 4 give more details.

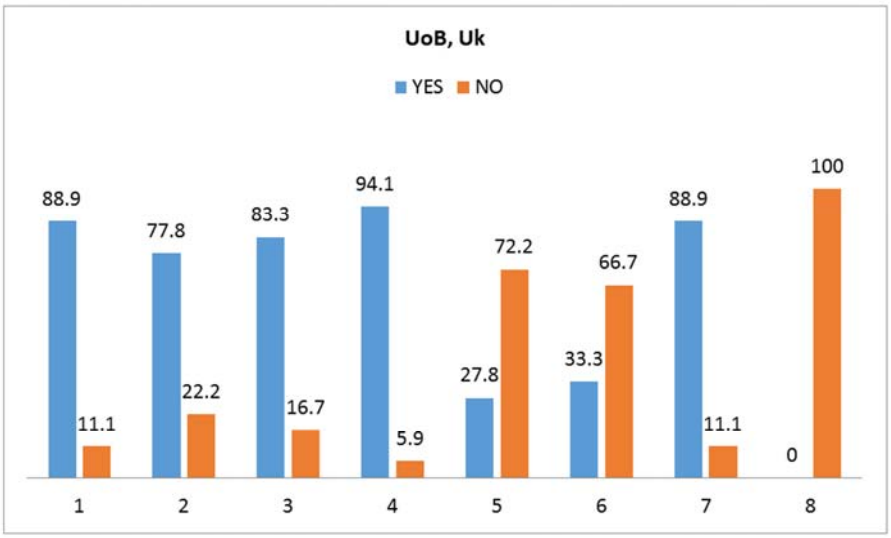

Figure 3. *Responses on the dominant causes of global warming (1).*

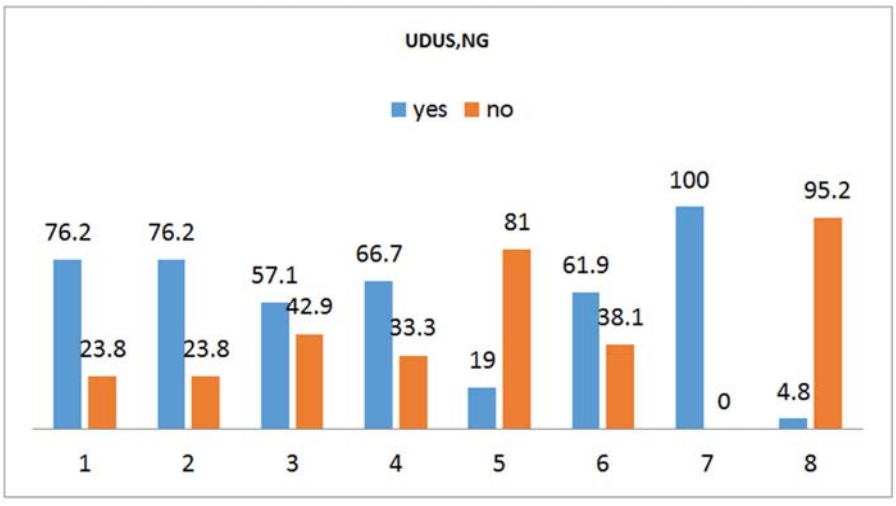

Figure 4. *Responses on the dominant causes of global warming (2).*

3.1.3. Individuals Perceptions of Risk

Here, the individuals' risk perceptions of the public health and well-being risks posed by global warming were assessed.

Table 6. *Individuals' perceptions of risks to public health and well-being posed by global warming (generic).*

S/No.	Which of the following do you think is/are risks posed by global warming?	Percentage response (%)				Chi-square (p-value)
		UoB, UK		UDUS, NG		
		Yes	No	Yes	No	
1.	Food shortages and starvation	94.4	5.6	95.2	4.8	0.911
2.	A decrease in the standard of living	33.3	66.7	57.1	42.9	0.137
3.	Increase in the rates of serious diseases	33.3	66.7	76.2	23.8	0.007*
4.	Increase in the donations to poorer nations from richer ones;	11.1	89.9	42.9	57.1	0.028*
5.	The weather will not be conducive for living	55.6	44.4	76.2	23.8	0.173
6.	Migration for better weather;	50	50	38.1	61.9	0.455
7.	Immigration for better weather;	27.8	72.2	19	81	0.519
8.	Increase in natural hazards (flood, drought).	100	0.0	90.5	9.5	0.179

Note: * = Chi-Square Test showing statistically significant relationship ($p<0.05$)

Respondents were tested of the general public health and well-being risks posed by global warming. Table (10) above showed that participants majority (100%) of respondents from the UoB, UK reported "Increase in natural hazards (flood, drought)." and few (11.1%) reported "Increase in the donations to poorer nations from richer ones". Comparing to the UDUS NG, majority (95.2%) of respondents selected "Food shortages and starvation" with a few (19%) that chose "Immigration for better weather". The p-values (0.911, 0.519 and 0.179) obtained indicated that the differences in the individual responses from both institutions was not statistically significant, except for the p-value (0.028) obtained for "Increase in the donations to poorer nations from richer ones" which indicated a statistically significant difference in their responses. See further details in Figures (5) and (6) accordingly.

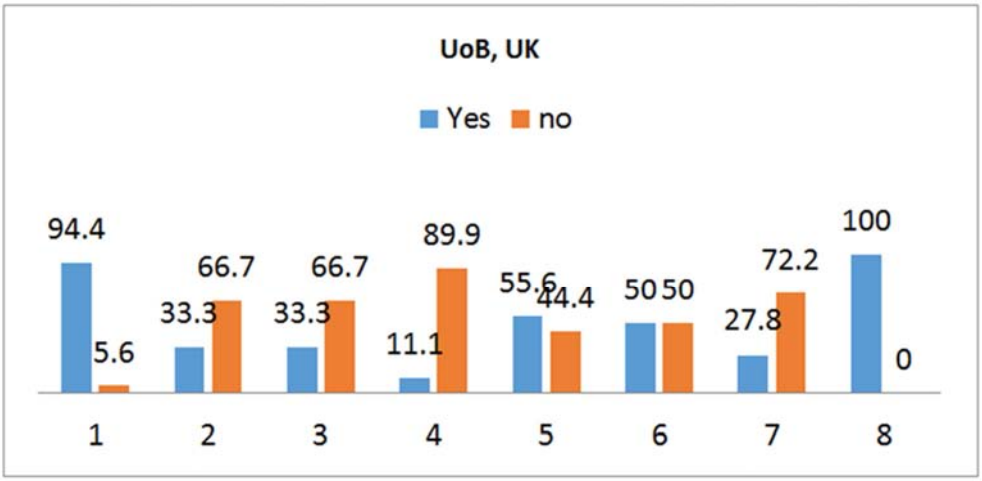

Figure 5. *Responses of individual risk perceptions of global warming (1).*

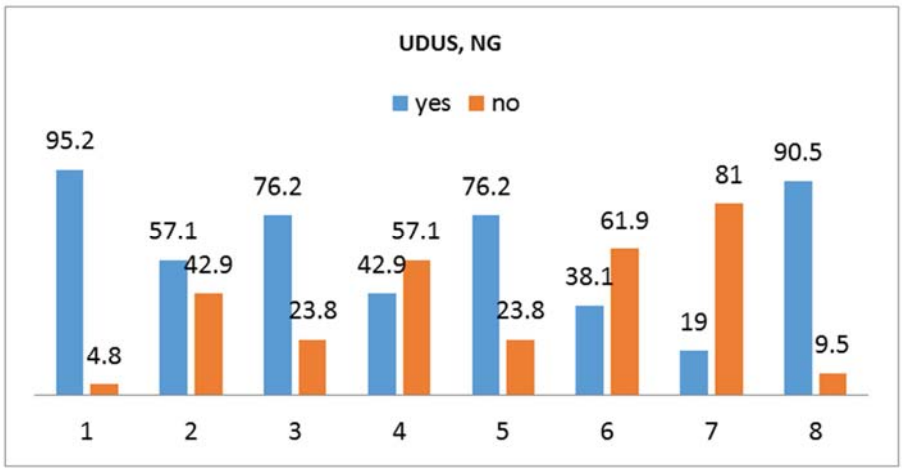

Figure 6. *Responses of individual risk perceptions of global warming (2).*

Table 7. *Individuals' perceptions of risks to public health and well-being posed by global warming (personal).*

S/No.	Which of the following risk(s) below do you think global warming may poses to you?	Percentage response (%)				Chi-square(p-value)
		UoB, UK		UDUS, NG		
		Yes	No	Yes	No	
1.	There will be food shortage for me;	38.9	61.1	71.4	28.4	0.041*
2.	A decrease in my standard of living;	38.9	61.1	47.6	52.4	0.584
3.	Chances that I will be infected with serious disease;	11.1	88.9	42.9	57.1	0.028*
4	My country will donate to poorer nations;	22.2	77.8	19	81	0.807
5.	The weather of my region will be extreme;	72.2	27.8	81.0	19.0	0.519
6.	My region will be over crowded due to immigrants	72.2	27.8	0.0	100	0.010*
7.	People from my region will migrate to other region with better environment;	11.1	88.9	28.6	71.4	0.178
8.	There may be increased natural hazards in my region (flood, drought).	94.4	5.6	95.2	4.8	0.911

Note: * = Chi-Square Test showing statistically significant relationship ($p<0.05$)

Respondents were tested of the public health and well-being risks they think global warming poses to them. Table (11) above demonstrated that, majority (94.4%) respondents from UoB, UK selected "There may be increased natural hazards in my region (flood, drought)" and only few (11.1%) chose "People from my region will migrate to other region with better environment" and "Chances that I will be infected with serious disease". Compared to respondents from UDUS, NG; majority chose "There may be increased natural hazards in my region (flood, drought)" and none (0.0%) chose "My region will be over crowded due to immigrants". In addition, the *p-values* (0.028 and 0.010) of "Chances that I will be infected with serious disease" and "My region will be over crowded due to immigrants" showed that there was a statistically significant difference in the responses between the respondents from both locations while the *p-values* (0.178 and 0.911) of "People from my region will migrate to other region with better environment" and "There may be increased natural hazards in my region (flood, drought)" does not show a statistically significant difference in the responses between the respondents from both locations. See Figures (6) and (7) below for further details.

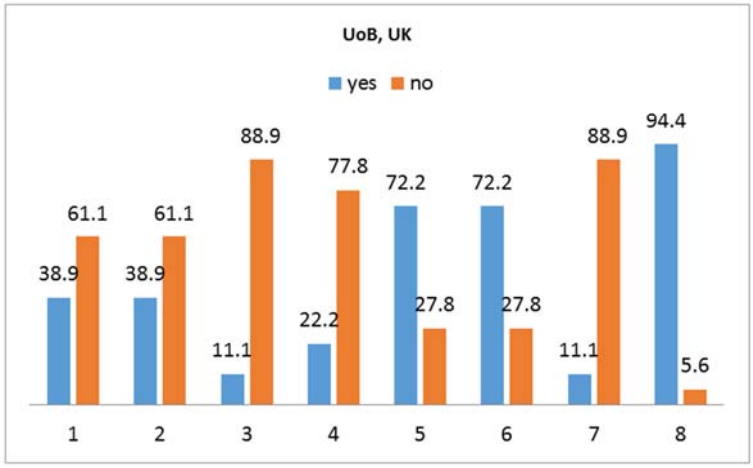

Figure 7. *Responses of individual risk perceptions of global warming (3).*

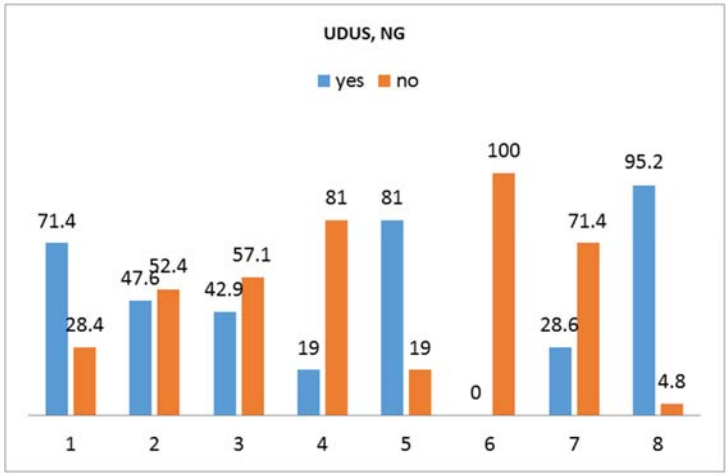

Figure 8. *Responses of individual risk perceptions of global warming (4).*

3.2. Institutional Perceptions

This section presented responses for the institutional perceptions of the risks posed by global warming to public health and well-being.

3.2.1. Institutional Willingness and Commitment Towards Mitigation of Global Warming

This section presents results of institutional responses on their willingness and commitment towards the mitigation of global warming.

Table 8. *Institutional commitment and willingness of global warming mitigation.*

S/No.	What role does your university play to stop global warming?	Percentage response (%)				Chi-square(p-value)
		UoB, UK		UDUS, NG		
		Yes	No	Yes	No	
1.	More research	94.4	5.6	28.6	66.7	0.000*
2.	Carbon management plan	100	00	0.0	100	0.000*
3.	Budgeting for environmental management issues	50	50	81	19	0.041*
4.	Campaign to create more awareness	77.8	22.2	19	81	0.002*
5.	Carbon foot print	61.1	38.9	0.0	100	0.000*

Note: * = Chi-Square Test showing statistically significant relationship ($p<0.05$)

Institutional respondents were tested on each institution's willingness and commitment towards mitigating the effects of global warming. Table (8) above indicated that majority (100%) participants from UoB, UK reported "Carbon Management Plan" and few chose "Budgeting for environmental management issues". In contrast UDUS, NG, majorly (81%) reported "Budgeting for environmental management issues" and none (0.0%) selected "Carbon Management Plan" and "Carbon foot print". In addition, the *p-values* (0.000, 0.000, 0.041, 0.002 and 0.000) obtained indicated statistically significant difference in responses from both higher institutions.

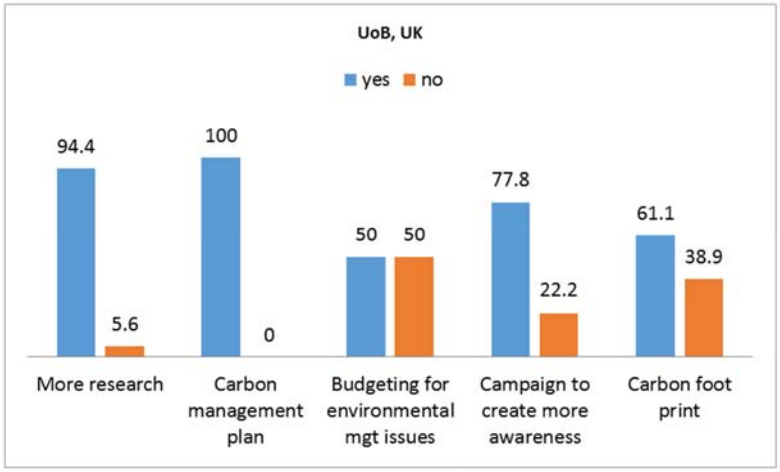

Figure 9. *Responses on institutional commitment and willingness to mitigating the risk posed by global warming (1).*

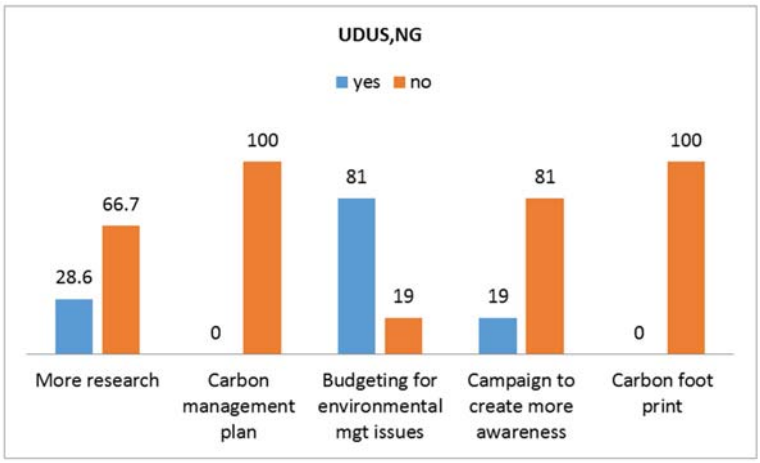

Figure 10. *Responses on institutional commitment and willingness to mitigating the risk posed by global warming (2).*

3.2.2. Wilcoxon Mann-Whitney Non Parametric Test of Two Independent Variables

Table 1. *Institutional ranking of priority.*

S/No.	UoB, UK	Minimum	Maximum	Mean	Std. Deviation
1	Reputational risk;	1.00	7.00	2.6111	1.57700
2	Environmental risk;	1.00	7.00	5.0556	2.09964
3	Fines from regulatory bodies;	1.00	5.00	1.3889	1.03690
4	Risk to learning;	1.00	7.00	3.7222	1.74240
5	Risk to students;	1.00	4.00	3.3889	.91644
6	Risk to staff;	1.00	7.00	4.6111	1.33456
7	Less research.	1.00	7.00	5.9444	1.66176

Table 2. *Institutional ranking of priority.*

S/No.	UDUS, Nigeria	Minimum	Maximum	Mean	Standard Deviation
1.	Reputational risk;	5.00	6.00	5.8095	.40237
2.	Environmental risk;	1.00	5.00	3.4762	1.50396
3.	Fines from regulatory bodies;	6.00	7.00	6.9048	.30079
4.	Risk to learning;	1.00	5.00	1.5238	1.07792
5.	Risk to students;	2.00	7.00	2.4762	1.12335
6.	Risk to staff;	2.00	5.00	3.2857	.64365
7.	Research.	1.00	6.00	4.6667	1.23828

Institutional priorities were tested. Results from Table (9) above show that respondents from UoB, UK, reported "Fines from regulatory bodies" (with lowest mean=1.3889) as the most important and "Less research" (mean=5.9444) as least important. Compared to UDUS, NG, Table (10) above show that respondents reported "Risk to learning" (Mean=1.5238) as the highest ranked while "Fines from regulatory bodies" (mean=6.9048) was the least important.

Table 11. *Institutional responses concerning commitment on mitigation measures.*

S/No.	Questions	Percentage response (%)				Chi-square (p-value)
		UoB, UK		UDUS, NG		
		Yes	No	Yes	No	
1.	Does the University have any policy in place towards mitigating the risk of global warming?	100	0.0	0.0	100	0.000*
2.	Does the University have management initiatives of global warming?	100	0.0	100	0.0	N/A
3.	Does the University have any emergency plans are in place to mitigate unforeseen occurrences of global warming effects of public health and well-being?	0.0	100	0.0	100	N/A

Note: * = Chi-Square Test showing statistically significant relationship ($p<0.05$)
N/A= Not applicable.

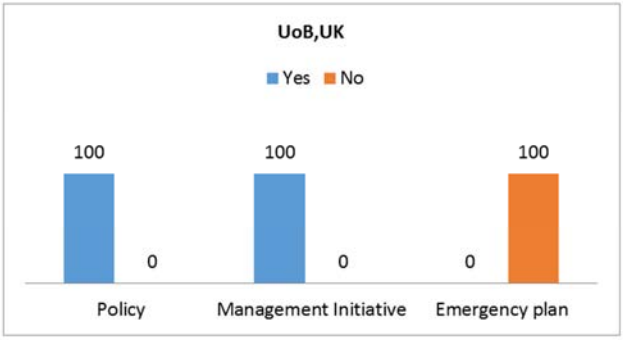

Figure 11. *Percentage responses on institutional commitment and willingness to mitigating the risk posed by global warming (3).*

Institutional policy makers were tested as to whether the institutions have any policy in place towards mitigating the public health and well-being risks posed by global warming. Tables (11) show that majority of respondents UoB UK chose "Yes" while the UDUs, Nigeria do not have any environmental policy. In addition, the *p-value* (0.000) indicated that there is a statistically significant difference in the responses from both higher institutions. Furthermore, both institutions do not have management initiatives for environmental sustainability and emergency plans in place to mitigate any unforeseen occurrences of natural hazards. See Figures (11) and (12).

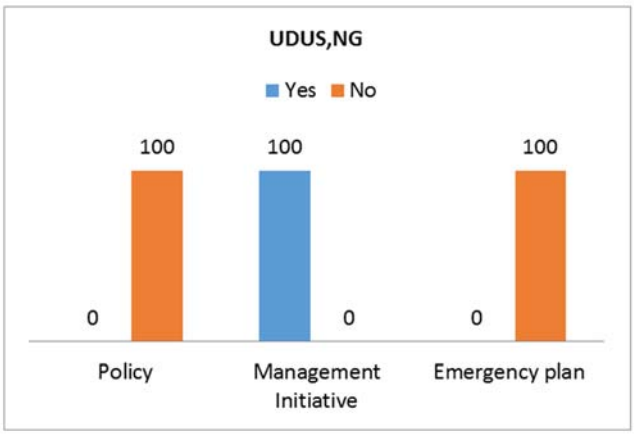

Figure 12. *Percentage responses on institutional commitment and willingness to mitigating the risk posed by global warming (4).*

4. Discussion

All results discussed here should be measured as indicative not definitive.

This chapter is divided into five parts:

This chapter is divided into five parts: (i). Levels of awareness of global warming between individual respondents from the two institutions, (ii). Perceptions of risk to public health and well-being posed by global warming between individuals in the UK and Nigeria, (iii). Degree of concern among the respondents and their Institutions on the risk posed by global warming on public health and environment**, (iv).** Personal and institutional judgments of public health and well-being risks posed by global warming, and (v). Willingness of the respondents and their institutions to participate in global warming reducing initiatives**.**

4.1. Levels of Awareness Between the Respondents from the Two Institutions

Feedback from individual respondents with institutional roles relating to global warming from UoB, UK and UDUS Nigeria showed that the emission of GHGs from human activities and Climate change is most common to global warming (See Table 4). Responses on level of awareness of global warming from the individual respondents from UoB, UK (94.4%) was not statistically significant when compared with responses from UDUS Nigeria (76.2%); or respondents in Houston TX and Portland (92%) as reported by [21]; or U.S respondents as documented by [8] but not or as responses from participants in the U. K as documented by [2] with (62%) The differences in levels of awareness with other studies (as shown above) may be linked to the following:

a) Year of study: Several studies for example, [1], have shown that there is an increased knowledge and awareness on global warming especially in the developed nations such as Europe, Japan and the United States. As it is evident in the increased in data and frequency in different scientific reports and other media of communication such as newspaper articles, mass media and Televisions Stations in these countries.
b) Time, location and the method of sampling may also affect results of the research.
c) [18] made it clear also that global warming is currently one of the most discussed environmental issues.
d) Other demographic factors such as Level of education and age could also a contributory factor for this increase as proven by [17], and
e) For Nigeria; it may be associated with the studies of Leiserowitz, (2007); that developing countries precisely Nigeria, Pakistan, Indonesia and Egypt have low awareness of global warming.

The implication of this result is that respondents (policy makers or advisors) of UoB, UK may likely be more committed (due to the slight difference) or ready to support any policy relating to GHGs emissions and other environmental sustainability policies than the respondents of the UDUS NG. This is because numerous studies have shown that levels of awareness influences perceptions [1, 2, 8, 9, 17] and perceptions in turn is important to Policy makers for enacting new policies and risk management regulations [6, 10, 13, 22, 25] enhances management systems on responses and policies of natural hazards [23] and may also instigate more planning and research initiatives geared towards addressing global warming either in Nigeria or the UK; as evidently seen in several researches [3,5,28]. Hence, individual respondents with institutional roles relating to global warming from the UDUS Nigeria may need more training on global warming to increase their awareness level.

So also, comparing the responses between individual respondents with institutional roles relating to global warming from UoB, UK (94.1%) and UDUS Nigeria (76.2%) on the dominant causes of global warming was not statistically significant. This agrees with [11,16, 26] as findings (See Table 5) showed that the most common dominant causes of global warming are burning of fossil fuels (i.e. oil and coal by utilities for energy); Industrial activities (i.e. emissions of pollutants from industrial activities) and deforestation from agricultural activities. Generally, the levels of awareness (on global warming knowledge and its dominant causes) between individual respondents with institutional roles relating to global warming from the UoB, UK and UDUS, Nigeria was compared (tested) using Chi-Square Test. And the *p value* (0.115) obtained at 95% confidence interval ($p<0.05$), indicated that difference of levels of awareness between the UoB, UK and UDUS, NG respondents was NOT statistically significant. Hence, the differences in the levels of awareness of global warming between the respondents in Nigeria (UDUS) and UK (UoB) are NOT statistically significant.

4.2. Perceptions of Risk to Public Health and Well-Being Posed by Global Warming Between Individuals in the UK and Nigeria

Feedback concerning perceptions of individual respondents with institutional roles relating to global warming from UoB, UK and UDUS Nigeria showed that risks to public health and well-being posed by global warming are more related to increased natural hazards (flood, drought), food shortages and starvation (See Table 6). Responses on the risk perceptions of global warming from the individual respondents from UoB, UK (100%) was not statistically significant when compared with responses from UDUS Nigeria (95.2%); but not residents (24% to 39%) in U.S.A as documented by [1]. In addition, perceptions were personalized (See, Table 7). Findings showed that individual respondents from UoB, UK and UDUS, NG reported that "There may be increased natural hazards in their regions (flood, drought)". So also, the UoB, UK (94.4%) risk perceptions compared with the UDUS, NG risk perceptions (95.2%) showed a non statistical significant difference. These findings were in agreement with [1] who conducted a study in the USA that showed respondents reported that their standard of living will not be affected. [17] linked this difference to environmental experience; as UDUS, Nigeria had more

experience of natural hazards (DREF, 2011). Other factors may be methods of sampling, year of research and focus group as mentioned earlier. The implication of these results is that, UDUS, NG respondents are likely to support and influence future policies relating to environmental sustainability, as higher perceptions had influenced forming and enacting new policies [6, 10, 13, 22, 25].

In addition, the responses on the perception of risks from both study locations were tested (using Chi-Square Test) to ascertain whether the differences are statistically significant. A *p value* (0.911) obtained at 95% confidence interval ($p<0.05$), indicated that difference perception of risks to public health and well-being of respondents between UoB, UK and UDUS,NG was NOT statistically significant. Therefore, the differences in the measure of the personal perceptions of risks to public health and well-being posed by global warming between respondents in Nigeria (UDUS) and UK (UoB) are NOT statistically significant.

4.3. Individual and Institutional Degree of Concern on the Risk Posed by Global Warming on Public-Health and Environment

This section presents individual and institutional degree of concern on the risk posed by global warming on public-health and environment.

Findings concerning the institutional degree of concern on the risk to public health and environment posed by global warming showed that UK higher institution (UoB) was 27.8% either "Neutral" or "Not worried" while the UDUS, Nigeria was majorly (57.1) "Less worried". Comparing with other studies done on individual basis; this result did not agree with [1, 2, 21] 65% (See Table 8). These differences may be associated to the nature of respondents, time, place, level of education, methods of sampling and demographic factors of respondents among others as shown by several studies [1, 2, 21]. The implication of this finding is that if higher institutions are less worried, neutral or less worried on the public health risks posed by global warming, they may not be likely to be committed towards the mitigation of the risks. Therefore, higher establishments needs more ownership approach to enhance mitigate the risks global warming poses and the same should be highly prioritized. So also, more awareness needs to be created by both higher institutions. The *p-value* (0.027) obtained at 95% confidence interval ($p<0.05$) using the Chi-Square Test indicated that there WAS a statistically signficant differences concerning intitutional degrees of concern in the responses in higher educatitional establishments of the UK (UoB) and Nigeria (UDUS). Therefore, the Nigeria higher institution (UDUS) actually has a higher degree of concern of risks to public health and environment posed by global warming than the UK higher institution (UoB).

4.4. Institutional Willingness to Participate in Global Warming Reducing Initiatives

Generally, the UK higher institution UoB, have the "Carbon Management Plan" (100%) showing their commitment and willingness to partake in the global warming mitigation policies while the Nigerian higher institution UDUS, NG, (81%) have "Budgeting for environmental management issues. The UK (UoB) institution has shown a higher percentage of commitment than the Nigerian UDUS higher institution. This suggested that, the institution in the UK was more willing and committed to taking measures in contribution their own quota of the global mitigation. The UK commitment towards the mitigation may be linked to the UK, legally binding Climate Change Bill, in March 2007

[15] and UK higher institutions of learning mandate by UK Department for Education and Skills which gave Higher Education Funding Council for England (HEFCE) the responsibility of upholding sustainable improvement and also to reveal this in the capital financial support allotment (www.birmingham.ac.uk/university/about/environment/index.aspx). Nigerian institution on the other hand, may need more conventional measures of mitigating the risk of global warming.

In addition, level of awareness, risk perception, place, and method of sampling among others, may account for the differences in results of this study as shown by numerous studies [1, 2, 21]. The *p-value* (0.000) obtained at 99% confidence interval ($p<0.001$) using the Chi-Square Test indicated that the differences in the institutional willingnes to partake in the global warming mitigation initiatives betweent the UK (UoB) and Nigeria (UDUS) higher establishments, WAS statistically signficant. Therefore, the UK higher institution (UoB) was more willing and committed to partake in the mitigation of global warming than the Nigeria higher institution (UDUS).

Furthermore, to support this objective of institutional commitment and willingness of mitigating the risks posed by global warming; the Wilcoxon Mann-Whitney of non-parametric test for two independent variables was employed. To the UK higher institution of learning (UoB), avoiding "Fines from regulatory bodies" for not meeting its mandate of cutting down $C0_{2e}$" was its most important priority (mean=1.3889) while to the Nigerian Higher institution UDUS, "Fines from regulatory bodies" was its least important priority (mean= 6.9048). Additionally, the most important priority of the Nigerian Higher institution UDUS, was avoiding "risk to learning" (mean=1.5238) and the same was ranked 4th from the list of areas that may vulnerable to the environmental threats posed by global warming. This implies that the UoB, UK commitment may be linked its obligation as mandated by the UK Department for Education and Skills and HEFCE so as not to be fined the various regulatory bodies monitoring compliance. Interestingly, the Nigerian higher institution UDUS, was more concerned not to distort learning activities and was not mandated by policy to cut down its CO_{2e}. So also, in meeting its obligation, the UoB, UK has an environmental policy in place while the UDUS, Nigeria does not have any. Both higher institutions have management initiative towards environmental

sustainability. The UoB, UK has the CMIP (See Section 1.6) while the UDUS, Nigeria has the Conservation Committee (See Section 1.7). However, both of the higher institutions of learning does not have any emergency plans in place to mitigate the unforeseen risk such as flood that global warming may pose.

5. Conclusion

Responses from both institutions showed that the differences in the institutional willingnes to partake in the global warming mitigation initiatives betweent the UK (UoB) and Nigeria (UDUS) higher establishments, WAS statistically signficant. The *p-value* (0.000) obtained at 99% confidence interval ($p<0.001$) using the Chi-Square Test tested it statistically significant. Therefore, the UK higher institution (UoB) was more willing and committed to partake in the mitigation of global warming than the Nigeria higher institution (UDUS). The UK (UoB) most important priority was to avoid fines from regulatory bodies, while the same was the least important to the UDUS NG. Additionally, the most important priority of the Nigerian Higher institution UDUS, was avoiding risk to learning and the same was ranked 4th by the UK, (UoB). Finally, in meeting its obligation, the UoB, UK has an environmental policy in place while the UDUS, Nigeria does not have any. Both of the higher institutions have management initiatives in place towards environmental sustainability. However, neither of the higher institutions have any emergency plans in place to mitigate risk such as flood of global warming.

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