

Climate Change Perception among Geography and Biology Teachers in Gwagwalada Area Council of the Federal Capital Territory of Nigeria

Ishaya S., Apochi, M. A and Mohammed Abdullahi Hassan

Department of Geography and Environmental Management, University of Abuja, Nigeria.

***Corresponding Author:** *Ishaya S, Department of Geography and Environmental Management, University of Abuja, Nigeria. Email: ishayasunny@yahoo.com*

ABSTRACT

This study assess climate change perception among Geography and Biology teachers in Gwagwalada Area Council of the Federal Capital Territory of Nigeria. In carrying out this study, the Interpretive Research method was utilized. The population targeted were the forty nine geography and biology teachers in the eight public senior secondary schools in the Area Council. Semi-structured questionnaire was used in this study. Findings of the study shows that all geography and biology science teachers from the studied schools affirmed to changes in climate/ The main indicators of climate change as observed by the teachers are temperature rise, decrease in rainfall, drier weather, decline in domestic water supply, incapacitation of crop production, de-vegetation, decline of pastures for livestock production thereby instigated conflicts between headers and farmers and rural-urban migration. Reforestation, afforestation, cultivating drought tolerant crops, encouraging irrigation/fadama farming in localities, improve in water usage, shortening growing season by cultivation varieties that matured within a short period of time and indebt dissemination of information on potential weather incidences/events/disasters where seen as strategies of combating climate change impacts as opined by the teachers. Findings shows that the scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum were not detailed in syllabus and there is need in strengthening curriculum towards mitigating climate change.

Keywords: *Climate Change, Perception, Geography, Biology, Teachers.*

INTRODUCTION

Over the last two decades, climate variability remains one of the most serious environmental, social and economic challenges on a global scale (Ishaya, 2013; Scholze et. al., 2006). Climate change is already affecting numerous sectors and productive environments, including agriculture, forestry, energy, and coastal zones, in developed and developing countries (Oli and Alec, 2008; Abaje, Ishaya and Usman, 2010) but the developing countries, however, are the most vulnerable. The impact of climate change on people's livelihoods will be greater in Africa (Nigeria inclusive), mainly because many poor smallholders depend on agriculture and have few alternatives (World Bank, 2010, Sustainable Development Goals, 2015). In systems already exposed to increasing resource demands, unsustainable management and pollution, exposure to climate change constitutes an important additional pressure. In the developing countries, vulnerability can be further increased by existing stress factors, such as endemic

poverty, limited access to capital, ecosystem degradation, high risk areas, lower adaptive capacity, disasters and conflicts and lack of effective response from the side of the government (Ishaya, 2013).

At the Sustainable Development Summit on the 25th September, 2015, the United Nation Member States adopted the 2030 Agenda for Sustainable Development. The main drive of the 17 Sustainable Development Goals (SDGs) is to end poverty, fight inequality and injustice, and radically reduce the impact of climate change by 2030. The SDGs was built on the outcome of the eight Millennium Development Goals (MDGs) which were anti-poverty targets the world was committed to achieve by 2015. The MDGs which was adopted in 2000, aimed at an array of issues that included slashing poverty, hunger, disease, gender inequality, and access to water and sanitation. Enormous progress were made on the MDGs, showing the value of a unifying agenda underpinned by goals and targets (United Nations, 2017).

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Despite this success, the indignity of poverty has not been ended for all countries particularly in Nigeria which is highly exacerbated by the threat posed by climate change. One of the three aims of the 17 Sustainable Development Goals (SDGs) is to tackle climate change by 2030. This aim could only be achieved through knowledge dissemination which could be done in senior secondary schools particular using geography and biology as a teaching subjects. In many developed nations, climate change is part of National Curriculum particularly in Europe. Understanding current perceptions of climate change among teachers is important for designing effective teacher training on climate change communication. It is in view of this that this study targets towards assessing climate change perception among Geography and Biology teachers in Gwagwalada Area Council of the Federal Capital Territory of Nigeria.

This study drives towards unveiling the perceptions of Geography and Biological Science teachers on climate change, geography and biology science teacher's opinion on strategies of combating climate change impacts, the scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum and unveiling geography and biology science teacher's opinion on ways of strengthening the curriculum towards achieving the Sustainable Development Goals with regards to climate change.

Study Area

Gwagwalada Area Council is one of the six Area Councils in the administration of the Federal Capital Territory (FCT). The study area is one of the Area Council of Federal Capital Territory (Abuja) Nigeria. The area is located between latitude 8°55'15.211"N, 9°01'13.411"N and longitude 6°51'13.611"E, 7°01'13.511"E (Balogun, 2001; Ishaya and Baji, 2013). It is strategically located close to the heartland of the FCT, within a very fertile agricultural land. It shares boundary with Kwali Area council to the South, Kuje Area Council to the East, Suleja to North and border town of Izom in the North Eastern part.

The settlements found within the study area are Gwagwalada town, Kutunku, Dobi, TungaGayan, Gwako, Dukwa, Dagiri and Paso, Ibwo, Wumi, Zuba, TungaMaje, Giyabiri, Kwaita, Gurfata, Ashara, Ledi, Giri, Kaida, Kuturu and few others. For this study Giyabiri, Ledi, Gurfata, Dobi, TungaGayan and Tunga

Maje were the selected settlements (see Figure. 1)

The climate of the Area Council just like most climate in the tropics have a numbers of climatic elements in common, most especially the wet and dry season's characteristics. The temperature in the area ranges from 30°C – 37.00°C yearly with the highest temperature in the month of March and mean total annual rainfall of approximately 1,650mm per annum. About 60% of the annual rains fall during the months of July to September. The area is drained by River Usuma and River Gurara the major rivers within the study area as well as in the FCT. Gwagwalada the largest settlement in the study area has a population of 23,114 people and is one of the largest satellite town and the third largest urban centre in the FCT (Balogun, 2001; Ishaya and Baji, 2013).

The area as a whole is located within the northern boundary of the Guinea Savannah. The vegetation shows a slight level of variability comprising shrub savanna vegetation type that covers the Iku – Gurara plains where the study area is located except for the dominance of riparian vegetation on the flood plains of River Gurara and Usuma (Balogun, 2001; Ishaya and Baji, 2013). The vegetation is dominated by species of plants such as Danulio Oliver, AlbiziaZygia, Shea butter tree Butrospermumparadoxium and African Locust bean. Parkiaclappertoniana, Terminatiapilisotigma, Amona, Nauclea and Bombaxcontratumare the dominant shrubs found within the area (Balogun, 2001; Ishaya and Baji, 2013).

Agriculture is one of the major economic activities in Gwagwalada Area council due to favorable climate and soil characteristics. Most of the indigenous people are engaged in peasant farming, lumbering, pond fishing, livestock farming among others, is examples of agricultural activities in Gwagwalada Area Council (Balogun, 2001; Ishaya and Baji, 2013).

Methodology

In carrying out this study, the interpretive science paradigm research method is picked out of the Positivist, Interpretive, and Critical research methods as opined by Neuman (2003), because it is highly suitable in identifying the perception of geography and biology teachers on climate change. This study dwells on geography and biology teachers' perception on climate change this succinctly fits into this

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method of research because the study is investigating teachers' reality about climate

change. Model of this description logically lead to qualitative methodology.

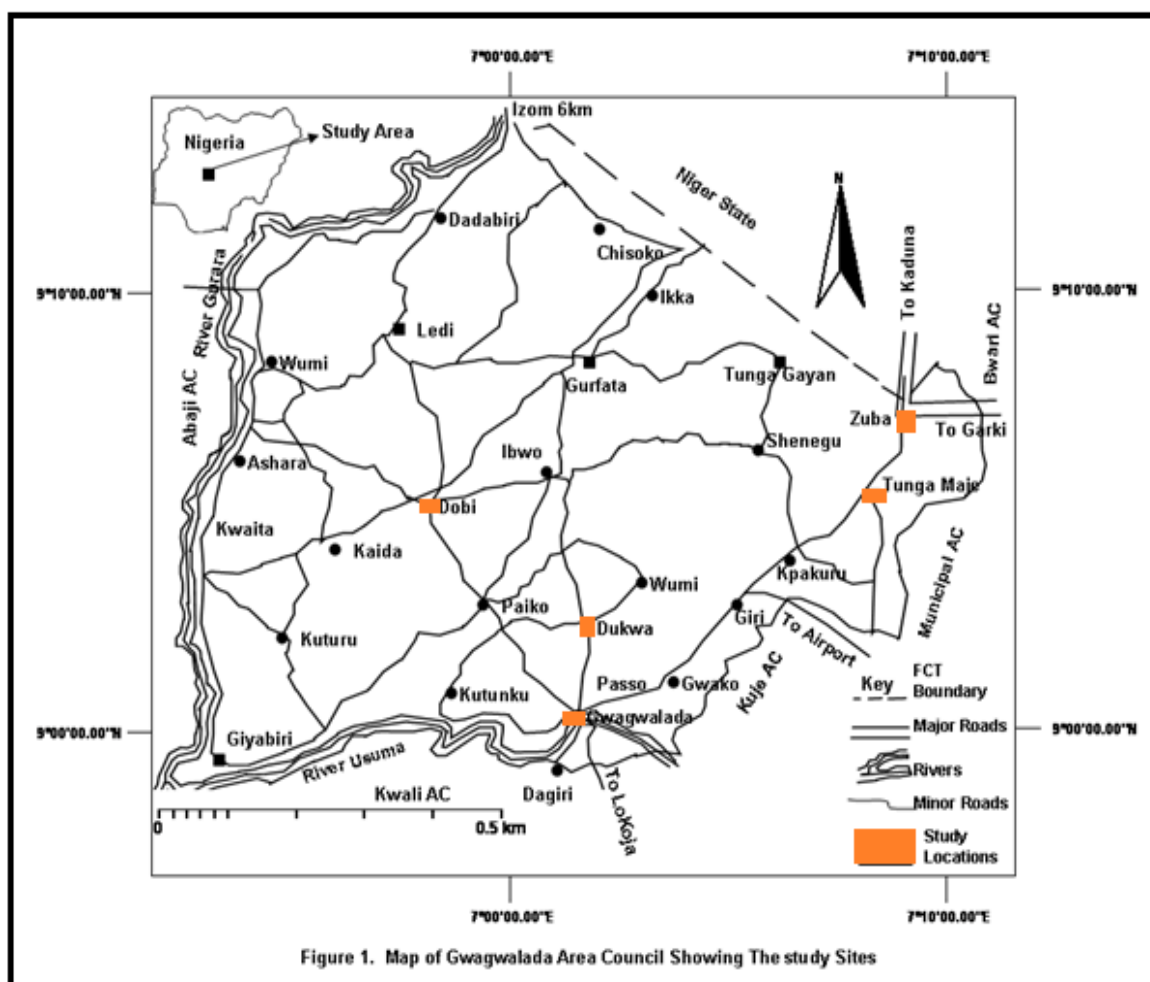


Figure1. Settlements Where Sample Schools are located

Sampling Procedure

The study adopted all the eight public senior secondary schools in Gwagwalada Area Council of the Federal Capital Territory of Nigeria, which are; Government Secondary School (GSS) Gwagwalada, Government Day Secondary School (GDSS) Gwagwalada, School For the Gifted (SFG) Gwagwalada, Government Secondary School (GSS) Dobi, Government Science Secondary School (GSSS)T/Maje,

Government Secondary School (GSS) Hajj Camp, Government Secondary School (GSS) Zuba and Government Girls Secondary School (GGSS) Dukpa were sampled for this study. The populations targeted were all the forty nine (49) geography and biology science teachers in the eight senior secondary schools in the Area Council were purposively sampled based on the intention of the study (see Table 1).

Table 1. Distribution of Science Teachers

Schools	Geography	Biology	Total
GSS Gwag.	2	6	8
GDSS Gwag.	2	3	5
SFG Gwag.	2	4	6
GSS Dobi,	1	3	4
GSSS T/Maje	2	3	5
GSS Hajj Camp	3	5	8
GSS Zuba	3	5	8
GGSS Dukpa	2	3	5
Total	17	32	49

Source: Researcher field work, 2018

Questionnaire Design

The Instrument used in this study was a semi-structured questionnaire. Generally, items in the questionnaire were grouped into four major themes which are;

- Perceptions of Geography and Biological Science teachers on climate change.
- Geography and Biological Science teacher's opinion on strategies of combating climate change impacts.
- The scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum.
- Geography and Biological Science teacher's opinion on strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change.

The questionnaire consists of demographics and open-ended responses. However, excluding demographics and open-ended items, the remaining two sections of the questionnaire consists items formatted as Likert-type statements to which respondents responded with a rating of (SA indicating Strongly Agree, A indicating Agree, D indicating Disagree, and SD indicating Strongly Disagree).

After the questionnaire pilot-testing to measure the reliability and to determine whether it was understandable by the target population, the final version of the questionnaire was administered to geography and biology science teachers in all the eight public senior secondary schools in Gwagwalada Area Council of the FCT of Nigeria.

Data Analysis

The responses were analyzed using descriptive and inferential statistics. The data were coded and prepared for analysis using the Statistical Package for Social Science (SPSS, 23) software. Both the means and the standard deviations of the questionnaire items were calculated. The inferential analysis were used to investigate the significant differences among mean scores of Geography and Biological Science teachers from all the eight public Senior Secondary Schools in Gwagwalada Area Council.

For this reason, one-sample *t* tests was used to compare differences in mean scores of the continuous-level (interval or ratio) and the

normally distributed data to be obtained. The qualitative responses were be analyzed by means of content analysis.

RESULT AND DISCUSSION

Intis study, results on climate change perception among Geography and Biology Teachers in Gwagwalada Area Council was presented based on individual schools dichotomy as well as urban and rural schools dichotomy.

Perceptions of Geography and Biological Science Teachers on Climate Change in Gwagwalada Area Council by Schools

The views of the surveyed 17 Geography and 32 Biology Science teachers on the perception of geography and biological science teachers on climate change are presented in table 2. All geography and biology teachers from the studied schools in Gwagwalada Area Council in the FCT affirmed to changes in climate. However, the degree of their affirmation differs slightly vary with GDSS Gwagwalada (3.7), GSS Gwagwalada (3.34), SFG Gwagwalada (3.44), GSS Hajj Camp Gwagwalada (3.64), GSS Zuba (3.39), GSSS TungaMaje (3.62), GSS Dobi (3.71) GGSS Dukwa (3.2) agreed that the Climate (see Table 2 and Appendix 2). The surveyed respondents from both urban secondary schools (GDSS Gwagwalada, GSS Gwagwalada, SFG Gwagwalada, GSS Hajj Camp Gwagwalada, GSS Zuba) and those from rural secondary schools (GSSS TungaMaje, GSS Dobi, GGSS Dukpa) were also at the same page, agreeing to changing climate with degree of affirmation of 3.12 for urban schools and 3.16 for the rural schools (see Table 3).

The respondent agreed to the fact that over the years, temperature is rising, the amount of rainfall is decreasing every year particularly in the northern part of Nigeria, weather is becoming drier every year and these has led to domestic water supply crises, impacted negatively on crop production, de-vegetation, impact negatively on pastures for livestock production thereby instigated conflicts between headers and farmers and rural-urban migration. The study of the Perceptions of Climate Change among Grade 11 Learners in the Tshwane Metropolitan Municipality, South Africa by Mapaleng *et. al.*, (2017) concurs that change is a living reality and of all the environmental

problems facing humankind today, anthropogenic-induced climate change is regarded as one of the most damaging in its potential repercussions. Concurring to the findings of this study, Edo (2016) also investigated teachers and students' perception of climate change dimensions on teaching and learning in secondary schools in Port Harcourt Local Government, Rivers State his findings indicated that severe weather conditions, whirlwind, excessive heat were among climate change dimensions that negatively impact on mankind.

Geography and Biological Science teacher's in all the schools agreed to the opinions that reforestation, afforestation, cultivating drought tolerant crops, encouraging irrigation/fadama farming in localities, improve in water usage, shortening growing season by cultivation varieties that matured within a short period of time and indebt dissemination of information on potential weather incidences/events/disasters where seen as strategies of combating climate change impacts. However, the summary of the degree of their affirmation varies insignificantly with GDSS Gwagwalada (3.50), GSS Gwagwalada (3.61), SFG Gwagwalada (3.70), GSS Hajj Camp Gwagwalada (3.07), GSS Zuba (3.01), GSSS TungaMaje (3.77), GSS Dobi (3.81) and GGSS Dukwa (3.70) (see table 2 and Appendix 2), while respondents opinions both from urban schools and that of rural schools also were in agreement with likert scale scores of 3.37 for urban secondary schools and 3.73 for the rural secondary schools (see Table 3).

This findings of this study coincide with that carried out by Ishaya and Baji (2013) in their analysis on indigenous people's perception on climate change impact on biodiversity in Gwagwalada Area Council of the FCT of Nigeria where majority of the indigenous people were of the view that our climate is changing due to uninterrupted anthropogenic activities such as urbanization, deforestation, industrialization and increase in agriculture due to population explosion (Ishaya and Baji, 2013). In the same vein, Ogunseemi (2016) opined that globally, the changes that have accompanied climatic changes have rapidly increased demanding for adaptation and mitigation on such changes through afforestation, cultivation of drought tolerant crops, irrigation farming, improve in water usage, cultivation of drought tolerant crops and dissemination of climate change information.

With regards to the scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum all the respondents disagree to the fact that climate change related topics are well captured in secondary school geography and biology science syllabus. The respondents disagree that issues on changing weather/climate, ecosystem, rainfall, natural disasters (drought and flood), impact of drought/flood on food chain/food security, impact of drought/flood on plants and animals and climate/weather instigated migration are not well treated in secondary syllabus. Summarily, respondents from the various schools disagreed with all the opinions presented with GDSS Gwagwalada respondents opining (1.76), GSS Gwagwalada (1.8), SFG Gwagwalada (1.80), GSS Hajj Camp Gwagwalada (1.54), GSS Zuba (1.93), GSSS TungaMaje (1.49), GSS Dobi (1.91) and GGSS Dukwa (1.62) (see Table 2 and Appendix 2), while respondents opinions both from Urban secondary schools and that of rural schools also were in disagreement with likert scale scores of 1.77 for urban secondary schools and 1.57 for the rural secondary schools (see Table 3). Ogunseemi, (2016) assessed science teachers' perception of climate change: implication for climate change education in schools in Nigeria, he concludes that in a new global economy driven by knowledge, changes have implications on the nature and purpose of science teaching in schools to determine a framework and pedagogy for climate change education and one of his key observation is the weakness of science subjects curriculums towards climate change related issues which does not differ from the observations made in this study. Results on geography and biological science teacher's opinions on strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change depicts the mean responses of GDSS Gwagwalada as 3.68, GSS Gwagwalada (3.6), SFG Gwagwalada (3.67), GSS Hajj Camp Gwagwalada (3.40), GSS Zuba (3.90), GSSS TungaMaje (3.66), GSS Dobi (3.62) and GGSS Dukwa (3.01) (see Table 2 and Appendix 2). The respondents' opinions both from urban secondary schools and that of rural secondary schools also were in agreement with likert scale scores of 3.63 for urban secondary schools and 3.42 for the rural secondary schools (see Table 3). In strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change, amongst issues agreed by the

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respondents were incorporating sustainable agriculture and climate change, incorporate food security and climate change, introduce cultural and science/technological innovations for tackling climate change, dissemination of knowledge towards combating climate change, introduce flood, desertification and drought and promote sustainable management of land and incorporate afforestation and reforestation/environmental greening towards climate change reduction in geography and biology science secondary school curriculum.

Rich (2008) also viewed that curriculum development for secondary school is another aspect of climate change discussion that need to be strengthen is researches. In support of this, Nooraidaet. al., (2012)examines climate change in chemistry curriculum for secondary schools in Malaysian context they conclude that among the aims of the Malaysian Secondary School Chemistry Curriculum, there is need to develop

concerned, dynamic and progressive society with science and technology culture that values nature and works towards the preservation and conservation of the environment. They conclude that it is very critical for environmental issues such as climate change, be incorporated in Malaysian Chemistry Curriculum since it's related to human activities. By integrating this issue, it will help teachers to develop students' awareness on climate change mitigation and adaptation for sustainable future. In support in of this study findings, Chimes (2007) observed that one of the difficulties teachers face in addressing the topic of climate change in secondary schools is that currently there are few textbooks that feature climate change as main topic or subjects. This is partly because of the newness of global warming discussion in the secondary education domain and the tendency of publishers having controversies.

Table2. Perceptions of Geography and Biological Science Teachers on Climate Change in Gwagwalada Area Council by Schools

	Respondents Opinion	GDSSG	GSSG	SFG	GSS H/C	GSS ZU	GSSS T/M	GSSD	GGSSD
A	Perceptions of Geography and Biological Science teachers on climate change.	3.17	3.34	3.44	3.64	3.39	3.62	3.707	3.2
B	Geography and Biological Science teacher's opinion on strategies of combating climate change impacts.	3.50	3.61	3.70	3.07	3.01	3.77	3.81	3.70
C	The scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum.	1.76	1.8	1.80	1.54	1.93	1.49	1.91	1.62
D	Geography and Biological Science teacher's opinion on strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change.	3.68	3.6	3.67	3.40	3.9	3.66	3.62	3.01

Source: Researcher Analysis, 2018.

Note: 0 – 1 = Strongly Disagree; 1.1 – 2.0 = Disagree; 2.1 – 3.0 = Agree; 3.1 – 4.0 = Strong Agree (Philip et. al., 2011, Ishaya, 2013).

Table3. Perceptions of Geography and Biological Science teachers on climate change in Urban and Rural Schools

	Respondents Opinion	Urban	Rural	Mean
A	Perceptions of Geography and Biological Science teachers on climate change.	3.12	3.16	3.14
B	Geography and Biological Science teacher's opinion on strategies of combating climate change impacts.	3.37	3.73	3.55
C	The scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum.	1.77	1.57	1.67

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D	Geography and Biological Science teacher's opinion on strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change.	3.63	3.42	3.525
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Source: Researcher Analysis, 2018.

Note: 0 – 1 = Strongly Disagree; 1.1 – 2.0 = Disagree; 2.1 – 3.0 = Agree; 3.1 – 4.0 = Strong Agree (Philip et al., 2011, Ishaya, 2013).

CONCLUSION AND RECOMMENDATIONS

This study provides a valuable understanding on climate change perception among Geography and Biology teachers in Gwagwalada Area Council of the Federal Capital Territory of Nigeria. All geography and biology teachers from the studied schools affirmed to changes in climate. The main indicators of climate change are temperature rise, decrease in rainfall, drier weather, decline in domestic water supply, incapacitation of crop production, de-vegetation, decline of pastures for livestock production thereby instigated conflicts between headers and farmers and rural-urban migration. Reforestation, afforestation, cultivating drought tolerant crops, encouraging irrigation/fadama farming in localities, improve in water usage, shortening growing season by cultivation varieties that matured within a short period of time and indebt dissemination of information on potential weather incidences/events/disasters where seen as strategies of combating climate change impacts.

The scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum were not detailed in syllabus. In strengthening curriculum towards mitigating climate change, there is need to incorporate sustainable agriculture and climate change, food security and climate change, introduce cultural and science/technological innovations for tackling climate change, dissemination of knowledge towards combating climate change, introduce flood, desertification and drought and promote sustainable management of land and incorporate afforestation and reforestation/environmental greening towards climate change reduction in geography and biology science secondary school curriculum.

REFERENCES

- [1] Abaje, I. B., Ishaya, S., and Usman, S. U., (2010). An Analysis of Rainfall Trends in Kafanchan, Kaduna State, *Nigeria Research Journal of Environmental and Earth Sciences*. 2(2): 89-96.
- [2] Balogun, O. (2001). *The Federal Capital Territory of Nigeria: A Geography of Its Development*. University of Ibadan Press Limited.
- [3] Chimes, Art. (March, 2007) *U. S. Educators Face Challenges in Teaching Climate Change*. Voice of America.
- [4] Edo, B. L. (2016). Teachers and Students' Perception of Climate Change Dimensions on Teaching/Learning in Secondary Schools, Port-Harcourt Local Government Area, Rivers State. *International Journal of Education and Evaluation*. 2(3) 43-50.
- [5] Ishaya, S. (2013). Assessing Cereal Vulnerability to Climate Variability in the FCT of Nigeria. Ph.D Thesis Submitted to Department of Geography University of Abuja.
- [6] Ishaya, S. and Baji, A. J. (2013). Indigenous People's Perception of Climate Change Impact on Biodiversity in Gwagwalada Area Council of Federal Capital Territory of Nigeria. *International Journal of Agricultural Economics, Rural Sociology and Development (IJARD)*, 5 (1) 1-11.
- [7] Ishaya, S. and Abaje I. B. (2009). Indigenous people's perception on climate change and adaptation strategies in Jema'a local government area of Kaduna State, Nigeria. *Journal of Geography and Regional Planning*; Vol. 1(8), 138-143, Retrieved January 29th 2011 from <http://www.academicjournals.org/JGRP> ISSN 2070-1845
- [8] Mapaleng S. L. and Nerhene D. (2017). Perceptions of Climate Change among Grade 11 Learners in the Tshwane Metropolitan Municipality, South Africa. *Southern African Journal of Environmental Education*. 33(1)11-18.
- [9] Mikaela H. (2016). Geography Teachers and Climate Change: Emotions about Consequences, Coping Strategies, and Views on Mitigation. *International Journal of Environmental & Science Education*. 11(4), 389-408
- [10] Neuman, W.L. (2003). *Social Research, Methods: Qualitative and quantitative Approaches*. 5th edition. Massachusetts: Allyn and Bacon. Boston.
- [11] Nooraida Y., Zurida H.J., Ismail, N.A.R, (2012). Climate Change in the Chemistry Curriculum for secondary Schools: Malaysian

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- Context. *International Journal of Global Education*. 1(2) (28-34).
- [12] Ogunseemi, O. E. (2016). Assessment of Science Teachers' Perception of Climate Change: Implication for Climate Change Education in Schools in Nigeria. *International Journal of Advanced Academic Research*. 2(8) 11-18
- [13] Oli, B. and Alec, C. (2008). *Assessing the Security Implications of Climate Change for West Africa: Country case studies of Ghana and Burkina Faso*. International Institute for Sustainable Development.
- [14] Rich S. (2008). *Understanding the Global Warming Discussion: Climate Change as a Context for Developing Standards-Based Research Skills in Secondary School Students*. M.Sc. Thesis. Submitted in Partial Fulfillment of the Requirements for the Degree Master of Science in Education. School of Education Dominican University of California.
- [15] Scholze M., Knorr W., Arnel N.W., and Prentice I.C. (2006). A climate-change riskanalysis for world ecosystems. *Proceedings of the National Academy of Sciences* Vol.103 (35): 13116-12120.
- [16] United Nation (2017). *Sustainable Development Goals Report*. United Nations, New York, 2017.
- [17] United Nations Development Programme (2007). *Human Development Report 2007/2008: Fighting Climate Change*, United Nations Development Programme, New York.
- [18] World Bank (2010). *World Development Report 2010: Development and Climate Change*. World Bank, WashingtonDC

APPENDIX 1

A	Perceptions of Geography and Biological Science teachers on climate change.	SA	A	D	SD
1	The Climate is changing				
2	Temperature is rising.				
3	The amount of rainfall is decreasing every year				
4	The weather is becoming dry every year.				
5	Climate change has led to domestic water supply crises				
6	Climate change has impacted negatively on crop production				
7	The Environment suffers from excessive de-vegetation due to climate change.				
8	Climate change has impacted negatively on livestock production				
9	Climate change has instigated conflicts between headers and farmers.				
10	Climate change has led to rural-urban migration				
B	Geography and Biological Science teacher's opinion on strategies of combating climate change impacts.	SA	A	D	SD
1	Reforestation and Afforestation is very important in combating climate change				
2	Cultivating drought tolerant crops could help in combating climate change				
3	Encouraging irrigation/fadama farming in our locality				
4	Improve in water usage maximization				
5	Shortening growing season by cultivation varieties that matured within a short period of time				

Questionnaire on Assessment of climate change perception among Geography and Biology teachers in Gwagwalada Area Council of the Federal Capital Territory of Nigeria.

SECTION A: Bio-Data of Respondents

Instruction: Tick Appropriately (√) as it Applies to You

- Name of school Sex (a) Male [] (b) Female []
- Marital Status (a) Single [] (b) Married []
- Age (a) Less than 30yrs [] (b) 31yrs to 40yrs [] (c) 41yrs to 50yrs [] (d) 51yrs and above []
- Academic qualification
- Years of Service (a) Less than 5years [] (b) 5-10years [] (c) 10-20years [] (d) 20years and above []
- Area of specialization (a) Biology [] (b) Geography [c] Others (specify)
- What class do you teach? (a) SS1 [] (b) SS2 [] (c) SS3 []

SECTION B: The following sets of questions aim at assessing climate change perception among Geography and Biology teachers in Gwagwalada Area Council of the Federal Capital Territory of Nigeria.

Instructions: tick appropriately (√) as it applies to you

Note: SA =Strongly Agree, A =Agree, D = Disagree, SD =Strongly Disagree

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6	There is need for better dissemination of information on potential weather incidences/events/disasters				
7	Nigerian government and all stakeholders involve in the fight against climate Change and global warming need to strengthen up				
C	The scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum.	SA	A	D	SD
1	Issues on weather/climate are well treated in the syllabus				
2	Issues on ecosystem are well treated in the syllabus				
3	Rainfall is well treated in the syllabus				
4	Natural disasters (drought and flood) are well treated in the syllabus				
5	Impact of drought/flood on food chain are well treated in the syllabus				
6	Impact of drought/flood on plants and animals are well treated in the syllabus				
7	Climate/weather instigated migration are well treated in the syllabus				
D	Geography and Biological Science teacher's opinion on strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change.	SA	A	D	SD
1	There is need to incorporate sustainable agriculture and climate change in secondary school curriculum				
2	There is need to incorporate food security and climate change in secondary school curriculum				
3	Introduce cultural and science/technological innovations of tackling climate change in secondary school curriculum				
4	Promote dissemination of knowledge towards combating, flood desertification and drought and promote sustainable management of land.				
5	Incorporate afforestation and reforestation/environmental greening towards climate change reduction in secondary school curriculum				

APPENDIX 2: PERCEPTIONS OF GEOGRAPHY AND BIOLOGICAL SCIENCE TEACHERS ON CLIMATE CHANGE IN GWAGWALADA AREA COUNCIL BY SCHOOLS

A	Perceptions of Geography and Biological Science teachers on climate change.	GDSSG	GSSG	SFG	GSS H/C	GSS ZU	GSSS T/M	GSSD	GGSSD
1	The Climate is changing	3.70	3.6	2.71	3.25	3.67	3.6	3.43	3.67
2	Temperature is rising.	3.30	3.0	3.0	3.50	3.25	3.7	3.73	3.33
3	The amount of rainfall is decreasing every year	3.15	4.0	4.0	4.0	4.0	4.0	4.0	4.0
4	The weather is becoming dry every year.	3.15	3.0	3.0	4.0	3.0	3.0	4.0	3.0
5	Climate change has led to domestic water supply crises	2.23	3.0	3.29	4.0	3.0	3.2	3.8	3.0
6	Climate change has impacted negatively on crop production	3.15	3.0	3.14	3.0	3.0	3.3	3.93	3.0
7	The Environment suffers from excessive de-vegetation due to climate change.	3.69	4.0	4.0	4.0	3.0	3.8	4.0	3.0
8	Climate change has impacted negatively on livestock production	3.15	3.0	4.0	3.25	3.0	4.0	3.09	3.0
9	Climate change has instigated conflicts between headers and farmers.	3.85	4.0	4.0	3.38	4.0	3.9	4.0	3.0
10	Climate change has led to rural-urban migration	2.29	2.80	3.29	4.0	4.0	3.7	3.09	3.0
	Mean Score	3.17	3.34	3.44	3.64	3.39	3.62	3.707	3.2
B	Geography and Biological Science teacher's opinion on strategies of combating climate change impacts.	GDSSG	GSSG	SFG	GSS H/C	GSS ZU	GSSS T/M	GSSD	GGSSD
1	Reforestation and Afforestation is very important in combating climate	3.85	4.0	3.71	3.0	3.0	4.6	4.0	4.0

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	change								
2	Cultivating drought tolerant crops could help in combating climate change	3.15	4.0	3.57	3.0	3.0	3.7	4.0	3.6
3	Encouraging irrigation/fadama farming in our locality	3.38	3.40	3.75	3.0	3.0	3.8	3.82	3.5
4	Improve in water usage maximization	2.92	2.60	3.29	3.0	3.0	3.9	3.73	3.0
5	Shortening growing season by cultivation varieties that matured within a short period of time	3.85	3.30	3.86	3.0	3.0	3.8	3.36	3.83
6	There is need for better dissemination of information on potential weather incidences/events/disasters	3.85	4.0	3.71	3.25	3.0	3.2	3.82	4.0
7	Nigerian government and all stakeholders involve in the fight against climate Change and global warming need to strengthen up	3.54	4.0	4.0	3.25	3.0	3.4	3.91	4.0
	Mean Score	3.50	3.61	3.70	3.07	3.01	3.77	3.81	3.70
C	The scope and nature of topics related to teaching of climate change in Geography and Biological Science curriculum.	GDSS	GSSG	SFG	GSS H/C	GSS ZU	GSSS T/M	GSSD	GGSSD
1	Issues on weather/climate are well treated in the syllabus	2.08	2.30	2.29	1.25	2.0	1.6	2.0	2.0
2	Issues on ecosystem are well treated in the syllabus	1.85	2.0	2.0	1.38	2.0	1.3	1.82	2.0
3	Rainfall is well treated in the syllabus	1.62	1.30	2.29	1.63	2.0	1.7	1.64	1.67
4	Natural disasters (drought and flood) are well treated in the syllabus	1.85	2.10	1.86	2.5	1.83	1.4	3.73	1.33
5	Impact of drought/flood on food chain are well treated in the syllabus	1.69	1.60	1.14	1.38	1.67	1.5	1.45	1.5
6	Impact of drought/flood on plants and animals are well treated in the syllabus	1.69	1.70	1.29	1.25	2.5	1.7	1.36	1.5
7	Climate/weather instigated migration are well treated in the syllabus	1.54	1.60	1.71	1.38	1.5	1.2	1.36	1.33
	Mean Score	1.76	1.8	1.80	1.54	1.93	1.49	1.91	1.62
D	Geography and Biological Science teacher's opinion on strengthening curriculum towards achieving the Sustainable Development Goals with regards to climate change.	GDSS	GSSG	SFG	GSS H/C	GSS ZU	GSSS T/M	GSSD	GGSSD
1	There is need to incorporate sustainable agriculture and climate change in secondary school curriculum	4.0	3.30	3.29	3.25	3.67	3.7	3.27	3.0
2	There is need to incorporate food security and climate change in secondary school curriculum	3.85	3.40	3.43	3.38	3.83	3.8	3.64	3.0
3	Introduce cultural and science/technological innovations of tackling climate change in secondary school curriculum	3.31	3.30	3.61	3.63	4.0	3.6	3.45	3.2
4	Promote dissemination of knowledge towards combating,	3.23	4.0	4.0	3.5	4.0	3.3	3.91	3.0

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	flood desertification and drought and promote sustainable management of land.								
5	Incorporate afforestation and reforestation/environmental greening towards climate change reduction in secondary school curriculum	4.0	4.0	4.0	3.25	4.0	3.9	3.82	3.0
	Mean Score	3.68	3.6	3.67	3.40	3.9	3.66	3.62	3.01

Source: Researcher Analysis, 2018

Note: 0 – 1 = Strongly Disagree; 1.1 – 2.0 = Disagree; 2.1 – 3.0 = Agree; 3.1 – 4.0 = Strong Agree (Philip et. al., 2011, Ishaya,2013).

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