



AUDIENCE KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS CLIMATE CHANGE ADAPTATION IN ANAMBRA STATE, NIGERIA

OKORO, Harriet Ogoma

Department of Mass Communication
University of Nigeria, Nsukka

Email: harriet.okoro.92962@unn.edu.ng

ABSTRACT

The issue of Climate Change is still strange to many Nigerians especially the rural dwellers. This has hampered on the aims of Nigerian government to invest in climate change mitigation and adaptation technologies as prioritized in her Nationally Appropriate Mitigation Actions and National Adaptation (NAMA) plans. The knowledge assessment in this study was used to evaluate respondents' broad knowledge of climate change, including their comprehension of what climate change is, what causes it, and how it is affecting their community. Citing the knowledge-gap theory as a perspective framework to guide us on the principles and nature of what is expected in a dichotomy of information rich versus information poor. Using focus group discussion, the study was carried out in 2 communities in the coastal areas of Anambra State that are vulnerable to climate change - Onitsha North Local Government representing an urban community and Aguleri town representing a rural community. To further elicit data, the study surveyed a sample of 400 respondents purposively selected. Findings revealed that 60% of population in the urban areas knew about climate change and its impacts within their areas. However, a thorough understanding of what causes climate change appears to be another big knowledge gap with respondents in the rural areas. There is need to close the knowledge gap in the rural areas through adequate media information and education.

Keywords: Climate change, knowledge-gap, media, mitigation, adaptation

Introduction

One of the greatest hazards to society is climate change, which has been seen as looming larger than other dangers like war and terrorism (Lomborg, 2015). Climate change is a widespread phenomenon that has caused numerous worries among both individuals and world leaders. This is because it has an impact on the environment, which therefore has an effect on humans. Climate change is defined by the United Nations Framework Convention on Climate Change (UNFCCC) in Mosser (2007) as a "change in climate that can be directly or indirectly linked to human activity that modifies the composition of the earth's atmosphere in addition to natural climate variability seen over comparable time periods".

It is one of the biggest risks to the environment, society, and economy around the world. The evidence is overwhelming that the average global temperature is rising, including air and ocean temperatures, snowmelt, sea level rise, and melting of ice. The average world temperature is affected by a variety of natural phenomena, but human activity continues to be a major contributor to climate change since it increases the emission of greenhouse gases (Nwabueze & Egbra, 2016; Lomborg, 2015). In 1992,

Nigeria and Ghana both ratified the UN Framework Convention on Climate Change. The National Adaptation Strategy and Plan of Action on Climate Change was adopted by Nigeria. (Nashuuta, 2016).

A huge number of people generally obtain their information through the media. They specifically relate to the disseminating of climate change information through media including radio, television, newspapers, mobile phones, extension agents, services, posters, bulletins, and so on (Adegbija, 2001). They offer simple explanations of climate change and global warming (Boykoff, 2010). Contrarily, the Intergovernmental Panel on Climate Change (IPCC) has defined climate change as a shift in the state of the climate caused by human activity or natural variability that can be detected statistically by changes in the mean and/or variability of its properties and that lasts for a long time, typically decades or longer (IPCC, 2007). One way to attribute this knowledge and attitude study is to attribute it to the concept of risk communication. Risk communication is a branch of risk perception that analyses the deliberate dissemination of risk signals to laypeople and risk assessors (Smith & Johnson, 1988; Plough & Kirmsky, 1987 in). Policymakers and organizations that aim to disseminate risk information with the goal of attempting to address people's risk perception biases might use the information as guidance.

There is a variation in how the information is distributed. Comparatively to a qualitative approach, information presented in a quantitative style with probabilistic probabilities will cause one to perceive risk to be lower (Smith, et al. 1990). The theory of risk communication focuses on people not only comprehending the information provided to them but also considering it significant in light of their own situation (Fischhoff, 1998).

Statement of the Problem

Political and economic interests have long sought to sway media coverage of climate change in order to have an impact on public knowledge, understanding, and perception due to the media's crucial role in the reconstruction of climate change narratives (Sampei & Aoyagi-Usui, 2019).

However, there is a huge knowledge gap in the information flow between urban and rural areas. Parts of the population with a better socioeconomic class acquire this information faster than sections with a lower base, as the decline of mass media information into the social system increases; as the difference or gap in awareness between these sections increases. The knowledge gap hypothesis is the name given to this phenomenon. (Surin & Tancard, 2007). By outlining the theory and guiding principles of the gap in consciousness of the population towards climate change and the environment, this study aims to investigate the level of information seeking about climate change among residents of two communities in Anambra State.

Study Objectives

The study objectives are to:

- 1) Ascertain if the respondents are aware of climate change risk impact on their environment;
- 2) Find out the media they most likely obtain their information on climate change; and
- 3) Determine the level of audience understanding about information on climate change.

Empirical Literature Review

The public's attitudes toward climate change mitigation are strongly influenced by risk perception and knowledge accuracy, but as with other science-based problems, the public initially learns about climate change through the media. This indirect transmission, while unquestionably required, likely raises the risk of introducing biased or wrongly weighted information into the discourse, whereas information that is perceived to be more credible is more likely to lead to behavior change (Coleman, 1993).

The knowledge that is made available to the public must be translated into understandable words because climate change is a scientific process. The media plays this role organically in the majority of

nations. The media has the ability to influence how people perceive climate change science in addition to how they comprehend it. Using thirty years' worth of data (1980–2009) of the Benue and Plateau meteorological stations in North Central Nigeria, Falaki (2012) used analysis of regression. According to the study, the lowest and maximum temperatures in Makurdi and Jos respectively increased by 0.10°C and 0.58°C and 0.49°C and 0.55°C, respectively. The study also showed that rainfall increased by 46.4mm/30 years in Makurdi but declined by 8.48mm/30 years in Jos, with the pattern of rainfall becoming more irregular.

Desertification and severe drought are effects of climate change in Nigeria. According to Odjugo and Ikhuoria (2003), Nigeria north of 12°N is severely threatened by desert encroachment, and sand dunes have covered vast swaths of arable land, diminishing the amount of productive agricultural area.

As a result, there has been a significant emigration and relocation of people to regions less at risk of desertification. Such exodus results in social impacts like a loss of social ideals and dignity. Herdsmen and farmers frequently engage in rising numbers of racial conflicts as a result. Between 1998 and 2006, these confrontations in Nigeria's six northern states claimed the lives of 186 persons (Yugunda, 2002 & Yaqub, 2007).

Additionally, it has been claimed that a number of rivers in Nigeria have dried up or are becoming more navigable during certain times of the year, including Lake Chad, whose extent decreased from 22,902 km² in 1963 to just 1,304 km² in 2000. (Odjugo, 2007). Due to the restricted supply of water, there will be a propensity for people to congregate near the few remaining sources. Under such conditions, there is a higher chance of further contaminating the few water supplies and of water-borne diseases like cholera, typhoid fever, guinea worm infection, and river blindness spreading. Moreover, In the semi-arid region of northern Nigeria, Ayuba, Maryah, and Gwary (2007) demonstrated how drought, desert expansion, and coastal inundation have begun to disrupt the country's ecology and cause ecological destabilization.

Adaptive communication Strategies: Implication to Knowledge and Attitude Change to Climate Issues

Thus, it becomes necessary to focus actions in order to lessen the negative effects of climate change and improve adaptive capacity. The intricate interrelationships of numerous components at various scales define adaptive capacity. The IPCC (2007) listed a number of variables that can alter adaptive ability, including money, technology, education, information, skills, infrastructure, access to resources, various psychological variables, and management skills. According to Vincent (2009), a person's ability to adapt to climate change at the household level depends on a variety of factors, including their knowledge base, which may allow them to foresee change and identify new or modified livelihood opportunities, and their access to additional resources needed to do so. This knowledge base necessitates an understanding of the need for adaptation, as well as awareness of the options available, the ability to weigh them, and the capability of putting the best options into practice.

In their study, Gupta and Hisschemöller (1997) in Uddin and Anjuman (2013) came to the conclusion that it is crucial to set up systems for the national and regional transmission of information on climate change and adaptation as well as venues for discussion and creation of adaptation techniques at various levels. The biggest barriers to adaptation in Nigeria, according to the Nigeria Environmental Study/Action Team (NEST) and Global Change Strategies International (GCSI), include a lack of information (awareness) and understanding (education) about the phenomenon of climate change. Boykoff (2010), for instance, examined how twenty different nations and six different continents covered climate change in their newspapers. He found that publications like *The Age* in Australia, *The Wall Street Journal* in the United States, *Globe and Mail* in Canada, and *Business Day* in South Africa all covered the issue, but he did not find any publications from Nigeria that did media coverage of climate change.

Although Nigerian meteorological stations provide weather-related reports, there is no specialised media coverage of climate change. The only time this rule does not apply is when there will be flooding or other natural calamities. The media will report on such but will not make use of occurrence to inform the populace of what might be to blame for the sudden harsh weather events our nation is currently experiencing. However, as is the case with the majority of science-based concerns, the public first hears about climate change through the media, particularly radio and official sources like extension agents and village heads, etc. Although unquestionably required, this indirect transmission most likely raises the risk of inaccurate or incorrectly weighted information being introduced into the conversation. In addition to shaping understanding of climate change science, the media have the power to shape people's impressions of their fate; a doomsday story may resign its audience to passivity, while a piece emphasising the real but not inevitable devastation from climate change may incite action.

The majority of research on the relationship between agriculture and climate change has focused on economics, social infrastructure, institutional features of adaptive ability, and technological factors (Burton, Smith, & Lenhart, 1998; Kates, 2000; Scheraga & Grambsch, 1998; Magadza, 2000).

Theoretical Framework

According to Bighash & Qamarzadeh (2021), “in the Knowledge Gap theory, new knowledge that is disseminated by the media in a social system causes information inequality and disparity among people especially when not all demographic groups are exposed to news via the media”. Researchers' analyses reveal that while these distances may not always widen, they may sometimes be minimized by planning particular activities through chats, lectures, and other forms of direct communication. The gaps in awareness are narrowed when the groups' levels of information, distances, and proximity to one another all increase.

One of the theories in the realm of communication and media is the knowledge gap theory. Tickenor and Donohue first formulated this theory in 1970. In Tickenor & Donohue (1970) in Wei & Yan (2010), their key finding was that, as knowledge is disseminated via the media in a social system, segments of the population with greater socioeconomic position tend to do so more quickly than segments with lower socioeconomic status as a result, rather than closing, the awareness gap between the two is growing.

The basis for the gap of awareness hypothesis is the notion that the media continuously widen the information gap between various social classes. Because of the differences in how they interact with the media, access the media, and consume information, this gap is also influenced by these differences. The portion of the population with better economic conditions has greater and quicker access to information as it moves through the mass media than the portion of the population with the worst living situations. (Wei & Yan, 2010)

Methodology

The study adopted a combined research approach including survey and qualitative research methods. In other words, mixed method—combining survey and focus group discussion (FGD)—was encouraged. This was accomplished by applying the method developed by Taro Yamane for calculating study sample sizes. The Statistical Package for the Social Sciences was used to facilitate computer-assisted analysis (SPSS). Statistics tables and percentages were used to present the data. By analyzing the statistical correlations between the pertinent variables, the study's objectives were met.

According to citypopulation.de/en/nigeria.com, the population of Anambra north which comprises of Anambra East, Anambra West, Ayamelum, Ogburu, Onitsha North, Onitsha South and Oyi local government areas has a combined population of 1, 613, 400. (One million, six hundred and thirteen thousand, four hundred)

Using a town hall organised by Hon. Tony Nwoye, the study leveraged on the platform to select 2 individuals representing one town across 40 respective flood affected towns in the senatorial zone. The towns are - Aguleri, Umueri, Enugwu Aguleri, Eziagulu Otu Aguleri, Enugwu Otu Aguleri, Mkpunando-otu Aguleri, Ikem Ivite, Igbariam, Umuoba Anam, Nando, Umueri, Nsugbe, GRA phase 1, GRA phase 2, Woliwo, Transkisi phase 1, Transkisi layout, Enu Onisha and Awada Layout spanning across the two purposively selected local government areas.

The selection was to make the intention of ideally bringing the various perspectives on the current climate change issue to a shared platform. The organization and management of the exercise were under the supervision of two team members. While one was in charge of leading the conversation, another was responsible for taking notes and helping to compile the findings for the feedback session. Two distinct group conversations were held for the focus group discussion. Each group consists of eight persons, aged 18 to 50, who were selected from various communities. According to Liamputtong (2010), FDGs "involve a group of 6-8 persons who come from similar social and cultural backgrounds or who have comparable experiences or concerns," hence it was decided that each group would have six participants. The discussion/contents interviews were thematically analyzed after being fully transcribed, however in direct contrast to the quantitative data.

Data Analysis

The following key questions served as discussion starters and were followed by the relevant phases or activities in chronological order to help accomplish the desired objectives:

- 1) Do you know about climate change?
- 2) What are the main issues with climate change that individuals have experienced over the last ten years, in your opinion?
- 3) What are the potential root causes of the climate change issues you've noted, in your opinion?
- 4) Which of the old media do you think gives you comprehensive information about climate change?
- 5) Do you consider the social media as a very accessible channel to obtain climate change information?
- 6) Do you perceive the issue of climate change a politically motivated issue?
- 7) Do you consider climate change as an environmental threat that needs more media attention?

Research Objective One: To ascertain if the respondents are aware of climate change risk impact on their environment

First Question: Do you know about climate change?

Table 1

S/N	Variable	Frequency	Percent
1	Yes	227	60
2	No	153	40
	Total	380	100

Knowing, perceiving, and being aware of occurrences are all parts of the concept of awareness. Table 1 states the respondents' climate change awareness which is connected to different sources of media information. 60% acquiesced that they are aware of climate change issues while 40% do not. The structure of awareness is reflected in the structure of media experience.

The participants in the FGD were asked to say in their own words if they know about climate change. Majority of their responses affirm their awareness with statements like: "I have heard through the media that flooding is as a result of global warming"; "climate change is a consequence of dangerous gases flaring in the atmosphere". Some of the comments especially from group in the rural area are not aware of climate change issues with responses like "The word is very strange to me"; "Our God is angry with us". "It is a sign of end time". Several of these comments demonstrate a lack of understanding about climate change.

Second Question: What are the potential root causes of the climate change issues you've noted, in your opinion?

Table 2:

S/N	Variable	Frequency	Percent
1	Fossil fuels	143	38
2	Bush Burning	60	15
3	Tree Cutting	54	14
4	Industrial Chemical Emissions	123	33
Total		380	100

Question 2 in the FGD had the group categorize and rank the identified potential causes of climate change as 6 members of the group representing the urban area identified industrial chemical emissions and fossil fuel as the major contributor of climate change. Hear one say: "In many parts of Europe, there have been government legislation to ban fossil fuels in order to embrace renewable energy". However, in the separate group from the rural areas, only two persons attributed climate change to bush burning.

Analyzing the survey, fossil fuels emerged as having the most severe impact on the climate 38%. Numerous studies have shown similar findings, with Hamilton and Stampone (2013) stating that fossil fuels and anthropogenic activities are both to blame for climate change (IPCC, 2007). Due to the rising temperatures, methane emissions, which are a major factor in global warming, have increased (Science News, 2010). According to Bloom et al. (2010), the warming of the mid-latitude and moist arctic region caused a rise in methane of roughly 7% between 2003 and 2007. Higher temperatures today can increase climate change's causes rather than just being a result of it. In addition, Nobre et al. (2009) stated that one of the causes of climate change is deforestation. Deforestation and Green House Gas (GHG) emissions are currently the main factors influencing the assertion (Nordhaus, 1991).

Research Question 2: What are the main issues with climate change that individuals have experienced over the last ten years, in your opinion?

Table 3

	Variable	Frequency	Percent
1	Flooding	188	50
2	Erosion	38	10
3	GasFlaring	70	18
4	CuttingdownofTrees	84	22
	Total	380	100

Climate change issue is such as unpredictable weather occurrences were deemed to be the most severe of the identified climate change issues, with a severity rating of 50% for flooding which of course is the most occurred and known climate disaster in both rural and urban areas close to the River Niger.

In the FGD, one of the participants in the urban area has this to say: "flooding has really dealt with us, first in 2013 and now in 2022 and another flood is predicted to occur in 2023. I have lost my belongings twice because of these flooding events".

While Pickup (1998) described how climatic variability causes desertification, IPCC (2001) concluded that climate change causes weather variability in the majority of regions throughout the world. According to

Morrison et al., climate change causes water scarcity (1998). In addition, Kinney (2008) and Delpla et al. (2009) revealed that the impact of climate change on air and water quality.

Research Question 3: To ascertain the media they most likely obtain their information on climate change.

To answer the second research question, two questions were posed to the respondents and they are:

Third Question: Which of the old media do you think gives you comprehensive information about climate change?

Table 4

	Variable	Frequency	Percent
1	Television	243	64
2	Radio	46	12
3	Newspaper	91	24
	Total	380	100

In response to this question, traditional media entail newspaper, radio and television. The group from the urban area identify television as the major source of information hence 64% (television), 12% (radio) and 24% (newspaper).

In FGD, radio remain the most major means of receiving mass media messages as many indicated. However, they also indicated watching cable television programmes and this shows that cable and digital television have penetrated the rural areas. "I have seen news about climate change in the CNN"; "I also heard in the news that all these flooding in our area is as a result of climate change"; said by the participants in the respective group.

According to Nwabueze's (2007) analysis of empirical data, Nigeria's mass media has not been doing well when it comes to covering environmental issues, particularly with regard to the Niger Delta region's environmental pollution, which appears to dominate environmental agendas. According to Udouo in (Ashong and Udouo, 2007), "the media has not done a good job of covering the region's pollution, particularly in the area of emphasizing and conveying the viewpoints of local residents affected by the pollution".

Fourth Question: Do you consider the social media as a very accessible channel to obtain climate change information?

Table 5

S/N	Variable	Frequency	Percent
1	Yes	278	73
2	No	107	27
	Total	380	100

In the responses, 73% of audience in the urban area opted for the social media as their desired source of information about climate change while 27% of respondents opted for social media reflecting on the overwhelming acceptance of digital communication in the Nigeria media space. Agbuta, Agumagu & Adesope (2021), posit that social media usage is becoming increasingly popular in a variety of industries, including politics, education, athletics, and even agriculture. Social media offers an efficient, portable, and practical way to share information in real time and rural residents can used social media for communicating climate change.

Research Question 3: To ascertain the level of audience understanding about information on climate change

To provide insight to the third research objective, four questions were articulated for the study. The data obtained thus were:

Fifth Question: Do you perceive the issue of climate change a political issue?

Table 6

S/N	Variable	Frequency	Percent
1	Agree	133	35
2	Disagree	247	65
	Total	380	100

In response to this question, for urban participants in the FGDs, 5 agreed that it is political game between the United States and China on Trading. When asked if they perceived this issue of climate change as a political matter:

1st Participant: "yes, I think it is about trade".

2nd Participant: "I do not think it is"

3rd Participant: "It is Russia and the US"

In the rural area, 5 do not agree that climate change is political issue; while the remaining three do not know. These results infer that there is knowledge gap in the dissemination of information about climate change specially to concern areas that are affected by the impact. In the table, it is suggested that people's reactions are affected by the flooding since 65% of people don't believe that politics has a role in climate change.

Sixth Question: Do you consider climate change as an environmental threat that needs more media attention?

Table 7

S/N	Variable	Frequency	Percent
1	Yes	344	90
2	No	36	10
	Total	380	100

Urban respondents in the FGDs who were asked this question indicated that all the participants believe the issue needs more media attention while also for the participants of the FGD in the rural area agree for the Nigerian media to report more on it. This also implies a knowledge gap in the communication of information regarding climate change. The role of media influence in bridging the awareness gap in this area, it is significant to remember that the media are not the primary factor in information inequality.

In the survey, the results on table 7 shows the need for media intervention. 90% of respondents in dire need of the media to create awareness for government, non-governmental institutions and to environmental change agents.

Seventh Question: Do you consider using electric cars to save the environment from pollution?

Table 8

S/N	Variable	Frequency	Percent
1	Yes	301	79
2	No	79	21
	Total	380	100

The survey result in table 8 demonstrates that there will be an alternate choice if it becomes accessible since electric automobiles are a very viable substitute for fossil fuel vehicles in industrialized economies.

In the FGD, the respondents in the two divide also showed appreciation of alternative options to clean energy if affordable, reliable and accessible.

Eighth Question: Do you dispose non-biodegradables indiscriminately?

Table 9

S/N	Variable	Frequency	Percent
1	Yes	278	73
2	No	102	27
	Total	380	100

Waste disposal is critical to environmental management as it entails conscious and responsible disposal of waste to ensure environmental protection and promotion of safe environmental management. Table 9 shows that 73% respondents dispose their waste indiscriminately and do not differentiate between biodegradable and non-biodegradable wastes.

In the FGD, the result is the same as a greater number of the participants do not dispose their waste safely. "I use to dispose some of our refuse in the river"; "In the market, we normally dispose waste in the gutter usually when it is raining". Solid waste poses a threat to people and public health as Nwabueze (2007, p. 14) tenders that "chief among the environmental problems bedeviling urban areas in Nigeria is the mounds and mountain of refuse which constantly poses a threat to public health and further destroy the aesthetic value of these cities".

Conclusion and Recommendations

Another environmental threat the globe is currently facing is global warming. It basically involves burning fossil fuels, which releases greenhouse gases into the air like carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons. These gases are then caught by sunlight and radiated back into the atmosphere as heat. The earth is warmed by the redistributive heat, which also causes the ozone layer to thin and the Antarctic ice to melt, increasing the amount of water in the oceans, seas, and rivers. The causes of these issues have been linked to violent tropical storms, floods, and draughts. It may be in the interests of responsible authorities to highlight some of the specific issues that make climate change responses workable.

The gap awareness theory's main problem is that when discussing how to equalize people in terms of information and access, the key is the socio-economic status of individuals. Of course, the media can aid in and speed up the distribution of information among segments of society who did not have access to it prior to the spread of the media. The socioeconomic condition of individuals is a barrier to equality, even if we can speed up knowledge dissemination and lower the cost of access.

More so, alternative options to clean energy should be made affordable, reliable and accessible by the appropriate authority. Most governments in the world create laws or environmental regulations that serve as guidelines for the environment, safeguard society from false environmental claims, and inform citizens on how to manage and make ethical environmental decisions. The issue of climate change and its global clamour has reached its crescendo to compel the government and of course, the media to embark on national sensitization, education and mobilization for attitude change towards safe environmental practices that align with the globally agreed Sustainable Development Goals SDGs.

Reference

- Abuta, Chigozie M, Agumagu, Anthony C & Adesope, Olufemi M. (2021). Social Media use by Arable Crop Farmers for Communicating Climate Change Adaptation Strategies in Imo State Nigeria. *Journal of Agricultural Extension* vol (25) 1
- Adegbija, M.V. (2003). Global information network for agricultural development: A case study of the FAO's WAICENT programme in Nigeria. *The Nigerian Journal of Research and Production*, 2(4), 1-9.
- Bighash, Khadijeh A. & Quamarzadeh Moshen (2021). Fundamentals and Effects of Knowledge Gap Theory on Human Society. *International Multidisciplinary Discipline Journal of Pure Life*. <http://p-l.journals.miu.ac.uk>
- Bloom, A.A., Palmer, I.P., Fraser, A. Reay, D.S. and Frankenberg, C. 2010. Large-Scale Controls of Methanogenesis Inferred from Methane and Gravity Spaceborne Data. *Science*. 327 (5963):322. doi:10.1126/science.1175176
- Boykoff, M.T. (2010). 2004-2010 World newspaper coverage of climate change and global warming. Center for Science and Technology Policy Research (CIRES), Colorado: University of Colorado. Retrieved from www.sciencepolicy.colorado.edu/media_coverage/
- Burton, I., Smith, J.B., & Lenhart, S. (1998). Adaptation to climate change: Theory and assessment. In J. F. Feenstra, I. Burton, J. B. Smith, & R.S.J. Tol (Eds.), *Handbook on methods for climate change impact assessment and adaptation Strategies*. United Nations Environment Programme (UNEP) and Institute for Environmental Studies, 5-20. Amsterdam: Free University of Amsterdam.
- Coleman, C (1993). The Influence of Mass Media and Interpersonal Communication on Societal and Personal risk Judgements. *Communication Research Journal* Vol. 25 (6)
- Falaki, A. A. (2012). Farmers' perception and adaptation to climate change in Benue, Plateau and Nasarawa States of Nigeria. Unpublished Ph.D. thesis, Department of Agricultural Extension and Rural Development, University of Ilorin, Nigeria. <http://globalmedia.journals.ac.za/>
- Intergovernmental Panel on Climate Change, (IPCC). (2007). *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press
- IPCC. 2007. *Climate change 2007. Fourth Assessment Report*. Cambridge; Cambridge University Press
- Lomborg, B. (2015). What does the Paris Treaty look like for Ghana. *Daily Graphic*. Accessed 4th January, 2023 205.
- McQuail, D. (2005). *McQuail's Mass Communication Theory, Fifth Edition*. Great Britain Sage
- Mosser, S.C (2007). *Communicating Climate Change and facilitating Social Change*. University of Colorado: Lisa Dilling

- Nashuuta , L (2016). Media vital in the attainment of SDGs. Southern Times. Available from <http://southernafrican.news/2016/06/19/media-vital-in-the-attainment-sdg>. Accessed 19th January, 2023.
- Nobre, Paulo, Malagutti, M., Domingos, F.U.,Roberto A.F., De Almeida. and Giarolla, E. 2009. Amazon Deforestation and Climate Change in a Coupled Model Simulation. *J. Climate*. 22: 5686–5697.
- Nordhaus, W.D. 1991. Economic approaches to greenhouse warming. pp. 33-68. In: *Global warming: Economic policy approaches*, ed.R..D.Dornbush and J.M. Poterba, Cambridge, MA: MIT Press.
- Nwabueze, C.D (2007). *Environmental Communication: Perspectives on Green Communication and Information Management*. Enugu: Daisy Press
- Nwabueze, C. &Egbra, S (2016). Newspaper Framing of Climate Change in Nigeria and Ghana. *Environmental Education and Post 2015/sdg-overview/goal-13.html*. Accessed 4th January, 2023
- Odjugo, P. A. O., & Ikhuoria, A.I. (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.
- Odjugo, P.A.O. (2007). The impact of climate change on water resources: Global and regional analysis. *The Indonesian Journal of Geography*, 39, 23-41.
- Pickup, G. 1998. Desertification and climate change—the Australian perspective. *Climate. Res.* 11: 51–63
- Plough, A. &Krimsky, S. (1987). The emergence of risk communication studies: Social and political context *Science, Technology and Human Values*, 12(3-4), 4- <http://globalmedia.journals.ac.za/10>.
- Smith, K., Desvousges, W., Johnson, R.,& Fisher, A. (1990). Can public information programs affect risk perception? *Journal of Policy Analysis and Management*, 9(1), 41 59.
- Smith, K.,& Johnson, R. (1988). How do risk perceptions respond to information? The case of radon. *The Review of Economics and Statistics*, 70(1), 1-8.
- Surin, Werner. and James Tancard (2007). *Communication Theories*. Translated by Alireza Dehghan. Tehran: University of Tehran Press
- Uddin M.N &Anjuman N. (2013). Participatory Rural Appraisal Approaches: An Overview and Exemplary Application of Focus Group Discussion in Climate Change Adaptation and Mitigation Strategies. *International Journal of Agricultural Research, Innovation and Technology* Vol 3 (2). <https://ageconsearch.umn.edu>
- United Nations Development Programme, (UNDP) (2009). *Human development report 2007/2008 on fighting climate change: Human solidarity in a divided world*. New York: UNDP.Retrieved from: http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf. Retrieved on 15th September, 2010
- United Nations Framework Convention on Climate Change, (UNFCCC) (1992). *Climate change*. Retrieved from <http://unfccc.int/resource/docs/convkp/Coneng.pdf>

Wei, Lu & Yan, Yanrong (2010). Knowledge Production and Political Participation: Reconsidering the Knowledge Gap Theory in the Web 2.0 Environment. <https://icime.com>

Wimmer R & Dominick, J. Mass Media Research: An Introduction. 7th Edition. Belmont, California: Wadsworth