

Promoting Knowledge of Climate Change (CC) amongst Nigerians: Implications for Education Managers

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Abstract

Rising sea levels, due to thermal expansion of the ocean, and higher frequency and intensity of coastal and inland storms threaten coastal communities worldwide. The implementation of pro-active, planned adaptation to reduce community vulnerability is strongly dependent upon people's awareness of the threat posed to their communities at the local level. With a focus on university lecturers in South-South Nigeria, a group of people expected to be knowledgeable; this study set out to look at the concept, nature and scope of climate change, its types and causes, global impacts and specific impacts on Nigeria and, its knowledge and to assess their level of awareness and the extent to which they discuss it. The results from the academic staff of six universities in South-South Nigeria (n=342) revealed that only 13 per cent know very much of climate change and 61 per cent never discussed it among themselves. Those who know and discuss it are mainly in the sciences whose areas of specialization and course contents are climate change related. Based on the findings, it was recommended that climate change clubs be established in universities. Lecturers of Education Management and Environmental Sciences should collaborate to man the clubs as well as organize Workshops and seminars on climate change from time to time to create awareness. They should also post slogans on climate change at strategic points on campus.

Keywords: Climate change, Awareness, Communication, University lecturers, Global warming, Global impact, South-south Nigeria

Introduction

Climate change or global warming has become a new reality, with deleterious effects, seasonal cycles are disrupted, as are ecosystems; and agriculture, water needs and supply, and food production are all adversely affected. Global warming (climate change) also leads to sea-level rise with its attendant consequences, and includes fiercer weather, increased frequency and intensity of storms, floods, hurricanes, droughts, increased frequency of fires, poverty, malnutrition and series of health and socio-economic consequences. It has a cumulative effect on natural resources and the balance of nature.

The impact of climate change can be vast. In Nigeria, this means that some stable ecosystems such as the Sahel Savanna may become vulnerable because warming will reinforce existing patterns of water scarcity and increasing the risk of drought in Nigeria and indeed most countries in West Africa. As well, the country's aquatic ecosystems, wetlands and other habitats will create overwhelming problems for an already impoverished populace. Preliminary studies on the vulnerability of various sectors of the Nigerian economy to Climate Change were conducted by NEST. The sectors evaluated were based on seven natural and human systems identified by the IPCC (2007), and condensed into five. They are:

- Human settlements and health;
- Water resources, wetlands, and freshwater ecosystems;
- Energy, industry, commerce, and financial services;
- Agriculture, food security, land degradation, forestry, and biodiversity; and
- Coastal zone and marine ecosystems.

Nigeria, as a developing nation is particularly sensitive to the effects of climate change. A large part of the economy of the country depends on natural resources, which are particularly vulnerable to climate change. When those resources are affected, communities are implicated. Disease, loss of livelihoods and settlements can force entire communities into relocation or complete extinction and even refugee status. As critical as the effect of climate change is, it is not clear whether Nigerians are aware of what climate change is or its effects. Perhaps the biggest obstacle is the lack of awareness and knowledge as Olorunfemi (2010) had put it.

Nigerians need to be educated and informed about climate change and how it can change our lives drastically. Lack of information (awareness) and knowledge (education) about climate change also means that many Nigerians are reluctant to accept the reality of climate change. Also, there is a lack of public policy, government preparedness and commitment to promoting climate change adaptation strategies in the country. This study is therefore intended to find out how much of climate change academic staff of universities know and whether they discuss it among themselves.

The Concept, Types and Causes of Climate Change

Climate change has been defined as a phenomenon created by human beings and nature, which devastates the earth and causes hardship of unpredicted magnitude to the living. (Intergovernmental Panel on Climate Change (IPCC, 1990). It is also referred to as global warming or global weather patterns. Udenyi (2010) opined that climate change is simply a change in the climate condition of the world and that the change is found by the scientists and others to be on the negative.

United Nations on Environmental Programme (UNEP, 2000), defines climate change as extreme reactions of the weather phenomenon which creates negative impact on agricultural resources, water resources, human health, depletions of ozone layer, vegetations, soil and doubling of Co₂ in the ecosphere. Omotosho (2007) defines climate change as a change of climate that is attributable directly or indirectly to human activities and, which alters the composition of the global atmosphere, in addition to natural climate variability observed over comparable time periods. Scientists have intensified the greenhouse effect by increasing the concentration of greenhouse gases in the atmosphere. Medugu (2009) submitted that climate change refers to an increase in average global temperatures caused by natural events and human activities, which are believed to be contributing to an increase in average global temperatures.

Climate change is unarguably the biggest environmental issue of our time. Climate change is global in its causes but its consequences are far more reaching in developing countries, particularly Nigeria. Climate change is an environmental, social and economic challenge on a global scale (Scholze, Annel and Prentice, 2006; Mendelsohn, Dinnar and Williams, 2006). It can be exacerbated by human induced actions such as: the widespread use of land, the broad scale deforestation, the major technological and socioeconomic shifts with reduced reliance on organic fuel, and the accelerated uptake of fossil fuels (Millennium Ecosystem Assessment, 2005). The most devastating adverse impacts of climate change in Nigeria and other subtropical countries according to Ishaya and Abaje (2008) includes frequent drought, increased environmental damage, increased infestation of crop by pests and diseases, depletion of household assets, increased rural urban migration, increased biodiversity loss, depletion of wildlife and other natural resource base, changes in the vegetation type, decline in forest resources, decline in soil conditions (soil moisture and nutrients), increased health risks and the spread of infectious diseases, changing livelihood systems, (Reilly, 1999; Abaje and Giwa, 2007).

Medugu in the Trust Newspaper of 4th July, 2009 refers to climate as a change in climate that is attributable directly or indirectly to human activities, that alters the atmospheric composition of the earth which leads to global warming. He also claimed that climate change has the potential of affecting all natural and human systems and may be a threat to human development and survival socially, politically and economically.

Nigeria has a variety of ecosystems, from mangroves and rainforests on the Atlantic coast in the south to the savannah in the north bordering the Sahara, which is being battered by global warming. He explained that while excessive flooding during the past decade has hurt farming in coastal communities, desertification is ravaging the Sahel. Spore (2008) explained the weather patterns that can lead to easy understanding of climate change. According to him, each day, the sun emits rays of light onto the earth's surface. The earth absorbs part of the heat, reflects another share into the atmosphere and sends out a third share in the form of infra-red rays. These rays are cushioned by the clouds and water vapour, which stabilizes the earth's temperature under normal circumstances. The problem we are facing today is that the concentration of GHGs produced by human activity has increased significantly. The gases absorb the terrestrial radiations from the earth and reradiate the heat back to earth, thereby leading to a general increase in temperature known as global warming.

There is "Man-Made Climate Change" and there is "Normal Climate Change". People, such as those involved in bush burning are to blame for Man-Made Climate Change. Normal Climate Change can happen with no people on the planet. As to the type of Climate Change happening now, most people believe Man-Made Climate Change is happening now while some people believe Normal Climate Change is the one happening.

Man-Made Climate Change: There is abundant evidence that human activities influence the global climate system and that is making earth's surface temperature to rise. This increase can be attributed, in part, to human-caused increases in greenhouse gases such as carbon dioxide. It is becoming apparent that these climatic changes are negatively affecting physical and biological systems worldwide. A report issued in 2001 by the Intergovernmental Panel on Climate Change (IPCC) stated that it is "virtually certain" that emissions of carbon dioxide due to fossil fuel burning are the main cause of increasing atmospheric carbon dioxide during the 21st century. In the context of climate variation, anthropogenic factors are human activities that change the environment. In some cases, the chain of causality of human influence on the climate is direct and unambiguous (for example, the effects of irrigation on local humidity), while in other instances it is less clear. Various hypotheses for human-induced climate change have been argued for many years.

According to IPCC (2010), the world's climate varies naturally as a consequence of:

- the way the ocean and the atmosphere interact with each other.
- changes in the Earth's orbit

changes in energy received from the sun

The Earth is surrounded by a layer of gases that act to trap heat. These so-called “greenhouse gases” are necessary to sustain life on Earth. Like the glass walls of a greenhouse, they let the sun’s rays enter but stop some of the heat from escaping. This keeps the planet warm enough to allow life to thrive. However, as people cause more greenhouse gases to be released into the atmosphere, the greenhouse effect becomes stronger. More heat is trapped and the Earth's climate begins to change unnaturally.

Human activity is changing the amount of greenhouse gases in the atmosphere in three important ways, which are burning fossil fuels, deforestation and a growing world population. They are discussed below:

Burning fossil fuels: When fossil fuels such as coal, oil and gas are burned, they release greenhouse gases. In 2005, burning fossil fuels sent about 27 billion tonnes of carbon dioxide into the atmosphere. Fossil fuels are burnt to create energy, which is used for many things including as submitted by IPCC (2010):

heating homes and buildings

growing, transporting and cooking food

travelling (for example, by car, plane, bus and train)

treating water to make it drinkable, heating it and piping it into homes

manufacturing, using and transporting products, from clothes to fridges, from plastic bags to batteries

Deforestation: Cutting down forests faster than they are replaced (deforestation) is a major contributor to climate change. It causes 5.9 billion tonnes of CO₂ per year to be released into the air. This accounts for 20 per cent of the world’s carbon emissions – more than the entire global transport sector produces. Deforestation makes such a huge contribution to carbon emissions because trees absorb CO₂ as they grow. The more trees that are cut down, the fewer there will be left to absorb CO₂, leading to it building up in the atmosphere. In addition, the agriculture and industry that replace the forests often cause an extra problem by producing carbon emissions of their own.

A growing world population: As the world’s population grows, there are more people who need food, livestock and energy. This increased demand leads to increased emissions.

Influence of Sun: The sun is the predominant source for energy input to the Earth. Both long- and short term variations in solar intensity are known to affect global climate. Solar intensity variations are considered to have been influential in triggering the Little Ice Age and some of the warming observed from 1900 to 1950. The Sun is our main source of light and warmth. It is the driving force behind the world's weather. We are all aware that a cloudy day is usually colder than a sunny one, and that nighttime is almost always colder than daytime. It is likely then that changes in the amount of energy coming from the Sun could well affect the Earth's climate.

Greenhouse Effect: The Sun is the only source of external heat for the Earth. Sunlight heats the Earth's surface during the day. As the Earth's surface warms up it also releases heat, but we cannot see this as light like sunlight from the Sun. Sometimes, on hot days we can see the heat shimmers rising from a hot black road. This shows us that a lot of heat is being given off by the surface. At night, when the surface is no longer heated by the Sun, the Earth continues to give off heat in this way. In fact, at the scale of the whole Earth, as much heat is given off by the Earth as is received by the Sun. This keeps the average temperature of the Earth fairly stable, currently at about 15°C.

Orbital variations: Slight variations in Earth's orbit lead to changes in the seasonal distribution of sunlight reaching the Earth's surface and how it is distributed across the globe. There is a very little change to the area-averaged annually averaged sunshine; but there can be strong changes in the geographical and seasonal distribution. The Earth orbits the Sun once every year. This orbit is highly regular, but there do exist tiny variations in it that affect the amount of heat received from the Earth by the Sun, and therefore, the Earth's climate.

Ocean variability: The ocean is a fundamental part of the climate system. Short-term fluctuations (years to a few decades) represent climate variability rather than climate change. On longer time scales, alterations to ocean processes such as thermohaline circulation play a key role in redistributing heat by carrying out a very slow and extremely deep movement of water, and the long-term redistribution of heat in the world's oceans. Oceans cover 70% of the surface of the Earth. Water is much better than air at storing heat and the oceans of the world store an immense amount of energy, much more than the atmosphere. Since oceans are in contact with air, heat can flow between the oceans and the atmosphere. Consequently, oceans can have a major influence on the Earth's climate. Like the wind in the air, water in the oceans flows in a series of currents, both near the surface and also deeper down. This moves heat all over the world, principally from areas nearer the equator to areas nearer the poles. If this did not happen the equator would be much warmer than it is and the poles would be much colder.

Mountains: Mountains are the largest features found on the Earth's continents. The highest ones in the world rise over 5 miles into the sky. Mountains are usually grouped together in ranges, which can be several hundred miles wide and many thousands of miles long. Mountain ranges are built by the same processes that cause the continents to drift over million or tens of millions of years. When continents collide, the rock in the middle is crunched upwards to form mountains. Most of the world's weather occurs in the lowest 5 to 8 miles of the atmosphere. Consequently, mountain ranges can disrupt the flow of air by their presence, affecting the weather and changing the climate.

Global Impacts of Climate Change

The greatest challenge that confronts man and societies today and the generations to come is that issue of climate change. Our societies are dominated and even driven by ideas and products from science and technology (Igwe 2003). And it is very likely that its influence on our lives will continue to increase in the lives to come. Various global problems facing us to day emanated from global scientific collaborations that depends largely on the ecosphere. (Sjoberg 2002). The effects resulted in the experience of the terrible environmental problem enumerated by Udenyi (2010) such as global warming, ozone layer depletion, acid rains, extinction of wild life, extinction of various tropical plants, earthquakes/volcanic eruptions, floods disaster, rock fall, mud flow, hurricanes/hail storms, melting of ice sheet in the poles region, droughts, desertification, heat wave, windstorms, forest fires in California.

There is growing evidence that climate change, particularly increasing temperatures, is already having significant impacts on the world's physical, biological and human systems, and it is expected that these impacts will become more severe. Warmer temperatures are causing changes in the hydrological cycle at regional and global scales, including decreases in the amount of water stored as ice in most of the world's glaciers, ice sheets and sea ice; decreasing snow cover and earlier snow melt; and changes in rainfall patterns. These changes affect the incidence and severity of drought and floods and the availability of water, which in turn present challenges for many aspects of human society and industry (e.g. agriculture, rural economies, insurance, water security and food security). Sea level rise due to losses from ice stores and thermal expansion is another consequence of climate change that will have an increasing impact on human settlements and infrastructure.

How Climate Change Impacts On Nigeria

There are a number of indirect impacts of climate change on human health in Nigeria. As Nigeria's inhabitants have already suffered from nutritional imbalances (poor nutrition and malnutrition), climate change will only have a deleterious effect on food security. A shift could occur in the location of some vector-borne diseases, such as malaria (mosquitoes) and sleeping sickness (tsetse fly). In response to shifts in the patterns of rainfall and temperature; mosquitoes currently thrive in locations where water logging and poor drainage typify the landscape. High flood frequency and water-logging due to climate change in ecozones hitherto unassociated with malaria will enhance the breeding of mosquitoes and thus the spread of malaria. Malaria will also increase due to the preponderance of stagnant pools of water resulting from the sea-level rise related flooding. New evidence with respect to micro-climate change due to land-use changes such as swamp reclamation and deforestation suggest an increase spread of malaria to new areas (Munga et al. 2006; IPCC, 2007).

Direct impacts include health problems induced by increasing incidences of heat waves. These could lead to more cases of cerebro-spinal meningitis (CSM), which today is found to correlate positively with the highest maximum temperature of the northern winter season, and inversely with absolute humidity to a lesser, although still significant, extent. The dryness has led to dry waterbeds and movement of people and their pasture to the southern regions thus causing tension and conflicts between the original inhabitants and the new comers.

Knowledge and Awareness of Climate Change by Nigerians

Climate change is severely affecting livelihoods in Nigeria by altering seasonal rainfall patterns. Streams and springs are drying up, causing major crop yield reductions and food shortages. However, the level of awareness of climate change impacts is very low. Corporations and the transport sector, the major perpetrators of this damage, have not even begun to take the necessary actions to address these problems. No abatement measures are being implemented to stop gas flaring, Nigeria's main source of greenhouse gas emissions. (Friends of the Earth, 2007). In a study of Indigenous people's perception on climate change and adaptation strategies in Jema'a local government area of Kaduna State, Nigeria by Ishaya, and Abaje (2008), it was reported that in terms of awareness, 13% of the respondents agreed that there is a high level of awareness on climate change in the study area, 33% of the respondents said they do not know and finally majority 54% of the respondents declined saying that the awareness on climate change is very weak in the study area and Nigeria as whole.

According to the UNDP report (2010), the level of awareness about climate change is rather low in Nigeria, and it is likely to continue if no intervention measures are taken. The survey noted that the awareness of climate change was highest at the federal level. This dropped sharply at the state and local government levels, where real action is needed. In a research carried out in 2009, Olorunfemi noted that perhaps the biggest obstacle to reducing the impact of climate change in Nigeria is the lack of awareness and knowledge. Lack of information and knowledge about climate change also means that many Nigerians are reluctant to accept the reality. As well, there is a lack of public policy, government preparedness and commitment to promoting climate change adaptation strategies in the country.

Given the existing low level of awareness about climate change in Nigeria, this research is carried out to find out how much academic staff of universities in South-South Nigeria know about climate change.

Methodology

The design adopted for the study was a descriptive survey. The sample consisted of 342 academic staff members randomly drawn from a population of 6850 persons in six universities in South-South Nigeria.

Table 1

Table showing population and sample

University	Academic Staff population	Sample
University of Benin	1479	74
Delta State University	770	39
Niger Delta University	768	38
University of Port-Harcourt	1403	70
University of Uyo	1002	50
University of Calabar	1428	71
Total	6850	342

A self-designed questionnaire titled: Climate Change Awareness and Communication among Academic Staff (CCACAS) was used to obtain data. The instrument was subjected to face and content validity as well as reliability test which gave a co-efficient of stability of 0.87. The instrument was administered to the respondents through the assistance of five colleagues in each of the other five universities, except the University of Port-Harcourt which was administered by the researchers. Analysis was done using percentages.

Results

The instrument sought to find out how much academic staff know of climate change, their source of information, whether they discuss it among themselves and whether government should pay great attention to climate change issue.

Table 2

On how much of climate change academic staff members (n=342) know on a 100 per cent scale for each option:

Option	No of respondents	Percentage
Very much	44	13
Much	195	57
Little	102	30
Very little	307	90
Nothing	34	10

Table 3

On causes of climate change:

Human activities	178	52
Natural changes in Environment	137	40
Not sure	68	20

Table 4

On source of information about climate change:

Scientific institutions	274	80
News/print media	267	78
Government agencies	246	72
Corporations	120	35
NGOs	140	40
Friends/family members	181	53

Table 5

On whether academic staffs discuss climate change among themselves, placing all options on 100 per cent scale:

Always	11	3
Sometimes	34	10
Seldom	89	26
Never	208	61
Total	342	100

Table 6

On whether government should pay great attention to climate change issue:

Agree	304	89
Somewhat agree	31	9
Indifferent	7	2
Total	342	100

Discussions

Recognizing the role academic staff of universities play in educating students in particular and the populace in general, it is surprising that only 13 per cent (44 persons) know very much and as much as 10 per cent (34 persons) know nothing about climate change. Although not a focus of this study, it was discovered that area of specialization and gender had something to do with how much academic staff know of climate change.

The cause of climate change is not very well known. As many as 68 persons (20 per cent) were not sure if climate change is caused by human activities or natural changes in the environment. 178 persons (52 per cent) responded that climate change is caused by human activities.

Source of information on climate change among academic staff is mainly scientific institutions (80 per cent), followed by news and print media (78 per cent). Corporations provide the least source of information as indicated by 120 persons (35 per cent).

Most academic staff members seldom discuss climate change amongst themselves. As many as 208 persons (61 per cent) have never discussed climate change. Only 11 persons (3 per cent) always discuss climate change. Again, it was found out that most of those who discussed it were those in the sciences who teach courses in and related to climate change.

Most academic staff members agree that government should pay great attention to climate change issue. 304 persons (89 per cent) agreed to this. 31 per cent somewhat agreed and only 2 per cent were indifferent.

Recommendations

Since the impact of climate change affects not only human settlements and health but also, water resources, wetlands, industry, commerce, financial services, food security, land degradation, forestry and biodiversity, it is recommended climate change awareness should be created on the Nigerian citizens. In this respect, efforts should be made to put in place integrated approaches for the adaptation and mitigation and one sustainable way to achieve this is through education and capacity building. To realize this,

- Climate change clubs should be established in universities. Academic staff members in faculties of education and environmental sciences should be made to coordinate the activities of such clubs. This will create awareness amongst academic staff and students.
- Workshops and seminars on climate change should be organized from time to time to create awareness. The environmental studies and educational management departments or the climate change club, if and when established, should organize seminars and workshops for the universities and their communities from time to time to create awareness.
- Inscriptions of slogans in climate change issues should be posted in strategic places on campus. The university authority in conjunction with Environmental Sciences and Education faculties should do this. Such slogan as "Cut one tree, plant one tree". This will further create awareness among academic staff and the university community.

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