

Assessment of the Knowledge of climate change and its effects on health of the Residence of Ife Central Local Government

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Abstract

The planet earth is warming and world climate as we know it is changing with evidenced based reactions and features across the world- the melting of icebergs, sea level rise, drought, average temperature increases and many others. These changes have significant effects on human livelihood and specifically consequential effects on human health. This research explores the knowledge and awareness of residents of Ile-Ife- a southwestern city in Nigeria towards climate change and their health. A descriptive survey was carried out among 250 residents who are between the ages of 15-55 years and have at least a secondary school education using an interviewer – administered questionnaire. The research instruments were distributed along occupation category, 100 for students, 80 for civil servants, 50 for business owners (traders) and 20 for farmers. Data from the field were analyzed using the Chi-square of comparison to test for significant associations between the independent and dependent variables at significance level $P \leq 0.05$. A result shows that 87.6% of respondents agree that climate is changing and 82.8% reported to have experienced its effects. 90% of respondents agree that climate change have effect on human health. 34.4% thinks climate change effects on health is a common knowledge. Malaria tops the list of diseases respondents thinks climate change is linked. 16.4% of respondents are aware of any government intervention to climate change's effects to protect their health. In conclusion citizens need further education and sensitization to fully grasp the crosslink between these two phenomenons to ease future public health interventions as regards mitigation and adaptation to climate change.

Keywords: climate; climate change; global warming; Nigeria.

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I. INTRODUCTION

Climate change encompasses both global warming caused by human-caused greenhouse gas emissions and the ensuing large-scale weather pattern adjustments. Though there have been previous periods of climatic change, since the mid-20th century humans have had an unprecedented impact on Earth's climate system and caused change on a global scale.^[1]

It is no longer news that climate change is taking its effects on human environment and consequently human lives. There is a consensus that climate change is affecting human health^[2], with effects likely to include: heat stress, increased risk of vector-borne, waterborne and food-borne diseases. Furthermore, increased frequency of extreme weather events including drought, flooding, and hurricanes would have a variety of public health consequences. However, the connections between public health and climate change are complicated, and they interact with other causes.^[3]

West Nile disease, dengue fever, Chikungunya fever, malaria, leishmaniasis, tick-borne encephalitis, Lyme borreliosis, CrimeanCongo haemorrhagic fever, spotted fever rickettsioses, and Yellow fever and Rift Valley fever are all anticipated to become more common as a result of climate change^[4]. Climate change is also anticipated to have an impact on waterborne infections. The significance of climate as a disease risk factor stems from the fact that waterborne disease outbreaks are frequently preceded by heavy rains.^[5] Inadequately treated water or tiny rural supplies are likely to be the most visible examples of this relationship^[6]. Several researchers have shown correlations between cholera and climate factors, including greater temperatures and rainfall^[7], flooding^[8], and major climatic cycles like El Nino^[9]. Warmer sea temperatures and a higher trophic status index

increase the risk of non-cholera vibrios, particularly *V. vulnificus* and *V. parahaemolyticus* in marine environments^[10]. Cyanobacteria can be found in both drinking and recreational waterways, and the majority of human cases have been linked to visible cyanobacterial blooms.^[11] Droughts may have a minor impact on health in affluent countries due to restricted access to water, but the consequences in resource-poor countries are likely to be severe^[12]. Extreme weather events present a unique set of challenges for people. Climate variability is expected to increase the frequency and intensity of extreme weather events^[13]. Although the effects of disasters like floods, catastrophic droughts, storms, and hurricanes on human health appear to be largely indirect (mediated by vector and waterborne diseases), acute injuries, fatalities, and mental health illnesses are also significant public health outcomes, but their management and prevention (disaster preparedness and response planning) are outside the scope of this study. Because of the severity of the outcome (death) and enhanced political sensitivity, heat stress and heat stress-related mortality are regarded a key direct impact area^[14]. The severe European heat wave of 2003 claimed the lives of 22,000–35,000 people, the majority of whom were elderly^[15]. Other diseases, such as food-borne and respiratory disorders, are expected to be aggravated in a warmer world. Salmonellosis cases have been found to peak during the hot summer months, with this link being observed at temperatures greater than 7.5 degrees Celsius.^[16] We believe that the impact of climate change on food-borne diseases will be minor if proper food handling and storage methods are followed, as well as enhanced food hygiene, as Lake and colleagues previously noted^[17]. The main cause of respiratory disorders is poor air quality. With increased greenhouse gas emissions and warmer temperatures, concentrations of air pollutants (mostly ozone and particulate matter) would rise.^[18]

Because the effects of climate change are expected to worsen over the next century, existing health problems may become more severe, and new health threats may develop. Connecting our understanding of how the climate is changing with our understanding of how those changes may influence human health might help us make better decisions about mitigating (or lowering) future climate change, recommend public health priorities, and highlight research needs.

If everyone has a role to play to protect the climate and their health, the question then arises that does everyone understand the concept of climate change and its impact on public health?

II. PROBLEM STATEMENT:

Climate is changing, with quantifiable data revealing an increase in sea temperature, increase in the severity of extreme weather events, declining air quality, and destabilizing natural systems due to increase in greenhouse emissions

These changes therefore have been linked to consequential changes in the physical environment, ecosystem and human societies, economic and social changes making it one of the biggest threat to human sustainability¹⁹. With evident reports in food insecurity, low fresh water supply, economic implications- where growth of nations is stalled, and likewise health numerous health implications; ranging from malnutrition, excessive heat related illnesses, vector and water borne diseases, increased exposure to environmental toxins, exacerbation of cardiovascular and respiratory diseases due to declining air quality and mental health stress among others.

As the elderly and urban populations age and become less able to adapt to climate change, their vulnerability to these health impacts will grow. Furthermore, the degree of vulnerability to particular health effects varies by region. As a result, on a regional level, climate change initiatives must integrate health as a strategic component. The co-benefits of improving health while addressing climate change will improve public health infrastructure today, while mitigating the negative consequences of a changing climate for future generations.

The dangers of these phenomenon, has called for global initiatives to rise in prevention of the imminent dangers climate change portends²⁰. In an article by Harsha T, 2008, titled: “Global initiatives to prevent climate change”, the author noted that “the issue is of immense importance for every global citizen”²¹. A consensus has formed that developing countries are more vulnerable to climate change than developed countries due to low adaptive capacities and expected repercussions of climate change. Many questions have therefore been asked of African readiness and actions towards mitigating the effects of climate change,

In Nigeria, governmental and non-governmental efforts are being made amid other global initiatives, and the government has recognized that unless significant response strategy is put in place and implemented at all levels, climate change possess a serious threat to its national sustainable development and may become a substantive shock to Nigeria’s effort to reduce pervasive poverty, create jobs, enhance people’s access to sustainable energy and improve the overall socio-economic well-being of its citizenry.²²

Health and society are interdependent variables. Social factors play a significant role in developing health and illnesses. It is therefore important that good knowledge of health and health policy be well understood by the citizens in order to properly key into the health programs instituted by the government. In case of inaction also, citizens have roles to play in calling out decision makers to take necessary actions.

Citizens knowledge and understanding of their health and how the numerous determinants of health affects them is then very crucial in combating the menace climate change possess for the future of public health. This study aims to understand public knowledge on climate change and its effects on health, in order to properly put into perspective citizen's role in the clamor for climate change advocacy in Nigeria, towards a healthy society.

OBJECTIVE OF THE STUDY

The research pose the following objectives:

- Investigate the awareness of the climate change among the residence of Ile Ife.
- Investigate the awareness of the residence of Ile Ife about the health implication of climate change.
- Examine the extent to which the residence of Ile Ife has the knowledge of the mitigation and adaptation measures by the government to protect their health.

Research questions

- Does the sample population know about climate change?
- Does the sample population know about climate change effects on health; and what are their personal experience
- To what extent does the sample population know of the mitigation and adaption measures- by the government, necessary to protect their health?

III. METHODOLOGY

The study was a cross-sectional descriptive study among the residents of Ife Central LGA of Osun state. In this study, the population was male and female who are residents of Ife Central LGA who are aged between fifteen and fifty-five years and who have a minimum of high school education, selected in conformity with Katosh, M.S. (2019) who refer to the population as an aggregate or totality of all the objects, subjects or members that conform to a set of specifications. These criteria specify the characteristics that people in the population must possess in order to be included in the study (Polit & Hungler 1994). The eligibility criteria used for this survey indicated that the age range was between 15-55 years, have at least a secondary school education and resides in Ife central local government of Osun state.

IV. RESULTS

Survey data were carefully coded and analyzed and here are the various results of analysis in concordance with the research questions. Three hundred (300) questionnaires were given out from which two hundred and sixty-six (266) were retrieved and two hundred and fifty (250) used for analysis, representing a response rate of 83.3 %.

SOCIAL DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

The respondents comprised of 61.6% of Females and 38.4% Males, with almost half (48.4%) of them within the age group of 15-25 years; the mean age of the respondents is. Approximately 7 out of 10 respondents have tertiary education. Slightly over half (50.8%) of the respondents were students.

Table 1: Social demographic characteristics of the respondents

SOCIAL DEMOGRAPHY	FREQUENCY	PERCENTAGE
AGE (years) n= 250		
15-25	121	48.4
26-35	60	24.0
36-45	41	16.4
45-55	28	11.2
GENDER n=250		
Male	96	38.4
Female	154	61.6
LEVEL OF EDUCATION n= 250		
SSCE	82	32.8
Diploma	24	9.6

BSC/HND	133	53.2
MSC	8	3.2
PH.D	3	1.2
OCCUPATION n=250		
Faming	9	3.6
Trading	1	4
Business owner	59	23.6
Civil servant	54	21.6
Student	127	50.8

KNOWLEDGE AND UNDERSTANDING OF CLIMATE CHANGE

An overwhelming 96.8% said they have head of climate change, and a little lower than this percentage 87.6% think the climate is changing. When asked if the participants have experienced or heard of the listed climate change effect, 23.7% of respondents said they have heard or experienced increased heat. Another 18.7 percent reported having heard or experienced increased heavy rainfall and reduced agricultural yield. Apparently, 82.8% have experienced these effects.

82.6% thinks climate changes have effects on general human life and 76.8% do significantly feel change in climate contribute to these effects. When ask how important is the topic of climate changing to participants personally, 54% said it is very important to them, and 35.2 % are not really sure if it matters to fellow residents the same way. Meanwhile only 33.6% thinks fellow residents have the knowledge of climate change at all.

Table 2: Knowledge and understanding of climate change among respondents

VARIABLES	FREQUENCY	PERCENTAGE
HAVE YOU EVER HAD OF CLIMATE CHANGE n=250		
Yes	242	96.8
No	8	3.2
DO YOU THINK CLIMATE IS CHANGING n=250		
Yes	219	87.6
No	4	1.6
Maybe	15	6.0
I don't know	12	4.8
CLIMATE CHANGE YOU KNOW OR HEARD (MULTIPLE RESPONSE)		
Increase heat	151	23.7
Drought	89	14.0
Insect outbreak	69	10.8
Declining water supply	89	14.0
Reduce agricultural yield	119	18.7
Heavy and frequent rainfall	119	18.7
DO YOU THINK CLIMATE CHANGE HAVE EFFECT ON HUMAN BEING n=250		
Yes	209	83.6
No	6	2.4
Maybe	22	8.8
I don't know	13	5.2
HAVE YOU EXPERINCED ANY OF THIS EFFECT		
YES	207	82.8

NO	24	9.6
MAYBE	11	4.4
I DONT KNOW	8	3.2

KNOWLEDGE OF CLIMATE CHANGE ON HEALTH AND PERSONAL EXPERIENCE

90% of respondents thinks climate change have implication for human health, but only 67.6% of total respondents reported to have experienced climate change’s effect on human health as shown in table 3. Sampling respondent’s opinion on whether they thing climate change affects the general health of people in Ile-Ife (an enlargement of the sample population), 40.4% of respondents thinks this is the case, while only 34.4% thinks the climate change effect on human health is a common knowledge.

When asked about the disease the respondents believe climate change impact have caused to them or their family, 28.4% mentioned Malaria in the open-ended question, among other categories of diseases mentioned- as presented in table 4, while 42.4% said climate change hasn’t specifically caused them or their family any disease. Meanwhile, 64.8% said they have experienced more insect outbreak in recent years, as presented in table 4.

Table 3: Knowledge of climate change on health and personal experience

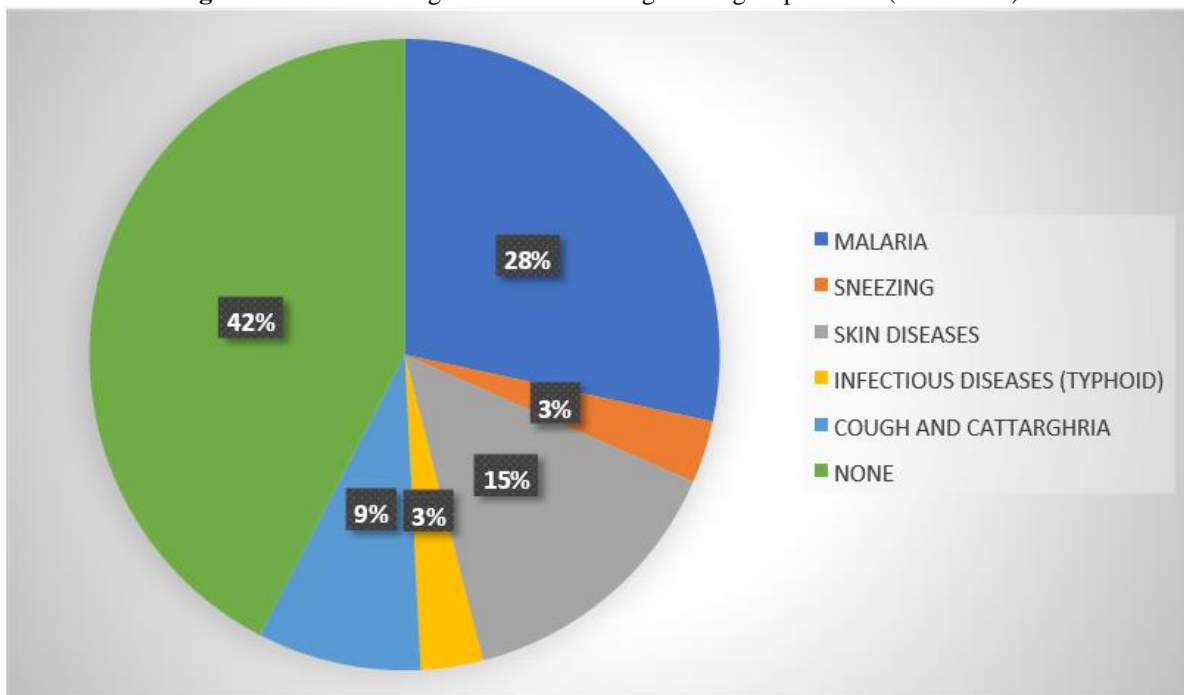
VARIABLES	FREQUENCY	PERCENTAGE
DO YOU THINK CLIMATE CHANGE AFFECT HUMAN HEALTH? n=250		
Yes	225	90.0
No	1	4.0
Maybe	19	7.6
I Don’t Know	5	2.0
HAVE YOU EXPERINCED HOW CLIMATE CHANGE AFFECT HUMAN HEALTH?		
Yes	169	67.6
No	49	19.6
Maybe	19	7.6
I Don’t Know	13	5.2
DO YOU THING CLIMATE CHANGE EFFECT AFFECT GENERAL HEALTH OF PEOPLE IN ILE IFE? n=250		
Yes	101	40.4
No	21	8.4
Maybe	69	27.6
I Don’t Know	59	23.6
DO YOU THINK CLIMATE CHANGE EFFECT ON HEALTH IS A COMMON KNOWLEDGE? n=240		
Yes	86	34.4
No	61	24.4
Maybe	63	25.2
I Don’t Know	40	16.0
WOULD YOU SAY YOU HAVE EXPERINCED MORE WARMTH TODAY THAN IN THE LAST 10 YEARS?		
Yes	125	50.0
No	125	50.0
WOULD YOU SAY YOU HAVE EXPERINCED MORE INSECT OUTBRAKE SUCH AS MOSQUITO? n=240		
Yes	162	64.8
No	88	34.2
WOULD YOU SAY YOU HAVE EXPERINCED MORE RAINFALL TODAY THAN IN THE PREVIOUS YEAR? n=250		
Yes	124	49.6

No	126	50.4
DO YOU THINK CLIMATE CHANGE IS SOMETHING THAT IS AFFECTING OR GOING TO AFFECT YOU?		
Yes	120	48.0
No	42	16.8
Maybe	66	26.4
I don't know	22	8.8

Table 4: Climate change and disease linkage among respondents

VARIABLE	FREQUENCY	PERCENTAGE
WHAT SICKNESS DO YOU THINK CLIMATE CHANGE AS CAUSED YOU?		
MALARIA	71	28.4
SNEEZING	8	3.2
SKIN DISEASES	36	14.4
INFECTIOUS DISEASES (TYPHOID)	8	3.2
COUGH AND CATTARH	21	8.4
NONE	106	42.4
Total	250	100.0

Figure 1: Climate change and disease linkage among respondents (illustration)



KNOWLEDGE OF MITIGATION AND ADAPTATION METHOD BY GOVERNMENT

Only 16.4% of respondents are aware of government’s intervention in mitigating climate change effects. When asked to mention specific intervention, only 20 respondents (of the 41 who are aware) said they know of physical project towards mitigation and adaptation of climate change’s effects, while 11 respondents are aware of public sensitization efforts by the government.

Table 5: Knowledge about mitigation and adaptation method by government

VARIABLES	FREQUENCY	PERCENTAGE
DO YOU KNOW IF GOVERNMENT IS DOING ANYTHING TO CONTROL THESE CLIMATE CHANGE EFFECT? n=240		
Yes	41	16.4
No	102	40.8
Maybe	35	14.0
I don't know	72	28.8
WHAT ACTION OF GOVERNMENT DO YOU KNOW? n=240		
Public sensitization	11	4.4
Physical project	20	8.0
No action by government	219	87.6
Variables	Frequency	Percentage
DO YOU KNOW IF GOVERNMENT IS DOING ANYTHING TO CONTROL THESE CLIMATE CHANGE EFFECT? n=240		
Yes	41	16.4
No	102	40.8
Maybe	35	14.0
I don't know	72	28.8

V. DISCUSSION

The study results show that the residents of Ife Central local government of Osun state, Nigeria are suitably aware of the knowledge of climate change. They acknowledge that climate is changing with varying effects on them and their locality. This was similar to the result of the study done in the Niger-Delta region of the country, where almost 90% of the respondents were aware of climate change but lacked detailed knowledge about the subject (Nzeadibe *et al.*, 2012). The result is also in resonance with the result of Ebuehi and Olusanya, (2013) that concluded that majority of the respondents in a study at IFO local government, Ogun state, Nigeria had heard about climate change with the media being the commonest source of information about it, however it reported that more than half of them lacked knowledge of specific details about climate change as shown from the findings that 57.6% of them had poor overall knowledge about climate change.

Residents in this study demonstrated good knowledge of the effects of climate change, reporting increased temperature, reduced and frequent rainfall, heavy and frequent rainfall as some of the notable effects some of which are already major concerns for African and Nigeria citizens demanding government interventions (Edem selormey *et al.*, 2019). Although findings from residents in Ife Central local government in this study represents an overwhelmingly majority (over 87%) having both heard and thinks climate is changing, but further investigations reveal a low communal sense of the knowledge of climate change as only about a third of the respondents thinks fellow residents are aware of the climate change phenomenon.

Their reality adds to the growing evidence that the awareness of climate change and its effects is growing in Africa. A 2019 findings from Afrobarometer round of public-opinion surveys across Africa show a keen awareness of climate change in some countries often backed by personal observation but the opposite in others (Edem selormey *et al.*, 2019), although the report suggests; four in ten Africans are unfamiliar with the concept of climate change even, in some cases, if they have personally observed detrimental changes in weather patterns. It is imperative to note however, that continuous awareness and public education is backed to further educate the residents in this region on the knowledge and effect of climate change to strengthen the fight against many of the devastating effects it has and could possibly cause the country Nigeria and Africa as a whole.

From the survey, demographic factors such as educational qualification and age mattered in the understanding of the concept of climate change and how it affects human being as a whole. It was seen that respondents who demonstrated more knowledge of climate change and its effects have a form of tertiary education and are within the age range of 15-25 years old- who were mostly students. This observation can be explained by a 2016 study that examined the level of climate change education and perception of Nigerian university graduates, the study revealed that about 70.7% of university graduates received brief lectures in some special elective courses during their university education, while only 4.1% were taught more than three semesters/terms in some special elective courses (Ayanlade *et al.*, (2016).

KNOWLEDGE OF SAMPLE POPULATION ON CLIMATE CHANGE'S EFFECT ON HEALTH

Respondents in this survey overwhelmingly think climate change affects human health and 67.6% reported to have experienced these effects. This is a good sign for public health knowledge.

In addition to deaths from drowning, flooding causes extensive indirect health effects, including impacts on food production, water provision, ecosystem disruption, infectious disease outbreak and vector distribution. Longer term effects of flooding may include post-traumatic stress and population displacement.

An important number of respondents in this survey specifically reported a link between climate change and their health, a notable disease experienced by most was Malaria- an infectious menace in Africa. According to the WHO: some of the world's most virulent infections are also highly sensitive to climate: temperature, precipitation and humidity have a strong influence on the life-cycles of the vectors and the infectious agents they carry and influence the transmission of water and foodborne diseases. Socioeconomic development and health interventions are driving down burdens of several infectious diseases, and these projections assume that this will continue. However, climate conditions are projected to become significantly more favorable for transmission, slowing progress in reducing burdens, and increasing the populations at risk if control measures are not maintained or strengthened. Climate change is expected to increase mean annual temperature and the intensity and frequency of heat waves resulting in a greater number of people at risk of heat-related medical conditions. The elderly, children, the chronically ill, the socially isolated and at-risk occupational groups are particularly vulnerable to heat-related conditions (Sampson, N. R., *et al*, 2013). Another notable disease condition includes several effects caused by heat to the human body-rashes, sun-burn.

Although child malnutrition was not expressly stated by this survey respondents, many however alluded to the fact that climate change effect has caused poor agricultural yield and even some of survey respondents reported hunger as a side effect of climate change. Climate change, through higher temperatures, land dryness and water scarcity, flooding, drought and displacement, negatively impacts agricultural production and causes breakdown in food systems. These disproportionately affect those most vulnerable to hunger and can lead to food insecurity. Vulnerable groups risk further deterioration into food and nutrition crisis if exposed to extreme weather events. Without considerable efforts made to stem the effect of climate change, it has been estimated that the risk of hunger and malnutrition globally could increase by up to 20 percent by 2050. In Nigeria, the prevalence of child malnutrition in children under age 5 was 31% in 2013- (Ijarotimi, O. S. (2013)- a burden which could be further compounded if climate change's effects are not proactively curtailed.

KNOWLEDGE OF MITIGATION AND ADAPTATION TO CLIMATE CHANGE EFFECT ON HEALTH

The study shows respondents in this survey from Ife Central local government area, show very low awareness of government action towards mitigation or adaptation to climate change effects, as an overwhelming majority reported to know of no particular action being taken by the government in response to the consequential effects of climate change.

Nigeria already has several policies and strategic initiatives which, if properly implemented, can serve as adaptation and mitigation measures towards climate change, including: The National Policy on Drought and Desertification, through the Federal Ministry of Environment. These efforts however still feel nonexistence to many Nigerians and our survey participants reflected this fact. Therefore, more awareness and education needs to be done by the Nigerian government in relating its adaptation and mitigation efforts to her citizens especially as it relates to public health.

VI. CONCLUSION

The research shows a good understanding of climate change and its effect on health by survey respondents, and suggest citizens (especially the not-so-young population group in their 30s upwards) need further education and sensitization –through the most relatable mode, in order to fully grasp the crosslink between these two phenomenon to ease future public health interventions as regards mitigation and adaptation to climate change.

Among the most important implications of climate change is its effects on human health, and citizenry knowledge about the crosslink between the two phenomenon is vital in combating the devastating effects climate change has on health.

Efforts to mitigate against climate change effects is a collective one, and as more and more knowledge continues to grow among humans (from the most knowledgeable to the least knowledgeable), about climate change and its effects, global leaders and citizens concerted efforts is needed to stem the menace for our world to become a more habitable ecosystem for all to live, and human sustenance to be preserved. This will therefore require every one of us to be in the know and agree on the detrimental effects of climate change phenomenal especially on public health.

The research therefore recommends the following:

- More efforts still need to be made (by the government and other health and environmental institutions) to further educate citizens (especially above 35years) on the danger of climate change and its health implications.
- Mass media can and should be deployed (through local broadcast organizations, national orientation agency) to sensitize citizens on the aspect of human caused climate change (fossil fuel burning, CO₂ emission, deforestation and many others).
- Government should intensify monitoring of industrial operations to ensure it conforms with global standards to keep our climate stable.
- Government strategy and actual projects on adaptation and mitigation of climate change and its attendant effects be transparent and well communicated for citizens to be in the know of it.
- Public health professionals should be trained and re-trained on climate change and its effects on health, and consequently their role in educating citizens of these changes so that the chain of knowledge can trickle down easily to the teeming population.

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