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PUBLIC PERCEPTION OF CLIMATE CHANGE IMPACT ON HEALTH AND ENVIRONMENT IN TARABA STATE, NIGERIA.

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Abstract

Globally the impacts of climate change have been reported widely. These impacts are in the IPCC 6th report as a red alert situation' on the interference and activities of humans consequently, the impacts of climate change on human health and the physical environment in Nigeria have also been reported. Natural phenomena such as global warming, ozone depletion, desertification and general environmental degradation are some of the issues causing widespread of some diseases reported. This study assessed public perception of climate change impacts on human health and the environment in Taraba State. Simple random sampling was used to design the survey. Data on public perception of climate change, health and the environment were obtained from 490

respondents using questionnaire survey. Findings from the study revealed that 78% of the respondents are aware of climate change concept. Majority 76% of the respondents reported that the major source of information about climate change was electronic media (television and radio). Respondents reported that climate change has negative impacts on health which includes outbreak of malaria, cholera and typhoid and environment which includes floods and loss of farm land. Based on these findings, this study therefore recommends a comprehensive environmental education to citizens on climate change.

Keywords: **public, perception, climate change, health impact, environment.**

INTRODUCTION

Despite the technological advancement in medical sciences, the health of the human population is still affected to a larger extent by weather and climate (Akibobola and Omotosho, 2005). Climate affects health in several ways, these effects may be direct as with heat stress, or indirect as with infectious diseases such as malaria and meningitis (Caroline, 2015). Changes in climate plays a significant role in people's health changes in temperature, precipitation patterns and extreme event such as floods, drought and heat waves could enhance the spread of some infectious disease worldwide (Environmental Protection Agency (EPA), 2010). Human comfort and health are affected more by climate than any other element of the physical environment. The physiological functions of the human body respond to changes in weather (Zemba, 2003). The climatic elements that affect the physiological functions of human body include radiation (sunshine), temperature, relative humidity and atmospheric pressure. Several authors (Ayoade, 2004; Zemba 2003; Esptein, 2005), Binbol and Uzochukwu; 2009) agreed that human comfort and health are influence most by temperature and humidity variations. Man is constantly exposed to the atmospheric environment whether outdoors or indoors. Therefore, his body feelings will be at a certain thermal equilibrium where it derives comfort to inhabit in a region.

Climate exercises an influence on man and his activities thus, the essentials of life for mankind namely air, water, food, clothing and shelter are all weather dependent or weather related. Certain illnesses are climate induced while several 0diseases that afflict man show close correlation with climatic condition and season in their incidence. Human physical and mental vigor are generally reduced by high temperature and relative humidity. On the other hand, extremely low temperature or very dry air may impair physical vigor (Binbol and Uzochukwu, 2009).

Climate does not really cause disease, but basically contributes to the factors that operate together to result to the disease, its severity and spread of the disease. Climate plays a certain role in the determination of human diseases, the first is that climate affects the resistances of the human body to diseases and helps in the recovery process from these diseases. Secondly, climate can determine the types and population of diseases.

Climate change is arguably the biggest current threat to public health,

contributing to the global burden of disease and premature death (IPCC 2007). Variant climate patterns and global warming will alter the pattern and prevalence of infections and vector-borne diseases (Haines *et. al* 2006). Disease burden may also increase as a result of climate change related migration of reservoir hosts (Hales *et. al* 2000). Additionally, climate variability will lead to a resurgence and increased endemicity of tropical diseases (Haines *et al* 2006) globally, an estimated 166,000 deaths result from change in climate annually, relative to the average baseline measurements between, 1961 – 1990 (Michael et al, 2004). Diarrhea, the leading cause of under-five death in developing countries is estimated to increase by 2 – 5% by 2020. Furthermore, annually, 5.5 million Disability Adjusted Life years (DALYs) can be attributed to climate change (WHO, 2002). An earlier study reported five categories of health outcomes which are most likely to be affected by climate change: temperature-related morbidity and mortality; health effects of extreme weather event (storms, tornadoes, hurricanes, and precipitation extremes): air-pollution related health effect, water borne, and food borne diseases; and vector-borne and rodent borne diseases (Patz, 2014).

Climate change is a fundamental element of the environment and a change in climate will consequently cause a change in the entire environment affecting other elements of the environment. Climate change present significant threat to the achievement of the millennium development goals especially those relating to promoting environmental sustainability, poverty eradication and disease. Climate change is not just an environmental issue, it has impacts on all facets of life in developed and developing nations alike. It has implications not only on the health and well-being of the earth's ecosystems but also on the economic enterprises and social relationships. The effects of climate change which include rising temperature and changes in precipitation are undeniably clear with impacts already affecting ecosystems and people. In both developed and developing countries (Oderide and Amosum, 2009). One of the greatest impacts of climate change is the worsening condition of extreme weather events like droughts, flood, rainstorms, among other Odjugo (2008) opined that the frequency and magnitude of wind and rainstorm did not only increase, they also killed 199 people and destroyed property worth N85.03 billion in Nigeria between 1992 and 2007 at the same vein Odjugo (2010) noted that climate change had led to a shift in crop cultivation in the northern Nigeria climate would have directly or indirectly affected population and human settlement in Nigeria. In general, about 15% of the country's population is presently affected by climatic variation and sea level changes. With climate change between 50% and 60% of the population would be affected.

Human beings are exposed to global warming through changing weather condition such as temperature, precipitation, seal-level rise and indirectly through changes in water, air and food quality. In addition, there may be changes in ecosystems, agriculture, industry and settlements and the economy Confalonieri, et al (2007) opined that climate change had altered the seasonal distribution of some allergic pollen species, the distribution of some infectious diseases, vectors, increased heat wave-related deaths. Moreover, the health status of millions of people would be affected through increases in malnutrition, epidemic diseases, increased deaths and injury due to extreme weather events; increased occurrence of cardio-respiratory diseases due to high concentrations of ground level ozone gas particularly in urban areas as result of climate change Stem (2006). In addition, change in the spatial pattern of distribution of some

infectious diseases, climate change would bring some benefits in temperature areas, such as fewer deaths from cold exposure, and some mixed effects such as changes in range and transmission potential of malaria in Africa. IPCC (2007) had remarked that expected benefits would outweigh negative health effects of rising temperatures, especially in developing countries. The spatial distribution, intensity of transmission, and seasonality of common malaria is influenced by climate. In Sub-Saharan Africa, Confalonieri, *et.al,* (2007) malaria is strongly influenced by climate Transmitted by Anopheles mosquitoes. Malaria kills almost 1 million people every year mainly African children under five years old. However, rainfall can be a limiting factor for mosquito populations and there is some evidence of reductions in transmission associated with decadal decreases in rainfall.

Vorosmarty *et al* (2000) noted that climate change effects the fundamental requirements for human health such as clean air, safe drinking water and sufficient food. Extreme heat with high temperatures contributes directly to deaths from cardiovascular and respiratory diseases, particularly among elder people. High temperatures also raise the levels of ozone gas and other pollutants in the air that exacerbate cardiovascular and respiratory diseases. Urban air pollution, pollen and other aeroallergen levels are also higher in extreme heat and they can trigger asthma, which affects millions of people. Ongoing temperature increases are expected to heighten the risk of a range of health effects, ranging from mental disorders, communicable diseases, reduction in the supply of fresh water, and can lead to water scarcity, drought and famine.

Adefila (2011) reported that food borne diseases and nutrition emanating from global warming can be associated with staple food shortages, malnutrition, and food contamination from seafood, chemical contaminants, pathogenic microbes and pesticides. Water-borne disease increase in water, precipitation, distribution and intensity, evapo-transpiration rates and changes in coastal system could increases the incidence of water contamination with harmful pathogens. Weather-related morbidity increase in the incidence and intensity of extreme weather event such as strong storms, floods, drought, and wildfires which may adversely affect people's health.

MATERIALS AND METHOD

Study Area

Taraba State is located between latitude 6º25′N to 9º30′N longitude 9º30′E to 11º45′E with tropical continental type of climate with a land area of about 60.291km^2, the second largest in Nigeria, has a total population of over 2.3 million people provisionary census figure (NPC, 2006) and annual growth rate of 3.1% per annum. The state is located on the mountain ranges in the easter borderland of Nigeria separating Nigeria and Cameroun Republics, it is bordered on the west by Nasarawa State and Plateau State, to the north by Bauchi and Gombe States and Adamawa State to the Northeast. Taraba Southern senatorial zone consist of five local government areas namely Wukari, Donga, Takum, USSA and Ibi Local Government. The area consist of undulating landscape dotted with a few mountaineous features. This includes the scenic and parts of prominent Mambilla Plateau. The climate is characterized by two distinct seasons, wet and dry. The wet season last a period of 7 months (April – October) while the dry season covers the month of November to March. The mean temperature

is about 28^{o}C, mean annual rainfall is about 1850mm in Taraba State.

Methods

In the conduct of the study, data was sourced through two major sources, primary data were obtained through the administration of questionnaire to select residents of the study communities in Taraba Southern Senatorial Zone. Secondary data were sought from published materials, such as journals, textbooks, internet and other relevant published materials.

Location of key areas of the study were selected through purposive sampling entails direct selection of respondents who resides within the core areas of the selected communities. Systematic sampling was adopted to select household heads from the study area. The operational of the systematic sampling involves selecting every 10th household head through this technique a total of 490 respondents were successfully sampled and administered with questionnaire in the study area. The questionnaire was designed to acquire and elicit responses on a range of issues such as level of awareness of climate change, perception, impact on health and environment and the perceive effects of climate change. Data collected was subjected to descriptive statistical analysis/frequency distribution table and percentage for each variable. Fourteen (14) communities were selected using simple random and systematic sampling methods (Table 1in result)

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

Personal characteristics of respondents are important human attributes that lay a significant role in the study of climate, variables assessed here include age, educational attainment and duration of stay.

Table 1: Socio-economic characteristics of respondents

S/N	Variables	Classes	**Frequency**	**%**
1.	Age	1-30	20	4
		31-60	381	78
		60 and above	89	18
2.	Educational status	Education	283	58
		Non-formal		
		Primary	94	19
		Secondary	75	15
		Tertiary	38	08
3.	Duration of stay(years)	1-10	00	00
		11-20	05	01
		21-30	140	29
		More than 30 years	345	70
	Total		490	100

Source: Author's field, work, 2021.

Data in Table 1 shows the socio-economic and demographic characteristic of the sampled respondents. Investigation into the age of respondents revealed that 78% of the sample respondents were within the age bracket of 31-60 years while 18% were above 60years. The implication here was that the respondent were matured to respond to key questions regarding climate based on the experience they have acquired over the years in Southern Taraba, with respect to level of education, majority of respondents (58%) acquired non-formal education,19 and 15% attended primary and secondary school. By implication, majority of the respondents are illiterates and semi-illiterates in terms of western education. Their responses will therefore be based on their local experiences and understanding. In terms of duration of stay within the study area, majority (70%) have been in the study area for over 30 years, 29% for 21-30 years and only 1% for 11-20 years. These findings are in line with that of Dankani and Raliya (2016) which reported that the level of western education among the resident of Kano and Zaria in their study of climate change awareness among residents of Kano and Zaria walled cities. At the same vein the above findings are in congruent with that of Labiru *et. al* (2020) in their study of

awareness of climate change impact and adaptation in the three Senatorial District of Plateau state, Nigeria. Which revealed that majority of the respondents have an Islamic education (non-formal). But this result disagrees with the one reported by Esther (2014) which revealed that the educational attainment of residents of Southwestern Nigeria is high. Perhaps this could be attributed to long history of western education in the region.

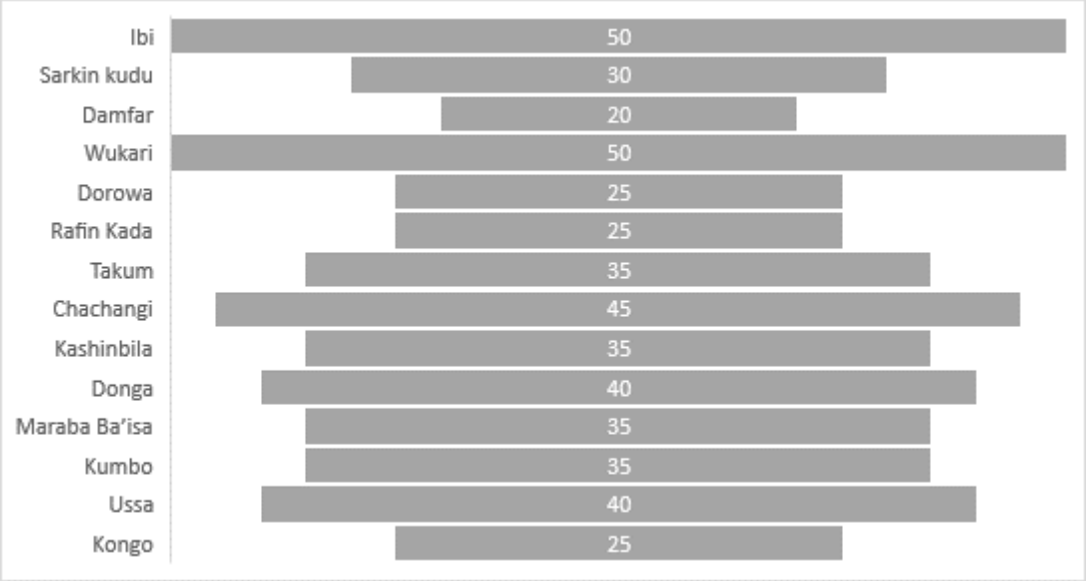

Figure 1: Number of respondents per community included in the survey.

Figure1. Shows the number of respondent's selected for the survey.

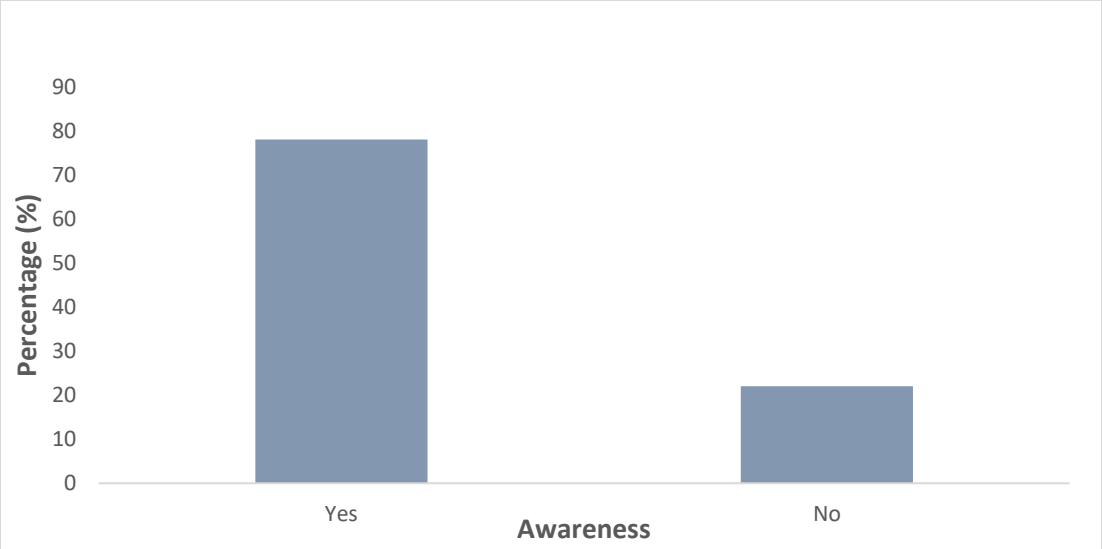

Figure 2 Public awareness of climate change issues

It is true, that issue of climate change is no longer news but a reality as its signs are all around us today. Awareness is having a knowledge or understanding of a subject, issue or situation. Table 1 shows the public awareness to climate change issues, data on Figure 2 revealed that (74%) of the respondent (public) are aware of climate change issues in Taraba Southern Senatorial District and its environment.

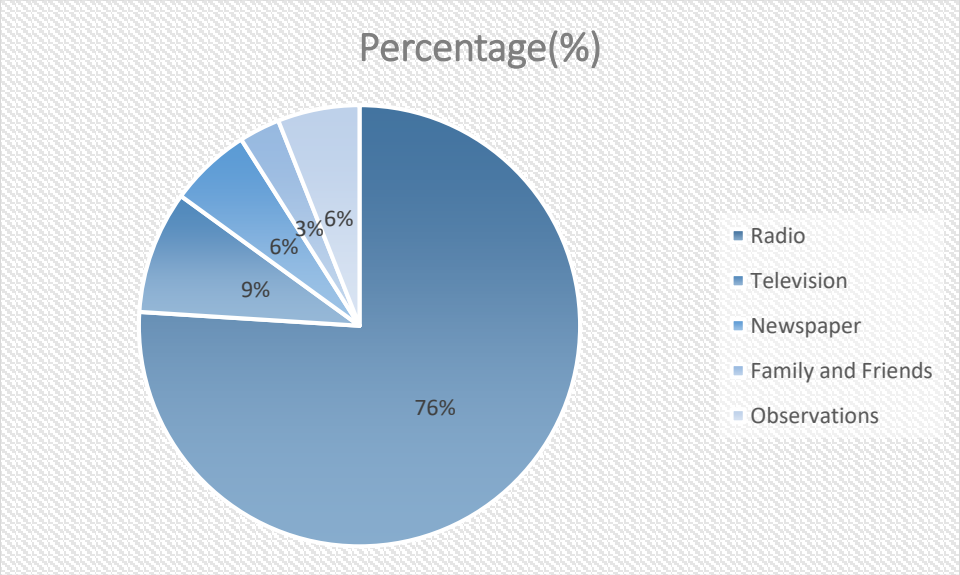

Figure3: Source of information about climate change

Investigation into the source of information about climate change by the respondents revealed that (79%), claimed to radio programme, television (9%), Newspaper (6%), family and friend (3%) and personal observation (6%), See figure 3. The dominance of radio as a major source of information about climate change phenomenon is not surprising because of high level of addiction of the resident to their radio and most cases despite not being educated, the radio avail them with the opportunity to be informed about happenings in their environment. This result confirms with that of Ismail et al (2016) in their study of effect and knowledge of climate change among farmers in Taraba State, that 42% of their respondents get information about climate change through the radio.

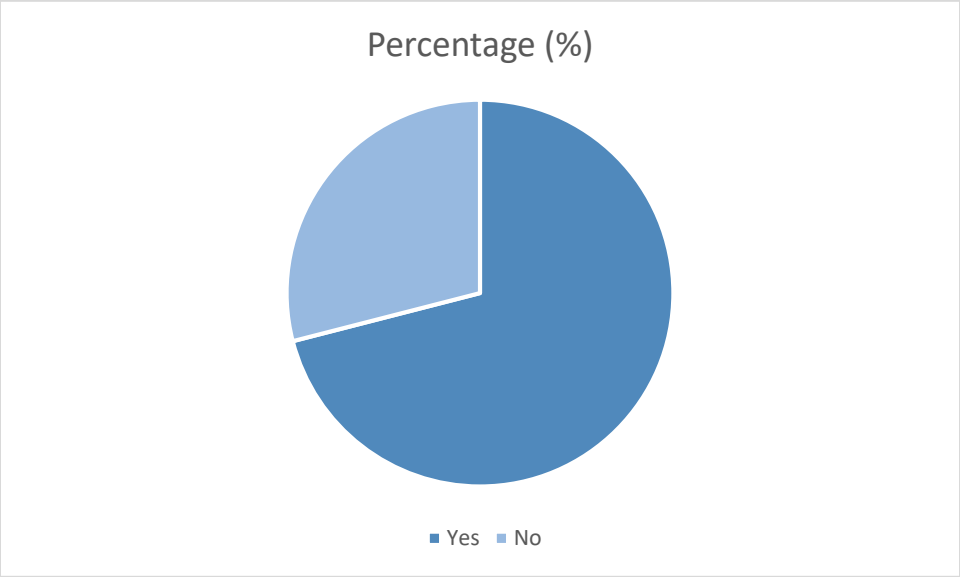

Figure 4: Perceived change in the occurrence of disease in the past decades

When question was post on whether the respondent perceived change in the occurrence of disease in the past decade majority (71%) of the respondents claimed that diseases were on the increase compared to the past decade. See figure 4.

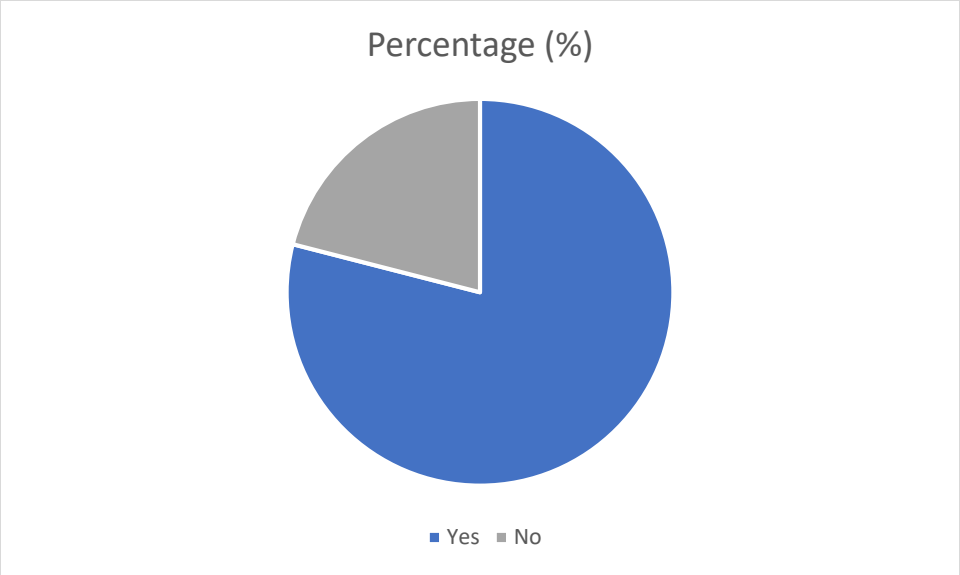

Figure 5: Perceived change in the occurrence of certain diseases during raining season

Figure 5 shows that 70% of the public in the study area perceive change in the occurrence of certain disease during wet season. See figure 5.

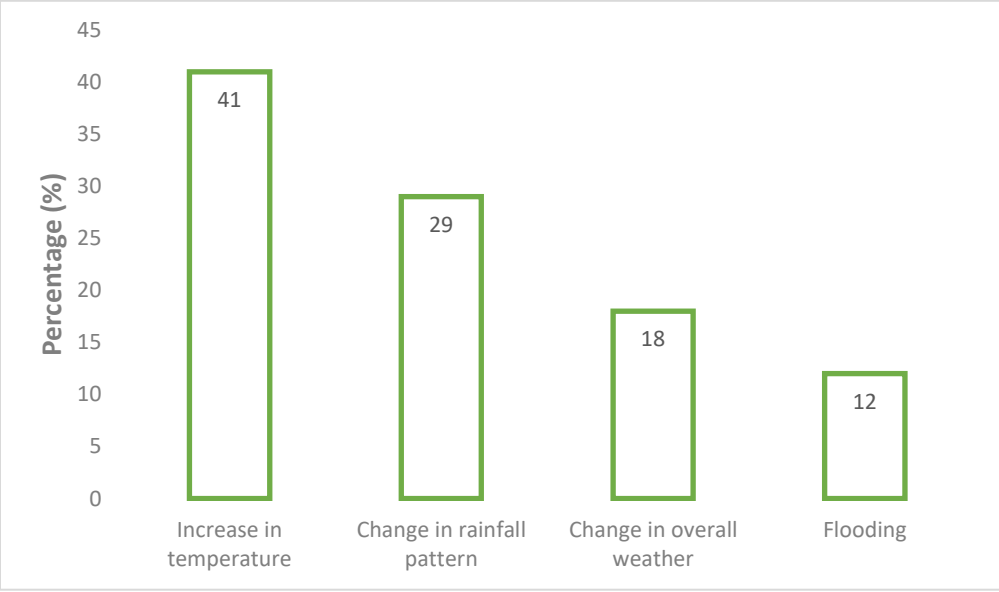

Figure6: Changes observed in weather and climate by respondents

Data in Figure 6 shows the perception on weather and climate change indices was analyzed,41% of the respondents perceive that temperature is getting warmer, 29% notice change in rainfall patter; 18% observe a general change in weather pattern in their community. Incidence of flooding was also reported by 12% of the respondent's respective (see Figure 6).

CONCLUSION AND RECOMMENDATION

The study was on public perception of climate change and its impact on health and environment in Taraba Southern Senatorial District, Nigeria. Arising from the data analysis, the conclusion drawn from this study is that the general public in Taraba South are aware of the impact of climate change on health and environment. Its manifestation in terms of climate change impact on health and environment are known. For effective mitigation and adaptation to climate in Taraba State, the following recommendations are made:

i. Government, Non-governmental organization (NGOs) and civil society organizations should intensity efforts in environmental education awareness campaign on climate change impacts, mitigation and adaptation in the state-owned television and radio stations and other media houses is an important platform for such campaign.
ii. Massive awareness campaign should be intensified to keep the populace abreast with the causes and consequences of climate change.
iii. Studies on climate change-adaptation and mitigation-strategies and other environmental issues should be integrated into the primary, secondary and tertiary curriculum.
iv. The State government through Ministry of environment should provide basic weather observation equipment for climate/weather monitoring in different senatorial districts in the state. This will enable the state to have a data base for weather which can be used in operational weather system forecast.

Conflicts of interest

The Authors declare no conflicts of interest.

Authors Contributions

All Authors contributed equally to this work. All authors read and approved the final manuscript.

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