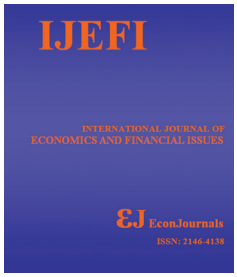

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Climate change and Life Expectancy in a Developing Country: Evidence from Greenhouse Gas (CO_2) Emission in Nigeria

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ABSTRACT

Both natural and human actions have contributed to high greenhouse gas (CO_2) emission and increased concentration of Carbon Dioxide in the atmosphere in the last four decades. This has led to global warming and subsequently to climate change. The adverse effect of climate change on human habitat, food production, human migration and human health can threaten average life span. In this paper, we examined the effect of climate change on life expectancy, with particular reference to CO_2 carbon dioxide emission in Nigeria. We adopted linear regression method and used ordinary least square (OLS) techniques to analyse the data. The data generated from World Bank publications between 1995 and 2013 were quaterized to have enough sample size to permit econometric tests. The coefficient of carbon dioxide emission turned positive indicating possible positive relationship between carbon dioxide CO_2 emission and life expectancy. Since it is not statistically significant, it suggests that CO_2 emission has not reduced the average number of years of Nigerian life.

Keywords: Climate Change, Life Expectancy, Greenhouse Gas, Greenhouse Gas Emission, Nigeria
JEL Classification: I12

1.INTRODUCTION

Climate is the average weather condition as it relates to temperature, air pressure, humidity, precipitation, sunshine, cloudiness and wind in a place for a long period of time. Living things adapt to the climate of their habitat in order to survive and prosper. Adaptation involves adjusting to opportunities and threats in the environment, given the climate. Rapid and perceptible change in climate is a source of concern because living things may be unable to adapt to their environment as rapidly as possible. Atmospheric temperature is an important element of climate and it has been observed that globally, average atmospheric temperature is on the increase since the beginning of the industrial age (Ekpo, 2014). The relatively rapid increase in average global temperature led to the concept of global warming.

Global warming is the rise in the average atmospheric temperature of the earth as a result of natural and human activities which generate greenhouse effect. A number of gases released by natural and human activities rise to the atmosphere and block heat from escaping (radiating) from the earth into space. Such gases are termed greenhouse gases because they produce greenhouse effects, constituting a blanket over the earth thereby trapping heat from escaping into space beyond the atmosphere. Oceans, the largest body of water on earth absorb so much of this trapped heat, causing the sea level to rise, coastal erosion to increase and ice to melt. The greenhouse effect which causes global warming causes changes in the average weather conditions of the earth and hence, climate change.

Natural causes of climate change are many and include changes in the tilt of the earth as it orbits the sun from 1 year to another, ocean current, volcanic eruptions, and solar variations. Volcanic eruptions release gases such as sulphur dioxide into the atmosphere. They also release ashes, dust and water Vapour into the atmosphere. The gases and dust remain in the atmosphere for a number of years, deflecting the rays of the sun from the earth and so reduces

the temperature. Oceans absorb and release carbon dioxide, and changes in ocean current affect the rate of absorption and release of carbon dioxide into the atmosphere. By this process, changes in ocean current contribute to the build-up of greenhouse gases, global warming and climate change.

Beyond the natural factors, human activities have contributed greatly to the climate change. The great improvements in human living conditions since the industrial revolution have been achieved at the cost of climate change, unknowingly. Fossil-fuels used to power machines have contributed considerably to the build-up of greenhouse gases. United Nations Framework Convention on Climate Change (UNFCCC, 2007) confirmed that global concentration of carbon dioxide increased by 36.33% parts per million in the last century which is attributed to industrialization. Moreover, natural vegetation in many parts of the world has been cleared to build residential houses, factories, offices, roads, airports and large-scale farms.

Use of chemical fertilizers in agriculture causes some microbial actions in the soil which produces nitrous oxide, methane, and carbon dioxide. In the atmosphere, these gases contribute to the volume of greenhouse gases. Natural resource prospecting and livestock farming has also contributed to decrease in natural vegetation on earth. Livestock farming, timber harvesting and mining have left many regions of the world bare of vegetation. Rapid deforestation continues to lower the amount of oxygen released to the air and an increase in the environmental temperature. There is evidence to show that the average precipitation in Sahel Africa has fallen by 25% in the last three decades (Ayuba, 2007), causing scanty rainfall in the region and a rise in temperature and environmental heat.

Continued climate change, and in particular, increase in global warming harms the environment and habitats. The ability of humans to adapt to such rapid changes in climate is limited. Impairment of health is the natural consequence of limited adaptability. Economic, social, and environmental determinants of human health such as adequate and nutritious food supply, safe and adequate drinking water and sanitation, clean air, and secure and affordable housing are adversely affected by climate change. The effect of climate change cuts across all living organisms because every living thing is sensitive to change in temperature. In animals, they are better with cold environment because of the ability of the metabolism to slow down. Similarly, man's health is affected by climate condition both directly and through the changes in environment he lives. High temperature increases stress in every human because of high loss of water and more energy expended to do the same task as before.

The world has made concerted effort in tackling the challenges of climate change but none of the efforts looked at the consequences of the climate change on life expectancy, especially in developing countries. International and continental discussions on climate change had focused mainly on its effect on agricultural food production, migration and environmental degradation. Some of the conferences organized at continental and international level are Fifth Conference on Climate Change and Development in Africa (CCDA), held in Zimbabwe (29–30 October, 2015), Fifth International Conference on Climate Adaptation 2016 (CCA, 2016), held in Ryerson University, Ontario Canada (15–16 October, 2016) and conference on 'Environmental in Coastal and Wetland Areas of Nigeria held at the University of Agriculture Abeokuta Nigeria (12–15 September, 2011). What is common in all the conferences is an attention paid to forest, adaptation, agriculture, gender and energy.

Though, all the conferences are important but focusing attention only on those things that indirectly affect life can lead to partial knowledge of the pervasive effect of global warming on the global community. Without full information on the danger of global warming on man, government in both the developed and developing countries may not give climate change the attention it deserves, especially in Africa where UNFCCC pointed out that the effect of climate change will be more. According to UNFCCC (2007), Africa is on record as the continent with highest variations in climate, as draught and flood can occur in an area within a space of months. Worse of it, UNFCCC points out that the region lacks the skill, resources, institutional capacity, knowledge and technology to cope with any dangerous situation which climate change can cause.

Cardiovascular and respiratory diseases, resulting in death, are common among elderly persons in particular, during periods of very high atmospheric temperature (Robine et al., 2008). Extreme heat raises the level of ozone and other pollutants in the atmosphere and these provoke cardiovascular and respiratory diseases, also. Similarly, global warming, a key element of climate change raises pollen and other aeroallergen which causes asthma attacks. There is evidence to show that this disease affects so many people in Nigeria today and the burden is increasing. From study done in Niger Delta region by Ogwu et al. (2015), result shows that there were increased cases of asthma, pneumonia, bronchitis and pulmonary infections which can be attributed to over release of poisonous gas in the air such as nitrogen and sulphur dioxides and other organic compounds by firms in oil exploration in the area. This result conforms to the report of World Health Organization (WHO, 2015) in Nigeria which projected an average rise in temperature by 4.9% between 1990 and 2100 and an 89.8% rise in diarrhea related child death attributable to climate change by 2030.

On the side of life expectancy, available data reveal that life expectancy at birth is on the increase in Nigeria (World Bank, 2016). For example, in 1960, the life expectancy at birth in the country was 37.18 years. Two decade after, that is, by 1980, life expectancy at birth rose to 45.55 years. It rose further to 52.75 years in 2014. In the same development, carbon dioxide emission (CO2) rose from 3406.643 kt in 1960 to 68154.862 kt in 1980 and to 95650.03 kt in 2013. Thus, while gas emission is on the increase, life expectance continued to improve.

The effect of greenhouse gas emission on life expectancy deserves great attention in Nigeria for three important reasons. First, the duration of rainy season has shortened in the country in the last two decades, creating drier land, causing environmental problems, health and adaptation challenges. Second, the country is currently

experiencing unusual environmental issues like acid rain and rain of black soot which are serious health risk not only to man but to other land and sea animals. Acid rain and rain of black soot are feared to be related to excessive release of greenhouse gases into the air across the country. Third, the country lacks the skill, technology and resources to handle climate change related problems like the developed countries. Hence, the outcome of the present research can aid government in taking proactive measures which will put in check emission of poisonous gases that emanate from human action in the country.

2. THEORY AND LITERATURE

Our analysis of the relationship between climate change and life expectancy was guided by three theoretical approaches, namely, Gaia theory, theory of metabolism and life history theory.

2.1. The Gaia Theory

The Gaia theory of metabolism made important contribution on the relationship between living organism and climate change. The theory which emerged towards the end of 1960s and traced to James Lovelock hints that living organisms interact with their environment each time, and the interaction helps an organisms to adjust to any change in the natural state of the environment. And the ability of an organism to live normal life depends on the relative ease of adjustment to the environmental changes. For instance, at its natural state, the atmospheric air is composed of 78.09% nitrogen, 20.95% oxygen, 0.93% argon, 0.039% carbon and the remaining percent is for other gases including methane. According to this theory, whenever this natural composition is altered, the life of an organism is threatened and its survival depends on how far and how fast it can adjust itself to the environmental changes. Following the postulation, excess greenhouse gas emission alters the composition of the atmospheric air with consequences on human health as temperature rises above tolerable limit of habitation (D'Amato et al., 2014).

With population growth also, forests are cleared on daily bases for agriculture food production. Subsequently, while more carbon dioxide is released to the atmosphere, less of it is absorbed by plant to produce its food. It leads to higher concentration of CO2 in the air. There are different views about the effect of the increased carbon emission on public health. Breitbart (2017) maintained that there is every tendency it has positive effect on longevity because people who live in countries where carbon dioxide emission is high have a record of higher life expectancy than those in countries where emission is low. In similar vein, (National Aeronautics and Space Administration, 2016) reports that more carbon emission has made the earth greener which has permitted better plant growth and higher agriculture productivity. The increase in CO_2 concentration in the air has helped plant to produce healthier food made available to man with positive effect on the quality of life and longevity.

2.2. Theory of Metabolism

The theory of metabolism posits that the metabolic process is very important in the life of every living organism because the amount of food burnt per unit of body weight in a day affects the health of an organism. Body temperature and metabolic process of an organism are related and organisms which live in cold environment tend toward lower metabolic rate than the warm-blooded organisms. Though, body size matters in metabolic rate, exposure of warm blooded animals to colder weather helps to speed-up their metallic process as they try to maintain normal body temperature. According to this theory, chemical reaction tends to move faster at every increase in temperature whether caused by man or by natural factors. The argument of this theory is that the lower the metabolic rate, the higher is the life expectancy.

2.3. The Life History Theory

The life history theory developed in the 1950s postulates that the ecological and physical environment is a significant factor that determines the variations in the life process of an organism. This theory points out that unstable environment affects the life of organisms, their reproductive system and population dynamics. Even though the environment here pertains to availability of resources, hazards, and competitors, climate factor has effect on each of the factors. For instance, adverse climate condition affects resources available in an area which can increase the scramble for food among the organisms living in that particular environment. The scramble for scarce resources leads to survival of the fittest and those who are not strong enough to get sizable portion may not live up to the normal life span.

2.4. Related Literature

The concern over public health impact of carbon emission and climate change has led to empirical studies in many countries. Some studies reveal that life expectancy is higher in countries with low carbon emission, suggesting that carbon emission is not good for longevity (Balan, 2016; Jerumeh et al, 2015; Ali and Ahmad, 2014). Balan (2016) examined the link between carbon emission and life expectancy in 25 EU countries. Result of the study showed that CO2 emission has negative and significant effect on life expectancy in general, but when broken down according to source of emission, natural gas and coal emission have negative effect on life expectancy while the effect of CO2 emission from petroleum on life expectancy is positive. The finding falls in line with the study by Deschenes and Greenstone (2007) which discovered that mortality rate will rise in America by the end of 21st Century under the current greenhouse gas emission.

However, there are studies which reveal that CO2 emission can increase longevity. They are Delavari et al. (2008), and Monsef and Mehrjardi (2015). In a panel study of 136 countries, Monsef and Mehrjardi discovered that life expectancy increases as CO2 emission increases, and though, CO2 emission was not significant, its positive effect on life expectancy suggests that it is not dangerous to human health. This is consistent with the research finding by Delavari et al. in Iran which revealed that CO2 emission has positive but insignificant effect on life expectancy in the country.

At the other side of the climate change, the effect of the global warming and increase in average environmental temperature on human health has been examined. Exposure of the earth to the direct radiation of the sun increases the warming of the earth

surface (Wuebbles and Edmonds, 1988), and there are direct and indirect effects of the increase in temperature on human health. High temperature increases severe heat and stress which can cause problem for people with respiratory health challenges. For example, study in Mozambique has shown that increase in average environmental temperature led to an increase in the number of people with cases of stroke (Gomes et al., 2015). Agwu and Okhimamhe (2009) equally discovered change in health pattern of Nigerians as a result of increase in average environmental temperature. From a cross-section study of communities in North-Central and South-Eastern Nigeria, Agwu and Okhimamhe discovered increased cases of asthma, hypertension, ulcer, malaria, diarrhea, diabetes and typhoid among the people of Zumba and Augie communities of Niger and Kebbi state in the North and Enugwu Nanka and Akama Amankwo Ngwo communities in Anambra and Enugu. Similarly, (WHO, 2015) revealed a likely increase in diarrhea related disease as average temperature increases by 4.9°C between 1990 and 2100 in Nigeria.

Moreover, study by Davies et al. (2004) and Zanobetti et al. (2012) showed that death is always highest in American cities during the period of extreme hot weather, especially among the elderly and people with cases of diabetes, congestive heart failure and myocardial infarction. Other evidences suggesting that higher temperature increases mortality are Hajat and Kosatky (2010), Burges et al. (2014), Anderson and Bell (2009) and Anderson and Bell (2011). Anderson and Bell (2009) discovered that the higher the intensity and duration of the heat, the higher the mortality in America. Unfortunately, earlier work in America cities by Medina-Ramon and Schwartz (2007) showed mixed result. For instance, they found that variations in summer temperature will increase general mortality, but mortality will be more for people with myocardial infarction and cardiac arrest during the cold weather.

Many scholars acknowledge a possible increase in health related problems at the instance of global warming and adverse temperature. They are Seltenrich (2015), Deschenes (2012), Caleb (2012), and Kalkstein and Smoyer (1993). Though, Deschenes and Greenstone (2007) maintained that climate is an important earth ingredient which keeps man's life going, Deschenes (2012) and Caleb (2012) point out that climate change is a threat to human life through its effect on the quality of water and air man drinks and breath in. From public health, breathing of polluted air affects the pulmonary, cardiac, vascular and neurological systems, and can as well cause asthma and inflammation of the lung (WHO, 2015a; Patrick and Kinney, 2008; Pope et al., 2002), while contaminated water is the source of water borne disease like diarrhea (Khan et al., 2012).

According to Huang et al. (2012), abnormal temperature can complicate the health condition of people with cardiovascular problems because of its effect on blood pressure. Research in many parts of the world showed that increase in average temperature is dangerous to the life of the people as it will lead to rise in heat related health problems such as stroke, asthma and a harm to a developing fetus (Salau, 2016, Zivin and Shrader, 2016)). And after a review of literature, Kalkstein and Valimont (1987) summarize that more deaths occur during extreme heat. Samet (2010) also maintains that though, climate change does not cause new disease, it is a threat to human life because it can complicate the problem of the people with asthma and hay fever.

Moore (2008) has different view about the effect of the rising average environmental temperature on human health. He contends that climate change and rising temperature is not all that a bad news for humanity as it also comes with something good. According to Moore, it may not be right to say categorically that rising temperature is detrimental to human health because from experience, more people die during cold season than warm season. This assertion goes in line with Deschenes and Greenstone (2007) contention that climate change will definitely keep life going because it will lead to an increase in the consumption of quality food which can preserve life. Research in Hong-Kong by Chau et al. (2014) reveal that in actual fact, there are more cases of hospitalization of people with ischemic heart disease during winter when weather is cold than summer when weather is hot. And study in Nairobi Kenya by Egondi et al. (2012) show that in general, death is higher during cold weather and it is only when temperature rises above 75% that it can increase mortality in children below the age of 5 as well as in those with non-communicable disease.

Despite many of the empirical revelation of negative effect of higher temperature on life expectancy, Andersen and Verner (2009) in a study in Bolivia discovered that temperature and precipitation had positive but insignificant effect on life expectancy both at community and national level analysis. The finding suggests that years of living increases as average environmental temperature rises. In a related cross-country study in Europe, Bardi and Perini (2013) also discovered that despite rising temperature in the continent, life expectancy is increasing in the countries studied. However, their study revealed that healthy life year expectancy is falling as temperature increases. Healthy life year expectancy is the measure of the change in health status of the people. Change in the health status of people depends on the rise or fall in chronic diseases or disease duration. Winters (2012) discovered similar reduction in the quality of life of the poor due to climate change and adverse weather condition in Bolivia.

After the review of related literature, present paper can make useful contribution to knowledge in the area of climate change and public health, especially in Nigeria. First, previous study in the Nigeria was based on industrial pollution and public health. Industrial pollution is a small fraction of CO2 emission in the country because Nigeria is not an industrial country and available data showed that CO2 emission from industrial sector was less than 1% of the total greenhouse CO2 emission in 2008 (World Bank, 2016). Second, more factors that affect life expectancy were included in the present study. Third and very important, result differed, which is a warning that when inadequate determining factors and data are used in an empirical research, result obtained can be misleading.

3. METHODOLOGY AND DATA

The study adopted the regression analysis because the method is popular in the study of a relationship between two or more

variables. The method has had wide application in health economics and medicine in the past and other fields of science are currently adopting it as a preferred method of research when the intention is to find out the effect of a factor on another. The OLS estimation technique was used in the analysis because of its best linear unbiased estimation property, as well as its simplicity. Data for the analysis were generated from World Bank Data Bank between 1995 and 2013. The annual data were quarterized so as to have a large sample size for econometric tests.

The model for this paper is the error correction model (ECM) which follows the classical linear regression. It is adopted because of its uniqueness with respect to its basic assumptions. It is often believed in econometrics that most annual time series data are not usually stationary at level form. Thus, this study subjected the variables of interest to unit root test using the augmented Dickey–Fuller (ADF) which is specified as:

$$\Delta Y_t = \beta_1 + \beta_2 + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \quad (1)$$

Where:

Y=A time series, t=A linear time trend, Δ=The first difference operator, β_s=Parameters, n=The optimum number of lags of the variable and ε_t=The error term.

The Augmented Engel and Granger 2-step approach due to Engel and Granger (1987) was employed to test for co-integration among the variables in the model as specified in equation 2.

$$\Delta\mu_t = \delta\mu_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta\mu_{t-i} + \varepsilon_t \quad (2)$$

Where: μ_t=The generated residual series and ε_t=pure white noise.

The life expectancy function was mathematically specified as:

$$LE=f(CDF, CO2, IMU, PC, SANI, HEP) \quad (3)$$

Where: LE=Life expectancy, CDF=Caloric deficiency, CO2=Carbon dioxide emission, IMU=Immunization, PC=Per capita income, SANI=Sanitation, HEP=Health expenditure per capita.

Transforming equation (3) to econometric specification in order to handle the effect of unincluded insignificant disturbance leads to;

$$LE_t=\alpha_0+\beta_1 CDF_{t-i}+\beta_2 CO2_{t-i}+\beta_3 IMU_{t-i}+\beta_4 PC_{t-i}+\beta_5 SANI_{t-i}+\beta_6 Pincome_{t-i}+\mu_{1t} \quad (4)$$

Equation (4) is transformed into logarithmic form in order to rescale the data:

$$LE_t=\alpha_0+\beta_1 CDF_{it}+\beta_2 logCO2_{it}+\beta_3 IMU_{it}+\beta_4 logPC_{it}+\beta_5 SANI_{it}+\beta_6 Pincome_{t-i}+\mu_{1t} \quad (5)$$

The logarithmic model was transferred to ECM because of probable evidence of cointegration. Thus;

$$dLE_t=\alpha_0+\beta_1 d\Sigma CDF_{t-i}+\beta_2 \Sigma d logCO2_{t-i}+\beta_3 \Sigma d IMC_{t-i}+\Sigma\beta_4 d logPC_{t-i}+\beta_5 \Sigma d Pincome_{t-i}+\beta_5 \Sigma d SANI_{t-i}+\beta_6 Pincome_{t-i}+\beta_7 ECM+\mu_{1t} \quad (6)$$

Where: e=Difference operator, β_i=Parameters, ECM=Speed of adjustment and other variables remain as defined before.

4. ESTIMATED RESULTS

The unit root test is an important pre-estimation test because it helps one know the stationary level of the data to be used in a study. An estimated result can be relied upon only if it is generated from a stationary process. The unit root result is presented in Table 1.

From Table 1, Sanitation improvement and life expectancy are stationary at the level form and second difference. Other variables are stationary at the first difference.

4.1. Cointegration Test

The cointegration test determines whether there will be long-run relationship between the dependent and independent variables.

From the ADF result presented in Table 2, we suspected cointegration between life expectancy and its determinants. Next, we proceeded to reconcile the short and long run behavior of the explanatory and dependent variables. The result of the error correction is presented in Table 3.

4.2. ECM Regression Result

The ECM estimation of equation 5 is presented in Table 3. Consistent with theoretical expectation are caloric deficiency (CDF), immunization (IMU), per capita income (PC), sanitation (SAN) and per capital health spending (HEP). Inconsistent with the theory is ECM, which has positive coefficient and can imply that in the long-run, the dependent and independent variables may not adjust to equilibrium. Outside CDF, all the variables have positive coefficient.

Table 1: Unit root test result

Variable	Level form	ADF	5% level	First difference	ADF	5%	Order of integration
LE	Level	3.67	−2.0	Second difference	−3.37	−2.90	I (2)
CDF	Level	−2.46	−2.90	First difference	−4.51	−2.9	I (1)
logCO2	Level	−0.90	−3.01	First difference	−3.64	−3.02	I (1)
logPC	Level	−0.84	−3.01	First difference	−8.12	−3.01	I (1)
SANI	Level	−3.09	−2.90	-	-	-	I (0)
IMU	Level	−1.33	−2.90	First difference	−9.39	−2.90	I (1)
HEP	Level	3.805526	−3.04	First difference	−5.36407	−3.01	I (1)

Source: Authors' computation based on data from World Bank. ADF: Augmented Dickey–Fuller

Table 2: Cointegration result

Variable	ADF	5% critical value	Prob
Residual	−3.1	−2.9	0.03

Source: Authors' computation based on data from World Bank

Table 3: Regression result: Dependent variable LE (−2)

Variable	Coefficient	Standard error	t-stat	Prob
CDF (−1)	−0.016075	0.006984	−2.30	0.0242
logCO_2 (−1)	0.470443	0.307559	1.53	0.1302
IMU (−1)	0.037432	0.010232	3.66	0.0005
log PC (−1)	0.917967	0.328725	2.79	0.0066
SAN	0.009496	0.011133	0.85	0.3810
HEP (−1)	0.009979	0.000185	5.30	0.0000
ECM (−1)	0.125519	0.142468	0.88	0.3810
Const	−0.373734	0.368912	−1.01	0.3142
R^2	0.35			
Adj R^2	0.29			
F-stat	6.03			

DW=2.63. Source: Authors' computation based on data from World Bank. ECM: Error correction model

5. DISCUSSION OF RESEARCH FINDINGS

The main objective of the paper is to unveil the effect of climate change on the life of the people in Nigeria, with a stress on whether greenhouse gas emission (CO_2) can shorten or prolong the number of years the people live. On a priori ground, it has not been postulated that climate change and life expectancy have positive relationship. Hence, one cannot rightly say positive or negative coefficient of CO_2 emission satisfied the theoretical expectation. We therefore discuss on the implication of the sign and magnitude of the coefficient. Going back to the result presented in Table 3, it shows that there is a positive association between greenhouse CO_2 emission and life expectancy, and an increase in carbon dioxide emission by 1 kt will lead to an increase in life of the people by 0.4 years. However, the variable is not significant at 5% level. The result is consistent with empirical findings in a developing country like Iran (Delavari et al., 2008), and many other countries (Monsef and Mehrjardi, 2015).

Though, CO_2 emission has no significant effect on life expectancy, the result suggests that increased concentration of carbon dioxide in the air will not cause reduction in longevity in Nigeria. But, it is important to note that other factors such as per capital health spending (HEP), improvement in sanitary practice and immunization of the child hold the key to longevity, especially in Nigeria. Unfortunately, Nigeria's life expectancy at 52.75 in 2014 is lower than fellow Sub-Saharan Africans. For example, life expectancy for Niger, Namibia and Ghana in 2014 stood at 61.46, 64.68 and 61.31. These countries are smaller as well as poorer than Nigeria. This means that the government on Nigeria needs to do more in the area of public health, especially on health spending. Provision of adequate health care services has been a lingering problem in the country with public health institutions running shortage of skilled workforce as well as essential drugs and amenities.

6. CONCLUSION

The study here examined the effect of climate change and in particular the greenhouse CO_2 emission on life expectancy in Nigeria. Result suggests that greenhouse gas emission is not a threat to longevity in Nigeria. However, the study did not decompose the greenhouse gases. This is the future challenge of the paper because the composition of the gases may matter for public health, especially demographic consideration with respect to age and occupation if data are available. For policy purpose, government of Nigeria should increase her spending on health services and improve environment cleanness. More campaign on immunization is needed in the parts of the country where parents are refusing child immunization.

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