

# MANIFESTATION AND EFFECTS OF CLIMATE CHANGE BESIDES ENVIRONMENTAL DEGRADATION IN URBAN CONURBATIONS

**MUHAMMAD YAHAYA UBALE**

Real Estate Department, School of Environmental Technology (SET),  
Abubakar Tatari Ali Polytechnic (ATA-POLY),  
PMB 0094, Wuntin Dada, Jos Road, Bauchi,  
Nigeria.

## ABSTRACT

All of humanity and the planet as well experience dangers posed by war complemented by the climate crisis and global warming. The world has reached a critical stage in its efforts to exercise responsible environmental bailiff. Objectives of this article are: To ascertain the presence of climate change in urban conurbations; To give scientific evidences and proofs on climate change as well as ecological degradation. The methodology engaged secondary data where articles, conference proceedings, seminar papers and literature materials were effectively used. This article discovered that Urban Conurbations alone consume approximately three-quarters of the world's energy and produce approximately 80 percent of destructive greenhouse gas emissions. Valuation of the vulnerability of Alexandria, the most important economic and historic center along the Mediterranean coast submits that, for a sea-level rise of just 50 cm, more than 2 million people must abandon their homes, about 214,000 employments would be loss, and over 35 billion U.S. dollars tourism income and property value would also be loss, this does not include the immense loss of world prominent cultural and historic archaeological sites. Equally, local urban heat islands contribute towards overall Global Warming. Similarly, local urban dust domes pollutes the urban air and pollutants absorb more heat as well contribute towards overall Global Warming.

**Keywords:** Climate Change, Environmental Degradation, Natural Evidences, and Urban Conurbations.

## 1.0 INTRODUCTION

It is evident that the warming of the climate system is increasing the global average air and ocean temperatures. It also prompts the rising in global average sea level and acute reductions of snow and ice. "All across the world, in every kind of environment and region known to man, increasingly dangerous weather patterns and devastating storms are abruptly putting an end to the long-running debate over whether or not climate change is real. Not only is it real, it's here, and its effects are giving rise to a frighteningly new global phenomenon: the man-made natural disaster." (Barack Obama). "I want to testify today about what I believe is a planetary emergency a crisis that threatens the survival of our civilization and the habitability of the Earth."(AlGore).

## 2.0 FACTS & NATURAL PROOFS ON CLIMATE CHANGE

Scientific evidences as well as proofs on climate change can be vividly seen in corresponding changes in the Sun's output, the Earth's orbit, drifting of the continents, vulnerable volcanic eruptions and greenhouse gases as acutely emitted. Increasing greenhouse gases, however, trap more heat. Earth is getting warmer by virtually every measure we know, and the temperature has been well above normal for more than 25 years. Although increases of 1.0-1.6°F (0.6-0.9°C) over the last century or so may not sound very threatening, that's a global average. The warming is stronger over land than over oceans and in the higher latitudes than in the tropics. Climate predictions are focused on longer-term influences of the sun, oceans, land, and ice on the atmosphere.

Instead of predicting a temperature at a particular place at a particular hour, climate modules project an average temperature over a year or longer in a large region or over the entire globe (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013). Natural proofs on climate change as well as degradation include among others acute rise in sea level, forecasts attested that the U.S. would lose 10,000 square miles to oceans, flood would engulf Miami, and erosion would be high, loss of wetlands, freshwater supplies might be tempered, half of the world's population lives along coasts would be at stake (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013).

## 3.0 ECOLOGICAL DEGRADATION IN URBAN CONURBATIONS

Considerably like the representations used to forecast weather, climate models simulate the climate system with a 3-dimensional grid that extends through the land, ocean, and atmosphere. The grid may have 10 to 60 different levels in the atmosphere and surface grid spacing of about 60 by 90 miles (100 by 150 km) the size of Connecticut. The models perform trillions of calculations that describe changes in many climate factors in the grid (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013). Collective evaluation of climate forecasts is that, climate ideal forecasts are not consistent more than a week whereas climate is based on similar dynamics (Okpala, 1992; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013). Snow and ice reflect

the sun's energy back to the universe. Shorn of the atmospheric white cover, more water can disperse into the atmosphere where it acts as a conservatory gas, and sequel to this phenomenon, the ground absorbs more heat. Sleet and frost are melting at proportions concealed for thousands of years (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; UN-Habitat, 2005, 2008; Chan, 2013). Oceanic ice is diminishing excessively, especially in the Northern Hemisphere. Settlements have seen average freezing Sea ice shrinkage by about 2.9 percent every ten year interval from 1978 to 2006, with faster melting in summer (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; UN-Habitat, 2005, 2008; Chan, 2013).

Climate representations create many of the higher features of climate change in Earth's crust in the past, and these replicate the pattern of warming in the last hundred years. This gives confidence that it correctly identified that the warming is due to man's activities, and that forecasts of forthcoming warming are convincing (UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; UN-Habitat, 2005, 2008; Chan, 2013). There is always abundant natural erraticism, sometimes; some places are warmer or cooler than others. Generally, however, summers are hotter, not only because of higher temperatures but also because humidity usually increases. This means that heat surfs, like the one that killed about 35,000 people in Europe in 2003, will become more common. On the other hand, winters will be warmer in some places, dropping warming bills while the number of days with ices is likely to decrease (UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; UN-Habitat, 2005, 2008; Chan, 2013).

#### 4.0 INTENSIFICATION OF CLIMATE CHANGE & MESOSPHERIC TEMPERATURE

Ultimately, oceans will continue their rise in the coming century as Forecasts give estimates ranging from a few inches to a few feet by the year 2100. However, if the rise is just about two feet, the US could lose up to about 10,000 square miles, whereas, if the rise three feet, they will engulf Miami and most of coastal Florida (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013). Sea-level rise also increases coastal erosion and the loss of coastal wetlands, and saltwater spoils freshwater drinking supplies. Coastal populations become even more vulnerable to storm surge and flooding. Considering that half of the world's population lives near coasts, sea-level rise is a thoughtful concern (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013). The great frightening challenge is that how much of the planet's ice sheet will melt as this effect persists severely? Because the temperature increased by approximately 1°C since 1900 to the year 2000 (Okpala, 1992; UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013). Acknowledged evidence of exceptional environmental change over the past 20 years is seen in the United Nations [Intergovernmental Panel on Climate Change](#) (IPCC) assessment report (Chan, 2013). It indicates that the environment reinforces peace and security which is central to development and human well-being. It published its 4th assessments earlier and its efforts were recognized by the Nobel Peace showing that the environment is fundamental for human peace and security (Chan, 2013).

There are 3,351 cities in the low elevation coastal zones around the world. Out of these cities, 64 percent are in developing regions; Asia alone accounts for more than half of the most vulnerable cities, followed by Latin America and the Caribbean (27 percent) and Africa (15 percent). Two-thirds of these cities are in Europe; almost one-fifth of all cities in North America

are in low elevation coastal zones (Chan, 2013). Climate change will encroach on the ecological development of all countries and coastal cities are the most vulnerable to sea level rise. For instance, Hong Kong, Sydney, Georgetown and Bangkok are equally the most vulnerable to sea level rise (Chan, 2013). Glacier melt in the Himalayas Mountain is expected to increase rate of flooding, and rock avalanches from destabilized slopes, and to affect water resources within the next two to three decades. This will be followed by decreased river flows as the glaciers withdraw (UNESCO, 1998; Chan, 2013).

Availability freshwater in South, East and South-East Asia, particularly in large river basins, is anticipated to drop, these could adversely affect more than a billion people by the 2050s (UN-Habitat, 2000; UN-Habitat, 2005, 2008; Chan, 2013). Prevalent indisposition and death due to cholera disease is predominantly associated with floods and droughts are expected to rise in East, South and South-East Asia (UN-Habitat, 2000; UN-Habitat, 2005, 2008; Chan, 2013). Upsurges in coastal water temperature would intensify the abundance and deadliness of cholera in South Asia (UN-Habitat, 2005, 2008; Chan, 2013).

## **5.0 CONURBATIONS AND THEIR SUSCEPTIBILITY TO CLIMATE CHANGE**

The Most susceptible conurbations are island and coastal cities. The potential impacts on humans and the built environment as coastal populations increase, vulnerability of those populations to sea level rise equally increases too (Chan, 2013). Virtually, about 50% of cities are previously dealing with the effects of climate change, and nearly all are at jeopardy. Well over 90% of all urban areas are coastal, putting most cities on Earth at risk of flooding from rising sea levels and powerful storms (Chan, 2013).

### **5.1 REPERCUSSIONS OF THE SUDDEN RISE IN SEA LEVEL**

Some of the consequences of the sudden rise in sea level include coastline and shoreline erosion, flooding and inundation of land, increased flood and storm damage, increased salinity of estuaries and aquifers among others. Others include coastline destruction and deposit where 1 cm rise in sea level erodes approximately 1m horizontally of seashores, coastline and beaches. Sea level rise has an intense effect on the rate of sediments and the sedimentation. Erratic quantity of sedimentation rates and changing vegetation zones is equally conspicuous. Storm floods cause large quantities of shore sediments to be eroded (Chan, 2013). Flood and storm damage coastal region which is more susceptible to rainstorm floods, disturbance of activities, danger to life and infrastructural destruction (Chan, 2013). 1 m rise in sea level would enable a 15-year storm to flood areas that today are only flooded by 100-year storms (Chan, 2013). Flooding would be increased by 36-58% for a minimal rise of about 30 in sea level and an increase of 102-200% for sea level rise more than 90 cm (Chan, 2013).

## **6.0 ECONOMIC ASPECT OF CLIMATE CHANGE**

Cost of rebuilding New Orleans and other conurbation that were damaged by storms cannot be over emphasized. The economic effects of climate change can be as shocking as the physical destruction. Unforeseen expenses from flooding, storms, snow removal and drought can lead to

major disruptions in business operations and metropolitan funds (UNESCO, 1998; UN-Habitat, 2005, 2008; Chan, 2013).

Bigger conurbations have a greedy desire for energy, thereby consuming two third of the world's energy and creating over 70% of global CO<sub>2</sub> emissions (UN-Habitat, 2008; Chan, 2013). Huge portions of Europe were hit by a major heat wave in the summer of 2003. Similarly, Paris, display a remarkable temperature irregularities (UN-Habitat, 2008; Chan, 2013). There are eight main regions generating Green House Gases (GHG), six zones are found in urban conurbations (Chan, 2013). Figure 1 below shows GHG emission by the respective sectors.

## **7.0 REMEDIES TO SUPPRESS THE IMPACT OF CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION**

For urban conurbations to suppress the acute impact and effects of the prevailing climate change as well as environmental degradation, the authorities should device the means of adapting the situation by improving on environmental awareness to suppress challenges; imbibe the strategy of disaster and ecological management with the aid of the national and state emergency management agencies (NEMA and SEMA) respectively. Urban conurbations are centers of consumption and production; hence a formidable waste management strategy must be in place to evacuate the daily accumulating solid waste thereby developing a well-coordinated or sustainable resource management that should be most efficient (UNESCO, 1998; Chan, 2013). Table 1 and 2 below shows the strategies that municipalities should embark upon to achieve the slated remedies.

## **CONCLUSION**

All conurbation, metropolitans and cities ought to struggle in the direction of becoming an Ecological City (Eco- City) or Green City. In the same vein, they should also endeavor to develop strategies for suppressing climate change as well as environmental degradation. Authorities should adopt the strategies outlined in both table 1 and 2 of this paper in order to suppress the acute menace of climate changes well as the encroaching environmental degradation.



## REFERENCES

- Chan, W. N. (2013). Sustainable Urban Development. Universiti Sains Malaysia. Penang, Malaysia. nwchan@usm.my
- Ogu, V. I., & Ogbuozobe, J. E. (2001). Housing policy in Nigeria: Towards enablement of private housing development. *Habitat International*, 25, 473- 492.
- Okpala, D.C.I. (1992). Housing Production System and Technologies in Developing Countries: A Review of the experiences and Possible Future Trends/Prospects. *Habitat International*. Vol.16 (3), 9-32.
- Tilly, S. (5<sup>th</sup> Nov., 2005). "Tsunami lifesaver visits UN". [New Straits Times](#), p. 27
- UNESCO, (1998). Improving Living Environments for the Low-Income Households in Saudi Arabia. Available online at:  
<http://www.unesco.org/most/mideast3.htm> Homepage:  
<http://www.sustainabledevelopment.org/blp/> Database:  
<http://www.bestpractices.org/>
- UN-Habitat, (2000). The Poor and Poor Land Management: Integrating Slums into City Planning Approaches. United Nations, New York 11- 31339—June 2011—31 000 Sales No. E.11.I.10
- UN-Habitat, (2005). Financing urban shelter: global report on human settlements. London: Earth scan.
- UN-Habitat, (2008). State of African cities 2008: a framework for addressing urban challenges in Africa. Nairobi: UN-Habitat.

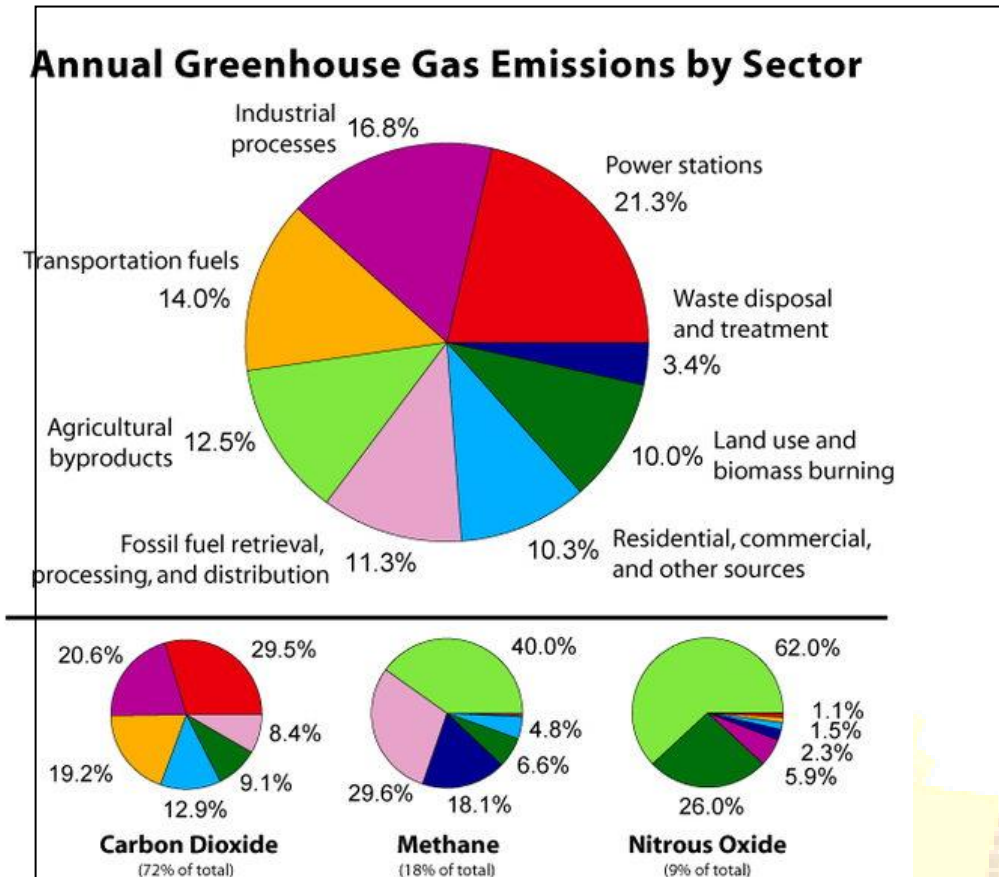


Figure 1 GHG emission by various sectors.

Source: (The authors from Chan, 2013).

Table 1: The strategies that municipalities should embark upon to achieve the slated objectives.

S/n	Basic Plans	Sector
1	Best Practices on climate change should be adopted.	Metropolitan development plans.
2	Nurture awareness on the impacts of climate change like global warming, air pollution, rise in sea level on the urban communities and urban environments.	Policy working framework.
3	Adopt Ecological and or Green city and environmental friendly approach.	Policy working framework.
4	Policymakers and private sector should change their mindsets to assimilate their lifestyles, consumption patterns, resources use and planning to this end.	Policy working framework.
5	Improve land use, reduce deforestation, increase afforestation, and reduce land degradation.	Metropolitan development plans.

6	Cost-effective preventative actions are increasingly incorporated into the city's development processes that are supported by scientific information, integrated climate impact assessment.	Policy working framework.
7	Reduce greenhouse gas emissions; emphasize on clean and renewable energy sources.	Policy working framework.

**Source:** (The Authors from UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013).

**Table 1:** The strategies that municipalities should embark upon to achieve the slated objectives.

S/n	Sector	Action	Authority
1.	Health	Reduce number of people exposed to malnutrition, diarrheal, respiratory and other infectious diseases.	Federal and state governments.
2.	Food	Produce cereals that have minimal impacts on subsistent farmers.	Federal and state governments.
3	Water	Ensure availability of water, prevent floods and droughts.	Federal and state governments.
4	Climate	GHG emission drifts (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs, SF <sub>6</sub> ) reduce the emission of these GHG.	Federal and state governments.
5	Environment	Prevent environmental degradation through awareness.	Federal and state governments.
6	Shores	Reduce the number of people exposed to flooding each year.	Federal and state governments.
7	Structures	Use energy consumption standards measures, use of energy-saving bulbs and improved cooking devices.	Federal and state governments.
8	Agriculture Forestry	Use improved crop and grazing land to enhance management.	Federal and state governments.

**Source:** (The Authors from UNESCO, 1998; UN-Habitat, 2000; Ogu and Ogbuozobe, 2001; Tilly, 2005; UN-Habitat, 2005, 2008; Chan, 2013).