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Full Length Research Paper

Climate change and engineering construction practices in Nigeria

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Climate change is a global on-going phenomenon that is driven by anthropogenic emission of green house gases. It is the global change in temperature or the total sum of the meteorological elements that characterized the average and extreme condition of the atmosphere over a long period of time at any place or region of the earth's surface, and it is also the regular pattern of weather conditions of a particular place. This paper Examines climate and Engineering construction practices in Nigeria, causes and sources of climate change, the effects of climate change, and Engineering responses to the effects of climate change.

Key words: Climate change, causes, sources, effects, engineering responses.

INTRODUCTION

The fact that there is an on-going global climate change is no longer new to science, technology and engineering according to Cunningham et al. (2003) and Enger and Smith (2006). Climate change is not spontaneous but anthrogenic with the uncontrolled emission of principal greenhouse gases such as carbon dioxide (Co_2), methane (Ch_4) chlorofluoro carbons [CFCS] and nitrous oxide [N_20] as the foremost driving force. Awalla (2013) asserted that climate change is driven by the gradual global warming of the earth's atmosphere. The earth's climate changes slowly from cold periods to warm periods.

Sources of climate change in Nigeria

The main Sources of climate change in Nigeria are as a result of the following:

(i) Bush Burning
(ii) Deforestation
(iii) Desertification
(iv) Firewood Burning
(v) Exhaust Pipes
(vi) Chimneys
(vii) Gas Flaring
(viii) Nuclear power tests
(ix) War Missiles
(x) Urbanization

In Nigeria, it is the domestic, Agricultural, and Industrial wastes that contribute majorly to climate change due to industrialization. The developed countries contributes about 97% of the greenhouse gases emission, while the undeveloped countries contribute the remaining 3%.

Causes of climate change

According to Awalla (2013), Climate change is caused by

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the temperature buildup of greenhouse gases like carbon dioxide and methane. These greenhouse gases form blanket – like structure in the atmosphere over the earth, which traps heat that would normally escape from the atmosphere. Carbon dioxide is the most human generated greenhouse gas pollutant emitted from the burning of fossil fuels, such as coal, oil and natural gas. Besides natural climate changes, Carbon dioxide have far-reaching changes in our weather, sea Levels, and climate.

Climate change and engineering construction practices in Nigeria

With the construction industry tied to most sectors that focus on climate warming initiatives, including Transportation, power generation, residential and commercial buildings, manufacturing, mining, forestry, and waste management, exports maintain that the knowledge about short-term weather and long term climate variability are essential to adequately design and successfully management of construction projects. This is especially so in developing countries, including Nigeria. According to Ekong (2014) decisions made about building and design, especially about infrastructure, have repercussions far into the future. Climate change affects the built environment by increasing wear on technical infrastructure and the external walls of the buildings and by increasing the risk of flooding in certain areas.

Effects of Climate change on engineering construction practices in Nigeria

The effects of climate change on Engineering construction need to be taken into consideration in all aspects of construction from land use planning to the positioning, construction, and life-cycle management of buildings and other infrastructural facilities for human uses and comfort. Clever infrastructural planning can counteract some of the negative effects of climate change and also create attractive built environments. This in fact, is the tenets of environmental sustainability (Ekong, 2015) it is also noted that on-site construction of buildings equally has a relatively low impact emission. It is usually influenced by choice of building materials, construction techniques and modes or distance of transportation of materials deployed to the construction sites. The effect of climate change is also felt during maintenance of buildings due to significant energy use, especially heating and lightning.

Climate change is also likely to increase the change of property development and the need for property maintenance than to decrease them, especially the external surfaces of buildings, which will suffer increasingly from wet and winding conditions as a result of climate change. This can lead to the faster deterioration of external surfaces of buildings, which will require more regular maintenance in the future. The extreme weather conditions will also increase erosion and the cost of construction.

Engineering response to the effects of climate change in Nigerian construction practices

i) The technical competences alone are inadequate to combat the effects of climate change, but developing the managerial skills will also complement the efforts towards combating the global climate change effects

ii) There is the need to consciously promote and fund adequate research and development of small hydropower generation to complement the existing complex transmission and distribution of energy

iii) The developed countries have made commitments to the reduction of green house emission; therefore, the developing countries should, as a matter of fact, put in place the policies that would assist other under-developed countries.

iv) Companies and other related organizations that carry out business in the area of fossil fuel [oil and gas] should be encouraged to invest more in renewable energy research.

v) The public and private sectors should engage in waste recycling as it creates Employment and provides positive solutions to the effects of climate changes. The recycling of waste to attain wealth is a viable option for sustainable development and local content requirement demands.

vi) Engineers and other allied professionals and regulatory bodies should ensure the development of sustainable codes and standards in line with global practices

vii) Increasing risk of flood needs to be controlled by identifying areas that are most Vulnerable to flooding, and discouraging properly development in those areas by imposing regulations on planning in high risk areas, and by specifying and enforcing development set backs for buildings, especially along water bodies that are liable to flooding, and for all wet lands.

viii) Green construction as a sustainable design will need resources that are more efficient and that can lead to the creation of healthier and more efficient homes

ix) Engineers should be prudent in the selection of materials for construction, as most construction now uses rigid and blown foamed insulation made of plastics. The use of plastic in construction often uses less greenhouse gas per application than traditional materials like cement.

x) Engineers should note the important place of proper Environmental Impact Assessment (EIA) for every

project, especially those projects that are likely to have negative impact on the environment. The essence of proper Environmental Impact Assessment (EIA) is to determine the likely effects such projects might have on the immediate and remote environment, as this will ensure that the overall environment is not adversely affected.

Conclusion

Climate change is an on-going phenomenon that is driven by anthrogenic emission of greenhouse gases. This development has therefore triggered the call for practicing Engineers and all stakeholders in the construction industry and also in build environment to have proper understanding and its implication on sustainable environment. Consequently, this wil provide a bold step for further solutions for engineering construction practices towards sustainable development in Nigeria.

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