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Environmental Degradation and Global Warming Challenges for Building Construction Profession

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----------**ABSTRACT**----------
This study examined the challenges posed by environmental degradation and global warming on then building construction profession. Environmental degradation is manifested in form of water pollution and flooding while global warming will likely result in an increase in the amount of waste exchanged among the ocean, increase in atmospheric temperature which increases rates of evaporation leading to a situation of drier soils, decline in air quality due to abundance of air pollutants. Data for the study were collected through well-structured questionnaire administered to building industry professionals. Data collected were analyzed using percentages. The findings reveal that desert regions ranked first (81.82%), forest ranked second with agreed percentage of 80.91 and lakes, streams, wetlands ranked third with agreed percentage of 77.27. These were followed by rising temperatures (73.64%). Both plant and animal species are sensitive to climate and it ranked first with disagreed percentage of 48.18.Unrestrained human activities all over the world have contributed to environmental destruction and ecological crisis which are threats to the construction industry. The building construction professional is required to be responsible for minimizing the effects of these challenges on construction work by taking appropriate steps in the investigation of soil tests, designing suitable foundations and retaining walls and ensuring that specifications are strictly followed so as to ensure that the structure withstands the adverse effect of the environmental degradation and global warning.
Keywords: *Environment, degradation, global, building construction, profession, greenhouse.*

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I. Introduction

Global warning denotes the accelerated warming of the earth surface due to anthropogenic (Human activity related) releases of greenhouse. Greenhouse is a glass or transparent plastic structure, often on a metal or wooden frame, in which plants that need heat, light, and protection from the weather are grown

The greenhouse effect refers to the way in which gases in the earth's atmosphere warm the earth glass roof of a greenhouse by letting sunlight in but keeping the reflected heat energy trapped inside.

These naturally occurring gases, notably dioxide and water vapours, are called greenhouse gases. [1] and [2] stated that an enormous large quantity of carbon is trapped in forest and forest soils of the world. The oxidation of this carbon shall yield large quantity of carbon dioxide which will add to the atmosphere. About 81.50 billion metric tonnes of carbon are added into the atmosphere annually out of which about 3.5billion metric tonnes are contributed by combustion of fossil fuels, organic fusses deforestation and any other human activities.[3]defined greenhouse effect is a warming of the Earth's surface as a result of atmospheric pollution by gases. It is now feared that the warming effects are being undesirably increased, causing climate changes and melting polar icecaps.

Habitat itself, according to [4], is destroyed often in order to convert it to some other form of land uses, such as agricultural or urban development. Defragmentation of a habit through, for example, road building can severally depress the population of wild plants and animal that live there, even to the point of extinction.

II. Literature Review

The average surface temperature of the earth to [5] has increased by about 10^0F in the past temperature increase are projected to increase to 1.8-6.3^{0}F in the next century, which scientists' speculate to be about 3.5^{0}F. Scientific modeling suggests that the surface temperature will continue to increase beyond the year 2100 even if concentrations of greenhouse gases are stabilized by that time.

Increasing global temperature causes the thermal expansion of sea level and the melting of ice caps which will result in rising sea level. Sea level has risen from 100mm to 250mm in this century and is predicted to result in a sea level rise of greater than 100mm. sea level rise increases the vulnerability of the coastal population to flooding and cause land to be lost to erosion.

There are currently 46 million people around the world who are at risk due to flooding from storm surges with a 500cm sea level rise; that number will increase to 92 million. Raise sea level 1meter and the number of vulnerable people becomes 118million. Rising water might force the occupants of numerous small inland nations to migrate elsewhere; as many of them lack the coastal defense systems to cope with higher water level [5].

Warming, according to [5], will likely result in an increase in the amount of water exchanged among the oceans, atmosphere, and land. Increasing rates of evaporation will likely result in drier soils. An accelerated hydrologic cycle means greater amount of precipitation in some areas and will probably result in more frequent and severe droughts and floods. Significant changes water volume distribution and supply are predicated and will likely have a dramatic impact on regional water resources.

Both plant and animal species are sensitive to climate. Due to global warming, ideal temperature and precipitation ranges suitable for present life forms may shift dramatically and rapidly more than the species that depend upon them can adapt naturally. A decline in biodiversity and in the goods and services provided by most ecosystems is a likely result.

However, a lengthening of the growing season is also predicated for some high latitude regions. This means that these regions will likely experience an increase in potential for agricultural production [1].

Within the next 100years, many forest species may be forced to migrate between 160.9 and 547.06km in the direction of the poles. The upper end of this range is a distance typically covered by migrating forests in millennia, not in decades. A decline in species composition is predicted and some forest types may disappear from the earth, while new ones may be established [6].

Changes in growing seasons and shifts in the boundaries between grasslands, forests and shrub lands are projected results of changing temperature and precipitation regimes. Increased level of carbon dioxide in the atmosphere may result in a decline in food values of grasses for herbivores.

Desert regions are likely to be more extreme, becoming even hotter than they are presently. The process of desertification will be more likely to become irreversible due to drier soils and land degradation through erosion and compaction [1].

In the next 100 years, between one third and one half of the world's mountain glaciers could melt affect the water supply to rivers and thus hydroelectric dams and agriculture. As is already being observed in Alaska, the real extent and depth of permafrost are projected to decline, resulting in adverse effects on human infrastructure. A decrease in the extent and thickness of sea-ice will likely improve the navigability of the Arctic Ocean [5].

Climate change is predicted to alter water temperatures, flow regimes, and levels. Such changes will likely cause an increase in biological productivity at high latitudes, but may result in extinctions for low latitude, cool and cold water species. Increased variability in flow, which will result in the frequency and duration of large floods and droughts increase, will tend to reduce water quality, biological productivities and the habitat in streams [1].

Climate change and sea level rise, or changes in storms or storms surges could cause the erosion of shores and associated habitat, an increase in the salinity of estuaries and freshwater aquifers, a change in tidal ranges in rivers and bays, a change in sediment and nutrient transport, a change in the pattern of chemical and microbiological contamination in coastal areas, and an increase in coastal flooding. The ecosystems at risk are salt water marshes, mangrove ecosystems, coastal wetlands, coral reefs, coral atolls, and river deltas.

Changing atmospheric temperature will change patter of ocean circulation, vertical mixing, wave climate, and qualities of sea –ice cover. These changes will affect nutrient availability, biological productivity and the structure and function of marine ecosystems. Paleoclimate (past climate) date and modals show that major changes in ocean circulation can be caused by freshwater additions to the oceans from the movement and melting of sea ice or ice sheets and can result in rapid and dramatic change in climate. Abrupt shifts in climate have had adverse effects on human civilization in the past. Paleoclimate data suggest that the collapse of the Mesopotamian empire about 4,200 year ago (2,200 BC) correspondents to a sharp cooling event [7].

"The warning of the earth is expected to be rapid, more rapid than any climate change that we know about in the recent history of the earth, including glacial periods ($0.5 – 1.0^0$C or greater than 1.0^0c degrees C or more decade for the middle to high latitudes). The warning is expected to be indefinite in duration and it appear to be entering a period of continued warning" [8].

"The paleoclimate records suggest that the climate system can respond to various climates forcing in a non-linear manner". For example, approximately 11,500 years ago the earth warmed $9\text{-}18^0$ F in less than a decade. If humans change the composition of the atmosphere significantly enough, the possibility exists that an abrupt climate shift with substantial social and ecological consequences could occur [7].

II. Methodology

Questionnaire was developed to sample professional opinions on the probable causes of environmental degradation and global warming challenges for structural engineering profession and to proffer remedies to same. One hundred and fifty (150) questionnaires was distributed, one hundred and ten (110) were collected back for analysis. The statistical tools used for analysis include frequency distribution table, mean, percentage. These methods had been used in construction research by authors such as, [9], [10], [11], [12], [13] among others.

IV. Data Presentation and Analysis

The data were presented using tables for clarification and better interpretation.

4.1 Professions of the respondents

Table 1: Professions of the respondents

	Frequency	Percentage
Builders	30	27.27
Quantity Surveyors	16	14.55
Architects	18	16.36
Estate Surveyor and Managers	10	9.09
Engineers	36	32.73
Total	**110**	**100.0**

Table 1 showed respondents' occupation. It showed that 32.73 are engineers, 27.27 percent are builders, 16.36 percent are architects, 14.55 percent are quantity surveyors and 9.09 percent constitutes estate surveyors and valuers.

4.2 Environmental degradation and global warming challenges.

Table 2: Effect of environmental degradation and global warming

S/N	EFFECTS	Agreed (A)	Disagreed (DIS)	% (A)	% (DIS)	Rank (A)	Rank (DIS)
1	**Rising temperatures**	**81**	**29**	**73.64**	**26.36**	**4**	**8**
2	**Sea level rise**	**77**	**33**	**70**	**30**	**5**	**7**
3	**Intensification of the hydrologic cycle**	**68**	**42**	**61.82**	**38.18**	**8**	**4**
4	**Dramatic effects on ecosystems**	**57**	**53**	**51.82**	**48.18**	**11**	**1**
5	**Forest**	**89**	**21**	**80.91**	**19.09**	**2**	**10**
6	**Rangelands**	**65**	**45**	**59.09**	**40.91**	**10**	**2**
7	**Desert**	**90**	**20**	**81.82**	**18.18**	**1**	**11**
8	**Cryosphere**	**76**	**34**	**69.09**	**30.91**	**6**	**6**
9	**Lakes, streams, wetlands**	**85**	**25**	**77.27**	**22.73**	**3**	**9**
10	**Coastal systems**	**67**	**43**	**60.91**	**39.09**	**9**	**3**
11	**Oceans**	**75**	**35**	**68.18**	**31.82**	**7**	**5**

Table 2 showed the effects of environmental degradation and global warming challenges for structural engineering and building profession. Desert regions are more extremely hotter than they are presently and it ranked first with agreed percentage of 81.82, forest ranked second with agreed percentage of 80.91 and lakes, streams, wetlands ranked third with agreed percentage of 77.27. These were followed by rising temperatures (73.64%). Both plant and animal species are sensitive to climate and it ranked first with disagreed percentage of 48.18. They made relevant contributions to the effect of environmental degradation and global warming.

4.3 Suggested solution for the environmental degradation and global warming

Table 3: Suggested solution to environmental degradation and global warming

S/N	SOLUTIONS	Agreed (A)	Disagreed (DIS)	% (A)	% (DIS)	Rank (A)	Rank (DIS)
1	The physical climate system, comprising the dynamics of atmosphere, oceans, land surface and ice sheets	90	20	81.82	18.18	2	3
2	The global interactions between living and non-living processes that together underpin the habitability and productivity of our planet.	87	23	79.09	20.91	3	2
3	The interactions between human society and its environment.	79	31	71.82	28.18	4	1
4	The structure and function of biological diversity, covering plant, animal and microbial life, on land, in fresh water and at sea.	100	10	90.91	9.09	1	4

Table 3 suggested solution to environmental degradation and global warming. The structure and function of biological diversity, covering plant, animal and microbial life, on land, in fresh water and at sea ranked first with percentage value of 90.91, The physical climate system, comprising the dynamics of atmosphere, oceans, land surface and ice sheets ranked second (81.82%) and the interactions between human society and its environment ranked least and ranked first on disagreed value of 28.18%

4.4 Discussion of findings

Environmental degradation and global warming challenges consist of factors. Eleven factors were identified during the research. The factor posing the most danger was the desert regions which are more extremely hotter than they are presently and it ranked first with agreed percentage of 81.82, forest ranked second with agreed percentage of 80.91 and lakes, streams, wetlands ranked third with agreed percentage of 77.27. These were followed by rising temperatures (73.64%). Both plant and animal species are sensitive to climate and it ranked first with disagreed percentage of 48.18. They made relevant contributions to the effect of environmental degradation and global warming. Remedies were proposed in other to prevent the effect of environmental degradation and global warming. Though interactions between human society and its environment ranked first with disagreed percentage of 28.18%, global interactions between livings and non-livings to encourage habitability and productivity of the planet, physical climate system, comprising the dynamics of atmosphere, oceans, land surface and ice sheets and structure and function of biological diversity, covering plant, animal and microbial life, on land, in fresh water and at sea.

V. Conclusion

Desert regions are more extremely hotter than they are presently were observed as the most prevalent effects. There should be link between desert and forest because there is declining in species composition and some forest types may disappear from the earth. Lakes, streams, wetlands increased variability in flow, which will result in the frequency and duration of large floods and droughts increase, will tend to reduce water quality, biological productivities and the habitat in streams. Rising temperatures will continue to increase beyond the year 2100 even if concentrations of greenhouse gases are stabilized by that time [5]. The structure and function of biological diversity, covering plant, animal and microbial life, on land, in fresh water and at sea will make the habitant to enjoy the environment.

VI. Recommendation

It has been a common saying that prevention is better than cure, this study has highlighted the responsibilities of building construction professionals in tackling the emergence of environmental degradation and global warming but steps can be taken to prevent or to reduce these phenomena.

The following recommendations are hereby made:

i. Plant trees to absorb carbon dioxide (CO_2) and green houses from the air.

ii. Alternative transportation systems such as mass transit, carpooling and telecommuting by leaving our cars at home for two days in a week; by so doing CO_2 emission can be reduced by 680.4kg a year. (IPCC, 2001).

iii. Buy product that feature reusable, recyclable or reduced packaging to serve the energy required to manufacture new containers. Also by recycling all of our home waste newsprint, glass and metal, we can reduce CO_2 emissions by 385.6kg annually (IPCC 2001).

iv. The Federal Government should initiate a research programme and rational assessment of the potential consequences of climate variability and change for the nation.

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