

## CREATIVE AND FUNCTIONAL EDUCATION: THE CHALLENGES AND PROSPECT OF CLIMATE AND ENVIRONMENTAL CHANGES IN NIGERIA

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### **Abstract**

Changes in climate and environmental conditions occur as a result of natural and human factors. The natural factors are almost beyond human control while the human factors are to a very large extent under human control. Human factors include, air, water and land pollutions, production of greenhouse gases, deforestation, desertification, emission of carbon dioxide, carbon monoxide and other harmful gases while natural factors include, volcanic eruption, ocean variations, solar variations, Plate Tectonics, Thermohaline circulations, etc. This paper discovered that there is a complete negligence of climate and environmental education in many countries including Nigeria. This is proven by the fact of the absence of climate and environmental education in the National policy on education in Nigeria. Based on this, this paper advocated for the inclusion of climate and environmental education in Nigeria education policy and how it will help to develop the economy. Suggestions were made that will enhance climate and environmental education which will enlighten people about the dangers of causing harm to the environment and how it will assist in the Nigerian economy.

**Keywords:** Challenges, Climate, Creative, Environmental changes, Functional Education

There has been a continuous rise in global temperature in the last 130 years, which has huge consequences on a wide-range of climate related factors. It is evident that carbon dioxide (CO<sub>2</sub>) and Methane are being dumped in the atmosphere at an alarming rate as a result of the advent of industrial revolution. There are oil spillage and gas flaring all

over the environment. Fossil fuels burning and deforestation which produce greenhouse gases are on the increase. This phenomenon is called greenhouse effect. Greenhouse gases act like blanket around the earth, wrapping energy into the atmosphere. This, is the cause of the earth warming.

There are distortions and pollutions in our water supplies, agriculture, weather, seasons, power, transportation system, and so on. However, it is important to state that, some changes in the climate are unavoidable; carbon dioxide can stay in the atmosphere for nearly a century. As such, the earth will continue warming, and the warmer it becomes, the greater the risk for more adverse changes to the climate and the Earth's system. Even though it is difficult to predict or forecast the impact of climate change, yet, what is certain is that the climate we are used to is no longer a reliable guide for what to expect in future.

The most current National Policy on education in Nigeria, 2004 edition, does not have any provision for the teaching of climate and environmental education. Nigeria is not the only country of the world that has this deficiency in her educational system. Several other countries in Africa have not made provision for this form of education. The western world is not left out.

### **The Concepts of Climate and Environmental Changes**

Climate is the average weather condition of a place over a long period of time, usually about or even over 30 years. Climate is the average weather usually taken over a 30-years period for a particular region and time. To ascertain the climatic condition of a place, there is always a systematic observation, recording and processing of the climatic elements such as temperature, rainfall,

atmosphere, pressure, humidity, wind, sunshine and clouds. Climate differs from weather in that, weather reflects short-term condition of the atmosphere while climate is the average daily weather for an extended period of time.

Environment in the view of Ajayi(1998) is the total surrounding of an organism in a given area including the physical and non-physical surroundings. Kwan, Lam and Ofoefuna (2011) see environments as the conditions of an organism's surroundings. Onuoha (2012) defined an environment as a set of conditions and forces which surround and have direct influence on the organization/organism. It therefore implies that environment is made up of all the physical visible and microscopic matters that affect the existence of organisms positively or negatively and an organism does not exist in isolation. It must co-exist with other matters.

There are five divisions of the sphere of an environment according to Ajayi(1988). These are:

- 1) The atmosphere; made up of the troposphere and stratosphere. The atmosphere consists of 78% nitrogen, 21% oxygen and 0.003% carbon dioxide and water vapour as the most valuable component. This sphere is seen as very important because it aids biotic activities.
- 2) The stratosphere; which also is known as the ozone layer absorbs ultra-violet radiation. So, when such radiation is prevented by the ozone layer from reaching the earth's surface in high intensity, many organisms (plants and animals) are relieved.

3) The Hydrosphere; this is the world of water existing in form of water, lakes and oceans.

4) The Biosphere; is the part of environment which is known as the active part of the earth where plants and animals inhabit. It is made up of Aquatic and terrestrial biotopes. The aquatic biotopes contain fresh and salt water, while the terrestrial biotope is zone where certain life forms can exist outside water.

5) The lithosphere; is the solid part of the environment which contains rocks, sediments and soil minerals. Supporting this view, internal mechanism argued that scientists generally define the five components of earth's climate system to include – atmosphere, hydrosphere, cryosphere, lithosphere (restricted to the surface soils, rocks and sediments) and biosphere. Natural changes in the climate system (internal forcing) result in internal climate variation e.g. include the typical distribution of species and changes as ocean currents.

#### **Causes and Effect of Climate and Environmental Changes**

Climate and environmental changes is the after mat of so many human activities and some natural occurrences. Some natural causes of climate change are referred to as ‘‘climate forcing’’ or ‘‘forcing mechanisms’’. Changes in the state of this system can occur externally (from extraterrestrial systems) or internally (from ocean, atmosphere and land systems), through any one of the described components. For example, an external change may involve a variation in

the Sun's output which would externally vary the amount of solar radiation received by the Earth's atmosphere and surface. Internal variations in the Earth's climate system may be caused by changes in the concentrations of atmospheric gases, mountain building, volcanic activity, and changes in the surface or atmospheric albedo.

However, some climatologists are of the opinion that only a limited number of factors are primarily responsible for most of the past episodes of climate change on the Earth. These factors include; variations in the earth's orbital characteristics, atmospheric carbon dioxide variations, volcanic eruptions, variation in solar output, plate tectonics and thermohaline circulation.

#### **Variation in the Earth's Orbital Characteristics**

The Milankovitch theory opines that normal cyclical variations in three of the Earth's orbital characteristics is likely responsible for the past climatic change. By implication the theory assumes that over time these three cyclic events vary the amount of solar radiation that is received on the Earth's surface. The first cyclical variation is known as eccentricity. This controls the shape of the Earth's orbit around the Sun.

#### **Volcanic Eruption**

During volcanism, materials from the earth's core and mantle are brought to the surface as a result of the heat and pressure generated within. Volcanic eruptions and geysers release particles into

the earth's atmosphere which affect the climate. The most dangerous of these gases is the carbon dioxide gas which reacts with water vapour commonly found in the stratosphere to form a dense optically bright haze layer that reduces the atmosphere transmission of some of the sun's incoming reception.

### **Solar Output Variations**

There are many variations in solar activity that have been observed through the sun and beryllium isotopes. The sun provides the earth with heat energy, an integral part of our climate. Numerical climate models predict that if there is a change in solar output of only 1% per century, the earth's average temperature will be altered by between 0.5 to 1.0 Celsius. In fact, solar radiation has caused a phenomenon known as global warming.

### **Plate Tectonics**

Planet earth has a landmass made up of plate tectonics that shift, rub against one another and even drift apart. This causes the repositioning of continents, wear and tear of mountains, large-scale carbon storage and increased glaciations.

### **Thermohaline Circulation**

Thermohaline circulation is the redistribution of heat via slow and deep oceanic currents. Kwan, Lam and Ofoefuna (2011) are of the opinion that pollution is the process by which substances are added to the environment or the addition of materials to the environment that damages or defiles it, making it undesirable or unfit for life.

These materials according to them are called pollutants. These harmful gaseous pollutants include; sulfur dioxide, nitrogen oxides, carbon dioxide, carbon monoxide and lead.

### **Sulfur dioxide and nitrogen oxides-**

These occur as a result of the burning of fossil such as coal, oil and natural gases. Sulfur dioxide at a very high concentration has damaging effects on both plants and animal lives. In the case of plants, it penetrates the leaves through the stomata (tiny opening in the cells of the leaves) and kills the plants. In the case of humans, sulfur dioxide causes irritation and damaging of the sensitive lining of the eyes, air passages and lungs. When this occurs for long time in an environment, it causes respiratory diseases.

**Lead** -it is possible to find the presence of lead in the food we eat, the water we drink and the air we breathe in. A long time accumulation of lead in the body system could lead to high concentration of lead which may result to cramps, loss of control of hands and feet, and sometimes coma and death. Air in cities has higher presence of lead than the air in rural areas.

**Carbon monoxide-** The exhaust of motor vehicles, generators, air crafts, motorcycles and other forms of engines that emit such gases are the sources of carbon monoxide. When carbon monoxide is breathed in, it combines with hemoglobin in the red blood cells to form 'carboxyhaemoglobin' which reduces

the capacity of the blood to transport oxygen round the body.

**Carbon dioxide-** this factor though primarily caused by human activities through the burning of organic compounds which results to the releasing of carbon dioxide into the air, yet has some natural implications. As such, carbon dioxide is the most important gases that cause "Greenhouse effects". This occurs when the sun rays hit the earth surface, but when they are reflected back into space, they are trapped in the atmosphere.

**Chlorofluorocarbons (CFC3)** - These are non-toxic, unreactive chemicals. They are used as aerosol propellants, as cooling agents in refrigerators and air conditioners, and in foam packaging. Chlorofluorocarbon is released into the atmosphere from aerosols and other sources break down the Ozone layer of the atmosphere. The Ozone is a gas that forms a layer over the Earth and it absorbs much of the ultraviolet rays from sunlight. So when the Ozone is broken down, more ultraviolet light reaches the Earth. This increases the risk of skin cancer (Kwan, Lam, Ofoefuna, 2011).

**Fertilizers-** These are chemicals used by farmers to increase yields of crops. The fertilizers contain nitrates and phosphates which are useful nutrients for the growth of algae and plants. However the over use of chemical fertilizers may cause water pollution in the sense that fertilizers that are not absorbed by crops may be washed away by rainwater into nearby rivers and

lakes. These are harmful to water organisms.

**Pesticides** – These are substances used to kill pests that destroy crops in farms. They include insecticides and herbicides. Insecticides are specifically used to kill insects. When applied to farms, they can be carried by rain water into rivers, streams and lakes. When they are in high concentration they may poison fish or animals that drink the water or feed on the contaminated fish.

**Deforestation-** This is the act of cutting down trees and shrubs indiscriminately. Trees may be cut down for the purposes clearing lands for building houses, industries and factories, for growing crops, for grazing cattle, sheep, horses etc.

**Soil erosion-** this is a situation whereby the soil is directly exposed to the forces of rainfall due to the cutting down of protective trees in forests. When this happens, topsoil which is the most fertile layer gets washed away during heavy rain especially on the steep slopes. This affects agricultural production and thereby affecting the nation's Economy.

**Desertification-** When the protective trees are cut down, sunlight directly falls on the soil, thus making water to evaporate rapidly from the soil making it to dry up and harden. With the topsoil eroded, plants life cannot be supported and other organisms that depend on plants and weeds for food are equally destroyed. The land thus remains barren.

### **The Need for Climate and Environmental Education for Sustainable Economic Growth**

Environment as in natural environment is the sum total of what is around something or someone. It includes living things and natural forces. The environment of living things gives them the opportunities for growth and development, including the possibilities of danger and destruction. Creatures or living things do not just live or exist in environment; rather, they constantly interact with their environment. More importantly, environmental education enhances critical thinking and basic life skills. Confirming this, the National Science Board of the National Science Foundation in the year 2000 stated the importance of environmental education to students in acquiring knowledge and gaining skills such as problem solving, consensus building, information management, communication, and critical and creative thinking.

The teaching of climate and environmental education is needed as a part of curriculum is that tomorrow's leaders need to be equipped for tomorrow's challenges and the children must adequately be prepared for the future they will inherit. The obvious fact is that today's children are disconnected from nature. In cities and civilized worlds, children are restricted and grown indoors. They do not have the privileges to explore the natural world. Rather, they are exposed to violence and wars through films, cartoons and other television programmes. Problems of teaching

climate and Environmental Education. Lack of funding has prevented the proper functioning of environmental education in many countries of the world. Environmental educators particularly complain of minimal support for the development and publication of environmental education resource texts. Supporting this, Burch(1994) points to the lack of "pedagogically sound environmental educational materials ...". Many countries budget so much money for agriculture and science education but budget very little or even nothing at all for environmental education.

### **Conclusion**

From all indications human beings to a large extent lack the awareness of the need to be environmentally friendly. They destroy natural environments through actions like deforestation, pollutions, desertification, production of greenhouse gases etc. This paper is of the opinion that our education system can play immense roles in creating the needed awareness about environmental friendliness. It therefore suggests that policy statements in favour of environmental education be included in the national policy on education, which presently lacks such. Such policy statements should specifically state the teaching of subjects and courses on climate and environmental education. This will enable the young school children and even the adult folk to understand better what it means to be environmentally-friendly.

### **Recommendations**

Government should make the National Policy on Education to enhance climate and environmental changes in Nigeria;

1) The curriculum at primary, secondary and tertiary levels of education must include climate and environmental education as a compulsory subject.

2) Teachers and educators should from time to time embark on seminars and workshops on climate and environmental changes.

3) Teachers should study and create sun safety awareness. This should be classroom and school wide activities that will raise children's awareness of stratospheric ozone depletion, ultraviolet radiation and simple sun safety practices.

4) There should be school sun safety programmes. This should be a collaborative effort of schools, communities, teachers, parents, health professionals, environmental groups, meteorologists, educational organizations and others. It is believed that with everyone's help, sun protection can go beyond classrooms to the entire communities.

5) There should be a study of past climate conditions which is known as pale climatology.

6) Students should study courses on global observations which will include; knowledge of geostationary operational satellites which is the monitoring of the western hemisphere and the pacific ocean from geostationary orbit 35,800 kilometers (22,300 miles) above the equator; polar-orbiting operational environmental satellites which entails

scanning every six hours from altitude of about 850 kilometers (529 miles); Air plat-forms which is to do with investigating hazardous weather for the prediction of hurricanes, tornadoes and winter storms; surface and submarine plat-forms which is about the exploration of the ocean surface and its depths.

7) Students should be taught how to be environmentally friendly; both natural and human causes of climate and environmental changes.

8) Students should be taught environmental sustainability, which has to do with sustainable development and its impact on environmental interaction and climate change.

9) Students should also be taught Earth Science which its major concern will be on the lessons on the production of carbon dioxide by human activities, re-cycling and their impact on climate.

10) The policy should state that all levels of education should design subjects and courses that will expose students to climate and environmentally friendly education.

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