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SUSTAINABLE DEVELOPMENT STRIDES IN NIGERIA: AN ANALYSIS OF CLIMATE CHANGE AWARENESS AND ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT: *The paper x-rayed the sustainable development strides in Nigeria: An analysis of climate change awareness and environmental sustainability. It started by looking at the sustainable goals as enshrined in the Millennium Development Goals (MDG) and narrowed it down to environmental sustainability. Furthermore, the paper examined man's destructive interference in the environment; delicate nature of weather and climate with a critical look at the ozone layer. Subsequently, the nature, causes and consequences of climate change were properly reviewed and man's efforts to create its awareness and how to mitigate the challenges of the change. Finally, the paper stressed the need for environmental sustainability for the future generations through climate change education and the way forward.*

KEYWORDS: Sustainable Development, Nigeria, Climate Change, Awareness, Environmental Sustainability

INTRODUCTION

Sustainability development notion differs between the first and third world countries. For the third world countries, sustainable development is seen in terms of promise of better economic and social conditions, while the first world countries perceive it as an aspect of preserving the environment for the next generation. So there are three imperatives involved from the above standpoints on sustainable development thus: ecological, economical and social. This is an eye opener for man in his environment (Schultz, Hummel, Empacher, Kluge, Lux, Schramm, Schubert, & Stiess, 2001).

Sustainable Development Goals Through Environmental Sustainability

Nigeria is a signatory to a number of International Protocols that seek the wellbeing of their citizens. Among them is the Dakar Framework for Action (2010). According to Kupoluyi (2014), this framework is machinery put in place to achieve the set goals by 2015, which is the essence of the Millennium Development Goals (MDGs). In September, 2000, 189 Heads of States and Government gathered to reaffirm their faith in the United Nations and to adopt the United Nations Millennium Declaration for improving the citizens of developing and under-developed nations of the world. Gbeneol (2014) states that 8 key goals and 21 targets were set out to be attained on or before 2015. The 8 key goals are:

- Goal 1: Eradication of extreme poverty and hunger
- Goal 2: Promotion of Universal Primary Education
- Goal 3: Promotion of gender equality and empowerment.
- Goal 4: Reduction of child mortality
- Goal 5: Improvement of maternal health
- Goal 6: Combating HIV/AIDs, malaria and other diseases.

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- Goal 7: Ensuring environmental sustainability and
- Goal 8: Develop a global partnership for development.

Of interest to this study is MDG-7 which is concerned with how the environment can be sustained. There is much awareness in regards to this issue as there are factors like climate change, deforestation and desertification that threaten the environment (Sharehu, 2012). According to Daramola (2015), little progress have been recorded in achieving MDG-7, as access to safe water and sanitation has not improved significantly, and there are other contending environmental challenges such as erosion and coastal flooding. The author posits that a consideration of extending the MDG beyond 2015 is necessary in order to achieve the set goals.

In the Annual Ministerial Review (AMR), a platform of 44 developing and developed nations shared their experiences on the MDGs progress. The United Nations' Environment Programme (UNEP) Executive Director, Steiner (2013) emphasizes that MDGs have proven to be a powerful focus for international efforts to eradicate poverty and catalyze action towards sustainable development. In respect to MDG-7 on environmental sustainability, he explains that considerable progress has been made in respect to the provision of water and the extension of reserve areas, but laments that the broader challenges of putting the environment and its natural or nature based aspect at the heart of sustainable development and the lives and livelihoods of over 7 billion people remain a real work in progress. This now calls for looking beyond 2015 to make an impact in the preservation of the environment - which is the life-based of humans on earth.

Man's Destructive Interference in the Environment and its Effects

Man's activities destroy the natural quality of the environment directly or indirectly through impact, pollution or over-exploitation. Therefore, care needs to be taken to sustain it, as it determines our well-being and existence. Sustaining the environment involves making sure that the process of interaction with it should be at equilibrium. Thus, environmental sustainability demands that the society designs activities to meet human needs, while indefinitely preserving the life support system of the planet. Sustainability requires that human activities should only use natural resources at a rate which can be replenished naturally. Long term result of environmental depreciation is the inability to sustain human life. Such degradation on a global scale would imply extinction of humanity; hence the emphasis on MDG-7 for environmental sustainability.

Of recent, adverse environmental changes have been a source of concern to Nigerian experts and other experts globally. The fast pollution and depletion of natural resources and their consequent effects on weather and climate have reached an alarming rate, and might have contributed to the present changes in the global climate. This is now the focus of the study on sensitizing man to be environmentally conscious.

Understanding the Delicate Nature of Weather, Climate and the Ozone Layer

There are three major components of weather and climate that regulate life on earth namely: The troposphere, atmosphere and the ozone layer. The troposphere regulates the incoming radiations on the earth surface- the long and short wave radiations. About 35% of the incoming radiation (shortwave radiation) reaches the surface of the earth. The other 65% are expended on the way. It is the 35% that heats up the earth's surface. As it warns up, it re-radiates some of

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the heat energy in form of long wave radiation. This long wave radiation is much more readily absorbed in the atmosphere, which now indirectly heats it up (Sutton, 1993).

The atmosphere is a thin layer of gas which is prevented from escaping into space by the force of gravity. It is composed of a number of gases like: Nitrogen, Oxygen, Carbon IV Oxide, and Water Vapour, among others that make up 99.99% of its gaseous content. Barry and Chorley (1990) posit that these gases are mixed in remarkably constant proportion and that any rapid change in any of the gases may lead to a violent charge in the atmosphere itself. The authors noted that industrial activities have been increasing the CO_2 content of the atmosphere through emissions like smoke, carbon monoxide (CO) and sulphuric acid (H_2SO_4).

Ozone layer is concentrated between 15-35 kms upward. Sutton (1993) explains that the ultraviolet radiation from the sun breaks up oxygen (O_2) atom into two parts (O+O). These separate atoms may individually combine with other oxygen atoms to create ozone i.e., O_2+O+ m = O_3+ m; where m represents energy and momentum balance provided by collision with a third atom. Sutton warns that the ozone layer is so important to man that any interference in its equilibrium may lead to chaos on the earth surface. This is because the layer absorbs the solar and terrestrial radiation, and its distribution equally affects the heat budget and vertical temperature structure of the atmosphere. In addition, the ozone layer protects the earth from the bombardment from short wave radiation, and its pressure would have affected life on earth. Having examined the nature and importance of the three major aspects of climate, the paper now x-rays the unbecoming changes in it.

Nature, Causes and Consequences of Climate Change

Climate change refers to deviations in the elements that make up the climate, in terms of nature/form and functions, over a long period of time (Gerald, Evan and Knutson, 1992). Such changes could be naturally or humanly facilitated. Global warming associated with climate change is a measurable increase in the average temperature of the earth's atmosphere, oceans and landmasses. The authors explain that scientists believe that the earth is currently facing a period of rapid warming brought about by rising level of heat trapping gases known as "greenhouse gases" in the atmosphere. The green house gases tend to retain the radiant energy (heat) provided to the Earth by the sun in a process known as the "green house effect". Howbeit, greenhouse gases occur naturally, and without them, the Earth would be too cold to sustain life. Substantiating further on the importance of greenhouse gases, Chamberlin (2011) reiterates that they are needed because without them, the earth would be about 35^{oC} colder.

Earth's climate has changed throughout history, especially in the last decade (20^{th}century), and the beginning of the 21^{st} century when the earth recorded its warmest period. Rayner and Malone (1998) observe that industrial and human activities have added more and more of these gases into the atmosphere. In addition, they noted that other factors like massive volcanic eruptions which have increased CO_2 in the atmosphere, changes in the intensity of energy emitted by the sun, and variations in earth's position relative to the sun both in its orbit and the inclination of its spin axis, have contributed significantly to the changes, Furthermore, Bosetti and Lubowski (2010) state that recent researches have shown that high increase in industrial activities and the advancement in science, technology and Information Technology have led to increase in temperature in various regions and increasing extremities in weather pattern. The authors affirm that research findings show that pollutants from fossil fuel use make clouds reflect more of the sun's rays back into space. This leads to an effect known as "Global Dimming" whereby less heat and energy reach the earth. Specifically, global climate changes

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have been caused by the following: oil blast discharges; improper disposal of drilling mud from petroleum prospecting; urban decay; sheet, gully, coastal and marine erosion; urban flooding, drought; desertification; industrial wastes; solid wastes; various non-biodegradable household and petro-chemical products; loss of fauna and flora; deforestation, among others (Bosetti and Lubowski, 2010).

Climate change leads to change in the amount of precipitation, leading to rise and fall in sea levels; increase in heat waves; incidences of diseases; risk of hunger and famine. There is also the fast depletion of the ozone layer that protects the Earth from the sun's harmful rays. This depletion of the layer by compounds with anthropogenic origins is a threat to human health, forests and crops (Kendall in Oformata and Phil-Eze, 2004).

Man's Efforts to Create Awareness and to Mitigate the Effects of Climate Change

Mankind has now become increasingly concerned about the profound changes being effected by man to the natural environment. Salau (1991) notes that resources are being depleted or wantonly polluted; certain species of plants and animals have been exterminated, and others threatened. Again, Bosetti and Lubowski (2010) perceive that the effect of these changes could lead to over 200 million people being refugees as a result of man-made and natural disasters like melting ice causing water shortage and wildlife depletion.

Extensive researches have been going on worldwide to determine the extent of climate change and its resultant effects on life on earth. The research focuses on determining how much of the effects are caused by anthropogenic (man-made) factors. Its potential impacts mostly studied by researchers include: the effect on sea level; drought; local weather and devastating winds. Gopsill (1973) posits that most of our current knowledge of global change comes from general circulation models (gcms). These models help to determine the annual temperature and precipitation information that would be pointers to global change.

Climate change is of urgent national and global concern, and Nigerians need to be enlightened on preventive steps and coping strategies of its adverse effects. On the Nigerian scene, the Federal Government has been so concerned with these adverse charges that it established the Federal Government Protection Agency (FEPA), now Ministry of Environment in 1988, through Decree 58. It was laddened with the responsibility of working out procedures on how to handle the environment; to address specific and identified environmental problems like: urbanization problems, deforestation, desertification, and pollution among others. Currently, direct concern is on the resultant effects of the aforementioned problems which is drastic climate change and its threatening effects on life now. The Ministry has expanded their scope through Environmental Impact Assessment (E.I.A). The E.I.A has evolved considerably in scope, tools, techniques and methodology which include the following: public participation or involvement; screening and scoping; impact identification; predicting; monitoring and evaluation. Also, the Ministry was empowered to sensitize and disseminate information on modern/scientific methods of agricultural and general land use practice, and the bulk of their activities was community based (Isife, 2011).

Need for Environmental Sustainability for our Future Generations through Climate Change Education

The burning issues of climate change and its adverse effects on man has necessitated the global sensitization and re-packing of curricular contents to reflect the trend and educating the

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younger generations on how to go about it too. Teachers as curriculum implementers impact more on the learners as they instruct them. They need to be trained in excellent curriculum content delivery of climate change. Their training programme in universities should include enhancing their technical skills in climate change curriculum implementation. According to Van Manenin in Ogbonna (2012), proper technical skills acquisition by teachers would enhance proper implementation of any developed curriculum. The proper training was re-echoed in the National Policy on Education (FGN, 2014:37), sub-section (d) thus: "To provide teachers with the intellectual and professional background adequate for their assignment and make them adaptable to changing situations."

The UNESCO (2010) climate change initiative was based on four thematic areas thus; scientific, educational, environmental and ethical. Of direct concern to this paper are the environmental and educational themes. The document emphasizes on strengthening the capacity of member states of which Nigeria is one, to provide climate change education for sustainable development at primary and secondary school levels through training on curricular review and reform. This initiative in the view of Sandabe, Askira and Umar (2012) is hinged on the fact that what children learn today will shape tomorrow's world. The authors posit that teachers need to be trained properly in order to inculcate the knowledge of climate change in learners. They believe that the training should be based on environmental challenges of climate change at local and global levels; and the effects for now and in the future. The authors suggested the packaging of the climate change curriculum termed "Environmental Studies" as general study courses at 200 and 300 levels of study in universities in Nigeria. Corrobating Sandabe *et al* opinion, Okeke in Akuakanwa (2012) emphasizes that the nation's teaching and learning procedures need to be reviewed to address the causes and consequences of climate change in terms of new contents and re-training of teachers.

Nigeria needs to have a re-think on its teacher education in the light of global issues and challenges. Teachers at all levels of the education system ought to be prepared and equipped with the right knowledge and methods in order for them to impart same to the learners. The training and preparation of teachers to face the global challenges of climate change and to impart appropriate knowledge and skills to learners becomes imperative. This has become necessary as no education system may rise above the quality of its teachers (FGN, 2014:39).

THE WAY FORWARD AND CONCLUSION

The Earth's climate has changed considerably throughout history. Satellites which go round the Earth have been picking up information concerning these changes. The use of fossil fuels to meet the world's energy needs is contributing significantly to an increase in green house gases, mainly- Carbon IV Oxide and Methane in the atmosphere. There is a widespread view that this increase is leading to climate change, with adverse effects on the environment.

Extensive researches have been on to determine the extent of the climate change and precautious measures to take, to avoid further changes. This is now the heart-beat of most nations of the world. The Nigerian government through the Ministry of Environment and the Commission on Climate Change has been busy working out solutions to these changes that is now affecting lives. There is the need to review the nation's curricula to reflect the basics of climate change so that the youths would be sensitized on time and to be watch guards of the environment for its sustainability.

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Special training would be needed for lecturers through workshops and seminars to update their knowledge on the issues of climate change. The training methods for student-teachers should involve students-centered approaches like experience-based/outdoor projects, field trips, report writing and advertisements, among others. In addition, proper materials/equipment should be made available to universities for effective teaching of the course contents, and to motivate the lecturers to be committed to the training and the creation of environmental sustainability awareness.

REFERENCES

Akuakanwa, G.O. (2012). *Developing curriculum on climate change at secondary education in Nigeria.* Paper Presented at the Silver Jubilee Conference of Curriculum Organization of Nigeria (CON) held at Imo State University, Owerri from 19th – 22nd September.

Barry, H., & Chorley, R.T. (1990). *Weather and climate*. Methuen: Methuen Press.

Bosetti, V., & Lubowski, R. (2010). *Climate change and sustainable development programme*. Washington D.C: Henry Holt & Co.

Chamberlin, G.C. (2011). *Climate science and the effect of climate change.* www.climatechange.ed.org Downloaded on March 2012.

Daramola, B. (2015). *Realizing the MDGs: Racing against time.* Retrieved on March, 24, 2015, from www.thisdaylive.com/articles/realisingmdgs-racing-against-time/173087.

Federal Republic of Nigeria (2014). *National policy on education*. Lagos: NERDC Press.

Gbeneol, D. (2013). Towards attaining 2015 MDGs' target data. *Daily independentmgcom/2013/04/towards/attaining 20135-mdgs-target date*. Retrieved on April 2013.

Gerald, A.M., Evan, J., & Knutson, T. (1992). *Trends in extreme weather/climate events: Issues related to modeling extremes in projections of future climate change*. New York: Henry Holt & Co.

Gopsill, G.H. (1973). *The teaching of geography*. London: Macmillan Publishers.

Isife, T.C. (2011). Environmental problems: How far has Nigeria fared in its policy? *Seminar paper presented at IDS conference, held at the University of Nigeria, Enugu Campus* on April 30th.

Kupoluyi, A. (2014). Can we still meet MDG target? *Punch Newspapers of January*, p. 8.

Ofomata, G.E.K., & Phil-Eze, P.O. (2004). *Geographical perspectives on environmental problems and management in Nigeria*. Enugu: Jamoe Publishers (Nig).

Ogbonna, C.A. (2012). *Teacher quality and licensing: Implications for curriculum delivery in tertiary institutions*. Paper Presented at the 8th Biennial Conference of World Council for Curriculum and Instruction, held at the University of Nigeria, Nsukka from 16th-20th October.

Rayner, S., & Malone, E. (1998). *Human choice and climate change*. Battelle: Battelle Press.

Salau, A.T. (1991). The relevance of geography education to national development. *In* P.U. Onyige (Ed.), *Geography education and national development.* Port Harcourt: Pam Unique Publishers.

Sandabe, A.K., Askira, I.M., & Umar, M. (2012). *Towards integrating climate change education into secondary school curriculum in Nigeria*. Paper Presented at the 25th Silver Jubilee Conference of Curriculum Organization of Nigeria (CON) held at Imo State University, Owerri, from 19th – 22nd September.

ISSN 2055-0111(Print), ISSN 2055-012X(Online)

Schultz, I., Hummel, D., Empacher, C., Kluge, T., Lux, S.E., Schubert, S., & Stiess, R. (2001). *Research on gender, the environment and sustainable development.* Frankfurt: Frankfurt Am Main

Sharehu, A.L. (2012) (Ed.). *NTI brief on capacity building of teachers*. Kaduna: NTI Press.

Steiner, A. (2013). *Address presented in the Annual Ministerial Review* (AMR) to assess the achievement of the MDGs.

UNESCO. (2010). *Climate change initiative document on climate change education for sustainable development.* Paris: UNESCO Press.

ISSN 2055-0111(Print), ISSN 2055-012X(Online)