ENVIRONMENTAL EDUCATION AND THE CHALLENGES OF SUSTAINABLE DEVELOPMENT IN NIGERIA

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Abstract

Environmental Education emerges in order to provide or confront specifically global and environmental problems which affect the quality of human lives. The industrialization and heavy burning of fossil fuels have released excess carbon dioxide (CO$_2$) and other poisonous gases into the atmosphere. The paper, in this vein, found that the Environmental Education can be applied in a way to remedy the hazardous effects of these industrial pollutions majorly caused by the multinational oil companies in the developing African countries. It X-rayed environmental education showing its content, general and specific objectives and its capacity for sustainable development. It called for caution to minimize environmental degradation and to enhance sustainable economic development in Nigeria.

The adverse consequences of oil exploitation especially pervasive oil spillage and the truncation of ecosystem imply that nature is being used by humans in ways that threaten the sustainability of natural resources base. Perhaps, it may be important to mention that the absorptive capacity of the environment has been irredeemably impaired as a result of toxic consequences of oil spillage, oil pipeline vandalization and unhindered gas flaring. The fish population have not fared any better because of the
deluge of effluents into fresh waters by multinational oil companies on a regular basis. Despite these flagrant infractions of the Niger Delta ecology, we are not aware of any serious effort at a concerted remediation measures for the Niger Delta environment (Jike, 2010).

However, environmental degradation is global in the sense that it affects everyone, and can only be managed effectively through global cooperation (O’Brien and Williams, 2007:333). The Rio de Janeiro United Nations Conference on the Environmental and Development (UNCED) in 1992 focused primarily on sustainable development, or ways to accomplish what seems like contradictory objectives: generating wealth and development while preserving the environment (Balaam and Veseth, 2008). Tackling global environmental degradation does indeed require potentially very high levels of co-operation and the issue is replete with conflicting interests and priorities of different states. The announcement by the USA in 2001 that it was withdrawing from the Kyoto Protocol, the main international agreement created to address the problem of environmental degradation and global warming, seemed to vindicate those who argue that there are major obstacles to the international system of states acting in concert (Brown, 2004).

The need for environmental education arises from the poor levels of cooperation among international actors to tackle global environmental degradation and warming. Environmental Education (EE) came into being as a result of the United Nations Conference on Environment and Development (UNCED) known as the Earth Summit which was convened in Rio de Janeiro, Brazil in June 1992 to deliberate on the necessary action to be taken in combating the various environmental problems endangering the survival of this planet (Campbell, 2008:477). The outcome of this summit laid serious emphasis on education as the reliable means of empowering the people to understand and manage the environment. Nations were thus encouraged to incorporate EE in the formal school curriculum. In Nigeria for instance, EE has been incorporated as Module 10 of citizenship education curriculum (Ajayi, 1997).

Sustainable development can be promoted in Nigeria through environmental education. Sustainable development was defined by the Brundtland Commission (1987) as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs’. What is to be sustained? Because our primary interest in this paper is the degradation of the ecological systems and the need for the conservation of natural resources, it is the natural resource base which needs to be sustained.

The major focus of this paper is to examine the role of environmental education in promoting sustainable development. In order to achieve this aim, section two of this
Overview of Environmental Degradation and the Challenges of Sustainable Development in Nigeria: A Global Perspective

Environmental degradation occurs when humans use nature in ways that both threaten the sustainability of the natural resources base and create unwanted problems such as pollution of human societies. There was a substantial global policy shift in development in the early 2000s reflecting an admission that too much emphasis had been placed on economic stabilization. There was also a recognition that some important tasks of development – poverty eradication, environmental sustainability, among others – have been sidestepped in the policies of the adjustment years. The global consensus on development as a fundamental goal of nation-states or global cooperation is expressed in the Millennium Development Goals (MDGs).

MDGs in this study are seen as global contemporary strategies for sustainable development in Nigeria. At the 2000 United Nations Millennium Summit world leaders adopted the Millennium Declaration which established eight goals to be achieved by 2015 (Bromley, Mackintosh, Brown and Wuyts, 2004:326). The eight MDGs are:

**Goal 1:** Eradicate extreme poverty and hunger.
**Goal 2:** Achieve universal primary education.
**Goal 3:** Promote gender equality and empower women.
**Goal 4:** Reduce child mortality.
**Goal 5:** Improve maternal health.
**Goal 6:** Combat HIV/AIDS, malaria and other diseases.
**Goal 7:** Ensure environmental sustainability.
**Goal 8:** Develop a Global Partnership for Development.

In general, the MDGs are global strategies for sustainable development. The eight goals are designed to address various aspects of human need that are expected to sustain development in developing countries, including Nigeria. To achieve these MDGs, the global community recognizes the importance of internal and external factors in the development process. For instance, MDGs emphasize the importance of internal or domestic factors in generating and supporting productive investment, and environmental sustainability. The MDGs also identify the need for international cooperation in tackling the challenges of sustainable development. Hence, the MDGs...
are United Nations sponsored initiatives to work on a local or domestic level to achieve sustainable development.

The linkage between environmental degradation and climate change is a major challenge not only to sustainable development, but also to the realization of the seventh Millennium Development Goal (MDG) on environmental sustainability. Environmental degradation arises due to lack of proper control of pollution from industries, oil spillage in oil-producing areas, flaring of natural gas, which is associated with petroleum exploitation, and vehicle emissions, open access and population influx. Environmental problems affect forestry resources and lead to mangrove degradation and biodiversity loss (Okeke, 2006).

Nigeria has a lot to learn from global happenings, which are tied to environmental degradation. There is a synergy between environmental degradation and sustainable development. Without proper environmental management, economic growth and human development will be undermined and without accelerated economic growth, environmental policies will not succeed.

The effective management of carbon emission into the airspace has been the central problem in global environmental degradation. In this regard, pressures are mounting on how to stop ongoing massive investments in carbon-intensive energy projects in some developed countries. Specially, contrary to promised by the global leaders, the World Bank funding for coal-fired power stations, which produce massive carbon emissions that contribute to climate change, has soared 40-fold over the past five years to hit a record $4.4 billion (£2.8 billion) in 2010 (Adeshina, 2011). This is seen as a yet another global policy inconsistency on environmental degradation and anti-climate change.

The implications of global environmental degradation are manifesting in many countries. For instance, during the year 2010, over 260,000 fatal cases were caused by natural disasters and catastrophes worldwide. The tragedies started with the January 12 (7.0) earthquake that struck Port-Au-Prince, the capital city of Haiti, resulting in about 250,000 deaths. This was followed by an 8.8 magnitude earthquake at Chili on February 27, with 521 deaths and less than a month later, a tropical storm in Madagascar (on March 12, 2010) killed 36 and injured 85,000 (Adeshina, 2011).

Economic losses are associated with these global natural disasters that are induced by global warming. Moreover, these economic losses have further widen the global poverty line, as billions of dollars worth properties and infrastructures had gone down the drain. For instance, the Icelandic volcano erupted March 20, 2010 and a second consecutive explosion (in April 14, 2010), making millions of air passengers
globally grounded and the Aviation industry suffering the losses of the century. In the same 2010, the disasters flooding in Queensland, Australia rendered about 200,000 homeless and affecting farming and the entire economy of the country (Bligh, 2011:44). This disasters had grossly affected the country’s essential commodity export: coal mines. The capacity affected equals 35 per cent of Australia’s estimated 259 million tones of coal exports in 2009. Australia accounts for more than half of global coal exports, which are vital to steel makers, especially in Asian countries such as booming China.

Therefore, environmental degradation and global warming are major challenges to the realization of Millennium Development Goals of poverty eradication and environmental sustainability. The natural disasters have shifted efforts and economic resources from the hundred per cent implementation of the agenda of the Millennium Development Goals (MDGs) for all developing countries to the provision of quick humanitarian funds for the victims of these disasters. These have equally affected the flow of international subventions made available to aide the wholly implementation of other development-based global projects and programmes for the developing countries.

Environmental Degradation and Climate Change in Nigeria: The Challenges For Sustainable Development

The occurrence of heavy rainfall and subsequent flooding in major cities in Nigeria, especially Lagos, has raised the need for a definite anti-climate policy. Environmental degradation and the negative impacts of climate change on sustainable development have created a complex situation in Nigeria that requires much more efforts than awareness campaign on climate change. The multinational oil companies have continued to manipulate every process that would lead to an end in gas flare, the major source of carbon dioxide emissions in Nigeria. The recent removal by the sixth National Assembly of all clauses that seek to end gas flare from the Petroleum Industry Bill (PIB), induced by pressure from Transnational oil companies (TNCs), represents the pervading culture of exclusion in the oil and gas industry (Ebiri, 2011:33 ). This must be addressed in order mitigate the impacts of environmental degradation and climate change on sustainable development (Ncube, 2011).

Recent study on the ecosystems shows that the rising amount of carbon dioxide (CO₂) emission through gas flare will make less effective the CO₂ absorptive capacity of wetlands, forests and farmlands (The Guardian, 2011:48). It means that wetlands, forests and farmlands soak up large amounts of carbon dioxide in the atmosphere. This ability of the environment to absorb CO₂ effectively renders the carbon harmless and therefore fights climate change. However, the study reveals that the capacity of land ecosystems to slow climate warming has been overstated.
Scientists have stated that many plants would grow faster as CO₂ levels rise, leading to more CO₂ mopped up from the atmosphere. But this triggers an increased release of nitrous oxide and methane, and rise in the levels of these greenhouse gases offset some of the benefit of the climate change fighting potential of increased carbon storage in the landscape. According to Groenigen (2011:48), a surge in the release of greenhouse gases from soils would negate at least 16.6 per cent of the previously estimated climate change fighting potential of increased carbon storage in the landscape. This also means that the pace of global warming could in fact be faster than previously thought.

Carbon dioxide is essential for plant life and keeping the planet warm. In other words, trees need large mounts of planet-warming carbon dioxide to grow, locking away the carbon in the trunks and roots. But scientists say CO₂ emissions from gas flare, fossil fuels and deforestation are overwhelming the natural cycle, driving global warming. Deforestation contributes to global warming because the CO₂ that forests soak up is released when forests are cut down and burned. Scientists have struggled to figure out exactly how much CO₂ forests soak up in different parts of the world and a global total for how much is released when forests are cut down and burned (The Guardian, 2011).

Environmental problems associated with environmental degradation and climate change in Nigeria are temperature, rainfall, extreme weather events and rising sea level. The experience in the last decade in Nigeria, which are projected to increase in the coming decades include rising average temperatures all over Nigeria, but most significantly in the Northeast of Nigeria. The coastal regions have positive moderating effects of the ocean on the rising temperatures hence this is milder in the coast.

In Nigeria’s north, especially the Northeast, the rising average daily temperature is more critical and areas around Maiduguri already experience significant increase in the number of days with mean average temperature above 40 degrees Celisus (The Guardian, 2011:49). This is projected to increase with adverse consequences for human livelihoods as well as crops and livestock production.

With respect to rainfall, aggregate volume of rainfall in the country is not showing much change, but what is very important is variation across the country. For instance, while rainfall volume is expected to decline in Nigeria’s northern region of the Savannah and in the sahel, the Rain forest and coast already experience more rainfall. The reduced rainfall in the north is consistent with the rising temperature in that region. It is important to note that most of Nigeria’s food production is done in the Savannah (Nwajiuba, 2011:49).
In the coastal regions, rainfall volume has increased and is projected to increase further this century. In addition to rising sea levels, which may occur due to wider global reasons such as rising temperatures, melting solid waters in the temperate regions of the world, and other reasons, put most of these coastal cities and communities at risk.

Nigeria is very susceptible to climate change due to her physical locations and characteristics as well as her socioeconomic situation. Nigeria has a long coastline with several island and coastal communities. Nigeria’s coastal cities are very critical to her economy. Nigeria also has significant parts along the North very vulnerable to desert-like conditions, arising from human and livestock activities, deforestation and wood fuel, as well as changing climate conditions. These are worsened by the pressure of survival and the search for livelihood and agricultural purposes. With respect to Nigeria’s socio-economic circumstances, majority of Nigerians are poor (Nwajiuba, 2011).

The Nigerian situation demands concrete efforts to reduce and set a target date of putting an end to gas flare. Nigeria can improve environmental management and accelerate sustainable development through policy initiatives that would drive a combination of high economic growth and a carbon neutral society for a socially equitable climate resilient. Table 1 Shows trends in carbon emissions through gas flare. The percentage of gas flared to production declines from 99.10 per cent in 1970 to 64.68 per cent in 1999. However, the lowest record of 31.82 per cent of gas flared to production in 2006 reveals that Nigeria needs to improve her environmental management. The framework of Petroleum Industry Bill (PIB) is expected to provide the basis for multinational oil companies redoubling their efforts to scale up climate mitigation.

Table 1: Gas Production and Utilization in Nigeria (Million Cubic Metres)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Utilization</th>
<th>Flared</th>
<th>Percentage of flared to production (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>8029.0</td>
<td>72.0</td>
<td>7957.0</td>
<td>99.10</td>
</tr>
<tr>
<td>1971</td>
<td>12975.0</td>
<td>185.0</td>
<td>12790.0</td>
<td>98.57</td>
</tr>
<tr>
<td>1972</td>
<td>17122.0</td>
<td>274.0</td>
<td>16848.0</td>
<td>98.40</td>
</tr>
<tr>
<td>1973</td>
<td>21882.0</td>
<td>395.0</td>
<td>26776.0</td>
<td>98.19</td>
</tr>
<tr>
<td>1974</td>
<td>27170.0</td>
<td>394.0</td>
<td>18333.0</td>
<td>98.55</td>
</tr>
<tr>
<td>1975</td>
<td>18656.0</td>
<td>323.0</td>
<td>20617.0</td>
<td>98.27</td>
</tr>
<tr>
<td>1976</td>
<td>21276.0</td>
<td>659.0</td>
<td>20952.0</td>
<td>96.90</td>
</tr>
<tr>
<td>1977</td>
<td>21924.0</td>
<td>972.0</td>
<td>20952.0</td>
<td>95.60</td>
</tr>
<tr>
<td>1978</td>
<td>21306.0</td>
<td>1866.0</td>
<td>19440.0</td>
<td>91.24</td>
</tr>
<tr>
<td>1979</td>
<td>27619.0</td>
<td>1546.0</td>
<td>26073.0</td>
<td>94.40</td>
</tr>
</tbody>
</table>
Environmental Education and Sustainable Development

According to Aibangbe (1997), Environmental Education (EE) emerged as a result of human consciousness and awareness to confront specific global and environmental problems which affect the quality of human lives. EE is concerned with providing the necessary information about the environment so as to enable people to be much aware of how to handle environmental problems around them. It is important that the learners are environmentally literate so that they are made to be aware of how their actions affect the environment adversely and how best to minimize environment problems. Hence, EE can lead to establishing a sustainable environment and development.
Adara (1993) also submitted that Environmental Education is concerned with propagating learning more about the environment for the benefit of the entire component of the environment. It can be referred to as the perception of the totality of the surroundings of man as they affect his growth and the development of life. It is the training for the understanding of the aggregate of all external and internal conditions affecting the existence, growth, development and welfare of man and the training relating to the protection of the environment (Adetuberu, 1995).

Environmental Education is very imperative in tackling environmental problems of many nations. The environment and natural resources are the base of support of economic growth which in turn affects standard of living of current and future generations (Aibangbe, 1997). Since our lives impact the environment through various economic activities man is involved in, no matter where we live, the best way to protect these environments is to learn about them and how to sustain them. Thus, EE is a strategic tool for environmental management. It involves the integration of both formal and informal education as well as research based approach to monitor and solve environmental related problems.

The Environmental Education Programme

Environmental Education as a teaching subject could be taught through schools curriculum, for instance, in general science, debates, quiz and essay competitions. special lectures, symposia, workshops and research could also be include. Likewise, informal education according to Obanya (2003), is outside the formal setting hence, peer group meetings, folklores and communication gadgets, like radio, TV drama and mass media such as magazines, newspaper and the world wide web are of great importance in sensitizing the public by exposing them to their environment and its problems (Okeke, 2006).

Okeke (2006) made it clear that EE should be a continuous process from pre-school ages to school and even out of school situation. All learners have the opportunity to acquire more knowledge and awareness about the environmental problems and active participation that could solve it. The fact that knowledge acquired through formal and informal education helps to reduce and solve some environmental problems makes adequate knowledge of great importance in developing economies.

The General Objectives of Environmental Education Programme

The general objectives of environmental education programme are as follows:
1. to enhance students’ awareness, knowledge and understanding of human environmental interactions (Tilbury, 1995).
2. to promote a sense of responsibility and active pupils and students participation in resolving environmental problems.
Specific Objectives of Environmental Education

These are the behavioural objectives. The teacher states these objectives in advance. There are unexpected opportunities which can occur in the classroom and teachers are expected to use and direct them toward objectives which are stated in three formal domains and they are as follows:
2. Affective domain.
3. Psychomotor domain.

Taking into consideration the topic in the course content, specific objectives are formulated as follows:

Cognitive Domain
1. Define environment
2. Discuss environmental problems and the abuses of the environment.
3. State the socio-economic reasons for the abuse of the environment.
4. Discuss the alternatives of clean technology to prevent or reduce the abuse of the environment.
5. Narrate the procedures involved in the design of environmental education programme.

Affective Domain
At the end of the lesson students should be able to:
1. Appreciate the importance of environmental education.
2. Become interested in identifying environmental problems and abuses.
3. Appreciate the socio-economic reasons for the abuse of the environment.
4. Become interested in the alternatives of modern technology for a clean environment.
5. Become interested in designing environmental education programmes.

Psychomotor (Skill) Domain
At the end of the lesson students should be able to:
1. Effectively outline the components that make up environmental problems and abuses.
2. Increase in the ability to search for more environmental problems and abuses.
3. Develop socio-economic reasons for the abuse of the environment.
4. Increase in the ability to provide or suggest alternative clean technologies to prevent abuse of the environment.
5. Competence in planning and designing environmental education programme.

Course Content
Nicholls and Nicholls (1978) defined content as the knowledge, skill, attitude and value to be learned.

Criteria for Selecting Content
In selecting content for the curriculum, adequate consideration must be given to each of the essential areas.
1. Usefulness of particular topic/activities in contributing to the attainment of conceptual process, skill and specific objectives.
2. Relevance to significant human activities, problems and issues.
3. Reliability, authoritativeness, validity and up-to-datedness.
4. Adaptability in terms of students’ capabilities and backgrounds.
5. Usefulness in planning and organizing instruction, in generating question and learning activities and in making applications in a variety of situations.
6. Usefulness in explaining variety of phenomena and developing a sense of structure of environmental education.
7. Usefulness in developing skills and modes, methods and processes of inquiry.
8. Usefulness in developing competence in clarifying values, attitudes, and value-laden issues and problems.
9. Availability of content in textbooks and of audio-visual and other teaching resources.

Course Content of Environmental Education
The course content of environmental education is as follows:
1. Introduction – What is environmental and sustainable development (definition)
2. Issues in environmental problems and abuses.
3. Socioeconomic reasons for environmental abuses.
4. Alternatives clean technology for environmental safety
5. Designing environmental education programme.
6. Overview of models of prevention of environmental abuses.
The content should be taught sequentially for easy comprehension of students.

Education and Sustainable Development
Education about the environment and sustainability is interdisciplinary in nature and this must allow for multiple perspective. It must depend on collaboration across agencies and groups and presumes a lifelong path of learning that extends through all levels of formal education into a variety of non-formal settings. The task is to transform
prevailing mindsets to recognize the long-term limits that nature imposes and the need to nurture rather than jeopardize the ecological systems that support our activities (Smith, 1992).

Education for sustainability according to the North American Association (NAAEE) involves guidelines and a conceptual framework for environmental education. They are also organized around themes that are well aligned with the ideas of shaping education for sustainability. The sub-section on environmental education provides these guidelines and conceptual framework for environmental education. These guidelines help us to examine the general and specific objectives of environmental education. The specific objectives, in turn, influence the criteria for selecting course content of environmental education. The relevant content also influences methodology.

Nicholls and Nicholls (1978) stated that it is very difficult to separate content from method and to say where one ends and the other begins. It is necessary to observe that content and methods come together with the student and the teacher to provide the learning opportunity. Therefore, the learning opportunity is essentially a description of a planned and controlled relationship between students, teacher, material, equipment and the environment in which it is hoped that desired learning will take place (Oghenelomeno, 1997:215).

The synthesis or the assembling of the various parts of educational framework for environmental sustainability gives rise to a new and better whole and it involves:
1. The questioning and analysis of knowledge of environmental processes and systems,
2. Skills for understanding and addressing environmental issues,
3. Personal and civic responsibility.

It is this synthesis that becomes the feed back to the guidelines and conceptual framework for environmental education. Hence, the synthesis is the end of a cycle on education for environmental sustainability. Figure 2 provides the flows and linkages of education for environmental sustainability.
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Figure 2: Framework of Education for Environmental Sustainability

Source: Adapted by the Authors from Tom-Ekine (2011), Unpublished Research Work for Post-Graduate Diploma in Education (PGDE).

Conclusion

We observe that the challenges of sustainable development can be effectively handled through Environmental Education (EE). Indeed, the EE emerges as a result of human consciousness and awareness to confront specific global and environmental problems which affect the quality of human lives. Industrialization has relied on
massively increased energy usage, largely from coal, oil and gas. This has led to burning fossil fuels which release carbon dioxide into the atmosphere. Carbon dioxide (CO$_2$) can remain in the atmosphere for centuries (The Guardian, 2011:50). Thus, the CO$_2$ emission into the airspace has been the central problem in environmental degradation and global warming.

The multi-national oil companies in Nigeria have often given excuses for gas flare on the premise that Nigeria’s oil production would dwindle if the flares were put out (Ebiri, 2011:33). This view contradicts the role of technology in the development process. The role of technology is principally that of raising output from scarce resources (Desai and Potter ed., 2008:281). Environmental sustainability is an economic good and therefore is a scarce resource. The oil companies can adopt modern technology and increase oil production without compromising sustainable development.

The major task of Environmental Education (EE) is to transform this prevailing mindset of poor “social commitment” to environmental sustainability that have characterized the behaviour of private firms, especially oil companies in Nigeria. The study observed that this trend is a serious limitation to sustainable development in this country. People define their ‘needs’ in ways which effectively exclude others from meeting theirs and, in the process, can increase the long-term risks for the sustainability of their people’s livelihoods. This is exactly the situation of the Niger Delta’s people with respect to the destruction of their means of livelihoods.

We recommend that the Federal Government of Nigeria should resolve all issues of environmental degradation in this country, especially in the Niger Delta. This implies most importantly, however, a revisit of the controversy associated with all the processes, including the Petroleum Industry Bill (PIB) currently before the sixth National Assembly, through which we enlarge our choices as a country, and reduce those of others. These processes are functions of the social institutions governing the use of resources and the systems of tenure that dictate the ownership and management of the natural resources. We also recommend that environmental education should be effectively utilized as means of providing necessary information about the environment so as to enable people to be much aware of how to handle environmental problems around them.

References

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