

SUSTAINABLE DEVELOPMENT IN NIGERIA: THE ROLE OF ENVIRONMENTAL SCIENCE EDUCATION

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Abstract

in the past few decades, Nigeria has been confronted with a number of unsustainable depletion of natural resources resulting to a mountain of environmental problems that has the potential of eroding earth's web of life (air, water and soil) and can also promote poverty. Efforts by government in promoting sustainable development have not yielded the expected results. The paper concludes that the incorporation of environmental science education into our educational curriculum whereby environmental issues are incorporated into the learning process of each generation will help to achieve the objectives of sustainable development-Keyword: Environmental science education, sustainable development, environmental degradation, awareness, unsustainable practices.

Introduction

The most serious long-term threat facing the world today is the danger of over exploitation of natural resources, which has produced irreversible harmful changes to the environmental conditions that support life on Earth. If this problem is not overcome, there may be no viable world for our descendants to inhabit. Environmentalists, social thinkers, ecologists and geographers through various conferences have advocated for a shift from technical and scientific solution to sustainable development approach (UNCHE, 1972, UNCED, 1992, DOE, 1994 and DEFRA, 2002). Today, worldwide the concept of sustainable development has been adopted as a policy by government especially after the declaration of the Earth summit called the United Nations Conference on Environment and Development (UNCED) that was held from June 3^R through June 14^I in 1992 in Rio de Janeiro, Brazil.

Definitions of the concept; sustainable development are many and varied probably because the concept is a mixture of language used by economists, environmentalist and social thinkers. World Commission on Environment and Development (1987) defined sustainable development as the development that meet the needs of the present without compromising the ability of future generations to meet their own needs. Singh and Titi (1992) defined sustainable development as a process of change in which the utilization of resources, the direction of investments, the orientation of technological innovation and exchange and institutional change reflect both future and present needs. Goodland and Ledoc (1987), defined sustainable development as a pattern of social and structural economic' transformation (i.e. development), which optimizes the economic and societal benefits available in the present, without jeopardizing the likely potential for similar benefits in the future.

Generally and at the practical operational level, sustainable development means that, production processes do not exploit the carrying and productive capacities of the natural resource base and compromise the quality of the environment, thus, limiting the options of the poor, the present and future generations. Sustainable development also involves the protection of the people's basic human rights and the freedom of the people to participate in the political, economic, social and environmental spheres of their communities and societies.

In Nigeria, environment indicators of unsustainable practices are palpable, for example, depletion of fishing and aquatic resources, depletion and degradation of forest resources; depletion and degradation of arable agricultural lands; water hyacinth proliferation, unemployment and underemployment, pollution of air, water and soil; gas Haze, Hooding and erosion, water supply/sanitation and desertification have been reported (NDES, 2003; World Bank Report, 1988; NDDC, 2001 and Ofomata, 1979). Social and economic indicators of unsustainable practices such as poverty, low-life expectancy, high death rate, high infant mortality and high level of unemployment have also been reported (Edozien, 1975 and Iniodu, 1997). Environmental degradation, resource depletion and species extinction impair the quality of life of future generation who rely on the quantity and quality of environmental resources available for production and consumption purposes. The and quality of environmental resources available for production and consumption purposes. The impairment of environmental functions leads to an undermining of economic development of future generations.

Accordingly, the Federal Government of Nigeria has made spirited efforts in reversing

unsustainable trends through numerous policies and programmes and the provision of infrastructures. One of such Nigeria's programmes is the establishment of the National Directorate of Employment (NDE). The core programmes of NDE include: Vocational Skills Development (VSD), Special Public Work (SPW), Agricultural Employment Programme (AEP), Small Scale Enterprises (SSE) and Mass Agricultural Programme (MAP). Each of the programmes has its sub-programmes or scheme. For instance, VSD has four schemes, namely; the National Open Apprenticeship (NAO), School-On-Wheel (SOW), Waste to Wealth, and Resettlement. Other programmes geared towards the alleviation of poverty in Nigeria are Poverty Eradication Programme (PEP), National Economic Empowerment Development Strategy (NEEDS), State Economic Empowerment Development Strategy (SEEDS). In the environmental sector, government in 1999, created the Federal Ministry of Environment. In addition government has also enacted numerous environmental laws such as Environmental Impact Assessment (EIA) Act No. 86 of 1992, Petroleum Act of 1969, Oil Pipelines Act No. 31 of 1956 amended Act 24 of 1965, Oil in Navigable waters Act 34 of 1968 and Petroleum Drilling and Production Decree No. 51 of 1969. The aforementioned regulations and laws are great towards ensuring environmental protection, resource conservation and community development.

Despite the introduction of all these programmes and enactment of these relevant laws in Nigeria, poverty and environmental degradation has continued to threaten the very existence of the Nigeria, evidence abounds, where ordinary citizens have dumped their solid waste refuse into gutters or open drains (even when hoppers or waster bins are provided). For example, in a study carried out in Lagos in 2005 to assess the success of Lagos Environmental Sanitation Authority and Malaria Control Project in Six communities of Surulere. Ajeromi and Mushin Local Government Areas, about 70 percent of the sampled 1403 respondents confirmed that they often dumped their refuse inside the gutters (CPH, 2005).

Empowerment for sustainable development requires giving to the people the true capacity to cope with the changing environment, for increased social awareness, higher levels of social and economic participation and the utilization of new insights in ecological processes of change and self-renewal. Onokerhoraye (1995), is of the view that the single most important activity that will enhance environmental management and sustainable development in the medium to long term is to raise well informed future generations with a strong commitment to sustained management of natural resources. It is now widely recognized that human resources development plays an integral role in the overall development process. The purpose of this paper is to examine the role of environmental science education in the process of achieving sustainable development in Nigeria. In examining this, the paper considers a number of issues: (i) the meaning of environmental science education, (ii) how can environmental science education be used as a vehicle for examining sustainable development and (iii) do current trends in the education systems enhance or mitigate against the achievement of sustainable development?

Defining Environmental Science (EE)

What then do we really mean when we talk of environmental science education? While the concept of environmental science has existed for centuries, it came alive as a substantive active field of scientific investigation (environmental science education) in 1960s and 1970s, driven by (a) the need for a large multi-disciplined team to analyze complex environmental problems, (b) the arrival of substantive environmental laws requiring specific environmental laws requiring specific environmental protocols investigation and (c) the growing public awareness of a need for action in addressing environmental problems. According to the Tbilisi Declaration (TICEE, 1977), environmental science education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments and skills to work individually and collectively towards solutions of current problems and the prevention of new ones.

The Goals of Environmental Science Education

Environmental science education is generally concerned with the development of skills, knowledge and motivation necessary to make informed decisions about environmental issues. Environmental science education teaches the citizenry to do what is right. But to do what is right is not easy if one does not know the value scale of what is right and what is wrong. Environmental science education is not a passive process. The goals of environmental science education as outlined by the 1977 Tbilisi Intergovernmental Conference on Environmental Education is as follows: Awareness; to help social groups and individuals acquire an awareness and sensitivity to the total environment and its

allied problems and/or issues.

Sensitivity; to help social groups and individuals gain a variety of experiences in and acquire a basic understanding of the environment and its associated problems and/or issues.

Attitudes; to help social groups and individuals acquire a set of values and feelings of concern for the environment improvement and protection.

Skills: to help social groups and individuals acquire skills for identifying and solving environmental problems and/or issues.

Participation: to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems and/or issues.

Principles of Environmental Science Education

Environmental Science Education must Involve Everyone: because of its very nature and importance, environmental education cannot be confined to any one group in our society. It is a responsibility for everyone - government, industry, the media, and educational institutions, community groups ~ right down to the level of the individual.

Environmental Science Education must Provide Lifelong information: This is so because environmental problems are forever improving, as we learn from our past experience and mistakes. As we develop and apply better environmental technologies, the ability of society and individuals to respond effectively also improves. In order to move closer to achieving sustainable development we need to continually refresh the knowledge and skills, which they apply to the environmental challenges, we face. Just as work place learning and retaining are essential to continued productivity, the same is true of environmental education, whether in formal and non-formal settings, **Environmental Science Education must be Holistic and about Connections:** In order to address environmental challenges, we need people who think broadly and who understand systems, connections, patterns and cause. The challenges themselves frequently have social, scientific, cultural, economic and ethical aspects all of which must be considered for their effective management. Specialist discipline-based knowledge, while contributing critically is no longer essential. Meeting this need presents a dilemma to the formal education systems over whether environmental science should be taught as a separate subject or incorporated into one or more particular subject areas. The right answer may vary from situation to situation, depending on what is most practical - suffice to say, a much stronger re-orientation of all relevant areas of formal education towards issues of sustainability is required. Equally important is the need to establish better communicative links between those people working on or learning about, similar or related environmental issues, but who come from different professional or disciplinary backgrounds. Better grounds for communication and partnerships are also required between formal and non-formal education settings and between various groups with competing interests on environmental issues.

Environmental Science Education must be Practical: One of the most fundamental defining characteristics of effective environmental education is that it must lead to actions, which result in better environmental outcomes, not simply the accumulation of education.

Environmental Science Education must be in Harmony with social and Economic

Goals: Effective environmental science education must also encourage the pursuit of environmental goals in harmony with other powerful and legitimate social and economic goals - it should not be taught in a vacuum, or simply equip people to pursue an agenda on the margins of society.

Components of Environmental Science Education

Environmental science encompasses issues such as climate change, conservation of natural resources, biodiversity and deforestation, groundwater, water and soil contamination, waste management, sustainable development, air pollution, energy conservation, noise pollution, declining fisheries, ozone layer depletion and trade in endangered species. Some of the areas of knowledge which environmental science education must deal with however are:

- The planet earth as a finite system
- The resources of the earth, particularly air, soil, water, minerals, their distribution and their role in supporting living organisms.
- The nature of ecosystems, their health and interdependence within the biosphere.
- The dependence of humans on environmental resources for life and sustenance.
- Sustainable development within the environment.
- The implications of resources distribution in determining the nature of societies and the rate

and character of economic development.

- The role and values of science and technology in the development of societies and the impact of technologies on the environment.
- The interconnectedness of present political, economic, environmental and social issues. And
- Processes of planning, policy making and acting to solve problems

The interrelationships that contribute to the study of environmental science are presented in Fig. 1:1

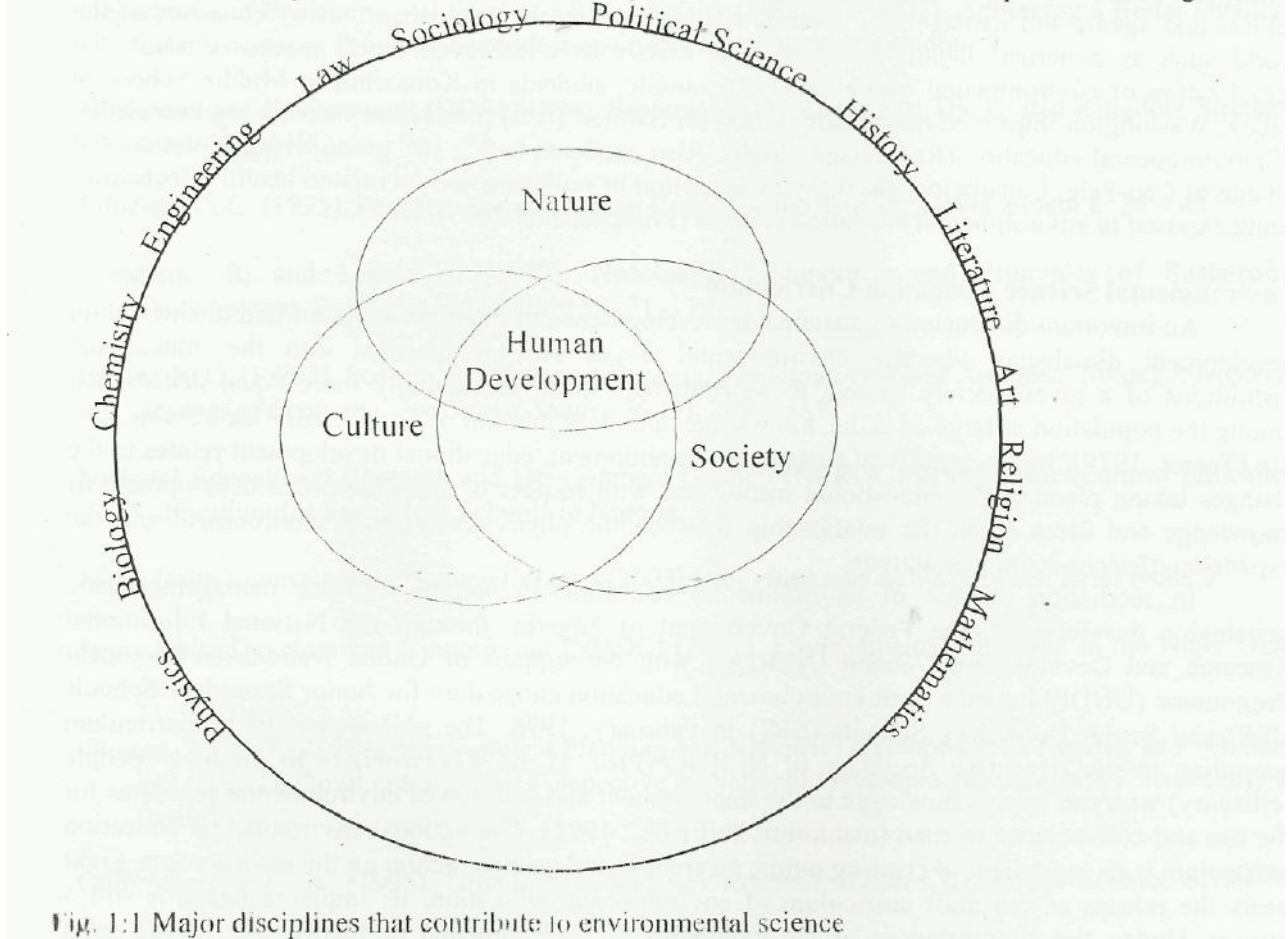


Fig. 1:1 Major disciplines that contribute to environmental science

Educational System as a Vehicle for Sustainable Development

Since development is an ongoing process relating to the needs and aspirations of successive generations, sustainable development is not a fixed target which when achieved is then forgotten. Sustainable development is dynamic or intertemporal process, which must be assessed by successive generations. Combating the environmental challenges caused by development requires the active participation of all through the process of education; The 1997, UNESCO statement: Educating for a Sustainable Future: A transdisciplinary vision for concerted action state: It is widely agreed that education is the most effective means that society possesses for confronting the challenges of the future. Indeed, education will shape the world of tomorrow.

Also at the Earth Summit in Rio de Janeiro, Brazil in 1992, 150 nations endorsed Agenda 21 document. Chapter 36 of Agenda 21 specifically focused on the role of education in promoting public awareness and training in achieving environmental decision-making. In it, {UNCED, 1992), world leaders asserted that:

Education is critical for promoting sustainable development and improving the capacity of people to address environmental and development, environmental and ethical awareness, values and **attitudes**, skills and behaviour consistent with sustainable development and for effective public participation in decision-making.

The educational system is therefore expected to provide for the preparation and training of skilled human resources to manage the economy, to facilitate, by means of trained personnel, the generation and advancement of knowledge in pure and applied fields and to perform a consciousness - raising function with respect to the social, cultural, political, economic and physical environment. In effect, the educational system should prepare person to be innovators, logical thinkers, problems solvers and agents and managers of societal change. During (he last decade, many countries of the world such as America, Japan, Australia, and Russia have achieved much success through the actualization of environmental education. For example, students in Komochin in Middle School in Lacey, Washington improved the spawning bed for Salmon (fish) production through the knowledge of environmental education (Rasmussen, 2000). Also, students in 9th, 10th grade living in the coastal village of Cap-Pele, Canada increased their conception of pollution and its related health effects after being exposed to environmental education courses (Pruneau, et al 2005).

Environmental Science Education Curriculum

An important dimension of sustainable development can therefore be identified: a curriculum development dimension whereby environmental issues arc incorporated into the educational institutions of a given society so that these contribute to an increasingly more equal distribution among the population at large of skills, knowledge and ideas thought of as necessary for a prosperous life (Torres, 1979). In the context of sustainable development, educational development relates to the changes taking place in the educational institutions with respect to the widespread development of knowledge and ideas about the relationship between the physical/ecological environment and the expansion of socio-economic activity.

In retaliation of role of environmental education in natural resource management and sustainable development, the Federal Government of Nigeria, through the National Educational Research and Development Council (NERDC) with the support of United Nations Development Programme (UNDP) issued a draft environmental education curriculum for Junior Secondary Schools (JSS) and Senior Secondary Schools (SSS) in February, 1998. The philosophy of the curriculum according to the Executive Secretary of NERDC (Prof. U. M. O. Ivowi) is to produce "people (citizenry) who can apply knowledge to the improvement and solution of environmental problems for the use and convenience of man (mankind)" (NERDC, 1998). The national environmental education curriculum is an ingredient of creating public awareness and positive action on the environment. Eight years the release of the draft curriculum of environmental education, its implementation is still a mirage. Under, the circumstances of the mountains of environmental problems (poor urban solid waste management, water hyacinth proliferation degradation of arable agricultural land, depletion of fisheries and forest resources, etc) in Nigeria, the need of creating environmental awareness and raising well informed future generations has become an urgent challenge. Our major focus is on suggesting to the providers of formal education to as a matter of urgency start the immediate implementation of national environmental science education curriculum.

Recommendations

It is therefore, recommended that:

1. The providers of formal education should review the draft environmental education curriculum for Junior and Senior Secondary Schools in Nigeria for the purpose of its implementation.
2. The Federal Ministry of Environment should as a matter of urgency embark on the aggressive campaign for environment protection.

Conclusion

Socio-economic development has placed particular pressure on the country's natural resources bases: agriculture, mining, forestry etc. Evidence abounds of unsustainable degradation of the nation's natural resources. The foundations of sustainable development are built on the way we think, the values we hold and the decisions we make. It cannot depend on just the technology available to us, the nature of our environment, or the policy instruments at our disposal. A public that is educated about the need for sustainable development is essential to achieving sustainable development.

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