

ENVIRONMENTAL EDUCATION: IMPLICATIONS FOR BIOLOGY EDUCATION IN NIGERIA.

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Abstract

The environment is defined as the physical, chemical and biotic conditions surrounding living organisms (plant and animals). The environment consists of the atmosphere, (air) the lithosphere (land, hills, rocks, soil etc), the biosphere (fauna (animal), flora (plant life), the hydrosphere (water) as well as the socio-culture aspect of environment which include people's belief, customs etc. Environmental education is the process of acquiring or transmitting knowledge, attitude and skills for the sustainable use of natural and man-made resources. The reasons for the importance of the environment are as follows: good health, aesthetics, to ensure security, for human development, to prevent pollution of air, land, water as well as to avoid erosion and flood. There are many problems affecting human health due to environmental degradation such as climate change, Ozone (O₃) layer depletion and global warming. In order to control environmental degradation, the Biology curriculum must be reviewed with more emphasis on conservation of natural resources, prevention of environmental degradation and various ways of controlling environmental pollution. The Biology teacher should make use of new teaching methods and techniques such as demonstration, guided and unguided discovery method, field trips., problem - solving technique, concept mapping, laboratory method as well as value clarification technique. There is also need to review biology resources making use of both human resources and material resources such as real objects, audio-visual aids, written or printed materials such as adequately written biology textbooks/ science journals, biology posters, charts, projected and non-projected aids for effective teaching and learning of biology in Nigeria as well as application of biological knowledge in solving problems especially environmental problems.

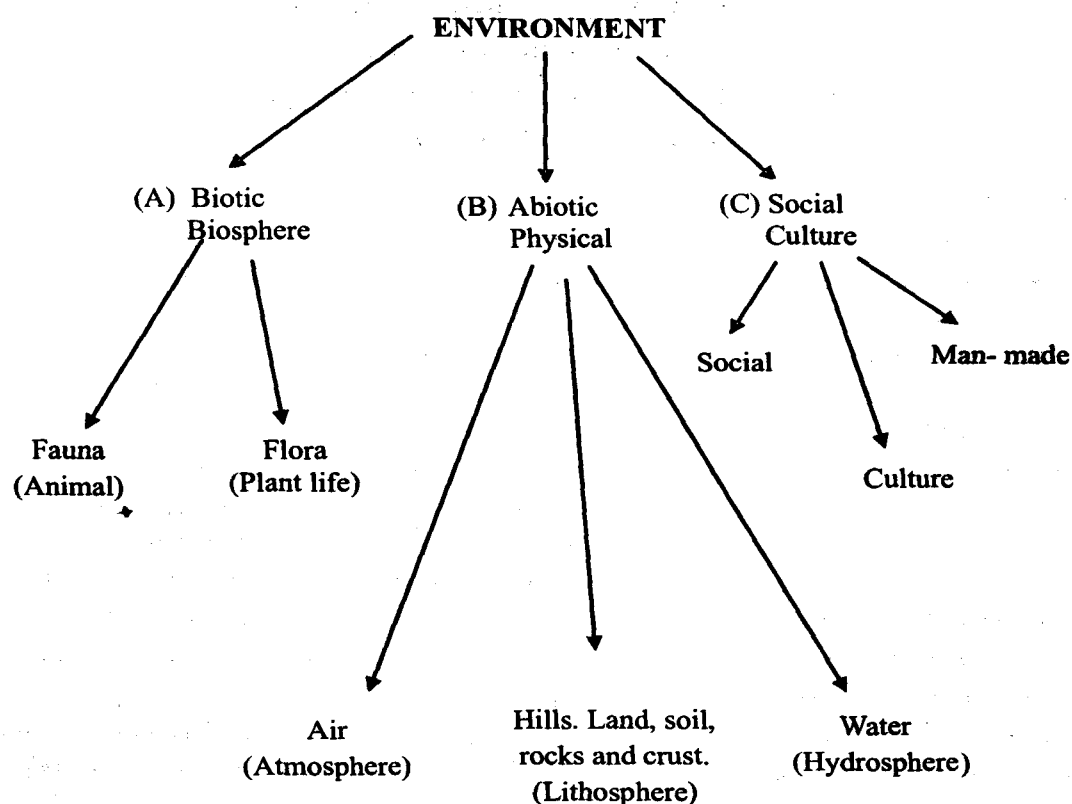
Introduction

United National Environmental Programme (UNEP, 1988) defined environment as the total outer physical and biological system within which human beings and organisms live. It is a whole complicated system with many interacting components. In other words,

environment is physical, chemical and biological conditions surrounding a living organism. The environment consists of the atmospheric compositions and processes, terrestrial ecosystem such as soils, lands, forests, mountains and agricultural land, coastal lands and its geological and hydro-geological

dimensions. It also includes human activities that interact with and affect the physical environment example of which includes agricultural activities, industrial activities, transportation, human

population and settlement, energy systems as well as peace and war. The various components of the nature of environment mode is represented below:



Nature of Environment Model (Olagunju, 2002)

According to Olagunju (2002), the social-cultural environment refers to the customs, belief, social instrument, political systems and man-made environment or physical structure constructed by man (for example, fixed / movable machinery, building etc.). In essence, environment depicts all the surroundings that are capable of affecting the behaviour, growth and development of the interacting living organisms within the system. A clear and healthy environment has been ranked first out of

ten basic human needs namely a clean and adequate supply of water, simple clothing, food, healthcare, simple housing, energy requirements, total education, spiritual and cultural needs (Connect, 1990). From the above, all the other basic human needs have direct and indirect bearing to the environment. Hence, Rodda (1993) stated that environment and human health are inevitably inter-linked and a healthy environment is essential to the health and well being of the planet (earth) and its

inhabitants who depend on it for the air they breathe, the water they drink and the food they eat.

Olagunju (2002) explained that the term education refers to the act of impacting or acquiring knowledge, skills and attitudes to prepare a person intellectually for a profession or a stated goal. It involves a system of training and instruction. Environmental education is the education about the environment and has been defined in several ways by educationists and environmentalists. Okebukola (1993) defined environmental education (EE) as the process of acquiring and transmitting knowledge, attitude and skills for the sustainable use of natural and man-made resources. According to Stapp (1969) as quoted by Ene (2012), environmental education is a process aimed at producing a citizen that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems and motivated to work toward their solution.

The major objectives of environmental education according to Ene (2012) are to help individuals acquire the following:

- 1) A clear understanding that man is an inseparable part of a system: the system consisting of man, culture and the biophysical environment and that man has the ability to alter the inter-relationships of this ecosystem.
- 2) A broad understanding of the biophysical environment both natural and man-made and its role in contemporary society.

- 3) A fundamental understanding of the biophysical environmental problems confronting man, how these problems can be solved and the responsibility of the citizens and the government to work toward their solutions.
- 4) Attitudes of concern for the quality of the biophysical environment which motivate citizens to participate in biophysical environmental problem solving.

The Tbilisi conference on Environmental Education (EE) and its declaration in (1975) as quoted by Adara (1993) defined (EE) as a process aimed at developing a world population that is aware of, and concerned about the total environment and its associated problems. (EE) Environmental Education provides the knowledge, attitudes, motivations, commitments, skills to work individually and collectively towards solution of current problems and the prevention of new ones. Tbilisi (1977) as quoted by Ene (2012) had five categories of EE objectives namely: awareness, knowledge, attitudes, skills and participation.

Awareness is to help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allied problems. Knowledge is to help individuals and social groups gain a variety of experiences within the total environment and to acquire a basic understanding of the environment, its associated problems and humanity's critical responsible presence and role in

it. Attitudes to help individuals and social groups to acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement. Skills category to help individuals and social groups to acquire the skills for working towards the solution of environmental problems and to foster a dialogue between these groups. Participation is to help individuals and social groups develop a sense of responsibility and urgency regarding environmental problems in order to ensure appropriate action, to help solve these problems and avoid future environmental problems.

UNESCO (1978) in Ene (2012) defined environmental education as a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations and commitments to make informed decisions and take responsible actions. UNESCO (1978) in Ene (2012) further stated the following principles of EE as follows:

- 1) Consider the environment in its totality-natural, technological and social (economic, political, cultural, historical, moral and aesthetics)
- 2) Be a continuous lifelong process,
- 3) Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective.

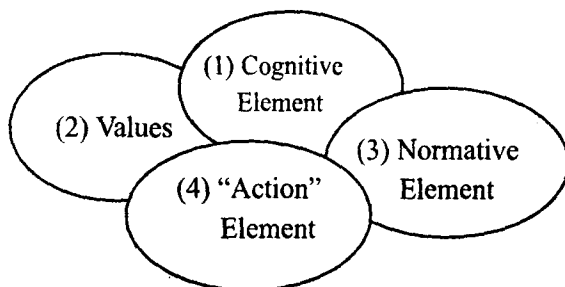
- 4) Examine major environmental issues from local, national, regional and international point of view.
- 5) Focus on current and potential environmental situations.
- 6) Promote the value and necessity of local, national and international co-operation in the prevention and solution of environmental problems.
- 7) Explicitly consider environmental aspects in plans for development and growth.
- 8) Enable learners to have a role in planning their learning experiences
- 9) Relate environmental sensitivity. Knowledge, problem-solving skills and values-clarification to every age.
- 10) Help learners discover the symptoms and real causes of environmental problems.
- 11) Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills.
- 12) Utilize diverse learning environments and a broad array of educational approaches to teaching and learning about and from the environment with due stress on practical activities and firsthand experiences.

Furthermore, Palmer (1998) in Ene (2012) gave another definition of EE (Environmental education) that slightly differs from the definition of EE already giving above. She defined EE as " the

process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings". This

author is of the view that environmental Education should not cover only physical environment but should include mental, emotional and social environments.

A model of environmental education



Source: Klimov and Ukolov (1994) in Ene (2012)

Elements of environmental education by Klimov and Ukolov(1994) in Ene (2012) consist of cognitive element, values, normative element and "action" element. The cognitive element assumes fundamental knowledge about the infraction of man and the environment, basic understanding of the aims and goals of natural conservation process, and global environmental problems and the various the ways of solving them. Values include understanding of the value of the environment itself (cognitive, ethical and practical values),the ability to manage human activities within the environment and to foresee the possible changes in the environment as the result of these activities at different levels. The normative element presupposes the ethical, aesthetical and ecological norms of the behaviour patterns for individuals, groups and society in the environment. The "action" element assumes the activities and methods directed toward the development of cognitive, practical and behavioural ecological skills (and

ability to evaluate the situation, the choosing of the solution and the development of personal features of the student).

Furthermore, Noibi and Lawal (1991) quoted Schimieder (1977) and summarized the various definitions of EE (environmental education) as: education from the environment to (experiences learnt from the environment), education about environmental (teaching about the environment), education for the environment commitment to environmental protection and conservation for sustainable development). Therefore, any form of education (biological inclusive) should aim at assisting an individual in acquiring experiences and knowledge reasons namely: to ensure our security, prevent, insects/ animals/ pests bites, prevent pollution (air, water, radio-active, noise and thermal pollution);prevent diseases ,promote our

health, prevent flood/ erosion, prevent accident, enhance social standard/ prestige and ensure aesthetics/ beauty of our environment.

The importance of environmental education (EE) in Nigeria

According to Olagunju (2002) man's daily activities are carried out within his environment. However; as these activities increase, the pace of environmental degradation accelerates. The various causes of this environmental degradation include: growth of human population, scientific and technological advancement, diminishing forest caused by deforestation without adequate reforestation, loss of fertile soil due to soil erosion/ flood, industrialization, depletion of material and power resources, urbanization (migration of people from rural to urban areas), extinction of certain living species/ loss of biodiversity) flora /plant life and faunal (animals) as well as pollution of air, land and water.

According to Ezedum (2012) city populations are growing faster than city infrastructure can adapt in Nigeria. The situation has been worsened by the romance of the political class with corruption which hinders greatly the deployment of public resources to infrastructural development. The rural dwellers are often not better off. They are often forced to move to the cities in search of greener pastures. However, more often than not the rural migrants end up not finding the opportunities they are looking for, but become part of the urban poor. These urban poor face the serious challenges of lack of housing,

infrastructure services and property rights. Such dwellers, to make up for the lack of available homes, step up shelters on city outskirts, usually on public owned lands. Such lands tend to be dangerous and not habitable since they are usually flood plains, river banks, steep slopes, and reclaimed lands (Youthink, 2012). The urban poor often live without electricity, running water and other municipal facilities and services. Furthermore, the fact that they do not own the land they live on denies them necessary collateral for sourcing credit. The absence of healthy environment of course makes them vulnerable to diseases. The other challenges of urbanization include worsening air quality and traffic. These are natural fall-outs of overcrowding and industrialization. It is estimated that each year one million people die of air pollution, while 1.2 million people die of urban traffic accidents in developing countries (WHO, 2012)

The health challenges associated with urbanization especially in the developing countries has earlier been noted by ISUH (International Society for Urban health, 2009). According to them, the health of slum dwellers is typically well below that in other urban and rural areas, even when stratified by poverty level. On the social and economic fronts ISUH (2009) observed that settlements without legal status and services can become focal points for social tensions, conflict and illicit economic activity. Furthermore, apart from the challenges facing the urban poor, the current challenge of global

warming owes its origin partly in the industrial activities and automobiles associated with urbanization. These encourage the burning of fossil fuels leading to the liberation of greenhouse gases with the consequent global warming.

According to Aniodoh (2001) pollution has been severally defined. In general, it may be viewed as something wrong in the wrong place in the wrong time and in the wrong quantity. The environment is considered polluted when it is altered in composition or condition directly or indirectly as a result of the activities of man so that it becomes less suitable for some or all of the uses for which it would be suitable in its natural state. In a nutshell, pollution is something undesirable because it affects human beings and their resources. Man's activities in his environment are largely responsible for environmental pollution. The following types of pollution have been identified namely are air, water and land pollution. Others include indoor, noise, radioactive and thermal pollution.

Air pollution may be defined as the presence of some contaminants such as dust, smoke, aerosols among others in the outdoor atmosphere which interfere with good helpful living. Smoke, dust, aerosols and gaseous particles are important sources of air pollution. Air pollution generally causes damage to organisms and buildings. For example, inhalation of dust can lead to lung disease which may lead to early death. Accumulation of dust on buildings is capable of changing to colour of such

buildings. Sources of indoor pollution include wood combustion, cigarette smoke, house dust and emission from kerosene heaters. Smoke from cigarette smokers are known to suffer from cancer and other complicated lung diseases.

Water pollution occurs when water changes in quality such that it is unsafe for human use or other purposes for which it would normally serve. Domestic, agricultural and industrial wastes are among many sources of water pollution. Drinking of polluted water can be hazardous to man and it can cause cholera typhoid fever and other water borne diseases.

Land pollution has been defined as the introduction into the soil of undesirable materials such as solids or liquids, which interfere with its sustenances of plant or animal life like water pollution, domestic, agricultural, industrial and municipal activities of man contribute to land pollution.

Noise is an unwanted sound and can impair hearing resulting to deafness. Thermal heating occurs when a body of water is heated due to activities of man. Such undesirable condition has adverse effects on aquatic plants and animals. Radioactive pollution occur when a radioactive element such as uranium or plutonium spontaneously emits dangerous radiations from its nucleus. Radiations from chemicals cause sever burns and death. Pollution affects man both directly and indirectly and in some cases death occur. Pollution control can be achieved through education, emission control devices, provision of industrial zones, recycling

and legal sanctions (Aniodoh, 2001).

If this environmental degradation (e.g global warming, Ozone (O_3) depletion climate change) is not adequately controlled/arrested in time, it can lead to a catastrophe. Thus, the need to have environmentally conscious citizens who can save the environment from disasters become inevitable. If people (including pupils, students) are knowledgeable about their environment, the associated problems, subsequent solutions and are motivated or inspired for actions, the situation would eventually change for the benefit of both present and future generations. Therefore, education is one of the tools in the society for dissemination of knowledge, skills and inculcation of good environmental attitudes.

Olagunju (2002) pointed out that EE (environmental education) is not a new discipline but a new dimension in the educational system concerned with conservation of natural resources and ecological studies in order to check environment degradation. In summary, EE is expected to be beneficial to the community for maintaining good health, conservation of natural resources, maintaining checks on environmental degradation, for example erosion, flood and pollution among others; controlling population growth and for sustainable development in Nigeria

Implication of EE for Biological Education in Nigeria

According to Ajewole (1998)

biology which is the study of living things (plants and animals) in their environment aims at helping the students to acquire appropriate skills, abilities and competencies that would enable them contribute to the development of the society. Ecology, an aspect of biology taught in schools, deals with the interrelation among plants, animals, and their non-living environment (Reynolds, 1998). The study of ecology reveals the influence of human activity in altering normal ecological relationships, creating new habitat (s) or to downgrade and destroy old ones; the biological consequences of pollution, waste disposals, pesticides' use and misuse etc.

Osisoma (1994) pointed out that literature review has revealed that the teaching and learning of Ecology in Nigerian schools had experienced a lot of problems as biology teachers and students find it difficult to teach and learn it. This might be due to the intrinsic nature of Ecology which has been shown to involve relationships among concepts of widely disparate degrees of concreteness and abstractness (Waheed and Lucas, 1992).

Olagunju(2002) emphasized that due to environment degradation, the need arises to teach Ecology in a way that reflects the nature of the subject basically through problem-solving and other practical approaches based on the interaction between living things and their environments. This calls for Biology curriculum review to re-orient the content areas to its relevance to students' personal lives, and subsequent application to resolve environmental

problems in their communities. Generally, this has implication for curriculum planners to review the curricular objectives and contents, as well as teaching methods. New biology learning resources and evaluation techniques should be adopted in order to foster in biology students and teachers a greater depth of understanding of the content area and to inculcate in them appropriate environmental attitudes which can enhance their commitment or motivate them to inherent or acquired skills in solving related environmental problems. Through this. They can work individually or collectively towards solution of current environmental problems (for example, biodiversity conservation) and prevention of more environmental degradation.

Conclusion

Environmental Education (EE) must be an integral part of the nation's educational system aimed at building up the environmental ethic- an ethic concerned with both contributing to public well-being and insuring the survival of our plant (earth) and the people therein. By communicating about the environment, we would be strengthening and expanding our national efforts towards sustainable development.

Recommendations

- 1) The following recommendations are very pertinent for effective and efficient environmental education for sustainable development in Nigeria namely: the government should among other things,

- 2) Prepare or update national strategies for environment and development of education as soon as possible
- 3) Ensure that every school is assisted in designing environmental activity work plans.
- 4) Ensure that all sectors of society, such as industry and universities include an environmental management component in all training activities
- 5) Develop a service of locally trained and recruited environmental technicians and experts able to provide local people and communities with the services they require
- 6) Enhance the ability to access, analyze and effectively use information and knowledge available on environment and development.

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