IMPACT OF HUMAN PRODUCED AIR POLLUTION ON ATMOSPHERIC COMPOSITION: NEED FOR ENVIRONMENTAL EDUCATION

Dr. (Mrs.). RABI MUHAMMAD (MSTAN)

ABSTRACT

In this paper an attempt was made to look into the issue of human produced air pollution and its effect on the natural heat balance. Over population, deforestation desertification, pollution and the issue of waste heat which warms up the environment were identified as factors that contribute to climate change. Environmental education which provides individuals with the knowledge and awareness of environmental challenges was emphasized. It was recommended among others that everyone, adults, youth and children should be prepared through education to recognize their environmental responsibilities with the view to improving the use and care of the environment.

Introduction

Living organisms everywhere interact with their non-living surrounding. That is they interact with their environment. It is an interacting set of physical, chemical and biological systems. Powerful earth systems influence human lives and humans alter the earth systems greatly. An understanding of human-earth relation is therefore part of our challenges. For example an understanding of how the solar energy influence the distribution of trees, soils, climate and lifestyles. An understanding of how natural system affects human population and in turn what impact are humans having on natural systems. This is essential to human survival for man must understand the earth's present status and its possible future. Defining the importance of earth's future enables man to work towards sustainable future.

Over the years, man has struggled to survive and maintain himself by utilizing his environment and its resources. Man's demand for energy has resulted to extensive mining and pumping of oil and natural gas. These energy sources have greatly expanded man's manufacturing potentials. They also brought about pollution which endangers the health of both man and his environment. It also resulted in the generation of waste heat which further affects the quality of the atmosphere by warming up the environment. According to Christopherson (2009) the signs of severe environmental distress are all

around us. Unsustainable practices are woven deeply into the fabric of modern life. Land degradation threatens food security, forest destruction threatens biodiversity, water pollution threatens public health and fierce competition for fresh water may well become a source of conflict and wars in the future.

A sense of environmental responsibility is therefore essential for human survival. Education ensures enlightenment. It takes an educated person to visualize the workings of the laws of nature. School must make real attempt to maximize learner's potentials and awareness of global situations. This makes environmental education a vital environmental awareness raising methodology. Environmental education is a learning process that increases people's knowledge and awareness about the environment and its associated challenges (Achimugu, 2010). It entails acquiring knowledge of current and future environmental problems.

The Environment

Human beings live and interact with the environment. According to Asoegwu (2008) the environment means the totality of the landscape which includes the natural settings in which we live. It comprises of the grasses, the forest, the rivers, lakes, living things- the animals and plant, the air, the soil, in short everything that we come into contact with.

The environment consists of four major components. These are -

The atmosphere which is a layer of air surrounding the earth's surface.

The biosphere which is the portion of the earth that is capable of supporting life. It is the area in which physical and chemical factors formed the context of life.

The lithosphere: this is the portion of the earth's crust made up of solid materials. It includes rocks, soil and sand that make up the land.

The hydrosphere which is the region of earth that contains its water. Water exists in all three states, liquid, solid and gaseous form. This includes the oceans, lakes, rivers as well as underground water cloud in the air, show etc.

The Atmosphere-Composition and Function

The atmosphere is a thin gaseous veil surrounding the earth's surface. The principal substance of the atmosphere is air which is the medium of life as well as a major industrial and chemical raw material. Air is a simple mixture of gases that is naturally odourless,

colourless, tasteless and formless, blended so thoroughly that it behaves as if it were a single gas (Chistopherson, 2009).

The earth atmosphere behaves like an enormous cell membrane. The membrane around a cell regulates the interactions between the cell's delicate inner workings and the potentially disruptive outer environment. Each cell membrane is selective as to what it will allow to pass through. The atmosphere acts as the earth's protective membrane. it filters sunlight reaching the earth, affects climate and is a reservoir of several elements essential for life.

The Earth Heat Balance

The earth is one of the nine planets in the solar system. Its surface according to Christopherson (2009) is a vast area of 500 million square kilometers (193, million square miles).

In the solar system, the sun is the only source of energy. The sun loses energy by radiation to the rest of the solar system. Only a small fraction of the sun's total energy falls on earth. For the surface of the earth to remain at an average constant temperature, the earth must either re-emit all of the radiant energy back to space or else store part of the energy in some form which does not heat its surface. This stored energy is a form of potential energy which can eventually be used for doing work.

In the natural cycle of events almost all energy eventually get reconverted to heat and lost again to space. Thus solar radiation and those other forms of energy secondarily produced such as winds, falling water and chemical energy trapped by photosynthesis will all eventually be dissipated to space as heat. It is this heat which determines the surface temperature of the earth. Man's use of this heat as source of energy cannot affect the natural heat balance. However, if the demand of heat is increased for some reasons, the temperature of the earth's surface will also increase.

Human Impact on the Environment

Human activities such as urbanization, industrialization and other scientific and technological practices have generated and continue to generate different forms of waste in the environment. These wastes are usually in form of solid, liquid, gas, heat, toxic and radioactive substances. These substances have the potentials of seriously damaging the environment. That is they are all capable of polluting the environment pollution, according to Okoli and Nzewi (2010) is the contamination of earth's environment with materials that

could be detrimental to human health and interfere with the quality of life or the natural functioning of ecosystems. That is when wastes are produced in large quality such that they are let in the environment to an extent that they cannot be effectively taken care of by natural processing, then the environment is regarded as being polluted. Taylor, Green and Stout (2005) defined pollution as the release into the environment of substances or energy in such quantities and for such duration that they cause harm to people or other organisms or their environment.

When harmful substances are released into the environment at rates which exceed the capacity of natural restorative processes to handle, that environment is polluted. Pollution can take place in all aspects of the environment.

Okoli and Nzewi (2010) classified pollution into three major types. These are:-

Water pollution caused by sewage, industrial wastes and agricultural chemicals such as fertilizers and pesticides.

Air pollution caused by Smog – a smoky mixture of carbon monoxide and organic compounds from incomplete combustion of fossil fuels such as coal and sulphur dioxide.

Solid/land pollution caused by a build-up of toxic chemical compounds, salts, pathogens (disease causing organisms) or radioactive materials that affects plants and animal life.

Human – Produced Air Pollution

The atmosphere acts as an efficient filter absorbing most harmful radiation changed particles and space debris so that they do not reach earth's surface. Thus maintaining the natural balance. Changes in the atmospheric composition affect the weather climate and organisms.

Evidence from around the world suggests that global climate is already changing as a result of human actions (Global warming). According to Christopherson (2009) scientific experts have concluded that climate change is occurring and humans are contributing.

The amount of atmospheric dust or particulate matter are thought to be increasing because of man's activities such as plowing, bulldozing, industry, logging, bombing, burning large quantities of fossil fuels or generating electricity from unnatural sources such as nuclear or thermonuclear reactors. According to Christopherson (2009) no matter how energy is produced, there is always the problem of waste heat

which warm's up the environment, and this has become a global problem that has attracted global attention.

Important atmospheric pollutants include fertilizers and pesticides gases such as Chlorofluorocarbons (CFS) Sulphur dioxide (SOS) hydro carbons (HCS) and the oxides of nitrogen. Increasing levels of natural gases such as carbon dioxide and water in the atmosphere as a result of human activities can also be considered as a form of pollution. Carbon dioxide and water vapour both transmit sunlight and thus their presence in the atmosphere does not significantly affect the amount of energy reaching the earth's surface. But the energy re-radiated from the earth as heat is readily absorbed by $C0_2$ and $H2_0$. Instead of being re-radiated into space, this heat is trapped into the atmosphere warming the earth's surface. This is known as the green house effect. Green house is a glass panel house that is used to grow plants. It works by trapping heat from the sun. The glass panels of the green house let in light but keep heat from escaping. This causes the green house to heat up much like the inside of a car parked in the sunlight. This keeps the plants warm enough to live in winter.

Carbon dioxide and water work in the same way being transparent to incoming short-wave radiation from the sun but absorbing strongly the long wave radiation warming the lower atmosphere which in turn radiates energy back to the surface of earth. Due to various human activities carbon dioxide levels as well as other green house gases such as carbon monoxide, methane and chlorofluorocarbons (CFCs) are rising at an unprecedented rate and their increased presence may lead to an increasingly warmer surface environment.

Other human effects on the environment include ozone depletion. Ozone layer is a thick blanket of ozone gas which protects the earth from the intensely dangerous ultra violet (UV) radiation from the sun by absorbing much of the incoming short-wave radiation. It is produced in the atmosphere by the action of sunlight on oxygen molecules. According to Mansi (2010) during early 1980s scientists discovered a thin area or hole in the ozone layer of the atmosphere which has continued to widen. This thinning of the ozone (0_3) depletion is called ozone layer as a result of human activities which have increased the amount of ultra-violet (uv) radiation reaching the earth and that means more heat on the surface of earth. In humans ultra violet radiations can cause sun burns, blindness and skin cancer. Ultra violet radiation can also cause severe crop damage,

destruction of ocean ecosystems etc.

Need for Environmental Education

The biosphere, land water and air on which all organisms depend for survival are deteriorating rapidly as a result of growing human population coupled with increasing demand for resources needed in the maintenance of human comfort. Existing and future demands are threatening the ecological stability. Individuals must be helped to develop the required attitude and behaviour necessary for environmental sustainability. This underscores the need for environmental education. According to Achimugu (2010) education remains the best tool for providing the public with the understanding of the ramifications of their actions and behaviour. This makes environment education a vital environmental awareness raising methodology.

Wushishi (2006) in Obianke, Udo & Mohammed (2010) defined environmental education as the process of recognizing values and classifying concepts in order to develop skills and attitude necessary to understand and appreciate the intra-relatedness among cultural and biophysical surroundings. Hongerford and Peyton in Eguabor (2008) sees environmental education as a permanent process in which individuals and the community gain awareness of their environment and acquire the knowledge, values, skills, experience and the determination which will enable them to act individually and collectively to solve present and future environmental problems. Achimugu (2010) also emphasized that environmental education is a learning process that increase people's knowledge and awareness about the environment and its associated challenges.

Teaching environmental issues in education therefore is significant in building and moulding values of learner's at their most impressive age with the aim of nurturing an environmentally responsible citizenry. Specifically the aim of environmental education in Nigeria area –

To foster a clear awareness of and concern about economic social, political and ecological interdependences in urban and rural areas.

Providing every person with opportunities to acquire the knowledge, values, attitudes, commitments and skills needed to protect and improve the environment.

The objectives of environmental education as enumerated by UNESCO/UNCEP (1988) are –

Awareness and sensitivity to environmental challenges. That is individuals and social groups should acquire an awareness and sensitivity to the total environment and its associated problems.

Attitude of concern for the environment and motivation to improve environmental quality. That is enabling social groups and individuals acquire a set of values and feelings of concern for actively participating in environmental improvement and protection.

Skills to identify and help resolve environmental challenges

Knowledge and understanding of the environmental challenges. Individuals and groups to gain a variety of experience in and acquire basic understanding of the environment and its associated problems.

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

For these laudable objectives to be attained, teachers must receive adequate training in environmental issues. They must also learn to adopt effective and efficient methods of imparting such knowledge to their students.

Conclusion

This paper examined the impact of human produced air pollution on the atmospheric composition. Human explosive population growth coupled with wide spread utilization of energy have generated atmospheric additives and pollutants that upsets the ecological balance. Unless a general awareness of the nature of the problem is created man will continue to threaten the health of the biosphere that supports him. Environmental education for all citizens is therefore imperative as the task of expanding human consciousness on present and future environmental challenges is the domain of education.

Recommendations

It is recommended in this paper that –

General environmental education should be provided for all citizens with the view to producing an informed citizenry that will adopt the use of environment-friendly sources of energy such as solar, wind and hydropower as alternatives to fossil fuel.

Knowledge of environmental challenges will enable individuals

to adopt sustainable environmental practices with the view to meeting the environmental challenges and finding personal satisfaction.

Teachers should acquire adequate knowledge of the environment and the necessary skills for the effective delivery of such knowledge to their students.

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