

Chapter Thirteen

AFRICAN ECOLOGICAL CRISIS AND EDUCATION

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Executive Summary

The world is on the brink of an unprecedented growth-related ecological crisis that threaten the sustainability of humanity and the society. An ecological crisis occurs when changes to the environment of a species or population destabilizes its continued survival and existence. Man engages in different activities to the detriment of his environment which in return endangers his life. Unfortunately, man lacks awareness and knowledge of his environment. Using the method of critical analysis, the researchers discover that the major factors of ecological crisis include: pollution of air, land and water through excessive deforestation, industrialization, anthropogenic climate change i.e. global warming etc. Therefore, there is need to educate the people about its causes, consequences and prevention to avoid further destruction. Secondly, its education will help encourage people to use energy and water more efficiently and recycle household waste. Lastly there should be inclusion of ecological crisis and environmental education into the curriculum of the school system.

Keywords: Education, Environment, Ecological crisis, Environmental education

Introduction

The current and accelerating scale with which the global ecological crisis rises has resulted in species extinction, global warming and ocean acidification to climate change, radically threatening life on this planet. There is a crisis and we are the cause. Mankind has fallen into a mess of global problems (into a global ecological crisis) which endanger not only its welfare, peace, and development but its survival and mere existence as well. The Earth was created and beautified for man to live comfortably and enjoy nature.

Unfortunately, the activities of man in his environment has severally affected and endangered him. The increase in different technologies and inventions has its own contribution to the ecology. Global warming has already had observable effects on the environment, such as shrinking glaciers, earlier break up of ice on rivers and lakes, increased droughts, intensifying extreme weather and plant and animal ranges shifting, output of the sun to the effects of volcanoes. Without effective action to halt the burning of fossil fuels and reduce the levels of greenhouse gases released by human activity, humans and wildlife worldwide face an unwelcoming future. There will be increased disruptions to society from extreme weather, with more frequent flooding and storms, more severe droughts and heat waves, rising sea levels and warming permafrost. In many regions, the effects of water shortages and extreme heat will adversely affect agriculture and the effects on the natural world will be severe with a major loss of coral reefs as oceans warm and to tropical forests as fires become more frequent. These impacts will also be felt enormously in economic terms. The cost of doing nothing and continuing our trends will severely oppress world. So many

people lack knowledge about their activities and its irreversible effects on man and his future generations. Again, ecological crisis has resulted in rampant death, resulting to different diseases and health issues (Ajayi, P.O.S., 1998).

Therefore, it is very important that man is educated and enlightened about the consequences of his activities as well as possible means to checkmate and solve the current ecological and environmental problems, for if we do not change many of our destructive ways, the changes will rapidly, destructively and without discrimination be forced upon us by a degraded, unstable biosphere. We should empower our minds to the challenges our society and natural world face and discover the actions we can take today for a better tomorrow.

Causes/Factors of Ecological Crisis

According to Boyes, E., and Stanisstreet, M. (2011) these are the factors that contributed to ecological and environmental crisis and they include:

Environmental causes of ecological crisis include:

Overpopulation

We are facing a shortage of resources such as food, water and fuel to sustain the rising global population, particularly in developing countries. Intensive agriculture attempting to lessen the problem actually leads to more damage through the use of chemical fertilizers, pesticides and insecticides. Overpopulation (global population explosion) has a central role, since more people have a larger ecological footprint, consume more, pollute more, occupy more space from natural ecosystems, and emit more carbon dioxide through their activities. Overpopulation directly intensifies global climate change, global biodiversity crisis, deterioration of the global state of the environment, and

urbanization and reduces the extension of rain forests and natural habitats as well as the nonrenewable energy sources (fossil fuels, natural building materials, stock of water).

Pollution

Pollution of the air, water and soil caused by toxins such as plastics, heavy metals and nitrates, caused by factors such as toxins and gases released by factories, combustion of fossil fuels, acid rain, oil spill and industrial waste.

Global warming

Global warming is driven by human-induced emissions of greenhouse gases and the resulting large-scale shifts in weather patterns. Though there have been previous periods of climatic change, since the mid-20th century humans have had an unprecedented impact on Earth's climate system and caused change on a global scale. The largest driver of warming is the emission of gases that create a greenhouse effect, of which more than 90% are carbon dioxide (CO₂) and methane. Fossil fuel burning (coal, oil, and natural gas) for energy consumption is the main source of these emissions, with additional contributions from agriculture, deforestation, and manufacturing. The human cause of climate change is not disputed by any scientific body of national or international standing. Temperature rise is accelerated or tempered by climate feedbacks, such as loss of sunlight-reflecting snow and ice cover, increased water vapour (a greenhouse gas itself), and changes to land and ocean carbon sinks. (Palmer, L., 2010)

Waste disposal

An excessive amount of waste is produced and dumped in the oceans. Nuclear waste is particularly dangerous, as well as plastics and electronic waste.

Ocean acidification

The increase in the production of carbon dioxide by humans causes the oceans' acidity to rise, which has a negative impact on marine life.

Deforestation

Loss of trees in order to make space for residential, industrial or commercial projects means that less oxygen is produced, and temperature and rainfall are affected. Man constantly cut trees either for firewood, or to build houses or factories, not minding its effects to Wildlife. This has resulted in extinction of some species of animals. It has been estimated that around half of the world's mature forests have been cleared by humans. According to Saylan, C. (2011), deforestation occurs for a variety of reasons, but the majority of deforestation now occurs when tropical forests are cleared for agriculture and pastoralism; other reasons include the destruction of trees for charcoal production and the selective logging of forests for timber. Whilst tropical forests cover only around 6% of the earth's surface, they are an essential part of the global ecosystem and of the biosphere: they help to regulate climate; they protect soils from erosion; and they provide habitats for a vast number of plant and animal species. One estimate suggests that around 90% of the world's species are found in tropical forests (Park 2001).

Non-environmental causes of ecological crisis include:

Urbanization

The issue of urbanization is indirectly related to that of population growth, since urbanization is occurring in response to increasing population pressures in rural areas and to the increasing concentration of economic opportunities in cities - often in so-called 'megacities' (cities with populations exceeding 10 million people). Urbanization is often associated with a range

of social and environmental problems including overcrowding, congestion, pollution, public health issues, shortages of water for drinking, and inadequate sanitation. Urbanization is also related to another issue: the decline of rural communities.

Poverty

Whilst poverty is complex and problematic to define, the persistence of poverty at all levels (from intra-household to global) represents an ongoing challenge, as acknowledged in most current development policies, initiatives and targets (such as the United Nations Millennium Development Goals (UNDP undated)). Vast differences in patterns of income, production and consumption are evident at all spatial scales, and those patterns are reflected in distinctive patterns of environmental impact (although in some cases environmental impacts are 'exported', as in the case of radioactive waste that is generated in one country before being transported to another for processing or disposal).

Food insecurity

In general, the rate of increase in total food production has exceeded that of total population growth over recent decades, mainly due to improvements in agricultural practices and in water management techniques. However, the average values conceal enormous differences in the distribution and quality of food, and the lack of food security remains a profound challenge in many parts of the world. Debates about food production raise important environmental issues such as the use of genetically modified (GM) and genetically engineered (GE) seeds and produce (Kanu and Imatiri 2019abc).

Disease

Closely related to issues of poverty and food insecurity are problems of disease due to malnutrition, scarcity of water for

drinking, poor sanitation, pollution, and inadequate shelter; those are often compounded by the spread of infectious diseases such as malaria, cholera, tuberculosis and small pox. Large differences occur in the responses of human societies to diseases, reflecting vast inequalities in health care spending and in funding for pharmaceutical and medical research.

Peak oil and energy security

Peak oil refers to the time at which maximum crude oil extraction occurs, after which the economically viable reserves become depleted and the rate of oil extraction declines. Some estimates suggest that peak oil will occur - or has already occurred - early in the 21st century, with the implication that alternative energy sources will need to be developed in sufficient time to serve as a substitute for oil. Regardless of the accuracy of predictions about peak oil, the issues of climate change and conflict respectively, are now driving debates about 'green' (decarbonised or renewable) energy sources and energy security.

Conflict and displacement

Conflicts between human societies continue to create severe environmental degradation in addition to human misery and a wide range of social impacts. For instance, the use of depleted uranium munitions causes significant land contamination, whilst the effects of the displacement of large numbers of people from zones of conflict can exert pressures on adjacent ecosystems. Displacement of people does not occur only in response to violence; globally, the effects of climate change are projected to result in the displacement of as many as 500 million environmental refugees.

Natural disasters

Whilst not necessarily part of the environmental crisis, human populations are also faced with ongoing threats due to the occurrence of natural disasters such as earthquakes, landslides, floods, tsunamis and wildfires. Yet whilst these hazards may be natural in origin, it is important to acknowledge that human vulnerability to natural disasters is generally increasing, not least because human populations and settlements are growing in many marginal and dangerous areas, such as floodplains. Hence unsustainable practices - such as the construction of settlements on floodplains, or the intensive cultivation of marginal hill slope lands - may greatly increase the impacts of natural disasters on human societies and economies. (Brade, G. ,2009)

Effects of Ecological Crisis to Mankind

Some of the possible consequences of these effects include:

Ozone layer depletion

The ozone layer or ozone shield is a region of Earth's stratosphere that absorbs most of the Sun's ultraviolet radiation. It contains a high concentration of ozone (O₃) in relation to other parts of the atmosphere, although still small in relation to other gases in the stratosphere. The ozone layer can be depleted by free radical catalysts, including nitric oxide (NO), nitrous oxide (N₂O), hydroxyl (OH), atomic chlorine (Cl), and atomic bromine (Br). While there are natural sources for all of these species, the concentrations of chlorine and bromine increased markedly in recent decades because of the release of large quantities of man-made organohalogen compounds, especially chlorofluorocarbons (CFCs) and bromofluorocarbons. These highly stable compounds are capable of surviving the rise to the stratosphere, where Cl and Br radicals are liberated by the action of ultraviolet light. Each radical is then free to initiate and catalyze a chain reaction capable of breaking down over 100,000

ozone molecules. By 2009, nitrous oxide was the largest ozone-depleting substance (ODS) emitted through human activities. The breakdown of ozone in the stratosphere results in reduced absorption of ultraviolet radiation.

Nuclear meltdown

A nuclear meltdown (core meltdown, core melt accident, meltdown or partial core melt) is a severe nuclear reactor accident that results in core damage from overheating. The term nuclear meltdown is not officially defined by the International Atomic Energy Agency or by the United States Nuclear Regulatory Commission. It has been defined to mean the accidental melting of the core of a nuclear reactor, however, and is in common usage a reference to the core's either complete or partial collapse. The nuclear meltdown at Chernobyl in 1986 caused the death of many people and animals from cancer, and caused mutations in a large number of animals and people. The area around the plant is now abandoned by humans because of the large amount of radiation generated by the meltdown. Twenty years after the accident, the animals have returned.

Climate change

According to Pidwimy, M. (2006), Climate change is starting to have major impacts on ecosystems. With global temperature rising, there is a decrease in snow-fall, and sea levels are rising. Ecosystems will change or evolve to cope with the increase in temperature. Consequently, many species are being driven out of their habitats. Climate change has adversely affected both terrestrial and marine ecosystems, and is expected to further affect many ecosystems, including tundra, mangroves, coral reefs, and caves. Increasing global temperature, more frequent occurrence of extreme weather, and rising sea level are among

some of the effects of climate change that will have the most significant impact (Hansen, J., et al., 2013; Kanu et al 2020).

Biodiversity extinction

Biodiversity loss includes the extinction of species worldwide, as well as the local reduction or loss of species in a certain habitat, resulting in a loss of biological diversity. The latter phenomenon can be temporary or permanent, depending on whether the environmental degradation that leads to the loss is reversible through ecological restoration/ecological resilience or effectively permanent (e.g. through land loss). Global extinction is being driven by human activities which overreach beyond the planetary boundaries as part of the Anthropocene and has so far been proven to be irreversible.

Degraded air quality

Other forms of air pollution are also significant, particularly at regional and local scales, as they may seriously degrade air quality; worldwide, approximately one billion people inhabit areas - mainly industrial cities - where unhealthy levels of air pollution occur. Many air pollutants are responsible for the degradation of air quality, but some key pollutants include particulate matter (such as soot), tropospheric ozone, oxides of nitrogen, oxides of sulphur, lead and various aromatic compounds (such as benzene). Many air pollutants may cause or aggravate respiratory and cardiovascular illnesses; some are known carcinogens; and some can cause damage to vegetation and, in turn, produce a range of ecological effects.

Degraded water quality

Similarly, water quality can be seriously degraded by contamination with pollutants, giving rise to a range of health-related and ecological effects (such as the degradation of coral reefs). A major source of water pollution is the terrestrial run-off

to inshore waters that occurs in many coastal locations; such run-off may contain significantly elevated levels of nitrogen and phosphorus from agricultural land and from human settlements. Many other human activities lead to water pollution, including mining and industrial processes, which may create toxic effluent. Oil spills, accumulation of plastics and the bioaccumulation of persistent organic chemicals are some of the other causes of serious degradation of the marine environment.

Acid rain

Pollutants in the atmosphere such as sulfur dioxide and nitrogen oxides cause acid rain, which has negative consequences for humans, wildlife and aquatic species.

Scarcity of fresh water

Besides the pollution of freshwater sources, there are a variety of other reasons for the scarcity of fresh water for drinking in many parts of the world - many of which are related to poor water resource management practices. For instance, the over-abstraction of water from rivers results in water shortages and problems of salinisation of downstream. Irrigation practices may also be responsible for the depletion of local water sources and the salinisation of irrigated land. Vast differences in water security exist at the global scale, reflecting both demand for fresh water and the scale of public and private investment in water supplies, treatment and distribution.

Land contamination

Land contamination occurs as a result of chemical or radioactive pollution, especially by long-lived (persistent) chemical species that enter the soil. Land contamination may cause profound ecological effects and it presents severe constraints to development, since contaminated land must typically be

rehabilitated before it is safe to use for agriculture, construction or recreation.

Soil erosion and degradation

Concerns about soil erosion, soil degradation and the problem of desertification have become acute. In part, these concerns are based on the historical experiences of dramatic soil erosion and transport in New World countries including the USA (during the 'Dust Bowl' of the 1930s) and Australia. Whilst analyses of the problems of soil erosion and degradation have become more sophisticated, recently, it is clear that these problems continue to have important consequences for agricultural and pastoral productivity as well as for the functioning of natural ecosystems.

Land use change and habitat loss

These issues overlap with others, such as deforestation, but they are broader and include the clearance of forest for agriculture and pastoralism, the transformation of land during urban growth, the development of new infrastructure (such as roads), the drainage of wetlands, and the destruction and removal of coastal mangrove forest.

Volcanic eruptions such as Mount St. Helens and the Tunguska and other impact events and earthquakes caused by incessant noise from industries etc.

Prevention of Ecological and Environmental Issues According Tochwala, L. (1999)

Recycle (& then recycle properly)

- Implementing recycling habits into your daily life is one of the most effective ways to help lessen landfill waste, conserve natural resources, save habitats, reduce pollution, cut down on energy consumption, and slow down global warming.

Conserve water & electricity

The tips you see below will seem like no-brainers; however, it takes to become more aware of your unconscious habits:

- Turn the sink water off when brushing your teeth
- Water the lawn in the morning or evening; cooler air causes less evaporation
- Switch off anything that uses electricity when not in use (lights, televisions, computers, printers, etc.)
- Unplug devices when possible; even when an appliance is turned off, it may still use power
- Remove chemicals inside of the house; research companies that use plant-derived ingredients for their household cleaning products
- Remove chemicals outside of the house; use eco-friendly pesticides and herbicides that won't contaminate groundwater
- Consider signing up for a renewable energy producer that uses 100% renewable energy to power homes.
- Volunteer. Volunteer for cleanups in your community. You can get involved in protecting your watershed, too.
- Educate. You can help others understand the importance and value of our natural resources. Public enlightenment is ongoing on the major preventive measures. Knowledge illuminates light into the ignorance of the people.
- Conserve water. The less water you use, the less runoff and wastewater that eventually end up in the ocean.
- Shop wisely. Buy less plastic and bring a reusable shopping bag.
- Use long-lasting light bulbs. Energy efficient light bulbs reduce greenhouse gas emissions. Also flip the light switch off when you leave the room!

- Plant a tree. Trees provide food and oxygen. They help save energy, clean the air, and help combat climate change. Afforestation is also a solution.
- Don't send chemicals into our waterways. Choose non-toxic chemicals in the home and office.
- The development of theories about environmental problems that will help to checkmate human activities (Orr, D.,2010)

Impact of Education to Ecological Crisis

Environmental degradation and climate change have been caused by the unsustainable patterns of human behaviour as they are linked to consumption. Most efforts to improve environmental sustainability involve international cooperation, legal restrictions, and technological developments, rather than behaviour.

Therefore, according to Onuoha, B. C.(2012), Environmental Education is seen as a process of infusing into the educational system environmental content in order to enhance the awareness of the people on environmental issues at all levels of education. This encourages students to research, investigate how and why things happen, and make their own decisions about complex environmental issues.

Education helps to expose students to nature and allowing them to learn and play outside. It fosters sensitivity, appreciation, and respect for the environment. Environmental Education serves as tool to build sustainable behaviour in the society. Quality education for sustainable development is a crucial antecedent tool to create a generation of people whose behaviour is constructed by environmentally sustainable habits.

Environmental education should “foster attitudes, motivations and commitments to make informed decisions and take responsible actions”. It helps social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems. Education also helps social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection. (Stewart, J. H.,2005)

Conclusion

Human activity has put a strain on the natural resources and posed a threat to the ability of the planet’s ecosystems to sustain future generations. Protecting and improving our future well-being requires wiser and less destructive use of natural assets. Therefore, the protection of our natural resources should be our sole responsibility. Education helps to better equip future generations to address current and future challenges. It plays an important role in bringing about the political and economic transformation necessary to create ecologically sustainable societies. Education shapes values and perspectives, and helps develop abilities, concepts and tools that can be used to critically reflect upon current lifestyles and identify political, social and ecological courses of action.

References

- Ajayi, P.O.S. (1998). Comprehensive geography for secondary schools.
- BBC News-15th April,2013. "Family and Education". www.bbc.co.uk/news/education-22158941 Retrieved on 4th August, 2015.
- Boyes, E., & Stanisstreet, M. (2011). "Environmental education for behaviour change: which actions should be targeted?" International Journal of Science Education.
- Brade, G. (2009). "Climate change". www.nnnv/.noaa.gov/cgi-bin/index.cgi? Retrieved on 6th June, 2015.
- Chawla, L. (1999). Life paths into effective environmental action, The Journal of Environmental Education, 31(1), and; Pease, J. et.al. (1997). Why landowners restore wetlands: A national survey. Iowa State University: University Extension, Ames, Iowa.
- Hansen, J., et al. (2013, December 3). Assessing 'dangerous climate change': Required reduction of carbon emissions to protect young people, future generations and nature. PLOS ONE. Retrieved from <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0081648>.
- Kanu, A. I; Omojola, I. O.; Bazza, M. B. (2020). Climate Change and Migration: Drawing the Lines and Making the Connections. *Villanova Journal of Arts, Humanities and Social Sciences* Vol. 2. No. 1. pp. 10-14.
- Kanu, I. A. and E. P. O. Imatari (2019). Food Security in Arid and Semi-Arid Lands in Africa. *Journal of African Studies and Sustainable Development*. Vol. 2. No. 8. pp. 50-83.
- Kanu, I. A. and E. P. O. Imatari (2019). The Question of Food Security in Arid and Semi-Arid Lands in Africa: Indigenous Knowledge and Implementers of

- Development. *Journal of African Studies and Sustainable Development*. Vol. 2. No. 8. pp. 190-200.
- Kanu, I. A. and E. P. O. Imatari (2019). Gender Rights, Climate Change and Food Security in Africa. *Nnadiabube Journal of Religion, Culture and Society*. Vol. 1. No. 2. pp. 80-86.
- Onuoha, B. C. (2012). Business and Entrepreneurial Environments: A Nigerian Perspective. Port Harcourt: African Entrepreneurship Initiative.
- Orr, D. (2010). "Earth in Mind" in "Should environmental education be taught in school". Clarkbeast.wordpress.com/2010/11/05. Retrieved on 31st May, 2015. *Oxford Journals Science and Mathematics. Bioscience* vol.51, Issue 4. Pp. 283-288.
- Palmer, L.(2010). "Public schools' global warming teaching: A rich field for mining for news stories'. Retrieved from www.yaleclimatemediaforum.org on 17th June ,2015.
- Pidwimy, M. (2006). "Causes of Climate Change" In *Fundamentals of Physical Geography*, second edition ([http/ www.physicalgeography.net/fundamentals/7y.html](http://www.physicalgeography.net/fundamentals/7y.html)). Retrieved on 17th April, 2015
- Saylan, C. (2011). "Green failure: what is wrong with Environment Education..." Retrieved from ([e360.yale.edu/ .../2407/](http://e360.yale.edu/.../2407/)).
- Stewart, J. H. (2005). "Challenges for Environmental Education: Issues and for the 21st Century". (*Bioscience oxford journals.org/com*). Retrieved on 30th June, 2015. Wikipedia "what is Environmental Education". en.wikipedia.org/wiki/Environment... Retrieved on 10th August, 2015.