Development of environmental awareness through education: Problems and Solutions

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Abstract

Severe air pollution can not only shorten the lifespan of a person; it can outright kill them. Air pollution is only a subset of issues we are facing about our environment. This paper focuses on the problem of raising environmental awareness in the context of environmental studies. There are major threats to the environment such as emission of greenhouse gases, deforestation, pollution, toxic waste disposal etc. It has become increasingly important to educate the populace, create awareness and come up with strategies to mitigate the harmful effects on our environment. Environmental education has an important part in developing and understanding of concepts that underpin environmental issues, leading potentially to pro-environmental behavior. This paper discusses the different types of environmental issues and difficulties that exist. It talks about various acts and laws that have been passed and their impacts on solving environmental issues. It also talks about the importance of education in solving environmental problems

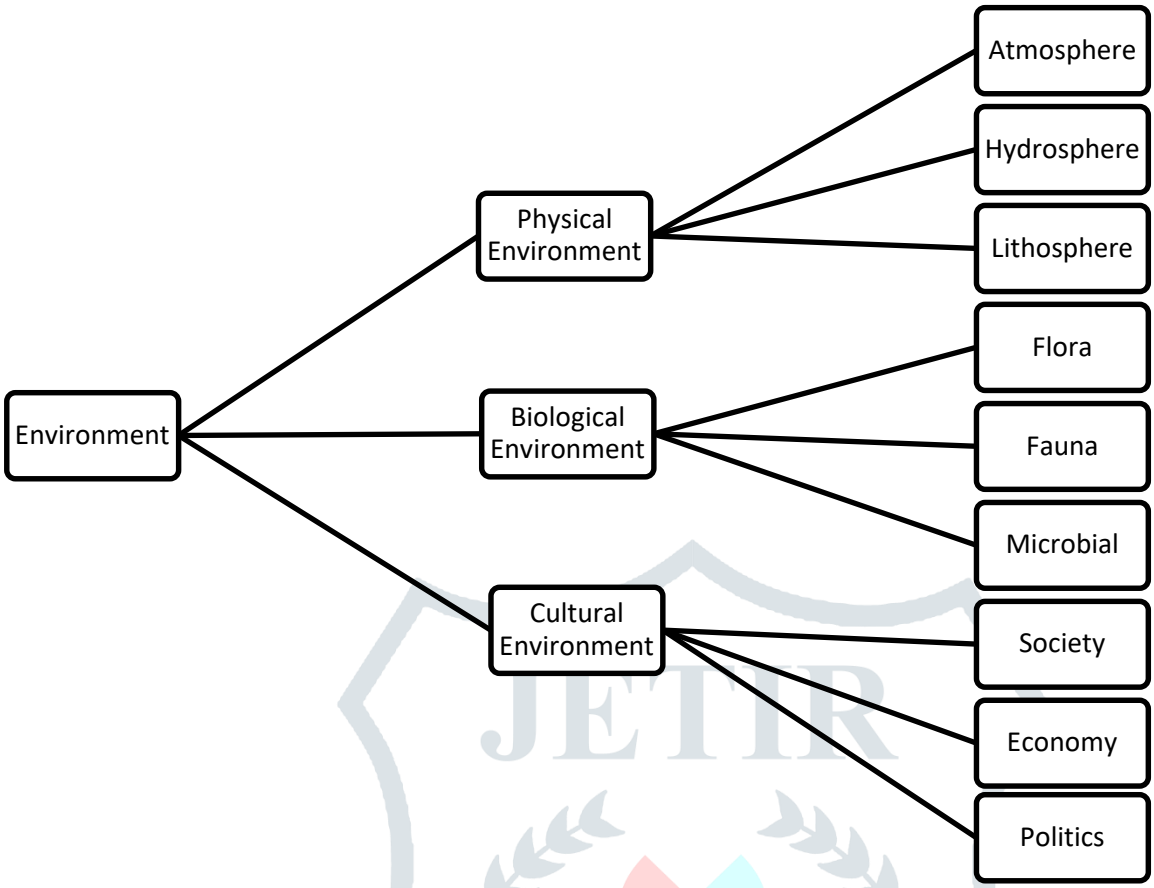
Key Words: environmental awareness, threats, dwindling, extinction, environmental education

INTRODUCTION

Environment is everything that surrounds human beings or it constitutes whatever around him, above the land, on the surface of the earth and under the earth.

Environment may be defined as conditions or circumstances that surround an organism. Environment could be a combination of external or cultural, economic, educational physical, religious and social conditions that affect growth and development of an organism. In the words of Albert Einstein, “Environment is anything that is not me”.

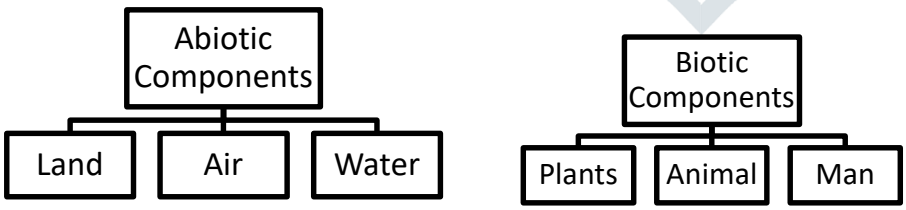
Classification and components of the environment



Environment has three categories namely: Physical environment, Biological environment and cultural environment.

The components of the environment are broadly classified into two major categories: Biological components and Physical Components.

Environment



The Abiotic components are classified as climatic (water, air) and edaphic (land/soil) and the biotic components are divided in producers, consumers and decomposers (plants, animals and man).

On the other hand, if ecospheres are taken into consideration then the components of environment are as follows:

1. **Atmosphere**: gaseous envelope on earth.
2. **Hydrosphere**: The aquatic portion of biosphere like streams, rivers, ponds, oceans and all water bodies.
3. **Lithosphere**: The solid portion of earth like land masses, rocks and mountains.
4. **Biosphere**: Flora (Plants) and Fauna (animals)
5. **Anthrosphere**: man made things

Human interaction with Environment:

Human interaction with the environment started from the moment he appeared on earth. The early man afraid of lighting, thunder, dense forests and darkness, started worshiping different aspects of nature. His activities or interaction with the environment had very little impact on it. Gradually, he started making radical changes in the environment to suit his needs. The phenomena reached their summit so to say on a work wide scale in the twentieth century.

The human systems are divided into physical activities (demography, consumption, Production: and to socio-political activities (decision making, institutional organization, culture and values).

Three basic dimensions of the role of humans can be differentiated (Clark, 1988):

- The interaction between human and environmental systems.
- The choices that individuals, governments and organizations make in efforts to manage interaction.
- The Underlying elements of social structure of culture that shape these interactions and choices.
- According to the report prepared by IPCC (2007), the human influences on the issue of climate change may have.
- Likely contributed to changes in wind patterns, affecting extra- tropical storm tracks and temperature patterns
- Very likely contributed to sea level rise during the latter half of the 20th century.
- Likely increased temperatures of extreme hot nights, cold nights and cold days.

Only an environmentally literate society will be able to adequately and constructively participate in the on-going discussions and reflection. The new generation will inherit the earth's environmental problems and be faced with addressing them, as they are problems that cannot be solved in one generation as suggested by Catherine Gautier and Stacy Rebich (2005).

Current Status

Climate Change – Climate emergency: global action is 'way off track' says UN head (Damian Carrington) 10 March, 2020.

Antonio Guterrey sounded the alarm at the launch of the UN's assessment of the global climate in 2019. The report concludes it was a record-breaking year for heat, and there was rising hunger, displacement and loss of like owing to extreme temperatures and floods around the world.

The climate assessment is led by the UN's world meteorological organization (WHO), with input from the UN's agencies for environment, food, health, disasters and migration as well as scientific centers.

In 2019 the oceans were at the hottest on record, with at least 84% of the seas experiencing one of the seas experiencing one or more machine heat waves. Surface air temperatures around the world were the hottest ever recorded, after a natural El Nino event boosted figures in 2016.

The Report says results from the world Glacier monitoring service indicate 2018-19 was the 32nd year in a row in which more ice was lost than gained. The melting of land ice combined with thermal expansion of water pushed sea levels up to the highest mark since records began.

The long-term decline of Arctic sea ice also continued in 2019, with the September average extent usually the lowest of the year the third worst on record.

Prof Brian Hoskins, of Imperial College London, said "The report is a catalogue weather in 2019 made more extreme by climate change, and the human misery that went with it. It points to a threat that is greater to our species than any known virus – we must not be diverted from the urgency of talking it by reducing our greenhouse gas emissions to zero as soon as possible (sources, the Guardian).

Greenhouse Gas Emissions

Carbon emissions fall as electricity producers move away from coal. Global emissions down by 2% amid mild winter and reduced use of coal fired power plants. Dave Jones, the lead author of the report said governments must dramatically accurate the electricity transition so that global coal generation collapses throughout the 2020s, India: New Procedure to Reduce Pollution from coal-fired power plants (26th April, 2018) by Alvina Board.

In spite of the rapid increase in power generation from renewable sources like wind and solar, over 60% of India's electricity is still generated in thermal power plants.

Coal, as a source of energy is firmly out of favor now due to climate change considerations. Most countries, including India, have plans to phase out coal in the next few decades. India, in fact, officially announced that it would not set up any new coal-fired power plants after 2022. However, we still have to live with coal for some more time at least in spite of the rapid increase in power generation from renewable sources like wind and solar, over 60% of India's electricity is still generated in thermal power plants. And it is estimated that even in the best-case scenario, coal would continue to be the mainstay of India's energy mix for at least three more decades.

Efforts are on to ensure that pollution emanating from coal is at least reduced a bit in these intervening years. A variety of "clean coal technologies" are being deployed or experimented with to realize the objective. The modern "Supercritical " Power Plants also emit lesser pollutants. Most thermal power plants burn coal to generate heat, which is used to convert water into steam. The pressure of the steam is then used to move turbines that produce electricity. The quality of coal is an important factor in deciding the efficiency of the plant. The amount of electricity generated per unit of coal burnt as well as the waste that is released. Typically, coal power plants release a lot of carbon dioxide that is a dangerous greenhouse gas. Burning coal in the conventional pulverized mode results in the release of a lot of fly ash, a major contributor to air pollution and a health hazard.

Coal is passed through an extensive "Pre-Processing" process called "washing: to remove the same of the ash content before it is burnt, which is also not very effective. A group of researchers at IIT Madras has now come up with a more effective way of managing this problem

ENVIRONMENTAL AWARENESS

To define environmental awareness, we must first understand the environmentalist movement. Environment is an ideology that evokes the necessity and responsibility of humans to respect, protect and preserve the natural world from its anthropogenic affections. Environmental awareness is an integral part of the movement's success. By teaching our friends and family that the physical environment is fragile and indispensable we can begin fixing the problems that threaten it.

Environment includes all living and non-living objects. We live in the environment and use the environmental resources like air, land and water to meet our needs. Development also means meeting the needs of the people. While meeting the ever-growing needs, we put pressure on the environment. When the pressure exceeds the carrying capacity of the environment to repair or replace itself, it creates a serious problem of environmental degradation. If we use any environmental degradation. If we use any environmental resource such as ground water beyond its limit of replacement, we may lose it forever. Therefore, there is a need to create 'awareness' about environmental protection. While efforts are being made at the national and international level

to protect our environment, it is also the responsibility of every citizen to use our environmental resources with care and protect them from degradation.

ENVIRONMENTAL PROBLEMS

Major Global Environmental Threats

The major global environmental threats of the present day may be listed as follows:

- Global Warming
- Greenhouse effect
- Population pressure
- Pollution of Air, water, soil and sound
- Depletion of ozone layer
- Deforestation, soil erosion, desertification and drought
- Acid precipitation
- Ecological refugees a growing problem.
- Energy crisis – Nuclear energy, radiation, coal and synthetic ful.
- Biological and chemical weapons research and nuclear arms race.
- Toxic waste disposal

Some of the notable problem of environment can be identified as under:

Land Air and Water: pollution of land and water has affected plants, animals and human beings. The quality of soil is deteriorating resulting in the loss of agricultural land. The loss is estimated to be about five to seven million hectares of land each year. Soil erosion, as a result of wind and/or water, costs the world dearly. The recurring floods have their own peculiar casualties like deforestation, silt in the river bed, inadequate and improper drainage, loss of men and property. The vast oceans, after being turned into dumping grounds for all nuclear wastes, have poisoned and polluted the whole natural environment.

Population Growth: population growth means more people to eat and breathe, and putting an excessive pressure on land and forest, and ultimately disturbing the ecological balance. Our growing population is putting pressure on land, leading to poor quality of productivity, deforestation (the loss of forest land so necessary for ecological balance and extinction of wild life leading to imbalance in the ecological order, loss of wildlife heritage and ultimately dwindling of several species.

Urbanization: Urbanization is no less a source of pollution, and therefore, a threat to the environment. Urbanization means a maddening race of people from villages to the cities. The net result of urbanization is dirt, disease and disasters. In a state of growing urbanization, environmental problems like sanitation, ill-health, housing, water-supply and electricity keep expanding

Industrialization: Industrialization coupled with the development of the means of transport and communication has not only polluted the environment, but also has led to the shrinking of the natural resources.

Examples of environmental issues that need fixing. There are several cause and effect problems that harm our environment.

Oil Drilling: This issue is one that causes a great deal of environmental destruction. Our dependence on possible on fossil fuel is a global addiction that affects every aspect of the world. Oil spills and offshore drilling poison marine life, oil drilling (on land) suffocates the earth, and the combustion of fossil fuels add to the increased atmospheric CO_2, which in turns causes the progression of global warming and ocean acidification. This is a multifaceted issue and is a good cause to get involved with because it covers such a broad spectrum of issues.

Deforestation: Millions of acres of forest are cut down for industrial benefit, such as large-scale farming, oil mining, and the production of paper goals. Deforestation causes wildlife and biodiversity extinction. The international union for conservation of nature environmentally threatened species with up to date information. Oftentimes, the cause for their threatened existence is listed as of habitat as it is for many Amazonian species.

Production of Plastic Goods: Currently our society creates a great deal of waste and much of that waste consists of plastic. According to the Environmental Protection Agency (EPA) in 2010 alone 31 million tons of plastic waste was created. This waste ends up all over the globe in both land and water, e.g. great pacific garbage patch. Not only is plastic waste an issue, but the production of plastic is also dependent on fossil fuel combustion to the U.S. Energy According to Information Administration (EIA) in 2010 191 million barrels of liquid petroleum gases and natural gas liquids were used in the U.S. alone to produce plastic goods.

SOLUTIONS TO ADDRESS ENVIRONMENTAL PROBLEMS

Possible Ideas

The following are ideas are lifestyle changes that, if adopted by a good number of people, can have a positive impact on the environment.

1. Instead of driving to work or school, take the bus, carpool, walk, or side your bike to cut down on greenhouse gas emissions. According to the EPA, transportation adds to 33% of the total atmospheric Co_2.
2. By reusable products such as glass bottles, reusable bags and cups. Avoid buying paper towels, plastic bottles and bags.
3. Start composting and recycling, which will help cut down our waste production.
4. Support local business and farmers by only buying organic food at farmer's markets.

Technologies that can save the Environment:

Electric cars and biofuels play a special role. The term "green cars" is not only restricted to the electric type, but also includes cars that consume less to travel the same distance, hybrid vehicles, and many others. And while we are still seeking alternatives to conventional vehicles, in order to reduce consumption of oil and fossil fuels renewable energy is appearing on the horizon as a key pillar of our development. This includes bio fuels, an alternative to traditional fuels generated from the biomass of living organisms or their metabolic waste. Research studies today are focusing on taking particular advantage of crop waste, such as sugar cane or corn. Biofuel production is a solution that facilitates the use of biotechnology for environmental purposes. But it is not the only one.

Environmental disasters such as the sinking of the Exxon Valdez and the prestige were the catalyst for scientists to implement pioneering technologies for cleaning oil contaminated environments. The use of microorganisms for these tasks is called bio-remediation, and it employs bacteria or fungi to decontaminate waste water from cities. These alternatives show that "living" technology will be crucial in promoting sustainable development.

Biomaterials used to "store" carbon dioxide, can help to reduce the greenhouse effect and global warming. Others' such as banana blades, manufactured in Mexico for construction, increase the chance of eliminating toxic compounds such as asbestos which is related to increased risks of cancer

Carbon dioxide is the most prominent greenhouse gas contributing to global warming. According to the energy information Administration, by the year 2030 we will be emitting close to 8,000 million metric tons of Co_2. Some experts say it's impossible to curb the emission of Co_2 into the atmosphere and that we just have to find ways to dispose of the gas one suggested method is to inject it into the ground before it gets a chance to reach the atmosphere. After the Co_2 is separated from other emission gases, it can be buried in abandoned oil wells, saline reservoirs, and rocks. While this sounds great, scientists are not sure whether the injected gas will stay underground and

what the long-term effects are, and the costs of separation burying and buying are still far too high to consider this technology as a practical short-term solution.

Hydrogen fuel cell usage has been touted as a pollution free alternative to using fossil fuels. They make water by combining hydrogen and oxygen in the process, they generate electricity. The problem with fuel cells is obtaining the hydrogen. Molecules such as water and alcohol have to be processed to extract hydrogen to fuel into a fuel oil. Some of these processes require the using other energy sources, which then defect the advantages of these "clean fuel" most recently, scientists have come up with ways to power laptops and small devices with fuel oils, and some car companies are promising that soon we'll be seeing cars that emit nothing but clean water. The promise of a hydrogen economy however, is not one that all experts agree will be realized.

Carbon Capture: There's too much carbon dioxide in the air, and its warming our planet. That's the premise of carbon capture and storage (CCS), an emerging class of technologies that are primed to play an important role in the health of our planet in the decades ahead. According to the CCS Association, capture technologies allow the separation of carbon dioxide from gases produced in electricity generation and industrial processes by one of three methods: pre-combustion capture, port-combustion and oxy fuel combustion. The carbon is transported by pipeline and stored in rock formations for below ground in 2017, the world's first Co_2 Capture plant went online in Switzerland. Startups in the US and Canada have developed carbon capture plants of their own. At scale, the technology could help reverse one of the most alarming environmental trends of our time.

Smart Grids*:* Our current power infrastructure is still stuck in the 19th and 20th centuries. The problem is that these grids are highly sensitive to fluctuations in usage and output. To make them work reliably, they demand an over production of energy and they tend to rely on pollution emitting energy sources. Smart grids will enable local production of energy down to the household level, which can be fed back into the grid upstream. Sensing technology and more accurate prediction models will fine-tune energy production to avoid overproduction, and better battery technology will enable storage of renewably sourced energy. And as appliances get smarter, the grid may start to automatically signal them to shut off to conserve power. All of this could add up to a huge change in how our power infrastructure functions. According to a study by the Electric power research institute, by 2030, smart grid technologies might help us reduce carbon emissions by 58% compared to levels from ten years ago.

Artificial Intelligence*:* AI will make autonomous vehicles navigate more efficiently, lowering air pollution. AI is being deployed by material scientists to develop biodegradable replacements to

plastics and develop strategies to clean our oceans, which receive some eight million metric tons of plastics annually.

Environmental Sensors: To heal the planet, we need to measure it. Distributed sensors are one of the unsung technologies allowing that to happen, and the continued spread of the networked sensor environment will be one of the undergirding technologies behind nearly every sustainability effort imaginable.

Networked sensors as small as a dime are already monitoring air and water quality, identifying pollutants, tracking acidification, and capturing real time data on phenomena that are crucial to our social and economic well-being.

ENVIRONMENTAL EDUCATION

Environmental Education is a process in which individuals gain awareness of their environment and acquire knowledge, skills, values, experiences, and also the determination which will enable them to act individually and collectively to solve present and future environmental problems. EE enhances critical thinking, problem solving, and effective decision-making skills and teaches individuals to weigh various sides of an environmental issue to make informed and responsible decisions.

The components of EE include awareness and sensitivity to the environment and environmental challenges, attitudes of concern for the environment and motivation to improve or maintain environmental quality, skills to identify and help resolve environmental challenges and participation in activities that lead to the resolution of environmental challenges. EE is aimed at producing good citizen that is knowledgeable concerning the biophysical environment and its related problems, is aware of how to help solve these problems and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones.

According to the definition of IUCN-1970 “Environmental Education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness of man, his culture and his biophysical surroundings. Environmental education also entails practice in decision making and self-formulation of a code of behavior about issues concerning quality”.

According to Environmental Encyclopedia (1999), Environmental Education aims to merge the ideas of Philosophy of environmentalism with the structure of formal education system.

UNESCO declaration (1980) says: "Environmental Education is fundamental to all learning providing the elementary knowledge, skills and motivation to participate in the solution and anticipation of environmental problems thus making its indispensable contribution to sustainable development and improved quality of life"

Goals of Environmental Education

The goal of Environmental education according to Tbilisi Declaration are:

- to foster a clear awareness of and concern about, economic, social, political and ecological interdependence in urban and rural areas;
- to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
- to create new patterns of behavior of individuals, groups and society as a whole towards the environment.

Objectives of environmental education

1. Awareness: To help individuals and social groups acquire awareness and sensitivity to the total environment and its allied problems.
2. Knowledge: To help individuals and social groups acquire basic understanding of the total environment and its associated problems.
3. Attitude: To help individuals and social groups acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement.
4. Skills: To help individual and social groups acquire the skills for solving environment problems.
5. Evaluation Ability: To help individuals and social groups evaluate Environmental measures and education programs in terms of ecological, political, economic, social, aesthetic and education factors.
6. Participation: To help individuals and social groups develop a sense of responsibility and urgency regarding Environmental problems to ensure appropriate action to solve those problems.

Environmental education as a Process

Environmental education should be thought of a process which takes place 'for' and 'in' the environment. By 'for' we mean that the objective of all education, and of environmental education in particular, is to enable the individual to fulfill his potentialities and aspirations while acquiring a sense of responsibility and commitment with regard to the improvement of environmental quality

for the benefit of all humanity. 'In' expression the fact that all resources of the environment itself should be used in the educational experience. It should not be forgotten that environmental education revolves around three central themes, each of which represents a particular stage:

1. Education in which the environmental represents a mean.,
2. Education concerning the environment, and
3. Education of the individual as a person living in an environment of a given quality and who is partly responsible for that quality.

Role of environmental education

Environmental education should make individuals and committees understand the complex nature of the natural and the built environments resulting from the interaction of their biological, physical, social, economic and cultural aspects. It should enable them to understand the economic, political and ecological interdependence of the modern world, in which decisions and actions by the different countries can have international repercussions.

CONCLUSION

Drilling for oil, deforestation, production of plastic goods, burning of fossil fuels are essential to the industrialized world. This industrial revolution has done severe damage to our environment and endangers the habitability of the planet for future generations. To address this, swift actions must be taken to inform the populace. Current techniques/strategies like composting, using recyclable materials and encouraging people to take public transports can certainly alleviate the damage done to the environment. This paper tells us about environmental awareness and responsibility of teachers to inculcate good and healthy habits through environmental education, so that students become sensitive and protective about the environment. This is a new field and its aim is to develop a positive attitude towards the environment. The paper talks about other methods to address environmental damage besides creating awareness among teachers and students. It talks about the impacts of various Acts and laws like the Stockholm conference (1972), the acts passed by the Indian Government in 1986 and the Rio Conference.

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