



Overview of Environment Pollution, Climate Change and Its Mitigation: on Educational Stand Points

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Abstract: *This article analyzes how human development activities are promoting for global environment pollution. The article argues the impact of climate change on human livelihood and ecological elements. The data of this study was obtained and compiled through a thorough review of various published research articles of international reputed journal and relevant books. Scientists and environmentalists are making awareness through different ways i.e., national and international conferences programmes. About environment conservation formal and non-formal educations are adopting in their curriculum. GOs and NGOs are conducting their programmes to control environment pollution and climate change but not seen improvement. The subject matter of minimizing environmental pollution and climate change has not been thoroughly investigated. So it is better to search a strategic resource to mitigate and adapt to climate change. This study also enhances the critical role that education can and should play in addressing and responding to climate change and all of its complexity. Anyway human should carry out the process to mitigate (adopt) in such problematic situation.*

Keywords: *Environment, Climate Change, Pollution, Education, Mitigation, Ecosystem.*

1. Introduction

The study overviews the global impact of environmental pollution and how it effecting human and their surroundings. Climate change is the main cause of environment pollution. The study is proceeding on introduction, background, review of literature, methodology, findings and discussion, conclusion and lastly reference. As the nature of objectives the study is adopted descriptive research design. The study data is selected (adopted) secondary data. Also the study process is adopted further research area and policies. The environmental crisis is caused due to the environment and ecological changes as a result of human developmental activities. It was for strengthen their economic and life style. This was done by on the support of science and technology of the present century (Appannagari, 2017). Moreover due to the development of socio-economic, scientific and technological development it is caused by serious problems of environmental pollutions on the other hands. Also the environmental crisis is arising out of the environmental deterioration due to several forms of pollution, depletion of natural resources because of rapid rate of their exploitation. It is due to increasing dependence energy consuming and ecologically damaging technologies. The loss of habitats due to industrial urban and agricultural expansion, reduction and loss of ecological populations due to excessive use of toxic pesticides and herbicides and loss of several species of flora and fauna (Appannagari, 2017).

At its most basic point is that climate change is caused by a change in earth's energy balance how much of the energy from the sun that enters the earth (and its atmosphere) is release back into space. The earth is gaining energy as we reduce the amount of solar energy that is reflected out to space just like people gain weight if there is imbalance between calories and calories out.

Since the Industrial Revolution started over 200 years ago, human activities have added very large quantities of greenhouse gases (GHG) into Earth's atmosphere. These GHG act like a greenhouse (or a blanket or car windshield) to trap the sun's energy and heat, rather than letting it

reflect back into space (Public health institute/Centre for climate change & health, 2016). I got interest to study of environment pollution and climate change adopting following objectives.

Objectives

The following specific objectives are adopted for the study;

To explore the environmental pollution and climate change in the world.

To identify the way measures to adopt the climate change.

To find the role of education for minimize environment pollution and its mitigation.

2. Methodology

The methodology for this study is designed to achieve the research objectives through qualitative descriptive analysis, focusing on secondary data. The study's data collection follows an "ex post facto" approach, wherein data is derived from previously collected research findings and facts (Pant, n.d.). Secondary data sources include archived documents, official government records, reports from the Central Bureau of Statistics (CBS), national and international publications, and various e-resources. This approach to secondary data allows for the exploration of trends, patterns, and historical insights relevant to the study's focus on climate change education and adaptive strategies in agriculture.

The use of qualitative methodology is well-supported in research that seeks to analyze complex issues within specific social and cultural contexts. According to Denzin and Lincoln (2005), qualitative approaches provide nuanced understanding, especially when examining community-based topics where lived experiences and social dynamics are central. This study's methodology follows a descriptive process that emphasizes thematic analysis, a widely accepted technique for organizing and interpreting qualitative data in categories relevant to the research objectives. Thematic analysis allows for in-depth exploration of each theme, revealing patterns across data sources while staying aligned with the study's goals.

To maintain the credibility and trustworthiness of the qualitative analysis, the study utilizes criteria outlined by Creswell and Clark (2007), who emphasizes that qualitative research, can yield reliable insights even within smaller sample sizes, provided that data is collected from varied, credible sources. As Maxwell (2012) notes, triangulation across multiple data sources enhances the validity of qualitative findings by confirming consistency in themes and observations. The thematic analysis for this study's results and discussion section allows for a structured presentation of findings, grouped by key themes that emerge from the data, which include adaptive strategies, community knowledge, and resource accessibility.

3. Result and Discussion

Environment Pollution in the World

Environmental pollution is caused of environment and ecological changes as a result of developmental process of the "economic and technological mean" of the present century. Hence the environmental crisis arising out of the environment deterioration caused by several forms of pollution, depletion of natural resources because of rapid rate of their exploitation and increasing dependence on energy consuming and ecologically damaging technologies. The loss of habitats due to industrial, urban and agricultural expansion, reduction and loss of ecological populations due to excessive use of toxic pesticides and herbicides and loss of several species of plants due to practice of monoculture removal of habitats through forest clearance has now become of global concern. The life of common man is being so rapidly adversely affected by environmental degradation caused by man himself that there has been a marked growth of interest within the last decade in the quality of the environment, the disruption of the earth's natural ecosystems and the depletion of resources (Appannagari, R.R, 2017, p152-153).

In simple way pollution defined as any undesirable change in biological, chemical and physical properties of air, water and soil that may cause harm all living organisms or cultural and natural elements of human environment (Shrestha, 2000).

Different calamities such as earthquakes, volcanoes, landslides, floods and cyclones was taken as the environmental subject of natural changes in early days. The changes used to occur only over geological times scales. But now rapid development of science and technology and haphazardly is used natural resources for industries to fulfill the need of enormously population growth, resulted

environment pollution. Global warming, climate change, deforestation, breakdown of ecosystem brought anxiety, deformed and contaminated which was peace, virgin, pure and uncontaminated; sometime in the past (Ibid).

Climate Change and its Impact in the Environment

Humans like all life on earth, depend on energy coming from the sun. But we also depend on the energy reflected from the earth's surface back into the atmosphere. This balance between energy coming in and energy going out has been maintained for billions of years, allowing life on earth to survive and thrive (Armstrong, et al., n.d). But what happens when? If excess greenhouse gases in the earth's atmosphere block more energy from leaving the atmosphere, upsetting that balance. Instead of leaving the atmosphere and going back into space, some of the excess energy is returned to the earth's surface. The Earth's surface, including its oceans, land, and air, experiences a significant increase in temperature. Greenhouse gases are essential to life on earth. For example, plants depend on carbon dioxide (CO₂). This is also an important greenhouse gas contribution to global warming. Greenhouse gases play a crucial role in maintaining Earth's surface and ocean temperatures, enabling life to thrive on our planet. But as greenhouse gases accumulate beyond their historic levels, they prevent more and more of the energy reaching the earth from and going back into space (ibid, P.8).

General Ways of Environment Pollution

Air Pollution

Air pollution has many sources and has been one of the major contributing factors to air quality on a global scale. The pollutants responsible for air pollution exist in gaseous and particulate forms, mostly emanating from human activities such as industrial emission, motor vehicle exhaust, incineration of waste, forest fire, and even natural ones such as volcanic eruptions (Ramli et al., n.d.; Zhang & Cao, 2015). These substances disrupt natural cycles; for example, natural carbon and nitrogen cycles cannot absorb the augmented levels of carbon dioxide released into the atmosphere due to activities relating to industries and transportation (WHO, 2016). At the present rate of emission at which it is being released, it would attain 600 ppm in the atmosphere, and this is an immediate issue because carbon dioxide is increasingly recognized to act as a greenhouse gas, one that accounts significantly for global warming (IPCC, 2014). Besides, there is biological respiration from plants and animals that emit carbon dioxide into the air; however, all these components are relatively less damaging because of their occurring nature of balance within the carbon cycle itself (Ramli et al., n.d.; Zhang & Cao, 2015).

Water Pollution

Water pollution means that the equilibrium of fresh water content is being polluted with the existence of toxic substances, organic matter and reduction of oxygen level in it, which causes bad effect to its user and living organism. Water is the most important natural resources because it is the agents for all kind of human activities including basic need for the living organism in the whole universe. Like air pollution, water pollution has existed for centuries and it has resulted in mass deaths because of water borne diseases such as diarrhoea, typhoid etc. caused of drinking water resource pollution. A huge mass of direct pollutants are sewage, suspended solid, infectious agents i.e., bacteria, viruses, parasites, exotic chemicals, radioactive disposal, heat and oil spoiled in the sea (Ramli,et al., n.d). Hence aquatic flora and fauna are badly affected by river, pond as well as sea pollution. Water pollution is a global issue and world community is facing worst results of polluted water. Major source of water pollution are discharge of domestic and agriculture wastes, population growth, excessive use of pesticides and fertilizers and urbanization. Bacterial, viral and parasitic disease are spreading through polluted water and affecting human health. It is recommended that these should be treated before entering into river. Educational and awareness programmes should be organized to central of pollution (Haseena, 2017). This suggests that the air pollution is major cause of climate change.

Land/soil Pollution

Land pollution is solid or waste materials get deposited on land and further degrade and deteriorated the quality and the productive capacity of land surface. Like the other types, land pollution also arises as a global environmental problem, specifically associated with urbanization and

industrialization, that should be dealt with globally, concerned environmental policies. The degradation of land surfaces are caused directly or indirectly by human (anthropogenic) activities. It is possible to mention several reasons temporally or permanently changing the land structure and so causing land pollution. However three main reasons are generally identified as industrialization, overpopulation, and urbanization, and the others counted as the reasons stemming from these main reasons. Some of them are as follows: improper waste disposal (agricultural domestic/industrial/solid/radioactive waste) littering; mining polluting the land through removing the top soil which forms the fertile layer of soil, or leaving behind chemicals used for the process: misuse of land (deforestation, land desertification); soil pollution, soil erosion, and the chemicals (pesticides), insecticides, and fertilizers) applied for crop enhancement on the lands (Savasan, Z, 2017, pp1-2).

Noise Pollution

Noise pollution is generally known as unwanted, untimely and unpleasant sound. Noise is an environmental pollutant. Noise pollution affects public health as well as physical materials. Noise pollution is more frequently found in such places where population density is maximum. The loudness of noise is measured in decibel (dB) unit. The prescribed safe noise level of WHO for a city is 45 dB (Bhattarai, 2014). Crossing the prescribed limit is regarded as causing noise pollution. There are many environmental situations where the noise level may be hazardous to health and hearing. Noise can cause both auditory illness (deafness) and non-auditory illness (psychosomatic disorders) over a long period of time. Although there is no official maximum permissible level of noise is recognized by the Nepal Government. There are, however, signs of warning at some places, especially school, colleges and hospital areas, where horn blowing is not allowed (Shrestha, 2000).

When the concentration of GHG is too high, too much heat is trapped, and the earth's temperature rises outside the range of natural variability. There are many GHG, each with a different ability of trap heat (known as its global "warming potential") and a different half-life in the atmosphere. GHG are sometimes called "climate active pollutants" because most have additional effects, most notably on human health (Ibid, p.2).

With regards to this view, Smith (2021) reported that climate change, as with many other environmental changes has large been approached through a problem oriented framing. This is increasing vulnerability in the nature as well as life of living beings dwelling in the nature.

Sustainable Development and Environment Conservation

Sustainable development (SD) is an all-round model for development, allowing used resources to be replenished so that future generations will have access to them. Mohieldin, as cited in Mensah (2019), described it as a model which considers present needs and those of future generations. This perspective on SD is further reinforced by Evers, as cited in Mensah, 2019, who perceives it as an organizing principle that meets human development goals while sustaining the ability of natural systems to provide essential resources and ecosystem services that society and economies depend on. Thus, SD desires to balance social progress, environmental balance, and economic growth. On one side, Ukaga et al. (as cited in Mensah, 2019) posit that shifting away from harmful socio-economic activities toward the one contributing to positive environmental, economic, and social impacts will suffice to meet SD goals. In addition, SD may be achieved through education that raises awareness among the populace for informed actions to be taken toward the SDs. For example, environmental education can prepare individuals to know the kind of decisions they will make when certain resources are used up or conserved. This is according to the SD framework, elaborating how educational systems should enable future generations to cope with many contemporary complex global issues, such as environmental degradation and climate change.

Global warming or climate change can be described as the slow rise in overall worldwide temperatures resulting from natural causes and human activities, especially the latter emitting more and more greenhouse gases into the atmosphere, specifically CO₂, CH₄, N₂O, and CFCs. According to the Intergovernmental Panel on Climate Change, these gases heat up the Earth's atmosphere and have a huge intensification effect on the greenhouse, leading to serious environmental problems. Climate change affects regions around the world, from melting polar ice caps and a rise in sea levels to increased frequencies of extremities in weather conditions like heatwaves, droughts, and heavy rainfall. According to Field et al. (2012), each of these effects will be magnified in the decades ahead,

posing significant threats to both natural and human systems. Effects on Various Ecosystems by Global Warming Global warming impacts various ecosystems, including ocean surface warming, leading to temperature stratification. In turn, this produces conditions unfavorable to some species, but highly favorable to others, often causing the collapse of whole ecosystems. Kumar et al. (2018) highlight the fact that climate change has always been a factor in extreme habitat alternation, where species like the polar bear have fallen well within the circle of risk. As Arctic sea ice is estimated to be melting at 9% per decade, its primary habitat-the polar bear-is at the verge of annihilation. Moreover, NOAA 2020 adds that this might eventually contribute to the destabilization of these already fragile ecosystems and the loss of biodiversity, which then alter ecosystem services so essential for human well-being. The educational response becomes highly necessary due to the crises because it instills a foundational understanding in environmental sciences and best practices of sustainability. Climate change and sustainability educational programs encourage communities to implement mitigation and adaptation measures that have minimal environmental degradations. They will also help instill a sense of responsibility, encouraging people and organizations to work out ways to reduce gas emissions and protect biodiversity. Filho et al. (2018) point out that ESD acts as a global driver against climate change, which is essential in developing a necessary educational sector toward sustainability in many countries.

Coping Measures of Climate Change

Environment law is a collective term for various international treaties, statutes, regulations, and national legislation that function in regulating various interactions of humans with their relationship to the natural environment. According to Bakhiet (2021), this law will check anthropogenic activities to avoid intentionally or unintentionally harming the environment through attempts at limiting resource utilization towards sustainability. From the latter half of the 20th century, environmental law emerged as one of the fastest-growing fields, developing from a small sector of the law into a strong framework of protection and conservation for the environment. This development demonstrates the need for legal frameworks in protecting individual rights, extending into the broader preservation of the environment itself. Whereas most early environmental laws dealt with property rights and only indirectly supported environmental conservation through providing for responsible resource use, more recent legislation deals directly with environmental protection in and of itself. Global legislation has expanded environmental protections to safeguard ecosystems, prevent pollution, and mitigate climate change's effects.

The United States has established significant legal precedents, such as the Clean Air and Clean Water Acts, and the Paris Agreement, to promote global greenhouse gas emissions reduction. These days, environmental laws can be as specific as local regulations regarding noise control or as international as efforts aimed at mitigating causes of climate change. Many countries recognize the right to a clean and healthy environment, with environmental protection laws incorporating environmental justice and public health provisions emphasizing the connection between human rights and environmental health.. For instance, the European Union's environmental law requires all member states to establish and enforce controls against pollution stringent enough to ensure that sustainable development is achieved both within countries and at an international level. This is according to the European Commission, 2020. Environmental law thus gives the necessary framework within which individual nations and countries can corporately act in the control of pollution and put up a fight against global warming to ensure that natural resources are being exploited in a truly sustainable manner. With environmental concerns growing globally, the importance of roles these laws can play is now increasingly urgent, forming part of a world that is rapidly changing current issues and shaping new ones in the protection of the environment. Programs dealing with education on environmental law are significant in bringing about better understanding among individuals and organizations of the legal and ethical dimensions of environmental protection, and fostering active participation in sustainability.

Global Environment Agreement and Conference

Global Environmental Agreements and Conferences International environmental agreements and conventions have been the very fulcrum upon which responses to environmental challenges are made. The right to a clean and healthy environment is recognized in many countries. In other words,

laws on environmental protection are increasingly including environmental justice and public health provisions that emphasize the nexus between human rights and a sound environment, with the right to clean air, water, and safe living conditions. These conferences saw the birth of a number of basic documents and treaties emanating from the Rio Declaration on Environment and Development to Agenda 21, instituted in 1992. It was at this Earth Summit that the United Nations Framework Convention on Climate Change—otherwise known as UNFCCC—was born: the foundation upon which subsequent agreements on climate action have been made. The latter was legally binding under the 2015 Paris Agreement under UNFCCC; the attempt to reiterate the global commitment to limits on greenhouse gas emissions went further to become a milestone of international climate policy itself. (Bodansky, 2016) The outcome of such conferences would range from one international treaty on specific environmental issues to another. Other agreements that deal with atmospheric pollution, such as the Montreal Protocol on Substances that Deplete the Ozone Layer, and marine pollution, such as the 1973 MARPOL Convention of the International Maritime Organization, set good examples in terms of protection against environmental health hazards globally.

The Convention on Biological Diversity signed at the Earth Summit in 1992 remains one of the most important agreements that take care of biodiversity and ensure sustainability in all respects on this earth. It has raised conservation of animals and biodiversity into a big issue. Member countries are legally obliged to address issues such as air, sea, and land pollution, endangered species preservation, and ecosystem preservation through these treaties.

Importance of Education on Environment Protection

Education for climate change builds key competencies among students and the general population for unfolding climatic changes. Along with conventional knowledge and learning, it should involve skills that would enable the adaptation of day-to-day practices and community systems toward adjustment. In a holistic sense, adaptation is an ecological, social, and economic adjustment process. Accordingly, adaptation is one process through which alteration in processes, practices, and structures decreases vulnerability to climate change impacts, variability, and events. Thirdly, UNESCO's 2019 report on vulnerability assessment shows how education can render the students proactive as climate leaders. In a number of schools, there are student clubs known as the Climate Change Crusaders, which undertake community-based vulnerability assessment in mapping climate change impacts within their locality and gathers the community members, local stakeholders, teachers, and government officials for discussing such impacts en masse and advance propositions of adaptive measures in the future. The engagement in such a manner also presents opportunities for adaptive capacity building and participates in planning for community resilience in general (UNESCO, 2019). According to Anderson, ESD encapsulates within its broader umbrella that is climate change education, which thus enables multi-stakeholder social learning, sustainable livelihoods, poverty reduction, and behavioral change. ESD consequently yields to sustainability as an all-encompassing aim for every level and kind of learning and promotes the acquisition of competencies necessary to attain sustainable adjustment. Besides, the educational establishments should practice environmental care themselves. This may be ensured through carbon-neutral policies of environment-friendly construction and maintenance of facilities and integration of green technology in the management of schools for reduced energy use.

Indeed, millions of schools worldwide have the potential to reduce their ecological footprint. International frameworks, such as the 1975 Belgrade Charter and the 1977 Tbilisi Declaration, both endorsed by UNESCO, guide environmental education globally. These outline goals for environmental education that focus on awareness, skills, and a worldwide commitment toward environmental stewardship. Since these frameworks were promoted, environmental education programs have expanded internationally, building awareness and competencies fundamental in creating climate resilience. In the United States, environmental education is integrated into school curricula from kindergarten through 12th grade, while private-sector environmental educators support in-school programs to further engage students in issues about the environment. As such, private environmental education complements school-based programs and extends the reach of climate change education through practical activities beyond the classroom that are intended to foster sustainable lifestyles. Experiential learning allows students to work directly on climate-related

projects, which, according to research, can significantly enhance their environmental commitment and readiness to engage in sustainable practices (Monroe et al., 2019). This may also be expressed in programs that are focused on specific environmental issues—for instance, the irregular rainfalls that could lead to water stress—could help foster the creation of alternative water supplies, like rainwater harvesting and grey water recycling systems (Blumstein, 2007). Other education policies that promote sustainability contribute directly to the mitigation of climate change. For example, green building design and sustainable management of school grounds reduce the carbon footprint from educational institutions and consequently set a model that enhances the integration of sustainability in the learning environment for students. This shows that environmental protection, as relates to the field of education, is a pedagogical and practical goal in view of the fact that a sustainable school serves as a model for students and the general community (Leiserowitz & Fernandez, 2008).

4. Conclusions

The study was focused on the overview of environment pollution, climate change and how to mitigate it by human. Also it describes on how education can play an important role to minimize the pollution and way out for coping their effect. The study has explored the importance of environment and what will be the effect of humans as well as living beings when environment is degraded. Environment pollution and climate change is supplementing each other. Change in environment is natural phenomenon but excessive and unnecessary change brought by human developmental activities enforced to degrade environment and result of climate change, ozone layer depletion. Education also is a main part to make awareness to conserve environment.

As adopted objectives it was designed qualitative research method and information for the study were secondary data collected from different sources. The study found that environment degradation is due to human developmental activities. Environment depletion and climate change brought challenges on human life. Impacts are on agriculture, industries, and beauties of nature, biodiversity and ecosystems. Education for environment conservation is implying but not seems so effective. Local knowledge, religions and cultures can significantly contribute to environmental conservation.

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