

## Environmental Degradation: Its Causes, Effects and Restoration

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### ABSTRACT

The environmental degradation refers to deterioration of the environment through depletion of resources which includes biotic and abiotic elements that constitute our surrounding. Environment has been deteriorating for the last couple of centuries and almost every part of the earth has been touched. The major and primary factors of environmental degradation are both manmade like as modern urbanization, industrialization, overpopulation, deforestation, agricultural intensification and natural such as flood, typhoons, droughts, rising temperatures, fires and many others. The industrial revolution of 19<sup>th</sup> century mechanized the production and manufacturing of goods and introduced the use of machinery and other heavy equipment; which in turn, used fuels as source of energy. The modern advancement in technologies on which we feel proud is actually the root cause of the environmental deterioration. The industrialization increases the number of poisonous gases like oxides of sulfur, nitrogen, carbon, and smoke in the atmosphere. The degradation has adverse effects on humans, plants, animals and microorganisms and even on food safety. To cope up with the critical situation, we need to make optimum use and management of resources, sustainable development; adoption of green concept. In present communication efforts has been made to overview the impact of environmental degradation and its consequences and plans to strategies to reduce the effects of development on environmental degradation.

**Keywords:** Agricultural Intensification, Environmental degradation, Food safety, Human impacts, Industrialization, Natural Resource, Pollution, Restoration

## INTRODUCTION

The environment is everything in our surrounding which affects our ability to live. Healthy environment can prevent about one quarter of global burden of disease. Clean air, stable climate, adequate water, sanitation and hygiene, safe use of chemicals, protection from radiation, healthy and safe work place and proper agricultural practices are all prerequisites for good health. India has made amazing achievements in the field of agriculture and production through Green revolution and industrialization, making India an exporter from an importer of food grains. Industrialization post 1991 has definitely brought prosperity to the Indian economy but along with that pollution and urbanization became major threats to the environment leading to stress on the basic needs of the life for example the natural resource base as well as pushed the environment closer to break the threshold of tolerance. Environmental sustainability is now a key factor in deciding the industrial development process. Actually, the term 'Environment' is the total sum of all the living and non-living objects in our surroundings. It includes all those elements that have some kind of impact on the growth and development of an organism.

The United Nations International Strategy for Disaster Reduction defines environmental degradation as "The reduction of the capacity of the environment to meet social and ecological objectives, and needs". Environmental degradation is of many types. When natural habitats are destroyed or natural resources are depleted, the environment is degraded. Efforts to counteract this problem include environmental protection and environmental resources management.

Environmental degradation is a very serious problem worldwide, which covers variety of issues including pollution, loss of biodiversity, animal extinction, deforestation, global warming and many others. The environmental degradation is deterioration of the environment through depletion of resources which includes all the biotic and abiotic elements. Environmental degradation is also having useful aspects through the creation of more new genes e.g. some new species have been grown as some ones have declined. Theory of natural selection states that new species are constantly regenerating as the environment changes, and human activity is the main driver's power. Most of the people about three fourths of its population depends directly for their livelihood on activities based on natural resource and the remainder of the population relies on these resources directly for food, fuel, industrial output, and recreation. The use of agriculture fertilizer is a major factor for the degradation of soil quality, soil erosion, salinity and general loss of fertility of agricultural land as well as the loss of the production of the quality crop. Similarly, groundwater aquifers are overexploited in many arid and semi-arid areas, surface water sources are highly polluted and consequently, water for drinking and irrigation is increasingly getting scarce and polluted. Fishery yields are declining, and air quality is deteriorating. Increasing levels of air, water, and land pollution pose a serious threat to human health and longevity (Malik *et al.*, 2014; Malik *et al.*, 2015; Yadav *et al.*, 2019). Good environmental management is essential for economic growth and development. Climate change and environmental degradation affect all types of development projects in all countries. Climate change and environmental degradation are proceeding rapidly and are already affecting many

communities in developing countries. (O'Neill *et al.* 2010) reported that slowing population growth could provide 16-29% of the emissions reductions, and suggested to be necessary by 2050 to avoid dangerous climate change. His study in 35 countries suggested that, slowed population growth could save 1.4 to 2.5 billion tons of carbon emissions per year by 2050, certainly help to solve the climatic problem.

### **CAUSES OF ENVIRONMENTAL DEGRADATION**

Numerous factors directly or indirectly affecting the environment, among them natural factors like flood, typhoons, droughts, rising temperatures and fires whereas urbanization, deforestation, population growth, economic growth, increase in energy use and increase in transportation are the main human activities responsible for environmental degradation (Ganapathi, 2019, Nathaniel *et.al* 2021, Singh A. 2015,). These collectively generate stress on the basic life, pushing the environmental impacts closer to the threshold limits of tolerance. (Chopra, 2016, Patnaik, 2018).

### **POLLUTION**

Environmental pollution means deterioration of natural resources qualitatively as well as quantitatively and these can come from variable sources (Olorode *et. al.* 2015). The growth of the human population, industrial and agricultural practices is the major cause of pollution. Pollution introduces due to various contaminants into the environment severely harm the plants and animals and sometimes threatened to their lives. Water pollution largely caused when toxic pollutants like pesticides, toxic chemicals and other particulate matter are introduced into water bodies like as lakes, rivers, ponds and seas. These contaminants are caused by different human activities such as agricultural runoff, improper sewage treatments and oil spills (Maurya 2020). Pollution is a very severe problem worldwide; pollution resulted in the decline of the quality of both natural biotic and abiotic factors (Cheng *et al.*, 2016; Rahman *et al.* 2017). Water pollution causes serious risk to life, particularly when the water used as source of drinking and for domestic purposes for human beings. Water pollution is working as the agents spread of numerous diseases such as cholera, typhoid, and tuberculosis. Olaniran (1995) defined water pollution as the presence of undue amounts of a hazard (pollutants) in water which make it unsafe for drinking, bathing, cooking or other domestic uses (Maurya and Malik, 2016a and b, Maurya *et al.*, 2019). Acid rains occur when oxides of sulphur combine with moisture generally emitted from coal plant and other related industries. Acid rain can acidify and pollute the lakes, streams, even the buildings and causes similar effects to the soil as well. According to the U.S. Environmental Protection Agency (EPA), if enough acid rain falls in a given environment, it can acidify the water or soil to a point where no life can be sustained. Plants die off consequently the animals that depend upon them likely to disappear. Similarly, the smoke emitted from various vehicles and industries like nitrogen oxide, carbon monoxide, carbon dioxide, sulfur dioxide, nitrogen dioxide, and particulate matter; these emissions contribute to increased global warming (Alexander and Kanner, 1995; Maurya 2020). The environmental protection agency (EPA) estimates that industrial workers suffer up to 300,000 pesticide-related acute illnesses and injuries per year, mostly cholinergic symptoms from anti-cholinesterases and lung disease from

airborne exposure (Hansen and Donohoe, 2002). These are toxic, remain in the environment long-term, resist degradation, and can travel long distances as well.

### **AGRICULTURAL RUNOFF**

Agriculture runoff generally caused by farming is a deadly source of pollutants. EPA categorizes agriculture as the major source of water pollution. Runoff of water washes over surface soil into the ponds, lakes and rivers and seas. During these processes the fertilizers and pesticides used on the farm lands go in to the water resources. Introducing poisons materials into water streams will have terrible consequences in the water ecosystem and food chain. Fertilizers have also large amount of phosphorus leads to explosions of algae in lakes and other water bodies. After the die of algae, bacterial decompositions start to break down of the organic materials. Shortly develops a treble situation where bacteria use the available dissolved oxygen in the water at threatened level, which causes plants, fishes and other organisms to survive. The water becomes acidic due to excessive acid rain, lakes and other water bodies become dead zones with conditions so toxic that neither plants nor animals can survive in these environments.

### **GLOBAL WARMING**

Global warming also referred to climate change is the observed rise in the average temperature of the climate system of the earth. Furthermore climate change and its effects differ from region to region and local climatic conditions. Expected effects include an escalation in global temperatures is mounting sea levels, deforestations, imbalanced climatic conditions, change in precipitation and expansion of deserts as well (Cunningham *et al.*, 1999). Global warming has several adversarial effects on human health and production in agriculture.

Change in climate generates a multifarious challenge posing a critical threat to life on the beautiful planet earth and generating entirely different way of intellectualizing the world and chances to provide safe food. In the recent past many studies pertaining to the potential effect of increase in temperature, unsafe weather events and thrashing events on food safety and then human health. Climate change and changeability may have an adverse effect on the occurrence of food safety hazards at different steps of the food chain, from primary production to consumption. There are various paths through which climate related factors may influences the safety to food containing variation in temperature and precipitation arrangements, high frequency and intensity of dangerous weather events, ocean warming, acidification and changes in nature of contaminants' transport ways and many others. Change in climate affect the eco-friendly features pertaining to food systems like agriculture, animal production, global trade, demographics and human behavior as well, which ultimately influences the food safety. Alteration in temperature as well as changes in pattern of rainfall leads to adverse effect on the tenacity and patterns of manifestation of bacteria, viruses, parasites, fungi and the arrangements of related foodborne diseases. These changes also leads to impact on microbial ecology as well as growth, plant and animal physiology, host exposure which result in the appearance, redistribution and change in the occurrence and strength of plants, animals diseases and pest augmentation, all of which may influences the food borne diseases and zoonoses as well. Change in climate and variation also leads a challenge to pest and diseases measures like as Good Agriculture and Veterinary

Practices with possible implications for the presence of chemical residues in food chain. Tough weather for example floods and droughts may cause to pollution of soil, agricultural lands, water and food, animal feed stocks with pathogens, chemicals and many other hazardous materials, initiating from sewage, agriculture and different industries. Apart from these different emergency situations after natural disasters are the particularly for water and food sanitation (Tirado et. al. 2010, Miraglia et. al. 2009). It causes an increase in risk of heat-related diseases, civil conflict and decline in economical sources. Apart from these it also affects human health due to the higher frequency of malaria, dengue, yellow fever, viral encephalitis due to the expansion of mosquitoes and other insect-borne related infections in the warmer areas of the world. Prolonged duration of abnormally high temperature can have drastic health problems on vulnerable populations (Sajjad, 2020). The antagonistic effect on production of agriculture is caused by the increased frequency of droughts, floods, hurricanes and increased incidence of pests ultimately causes a shortage of food. The IPCC reports point out the shortage of water and food due to high temperature will affects about the 130 million people in the Asia.

### **POPULATION**

Population is directly related demand of food, clothes and shelter. As increase in population increase the need the more space to grow food and directly related materials and provide the homes to millions of people as well. These result in deforestation which ultimately leads to loss of natural biodiversity, destruction of the ecosystem. The increase population and economic developments in the country degrade the environment. In addition to these uncontrolled growths of urbanization, industrialization, expansion, intensification of agriculture and the destruction of natural habitats are also due to population growth. The growing population and the environmental deterioration face the challenge of sustainable development. Population is a significant source of development at the same time it is a major source of degradation of environment. Unless the relationship between the multiplying population and the life support system has to stabilize, innovative development programmes are not likely to produce required results. Population affects the environment chiefly by the use of natural resources and generation of wastes as well as associated with environmental stresses like loss of biodiversity, air and water pollution. Several reasons are responsible for distress out migration from rural to urban areas. This is reasonably due to the decline in resource availabilities per capita and reduction in economic opportunities in the rural areas and these are comparatively better in urban areas.

### **URBAN DEVELOPMENT**

As per numerous renowned ecologists, urban development is one of the major causes of degradation of environment. Population is directly related to the requirements of the livelihoods, as it increased the need for land for homes and farms increased. As per the World Bank, India, alongside China, Indonesia, Nigeria, and the United States will lead the world's urban population surge by 2050. (Chopra, 2016)

### **DEFORESTATION**

Forests are invaluable property of a nation as they provide raw materials to modern industries, timber for building purposes, habitats for numerous types of animals and micro-organisms. Good

fertile and nutrient-rich soils having a high content of organic matter offer protection to soils by binding the soils through the network of their roots and by protecting the soils from the direct impact of falling raindrops. They encourage and increase the infiltration of rainwater and thus allow maximum recharge of groundwater resources, minimize surface run-off and hence reduce the frequency, intensity, and dimension of floods. High rate of deforestation means cutting down of trees with high frequency to make the arrangement of more homes and industries. Rapid growth in population and extension in urbanization are the major causes of deforestation. In addition to these, use of forest land for agriculture purposes, animal grazing, harvests for wood for fuel and logging are also causes of deforestation. Deforestation contributes to global warming by increasing the level of carbon dioxide in the environment (Sajjad, 2020). Deforestation responsible for the several problems associated with environmental degradation through augmented rate of soil erosion, hikes the sediment load of the rivers, siltation or reservoirs and river beds, promotes the conditions of drought, changes in the pattern of distribution of precipitation, intensification of greenhouse effects increase in the destructive force of the atmospheric storms and many others. (Tyagi et. al. 2014)

### **NATURAL SOURCES**

Environmental degradation is largely accompanying with the human activities, however it also influences constantly with time. Without the influence of human activities, some ecosystems decline with the time. Landslides, earthquakes, tsunamis, hurricanes, and wildfires sometimes utterly abolish local plant and animal communities to the level where they can longer functioning. The environment sometimes unable to keep up with the new species and hence probabilities of degradation increased.

### **IMPACTS OF ENVIRONMENTAL DEGRADATION**

Environmental degradation caused by socio-economical, technological, institutional and other related activities. The resources those are affected include water, air and soil. The degradation influences the wildlife, plants, animals and micro-organisms as well. When factories release toxic chemicals and waste into water bodies at abnormally high rate without suitable treatment, healthy life of living being start to suffer. Pesticides and fertilizers while farming run to water systems and pollute the same. Polluted drinking water affect the life of all living being abruptly causes several serious illnesses and sometimes it become the cause of death. Areas where the pollutants are at high level in air causes many respiratory system related issues like pneumonia and asthma. Common pollutants responsible for air pollution are residual suspended particulate matter (RSPM), suspended particulate matter (SPM), oxides of nitrogen, carbon, lead, sulphur and many others. The common factors responsible for poor air quality in urban areas are industrialization, enormous increase in vehicle and the burning of fossil fuels creates the problems by which many living being suffered from respiratory systems, heart and lung diseases (Chopra, 2016). Many people are reported to die due to the indirect effects of air pollution (Adakole and Oladimeji, 2006). Biodiversity is an important factor for maintaining the balance of the ecosystem and stabilizing climate. Deforestation, global warming and overpopulation are the main cause of loss of biodiversity.

The ozone layer is known to protect the earth from harmful effect of ultraviolet rays. The presence of chlorofluorocarbons in the atmosphere is the major cause of the ozone layer to deplete. Depletion of the ozone layer causes reduction in protection of earth surface from harmful rays (Buhaug *et al.*, 2010, Chopra, 2016). The deterioration of the environment can be a huge setback for the tourism industry that relies on tourists for their daily livelihood. Environmental damage in the form of loss of green cover, loss of biodiversity, huge landfills, increased air, and water pollution can be a big turn off for most of the tourists. As humans dump waste products, use chemicals, and over fish in the oceans and seas, areas of beauty such as coral reefs are damaged. At times the destruction is so great that is cannot be reversed. We are killing our planet and the consequences are tremendous. The huge cost that a country may have to borne due to environmental degradation is economic impact in terms of restoration of green cover, cleaning up of landfills and protection of endangered species. The economic impact can also be in terms of the loss of the tourism industry. As you can see, there are a lot of things that can have an effect on the environment. If we are not careful, we can contribute to the environmental degradation that is occurring all around the world. We can, however, take action to stop it and take care of the world that we live in by providing environmental education to the people which will help them pick familiarity with their surroundings that will enable to take care of environmental concerns thus making it more useful and protected for our children and other future generations.

### **RESTORATION MEASURES**

Healthy environment is necessary for good working, good health and efficiency for every work. It is moral responsibility to everyone takes the measure to protect the environment. Among them some common remedial steps to reduce are the degradation of environment such as conservation of water by discriminating the use as per requirement. Reuse the recyclable materials in view to reduce pilling of waste, throw the waste in appropriate bins, and conserve the energy by using more efficient apparatus/instruments and the messages related to the significance of the good environment, cause and consequences.

The protection of environment from contaminations is prime important for everyone and hence it is responsibility of each and every one to take the measure in these regards. Reduce the use of harmful materials with all efforts. Furthermore, it is moral responsibility of academicians and scientific community to search new alternatives routes to reduce the pollution and balance the equilibrium between development and environment.

### **CONCLUSION**

Healthy environment plays pivotal role in the life process of all living beings. Good environmental conditions improve the work efficiency, productions and improve the economy as well. Deterioration in environmental condition causes several problems with respect to all issues. Therefore, it is required to discuss the different environmental degradation related matters, try to search the new strategies in view mitigate the problems and also search the new remedies to overcome these.

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