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Problem of Environmental Pollution: Preventive Measures and Proposed Solutions to Address It

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Body of Occupational and Environmental Safety and Health



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Abstract

The environment in its broad linguistic sense indicates to the location that human being belong to by turning it to his home and living there. The connection between environment and the meaning of home or house has a clear indication; undoubtedly, this indication illustrates the attachment of the creature's heart with the home and to reside there. From this point, one of the ascertained commitments is that the environment in its broader meaning, should meet the individual's aim and interests, similar to the homes and houses which fulfill the aims, interests and concerns of the individuals. The simple definition of pollution which is understood by any one of us is: "basically the thing is not clean" which causes some damages and problems to the human's health, or even to the whole organisms and in the entire world. While, if we focus on the concept of environmental pollution from a more practical and precise perspective: it could be described as a change in the environmental surrounding organisms through human's behaviors and its daily activities which lead to the emergence of some resources which do not fit with the organisms' locations and leading to its unbalance. Basically, the human being is the main factor who controls the Contaminants by turning it either to useful resources or harmful ones. For example, the animal's biological offal could be a useful resource if it is exploited as fertilizers for agricultural soil. While in the case of its disposal in the waters, it will spread various diseases and epidemics. For this purpose, this attempt is directed to contribute in the recognition of the problem, selection of its types, reasons, and the purpose of the preventive measures and proposed solutions for addressing the pollution in a various methods.



CHAPTER I

Definition of Environment and Pollution (Types and Causes)

Section I: Causes of Environmental Pollution:

Human being is the main and basic cause of the pollution process occurrence in environment, and the emergence of all types of contaminants, as the following:

Human - Industrial expansion – Technological development – Misuse of resources – Population explosion.

Human is the one who invent, who create, who use, who is the main component of population.

Section II: Types of Pollution

2-1. Soil Pollution:

The soil which is considered as the main source of welfare and crop, is the most misused element by human in the environment. The human being deals harshly with the soil without realizing its importance as the sole basic source of his family's food. Non-realizing and understanding the fact leads to the emergence of the human's negligence as well.



2-1-1: Causes of Soil Pollution:

Soil salinity and water saturation, excessive use of irrigation water and poor sanitation cause damage to the soil. The Desertification phenomenon leads to minimize the rain, and wind which bring the sand to the agricultural lands.

- Use of pesticides and chemicals excessively
- The expansion of the urban construction, which led to bulldozing and sweeping away the agricultural lands.
- Pollution by sedimentation of substances into the air of the industrial areas.
- Pollution by radioactive materials.
- Pollution by heavy metals.
- Pollution by organisms.

2-1-1-1. Pollution of Wastes:

Among the types of environmental pollutions, there is the pollution of waste, which includes:

First: Garbage

Second: Radioactive Wastes

First: Garbage:

It means what human leaves behind them of residues during their daily life activities. It is noticed that its share is increasing in developing countries, especially in the context of population inflation. This high percentage of waste



coupled with the absence of health awareness, as well as a weak collection and disposal systems, is causing serious damages, as the following:

-Spread of foul odors

-Occurrence of flames and fires

-A breeding environment for insects such as flies, mosquitoes and mice.

-Proliferation of microbes that cause infection of: Diarrhea, cholera, dysentery, amoebiasis, hepatitis, tetanus, tuberculosis, visual disorders, spread of diseases the cattle spores.

Second: Radioactive Wastes:

1. Military Wastes:

Still the discussion over how to deal and disposal the radioactive waste is ongoing. So far no satisfied solution is determined although the worldwide secret nuclear programs are nearly ceased and the state's radioactive activities no longer covered. While a variety of challenges still clearly present. Currently, the problem does not lie in manufacturing more nuclear weapons, but it lies in its a complex disposal manner and availability of a healthy way to store it as well as the huge financial problems which is required to cover the removal cost and recovery from the pollution which is caused by these wastes..

2. Civilian Waste:



The radioactive waste is not limited solely to the military sector and its destructive weapons, but it also includes the radioactive wastes which come from civil electric generation besides other peaceful means. The civilians damage the environment through a traditional treatment of radioactive waste by burying it in the landfills, and they think it is the only way for its disposal because despite worldwide effort for inventing a safe manner, nevertheless they failed. However, the volume of the disaster is not limited to the manner of its burying by affecting the surrounded environment, and the farming in these polluted lands which affect the human's quality and destroying its genes, but its effects will last and continue, and it may never be removed over time.

2-2. Water Pollution

It includes:

First: Fresh water pollution.

Second: Pollution of the marine environment.

First: Fresh Water Pollution and its impact on Human Health:

What are the elements that cause pollution to the fresh water?

The phenomenon:

1- Use of water tanks, in the case that the water does not reach the upper floors, which are not cleaned periodically, which is very dangerous.



- 2- Lack of sanitation and disposal of its wastes.
- 3- Disposal of the industrial wastes without its treatment or partially treated. –

Impacts of fresh water pollution on human health:

Simply, it immediately destroys human health through infection with intestinal diseases, including: cholera, Typhoid, all types of dysentery, hepatitis, Malaria, bilharzias, cases of poisoning, liver diseases.

-it is not limited to the damage for human and the diseases that cause, but damage the life in the rivers and lakes. Fertilizers and agricultural residues in wastewater contribute to the growth of algae and other plants, which is detrimental to fish resources because these plants obscure the sunlight and oxygen, and It also helps to breed insects such as: mosquitoes and snails that for example cause bilharziasis.

Second: Pollution of Marine Environment and its Impact:

-Sources of the pollution: the pollution occurs either because of the oil leakage from ship and vessel accidents or from industrial and civilian sanitation.

Impacts of the Marine Pollution:

1-Causes many disease for human

- Hepatitis, Cholera, Intestinal disease, leather inflammation.

2-Damage other organisms:



-It damages the fish resources, and cause large migration of the beneficial birds.

-It damages the marine corals which affect the tourist attractions, in the same time affect the fish resources because many types of fish take the corals as their home and environment.

2-3. Air Pollution:

Air pollution means the existence of damaging substances in the air which in first place negatively affect the human health. Thus, it is necessary for human to control the air pollution as it is the elixir of life for human being. Air pollution causes the death of nearly 50000 person annually (this percentage represent 2% of the total other causes of death). The most disturbant element is the smoke emerging from cigarette and tobacco, which kills about 3 million people annually and it is expected to raise to 10 million in the next for decades, if the phenomenon continued in the current mode.

Section III: Global Warming Phenomenon

Global warming can be defined as the gradual increase in temperature in the lowest layers of atmosphere as a result of the emission of greenhouse gases since the beginning of the industrial revolution. Greenhouse gases mostly consist of water vapor, CO₂, methane and nitrous oxide. Ozone is a natural gas that plays an important role in heating the Earth's surface so that it can live on it.



Without it, the Earth's surface temperature may reach 15-19 degrees Celsius below zero. These gases absorb some of the infrared radiation emitted from the surface of the earth as a reflection of the radiation falling on the surface of the earth from the sun, and retain it in the atmosphere of the earth to maintain the Earth's temperature at normal rate.



CHAPTAE R II

Preventive Measures and Proposed solutions to address pollution

Section I: Importance of Trees in preserving the Environment and protecting it from Pollution

The human's life from very beginning was connected with a tree through the story of Adam and Eve. Throughout history trees occupy a respectful place at the nations, which sometime reached the level of holiness. That is because it is connected with the daily needs of human throughout the life, and the tree's name is mentioned in many ancient codifications, Heritage and research works, and in the poetrys and literature language as well as the most Heavenly religions mention its holiness, first of them is Holy Qur'an. It is interesting to note that to this day the people continue to beat the wood believing that it will expell the evil and envy, and in this reference to the trees that have great spiritual effects known to man in all parts of the world. Trees are correlated with human through producing more than 10000 substances allocated for human's various uses and his daily needs. Human lived and coexist with the trees after hiding themselves in its shades and eating its fruits and boasting its flowers and beauty, and enjoying the refreshing breaths in their forests and used their firewood. Wood remains a source of non-limited products despite the production of competitive industrial materials. It is used in the port, furniture, bridges, and pillars for mines, boats,



helicopters, runways, and construction panels. Wood is the raw material in the manufacture of cardboard, cellophane, photographic film and industrial fresheners.

Wood is the fuel, since the earliest centuries till nowadays; it is used as a main heating material. It has a high strength compared to its weight, which is the heat and electricity-insulating. It contains cellulose, a basic material for the production of many chemical compounds. human enjoys trees in the case of vegetables and also during the picking and dryness, it is a tree described by the Creator Almighty: by a good word, its origin is fixed and its branch in the sky..

Section II: Importance of Trees and Forests in protecting Environment

Both industrialized and developing oil countries are affected by the environmental problem of oil and gas extractions as well as refineries of Hydrocarbon derivatives. Trees play a substantial role in the environmental issues, which its lack in any area leads to an environmental imbalance in the region. Although a single tree may not vitally influences the environment as a whole, while they collectively provide a small atmosphere which positively affect the surrounding environment. The role which trees play in protecting environment is crucial. Thus some of them are mentioned below:



1- Decreasing pollution: Plants provide more oxygen in the air which is the start of a food chain for all organisms through the process of photosynthesis and absorption of carbon dioxide gases, which is one of the main causes of pollution.

2- Optimize the atmosphere through transpiration and climate improvement. The presence of plants and trees somewhere, in turn, reduces the temperature in that place, especially in the summer.

3- Relieve sun glare (radiated) through leaves of trees.

1- Absorption of sounds and reduction of the noise sharpness in the crowded areas.

2- Stop sand crawling and reduce desertification

3- Preserving the soil and reduce the problem of soil erosion and drained by erosion factors such as wind and strong water. Protecting the cities from the strong winds and reduce its strength.

A medium tree absorbs 107kg of CO₂ in a daily manner, and produces 140liter of oxygen. To remove the pollutant effects of one vehicle, it requires planting 7 trees. In addition to the trees' benefits of absorbing the CO₂, it works to reduce the speed of the air loaded with dust, which leads to the leakage of contaminants suspended in the air and increases its purity.

*the management of trees and forests in a sustainable way is regarded as a basic factor in the water resource management. Forest regulate the quality of water and protect soil, and contribute in fertilizing the soil as well as directing



Surface runoff of water. The diverse forest is a repository for dozens of species of animals that are essential to the ecological balance of lions, reptiles and birds. It improves the quality of life of urban dwellers who move to them in search of comfort and contact with nature by enjoying nature and beautiful scenery. That is why, planting trees is too important for the society and in the individual's life which provides a beautiful scene and serves social environment either by crops or woods.

Section III: How to Preserve Vegetation and Trees?

- No construction over the agricultural lands
- Conducting of foundation campaigns for afforestation
- Respect the tree feast and celebrate it
- No neglecting of the agricultural soils and cultivating it as possible
- Avoid the tree cutting or burning
- Install sand dunes



Above sample: The pollution disaster threatens to evacuate Ahwaz from its population www.Al-Arabia.com

Let us do not forget Wangari Maathai, the first African woman who won the Nobel Prize for peace in 2004, and that was because of her establishment of the Green Belt Movement in 1977. They planted more than 30 million trees and raising it as a sign for peace, depending on a clean and healthy environment and protecting it.

Section IV: The Afforestation Operation

After chosen appropriate plants for the local environment, among the successful factors of the afforestation operation inside the cities is to follow



the scientific measures and regulations of the afforestation in the streets' sidewalks, central islands, in front of the shops and houses.

Among the most important technical proposals for developing the work in the secretariats and municipalities regarding the adoption of scientific standards and controls in the preparation process, are the following:

A- Removal of the obstacles of vision such as trees and plaques at the intersections and light signals, and keeping only the green plates and plants of a limited height in these areas. The distance between the turn, the sign, the intersection, and the beginning of afforestation must be agreed upon. All this will be achieved only by conducting a field study contributed by the secretariats with the officials in the traffic in order to come up with a realistic study of a radical solution to such obstacles. when those points have taken into consideration, the afforestation will contribute to the beauty of cities and the preservation and safety of innocent lives and reduces accidents.

B- It is necessary to re-study the status of the ponds on the sidewalks in terms of removing or redistributing some of them so as to facilitate the passage of pedestrians. Especially on the sidewalks of the streets in the cities of high density pedestrian.

C- As to the afforestation in front of the shops, it is accompanied by many barriers. The difficulty in the operations of the agricultural irrigation and its



maintenance in the narrow roads is one of the main barriers. In addition, trees in front of the shops hinder the traffic and obscure the vision of shop fronts. Accordingly, majority of the shop owners do not like it. Furthermore, the ponds of these trees may collect wastes, which exposes them to the demise.

D- As for the afforestation in the sub streets, it should be mentioned that the majority of the citizens do not desire the afforestation in front of their houses. Especially when the trees grow up. Under the pretext that the cutting operations lead to the detection of houses and the fall of leaves in their homes and on their cars. Additionally, suffering during the irrigation and the presence of resident cars in front of those trees. It is preferable that the subject be optional for citizens and not mandatory. A citizen who plants a tree by choice and desire will be keen on it and will give it part of its time and money to maintain and care for it, and vice versa if it is mandatory.

E- Fields that are designed in the triangles form should be cultivated with flowering plants or other short plants so as not to obscure vision and ensure the safety of traffic.



CHAPTER III

Section I: Preventive Measures to Maintain Air Safety

A number of measures and procedures exist that can be followed in preventing or limiting air pollution. It includes: appropriate scientific planning when establishing industries, taking into account the climate and terrain, determining the maximum concentrations of polluting substances allowed in the air. Also monitoring and reviewing points should be established to measure air quality in different areas of each city, taking into account the growth patterns of these cities and the quantity of pollutants.

Dissemination of the air quality standards for polluting materials, as well as the results and the monitoring measurements of this quality should be published in the various media. The interest in planting trees, green areas and belts around the cities and industrial areas should be motivated.

Among the proposed solutions to resist the air pollution is to choose a fuel free from contaminants and turning to new sources of low-pollution energy. In addition, cars and public transport means must be controlled by stopping any transport mean with a high emission percentage of gases. In addition, the sources of pollution should be monitored, especially the combusting machines in factories and power plants in order to reduce the quantity of the pollutant materials that they release.



Section II: Preventive Measures to Maintain Water Safety

It primarily includes investigation of the water pollutant materials and preparing the lists of standards for it, as well as studying the nature of the water in terms of the size, composition and particulate matter and also its properties. In addition, the pollutants' chronic effects should be determined in the case of low concentration exposures by humans and other organisms. And identification of diseases that transmit through the polluted water.

Enactment of legislations to maintain and preserve water in a chemical, natural and biological condition that does not cause harm to humans, animals and plants. Finally, periodically analyzing the water chemically and biologically to ensure its continued safety.

- Among the proposed solutions to address water pollution:

Improvement of the treatment methods of public water resources and sewage that is to meet the urgent need for water due to the population explosion, industrial and agricultural progress, and the needs of industry and agriculture.

Section III: Preventive Measures to Maintain Soil Safety

Since pollution is not limited only to air and water, but also to the soil, a number of preventive measures are required for the protection of harmful pests and the disposal of some irregularities, such as plastic materials and rubber tires by mixing with paving materials.



Among the projected solutions to address soil contamination: If pesticide use was extremely essential, the rapid putrefaction pesticide should be used rather than the fixed one. If it was necessary to use the fixed pesticides, it must be in the least possible, and in conditions that make them less polluting the environment.

Further research on the relationship between pesticides that pollute Environment and living organisms should be conducted. Also a continuous awareness and training should be speeded to pesticide users to identify the best pest control methods and to use as little pesticide as possible to achieve the desired purpose and to improve pesticide use equipment.



CHAPTER IV:

Stages and Degrees of Pollution

Stage I: Acceptable Pollution

It consists of a limited extent of pollution which is not generally accompanied by 'any clear hazards' affecting the appearance of life on the Earth. Thus such degree of pollution is only an environmental phenomenon rather than an environmental problem.

Stage II: Harmful Pollution

The pollutants in this degree reach the phenomenon boundary, which leads to a disruption in the harmonic movement within the system. It will be accompanied by serious risks to the most organisms and non-organisms in the environment. The pollution in this stage appears as a major problem.

Stage III: Deadly Pollution

Pollution in this stage is the most dangerous one, as the pollutants exceed the dangerous limit to reach the so-called lethal or destructive limit of life.

The Pollutants can be broadly divided into several Groups:

1. Gaseous Contaminants: They are released from factories' chimneys or from separation and distillation devices, e.g. sulfur oxides, hydrogen sulfide, nitrogen oxides, ammonia, carbon monoxide and hydrocarbons.



2. **Molecules:** It can be gases, vapors or solids of micro-volumes, which are released from metal industries such as steel, aluminum, asphalt industries, petroleum and chemical industries.

Molecules include:

A - **Dusts:** Solid molecules its diameter is more than 1 micrometer.

B - **Fog:** Liquid Molecules (drops) resulting from the condensation of vapors, its diameter between (0.5-10) micrometers.

C - **Smoke:** Its diameter is less than (0,5) micrometers.

D - **Liquid drizzle:** Its diameter of (10-400) micrometer.

E -**Molecules** less than (0.1) micrometers and they are charged with a negative or positive charges, or uncharged.

3-Heavy Metals: released from the chemical industries, including lead, mercury, copper, nickel, etc., and enough parts of the million may cause great danger.

4. Liquid Waste: It is produced by most industries, especially petroleum and chemical industries, including:

A-Non-Organic Wastes: containing acids, bases and salts.

B-Organic Waste: Includes oils, greases, organic chemicals, insecticides, herbicides, hydrocarbons,

5. Solid Waste: These wastes are produced from the human and animal activities. They are solid or semi-solid and may not of any value, such as: food



waste, garbage, ash, demolition waste, waste of industry - waste of the waste treatment plant.

6. **Noise:** It has not yet been proven that a person loses his life due to his continuous exposure to high levels of noise. While it may damage human such as: temporary or permanent hearing loss, as well as it may interference in the close contacts between people and disturb them during sleep, work and so on.

Four classes of wretched pollution could be mentioned below:

1-Organic Pollution: it emerges in the existence of organic offal in the watery areas which by its putrefaction leads to proliferation of bacterium, viral life, spleen, the single cells. This pollution primarily occurs due to the leakage of sewage into dam, rivers, underground water, valleys and lakes. Also it emerges from proliferation of household, industrial and agricultural residues which is rich with trophic materials. The organic pollution is often connected with the density of population, the centers of concentrated residents, especially the urban ones. It is usually an indicator of a incompetent sanitation or lack of it.

2- Chemical Pollution: It emerges in the existence of chemical composites in the watery areas which the concentration many times higher than its normal average. It is often comes from water which used in washing and isolating the metals. Also from waters used in multi-industries which mixes with riverbeds or sanitation untreated. Usually this water is loaded with heavy metals which is



highly poisoned, containing: chrome, carbon, zinc and lead...etc. it causes many cutaneous and internal diseases.

3-Thermal Pollution: This is due to the increase in waters temperatures in the natural medium as a result of its mixture with the cooling water from the power plants and some chemical industries. Thermal pollution changes the balance and chemical interactions in the water environments, especially acidity, carbonate deposition, dissolved oxygen in water, and the death of organisms in water.

4-Radioactive Pollution: It produces from nuclear wastes, power generation plants or mineralization that is available on some radioactive objects. This pollution is also caused by the nuclear tests, and may be transmitted by washing rain water from areas that are contaminated with radiation or with the flow of groundwater. The concept of pollution that began at the end of the 1970s, it was limited to "pollution of air, water and dust. While currently includes the loss of natural resources, including the collapse of the environment. For example, addressing the pollutant waters has become "more complex" due to the intensive and widespread use of different types of pesticides in agricultures.



Gaseous pollutants include the following:

1. **Hydrocarbons:** It could be a gas, liquid or solid organic compounds. It consists mainly of numbers of carbon atoms and hydrogen in very different forms and types. Hydrocarbons are not dangerous substances themselves, but its risks lie in their subsequent interactions with other pollutants under the sunlight, oxygen and other substances.
2. **Carbon Monoxide:** This gas is the result of the union between carbon with oxygen, when carbon is burned "incompletely" or under certain conditions. The source of carbon in these cases is oil or coal or natural gas. It is one of the main types of energy sources on the earth, and it is commonly known as fossil fuels. The reason for this description is due to the buried animal and plant organic matter millions of years ago in the ground and was transformed by heat and heavy pressure into oil, coal, and natural gas.
3. **CO₂**
4. **Nitrogen oxides:** One of the most important nitrogen polluting gases to the atmosphere is nitric oxide or nitrogen monoxide and nitrogen dioxide NO₂. In high temperature conditions (above 100° C) these gases are produced during the combustion process. Gas Oxygen and Nitrogen Combine with Lycone Oxide at most it produces Nitric Oxides NO with a small amount of Nitrogen dioxide NO.



5. **Sulfur Oxides:** The contamination of sulfur oxides is one of the most serious air pollution problems in the environment, especially human health. These oxides include mainly sulfur dioxide and sulfuric acid.
6. **Hydrogen Sulfide Gas:** H₂S is emitted from various natural sources, such as the volcanic eruptions from which significant quantities are released, as well as "larger quantities resulting from the degradation of organic matter of plant and animal origin, especially in wet and water environments and under the influence of anhydrous bacteria that attack the bacteria and transform it into a process Reduction to kbritet.



Pesticides and chemical, scientific and educational horizons



Conclusion

Finally, we confirm that researching an essential topic, such as environmental pollution and the degree of international responsibility in it, is a contemporary and precise subject. I recognize that its study is not simple, due to the evolution of the environmental protection researches and diverse doctrinal approaches to international environmental problems. This derives me to call on international law and environmental protection organizations to satisfy their international legal responsibilities. Thus they should study and specify the elements of damage and compensation in this area, as well as the responsibility of the States for acts that cause pollution that threatens all humankind, and also specify standards whereby the measurement of the degree of gravity of such acts. They should clarify all of these concepts and provide them for researchers without leaving any confusions and ambiguities. I do not ignore anybody's role, from in their position either by negative or positive impact on the environment. Everyone is invited to take accountability for protecting the environment. In the case of our dereliction and failure to fulfill this responsibility, we will become conspirators in the crime of destroying the planet. It is a common crime, and we will all be harmed by the damage that does not know borders, and pass us without a censor, judgment or passport. Pollution and its impacts will spread everywhere which there may not be any safe place. Despite all this, it is not too late! There should be an international cooperation and collaboration. The worldwide organizations have to coordinate their efforts. States must enact strict environmental laws and legislations; fill the legal vacuum in the field of environmental protection. The media should activate their efforts for environmental knowledge. The goal is that human live a stable and safe life, free from risks and diseases and far from all manifestations of panic and worry, then achieving our hopes. ▮