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SOIL POLLUTION

Dr. Mahadik Chandrakant Ekanath
Associate Professor ,Department of Chemistry,
Ramkrishna Paramhansa Mahavidyalaya, Osmanabad.

ABSTRACT

Soil is the dumping ground of most of the waste products-domestic, human, animal, industrial and agricultural. Every year the solid wastes dumped into the soil are increasing at an alarming rate all over the world. Large number of hazardous chemicals and several thousand tons of wastes are ultimately dumped on the land. These are leached by municipal and industrial wastes and are responsible for pollution of ground water. The problem of soil pollution is compounded by the use of agrochemicals, eg., pesticides, fungicides, bactericides, insecticides, biocides, fertilizers and manure. Besides these the soil is polluted by deadly pathogenic organisms. The soil pollution differs from air and water pollution in the sense that the pollutants in soil remain in direct contact with the soil for relatively longer periods. In fact, the soil has been heavily polluted as a result of industrial revolution and green revolution. Basically humans are responsible for the pollution of the land.

What causes Soil Pollution? Human activities are the primary cause of soil pollution and land degradation. By the end of this topic, you will know how different forms of human activities are responsible for the majority of different types of soil pollution.

KEYWORDS : waste products-domestic, human, animal, industrial and agricultural.

INTRODUCTION

Soil pollution is the addition of chemicals to the soil in quantities that are toxic to the environment and its residents. This addition is mostly by human activities such as mining, modern practices in agriculture, deforestation, indiscriminate dumping of human generated trash and unregulated disposal of untreated wastes of various industries

Pollution by agricultural practises has come up ever since the demand for food has increased, proportional to the increase in population. To increase the yield of farms and fields the farmers have had to resort to additional chemical fertilizers, pesticides, weedicides, hormonal treatments for the animals, nutrient laden feed and many such practices which changed the way farming was done traditionally.

Soil, Soil Pollution & Pesticides

Soil Pollution has gradually become a major challenge that we need to overcome for establishing a healthy environment. Weathering of the earth's crusts by different processes leads to the formation of soil that accumulates over the centuries. The soil is the home for a large part of bacterial biodiversity and other microscopic and macroscopic living organisms.

However, let us consider our very own country India. Indian economy is largely dependent on agriculture. Thus, we Indians give very high priority to the development of agriculture, fisheries, and livestock. Therefore, for surplus production, it is very important to protect crops from any type of damage that occurs due to insects, weeds, rodents and other crop diseases.

So, how do we protect crops? The very obvious answer is pesticides and herbicides. However, do you know these pesticides and herbicides is a leading cause of soil pollution? Therefore, it is very important to judiciously use pesticides because it contains lots of different harmful chemicals. Therefore, to improve soil and prevent soil pollution it is important to limit the use of pesticides and herbicides.

Definition of Soil Pollution

Soil pollution refers to anything that causes contamination of soil and degrades the soil quality. It occurs when the pollutants causing the pollution reduce the quality of the soil and convert the soil inhabitable for microorganisms and macro organisms living in the soil.

Soil contamination or soil pollution can occur either because of human activities or because of natural processes. However, mostly it is due to human activities. The soil contamination can occur due to the presence of chemicals such as pesticides, herbicides, ammonia, petroleum hydrocarbons, lead, nitrate, mercury, naphthalene, etc in an excess amount.

The primary cause of soil pollution is a lack of awareness in general people. Thus, due to many different human activities such as overuse of pesticides the soil will lose its fertility. Moreover, the presence of excess chemicals will increase the alkalinity or acidity of soil thus degrading the soil quality. This will in turn cause soil erosion. This soil erosion refers to soil pollution.

Causes of Soil Pollution

Soil pollution can be natural or due to human activity. However, it mostly boils down to the activities of the human that causes the majority of soil pollution such as heavy industries, or pesticides in agriculture.

Pesticides

Before World War II, the chemical nicotine chemical present in the tobacco plants was used as the pest controlling substance in agricultural practices. However, DDT was found to be

extremely useful for malaria control and as pest control of many insects during World War II. Therefore, it was used for controlling many diseases.

Hence, post-war, people started using it as pest control in agriculture for killing rodents, weeds, insects, etc and avoiding the damages due to these pests. However, everyone gradually the adverse effects of this chemical which led to the ban of this chemical in many parts of the world including India.

Moreover, pests became resistance to DDT due to the chemicals regular use. Hence this led to the introduction of other harmful chemicals such as Aldrin and Dieldrin. Pesticides are synthetic toxic chemicals that definitely kill different types of pests and insects causing damage to agriculture but it has many ecological repercussions.

They are generally insoluble in water and non-biodegradable. Therefore, these chemicals will not gradually decompose and keep on accumulating in the soil. Therefore, the concentration of these chemicals will increase when the transfer of these chemicals take place from lower to higher trophic level via the food chain. Hence, it will cause many metabolic and physiological disorders in humans.

Chlorinated Organic toxins

The harmful effect of DDT and other chemicals led to the introduction of less persistent organic and more-biodegradable substance such as carbamates and organophosphates. However, these chemicals act as harmful toxins for nerves, hence they are more dangerous to humans. It led to pesticides related to the death of field workers in some agricultural fields.

Herbicides

Slowly, the industries began production of herbicides like sodium arsenite (Na_3AsO_3), sodium chlorate ($NaClO_3$), etc. Herbicides can decompose in a span of few months. However, even they affect the environment and are not environmental friendly. Even though they are not as harmful as organo-chlorides but most of the herbicides are toxic. They are known to cause birth defects.

Furthermore, research suggests that spraying herbicides causes more insect attack and diseases of plants in comparison to manual weeding. One thing to note here is all the above factors occupy just a small portion of the causes. Majority of the causes is related to manufacturing activities in chemical and industrial processes that are released in nature or environment.

Inorganic Fertilizers

Excessive use of inorganic nitrogen fertilizers leads to acidification of soil and contaminate the agricultural soil. Also known as agrochemical pollution.

Industrial Pollution

The incorrect way of chemical waste disposal from different types of industries can cause contamination of soil. Human activities like this have led to acidification of soil and contamination due to the disposal of industrial waste, heavy metals, toxic chemicals, dumping oil and fuel, etc.

Inferior Irrigation Practices

Poor irrigation methods increase the soil salinity. Moreover, excess watering, improper maintenance of canals and irrigation channels, lack of crop rotation and intensive farming gradually decreases the quality of soil over time and cause degradation of land.

Solid Waste

Disposal of plastics, cans, and other solid waste falls into the category of soil pollution. Disposal of electrical goods such as batteries causes an adverse effect on the soil due to the presence of harmful chemicals. For instance, lithium present in batteries can cause leaching of soil.

Urban Activities

Lack of proper waste disposal, regular constructions can cause excessive damage to the soil due to lack of proper drainage and surface run-off. These waste disposed of by humans contain chemical waste from residential areas. Moreover leaking of sewerage system can also affect soil quality and cause soil pollution by changing the chemical composition of the soil.

After-Effects of Soil Pollution

Soil pollution is not only the problem in India but it is a global problem. It causes harmful effect on the soil and the environment at large. Contamination of soil will decrease the agricultural output of a land. Major soil pollution after effects are:

Inferior Crop Quality

It can decrease the quality of the crop. Regular use of chemical fertilizers, inorganic fertilizers, pesticides will decrease the fertility of the soil at a rapid rate and alter the structure of the soil. This will lead to decrease in soil quality and poor quality of crops. Over the time the soil will become less productive due to the accumulation of toxic chemicals in large quantity.

Harmful Effect on Human Health

It will increase the exposure to toxic and harmful chemicals thus increasing health threats to people living nearby and on the degraded land. Living, working or playing in the contaminated soil can lead to respiratory diseases, skin diseases, and other diseases. Moreover, it can cause other health problems.

Water Sources Contamination

The surface run-off after raining will carry the polluted soil and enter into different water resource. Thus, it can cause underground water contamination thereby causing water pollution. This water after contamination is not fit for human as well as animal use due to the presence of toxic chemicals.

Negative Impact on Ecosystem and Biodiversity

Soil pollution can cause an imbalance of the ecosystem of the soil. The soil is an important habitat and is the house of different type of microorganisms, animals, reptiles, mammals, birds, and insects. Thus, soil pollution can negatively impact the lives of the living organisms and can result in the gradual death of many organisms. It can cause health threats to animals grazing in the contaminated soil or microorganisms residing in the soil.

Therefore, human activities are responsible for the majority of the soil pollution. We as humans buy things that are harmful and not necessary, use agricultural chemicals (fertilizers, pesticides, herbicides, etc.), drop waste here and there. Without being aware we harm our own environment.

Therefore, it is very important to educate people around you the importance of environment if they are not aware. Prevention of soil erosion will help to cease soil pollution. Thus, it is our small steps and activities that can help us to achieve a healthier planet for us. Therefore, it is essential for industries, individuals and businesses to understand the importance of soil and prevent soil pollution and stop the devastation caused to plant and animal life. the Negative Consequences of Soil Pollution?

Soil contamination harbors an expansive range of negative results that influence plants, creatures, people, and the biological system in general. Since kids are progressively defenseless to maladies, contaminated soil represents a more prominent danger to them.

Impacts on Human Beings

Soil contaminants can exist in every one of the three stages (strong, fluid, and vaporous). In this way, these contaminants can discover their way into the human body by means of a few channels, for example, direct contact with the skin or through the inward breath of tainted soil dust.

The momentary impacts of human introduction to contaminated soil include:

- Headaches, sickness, and retching.
- Coughing, torment in the chest, and wheezing.
- Irritation of the skin and the eyes.
- Fatigue and shortcoming.

An assortment of long haul illnesses have been connected to soil contamination. Whatever infections are recorded beneath.

- Exposure to significant levels of lead can bring about changeless harm to the sensory system. Youngsters are especially helpless against lead.
- Depression of the CNS (Central Nervous System).
- Damage to essential organs, for example, the kidney and the liver.
- Higher danger of creating malignancy.

It very well may be noticed that many soil poisons, for example, oil hydrocarbons and modern solvents have been connected to intrinsic issue in people.

Effects on Plants and Animals

Since soil contamination is frequently joined by a decline in the accessibility of supplements, vegetation stops to flourish in such soils. Soils defiled with inorganic aluminum can demonstrate harmful to plants. Likewise, this kind of contamination regularly builds the saltiness of the dirt, making it aloof for the development of vegetation.

Plants that are developed in dirtied soil may aggregate high convergences of soil contaminations through a procedure known as bioaccumulation. At the point when these plants are devoured by herbivores, all the aggregated toxins are left behind the natural way of life. This can bring about the misfortune/annihilation of numerous alluring creature species. Likewise, these toxins can in the long run advance toward the highest point of the natural pecking order and show as ailments in people.

Effects on the Ecosystem

- Since the unpredictable contaminants in the dirt can be diverted into the air by winds or can saturate underground water holds, soil contamination can be an immediate supporter of air and water contamination.
- It can likewise contribute towards corrosive downpour (by discharging immense amounts of smelling salts into the environment).
- Acidic soils are unfriendly to a few microorganisms that improve soil surface and help in the deterioration of natural issue.
- Crop yield is extraordinarily influenced by this type of contamination. In China, more than 12 million tons of grain (worth around 2.6 billion USD) is seen as unfit for human utilization because of tainting with overwhelming metals (according to thinks about directed by the China Dialog).

CONCLUSION

According to the study, soil contamination was found to be 1.13 times more likely in non-ODF villages as compared to ODF villages. Similarly, non-ODF villages are 1.48 times more likely to have their food contaminated and 2.68 times more likely to have household drinking water contaminated compared to ODF villages.

The two reports were released on the World Environment Day and representatives of both institutions lauded the political will of the government for pursuing this scheme. In his first Independence Day speech as the PM in 2014, Modi spoke at length about sanitation and the need to build toilets, a precursor to his ambitious Swachh Bharat Mission. A World Health Organization study in 2018 said that 3 lakh lives would be annually saved once 100% ODF is achieved.

Environment minister Prakash Javadekar claimed Swachh Bharat Mission has become a people's movement. "People made whistle gangs to taunt anyone who would sit in the field. Thousands of women started using toilets. Earlier toilets were made, but not used. We will go forward to provide more toilets as poor people want to aspire," he said.

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