

Environmental Impact Assessment on Soil Pollution Issue about Human Health

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Abstract

Soils are formed by the decomposition of rock and organic matter over many years. Soil properties vary from place to place with difference in bedrock composition, climate and other factors. Certain chemical elements occur naturally in soils as components of minerals, yet may be toxic at some concentration. Other potentially harmful substance may be end up in soils through human activities. Soil contamination may be responsible for health effects costing millions of Euros, but studies to quantify the true cost are in their infancy. Health problems from cancer (Arsenic, Asbestos, Dioxins), to neurological damage and lower IQ (Lead, Arsenic), kidney disease (Lead, Mercury, Cadmium). Heavy metals and persistent organic chemical are of particular concern. Human activity introduces heavy metals (Such as Cd, As, Hg etc) to our soils through mining, smelting, industry, agriculture and burning fossil fuels.

Keywords: Environmental impacts, soil pollution, human health, toxic metals.

Introduction

Soil is a dynamic, natural body occurring on the surface of the earth. It is a medium for plant growth of land plants. Soil pollution is defined as a phenomenon characterized by the loss of structural and biological properties by the soil layers as a result of numerous human and natural factors, such as wind, deforestation, chemical use, among others, etc. Developmental activities such as construction, transportation and manufacturing

not only deplete the natural resources but also produce large amount of wastes that leads to pollution of air, water, soil, and oceans; global warming and acid rains. Untreated or improperly treated waste is a major cause of pollution of rivers and environmental degradation causing ill health and loss of crop productivity. In this lesson you will study about the major causes of pollution, their effects on our environment and the various measures that can be taken to control such pollutions.

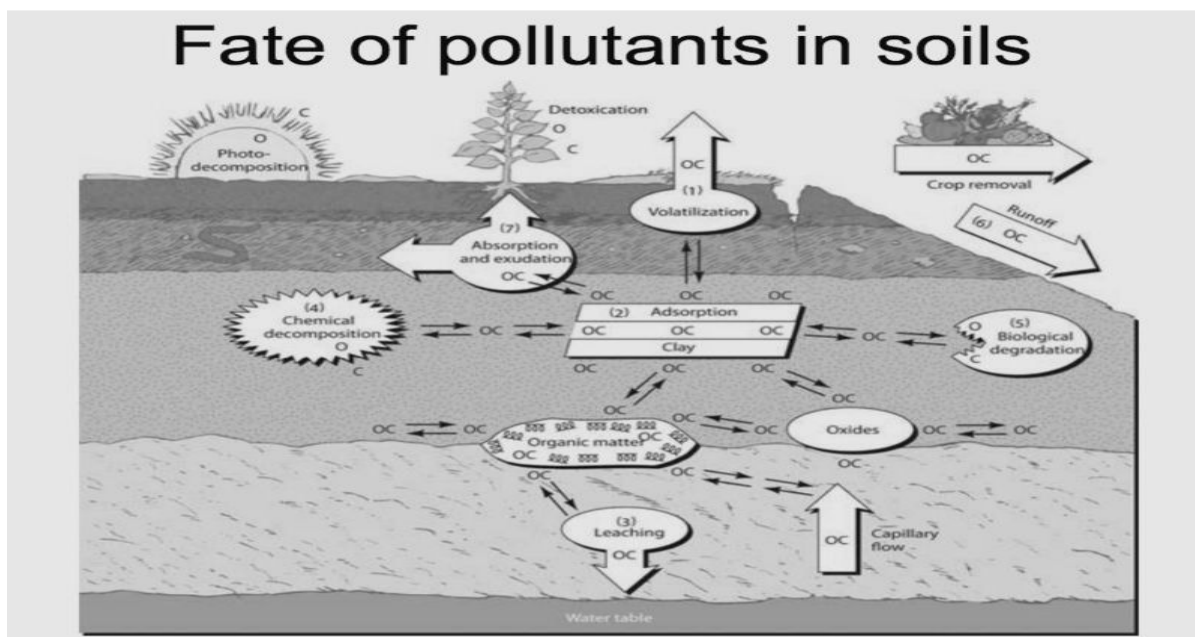


Figure-1
Fate of Pollutants in Soils

Table-1
Types of pollutant and Effects

Pollutant	Source	Possible effects
Lead	lead paint and gasoline	brain damage and learning problems
Coal dust	coal mining	black lung disease
Pesticides	use in agriculture and landscaping	nerve damage, birth defects, and cancer
Bacteria in food	poor sanitation and poor food handling	gastrointestinal infections
Particulate matter	vehicle exhaust, burning waste, fires, and tobacco smoke	respiratory damage (asthma, bronchitis, cancer)

Source: Based on the Basic Law for Environmental Pollution Control¹⁻⁴. Pollution that contaminants all, or at least portions of land and underlying soils, Common soil pollution sources

Agriculture: Example: sediments, pesticides, herbicides, animal wastes, and fertilizers resulting from poor irrigation systems and the improper disposal of wastes⁵⁻⁶.

Industrial Processes: Example: release of toxic substances from industry, poor mining practices, oil and gas well leaks, and underground storage tanks⁵⁻⁶.

Health effects: Soil pollution makes direct impact on human health or due to inhalation of polluted soil which have vaporized.

Commonly encountered heavy metals are chromium, cobalt, nickel, copper, zinc, arsenic, selenium, silver, cadmium, antimony, mercury, thallium and lead etc in polluted soil can be chronic exposure to carcinogenic, due to this congenital disorders or other chronic health problem created. Due to industrial or human made naturally occurring chemicals as ammonia and nitrate linked with livestock fertilizer from land operation, have also been defined as health dangerous in soil and groundwater.

The term leukaemia is also associated with higher concentration of benzene have chronic exposure to human health. Kidney damage observe due to concentration of mercury and cyclodienes, induce sufficient concentration of PCBs and cyclodienes have also been attached to liver toxicity. Neurological damage caused by Carbomates and organophosphates. Cancers caused by arsenic, asbestos or dioxins, lower IQ caused by lead or arsenic, bone diseases through lead, fluoride or cadmium. Highly polluted soil through ingestion of investing can cause death.

The Scottish Government medical institution of occupational exposure to human health from contaminated land assessment methods to review the project for introducing the purpose of the Commission's overall guidance is an important possibility that

sites are important to human health damage (SPOSH) represents the Scottish local authorities in assessing should be useful to the above work. it is envisaged that the project output is a short document Published guidance and reference existing methodologies that are being particularly relevant and useful have been identified as health risk assessment must provide high level guidance on the project how to determine the risk acceptance policy guidelines to human health have been developed and are in the Scottish legislation and statutory Guidance(SPOSH) as defined in line with the criteria for unacceptable risk creation approach to assessment will examine⁷⁻¹².

Ecosystem effects: Not unexpectedly, polluted soil affected essential ecosystem due to this soil chemistry changes which contaminated species. Radical concentration at too many hazardous chemicals can arise from there changes of arthropods and microorganism in soil environment. Polluted soil linked to primary food chain of ecosystem which can result into virtual elimination of the lower life forms on chemical effects. Even if small, lower food chain pyramid level foreign organic chemicals become more concentrated for each consumers of the food chain.

The ecological balance of any system gets affected due to the widespread contamination of the soil. Most plants are unable to adapt when the chemistry of the soil changes so radically in a short period of time. Fungi and bacteria found in the soil that bind it together begin to decline, which creates an additional problem of soil erosion.

The fertility slowly diminishes, making land unsuitable for agriculture and any local vegetation to survive.⁷⁻¹².

Methodology

Key concepts in understanding soil contamination and health, Soil Properties: Soil variation observes across the India from one place to other place. The physical and chemicals properties of soils depend upon to topography, living being, particular time, climate condition, available material it's also been linked to human health. soil is a systematic composition will impact how much water holding capacity, how to supports the ecosystem, how much chemical reaction and cycles nutrients to be occur, due to above factor it is define that how the soil transported and transformed will definitely occur contamination in soil. The present chemicals form in living organism that is harmful to human health.¹³⁻¹⁶.

Soil Health: Farmer relates to soil health and scientist relates to soil quality both are same. A healthy soil has many biological, chemical and physical parameters. Heathenise of the soil will increases to add sufficient amount of organic matter having suitable soil structure.¹³⁻¹⁶. Routes of Soils to human intake, Eating, Inhalation, Through Skin.

Table- 2
Below shows the sources, risk levels and health effects from exposure to this heavy metals

Heavy Metal	Sources of Environmental exposure	Minimum Risk level	Chronic exposure toxicity effects
Lead	Industrial, vehicular emissions, paints and burning of plastics, papers, etc	Blood lead levels below 10 µg/dl of blood*	Impairment of neurological development, suppression of the hematological system and kidney failure
Mercury	Electronics, plastic waste, pesticides, pharmaceutical and dental waste	Below 10 µg/dl of blood* Oral exposure of 4mg/kg/day**	Gastro-intestinal disorders, respiratory tract irritation, renal failure and neurotoxicity
Cadmium	Electronics, plastics, Batteries and contaminated water	Below 1 µg/dl of blood*	Irritation of the lungs and gastrointestinal tract, kidney damage, lungs cancer

Mg/dl*: micrograms per deciliter of blood Mg/kg**: milligrams per kilogram

Environmental Pollution and Impacts of Exposure: Heavy metal can be called as metallic elements that are available in both natural and polluted environment. In natural environment found less concentrated but high concentrated in polluted environment. Once this heavy metal deposited they will not be disintegrated for long life due to this so many health problem occurs as vomiting, abnormalities, nausea and gastrointestinal, for example we discuss here as Arsenic from smelter emissions and pesticide residues binds strongly to soil and will likely remain near the surface for hundreds of years as a long-term source of exposure¹³⁻¹⁹.

Impacts on Public Health: Environmental assessment has been conducted to dumpsite exposes residents levels around the health, had been continuing since pollutants adverse environment¹⁵⁻²⁰.

During experiment we found that higher levels of lead have downstream impact on the living organism near the affected site in which half of the children experimented had toxic level of lead in blood sample near about equal or more as multi nationally accepted (10 µg/dl of blood), due to this led to clinical symptoms such as muscular weakness, headaches and chest pain etc.

Control of soil pollution: Educate farmers to ensure crop rotation. Provide informal settlements with proper waste removal. Ensure local government provides many dustbins in towns and cities. Form action groups in communities to clean up polluted areas. Enforce legislation to prevent dumping in unauthorized areas with strict fines.

Conclusion

This pilot Project has linked environmental pollution and Human health. Soil samples experimented from locations near and within the affected site show high levels of heavy metals emanating from the site in Mainly cadmium, copper, chromium, mercury and lead. It is only in the last 50 years, with the expansion of industry and the chemicalization of agriculture, that the inherently extractive economy has acted as though the renewable resources that support agriculture are fair targets for exploitation in industrial terms. That is what makes the modern era different. Guidelines and proper management of keeping in view should be evolved slag’s including toxic metals techno economic feasibility.

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Table- 3
Below summarizes the health results of the 320 children aged 2-18Years examined in MIDC Area of Mahape, Pawane and Taloja Villages

Impacts on Public Health	Affected children	% disorders
Dermatological (skin disorders)	48	15.0
Respiratory	96	30.0
Gastroenteritis (GE) (abdominal and intestinal problems)	39	12.2
Dental disorders	31	9.7
Oto (affecting the hearing system)	15	4.7
Skeletal /muscular systems	8	2.5
Central nervous system	7	2.2
Eye infections	17	5.3
Blood (anemia)	2	0.6
Others*	21	6.6
Normal	36	11.3

Others*: malaria, chicken pox, septic wounds, congenital abnormalities, cardiovascular diseases and lung cancer

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