

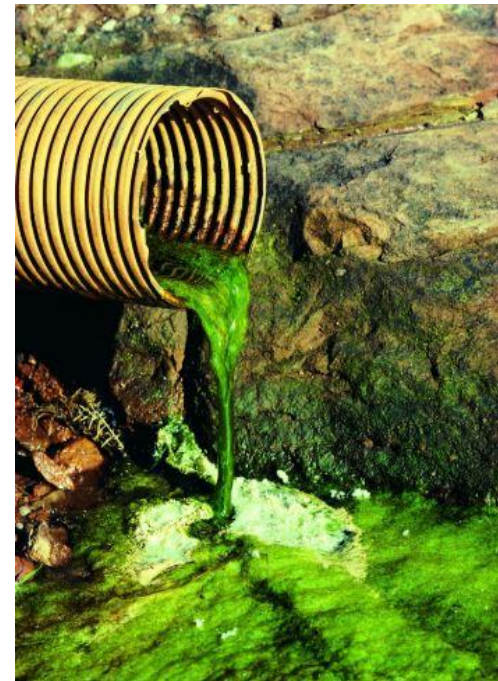
SOIL POLLUTION



- The soil is a resource for which there is no substitute.
- Environmental historian Donald worster' reminds us that fertilizers are not a substitute for fertile soil.

Meaning

- Soil pollution is defined as the presence of toxic chemicals (pollutants or contaminants) in soil, in high enough concentrations to pose a risk to human health and/or the ecosystem.
- 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.

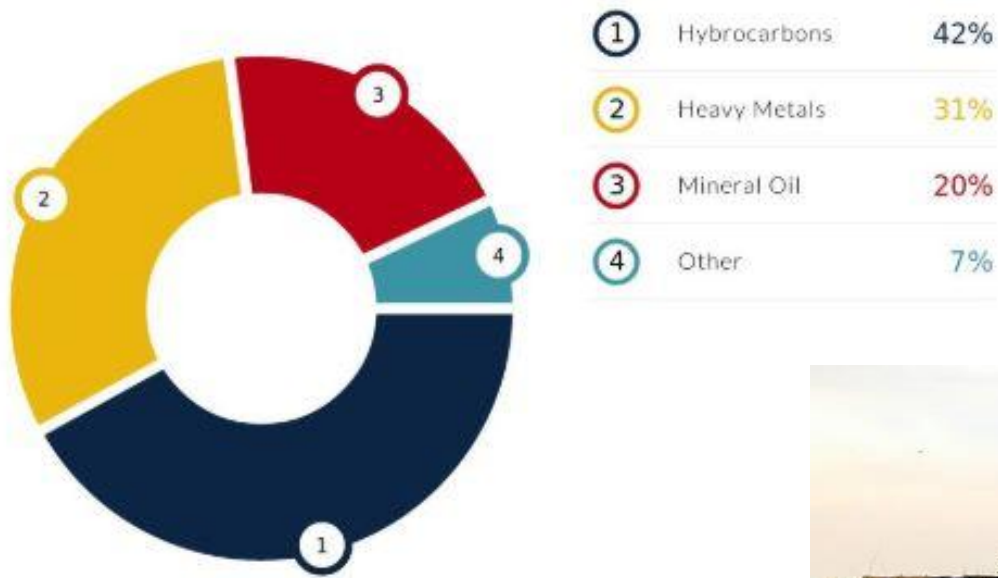


Introduction

- Soil contamination or soil pollution as part of land degradation is caused by the presence of xenobiotic (human-made) chemicals or other alteration in the natural soil environment.
- It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste.
- Contamination is correlated with the degree of industrialization and intensity of chemical substance.
- The concern over soil contamination stems primarily from health risks, from direct contact with the contaminated soil, vapours from the contaminants, or from secondary contamination of water supplies within and underlying the soil

Types of soil pollutants

- Biological agents work inside the soil to introduce manures and digested sludge (coming from the human, bird and animal excreta) into the soil.
- Agricultural practices: The soil of the crops is polluted to a large extent with pesticides, fertilizers, herbicides, slurry, debris, and manure.
- Radioactive substances such as Radium, Thorium, Uranium, Nitrogen, etc. can infiltrate the soil and create toxic effects.
- Urban waste consists of garbage and rubbish materials, dried sludge and sewage from domestic and commercial waste.
- Industrial wastes: Soil, pesticides, textiles, drugs, glass, cement, petroleum, etc. are produced by paper mills, oil refineries, sugar factories, petroleum industries and others as such.



Toxic Metals that Cause Soil Pollution

Arsenic	Mercury	Lead
Antimony	Zinc	Nickel
Cadmium	Selenium	Beryllium
Thallium	Chromium	Copper



Causes

- Micro plastics
- Oil spills
- Mining and activities by other heavy industries
- Accidental spills may happen during activities, etc.
- Corrosion of underground storage tanks (including piping used to transmit the contents)
- Acid rain
- Intensive farming
- Agrochemicals, such as pesticides, herbicides and fertilizers
- Petrochemicals
- Industrial accidents
- Road debris
- Drainage of contaminated surface water into the soil
- Ammunitions, chemical agents, and other agents of war
- Waste disposal
 - Oil and fuel dumping
 - Nuclear wastes
 - Direct discharge of industrial wastes to the soil
 - Discharge of sewage
 - Landfill and illegal dumping
 - Coal ash
 - Electronic waste
- Pesticides and herbicides
- Agents of war

- The root cause of soil pollution is often one of the following:
 - Agriculture (excessive/improper use of pesticides)
 - Excessive industrial activity
 - Poor management or inefficient disposal of waste

How does it effect human health?

- through direct contact with soil
- inhalation of soil contaminants which have vaporized
- infiltration of soil contamination into groundwater aquifers (underground layer of water-bearing permeable rock) used for human consumption.
- soil contamination vary greatly depending on pollutant type

What are the effects on human health

- congenital disorders (chromium, lead and other metals, petroleum, solvents, and many pesticide and herbicide)
- Leukemia (benzene)
- kidney damage (Mercury and cyclodienes)
- liver toxicity (PCBs and cyclodienes)
- neuromuscular_blockage (Organophosphates and carbonates)
- depression of the central nervous system (chlorinated solvents).
- headache, nausea, fatigue, eye irritation and skin rash (Chemicals)
- some irreversible diseases other chronic health conditions
- can cause death by exposure via direct contact, inhalation or ingestion of contaminants in groundwater contaminated through soil.

Short term effects

- headache
- nausea and vomiting
- chest pain
- coughing and lung problems
- fatigue
- skin rash
- eye irritations