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SOIL POLLUTION DUE TO INDUSTRIAL WASTE

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Abstract

Starting in the 18th century and gaining popularity in the 19th century, the Industrial Revolution caused drastic changes in the social and economical lives of humans. The benefits of this revolution are felt even today, but so are the adverse effects. This advances industrialization results in industrial pollutants to adversely affect soil.

We have conducted the survey in the particular catchment area in the industrial area M.I.D.C., Yavatmal- 445001

Soil pollution generally occurs when there is presence of pollutants, toxic chemicals or contaminated substance in the soil in high concentrations to be of risk to plants, wildlife, humans and the soil itself. The most common source of the industrial pollution are petroleum mineral oil and mineral oil based products. These products when mixed with soil, results in soil pollution. Heavy metal pollution of the soil is mainly caused by the metals like nickel, copper, zinc, chromium, and lead. These are the metals which are largely produced from the industries. The types of metals present in a particular waste depends on the procedure of generation of waste.

Today, arable land is slowly transforming into desert and becoming non-arable at ever increasing rates. The most common source of the industrial pollution are petroleum mineral oil and mineral oil based products. These products when mixed with soil, results in soil pollution. Heavy metal pollution of the soil is mainly caused by the metals like nickel, copper, zinc, chromium, and lead. These are the metals which are largely produced from the industries. The types of metals present in a particular waste depends on the procedure of generation of waste. Usage of pesticides and other toxic chemicals in the field of farming and agriculture is also leading to the soil pollution. Soil contamination caused by the heavy metals from industrial wastes will make soil unhealthy

Index Terms: SOIL POLLUTION IN THE LANDS IN THE VESINITY OF THE INDUSTRIAL AREA.

1. INDUSTRIAL WASTE

The increasing industrialization has led to the pollution of soil through the discharge of effluents by the industrial units. Each type of soil has its own individuality. The distinctive feature of this individuality is the soil profile, which consists of series of layers different from one of percolation of the waste water discharged into the land and the subsequent washing down of the pollutants to the successive horizons. The effluents

discharged by the industrial units onto land contain many toxic chemicals, mineral acids, bases etc. which over a period of time get deposited in the soil due to their retention and adsorption on the soil particles. The mineral constituents present in trace amounts in the discharged effluent favor the growth of some algal, fungal and bacterial colonies which in turn change the texture of the soil. Micronutrients discharging into the soil through effluents results in the porosity of the soil

resulting in poor yields. Also some of the deposited chemicals may be taken up by the plants/ crops growing in such contaminated soils. Organic effluent with high concentration of biodegradable organic matter discharged into the soil attract the saprophytic soil and air micro flora and thus could proliferate resulting in poor yields or fungal diseases in many cases. Thus there is a need to monitor the soils where waste water is applied for irrigation/plantation purposes The

Board is therefore monitoring the soil sample from the fields which are contamination by various pollutants.*



1.1 Causes of Industrial Pollution

1. Lack of Policies to Control Pollution –Less number of effective policies and poor enforcement drive are allowing many industries to bypass laws that are made by pollution control board which have resulted in mass scale pollution that will affect lives of many people.
2. Growth in industries - In most industries, growth is taking place wherein those companies flouted rules and norms and polluted the environment with both air and water pollution.
3. Usage of Outdated Technologies- Many industries even now rely on old technologies to produce products that produce large amount of waste. To avoid high cost and expenditure, many companies still have being making use of traditional technologies to produce high end products.
4. Presence of Large Number of Small Scale Industries- Many of the small scale industries and the factories that don't have enough money and depend upon the government grants to run their day-to-day businesses, often disobey environment regulations and release large amount of toxic gases in the atmosphere.
5. Inefficient Waste Disposal- Water pollution and soil pollution are often a time caused due to inefficiency in disposal of waste. Chronic health problems are caused due to long term exposure to polluted air and water. It also decreases the air quality in the surrounding areas which causes many respiratory disorders and illness.
6. Leaching of Resources From Our Natural World- Industries do require large amount of raw material for making them into finished products. This requires extraction of minerals from the earth. The extracted minerals causes soil pollution when spilled on the earth surface. Leaks from vessels can cause oil spills that may cause harmful for marine ecosystem.

1.2 INDUSTRIAL WASTE

Industrial waste contains organic and inorganic compound, heavy metals , acids, alkalies, suspended solids and other material

In india there were 17 catogery of heavily polluted industries have been identified by our central control board.

The are cement, thermal power plant, distilleries, sugar, fertilizer, integrated iron and steel , oil refineries ,pulp an dpaper , petrochemical, pesticides ,tanneries ,basin drugs and pharmaceutical, dye, caustic soda, zinc smelter ,copper smelter and aluminium smelter

TB. COMPOSITION OF SOME INDUSTRIAL EFFLUENTS -

Characte ristic						
	Oil refin ery	Pap er mill	Distill ery	Cycle indus try	Spe nt was	Zn smel ter
pH	6.9	4.8	7.1	7.1	7.2	3.5
EC	0.5	1.2	13	4.8	29	7.7
C	820	135 0	28350	23	222 5	ND
N	140	168	42	84	120 0	ND
K	0.1	0.5	1576	163	668	ND

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Fe	80	240	459	92	61	0.7
Mn	7.8	16.4	37.9	15	4	ND
Zn	30	6.4	37.9	2.4	1.2	ND
Pb	1	3.8	8.7	ND	0.7	ND
Ni	3	4.2	6.6	30	0.7	ND
Cd	0.1	0.2	0.3	5.4	0.06	0.02

2. Effect Of Soil Pollution

Loss of soil and natural nutrient includes in the soil pollution. Plants also would not live in such soil, which would further result in soil erosion.

Disturbance at the balance of flora and fauna residing in the soil.

Increment in the salinity of the soil, which therefore makes it unfit for vegetation and thus making it useless.

Agricultural practices:

Sometimes, excessive chemical fertilizers are applied to the crops. Plants absorb what they need and the excess goes into the soil. Animal excreta, debris and crop residues are some other contaminants that result from agricultural practices. These contaminate the soil by changing its physical and chemical properties.

Effects:

- i. Soils that have been spoiled due to excessive use of chemicals and pesticides become barren.
- ii. When plant macronutrients like potassium, phosphorus and nitrogen are used excessively, the soil becomes deficient in micronutrients like boron and zinc.
- iii. Excess chemicals from agricultural practices harm the survival of a number of friendly microorganisms.
- iv. Pesticides that contaminate the soil seep lower down the soil layer and contaminate groundwater that is used for domestic purposes.

3. Biological agents:

Biological agents like bacteria, fungi, virus and protozoans are a major cause of soil pollution. Human and animal excreta, poor sanitary conditions, wastes from hospitals and food joints cause soil pollution because they perpetrate growth of biological agents in the soil.

Effects:

- i. They cause diseases in human beings.
- ii. They harm the development and existence of flora and fauna.
- iii. They spoil qualities of fruits and vegetables grown in the polluted soil.

Radioactive pollutants:

Radioactive pollutants arise from nuclear activities like explosion devices, nuclear tests and laboratories, as well as nuclear power plants. Refining of plutonium and thorium as well as fuels for industrial and domestic uses are some other causes of radioactive pollution. Radioactive elements that are released into the air also enter the soil as radionuclides with rainwater.

Effects:

- i. The rainwater that passes through the polluted soil picks up radioactive elements. This harms the flora and fauna that thrive on rainwater.
- ii. Radioactive elements are absorbed by soil particles, causing harm to soil qualities.
- iii. They can cause health problems for human beings.

lose their food supply.



Urban wastes:

Urban wastes that result in residential areas cause contamination of the soil at places where the wastes are not properly disposed. Wastes like glass, plastic, human excreta, fuel residues, metals and vehicular products are common urban wastes.

Not only does accumulation of these wastes result in poor human health, they also cause pollution of the soil. Urban wastes do not dispose easily, and therefore cause a lot of harm to the soil and its properties. Nonbiodegradable wastes like plastic, metal cans and glass cause great harm to the soil.

Effects:

- i. Urban wastes dirty residential areas, resulting in the growth of insects and pathogens.
- ii. They are harmful to human health.

Generally, crops cant grow and flourish in polluted soil. Yet, if some crops manage to grow ,or grown in such soil they would be poisonous enough to cause serious health problems in people consuming them.

~ Creation or production of a toxic dust is another potential effect of soil pollution.

~ Foul smell due to industrial chemicals and gases might result or fall in headaches, fatigue, nausea, and other health problem in many people.

~ Soil pollutants would bring in alteration or disturbance in the soil structure, which would lead to death of many essential organisms in it. This would also directly affect the larger predators and compel them to move to other places, once they

3. PREVENTION /POSSIBLE SOLUTION

- The Industrial effluents must be monitored continuously to avoid or restrict the excessive accumulation of toxic metal in the soil.
- There should be strict government law that only affect industrial efflents be used in the field which are cleaned through effluent treatment plants.
- It is sets in the Environment protection act 1970, all waste will have to be managed in the following order of preference.
- Effluents from industries have to be diluted to avoid their adverse effect on soil .
- Applications of organic manures boost the yield of soil as well as decrease or reduce the metal availability to plant.

4. CONCLUSION

Thus it was analysed that how industrial waste distrurbed the quality of soil and shows adverse effect on growth of plant and yield of crop, The presence heavy metal in soil disturbs food chain and causes serious effect on human health , therefore there is need for proper management and treatment of industrial waste so as to make soil health and wealth

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