

Soil Pollution and Control Measures

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.

or

Any undesirable change in the physical, chemical and biological properties of soil that causes detrimental effect on living biota is known as **Soil pollution**. Soil is not a renewable resource. Its degradation can be rapid (a few years or decades) while it takes several thousands of years to form and regenerate.

Causes of soil Pollution:

- i. **Deforestation and soil erosion:** Deforestation which makes dry land is one of the major reasons of land pollution. In this, we need to observe that once a land becomes dry or barren then it cannot be regained i.e. it will be very difficult to regain its fertility.
- ii. **Mining activities:** At the time of mining activities and extraction activities, many land spaces are made under the surface.
- iii. **Agricultural activities:** With the increase in human population there is an increase in demand for food also. Farmers use toxic pesticides and chemicals to get rid of distinct types of insects and these types of practices result in poisoning of soil.
- iv. **Overcrowded landfills:** Every household produces garbage and the garbage which cannot be recycled come under landfills and this damage beauty of a city and town and at the same time results inland pollution.
- v. **Construction activities:** Because of urbanization these days, construction activities are at a high rate and these activities generates waste particles at a high amount.
- vi. **Industrialization:** There is an increase in population which results in an increase in food, shelter, and other required things. This requirement gave rise to industries and these industries require raw materials which lead to deforestation and also they produce a large amount of waste which has to be disposed of.
- vii. **Nuclear waste:** Nuclear waste from a nuclear plant is dumped beneath surface of the earth for avoiding causality.
- viii. **Sewage treatment:** After the treatment of sewage, huge amount of solid waste goes into landfills which lead to pollution of the environment.

Effect of soil pollution

i. Change in climate patterns

The effects of land pollution are very hazardous and can lead to the loss of ecosystems. When land is polluted, it directly or indirectly affects the climate patterns.

ii. Environmental impact

When deforestation is committed, the tree cover is compromised. This leads to a steep imbalance in the rain cycle. A disturbed rain cycle affects a lot of factors. To begin with, the green cover is reduced. Trees and plants help balance the atmosphere, without them we are subjected to various concerns like Global warming, the greenhouse effect, irregular rainfall and flash floods among other imbalances.

iii. Effect on human health

The land when contaminated with toxic chemicals and pesticides lead to the problem of skin cancer and the human respiratory system. The toxic chemicals can reach our body through foods and vegetables that we eat as they are grown in polluted soil.

iv. Causes air pollution

Landfills across the city keep on growing due to an increase in waste and are later burned which leads to air pollution. They become home for rodents, mice, etc which in turn transmit diseases.

v. Distraction for tourists

The city loses its attraction as a tourist destination as landfills do not look good when you move around the city. It leads to a loss of revenue for the state government.

vi. Effect on wildlife

The animal kingdom has suffered most in the past decades. They face a serious threat with regards to the loss of habitat and natural environment. The constant human activity on land, is leaving it polluted; forcing these species to move further away and adapt to new regions or die trying to adjust. Several species are pushed to the verge of extinction, due to no homeland.

Other issues that we face include increased temperature, unseasonal weather activity, acid rains, etc. The discharge of chemicals on land, makes it dangerous for the ecosystem too. These chemicals are consumed by the animals and plants and thereby make their way in the ecosystem. This process is called biomagnification and is a serious threat to the ecology

Control of soil pollution

The following steps have been suggested to control soil pollution and to help prevent soil erosion. In general, we would need less fertilizer and fewer pesticides if we could all adopt the three **R's: reduce, reuse, and recycle**. This would give us less solid waste.

- i. *Reducing chemical fertilizer and pesticide use:* Applying biofertilizers and manures can reduce chemical fertilizer and pesticide use. Biological methods of pest control can also reduce the use of pesticides and thereby minimize soil pollution.
- ii. *Reusing of materials:* Materials such as glass containers, plastic bags, paper, and cloth can be reused at domestic levels rather than being disposed, reducing solid waste pollution.
- iii. *Recycling and recovery of materials:* This is a reasonable solution for reducing soil pollution. Materials such as paper and some kinds of plastics and glass can and are being recycled. This decreases the volume of refuse and helps in the conservation of natural resources. For example, the recovery of 1 tonne of paper can save 17 trees.
- iv. *Reforestation:* Control of land loss and soil erosion can be attempted through restoring forest and grass cover to check wastelands, soil erosion, and floods. Crop rotation or mixed cropping can improve the fertility of the land:
 - Use of pesticides should be minimized.
 - Use of fertilizers should be judicious.
 - Cropping techniques should be improved to prevent the growth of weeds.
 - Special pits should be selected for dumping wastes.
 - Controlled grazing and forest management.
 - Wind breaks and wind shield in areas exposed to wind erosion.
 - Planning of soil-binding grasses along banks and slopes prone to rapid erosion.
 - Afforestation and reforestation.

Case study: Save Aravalli hills from illegal mining.....

The Aravalli Range is a range of mountains in western India running approximately 800 km in a northeastern direction across Indian states of Gujarat, Rajasthan, Haryana and Delhi. Aravalli is the oldest mountain range in India. The honourable Supreme Court has banned mining in Haryana Aravallis in 2002 and 2004, and concerned with the devastation caused, in 2009, extended the ban on mining in an area of 448 km² covering Aravalli range in Gurgaon, Faridabad and Mewat districts. Due to mining in earlier years, this area has been ravaged beyond repairs. Due to a SC judgement, there is ban on mining in this area. Still, there have been numerous reports of illegal mining. These Aravalli ranges has following significant values:

- The Aravallis are ecologically very significant, and form the catchments of rivers and nallas that originate from the hills and irrigate the plains.
- The Aravallis have also been identified as an important groundwater recharge.
- The Aravallis also consist of unspoilt forests like the Mangarbani which are home to close to 300 native plant species, 120 bird species and many animals (jackal, neelgai, mongoose).
- The Aravallis provide the only major forest cover in the state of Haryana which has a total forest cover of just 3.59%, the second lowest among Indian states. It is high time that the state recognized the importance of this region and took steps to protect it.

On Oct, 28, 2018, the Supreme Court directed the Rajasthan government to stop illegal mining in a 115.34-hectare area in Aravalli hills within 48 hours. A bench comprising Justices Madan B Lokur and Deepak Gupta said it was compelled to pass the order because Rajasthan has taken the issue "very lightly". The apex court also referred to a central empowered committee report that 31 hills or hillocks have vanished in the state's Aravalli area. The disappearance of hills in Rajasthan could be one reason for the rise in pollution levels in Delhi, the court said. The bench directed the chief secretary of Rajasthan to file an affidavit regarding compliance of its order.