

ARTICLE ID: 13

Soil Erosion: Agriculture Production Challenge

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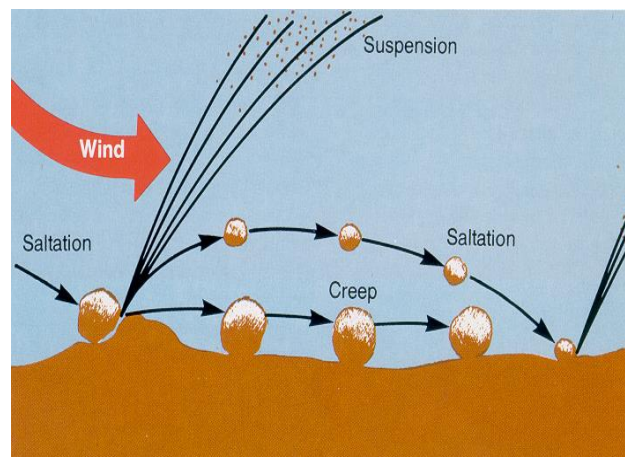
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Introduction: -

The soil is the top layer of the earth's surface. It is made up of dirt and rock. It is filled with air and life. A variety of organisms, like insects, earthworm, live in soil. For plants, soil serves as a storehouse of water and minerals needed for their growth. It also provides shelter to many animals that live on or in the soil. Without soil, there would be no grass, no crops, no trees, no food for us and other animals. It is a process in which the top fertile layer of soil is lost. Due to soil erosion, the soil becomes less fertile. The top layer of soil is very light which is easily carried away by wind and water. The removal of topsoil by the natural forces is known as soil erosion. In this process, the soil particles are loosened or washed away in the valleys, oceans, rivers, streams or faraway lands. This has been worsening due to human activities such as agriculture and deforestation. Soil erosion is a continuous process that occurs either slowly or at an alarming rate. It results in a continuous loss of topsoil, ecological degradation, soil collapse, etc. Let us have a detailed look at the causes, effects and prevention of soil erosion.

As per NAAS (2010), the extent of soil Erosion (soil loss more than 10 tonnes/ha/yr) in cultivable land of the country was 92.4 million hectares as assessed by the ICAR using the harmonized database. Major causes of soil erosion in India are over-cultivation, overgrazing, and deforestation. Much of soil erosion in India is caused by faulty practices of farming. The most outstanding among these are faulty ploughing, lack of mulching and above all the practice of shifting cultivation. One example of such practices is seen in the form of fields ploughed along the slope and not along the contours.

www.justagriculture.in



Sources: - <https://www.netsolwater.com/>

Sources: -<https://infosys.ars.usda.gov/>

Cause of Soil Erosion: -

Following are the important causes of soil erosion: -

1. **Rainfall and Flooding:** -Higher intensity of rainstorms is the main cause of soil erosion. Four types of soil erosion are caused by rainfall: Rill erosion, Gully erosion, Sheet erosion, Splash erosion. The raindrops disperse the soil, which is then washed away into the nearby streams and rivers. Regions with very heavy and frequent rainfall face a large amount of soil loss. The flowing water during floods also erodes a lot of soil by creating potholes, rock-cut basins, etc.
2. **Agriculture:** - The farming practices are the major cause of soil erosion. The agricultural activities disturb the ground. The trees are cleared and the land is ploughed to sow new seeds. Since most of the crops are grown during the spring season, the land lies fallow during winters. Most of the soil is eroded during winters. Also, the tyres of tractors make grooves on the land, making a natural pathway for water. Fine soil particles are eroded by wind.
3. **Grazing:** - The grazing animals feed on the grasses and remove the vegetation from the land. Their hooves churn up the soil. They also pull-out plants by their roots. This loosens the soil and makes it more prone to erosion.

4. **Logging and Mining:** - A large number of trees are cut down to carry out the logging process. Trees hold the soil firmly. The canopy of the trees protects the soil from heavy rainfall. The leaf litter that protects the soil from erosion, is also lost during logging. Mining activities also disturb the land and leave the soil more prone to erosion.
5. **Construction:** - The construction of roads and buildings exposes the soil to erosion. The forests and grasslands are cleared for construction purposes, which exposes the soil making it vulnerable to erosion.
6. **Rivers and Streams:** - The flowing rivers and streams carry away the soil particles leading to a V-shaped erosion activity.
7. **Heavy Winds:** - During dry weather or in the semi-arid regions, the minute soil particles are carried away by the wind to faraway lands. This degrades the soil and results in desertification.



Sources: -
<https://instaturf.com/>



Sources: -
<https://www.theguardian.com/>



Sources: -
<https://www.fao.org/>

Effects of Soil Erosion: -

The major effects of soil erosion include:

1. **Loss of Arable Land:** - Soil erosion removes the top fertile layer of the soil. This layer is rich in the essential nutrients required by the plants and the soil. The degraded soil does not support crop production and leads to low crop productivity.
2. **Clogging of Waterways:** - The agricultural soil contains pesticides, insecticides, fertilizers, and several other chemicals. This pollutes the water bodies where the soil



flows. The sediments accumulate in the water and raise the water levels resulting in flooding.

3. **Air Pollution:** - The dust particles merge in the air, resulting in [air pollution](#). Some of the toxic substances such as pesticides and petroleum can be extremely hazardous when inhaled. The dust plumes from the arid and semi-arid regions cause widespread pollution when the winds move.
4. **Desertification:** - Soil erosion is a major factor for desertification. It transforms the habitable regions into deserts. Deforestation and destructive use of land worsens the situation. This also leads to loss of biodiversity, degradation of the soil, and alteration in the ecosystem.
5. **Destruction of Infrastructure:** - The accumulation of soil sediments in dams and along the banks can reduce their efficiency. Thus, it affects infrastructural projects such as dams, embankments, and drainage.

Soil Erosion Prevention: -

Soil erosion is a serious [environmental issue](#). Steps should be taken to curb this problem. Following are some of the methods of soil erosion prevention:

- ✓ Plant trees on barren lands to limit erosion of soil.
- ✓ Add mulch and rocks to prevent the plants and grass underneath to prevent soil erosion.
- ✓ Mulch matting can be used to reduce erosion on slopes.
- ✓ Put a series of fiber logs to prevent any water or soil from washing away.
- ✓ A wall at the base of the slope can help in preventing the soil from eroding.
- ✓ Every household should have a proper drainage system so that water flows down into proper water collecting systems.

Key Points of Soil Erosion: -

- ✓ It is the natural process of wearing away topsoil, but human activities have accelerated the process.



- ✓ It is usually caused due to the removal of vegetation, or any activity that renders the ground dry.
- ✓ Farming, grazing, mining, construction and recreational activities are some of the causes of soil erosion.
- ✓ The effects of soil erosion are not just land degradation. It has led to a drastic increase in pollution and sedimentation in rivers that clogs the water bodies resulting in a decline in the population of aquatic organisms.
- ✓ Degraded lands lose the water holding capacity resulting in floods.

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