

Factor of Soil degradation

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What is soil?

- The upper layer of earth in which plants grow, a black or dark brown material typically consisting of a mixture of organic remains, clay, and rock particles.
- Soil is one of the three major natural resources, alongside air and water. It is one of the marvellous products of nature and without which there would be no life.

Soil Degradation

- Soil degradation is the inability of soil to support the growth of crops.
- Soil degradation is the decline in soil quality caused by its improper use, usually for agricultural, industrial or urban purposes.
- It is a serious environmental problem.
- Avoiding soil degradation is crucial to our well-being.

(FAO, 2015)

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Soil Degradation : Factors-

1. Physical Factors :

- ❑ There are several physical factors contributing to soil degradation distinguished by the manners in which they change the natural composition and structure of the soil.
- ❑ Rainfall, surface runoff, floods, wind erosion, tillage, and mass movements result in the loss of fertile top soil thereby declining soil quality.
- ❑ All these physical factors produce different types of soil erosion (mainly water and wind erosion) and soil detachment actions, and their resultant physical forces eventually change the composition and structure of the soil by wearing away the soil's top layer as well as organic matter.
- ❑ In the long-term, the physical forces and weathering processes lead to the decline in soil fertility and adverse changes in the soil's composition/structure.



Soil Degradation : Factors-

2. Biological Factors :

- ❑ Biological factors refer to the human and plant activities that tend to reduce the quality of the soil. Some bacteria and fungi overgrowth in an area can highly impact the microbial activity of the soil through biochemical reactions, which reduces crop yield and the suitability of soil productivity capacity.
- ❑ Human activities such as poor farming practices may also deplete soil nutrients thus diminishing soil fertility. The biological factors affect mainly lessens the microbial activity of the soil.



Soil Degradation : Factors-

3. Chemical Factors

- ❑ The reduction of soil nutrients because of alkalinity or acidity or waterlogging are all categorized under the chemical components of soil degradation.
- ❑ In the broadest sense, it comprises alterations in the soil's chemical property that determine nutrient availability.
- ❑ It is mainly caused by salt buildup and leaching of nutrients which corrupt the quality of soil by creating undesirable changes in the essential soil chemical ingredients.
- ❑ These chemical factors normally bring forth the irreversible loss of soil nutrients and production capacities such as the hardening of iron and aluminum-rich clay soils into hardpans.

Soil Degradation : Factors-



4. Deforestation:

- ❑ Deforestation causes soil degradation on the account of exposing soil minerals by removing trees and crop cover, which support the availability of humus and litter layers on the surface of the soil.
- ❑ Vegetation cover primarily promotes the binding of the soil together and soil formation, hence when it is removed it considerably affects the capabilities of the soil such as aeration, water holding capacity, and biological activity.
- ❑ When trees are removed by logging, infiltration rates become elevated and the soil remains bare and exposed to erosion and the buildup of toxicities.
- ❑ Some of the contributing activities include logging and slash and burn techniques used by individuals who invade forest areas for farming, rendering the soils unproductive and less fertile in the end.

Soil Degradation : Factors-

5. *Misuse or excess use of fertilizers :*

- The excessive use and the misuse of pesticides and chemical fertilizers kill organisms that assist in binding the soil together.
- Most agricultural practices involving the use of fertilizers and pesticides often entail misuse or excessive application, thereby contributing to the killing of soil's beneficial bacteria and other micro-organisms that help in soil formation.
- The complex forms of the fertilizer's chemicals are also responsible for denaturing essential soil minerals, giving rise to nutrient losses from the soil.
- Therefore, the misuse or excessive use of fertilizers increases the rate of soil degradation by destroying the soil's biological activity and builds up of toxicities through incorrect fertilizer use.

Soil Degradation : Factors-

6. Industrial and Mining activities :

- ❑ Soil is chiefly polluted by industrial and mining activities. As an example, mining destroys crop cover and releases a myriad of toxic chemicals such as mercury into the soil thereby poisoning it and rendering it unproductive for any other purpose.
- ❑ Industrial activities, on the other hand, release toxic effluents and material wastes into the atmosphere, land, rivers, and groundwater that eventually pollute the soil and as such, it impacts on soil quality.
- ❑ Altogether, industrial and mining activities degrade the soil's physical, chemical, and biological properties.



Soil Degradation : Factors-

7. *Improper cultivation practices:*

- ❑ There are certain agricultural practices that are environmentally unsustainable and at the same time, they are the single biggest contributor to the worldwide increase in soil quality decline.
- ❑ The tillage on agricultural lands is one of the main factors since it breaks up the soil into finer particles, which increase erosion rates.
- ❑ The soil quality decline is exuberated more and more as a result of the mechanization of agriculture that gives room for deep plowing, reduction of plant cover, and the formation of the hardpan.
- ❑ Other improper cultivation activities such as farming on steep slope and mono-cropping, row-cropping, and surface irrigation wear away the natural composition of the soil and its fertility and prevent soil from regenerating.



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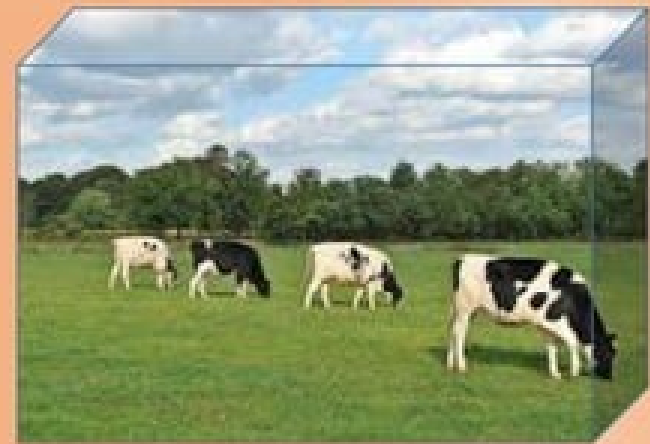
8. Urbanization:

- ❑ Urbanization has major implications on the soil degradation process. Foremost of all, it denudates the soil's vegetation cover, compacts soil during construction, and alters the drainage pattern.
- ❑ Secondly, it covers the soil in an impermeable layer of concrete that amplifies the amount of surface runoff which results in more erosion of the topsoil. Again, most of the runoff and sediments from urban areas are extremely polluted with oil, fuel, and other chemicals.
- ❑ Increased runoff from urban areas also causes a huge disturbance to adjacent watersheds by changing the rate and volume of water that flows through them and impoverishing them with chemically polluted sediment deposits.

Soil Degradation : Factors-

9. Overgrazing :

- ❑ The rates of soil erosion and the loss of soil nutrients, as well as the topsoil, are highly contributed by overgrazing.
- ❑ Overgrazing destroys surface crop cover and breaks down soil particles, increasing the rates of soil erosion. As a result, soil quality and agricultural productivity are greatly affected.





THANK YOU