

17. CONSERVATION OF SOIL AND LAND

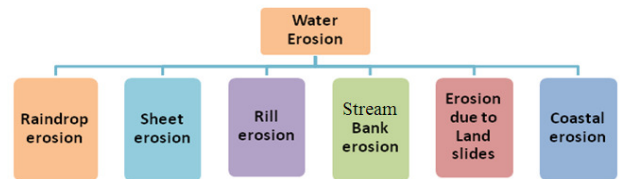
- Soil conservation is a set of management strategies for prevention of soil erosion i.e. soil being eroded from the earth's surface or becoming chemically altered by overuse, salinization or other chemical soil contamination.
- Water and wind erosion are main causes of land degradation combined, they are responsible for 84% of global degraded land making erosion one of the significant environmental problem.
- Rapid increase in human population has placed a great strain on the land and soil resources resulting in land degradation and soil erosion.
- Soil and land is defined :

Soil is the upper most layer of the earth's crust, which can be dug or ploughed, and in which plants grow.

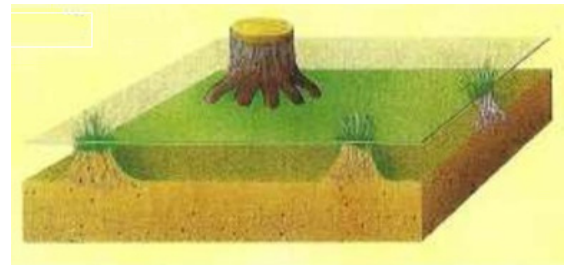
Land is a solid, substratum which supports human and many other organisms.

- **Soil Erosion**
Soil erosion is the loosening and displacement of top soil particles from the land. Soil erosion is a natural process that occurs on all lands. Soil erosion may occur at a slow or fast rate.
- **Land Degradation**
Land degradation is the deterioration in the quality of land. Degradation of land results in loss of crop production capacity of the land.
- Soil erosion is classified on the basis of the physical agent responsible for erosion.
- The various types of soil erosion are consequently referred to as: e (a) Water erosion (b) Wind erosion.

- (a) **Water erosion**
- Soil erosion by water occurs by means of raindrops, waves or ice. Soil erosion by water is termed differently according to the intensity and nature of erosion.



- **Raindrop erosion**
Raindrops initiates water erosion because after falling on land surface rain drops cause detachment of soil particles. These particles are washed away by flowing water.
- **Sheet erosion**
The detachment and transportation of soil particles by flowing rainwater is called sheet or wash off erosion.



- **Rill erosion**
In rill erosion finger like rills appear on the cultivated land after it has undergone sheet erosion . These rills are usually smoothed out every year while forming. Each year the rills slowly increase in number become wider and deeper. When rills increase in size they are called gullies. Ravines are deep gullies.

- **Stream bank erosion**

The erosion of soil from the banks (shores) of the streams or rivers due to the flowing water is called bank erosion.



- **Land slide**

Sudden mass movement of soil is called landslide. Landslides occur due to instability or loss of balance of land mass with respect to gravity

- **Coastal erosion**

Coastal erosion of soil occurs along sea shores. It is caused by the wave action of the sea and the inward movement of the sea into the land.



- **Consequences of soil erosion**

- Erosion removes the fertile part of soil and the bulk of nutrients and organic matter are lost. The less fertile subsoil is left.
- Sheet, rill, gully and stream bank erosion also cause siltation of rivers, streams and fields.

- **Prevention of soil erosion**

- To retain vegetation cover
- Control cattle grazing
- Crop rotation
- Improve vegetation to increase soil organic matter

- Ruoff water should be stored by constructing dams
- To prevent coastal erosion, vegetation in the beaches to be re-established

Wind erosion

- Soil erosion by wind occurs in arid and dry areas where natural vegetation has been destroyed.



- It is a major source of land degradation, desertification and crop damage.
- The loose soil particles are blown and transported from wind by three ways:
 - (i) **Siltation**: where particles are lifted a short height into the air and bounce and salted across the surface of soil.
 - (ii) **Suspension**: transported over long distances in the form of suspended particles.
 - (iii) **Surface creep**: transported at ground level by high velocity winds.
- **Consequences of wind erosion**
 1. Wind erosion removes the finer soil material including organic matter, clay and silt, in a suspension (colloidal) form and leaving behind coarser, less fertile material.
 2. Wind erosion also damages roads and fertile agricultural fields by depositing large quantities of air blown soil particles.
- Remedial strategies for prevention of wind erosion
 1. The vegetation cover over sandy soils should be kept above 30%. Access of wind to the soil should be controlled by leaving the stubble or mulch on the soil.
 2. Wind speed can be controlled by planting trees in form of a shelter belt.

3. The practice of leaving the land fallow and use of machinery should be modified. This can be done by using direct drilling techniques.

4. Over grazing by cattle should be avoided

- **Soil erosion caused by human activities**



- **Land Degradation**

- is a process in which the value of the biophysical environments is affected by a combination of human-induced processes acting upon the land.

- Land degradation has impact on the environment around it. It causes a loss or change in vegetative cover and soil nutrients.

- **Causes of land degradation**

- Water and wind erosion are two primary causes of land degradation, combined, they are responsible for 80% of degraded acreage.

- **Some major causes of land degradation are:**

- Use of agrochemicals, chemical fertilizers and pesticides.

- Cultivation of high yielding plant varieties and

- Excessive irrigation.

- **Some other causes of land degradation are:**

- Deforestation

- Overgrazing

- Commercial development

- Quarrying of sand, ore and minerals

- Monoculture

- Soil erosion

- Agrochemicals are applied to the soil for two main reasons namely to:

- (i) Replenish or replace soil nutrients by using chemical fertilizers.

- (ii) Destroy plant pests by using toxic chemicals called pesticides.

- Conservation of cultivable land cause can be achieved not only through preventive and remedial measures in order to control land erosion and degradation but also by using innovative agricultural technologies which involve use of-

- Organic farming or green manures

- Biofertilizers

- Biological pest control

- A. **Organic farming includes**

- Integrated Pest Management

- Crop rotation

- Integrated Disease Management

- Organic biofertilizers

- **Measures for Preventing Soil Erosion and Land Degradation**

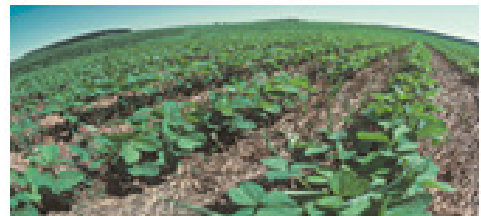
- (a) **Tree planting**

To prevent wind erosion, trees should be planted in such a way so that they break the force of the wind.

The trees not only cover soil from the sun, wind and water, they also help to hold the soil particles.

- (b) **The ploughing style**

The ploughing style substantially reduces the amount of erosion. Tilling the field at right angles to the slope called contour ploughing.



It helps to prevent or reduce soil erosion.

- (c) **Strip farming:** This involves planting the main crops in widely spaced rows and

filling in the spaces with another crop to ensure complete ground cover.

- The ground is completely covered so it retards water flow which thus soaks down into the soil, consequently reducing erosion problems.

(d) Terracing: It is another method of reducing or preventing soil erosion on mountain slopes.

In this method, steps are cut out on slopes making terraces.

Terracing is usually done on slopes, by leveling off areas on the slope to prevent the flow of water directly down the hill.



Check Yourself

1. A solid substratum which supports human and other organisms is known as:
 - a. Earth
 - b. Plain
 - c. Land
 - d. Soil
2. Soil erosion in nature is caused by:
 - a. Deforestation
 - b. Floods
 - c. Tornadoes
 - d. All the above
3. When protective vegetation cover is destroyed, name the erosion:
 - a. Rill erosion
 - b. Geological erosion
 - c. Accelerated erosion
 - d. Gullies erosion
4. Wind transport or removal of soil causes erosion by----- method:
 - a. Siltation
 - b. Suspension
 - c. Surface creep
 - d. All the above
5. Excessive use of fertilizers can cause:
 - a. Eutrophication
 - b. More crop cultivation
 - c. Depletion of nutrient
 - d. Water logging

Ans: 1. c 2.d 3.c 4.d 5.a



Stretch Yourself

1. What is soil erosion?
2. Define coastal erosion
3. Explain land degradation in brief.
4. What is wind erosion?
5. What is the difference between soil and land?



Test Yourself

1. Discuss the consequences of soil erosion
2. How does crop rotation and land fallow help to prevent soil erosion?
3. Describe the strategies used for prevention of soil erosion by wind.
4. Mention the causes of land degradation.
5. Differentiate between strip farming and terrace farming.