



Land Degradation and Conservation Measures

95 per cent of our basic needs for food, shelter and clothing are obtained from land. Human activities have degraded lands and also increased the pace of damage to lands caused by natural forces.

Waste lands are degraded lands which do not fulfill their life sustaining potential. It includes rocky, and desert areas and land put to non-agricultural uses such as settlements, roads, railways, industry. Currently, India has about 130 million hectares of waste land.

It comprises 28 per cent forest degraded area, 56 per cent is water eroded, 10 per cent is wind eroded and the rest 6 per cent is affected by saline and alkaline deposits. Deforestation, overgrazing and expansion of mining and quarrying operations have contributed to degradation. Besides these, natural factors like water have caused erosion of top soil.

Mining causes deep scars and traces of over-burdening when excavation of minerals is completed. Mineral processing like grinding of limestone for industry and calcite and soapstone for ceramic industry generates large amounts of dust. It ultimately settles down on the land, retarding water infiltration in soil. Industrial effluents and wastes have caused land and water pollution in many areas.

National forest policy: Forest is an important and major natural resource for India. It is gradually exploited and depleted in the growth process, so Indian Government has implemented a comprehensive policy for preservation, development and sustainable use of this resource. India is one of the very few countries of the world where forest policy is in operation since 1894 and entirely revised in 1952 and 1958.

Net sown Area: This represents the total area sown with crops and orchards. Area sown more than once in the same year is counted once.

- To solve problems of land degradation, the methods given below can be employed:
 1. Afforestation and proper management of grazing lands.
 2. Proper discharge and disposal of industrial wastes after treatment.
 3. Control over mining activities.
 4. Planning of shelter belts of trees in arid areas.
 5. Control on Overgrazing.
 6. Stabilization of sand dunes by growing thorny bushes.
 7. Waste land management.

Soil as a resource: Soil is the most important renewable natural resource. It is the medium of plant growth and a living system which supports many types of living organisms. It takes millions of years to form soil upto a few centimeter in depth. The important factors in the soil formation are relief, parent rock or bed rock, climate, vegetation and forms of life. Forces of nature such as change in temperature, actions of running water, wind and glaciers, activities of

Areas and Causes of Land Degradation

Cause of land degradation	Areas where land degradation has occurred
Mining and Quarrying	Jharkhand, Chhattisgarh, Madhya Pradesh and Odisha
Waterlogging due to over irrigation causing increase in salinity and alkalinity	Punjab, Haryana and Western part of Uttar Pradesh
Overgrazing	Gujarat, Rajasthan, Maharashtra, Madhya Pradesh and the hilly states Northern India
Industrialisation causing retardation of water infiltration into the soil	In pockets all over India



decomposers etc also contribute to soil formation chemical and organic changes happened in the soil are equally important for its formation. Soil consists of both inorganic and organic materials (i.e. humus).

Classification of Soils: Soils in India are classified into different types on the basis of chemical and physical factors like colour, thickness, texture, age, etc.

India has varied relief features, landforms, climate and vegetation. All these have contributed to the formation of following types of soils.

1. **Alluvial Soils:** This is the most widespread soil in India, which has been deposited by three important Himalayan river systems - the Indus, the Ganges and the Brahmaputra, covering about 45.6 per cent of the area.

Due to its high fertility, areas having this soil are intensively cultivated and densely populated.

Some features of alluvial soil are given below:

- This soil is mostly found in river valley of the Northern Plains (Indus, Ganga, Brahmaputra), strips in Gujarat and Rajasthan, in Eastern coastal plains in the deltas of Peninsular rivers (Mahanadi, Godavari, Krishna, Kaveri).
- It is made up of silt; sand and clay rich in nutrients like potash, phosphoric acid. And lime. It is suitable for growing paddy, wheat, sugarcane and other cereal and pulse crops.
- In inland river valleys soil particles are of bigger size. Near the break of slope, soils are coarse. These soils are more common in the plains at the foothills such as Duars, Chos and Terai.
- It can also be described on the basis of age. The older alluvial soil, further away from the rivers, is known as Bangar, whereas the newer soil near the rivers is known as Khadar. This is lighter in colour, has finer particles and is more fertile than Bangar soil.
- Alluvial soils in the drier areas are more alkaline and can be productive after proper treatment and irrigation.

2. **Black Soils:** This is also known as black cotton soil or regur soil. It covers 16 per cent of India's total geographical area. It is black in colour and best for growing the cotton crop.

Some features of black soil are given below:

- It has been formed by climatic conditions and the parent rock material.
- It is found in the Deccan trap (Basalt) region and is made up of lava flows.
- This soil covers the plateau areas of Saurashtra, Maharashtra, Malwa, Madhya Pradesh, Chhattisgarh and also lies along the valleys of the Godavari and Krishna rivers.
- Black soils are made up of extremely fine i.e. clayey material.
- It is rich in nutrients like calcium carbonate, magnesium carbonate, potash and lime, but is poor in phosphoric content.
- It develops deep cracks during the hot summer, which helps in aeration of the soil. It becomes sticky (due to high moisture retention) when wet and becomes difficult to be tilled.
- It needs to be tilled just after the first rain or during the pre monsoon period.

3. **Red and Yellow Soils:** It is red in colour and covers 10.6 per cent of India's total geographical area. The red colour of this type of soil is due to diffusion of iron particles into crystalline and metamorphic rocks in low rainfall areas of the Deccan



plateau (Eastern and Southern parts). It turns yellow in its hydrated form. It is found in parts of Tamil Nadu, Odisha, Madhya Pradesh, Karnataka, Maharashtra, Andhra Pradesh and the Chota Nagpur plateau areas of Chhattisgarh and Jharkhand.

4. Laterite Soils: The word laterite has been derived from the Latin word later which means brick. It covers about 7.2 per cent of India's total geographical area. It develops in areas with high temperature and heavy rainfall, resulting in intense leaching due to heavy rain.

Some features of laterite soil are given below:

- This soil has low humus content due to the microorganism getting destroyed due to high temperature.
- It can be made cultivable with adequate amounts of manure and chemical fertilizers.
- It is useful for growing coffee, tea, cashew nut, tapioca cinchona.
- These soils are found in Karnataka, Kerala, Tamil Nadu, Madhya Pradesh, Andhra Pradesh and hilly areas of Odisha and Assam etc.

5. Desert or Arid Soils: This soil covers about 4 per cent of India's total geographical area. It is sandy in texture, red to brown in colour and saline in nature. In some areas common salt obtained in this soil due to evaporation of water.

Some features of arid soil are given below

- It lacks humus and moisture due to dry climate, high temperature and faster rate of evaporation.
- It can be useful for cultivation only with suitable irrigation methods as in case of Ganganagar district of Western Rajasthan. It is useful for growing barley, wheat, cotton, maize, millets and pulses.
- This soil is found in Western parts of Rajasthan, Northern Gujarat and Southern parts of Haryana.
- In the lower horizons of this soil, kankar are found due to increasing calcium content downwards, which restricts the infiltration of water.

6. Forest and Mountain Soils: It covers about 8 per cent of India's total geographical area found in hilly and mountainous areas of the country sufficient forests are available.

Some features of forest or mountain soils are given below

- Its texture varies with the mountain environment where it is formed.
- They are loamy and silty in valley sides and coarse grained in the upper slopes.
- Due to lack of forest cover in the snow covered Himalayas, soils are acidic with low humus content.
- This soil is useful for cultivating spices, tea, coffee and fruits.
- It is found in lower parts of valleys particularly on terraces and in the hilly regions of Jammu and Kashmir. Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh.

Soil Erosion and Soil Conservation: Soil erosion is the removal of the soil cover and subsequent washing down of top soil. The process of soil formation and erosion go on simultaneously and generally there is a balance between the two. Sometimes, this balance is disturbed due to human causes like deforestation, over-grazing, construction and mining, etc. It can lead to infertility of soil





desertification and flooding.

Natural Causes: Erosion through wind, glacier and water are natural causes.

Wind Erosion: It occurs due to wind blowing off the loose soil in the top layer, unless it is held down by binding agents like trees, bushes, etc. This can be reduced by methods of strip cropping and planting of shelter belts of trees in arid and semi-arid regions. These methods are discussed below

1. **Strip cropping:** Large fields can be divided into strips. Strips of grass are left to grow between the crops. This breaks up the force of the wind. This method is known as strip cropping.
2. **Shelter belts:** Planting rows of trees to create shelter along the edge of fields. This helps in reducing the speed of wind. Rows of such trees are called shelter belt.

Water Erosion: Water flowing down over a large area causes the top soil to be washed away. This is called sheet erosion. Gully erosion occurs by water flowing down through small channels. Erosion is caused by deep channels of water flowing down. This causes land unfit for cultivation and is known as bad land. Such is the case in the Chambal basin, where the gullies are known as ravines.

State of India's Environment: The village of Sukhomajri in Panchkula district of Haryana has shown a way to reverse land degradation. Tree density in the area has increased from only 13 per hectare in 1976 to 1272 per hectare in 1992 due to community participation.

Human causes: Deforestation, overgrazing and faulty methods of agriculture are human actions which as of the country, soil erosion has been stopped by employing contour ploughing and terrace farming. Both methods do not allow water to run down the slopes to prevent soil erosion. Restricting the grazing of animals, planting trees on barren hill slopes and constructing suitable dams to avoid large scale water flow are other methods used to reduce soil erosion.

