

# Soils in India

## Soil Formation and Characteristics

Soil is a renewable resource that supports life and is vital for plant growth. Topsoil, the uppermost layer, consists of humus and is affected by factors like temperature, parent rock, decomposers, and water. Fertile soil has sufficient moisture, depth, and nutrients like nitrogen, potassium, and phosphorus. Fertility can be improved by adding fertilizers.

## Classification of Soil

- **Residual Soil:** Formed in its original position by rock fragmentation (e.g., black, red, laterite, desert soil).
- **Transported Soil:** Formed after being moved by agents like wind and water (e.g., alluvial soil).

## Types of Soil in India

1. **Alluvial Soil**
  - Formed by river deposition, consisting of sand, clay, and silt (loam).
  - Found in river basins (Ganga, Indus, Brahmaputra, Mahanadi, Godavari, Krishna, Kaveri).
  - **Types:** Khadar (new, fertile) and Bhangar (old, less fertile).
  - Fertile, rich in lime and potash but deficient in nitrogen and humus.
2. **Black Soil**
  - Also called regur soil, ideal for cotton cultivation.
  - Clayey and water-retentive, shrinks during dry seasons and expands when wet.
  - Found in Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, and parts of Tamil Nadu.
3. **Red Soil**
  - Formed from the weathering of crystalline rocks, high in iron oxide.
  - Found in Tamil Nadu, Chhattisgarh, Jharkhand, Odisha, and parts of the Peninsular Plateau.
  - Requires fertilizers for better fertility and is suitable for crops like rice and tobacco.
4. **Laterite Soil**
  - Formed by weathering and leaching in tropical climates.
  - Found in hilly areas of Madhya Pradesh, Maharashtra, Odisha, Karnataka, and Kerala.
  - Not very fertile and lacks moisture retention.
5. **Mountain Soil**
  - Found in hilly regions, including peat, meadow, and forest soils.
6. **Desert Soil**
  - Sandy soil found in arid desert regions, lacking moisture and organic content.
7. **Saline and Alkaline Soil**
  - Rich in salts and alkalis, found near coastal areas with poor drainage.
8. **Marshy Soil**
  - Found in waterlogged areas, rich in organic matter, near deltas and coasts.

## Distribution of Soils in India

- **Alluvial Soil**

## Soils in India

- **Inland Alluvium:** Plains of Indus, Ganga, and Brahmaputra rivers, extending from Punjab to Bangladesh and Assam. Also found in Haryana, Uttarakhand, Uttar Pradesh, Bihar, West Bengal, parts of Gujarat and Rajasthan.
- **Deltaic Alluvium:** Deltas of Ganga-Brahmaputra, Mahanadi, Godavari, Krishna, and Kaveri.
- **Coastal Alluvium:** Coastal strips of Peninsular India and plains of Gujarat.
- **Black Soil**
  - Found in Deccan lava traps, parts of Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Karnataka, Rajasthan, Uttar Pradesh, and some parts of Tamil Nadu.
- **Red Soil**
  - Found in Tamil Nadu, Chhattisgarh, Jharkhand, Bundelkhand, Odisha, Meghalaya, Mizoram, Manipur, and Nagaland. Predominantly in the Plateau regions of Peninsular India.
- **Laterite Soil**
  - Found in highland areas of the Peninsular Plateau, including parts of Madhya Pradesh, Maharashtra, Odisha, West Bengal, Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu.

## Soil Erosion

### Soil Erosion by Water

- **Gully Erosion:** Deep channels formed due to heavy rainfall.
- **Rill Erosion:** Small channels formed by runoff water.
- **Sheet Erosion:** Removal of topsoil by sheet-like water flow.
- **Leaching:** Nutrient loss from soil due to heavy rainfall.
- **Stream Bank Erosion:** Soil removal due to river course changes.
- **Sea Erosion:** Soil eroded by the sea waves along coasts.

### Soil Erosion by Winds

- **Wind Erosion:** Topsoil blown away by wind.
- **Saltation:** Smaller particles are bounced along the ground.
- **Soil Creep:** Larger particles roll or slide along the surface.

### Human-Induced Soil Erosion

- Deforestation, overgrazing, and bad farming techniques contribute to soil degradation.

### Causes of Soil Pollution in India

- **Heavy rain**
- **Population pressure**
- **Deforestation**
- **Bad farming techniques**
- **Overgrazing**
- **Topography**

# Soils in India

## Affected Regions

- **Badlands:** Chambal and Yamuna regions.
- **Western Himalayas:** Hilly regions prone to erosion.
- **Chotanagpur Plateau:** Affected by soil erosion.
- **Tapti-Sabarmati Valley:** Gujarat region.
- **Regur Soil Area:** Maharashtra.
- **Dry Areas:** Rajasthan, Gujarat, Haryana.

## Methods to Prevent Soil Erosion

1. **Contour Ploughing:** Ploughing along slopes to reduce water flow and soil loss.
2. **Terrace Farming:** Creating terraces on slopes to minimize soil erosion.
3. **Strip Cropping:** Growing grass strips between crop rows to break wind speed.
4. **Shelter Belts:** Planting trees in rows to shield against wind.
5. **Plugging Gullies:** Filling soil channels with silt during heavy rain.

## Soil Conservation Programs in India

1. **Integrated Watershed Management:** Absorbs rainwater and reduces erosion.
2. **Ravine Reclamation:** Afforestation and land reclamation in ravine areas (Madhya Pradesh, Uttar Pradesh, Rajasthan).
3. **Controlling Shifting Cultivation:** In states like Arunachal Pradesh, Mizoram, Nagaland, and Assam.
4. **Biofertilizer and Quality Control Projects:** Aimed at balanced fertilizer use during the Seventh Five-Year Plan.

These methods and initiatives aim to prevent soil erosion, protect fertility, and support sustainable agriculture.