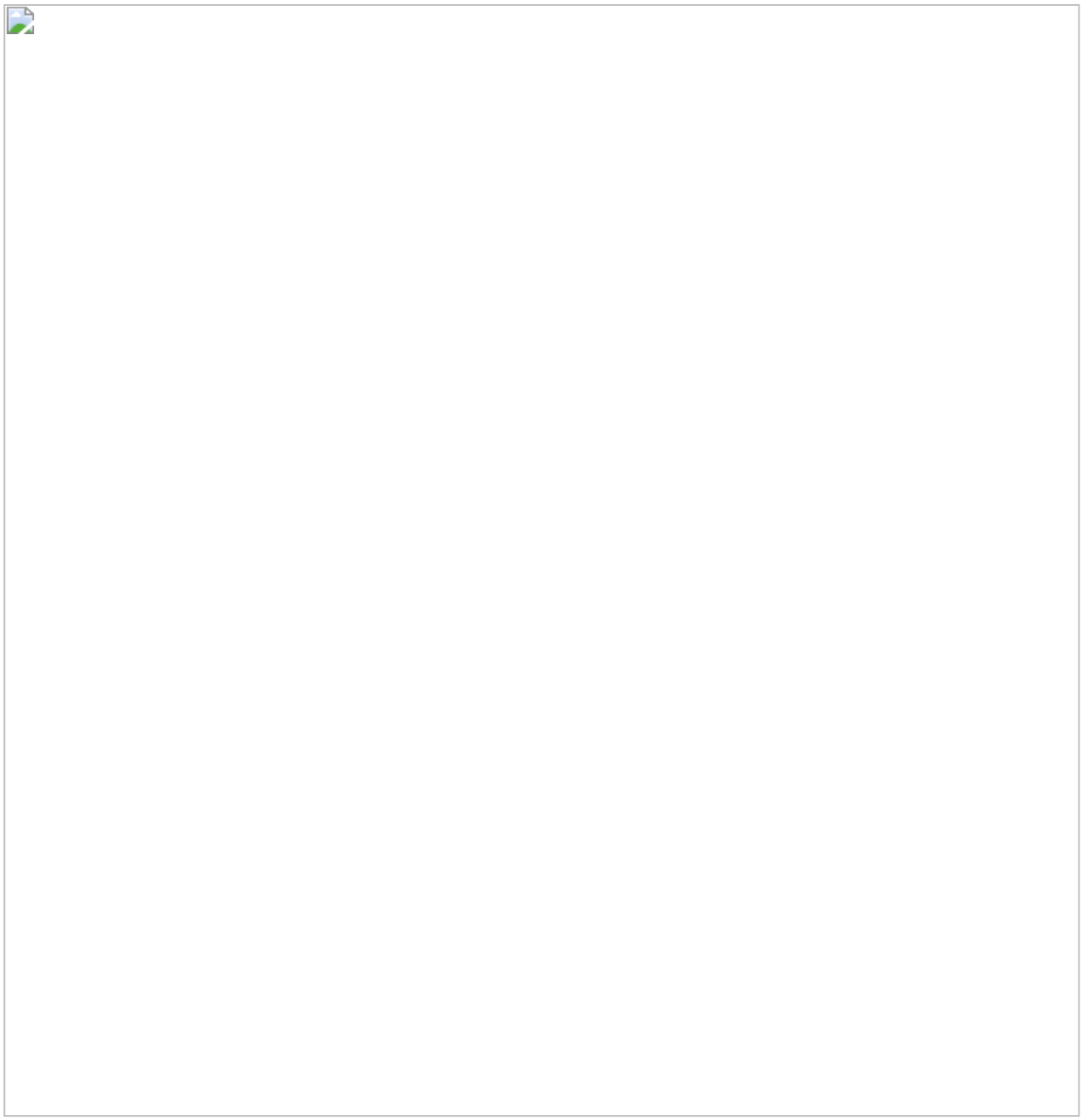
Deforestation, Grassland Ecosystem, Types of Grasslands, Economic Importance of Grasslands

Deforestation

Indiscriminate felling of trees as a result of urbanization, industrialization, mining operations, and use of wood for domestic and other purposes, have caused heavy depletion of forests.



Causes

Shifting Cultivation

- In this practice a patch of land is cleared, vegetation is burned and the ash is mixed with the soil thus adding nutrients to the soil.
- This patch of land is used for raising crops for two to three years, and the yield is modest.

- Then this area is abandoned and is left to recover its fertility, and the same practice is repeated elsewhere on a fresh piece of land.
- All that is required for this method of cultivation is a set of simple tools, not high level of mechanisation.

Development Project

- The human population have increased considerably, so with their requirements.
- Development projects like the hydroelectric projects, large dams and reservoirs, laying down of railway lines and roads are not only extremely beneficial, but they are also linked with several environmental problems.
- Many of these projects require immense deforestation.

Fuel Requirements

The increasing demand for firewood with ever growing population increases greater pressure on the forests, which results in increased intensity of deforestation.

Raw Materials

- Wood is used as a raw material by various industries for making paper, plywood, furniture match sticks, boxes, crates, packing cases, etc.
- Industries also obtain their raw materials from plants such as drugs, scents and perfumes, resins, gums, waxes turpentine, latex and rubber, tannins, alkaloids, bees wax.
- This exerted tremendous pressure on forest ecosystem and their unrestricted exploitation for various other raw materials is the main cause of degradation of the forest ecosystem

Other Causes

Deforestation also results from overgrazing, agriculture, mining, urbanization, flood, fire, pest, diseases, and defence and communication activities.

How It Affects?

- Closed forests (based on canopy level) have being diminished due to deforestation leading to increase in degraded forests.
- Forests recycle moisture from soil into their immediate atmosphere by transpiration where it again precipitates as rain.
- Deforestation results in an immediate lowering of ground water level and in long-term reduction of precipitation.
- Due to deforestation, this natural reuse cycle is broken and water is lost through rapid run off.
- Much of the mining activity in India is being carried out in forest regions. The obvious result is deforestation and erosion.

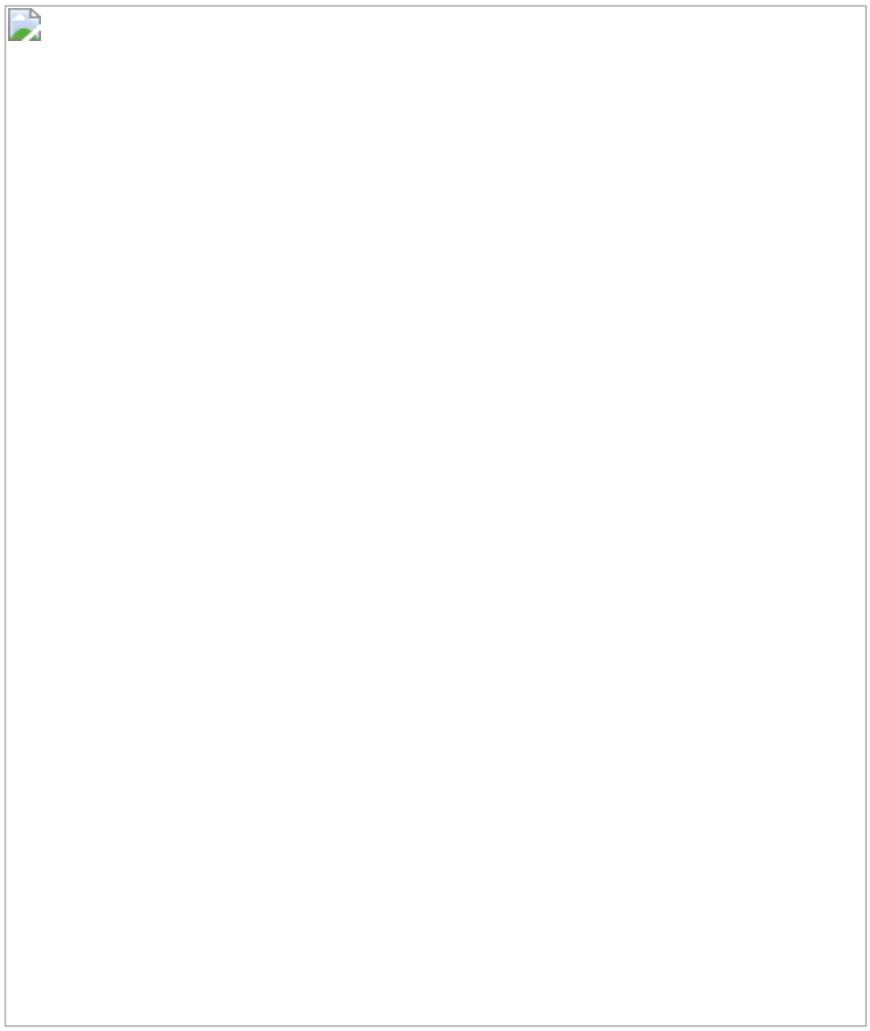
- Underground mining also significantly denudes forests because timber is used for supporting the roofs of mine galleries.
- A large number of abandoned mines are lying in bad shape and are under extensive gully erosion leading to degradation of the habitat.
- Deforestation affects the biota and neighbouring ecosystems, soil erosion, land degradation, alteration of ground water channels, pollution and scarce.

Grassland Ecosystem

- The grasslands are found where rainfall is about $25 - 75$ cm per year, not enough to support a forest, but more than that of a true desert.
- Typical grasslands are vegetation formations that are generally found in temperate climates.
- In India, they are found mainly in the high Himalayas. The rest of India's grasslands are mainly composed of steppes and savannas.
- Steppe formations occupy large areas of sandy and saline soil; in western Rajasthan, where the climate is semi-arid, average rainfall is less than 200 mm a year with a dry on of $10 \text{to} 11$ months, and a large variation in rainfall.
- The soil is always exposed, sometimes rocky but more often sandy with fixed or mobile dunes. Forage is available only during the brief wet season. The grass layer is sparse and consists mainly of annual grass species.
- In the central and eastern parts of Rajasthan, when the rainfall is about 500 mm per year and the dry season is of six to eight months, dry savanna grazing ecosystems have developed. The light shade cast by the sparse population of trees like Khetri (Prosopis cineraria) favours the growth of the grasses.
- The major difference between steppes and savannas is that all the forage in the steppe is provided only during the brief wet season whereas in the savannas forage is largely from grasses that not only grow during the wet season but also from the smaller amount of regrowth in the dry season.

Types of Grasslands

Based on climatic conditions there are six types of grasslands found in the different regions of the Indian subcontinent. Four major types of grasslands are discussed here.



Semi-Arid Zone (The Schima-Dichanthiurn Type)

- It covers the northern portion of Gujarat, Rajasthan (excluding Aravallis) , western Uttar Pradesh, Delhi and Punjab.
- The topography is broken up by hill spurs and sand dunes.
- Senegal, Calotropis gigantia, Cassia auriculata, Prosopis cineraria, Salvadora oloides and Zizyphus Nummularia whidi make the savanna rangeland look like scrub.

Dry Sub Humid Zone (The Dichanthium-Cenchrus-Lasitrrus Type)

- It covets the whole of peninsular India (except Nilgiri) .
- The thorny bushes are Acacia catechu, Mimosa, Zizyphus (ber) and sometimes fleshy Euphorbia along with low trees of Anogeissus Latifolia, Soymida febrifuga and other deciduous species.
- Sehima (grass) is more prevalent on gravel and the cover may be 27% . Dichanthium (grass) flourishes on level soils and may cover 80% of the ground.

Moist Sub Humid Zone (The Phragmities Sacchrum-Imperata Type)

- It covers the Ganga alluvial plain in Northern India.
- The topography is level, low lying and ill- drained.
- Bothriochloa pertusa, Cypodon dactylon and Dichanthium annulatum are found in transition zones.
- The common trees and shrubs are Acacia Arabica, hogeissus, la tifolia, Butea monosperma. Phonic sylvestris and Zizyphus Nummularia. Some of these are replaced by Borassus sp in the palm savannas especially near Sunderbans.

The Themed a- Arundinella Type

- This extends to the humid montane regions and moist sub-humid areas of Assam, Manipur, West Bengal Uttar Pradesh, Punjab, Himachal Pradesh and Jammu and Kashmir.
- The savanna is derived from the humid forests on account of shifting cultivation and sheep grazing.

Economic Importance of Grasslands

- India teems with animals of all shapes and sizes from the black buffaloes to sheep's and there are millions of them.
- The livestock wealth plays a crucial role in Indian life. It is a major source of fuel, draught power, nutrition and raw material for village industries.
- This huge mass of livestock needs fodder for sustenance but there is not enough of it.
- Only about $_{13}$ million hectares in the country are classified as permanent grazing lands. On top of it, they exist in a highly degraded state.
- Grassland biomes are important to maintain the population of many domesticated and wild herbivores such as horse, mule, ass, cow, pig, sheep, goat, buffalo, camel, deer, zebra, etc. which provide food, milk, wool, hide or transportation to man.
- Indian Grasslands and Fodder Research Institute, Jhansi and Central Arid Zone Research institute, Jodhpur.

Impact of Grazing

- Due to heavy grazing pressure, the quality of grasslands deteriorates rapidly, the mulch cover of the soil reduces, and microclimate becomes drier and is readily invaded by xerophytic plants.

- Due to absence of humus cover, mineral soil surface is heavily trampled when wetness produces paddling of the surface layer. In turn it reduces the infiltration of water into the soil and accelerates its run off, producing drought.
- These changes contribute to the reduction of energy flow, and the disruption of the stratification and periodicity of the primary producers. It results in a breakdown of the biogeochemical cycles of water, carbon and nitrogen.
- Water and wind erosion completely deteriorates dry grassland microclimate.
- Intensive grazing results in increased areas of bare soil, which creates a new habitat for burrowing animals such as mice, jack-rabbits, gophers, prairie dogs. Locusts etc. , which render large areas of forage lands sterile.

Role of Fire

- Fire plays an important role in the management of grasslands.
- Under moist conditions fire favours grass over trees, whereas in dry conditions fire is often necessary to maintain grasslands against the invasion of desert shrubs.
- Burning increases the forage yields, e. g. Cynodon daotylon.