NATURAL RESOURCES

Dr. Prasenjit Adak

Resources

- What are resources?
  - A resource is a source or supply from which a benefit is produced and that has some utility.
  - Example: Land, Minerals Soil, Water, Energy, Food etc.
- Types of resources:
  - Natural resources
  - Man-made resources
  - Human resources

Natural Resources

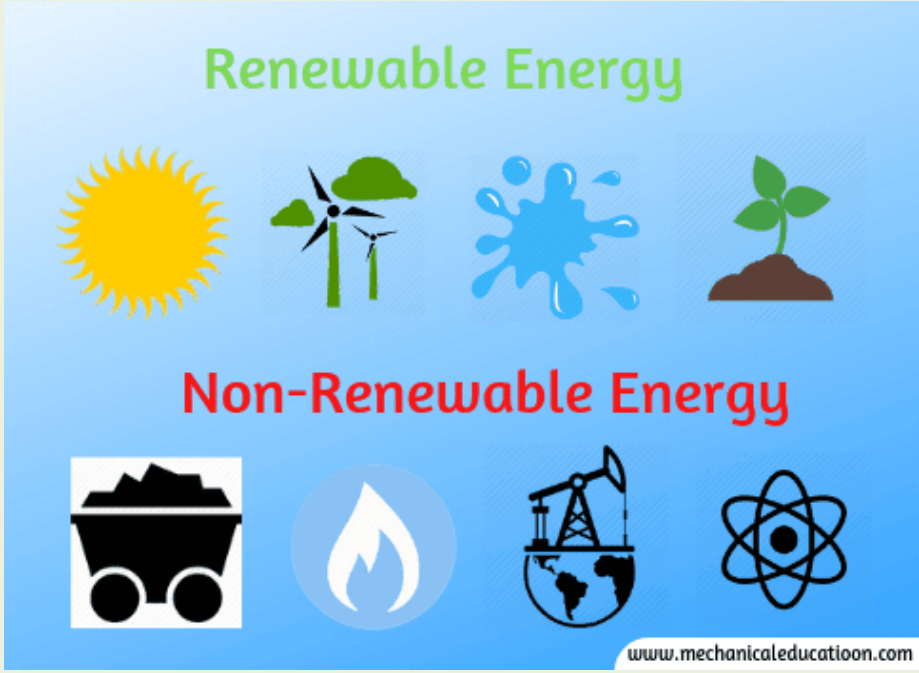
- What are natural resources?
  - The natural resources may be defined as any material given to us by nature which can be transformed in a way that it becomes more valuable and useful.
- Types of natural resources:
  - Non-renewable resources
  - Renewable resources

Types of natural resources

- Based upon chemical nature:
    I. Inorganic (e.g. air, water, ores etc.)
    II. Organic (e.g. plants, animals, ores etc.).
- Based upon distribution:
    I. National (land, minerals etc.)
    II. Multinational (lakes, rivers etc.)
    III. International (e.g. air, oceans etc.)
- Based upon availability:
    I. Inexhaustible (unlimited in supply e.g. sunlight, wind, tidal energy)
    II. Exhaustible (limited in supply)
    a) Non-renewable (fossil fuels)
    b) Renewable (forests, underground water, top soil etc.)

Renewable and Non-renewable Resources

- What are renewable resources?
  - The resources which are renewed or replenished fast or have unlimited source.
  - Example: Water, air, biomass, solar energy etc.
- What are non-renewable resources?
  - The resources which can not be renewed or replenished.
  - Example: Fossil fuels, Nuclear power, Minerals etc.



Some natural resources to be discussed

Land Resource

Forest Resource

Water Resource

Energy Resource

This PPT should be used as reference only. Reading books (mentioned in syllabus) is mandatory for the preparation of the examinations.

LAND RESOURCE

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Land as a resource

- The study of soils in their natural environment is called “pedology”.
- Land is a renewable but limited resource
- Problems related to land resource
  - Reaching the carrying capacity
  - Population density
  - Improper land-use planning
  - Saltwater intrusion
  - Land degradation
  - Soil erosion

Land Degradation

- Causes
  - Natural causes
    - Heavy rainfall
    - High speed winds
    - Natural disasters: earthquake, landslide, flood, draught
    - Expansion of desert
  - Anthropogenic causes
    - Mining
    - Urbanization
    - Deforestation
    - Overgrazing
    - Water logging
    - Construction of dams
    - Extensive use of fertilizers
    - Dumping of industrial and municipal wastes

Soil

- Soil is a dynamic natural body capable of supporting a vegetative cover. It is composed largely of weathered rocks, water, oxygen and organic materials.
- Soil formation
  - Processes
    - Physical weathering
    - Chemical weathering
    - Biological weathering
  - Factors
    - Parent material
    - Living organisms
    - Climate
    - Topography
    - Time

Soil

- Soil profile

O HORIZON
Surface litter: Partially decomposed organic matter

A HORIZON
Topsoil: Humus, living creatures, inorganic minerals

E HORIZON
Zone of leaching, materials move downward

B HORIZON
Subsoil: iron, aluminium humic compounds are accumulated and clay leached down from A and E horizons

C HORIZON
Weathered parent material: Partial breakdown of inorganic minerals

R HORIZON
Bedrock

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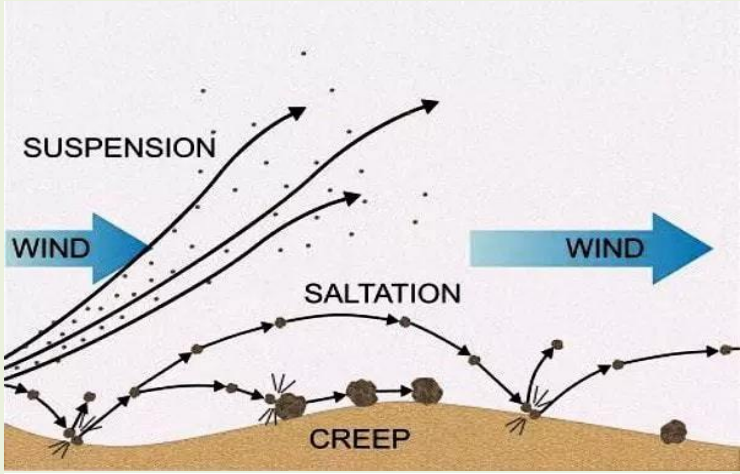
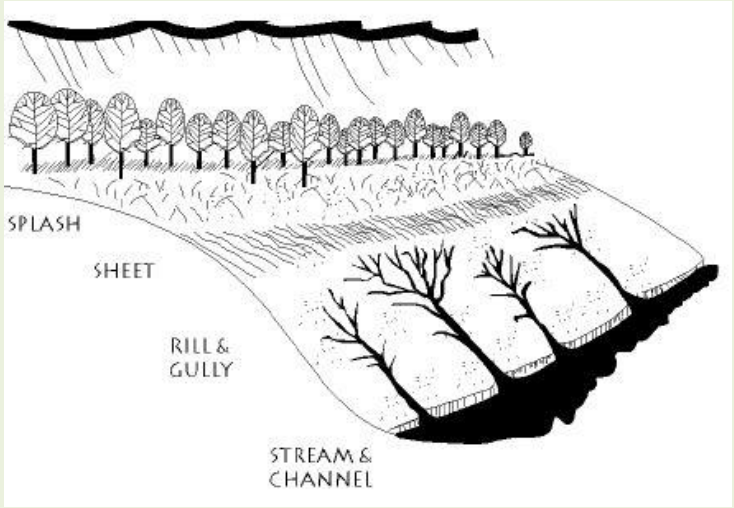
Soil

- Functions of soil
  - Facilitates nutrient cycle
  - Food and other biomass production
  - Stores water and regulates water supply
  - Regulates the emission of trace gases
  - Filter ground water
  - Degrades pollutants
  - Biological habitat
  - Source of clay
  - Platform for man-made structures: buildings, highways

Soil Erosion

- Types
  - Normal erosion or geologic erosion
  - Accelerated or Anthropogenic erosion
- Causes
  - Climatic agents
    - Water induced erosion
      - Splash erosion
      - Sheet erosion
      - Rill erosion
      - Gully erosion
      - Slip erosion
      - Stream bank erosion
    - Wind induced erosion
      - Suspension
      - Saltation
      - Surface creep
  - Biotic agents





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Soil Erosion

- Effects
  - Decreased productivity of land
  - Desertification of land
  - Deposition of soil in water bodies
  - Reduction of agricultural land in river banks

Soil Erosion

- Control
  - Conservational till farming
  - Stubble mulching
  - Contour farming
  - contour bunding
  - Construction of check dams
  - Terracing
  - Strip cropping
  - Alley cropping (Agro-forestry)
  - Wind breaks

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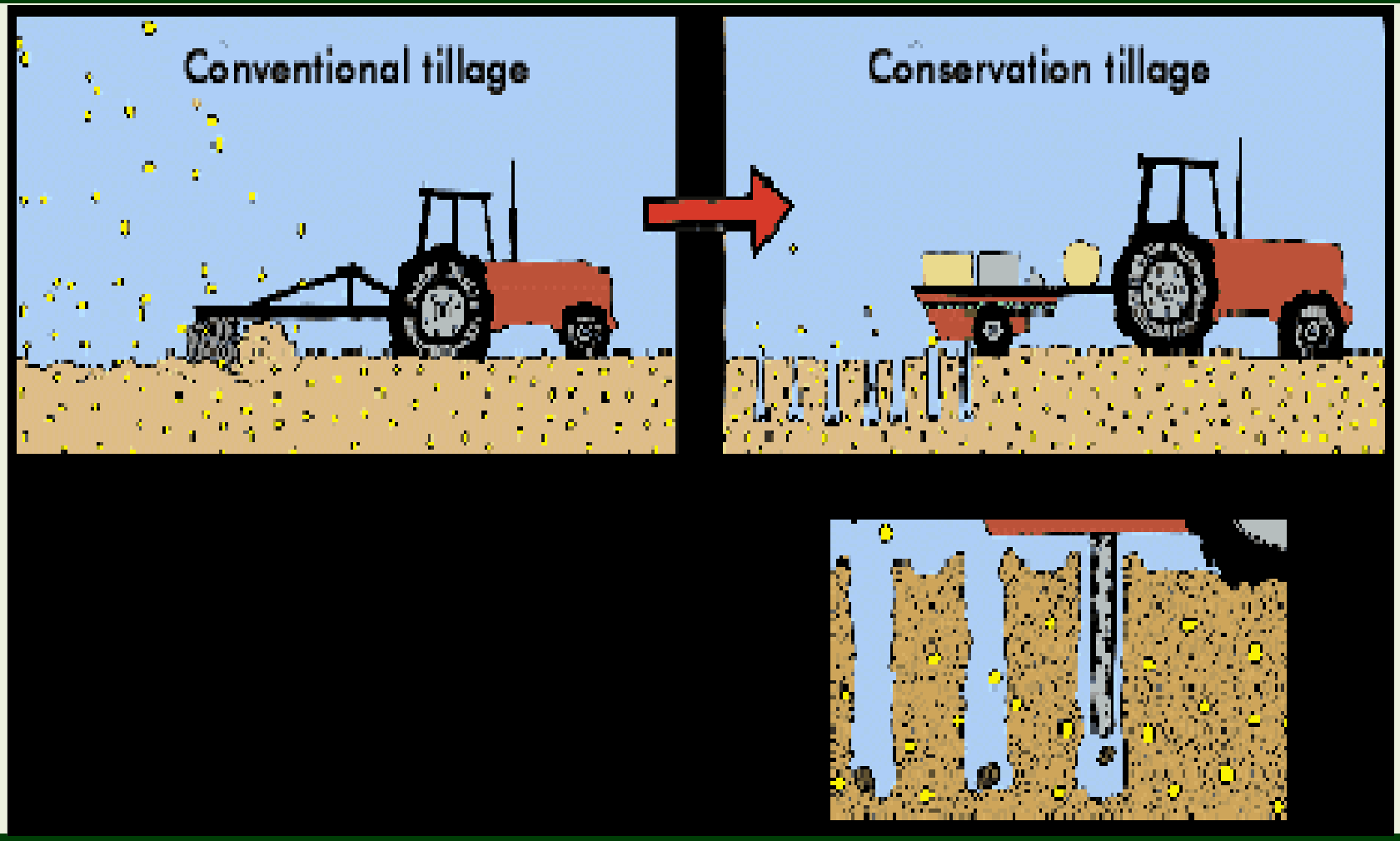
Conventional tillage VS Conservation tillage



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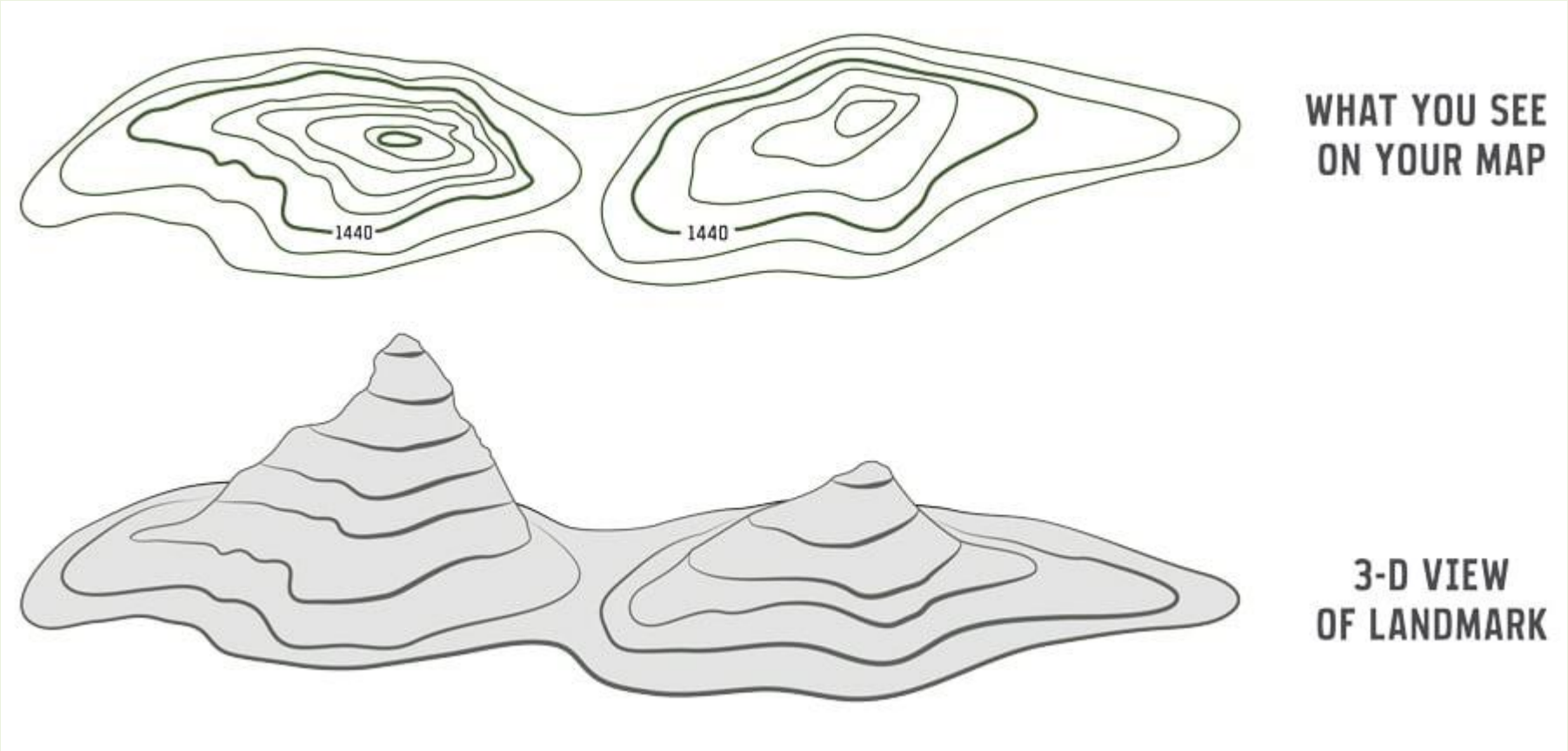
Contour Lines



Contour Lines (lines that connect the points with same altitude)

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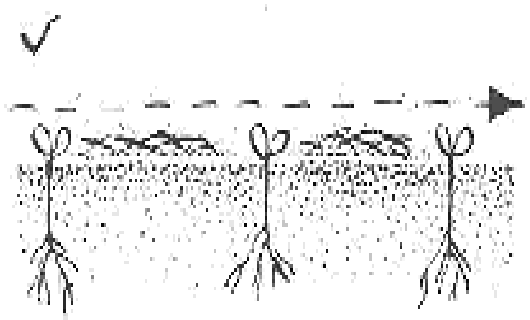
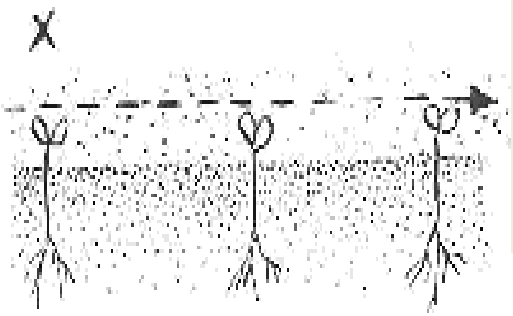
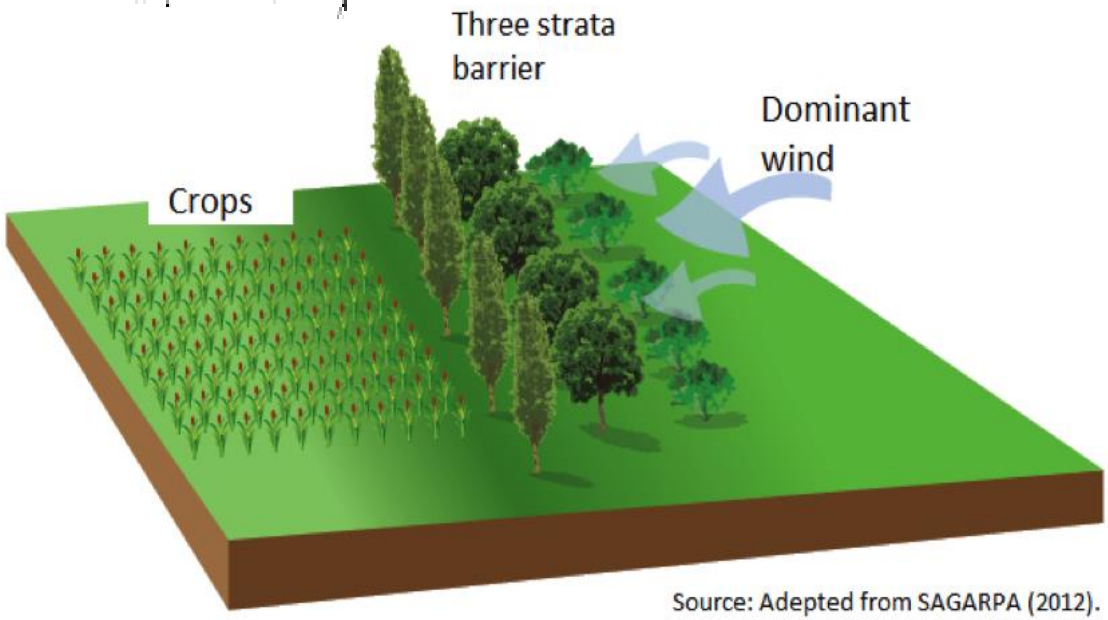
Wind Breaks







Source: Adepted from SAGARPA (2012).

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Desertification

- Types
  - Moderate (10 - 25%)
  - Severe (25 – 50%)
  - Very severe (more than 50%)
- Causes
  - Natural causes
    - Very low rain fall
    - Excessive evaporation
    - Vast difference in diurnal temperature
    - High salinity
  - Anthropogenic causes
    - Deforestation
    - Overgrazing
    - Conversion of pasture into arable land
    - Excessive use of fertilizer

Desertification

- Effects
  - Rapid soil erosion
  - Poor soil quality
  - Unfavorable climate
  - Low water table, salty and hard water
  - Endangered human and animal life
  - Economic and human cost

Desertification

- Control
  - Large scale plantation
  - Sustainable agricultural practices
  - Development of pasture land and controlling overgrazing
  - Development of water catchment
  - Rainwater harvesting

Mining

- Mining is the extraction of valuable minerals or other geological materials from the Earth

Opencast Mining

Underground Mining

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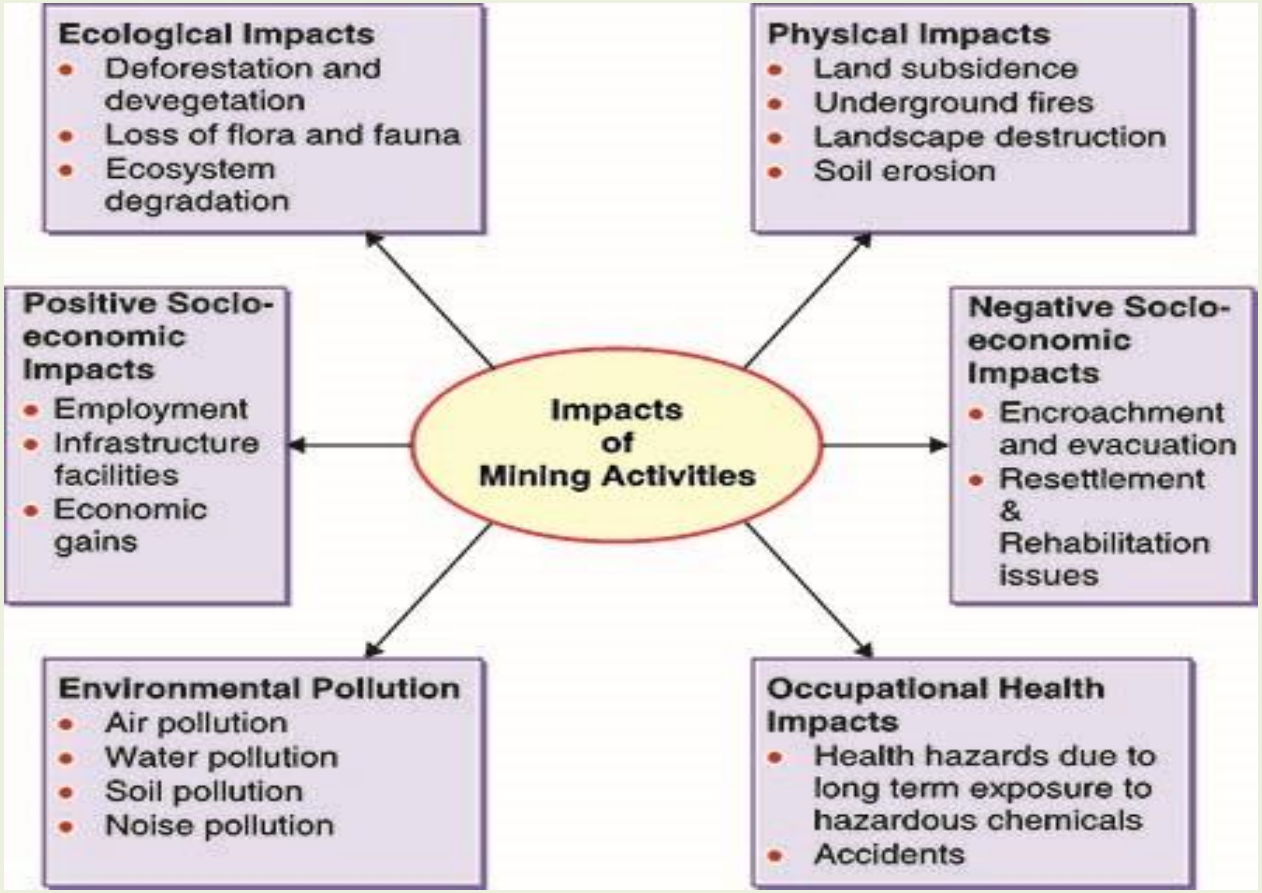
Mining

- Effects of Mining



Thank You

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