CHAPTER-5

MINERALS AND ENERGY RESOURCES

Minerals

Minerals are an indespensable part of our lives. these are homogenous naturally occuring substance with a definable internal structure

Rocks

Minerals which depends upon the physical and chemical condition.

Classification of Minerals

- **Metallic**
  - **Ferrous**
    - eg. Iron ore
      Manganese
      Nickel
      Cobalt
  - **Non-Ferrous**
    - eg. copper
      lead
      tin
      Lead
  - **Precious**
    - eg. gold
      Silver
      Platinum
- **Non-Metallic**
  - eg. Mica
    Salt
    Potash
    Sulphur
    granite
- **Energy minerals**
  - eg. Coal
    Petroleum
    Natural gas.

Mode of occurence of Minerals

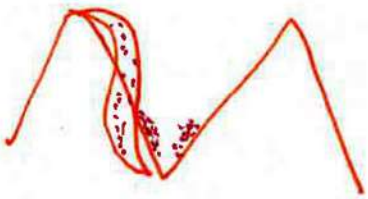
→ Found in **Ores** → (Minerals mixed with other element)

Commercially viable extraction

(i) Veins and lodes (ii) Beds and layers (iii) Residual mass of weathered Material

eg Bauxite

(iv) Alluvial deposits



eg Gold, silver, tin

[Minerals not corroded by water]

Types of Mining and Distribution of Minerals

(i) Open Pit Mining
(ii) quarrying
(iii) Underground Mining with shaft

Some facts

- Minerals are nationalised
- Mining by tribals groups [Rat hole]

Minerals

→ Peninsular rocks
- coal, Metallic minerals, Mica and Many other non-Metallic minerals.

→ East and west of Peninsula
- Petroleum
- Rajasthan
- Non-ferrous Minerals [Copper]

→ North India
- Devoid of Economic Minerals

Ferrous Minerals

Iron Ore

→ Back bone of Industrial Development.
→ Magnetite [70% of Iron content]
→ Excellent magnetic qualities.
→ Hematite [50-60% of content]
→ Industrial Iron

Manganese

→ used in making steel and ferro-Manganese alloy
→ 10kg in 1tonne of steel.
→ used in Manufacturing bleaching powder Insecticid and paints
→ Orissa is the largest Producer of Manganese ore

Major iron ore belts in India

(i) Orissa - Jharkhand belt
- → Hematite ore found in Badampahar, Gua and Naamundi
- → Port - Paradwip port

(ii) Durg - Bastar - Chandrapur
- → Chattisgarh and Maharastra
- → Hematite ore found in Bailadila range of Bastar district.
- → Port - Vishakapatnam [Japan and South Korea]

(iii) Bellary - Chitradurga - Chikmaglur - Tumkur
- → Kudermukh Mines is 100% export unit.
- → Port - Manglore [Through pipe line]

(iv) Maharastra - Goa Belt
- → Goa and Ratnagiri district of Maharastra.
- → Port - Murmagao.

Non-Ferrous Minerals

- → Not sufficient.
- → Minerals such as copper, bauxite, lead, zinc and gold.
- → used in Metallurgical, engineering and electrical Industrial.

Copper

- → India is critically deficient in copper Production.
- → Malleable, ductile and a good conductor therefore have high demand.
- → Balaghat Mines produces 52% of total Copper
- → Singbhum district and Khetri Mines

Bauxite

- → Bauxite - alumina - aluminium
- → Strength of Metal eg iron with Extreme lightness, Good Conductivity and great Malleability
- → Amarkantak Plateau, Maikal hills Pleateau region of Bilaspur - Katni
- → Orissa - largest Bauxite Producing state

Non-Metallic Minerals and Rock Minerals

Mica

→ Made of series of plates
→ used in electronic industries due to di-electric strength, low power loss factor, insulating properties and resistance to high voltage
→ Chota nagpur plateau, Koderma, Gaya-Hazaribagh Ajmer, Rajasthan and Nellore Mica belt of A.P

Limestone

→ Rock composed of calcium carbonates or calcium and Magnesium carbonates.
→ Essential for Smelting iron ore in Blast furnaces and Cement Industries
→ A.P, M.P, Rajasthan, Gujrat, T.N and Many more.

Hazards of Mining

(i) Impact on Miners
- Risk of collapsing Mine roofs
- Inundation and fire in Coalmines

Health issues
↓
Dust and noxious fumes are inhaled
↓
Vulnerable to Pulmonary disease

Impact on Environment
- water source get contaminated
- Dumping of waste and slurry
  ↓
  Degradation of land, soil and river pollution.

Conservation of Minerals

→ our dependence on minerals and its availability to us.

→ 1% of the earth's crust.

→ Replenishment and Mineral formation ⓓ = ⓘ consumption

∵ finite and non-renewable

→ Continued extraction = ⓘ Costs [↓ Greater depths, ↓ Decreased quality]

→ Step for Conservation

• Improved technology, Recycling of Metals, using other alternatives and substitutes.

Energy Resources

Nessicity of energy ??

eg Fuel mineral like Coal, Petroleum, natural gas, Uranium and Electricity.

Conventional Source

→ ordinary, following the traditional way eg firewood cattle dung cake, coal, Petro-leum

eg Natural Gas

→ it is source of energy as well as industrial raw material.

→ Found in association with or without Petrol.

→ low carbon emission, found in K-G basin, Mumbai High

→ HVJ pipeline,

Non-Conventional Source

→ Not ordinary, other than traditional way eg: Solar, wind, tidal, geothermal

Coal

- Degree of compression, Depth and time of burial

On the basis of quality

(i) **Peat**
- → Low carbon
- → High Moisture
- → Low Heating capacity

(ii) **Lignite**
- Low grade brown coal
- Soft with high moisture content.

(iii) **Bituminous**
- * Deep inside the Earth
- * High Temperature
- * Commercial use, Smelting.

(iv) **Anthracite**
- Highest quality
- Hard coal

On the basis of age

(i) **Gondwana Coal**
- About 200 Million Coal
- Damodar Valley, Jharia, Raniganj, Bokaro.

(ii) **Tertiary Coal**
- → 55 million Year ago
- → North eastern states.

Petroleum

* Petroleum Industry as a "Nodal Industry"
* Synthetic textile, fertilizer and numerous chemical Industries.

Occurence

- Anticline and faults traps in Rocks formed during tertiary age.
- Porous and non-porous layers and Gas being lighter usually occurs above the Oil.

→ Found In → Mumbai High, Gujrat, Assam.

Electricity

- Per capita consumption is considered as index of development

Hydro Electricity

- Produced by Running water
- Use renewable resources
- Multipurpose river projects like Bhakra Nangal, Damodar Valley Corporation.

Thermal electricity

- By Burning Coal, Petroleum and Natural gas.
- Use non-renewable fossil fuels.

Nuclear or Atomic Energy

→ Obtained by altering the structure of atoms

- Uranium and thorium are used.
- Found in Jharkhand, The Arawali ranges of Rajasthan and the monazite sand of Kerala [rich in Thorium]

Solar and Wind Energy

→ Photovoltaic technology converts sunlight directly in to electricity.

→ The largest solar plant of India is located at Madhopur near Bhuj

→ Relief for rural household

⇓

firewood and Cowdung cakes

⇓

Environment Conservation

→ Potential of wind
  → largest wind farm cluster Nagarcoil to Madurai (T.N)
  → A.P, KN, Guj, Kerala ∞, Maharastra etc.

Bio-gas

→ Shrubs, farm waste, animal and human waste is used to make biogas.

→ Decomposition of organic matter into gas and have higher Efficiency as compared to kerosene, dung cake are the charcoal.

→ Plants using cattle dung are known as "gobar gas plants"

Tidal Energy

→ Energy produced by tides.

→ Gulf of Kuchchh, Provides ideal condition for utilising tidal energy.

Geo-thermal Energy

→ Electricity Produced by the heat from the Interior of the Earth.

→ water turns in to steam and steam is used to rotate turbine and generate electricity.

Two Experimental Projects

- Puga valley, ladakh
- Parvati valley near manikarnam, H.P

Conservation of Energy resources

→ To increase development there is need for the energy.
→ Consumption of Energy is also increasing.
→ We should use Sustainable Energy
→ Use public transportation.
→ Switch off electricity when not in use
→ Using power saving devices.
→ Using non-conventional sources of Energy.

∴ Energy Saved is Energy Produced