

Natural Resources

Part III

ENERGY RESOURCES

ENERGY RESOURCES

TYPES OF ENERGY RESOURCES:

Renewable energy resource
(or) Non conventional energy
resources

Non renewable energy resources
(or) Conventional energy
resources



RENEWABLE ENERGY SOURCES

Energy which can be regenerated.

Merits of renewable energy resources

- Unlimited supply
- Provides energy security.
- Fits into sustainable development concept.
- Reliable and the devices are modular in size.
- Decentralized energy production.

TYPES OF RENEWABLE ENERGY RESOURCES

MAJOR SOURCES OF RENEWABLE ENERGY



1. SOLAR ENERGY

Nuclear fusion reaction of sun produces enormous amount of energy. Several techniques are available for collecting, storing and using solar energy.

Solar cell (or) Photovoltaic cell (or) PV cell:

Uses: It is used in calculators, electronic watches, street light, water pumps etc.

Solar battery: Large number of solar cells connected in series is called solar battery. It is used in remote areas where continuous power supply is a problem.





Solar water heater: It consists of insulated box painted with black paint with glass lid. Inside the box black painted copper coil is present. Cold water is allowed to flow, it is heated up and flows out into a storage tank from which water is supplied through pipes.

2.WIND ENERGY

Moving air is called wind. The energy recovered from the force of the wind is called wind energy. Its speed is high.

Wind mills: When a blowing wind strikes the blade of the wind mill, it rotates continuously. And rotational motion of the blade drives number of machines like water pump, flour mills and electric generators.





Wind farms: When a large number of mills are installed and joined together in a definite pattern – it forms wind farm. It produces large amount of electricity.

Condition: Minimum speed for wind generator is 15 Km/hr

Advantages:

It does not cause air pollution

Very cheap

OCEAN ENERGY

Tidal energy (or) Tidal power

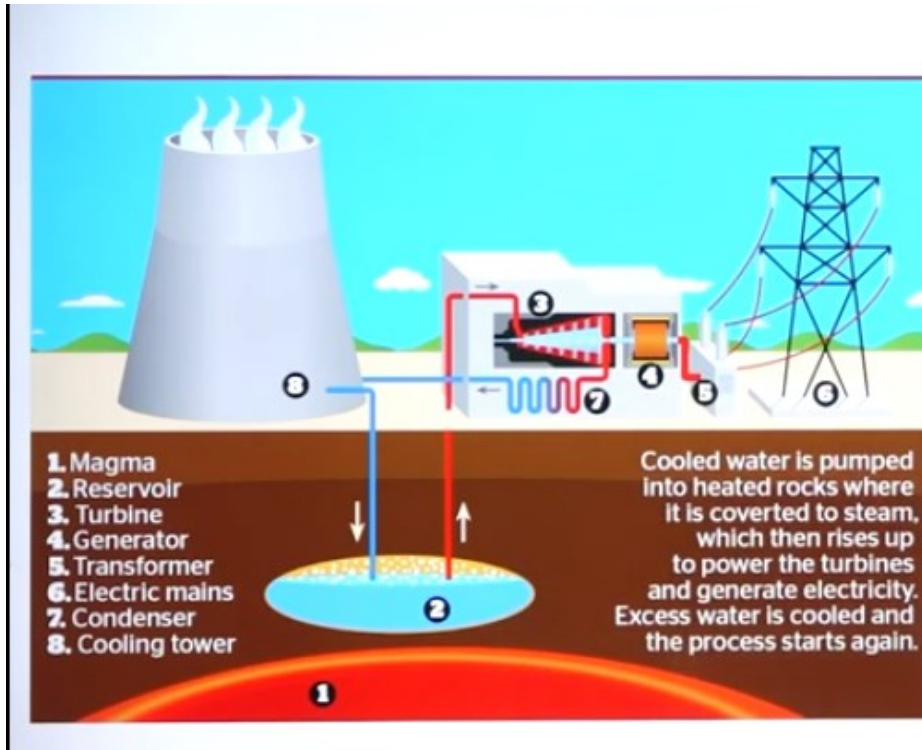
- Ocean tides are due to gravitational force of sun and moon which produce enormous amount of

High tides – rise of water in the ocean. Low tides – fall of water in the ocean.

During high tides sea water enters into the reservoirs and rotates the turbine, produce electricity.

Low tide water from the reservoir enters into sea rotates the turbine to produce electricity





Geo thermal energy

Temperature of the earth increases $20 - 75^{\circ}\text{C}$ per/km when we move down the earth. The energy utilised from the high temperature present inside the earth is called geothermal energy.

Natural geysers: Hot water or steam comes out of the ground through cracks naturally is called natural geysers.

Artificial geysers: Artificially a drill hole up to the hot region and by sending a pipe into it. The hot water or steam is used to rotate the turbine and generate electricity.

BIO MASS ENERGY

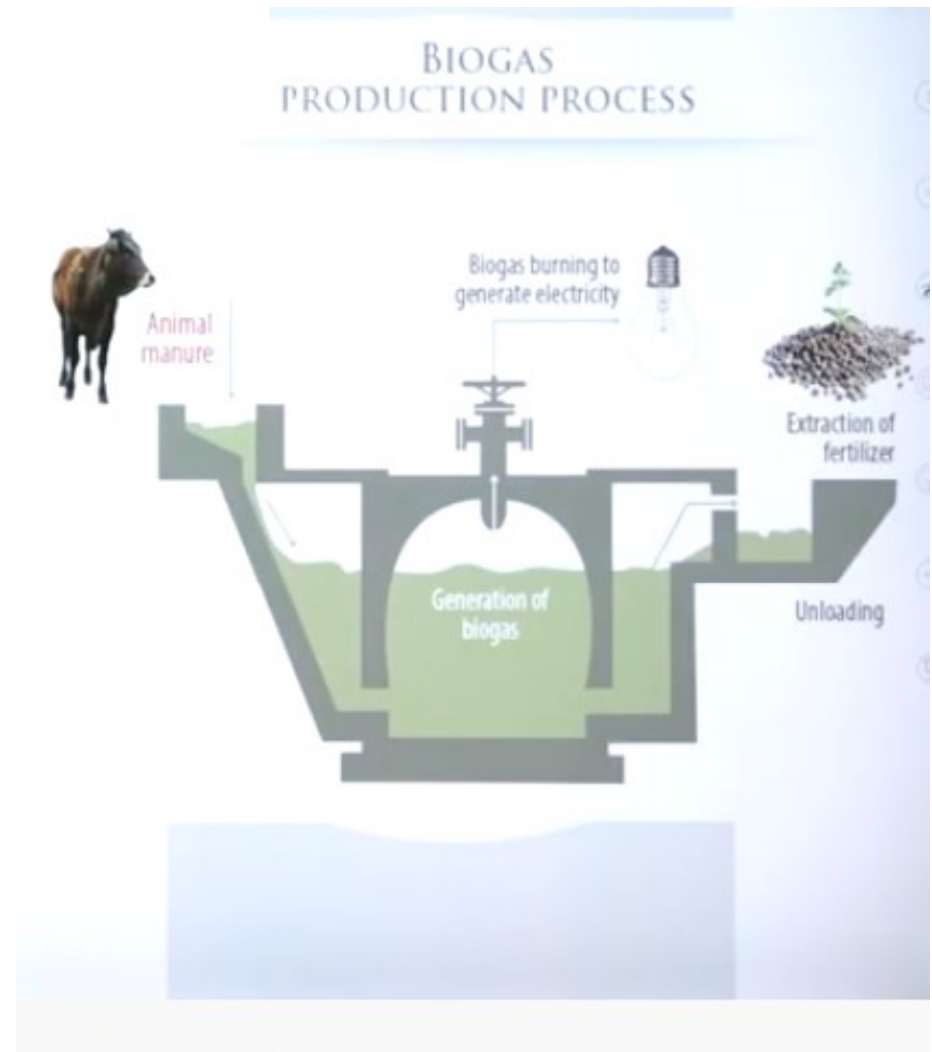
Bio mass: Organic matter produced by plants or animals used as source of energy



BIO MASS ENERGY

Bio gas: Mixture of methane, carbondioxide and hydrogen sulphide. Methane is the major constituent. It is obtained by anerobic fermentation of animal dung (or) plant wastes in the presence of water.

Bio fuels: Fuels obtained by the fermentation of biomass.
Ex: Ethanol, methanol



BIOFUEL

Ethanol: Produced from sugar cane. Calorific value is less.

Methanol: Obtained from ethanol Calorific value too less.

Gasohol: Mixture of ethanol and gasoline India trial is going on to use gasohol in cars and buses.

Hydrogen fuel: Hydrogen produced by pyrolysis, photolysis and electrolysis and electrolysis of water. It had high calorific value. Non polluting one as combustion product is water.

Disadvantages:

Hydrogen is highly flammable and explosive.

Safe handling is required

Difficult to store and transport



NON RENEWABLE ENERGY SOURCES

Energy which cannot be regenerated is called as non-renewable.



Coal



Natural Gas



Oil



Nuclear

COAL

It is a solid fossil fuel.

Disadvantages:

When coal is burnt large amount of CO_2 is released which causes global warming.

S, N produces toxic gases during burning.



PETROLEUM

- Crude oil is a liquid consists of more than hundreds of hydrocarbons and small amount of impurities.
- The petroleum can be refined by fractional distillation.
- In the world level 25% of oil reserves are in Saudi Arabia.
- At present rate of usage, the world crude oil reserves are expected to get exhausted in just 40 years.



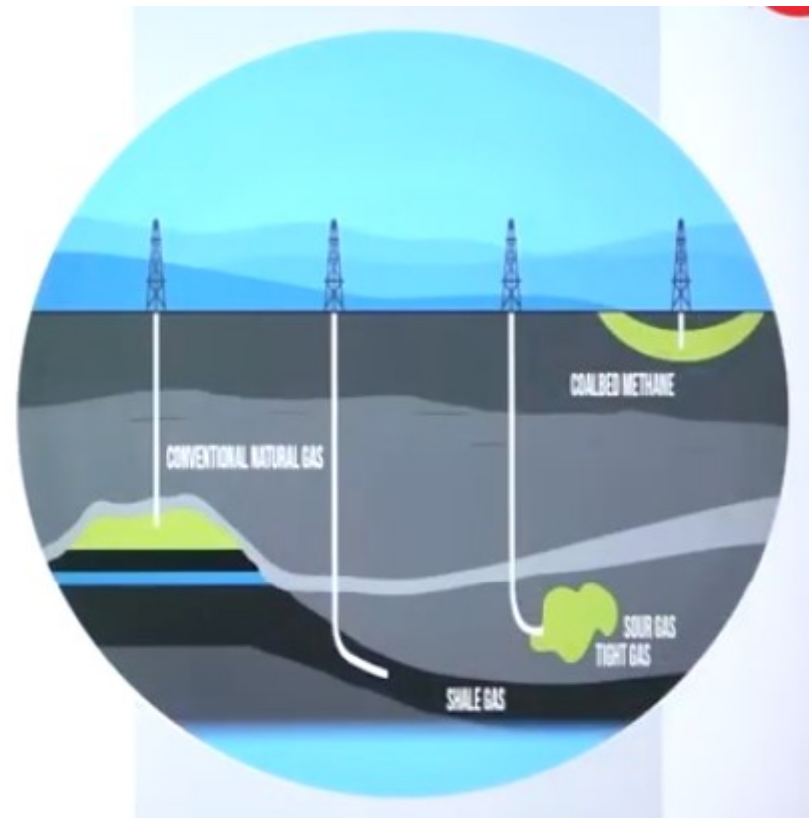
LIQUEFIED PETROLEUM GAS (LPG)

Petroleum gases obtained during FD and cracking can be easily converted into liquid under high pressure as LPG. It is colorless and odorless gas, but during cylindering mercaptans are added to detect leakage.



NATURAL GAS

- These are found above oil in oil wells. It is a mixture of methane and other hydrocarbons.
- Calorific value is high.
- There are two types.
 - Dry gas and wet gas.



Difference between CNG and LPG

CNG	LPG
Its primary use is as an alternative for fuel in automobiles.	It has various uses such as heating and cooking in homes. LPG also has industrial and agricultural uses.
The primary component in CNG is methane.	The primary component in LPG is propane and butane.
It produces relatively lower quantities of greenhouse gases (in comparison with LPG).	It produces relatively large amounts of carbon dioxide, a greenhouse gas.
It is relatively safe as it disperses rapidly into the air.	It is highly flammable as it is much heavier than air.
The primary source of obtaining CNG is from oil wells, bed methane wells, coal wells and even natural gas wells.	The main source of obtaining LPG is from the process of extracting natural gas from reservoirs.

NUCLEAR ENERGY

Dr.H.Bhabha is a father of nuclear power development in India. 10 nuclear reactors are present in India. It produces 2% of India's electricity.



CASE STUDY

Wind Energy In India:

the total installed wind power capacity was 40 GW, the fourth largest installed wind power capacity in the world. Wind power capacity is mainly spread across the Southern, Western and Northern regions.

Top five states generating wind power energy in India are:

- Tamil Nadu
- Gujarat
- Maharashtra
- Karnataka
- Rajasthan

MINERAL RESOURCES

MINERAL RESOURCES

Naturally occurring inorganic crystalline solids with uniform chemical composition are called minerals



USES AND EXPLOITATION OF MINERALS

1. Development of industrial plants and machinery. - Fe, Al & Cu
2. Construction work – Fe, Al & Ni
3. Generation of energy - coal, lignite, uranium
4. Designing defense equipments like weapons and ornaments
5. Agricultural purposes – fertilizers and fungicides – Zn & Mn
6. Jewellery – Au, Ag & Pt
7. Making alloys for various purposes
8. Communication purposes – telephone, wires, cables and electronic devices
9. Medicinal purposes, particularly in ayurvedic system.

EFFECTS OF MINING ACTIVITIES

DEVEGETATION

- Top soil and vegetation get removed
- Deforestation leads to several ecological losses
- Land scape gets badly affected



GROUND WATER CONTAMINATION

- Mining pollutes ground water; sulphur is converted into sulphuric acid which enters into the soil.



SURFACE WATER POLLUTION

- Radioactive wastes and other acidic impurities affect the surface water, which kills many aquatic animals



AIR POLLUTION

Smelting and roasting are done to purify the metal which emits air pollutants and damage the nearby vegetation. It causes many health problems.





SUBSIDENCE OF LAND

Mainly underground mining results in cracks in houses, tilting of buildings and bending of rail tracks

EFFECTS OF OVER EXPLOITATION OF MINERALS

1. Rapid depletion of mineral deposits
2. Wastage
3. Environmental pollution
4. Needs heavy energy requirements.



MANAGEMENT OF MINERAL RESOURCES

1. The efficient use and protection of mineral resources.
2. Modernization of mining industries
3. Search for new deposit
4. Reuse and recycling of the metals.
5. Environmental impacts can be minimized by adopting eco friendly mining technology.

CASE STUDIES-MINING AND QUARRYING IN UDAIPUR

- 200 open cast mining and quarrying in Udaipur.
- But 100 mines are illegal.
- 150 tons of explosives are used per month.
- It pollutes air, soil and water. It affects irrigation and wild life

Food Resources

FOOD RESOURCES

Food is an essential requirement for survival of life. Main components are carbohydrates, fats, proteins, minerals and vitamins.



TYPES OF FOOD SUPPLY

Crop plants: Grains mostly constitute about 76% of the world's food. Ex: Rice, Wheat and Maize

Rangelands: Produces 17% of world's food from trees and grazing animals. Ex: Fruits, milk and meat

Ocean: Fisheries – 7% of world's food

WORLD FOOD PROBLEM

- In the earth's surface, 79% is water out of total area. 21% land (forest, desert, mountain and barren land) . Less % cultivated land, at the same time population explosion is high therefore world food problem arises.
- Environmental degradation like soil erosion, water logging, water pollution, salinity affects agricultural land.
- Urbanization affects agricultural land. Hence production of rice, wheat, corn and other vegetable is difficult.



OVER GRAZING

It is a process of eating the forest vegetation without giving a chance to regenerate.



EFFECTS OF OVER GRAZING

- 1 Land degradation
- 2 Soil erosion
- 3 Loss of useful species

EFFECTS OF OVER GRAZING

Land degradation

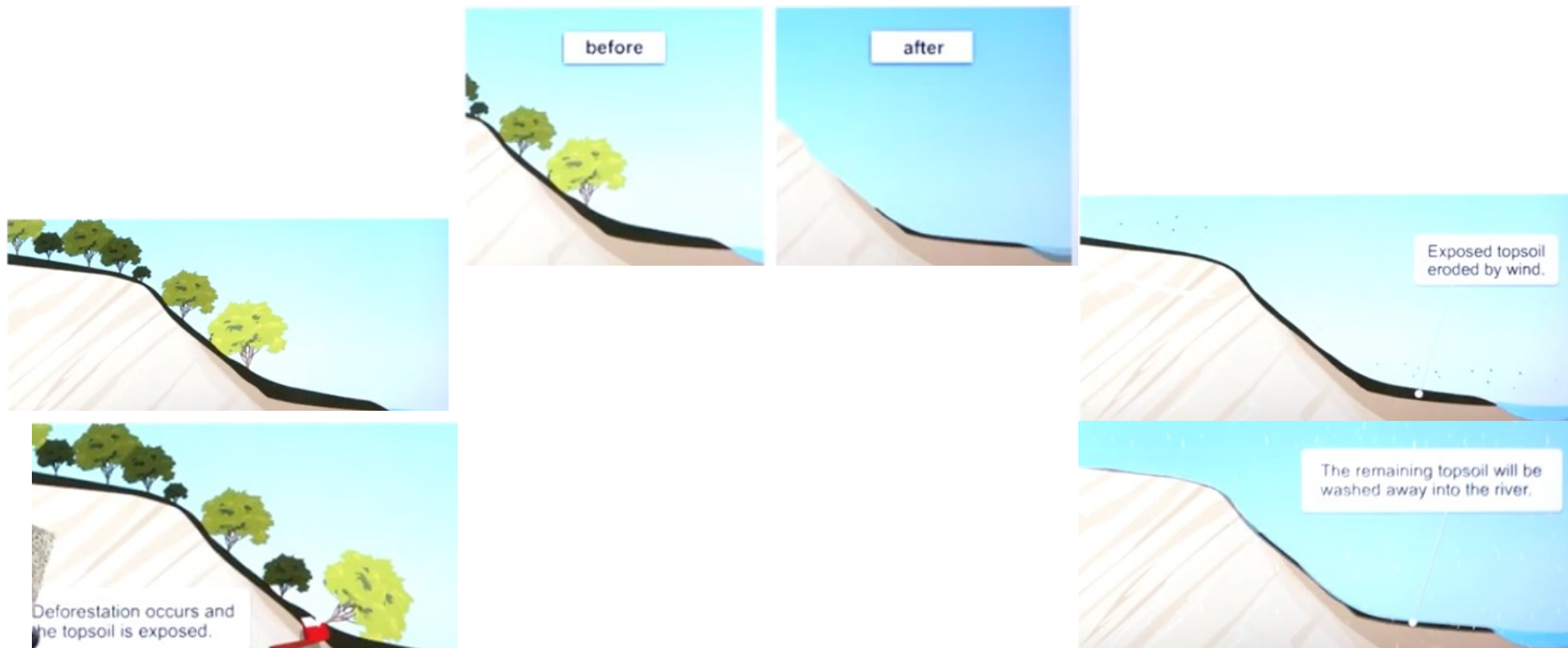
- Over grazing removing the cover of vegetation
- Exposed soil gets compacted
- Soil moisture reduces.
- Desertification - OG leads to poor, dry and compacted soil.
- Land cannot be used for further cultivation.



EFFECTS OF OVER GRAZING

Soil erosion: When the grasses are removed the soil becomes loose and gets eroded by the action of wind and rain fall.

Loss of useful species: OG affects the plant population and their regenerating capacity. replaces the plant of high nutritive value with plant of low nutritive value.



AGRICULTURE

Agriculture is an art, science and industry of managing the growth of plants animals for human use.

It includes cultivation of the soil, growing and harvesting crops, breeding and raising livestock, dairying and forestry.



TYPES OF AGRICULTURE

1. Traditional agriculture
2. Modern (or) industrialised agriculture



TRADITIONAL AGRICULTURE

Small plot, simple tools, surface water, organic fertilizer and a mixture of crops constitute traditional agriculture. They produce enough food to feed their family and to sell it for their income.



MODERN AGRICULTURE

Hybrid seeds of single crop variety, high tech equipments, lot of fertilisers, pesticides and water to produce large amount of single crops.



EFFECTS OF MODERN AGRICULTURE

Problems in using fertilizers

1. **Excess of fertilizers causes micronutrient imbalance.** (e.g) Punjab and Haryana deficiency of nutrient zinc in the soil affect the productivity of the soil.
2. **Blue baby syndrome (nitrate pollution):** Nitrate present in the fertilizer causes blue baby syndrome, when the amount exceeds the limit leads to death.
3. **Eutrophication:** Nitrogen and phosphorus in the crop fields washed out by runoff water in the water bodies, which increases the nourishment of the lakes called eutrophication. Hence algal species increases rapidly. Life time of the species is less and they decompose easily and pollute the water which affects the aquatic life.

③ EFFECTS OF MODERN AGRICULTURE

Problems in using pesticides

1. Death of non-target organism.
2. Producing new pest – super pest
3. **Bio magnification** – Most of the pesticides are non-bio degradable, keep on concentrating in the food chain and it is harmful to human beings.
4. **Risk of cancer:**
 - a) It directly acts as carcinogen
 - b) It indirectly supports immune system.

CASE STUDY- PESTICIDES IN INDIA

1. In Delhi the accumulation of pesticide in the body of mother causes premature delivery and low birth weight infant.
2. Pesticides in Pepsi and Coca Cola India has reported that Pepsi and coca cola companies are selling soft drinks with pesticide content 30-40 times higher than EU limits. This damages the nervous system.

THANK YOU

Acknowledgements:

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