UNIT 2: NATURAL RESOURCES.

Forests

Water

Minerals

Food

Energy

Land

What is Natural Resource?

- The environment is everything which surrounds on organism and influences its life in many ways. It includes physical and biological components.

- The physical components of the environment are soil, water, air, light and temperature (Abiotic components). The plants and animals are collectively referred to as Biotic components.

- All these components work together, interact and modify the effect of one another. The basic need of life are fulfilled by minerals present in the nature. These are referred to as Natural Resources.

Classification of Natural Resources

1. Based on Origin:

a. BIOTIC: (living organisms)

b. ABIOTIC: (non living organisms)

2. Based on Availability:

a. Inexhaustible/ Renewable : (replenishes naturally)

b. Exhaustible/Non renewable: (replenishing process is extremely slow)

3. Based on Distribution:

a. Omni present: (found everywhere)

b. Location based: (found at some specific locations only)

Continue...

4. Based on Source:
   a. Forest Resources
   b. Water Resources
   c. Mineral Resources
   d. Marine Resources
5. Based on Chemical Composition:
   a. organic: (vegetables, animals, bacteria, mineral oil)
   b. Inorganic: (Air, water, minerals)
   c. mixed: (land)

Forests

The earth’s land area where the vegetations are grown naturally in groups is known as a forest. Vegetations means trees, shrubs, creepers or any woody vegetations having a closed canopy.

Classification of Indian Forests

1. Evergreen forests
2. Deciduous forests
3. Dry forests
4. Tidal forests

Type of Forest States

1. Rain evergreen forest: Western Ghats
2. Tropical wet evergreen forest: Kerala , Assam
3. Tropical deciduous forest: Gujarat, Rajasthan
4. Broad leaves deciduous forest: Himalaya
5. Coniferous deciduous forest: U.P, H.P , J & K
6. Mangrove forest: coastal area

Functions of Forests

Function

1.Protective functions: Protect against : flood, soil erosion, drought ,etc.

2. Productive functions: Produces: Katha , pulp paper , bamboos, etc.

3. Regulative function: Regulates Temperature,O2 ,CO2.

4. Accessory function: Helps in : aesthetics and habitats of flora & fauna.

Importance of Forest

Ecological Importance

- Regulation of Global climate and temperatures
- Reduction in Global warming
- Production of Oxygen
- Conservation of soil
- Important in a fertility of soil
- Control of water flow
- Habitats to Wildlife
- Absorption of noise
- Absorption of Air Pollution

Importance of Forest

Economical Importance

1. Timber
2. Fuel food
3. Raw material for wood based industries
4. Bamboo
5. Food
6. Miscellaneous products

Deforestation

- Deforestation refers to the long term or permanent loss of forest cover.

- 10% loss of canopy is considered as Deforestation.

Causes

- Population explosion
- Shifting Cultivation
- Growing food demands
- Raw material for wood based industries
- Infrastructure Development
- Forest Fires :
- (i) Ground fire
- (ii) Surface fire
- (iii) Crown fire
- (iv) human activities
- Over grazing :
- Mining activities
- Attack of insects
- Natural forces

Threats associated with Deforestation:

1. Increase in the possibilities of flash floods.
2. Decrease in the rain fall.
3. Increase in the atmospheric temperature.
4. Increase in the amount of soil erosion.
5. Migration of tribal population leads to mental frustration.
6. Extinction of some useful medicinal species.
7. Shelter problem for forest animals will increase.
8. Problem of urbanization will arise.
9. Atmosphere will become adverse.
10. Desertification of forests and agricultural land.
11. Forest dwellers will have a problem of survival.
12. Decrease in the population of animal species.
13. Increased chances of cyclone due to climate change.

Effects

- Destruction of species habitats :Extinction of species, Loss of Bio-diversity
- Reduction of vegetation: Soil erosion
- Loss of soil fertility Loss of mineral nutrients
- Landslides
- Destructs Oxygen cycle
- Pollution + Global warming
- Less forest products Quality of our life

Need and measures of Forest Conservation

- **Needs:**

1. To maintain equilibrium in Ecosystem.
2. To maintain Bio-diversity.

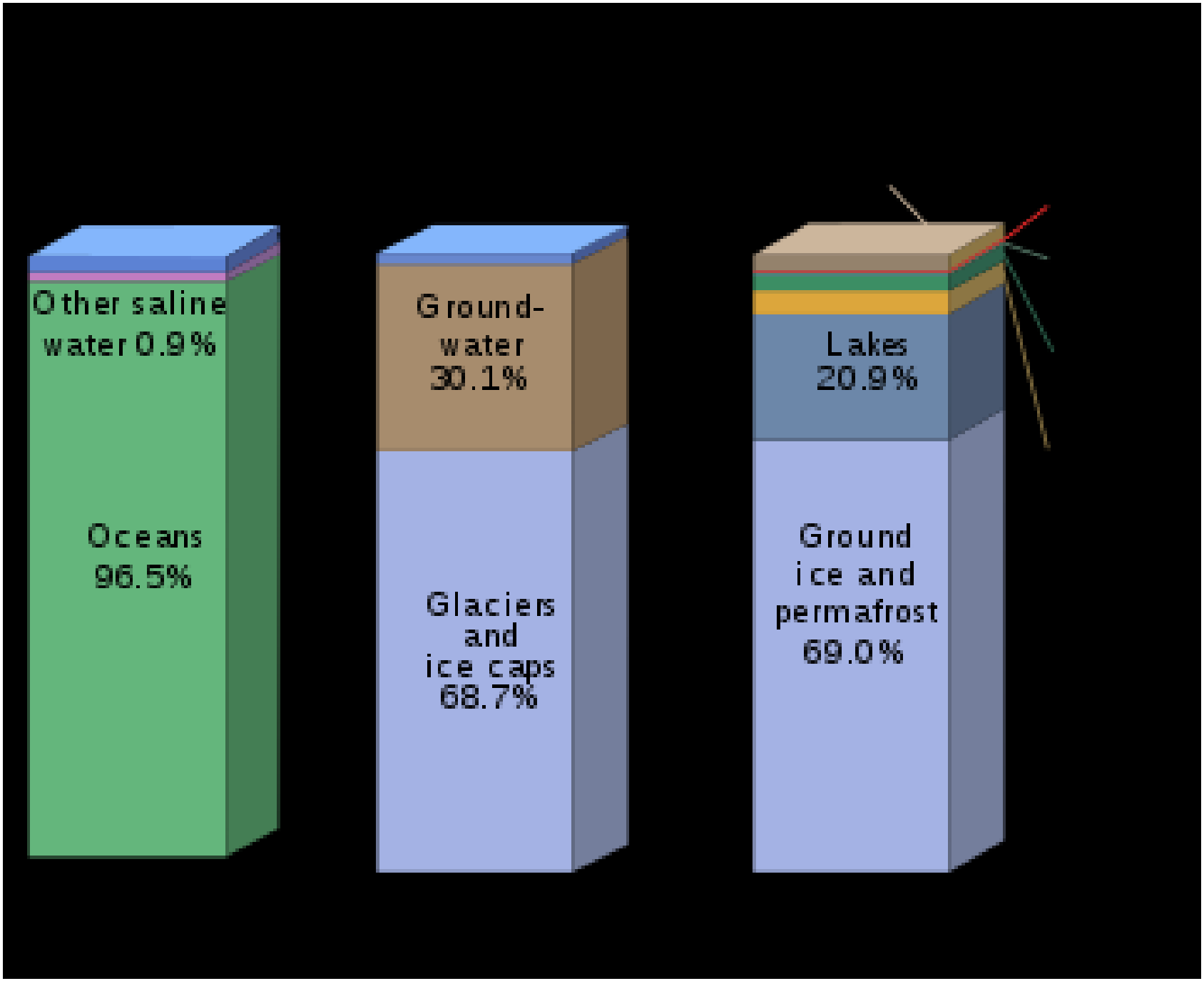
- **Measures:**

1. Forest fires should be prevented.
2. Use of pesticides to eliminate the risk of pests.
3. Plantation of resistant varieties.
4. Replacements of trees (aforestation)
5. Replacing the fire woods by biogas and solar cooker.
6. Implementation of social forestry programmes.
7. Aforestation programmes should be undertaken on wastelands.
8. Trees of aesthetic value should be planted.
9. Renewal of forest crops.
10. Reforestation by suitable monoculture.
11. Unwanted felling of trees should be restricted.

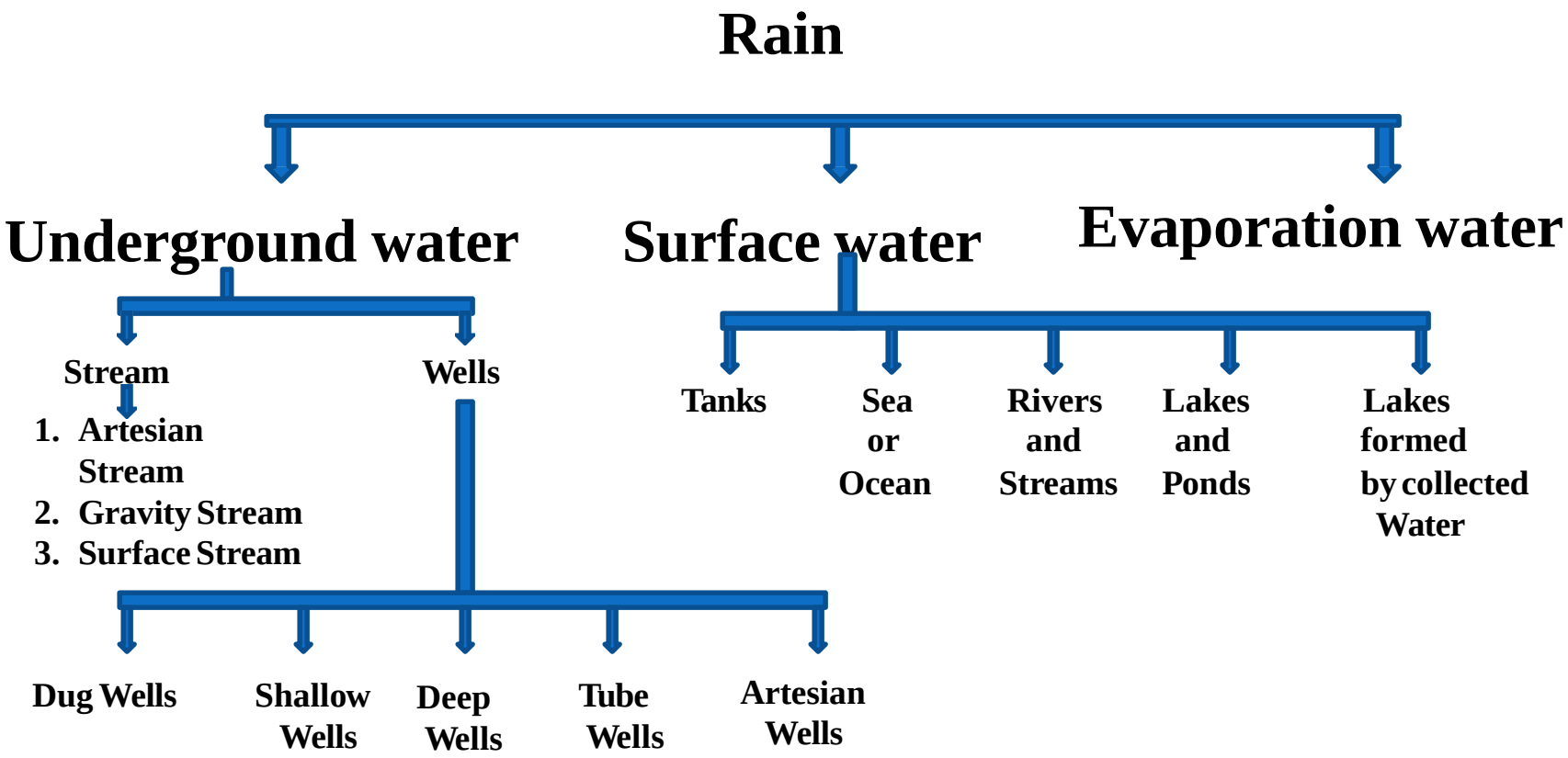
Water

Uses of Water:

1. Use of water in Agricultural and Industrial activities.
2. Drinking and Washing purposes.
3. Vital for Fishing Industry.
4. Marine transportation.
5. Electricity generation.


Other saline water 0.9%
Oceans 96.5%
Ground-water 30.1%
Glaciers and ice caps 68.7%
Lakes 20.9%
Ground ice and permafrost 69.0%

Sources of Water: (Water sheds)



Types of Wells:

1. **Shallow wells:**
   - 2 to 6 mts. Diameter
   - Half or Full Built up (brick walls)
   - 7 to 15 mts. Depth
   - used for household purposes
2. **Deep Wells:**
   - made of cement pipes (format)
   - 20 to 40 mts depth
   - 0.6 to 0.9 mts diameter
   - pure water ready to supply directly

3. Tube Wells:

- 60 to 300 mts depth
- 0.5 to 1.3 mts diameter
- 40 to 50 liters per second water flow
- Water used for gardening or water supply to distant place
- Purification is necessary

4. Artesian Wells:

- Constructed in valley or hilly areas
- Water pump is not required
- Purification of water is necessary

5. Dug Wells:

- Similar to Shallow wells
- Digging tools and spades are used to dug these wells
- Parapet wall of 1 mt. height is constructed
- Well is surrounded by inside slope

Dams and its Social and Environmental Impacts:

- **Advantages of Dams:**

1. Helps in water supply in Summer.
2. Blocking the water flow towards Sea.
3. For forming artificial lakes to maintain daily water supply.
4. Helps in irrigation and electricity generation.
5. Useful in creating Ecosystems for Birds and Aquatic Animals.
6. Useful to farmers to yield multiple crops in a year.

Problems Caused by Dams:

1. Fragmentation and Physical Transformation of rivers.
2. Serious impact on river-line Ecosystem.
3. Social consequences of large dams due to displacement of peoples.
4. Water logging and salinization of the surrounding land.
5. Dislodging animal population, damaging their habitat and cutting of their migratory routes.
6. Disruption of fishing and water- way traffic.
7. Emission of green house gases due to rotting of vegetation.
8. Serious impact on tribal people.
9. Failure in achieving the targeted objectives and high cost.

Impact of Over Utilization of Water:

1. Water scarcity specially in summer.
2. Wastage of Water may lead to blockage of drainage line, water pollution, Air pollution and Virulent disease or epidemics.
3. Economic loss due to over usage of Water.
4. It may be considered as Crime or Offence in the court of Almighty.

Recharging and Conservation of Water:

1. Construction of small Dams and artificial lakes for the water storage purpose.
2. Construction of ponds for the purpose of storing rain water.
3. Grow more trees to increase the chances of Rain.
4. Economical use of water. (avoid water wastage)
5. Try to reuse the water. E.g:
   1. Water used for bathing can be reused for vegetation in the veranda.
   2. Reuse of water by spraying it on dusty roads to prevent small particles to mix with air.
6. Use based water charges for controlling water usage.
7. After purification of Dirty water it should be used in farms or grass lands.

MINERALS

- A mineral is a naturally occurring substance of definite composition and identifiable physical properties.
- Coal, natural gas and mineral oil
- Metals like iron, copper, silver, aluminum, manganese and other valuable stones.

Classification of Minerals:

1. Energy Providing Minerals: Coal, Natural Gas and Mineral oil etc.
2. Valuable Minerals: Gold, Silver and Diamond.
3. Minerals Useful in Construction Work: Stones, Marbles, Lime etc.
4. Industrial Minerals: Iron, Copper, Manganese, aluminum etc.

Exploitation of Minerals:

- Minerals are recovered by the process of mining. It is the physical removal of minerals from the crust of the earth.

Methods of mining:

- A. <u>Surface Mining:</u>
  1. Open pit mining: For obtaining Lime-stone, sand stone, marble, granite, mica etc.
  2. Dredging: To Obtain the underwater Mineral deposits.
  3. Strip mining: Use of big digging tools to obtain the minerals from the ore.

B.<u>Underground Mining:</u> By making big Holes into the earth's surface to bring out the minerals lying in the deep earth ore.

Impact of Mines and Minerals on Environment

1. Air pollution by the emission of Sulphur Dioxide and Nitrogen Monoxide (SO2 and NO) during the mining process.
2. Various types of diseases arises due to air pollution.
3. Possibility of Acid Rain due to Toxic substances in the air.
4. Increase in Noise pollution due to the use of Heavy machineries in mining process.
5. Emission of Radon and Thorone in the Uranium Mines.
6. When water flows from mines, there will be Water Pollution.
7. Polluted water obtained from the Natural oil wells may create Land pollution.

Conservation of Minerals

Recycling: Reusing of useless articles by adopting proper processes for them.

Reusing: Reusing the Articles again and again.(glass bottles)

Decrease consumption: Minimizing the requirements of certain minerals and reducing the wastage.

Substitution: Try to find the Substitute of the Minerals.

Use of Waste: the Wastage of some industries can be used as Raw materials in other Industries.

FOOD

- Any substance or thing which is able to satisfy appetite to meet the physiological needs for growth to maintain all body processes and to supply essential energy required for maintaining body temperature and activity.

  Chapatti, rice, bread, butter, fruits, vegetables, milk, edible oil, etc are the routine examples of food.

Functions of Food

It provides energy to do day to day work and maintains body temperature.

It provides nutrients for the development and the growth of the body.

It provides substances to replace the catabolic cells by new cells or to appropriately repair the damaged cells.

It provides substances for the proper functioning of the reproductive system.

It regulates body activities to ensure longitivity of life and body.

Components of Food and their Functions

Element/ component	Daily requirement	Function	Sources
1. Carbohydrates	500 gms.	Energy and Temperature of the body is maintained	Grains, potatoes, sugar, banana, carrot, honey, etc
2. Fats	50 gms.	Important for the development of cells and building tissues.	Clarified butter, edible oil, milk, butter, eggs, etc
3. Proteins	100 gms.	Necessary for the growth and development of body tissues.	Cereals, milk, curd, cheese, meat, fishes, and eggs.
4. Water	2.5 liters	Essential for the bio-chemical process in the body.	Water

5. Salt (minerals)	0.7 gm.	Security against damage and strengthens bones.	Grains, cereals, salt
6. Vitamins	0.6 gm	Useful for bio chemical processes, health, growth	Milk, butter, vegetables, eggs and meat
7. Roughage	Rarely taken	It is useful for proper digestion and bowel's movement.	Chaff of grains.

Importance of Vitamins

K	Blood clotting, strong bones	Cabbage, cauliflower, spinach, soybeans
B	Helps body use food energy, digest proteins, function of central nervous system, digestion and metabolism	Lean meats, eggs, fish, dairy products, soybeans, yeast, broccoli, lean beef, cabbage, whole grains *note there are a variety of B vitamins; this is a summary
C	Helps immune system, helps wound healing, helps absorb iron	Citrus fruits, green peppers, strawberries, tomatoes, broccoli, sweet and white potatoes, cantaloupe
D	"sunshine vitamin" - helps absorb calcium (for healthy bones and teeth) 	Dairy products, fish, oysters, sunshine! 
E	Protects body against damage from free radicals, helps form red blood cells (to carry oxygen)	Wheat germ, corn, nuts, seeds, olives, spinach, green leafy vegetables, vegetable oils (sunflower oil, soybean oil)

Modern Agriculture

- Modern agriculture is an evolving approach to agricultural innovations and farming practices that help farmers increase efficiency and reduce the number of natural resources like water, land, and energy necessary to meet the world's food, fuel, and fibre needs.

- The agribusiness, intensive farming, organic farming, and sustainable agriculture are other names of modern agriculture.

Effects of Modern Agriculture

Soil Erosion

- The top fertile soil of the farmland is removed due to the excessive water supply.
- This leads to the loss of nutrient rich soil that hampered the productivity.
- It also causes the global warming because the silt of water bodies induces the release of soil carbon from the particulate organic material.

Effects of Modern Agriculture

Contamination of ground water

- The ground water is one of the important sources of water for irrigation. From agricultural fields nitrogenous fertilizers leach into the soil and finally contaminate groundwater.

- When the nitrate level of groundwater exceeds 25 mg/l, they can cause a serious health hazard known as “Blue Baby Syndrome”, which affects mostly infants even leading to their death.

Effects of Modern Agriculture

Water-logging and salinity

- The salinity of the soil is one of the reasons of low productivity just because of the improper management of farm drainage.

- In this situation, the roots of plants do not get enough air to respiration then it leads to low crop yield as well as low mechanical strength.

Effects of Modern Agriculture

Eutrophication

- It refers to the addition of artificial or non-artificial substances such as nitrates and phosphate, through fertilizers or sewage, to a fresh water system. It leads to increase in the primary productivity of the water body or 'bloom' of phytoplankton.

- Excessive use of fertilizers that consists of nitrogen and phosphorus leads to over nourishment of the lakes/waterbodies and gives rise to the phenomenon of eutrophication

FERTILIZERS

- The substance which brings an improvement in the productivity of the land and which is also helpful in bringing up vegetation is called fertilizer.

The Fertilizers can be divided in to two parts

A. Chemical or mineral Fertilizers
B. Biological or Natural Fertilizers

Chemical Fertilizers

- The continuous crop yield will exhaust the level of minerals (nitrogen, phosphorus, calcium and potassium). To regain the minerals chemical fertilizers are used.
- Characteristics of Chemical Fertilizers:
  1. It is soluble in water.
  2. It is durable.
  3. It should not be harmful to the plans.
- Types of Chemical Fertilizers:
  1. Phosphatic
  2. Nitrogenous
  3. Phospho-nitrous

Biological Fertilizers

- Classification of Biological Fertilizers:

1. Manures:

   It is obtained by decomposition of organic substances and bacteria.

2. Bio Fertilizers:

   It includes the micro living organisms in the land which is used to increase the fertility of the land. It provides the nitrogenous elements to the plants and vegetation.
   The main resource of bio fertilizers are; bacteria, algae and fungus.

Forms of Manures

1. **Farmyard manures:** Mixture of crop residues and excreta of animals. It has all maintenance elements of land and makes the land fertile.
2. **Compost:** Decomposition of organic matter by the micro-organisms: like fungi and bacteria. To prepare the compost, layers of plant materials, cattle dung and soil are arranged and water is sprinkled to keep it moisted.
3. **Green manures:** It consists of fast growing green plant materials. The leguminous and the non leguminous plants are planted on the same land. The process is called green manuring.

Manures v/s Bio Fertilizers

Manures	Bio Fertilizers
It is semi rotten or decayed organic substance, which is added to the soil.	It is a living formation which increases the fertility of the soil by microbial process.
This fertilizer provides nutrient elements (such as organic and inorganic) to the soil.	It provides inorganic elements to the soil. When the living species of this fertilizer are dead, it provides the organic elements in some extent.
This fertilizers keep the soil in its proper form and forms the aeration and hydration in appropriate proportion in soil.	It does not keep the soil in the proper form.
These fertilizers are not available in the sufficient necessary quantity for the agriculture.	These fertilizers are available in the sufficient necessary quantity for the agriculture.

Drip irrigation

- Drip irrigation or trickle irrigation is an irrigation method which saves water and fertilizer by allowing water to drip slowly to the roots of plants, either on to the soil surface or directly on to the root zone, through a network of valves, pipes, tubes, and emitters.

- There are certain advantages and disadvantages of this irrigation method which are

Advantages of drip Irrigation

1. Minimizes the use of fertilizers.
2. High water application efficiency.
3. Leveling of the field not necessary.
4. Ability to irrigate irregular shaped fields.
5. Moisture within the root zone can be maintained at field capacity.
6. Minimized soil erosion.
7. Highly uniform distribution of water.
8. Lower labour cost.

Disadvantages of Drip Irrigation

1. High initial cost.
2. The sun can affect the longetivity of the tubes used in the drip irrigation.
3. Clogging problem will arise.
4. Drip tape causes extra clean up costs after harvest.
5. If not installed properly, then it may create waste of water, time and harvest.

Pesticides:

- Pesticides are poisons used to kill pests.
- We use pesticides to kill off pests that hurts us, animals or plants. Farmers first used them to kill off bugs and weeds because they have big fields. After a while the cities and towns started using them.
- Pests don’t have to be just bugs they can be weeds, diseases that kill plants, and other animals such as rats or mice.

- At least three million people are poisoned by pesticides every year.
- 25 million agricultural workers are poisoned every year.
- More than 200,000 people die each year from pesticides
- Half of all pesticides are used on the five main crops- cereals, corn/maize, rice, cotton and soya.

Benefits of pesticides

1. It helps in increasing the yield of crop plants.
2. Application of pesticides may be beneficial in Public Health Programmes. (e.g. for controlling the growth of mosquitoes causing malaria, yellow fever, etc. houseflies, lice, cockroaches, poisonous insects, etc.
3. It helps in controlling the pests causing damage to animals, stored food, books, wooden articles, etc.
4. Pesticides are also used to protect stored food grains in godowns.

Disadvantages of Pesticides;

1. Along with the harmful pests, it may also damage the crops or plants.
2. It may cause the damage to the bacteria which are useful for the growth of plants.
3. It causes the damage to the health of the person who is spraying it in the field.
4. Some pesticides are able to mix with the air and may pollute the atmosphere.
5. The durable poisonous pesticides may cause the water pollution as it can flow with the water and mixes to the water resources.
6. Some types of pesticides may enter into the food chain and can harm the human health.

Land

- Uses of Land:
  1. For Residential and for Construction purpose.
  2. For the construction of roads.
  3. For Agricultural and for Gardening purpose.
  4. For creating Forests.
  5. For the construction of big Industrial Units.
  6. For preparing canal and water resources.
- Misuses of Land:
  1. Destruction of forests.
  2. Unused grass land.
  3. Non planned urbanization.
  4. Excess use of chemical fertilizers.
  5. Use of land for mineral industries.

Land slides

- It refers to the sliding or dislodging of a large mas s of rocks materials , soils etc… down the side of amount a inorcliff landslides represent the most extreme hazards , especially in terms of loss of life Overpopulation and socio-economic pressures have forced some of the most vulnerable populations into areas of high risk (hill sides)

Causes

- Climate
- Earthquake
- Weathering
- Erosion
- Volcanoes
- Forest fire
- Gravity
- Mining

Effects

- Lead to economic decline
- Decimation of infrastructure
- Loss of life
- Affects beauty of landscapes
- Impacts river ecosystems

Various Causes of Soil Erosion

1. Rain and Rainwater Runoff
2. Farming
3. The slope of the Land
4. Soil Erodibility
5. Lack of Vegetation
6. Unsheltered Distance
7. Wind

Effects of Soil Erosion

1. Loss of Topsoil
2. Soil Compaction
3. Reduced Organic and Fertile Matter
4. Poor Drainage
5. Issues With Plant Reproduction
7. Long Term Erosion
8. Water Pollution
9. Climate Change

Preventive Measures

1. Careful Tilling
2. Crop Rotation
3. Increased Structure For Plants
4. Water Control
5. Soil Conservation
6. Increased Knowledge

Soil protection:

1. Avoid Soil erosion.
2. Avoid Water congestion.
3. Water slop on the slope has to be controlled to minimum speed.
4. Water should be absorbed in the soil with a slow speed.
5. Control the wind velocity by growing more trees.
6. Construct the drain of such a breadth that the soil particles may be kept to stick one another.

Desertification

Desertification is a type of land degradation in dry lands in which biological productivity is lost due to natural processes or induced by human activities whereby fertile areas become increasingly arid

Causes

Causes

- Overgrazing
- Deforestation
- Increased population

Effects

- Biodiversity loss
- Loss of productive capacity

THANK YOU