

9/11/22

The Multidisciplinary Nature of Environmental studies

I.C.W

Chapter 1 Syllabus

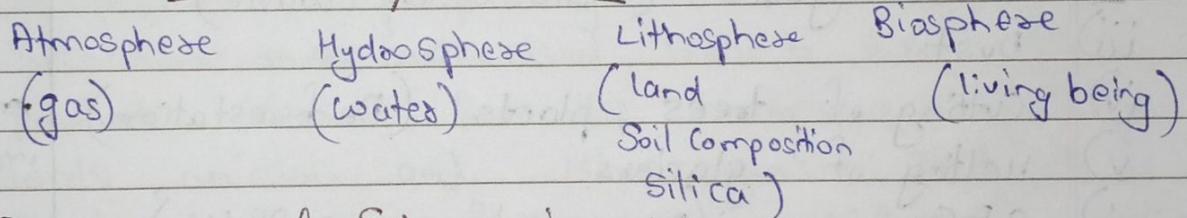
- a) Definition
- b) Scope importance
- c) Component of environment
- d) Need for public awareness

Environment → It is defined as sum total of all the elements, factors and all the condition ~~in the~~ which has an impact on development action and survival of organism.

Components

- Biotic (lives)
- Abiotic (Non lives)

Component of environment



Environmental Science importance

- a) Physical Science → Physics, chemistry, Mathematics etc.
- b) Life Science → Biology, Medicine
- c) Humanities → History, economics, Political science
- d) Commerce Management →

that's why it is called Multidisciplinary & Nature of Environmental Studies. because it consist Physical Science, life Science, Humanities, Management etc.

Scope & importance of Environmental studies

A) Importance

- i) To protect Environment
- ii) To decrease pollution level

Scope & importance में क्यों लाभा तोड़े
Point same हैं

Global environmental problems

- i) Pollution
 - ii) Harmful gases (Radio active waste)
 - iii) Dust
 - iv) cutting of trees, plants (Deforestation)
 - v) Melting of glaciers
 - vi) CFCs (ozone layer depletion)
 - vii) Global warming
 - viii) Radio-active Acid rain
 - ix) Depletion in ground water
 - x) Population growth
- ~~(xi)~~ (xi) State the objective of Environmental Studies

Ans

Objective of Environmental Studies

UNESCO (1971) → से विषयीकृत Environmental Studies
United Nations Educational Scientific and cultural organization

- a) Awareness
- b) Attitude
- c) Participation
- d) Knowledge
- e) Skill

- Q) Need for Public awareness Justify it.
- Sq) Need for public awareness

Formal Education

- Mandatory from Standard I to undergraduate
- Higher degrees
- Short term courses (NPTEL)
- Management studies

Non-formal education

- NEAC (National Environment Awareness Camp)
- Eco-club Setup
- GLOBE (Global Learning & Observation to Benefit the Environment)
- Mass Media

- Q) Write short note of Bioprospecting & Biopiracy

Ans Bioprospecting / Biodiversity Prospective

Definition → Bioprospecting is defined as a systematic and organised search for useful products derived from the bioresource including plants, animals and microorganism that can be developed for the further ~~commercial~~ commercialisation and overall benefits to the society.
 Ex → Opium is used as a pain killer

Biopiracy

Biopiracy refers to the use of bio-resources by multinational companies and other organisation without proper authorization from the concerned countries or the concerned people.

Ex → Basmati rice organized from India but authorized by USA.

Natural Resource

Natural Resource → The resources which we get from natural.

Classification of Natural Resource

a) On the basis of Biotic component

i) Biotic Resource

ex → Forest, Food

wild life

ii) Abiotic Resources

eg → Water, Land

Minerals

b) On the basis of renewability

Renewable Resource

eg → Solar, wind,
Hydro energy

Non Renewable Resource

eg → Fossil fuel, forest.

Q) Differentiate b/w Renewable & Non Renewable Resources.

Ans Renewable Resource

- i) It can be used throughout the life
- ii) They are energy resource which cannot be exhausted
- iii) It is sustainable
- iv) Required large area for installation of power plant

Non-Renewable Resource

- i) It cannot be used throughout the life
- ii) They are energy resource which can be exhausted
- iii) It is exhaustible
- iv) Required low area for installation of power plant

Natural Resource

v) These resources are pollution free.

v) The resources are not pollution free.

Types of Natural Resource

- a) Forest Resource
- b) Water Resource
- c) Mineral Resource
- d) Food Resource
- e) Energy Resource
- f) Land Resource

Importance, Over ~~exploitation~~
conservation ~~Practices~~ Practices
case study,
consequences.

A) Forest Resource

India 68 Million hectare (24% of total land)

Type of forest

Reserve forest
(No human activity
only for wild life
& vegetation)

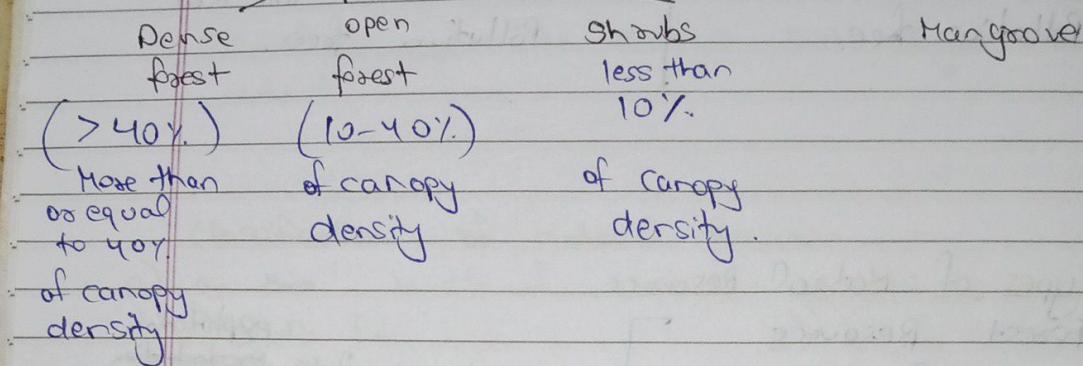
open forest

(Some human activity
done)

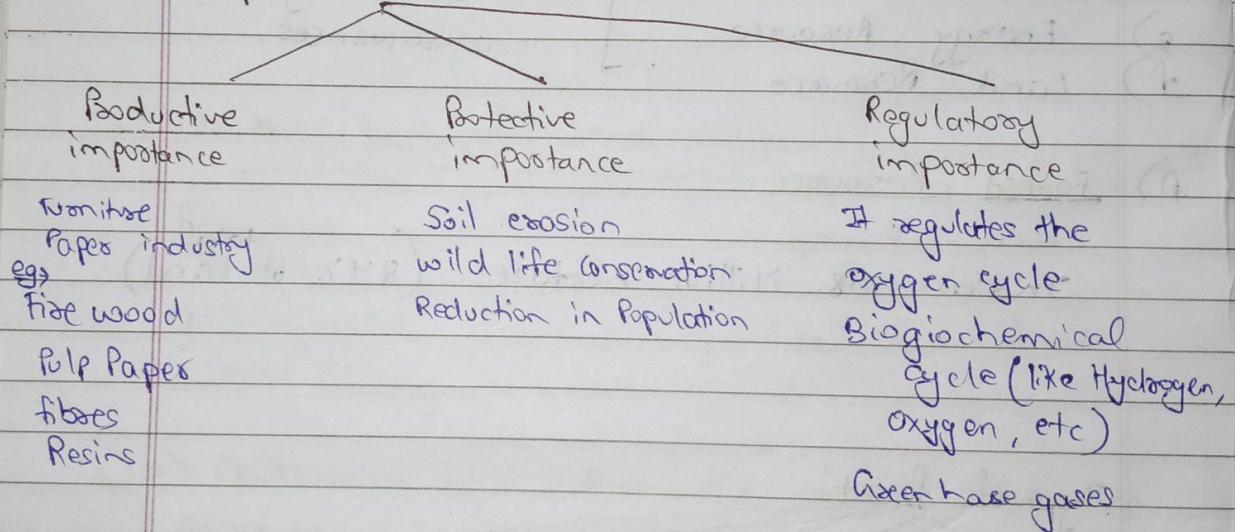
Protective forest

unclosed
forest
(only tribe
people live
no one allow
to enter into
this)

On the basis of canopy density



Importance of forest



Uses of forest

commercial uses
Economical significance

Environmental significance

(Importance of forest water)

Over exploitation of forest

over exploitation of forest it is caused the factor called deforestation.

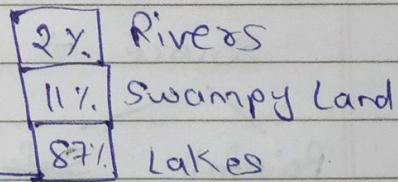
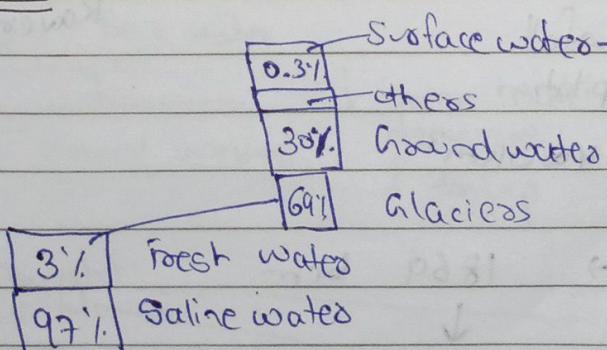
| Causes | Consequences | Conservation |
|---|---|-------------------------------------|
| a) Pollution Population | a) Global warming ↑ | a) Forest camp |
| b) Making apartment | b) Ozone layer depletion | b) Awareness program |
| c) factory Setup | c) Pollution ↑ | c) Tree plantation |
| d) Industrialization | d) Climate change | d) Implementation of laws regarding |
| e) Water logins | e) Soil erosion | Forest High e) Subsidy to |
| f) Increase demand of forest Product | f) Flood & Natural disaster | the forest product |
| g) Shifting cultivation & over grazing | g) Loss of floral fauna (Biodiversity) | |
| h) Agriculture land expansion | | |
| i) Wood extraction | | |

Case study related to forest

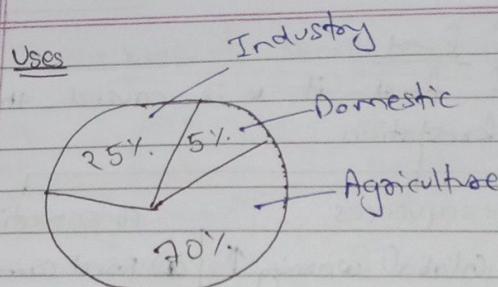
Chipko Movement (To prevent the cutting of tree)

B) Water Resources

75% water

Sources

Earth's water distribution



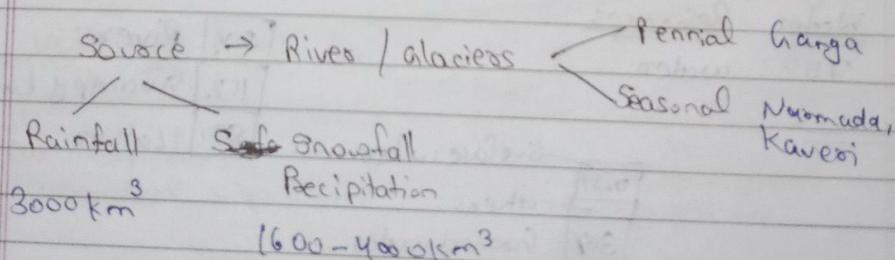
Importance characteristics

- Universal Solvent \rightarrow (Polar Solvent)
- High surface tension (72 dynes/cm at room temp.)
- High latent heat of vaporization
- Low density / viscosity
- Anomalous behaviour during freezing
- Low viscosity

Importance / uses

- Agriculture
- Industry
- Domestic use
- Recreational Activity

Ex. exploitation of water



All water (India) \rightarrow 1869 bcm

\downarrow

$690 \quad 37\%$

Saline
water

Metoo
June-July
comparat

| 1997 | 2010 | 2025 | 2050 |
|--------------------------------|---------------------|---------------------|----------------------|
| 629 km ³ | 710 km ³ | 843 km ³ | 1180 km ³ |
| \rightarrow 40% water demand | | | |

Over exploitation of water

Surface water

Agriculture

Industry

Domestic

Dam construction

Ground water

Consequences Surface water

- Disturbance in Nature or aquatic life
- Migration of wild life
- ~~Drying up~~ Low in fresh water
- Soil erosion

Consequences Ground water

- Lowering in water table
- Land drying up
- Water pollution due to leaching
-

aquifers fresh water

Saline water

Ground water

\downarrow water level decreases
 \downarrow dry up

then More chances
of Natural
disasters

Drought

Metological
June-July Monsoon come
comparatively year by year

Hydrological drought

decrease in ground water level

Agricultural drought

Conservation

- ~~W~~ a) Rainwater Harvesting
- b) collection of Rainwater | kuls
- c) Bamboo Irrigation
- d) Diversion channel

Dam construction

- ~~W~~ ~~disadvantages~~ Advantages
- i) Irrigation
- ii) Supply of water to area of water scarcity
- iii) Flood control
- iv) Power generation
- v) Recreational Activity

Disadvantage

- i) Migration of local people
- ii) Deforestation
- iii) Land erosion
- iv) Loss of biodiversity
- v) Effect of aquatic life

~~W~~ (1) Write short note on Dam construction

Environment impact on Dam construction

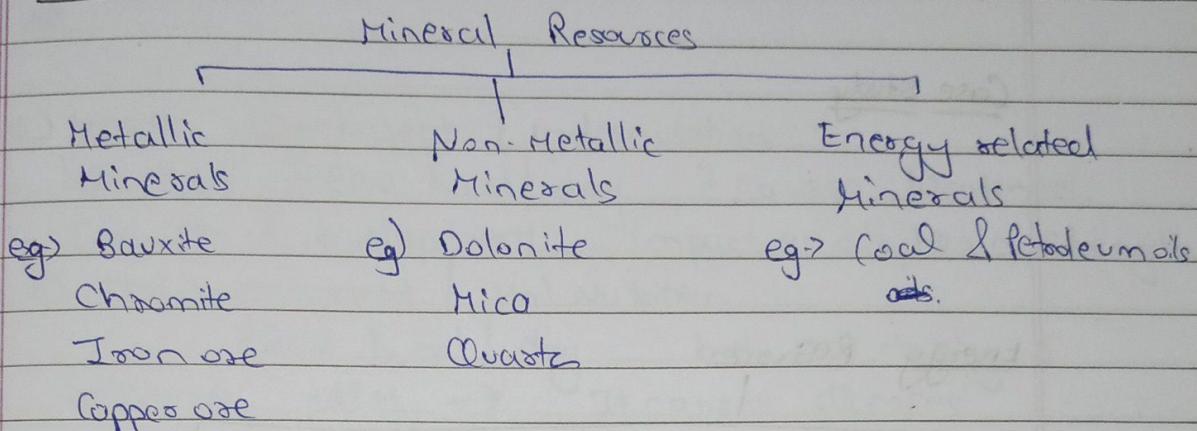
Case Study

- a) Kaveri water dispute (Karnataka, Tamil Nadu, Pondicherry)
- b) ~~Also~~ Theri dam
- c) Brahmaputra (China, Nepal, India)

~~W~~ (2) Write down the consequence on over exploitation of surface & ground water

Mineral Resources

Classification



Iron → Madhya pradesh, chhattisgarh

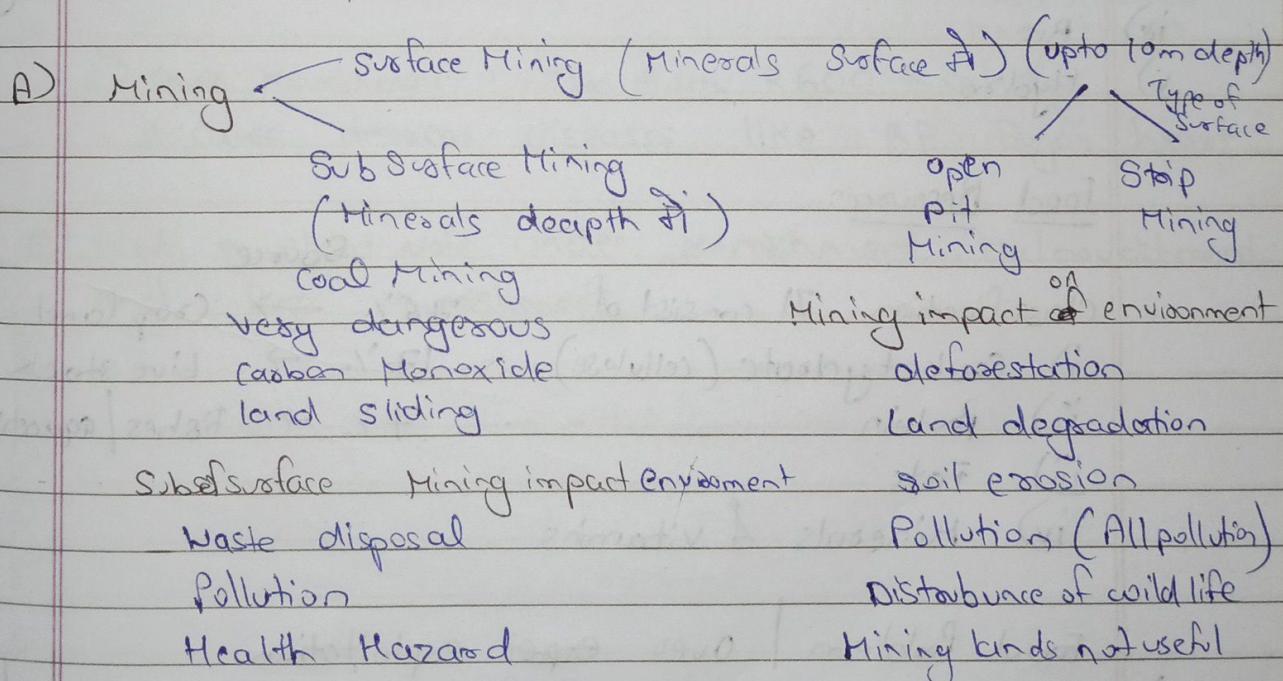
Exploitation

Importance of Minerals

Importance

① Industrialization

Extraction of minerals



- ~~(a)~~ Write down the Environmental impacts of over exploitation of Minerals / extraction of Minerals resources.

Case Study

Energy Resources

Renewable

- i) Solar → Nuclear
- ii) Wind → Ocean
- iii) Geothermal
- iv) Bio
- v) Hydro

Non-Renewable

- i) Coal
- ii) Fossil Fuel
- iii) Alternate Source of energy

Food Resources

Classification It consist of

- i) Carbohydrate (cellulose)
- ii) Protein
- iii) Fats
- iv) Minerals & vitamins

Source

- 76% → Crop land
- 17% → Livestock
- 7% → Fishes / aquatic

- Food Problem | over ~~exp~~ exploitation
- i) Average requirement of food energy 2600 K cal/day

Male = 3000 K cal/day

Female = 2200 K cal/day

- a) Under nourishment / under nutrition \rightarrow less than 2600 Kcal/day
- b) Malnourishment / Mal nutrition
- c) Over nourishment / Over nutrition.
~~ab~~

- a) Under nourishment / under nutrition
less than 2600 Kcal/day It causes Weakness, Growth & development, Impact on our brain, strength.
- b) Malnourishment / Mal Nutrition
2600 Kcal/day but not taking a balance diet. \rightarrow It causes diseases

Iron deficiency leads \rightarrow anaemia

Protein deficiency \rightarrow Goiter

Iodine deficiency \rightarrow ~~Kwashiorkor~~
~~Kwashiorkor~~

~~Kwashiorkor~~
Marasmus

- c) Over Nourishment \rightarrow More than 2600 Kcal/day
it cause ~~diseases~~ diseases like BP, Sugar, heart

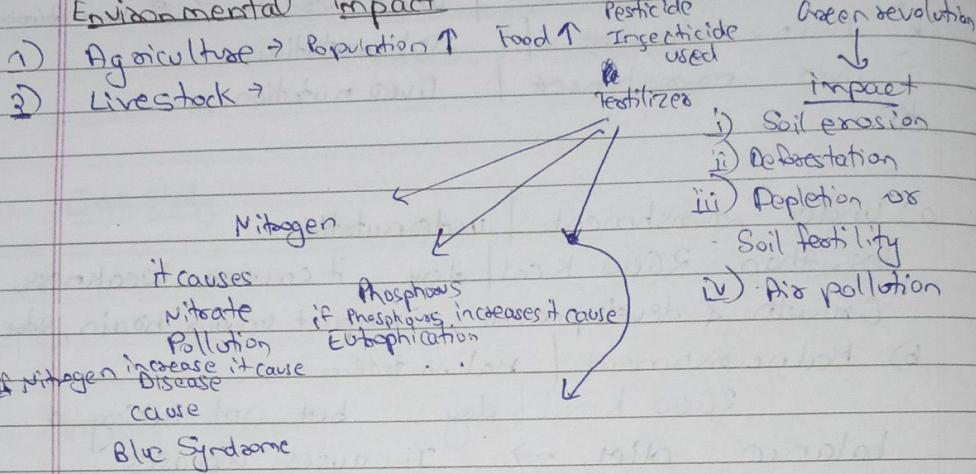
- Q) Write a short note under Nourishment, Malnourishment and Over Nourishment.

Green Revolution \rightarrow Using Modern Technology
High yield seed
Irrigation
Fertilizers & Pesticides

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Environmental impact



Cause of waterlogging

- i) Irrigation
 - ii) High Rainfalls
 - iii) Disadvantage water logging
 - iv) Blocking of soil pores
 - v) Saturation of water table
- both block O₂ supply
↓ it cause

Yellowing of plant

↓
Death of plant

Salinity

↑ in salt conc? like Na⁺, PO₄³⁻ etc

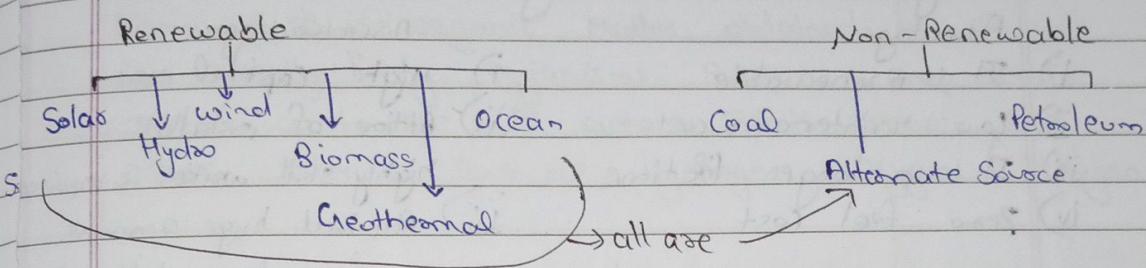
Cause Salinity

Excessive use of fertilizers

High evaporation rate

Poor drainage

disadvantage of salinity

Energy ResourceEnergy Resourcei) Solar Energy

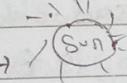
It is a type of energy which is generated by the Sun.

Advantage

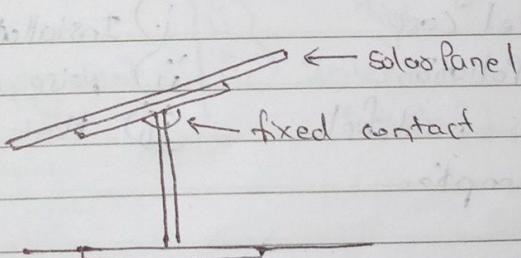
- i) Pollution free
- ii) Renewable
- iii) Low Maintenance cost
- iv) It is reliable source of energy

Disadvantage

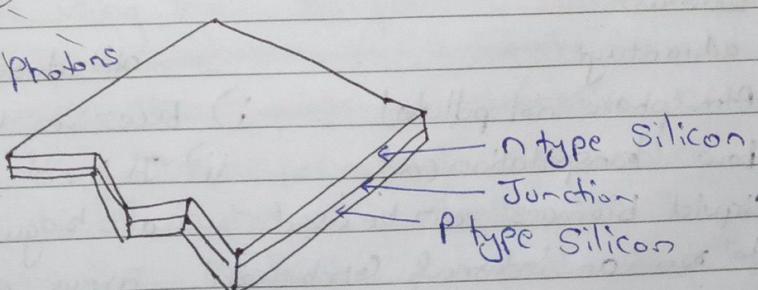
- i) Cannot be Moved easily
- ii) Weather dependent
- iii) It required larger area for installation of setup
- iv) Required More space

Working → 

Solar tracking follow the direction of Sun



Photons



3) Hydro energy

Hydro energy is a form of energy which help us to generate the electricity with the help of water.

Advantage

- i) It is a renewable
- ii) low maintenance cost
- iii) It has a longer lifetime
- iv) zero fuel cost

disadvantage

- i) High capital cost
- ii) At time of installation
- iii) highly skilled workers are required
- iv) Required huge amount of water all the time.

3) Wind Energy

Wind energy is the use of wind turbines to generate electricity.

advantage

- i) No fuel cost
- ii) no pollution
- iii) Reduces fossil fuel consumption

disadvantage

- i) Installation is expensive
- ii) noise pollution due to turbine
- iii) Most land use

4) Biomass

advantage

- i) Atmosphere not polluted
- ii) less transportation cost
- iii) liquid biomass can be used to run an internal combustion engine
- iv) Solid biomass can be converted into liquid and gaseous form

disadvantage

- i) Excessive use destroys forests
- ii) It is not possible to set up a biogas plant in urban areas as the biogas plant occupies space

(iii) Biomass has a water content 50% to 60% which is heavy.

Biomass → it is organic Matter obtained from living or recently living organisms such as crop residue, animal waste etc. It contain 75% carbon and other molecules such as Hydrogen, Oxygen & Nitrogen.

5) Geothermal Energy → It is energy that is generated from the heat within the earth. Hot rocks in the earth's core emit heat which generates steam and pressure and thus comes out of the earth's surface. This steam is used to run turbines to produce electricity.

Advantage.

- i) Renewable Source
- ii) Green energy
- iii) Generation of employment
- iv)

Disadvantage

- i) Transportation
- ii) High installation cost
- iii) Intensive research required.

6) Ocean thermal Energy

It refers to using the temperature difference between ~~the deep parts of the sea, which are cold~~ and the ~~shallow~~ parts of the sea ocean surface & ocean deep. The deep parts are cooler because sunlight not full reaches the depth. The Temperature difference b/w the shallow parts and deep part is 20°C to 25°C . So Ammonia is used for such process.

Advantage

- i) Pollution free
- ii) Renewable

Disadvantage

- i) Capital investment high
- ii) Conversion efficiency is very low about 3-4% due to small temperature difference b/w shallow & deep part
- iii) Energy efficiency is less
- iv) Conversion efficiency is low about 3-4%.

Nuclear &
energyCoal & PetroleumNatural gasAdvantage

- i) It is easier to store
- ii) It is really cheap
- iii) It is more reliable than renewable energy

disadvantage

- i) Not Renewable energy source
- ii) Pollute the environment
- iii) In case of irresponsible use they can be dangerous

Ocean Energywave
energytidal
energyOcean thermal
energy

It is associated with the kinetic energy. Depend on lunar cycle, tide, winds & weather. Wave carry size & strength which rotate turbine and convert mechanical into electrical energy.

During full Moon and half Moon

wave goes upward and downward which rotate turbine and produce electricity

high
it is very
due to
difference
deep pool
less
less about

energy
concent
onsible

Advantages Wave energy
i) It is renewable energy
ii) pollution free

disadvantage

- i) The energy generation or the electrical energy generate from the wave is very less
- ii) It is very expensive in the installation.
- iii) Effect the aquatic life.

Advantage tidal energy
i) Renewable
ii) pollution free

disadvantages.

- i) It is very difficult to construct dam in coastal area
- ii) It is only use when full Moon night or half Moon night are present.

Q) Write a short note on ocean thermal Energy conversion (OTEC).

Ans) OTEC (Ocean thermal Energy conversion)
The energy available due to the difference in the temperature of water at the upper surface and the deeper layers of the ocean is known as ocean thermal energy.

Ocean thermal energy is used to generate electricity in an Ocean thermal Energy conversion power plant (OTEC Power plant). A temperature difference of 20°C or more between the surface water and deeper water is needed for the operation of these plants.

The warm surface water of the ocean is used to boil a liquid like ammonia

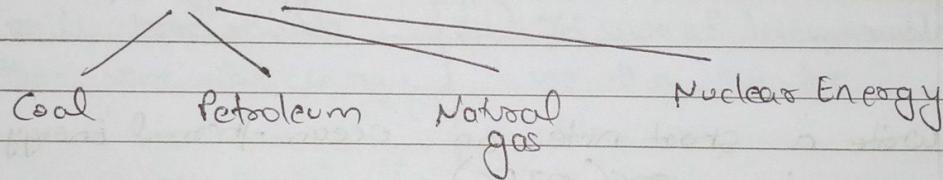
or chlorofluorocarbon. The high pressure of liquid vapours is used to run the turbine of a generator and produce electricity.

Advantages

Disadvantages

} do previously.

No. 3 Renewable



| Coal | C.Y. |
|------------|------|
| Wood | 10% |
| Peat | 11% |
| Lignite | 40% |
| Bituminous | 65% |
| Ashesite | 95% |

more present

less present
Metallurgical Reducing agent

Petroleum

Cake oil (Natural gas)

↓
fractional distillation

↓
Petrol, Diesel

Renewable Energy

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Date: _____

- Q) Write short note on Alternate source of energy.

Ans)

Biofuel →
Wind
Solar
Geothermal
Hydroelectric

Biodiesel
Vegetable oil
Ethanol
Methanol

Waste to Energy conversion

Incineration Biodegradation Pyrolysis

Need of alternative energy resources

- i) we need renewable ways to generate power
- ii) To avoid using Non-renewable like Fossil Fuel

a) Biofuel → Ethanol produced from common crop like
Sugar, Potato

Biodiesel made from vegetable oil

Both Ethanol & biodiesel are added to gasoline
So we use less fossil fuel

Disadvantage

- i) Biofuel can only be produced when the fuel crop are growing
- ii) The land for growing food should be used for food

Advantage

- i) Positive Economic impact
- ii) Sustainability
- iii) Reducing foreign oil dependency

Q) Rest other done previously

LAND Resources

13,393 million hectares land ($\frac{1}{5}$ of the earth Surface)

India \rightarrow 328.7 million mha

Forest \rightarrow land 30%.

Agricultural = 11%
 Barren Uncultivated Land } 22%.
 Grazing land }

Area under constructional / Industrial = 37%.

Causes

- i) Deforestation
- ii) Over grazing
- iii) shifting cultivation
- iv) mining activities

Consequences

- i) Soil erosion
- ii) loss of soil fertility

factors

Soil erosion \rightarrow deforestation
 faulty cultivation Method
 shifting cultivation
 over grazing
 Lack of proper surface draining.

Globally

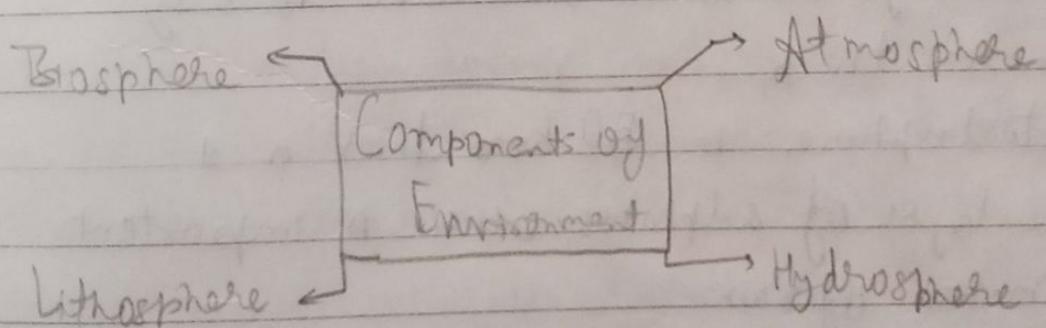
Total Energy Requirement
 Segregation of energy.

contains generation of energy
 Conventional Energy Alternate Energy

• Goals of Environmental Education

To develop a world population that is aware of & concerned about environment as a whole & the problems associated with it, and committed to work individually as well as collectively towards solutions of current problems and prevention of future problems.

• Components of Environment



- Atmosphere - Blanket of gases surrounding the earth
- Hydrosphere - Various water bodies present on the earth.
- Lithosphere - Contains various types of soils & rocks on the earth
- Biosphere - Composed of all living organisms & their interactions with the environment.

Detailed

Atmosphere

- The atmosphere forms a protective shell over the earth.
- The lowest layer, the troposphere, the only part to warm enough for us to survive in is only 12 kilometers thick.
- The ~~st~~ stratosphere is 50 kms thick and contains a layer of sulphates which is important for formation of rain.
- It also contains a layer of ozone, which absorbs ultra violet light.

Hydrosphere

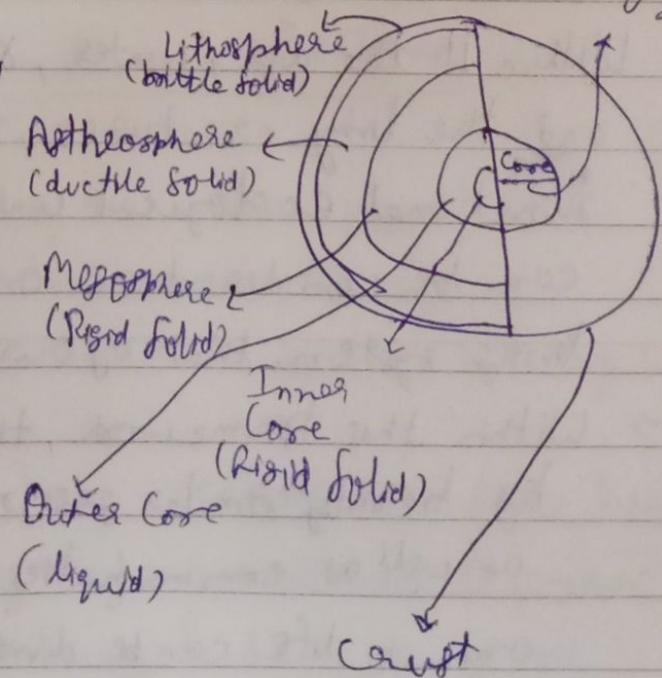
- The hydrosphere covers three quarters of the earth's surface.
- A major part of the hydrosphere is the marine ecosystem in the ocean, while only a small part occurs in fresh water.
- Fresh water in rivers, lakes and glaciers, is perpetually being renewed by a process of evaporation and rainfall.
- Some of this fresh water lies in underground aquifers.
- Human activities such as deforestation create serious changes in hydrosphere.

~~J~~

Lithosphere

- The crust of the earth is 6-7 km thick & lies under the continents.
- Rocks, when broken down, form soil on which man is dependent for his agriculture. Their minerals are also the raw material used in various industries.

Fe & Ni alloy.
Density = $10-13 \text{ g/cm}^3$



Crust (Avg Composition)

47% O

27% Si

8% Al

5% Fe

4% Ca

2% (Mg, K, Na)

Note → There are two types of crust: continental & oceanic.

— Continental Crust → Composed mostly by granite ($2.7 - 3.0 \text{ g/cm}^3$)

Oceanic Crust → Composed of basalt
($3.0 - 3.3 \text{ g/cm}^3$)

• Biosphere (simply meaning; where life present or exist)

→ This is the relatively thin layer on the earth in which life can exist.

→ Within it the air, water, rocks and soil and the living creatures, form structured and functional ecological units, which together can be considered as one giant global living system, that of our Earth itself.

→ Within this framework, those characterised by broadly similar geography and climate, as well as communities of plant and animal life can be divided for convenience into different biogeographical realms.

19/3/23

Ecosystem

Ecosystem → It is the interaction of living and non-living organism. It is defined as the integration of all the living and non-living factors of the environment. In which Matter cycle and energy flows present.

The Study of Ecosystem is called Ecology.

further of Ecology in India → Ramdeo Mishra

The concept of ecosystem can be appreciated by the fact that animals depend upon the plants directly or indirectly for food. Plants are capable to manufacturing their own food but they also dependent on abiotic ~~environment~~ environment for getting light, CO_2 for the synthesis of food.

Types of Ecosystem

Natural ecosystem

Aquatic ecosystem

benthic ecosystem

Marine ecosystem

Lentic

Lotic

wetlands

~~Terrestrial~~ Artificial ecosystem

Terrestrial ecosystem

Forest ecosystem

Grassland ecosystem

Mountain ecosystem

Desert ecosystem

Ecosystem of two types

A) Natural Ecosystem These operate by themselves under natural conditions without any major interference by Man.

Terrestrial ecosystem Found on Land

- Forest Ecosystem
- It is type of terrestrial ecosystem in which living organisms such as tree, insects, animal and human being interact with each other.
- The classification of forest ecosystem is based on temperature and rainfall in area of particular forest ecosystem.
- In India about 21.71% of total land area is occupied by forest.
- The major forest found in India are Tropical rain forests etc.

Forest ecosystem (components)

Abiotic components

Contain physical & chemical features

Physical features include wind, soil, moisture, temperature light etc

Chemical features water, gases Nitrogen etc

Biotic components

Producers

Consumers

Decomposers

Primary Secondary Tertiary

Producers They are mainly green plants which prepare their food by the process of photosynthesis

Nature of Soil, climate & local topography determine the distribution of tree & their abundance in the forest vegetation.

Ex -> Neem, peepal

Consumers These organisms which do not make their own food & depend on others for food.

- i) Primary consumers → Those organisms which feed on green plants only are called primary consumers they are called herbivores Example → Rabbit, cow
- ii) Secondary consumers → They are carnivores which feed on other animals and also omnivores which feed on both animal & plants Ex → birds.
- iii) Tertiary consumers → They feed on both secondary and primary consumers. Ex → Lion etc.

Decomposers When autotrophs (producers) & heterotrophs die in forest then special kind of organisms called decomposers feed upon these dead and decaying matter & break complex organic compound into simpler organic compound & make them available for autotrophs
Ex → Bacteria.

Advantages

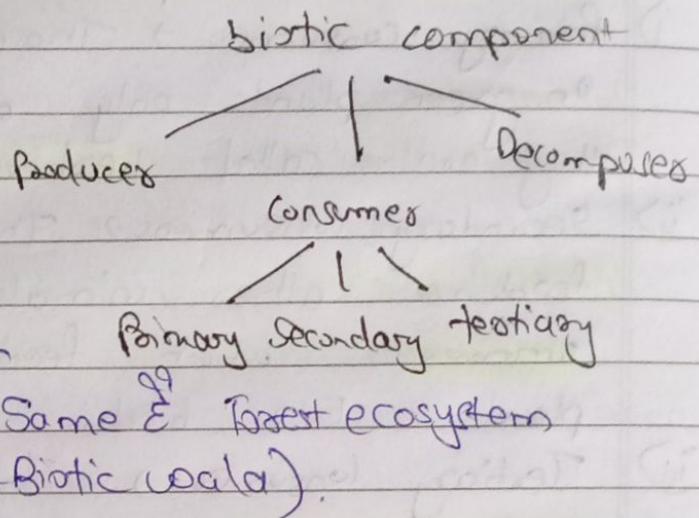
- a) Used for Medicine preparation
- b) control flood, soil erosion
- c) without forest the area become desert
- d) Air purify.

Grassland Ecosystem

Grassland are area of grass. They occupies 20% of earth surface. Where rainfall is not enough to support the growth of trees there grass will occur.

Grassland ecosystem component

abiotic component
It includes nutrient present in soil & gases in atmosphere



c) Desert ecosystem

It is present where low or high temperature & limited vegetation. Based on climatic condition there are two types hot desert or cold desert. (Rainfall) less than 25 cm average

Desert ecosystem components

Abiotic component

It includes like

light, temperature

Biotic component

Producers

- i) They make their own food

- ii) Widespread branched root system

- iii) Plant have thick fleshy cell that store water in stems
(called succulent)

Consumers

- i) They not make their own food

e.g. lizard

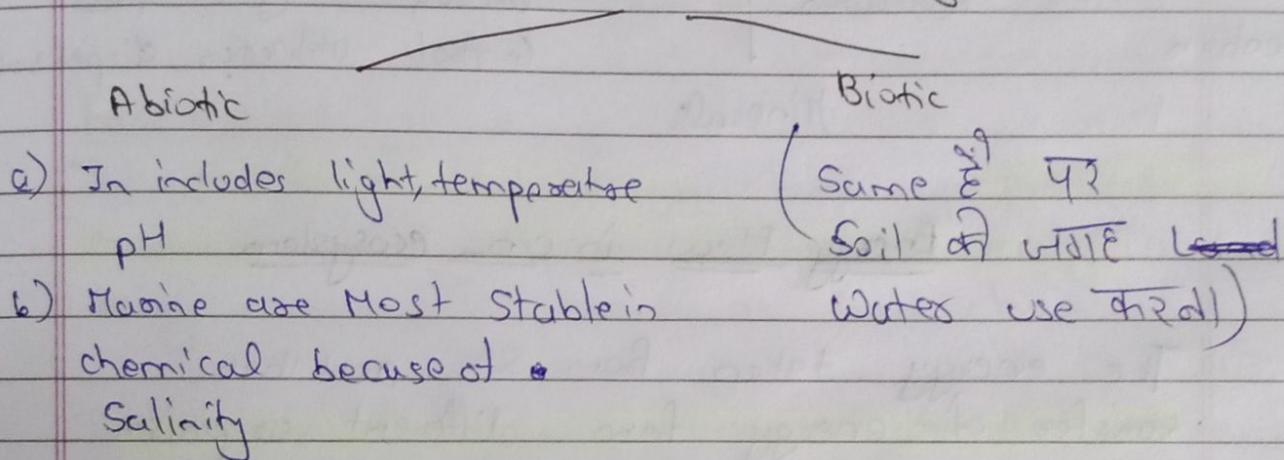
Decomposers

(Gum forest wala)

Aquatic Ecosystem

- a) Fresh water → Lotic (Running Water as Stream, rivers)
Lentic (Standing water pond, pools)
- b) Marine water → Like ocean & seas.
Salt concentration high

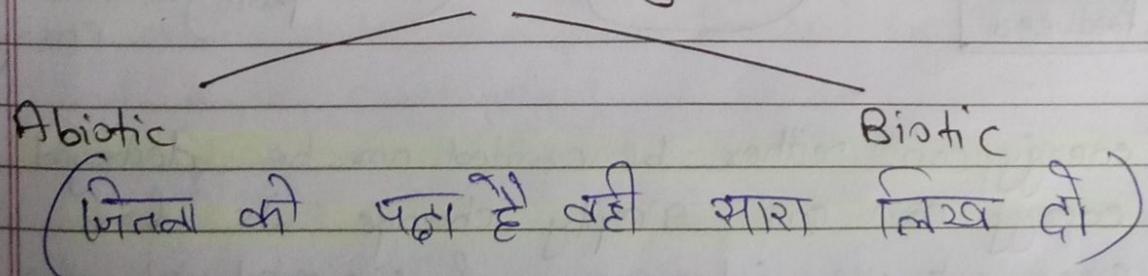
Component aquatic ecosystem



Artificial Ecosystem

It is a ecosystem whose condition are Modified by Man example → Gardens, parks.

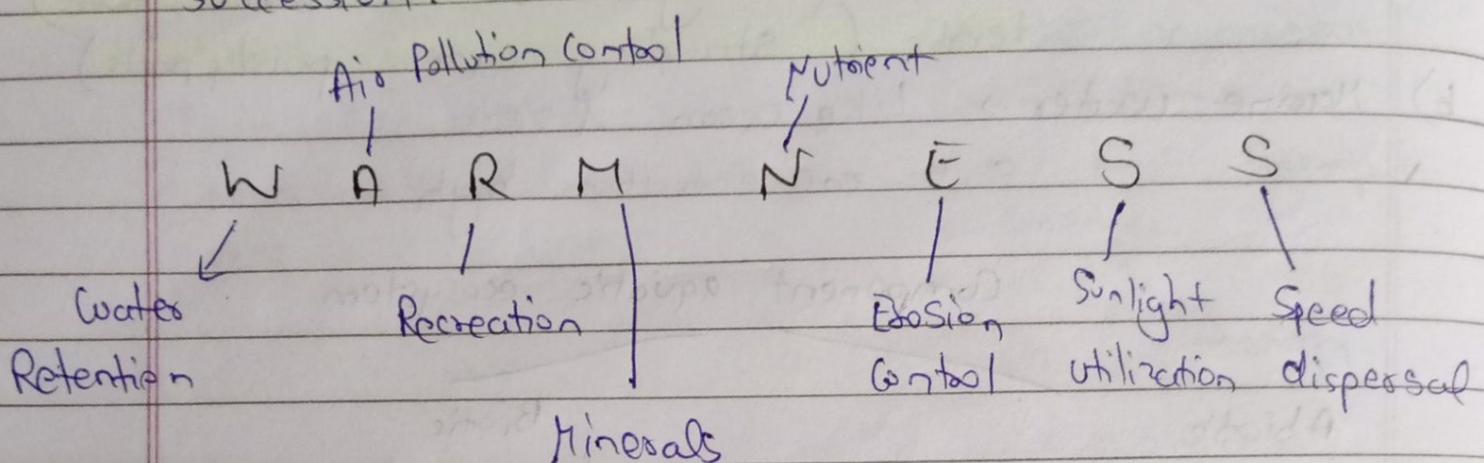
Structure of ecosystem / components



Function of ecosystem

- Regulation of Nutrient and energy
- It regulates the essential ecological process Support the life system.
- Maintain a balance b/w the various topic of ecosystem
- Regulation of energy by a foodchain

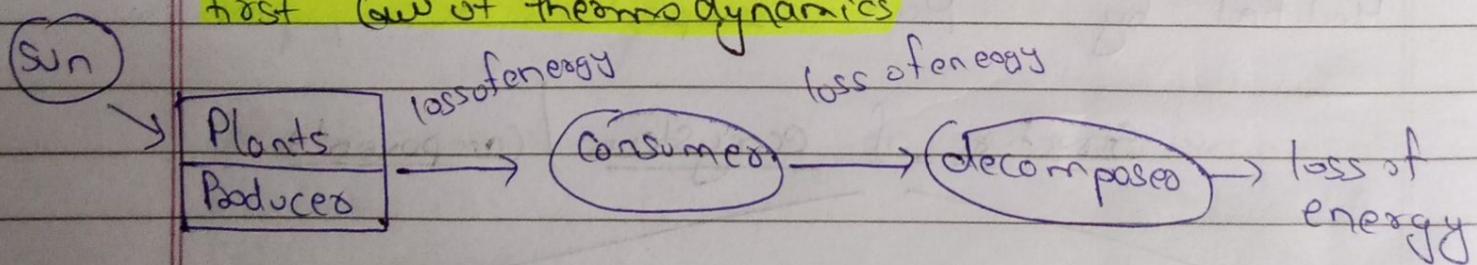
c) Ecological development & ecological succession.



Energy Flow in an ecosystem

The energy taken from Sun and then transfer of energy from different organism (from one organism to another organism) and then energy is loss in external environment. It follows two laws of thermodynamics.

first law of thermodynamics



energy can neither be created nor be destroyed. Energy can simply change its form.

Green plants use Solar energy & converted into the chemical energy with the help of photosynthesis.

It is pass to consumer and after the

die of ~~any~~ consumer it is used by

decomposes for food. Then energy loss in the atmosphere.

During transfer of energy large part of energy is lost in heat.

Ten percent law (10%.)

It states that when the energy is passed from one topic level to another then only 10% energy is passed. on the next topic level.

It is unidirectional flow of energy
~~shortest the food chain greater will~~

Food chain

The transfer of food energy from ~~producers~~ to consumer with repeated stages of eating and being eaten is known as food chain.
 or

The transfer of energy from one topic level to another next topic level is called food chain energy (in the form of food)

Sunlight → Producers → Primary → Secondary → Tertiary
 (producer) (consumer) (consumer) (consumer)

Three types of food chain

a) Grazing food chain (Producers to consumer)

Food chain starts from plant & goes to herbivores
 And onto carnivores.

Green plant → Deer → Tiger

b) Detritus food chain (Dead plant/animal to consumer)

Dead organic Matter → Detritivores → Predators

Mangrove leaves → Detritus → Microorganism → Crabs → Small fish
 & large fish

c) Parasitic food chain

Parasite may consume a portion of food
 & they also get Nutrient they provide
 harm to them.

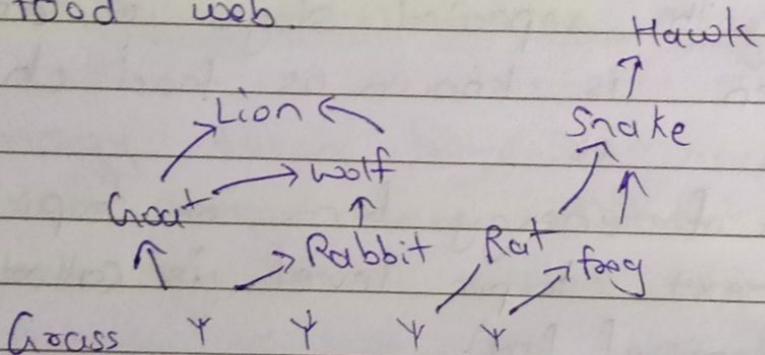
Green plant → sheep → Liver Fluke

Significance of food chain

- a) It maintain ecological balance
- b) It understand the problem of Bio-Magnifications
- c) Energy Flow understand

Food web

A ~~new~~ network of food chain which are interconnected at various trophic levels so as to form a no. of feeding connection amongst different organisms of a biotic community called food web.



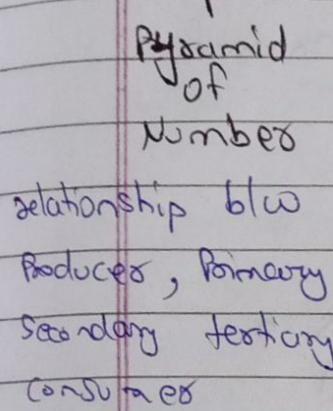
Ecological pyramid

If we study different trophic level of food chain in term of biomass, number & energy.

We find gradual decrease in the biomass, numbers & energy. (we go higher in trophic level)

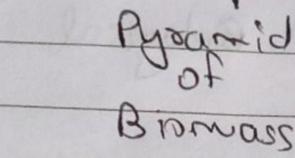
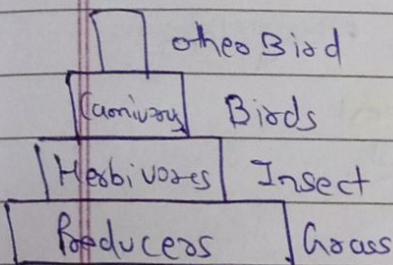
It shape is like Pyramid. It is graphical representation. (producer in base & top of carnivores)

Ecological Pyramid

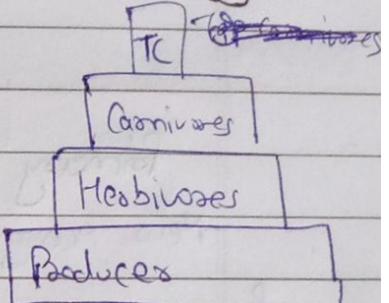
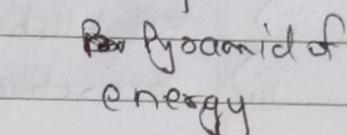
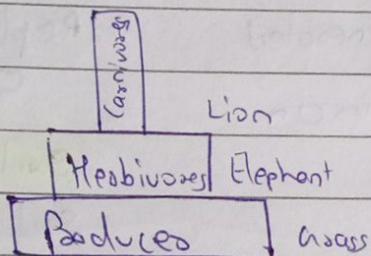


Pyramid of Number

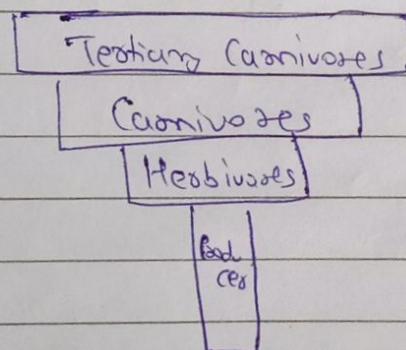
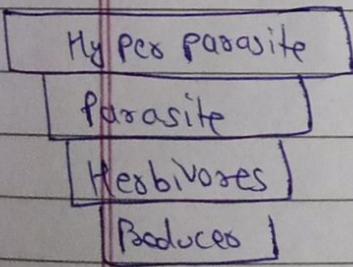
relationship b/w
Producers, Primary
Secondary testing
Consumers



Decrease in bloomers
from low to high
topic level



gradually decrease
in energy we
go up from flower
topic level to
higher topic level



~~unidirectional flow~~

Ecological Succession

Succession → Means when one thing is replaced by the other and the process is continue till a final stage is reached

Ecological succession) The progressive change in the species composition of an ecosystem.

It is defined as gradual change in structure & composition in the ecological community with respect to time.

Stages

- i) colonization
- ii) establishment
- iii) extinction

Exogenous Factors

- i) climatic flood, forest rainfall
- ii) Biological plant & animal

TypesPrimary Succession

New ecosystem generated
Process creating life in an
area where no life
existed earlier

Secondary Succession

Replacement of
existing ecosystem
Soil Present
soil fertile

No Soil

rocks → grass → shrubs



Small

tree



large

forest ← tree

Biodiversity

Biodiversity It refers to the variety of living organism within a given area. All the different plant, animals & microbes are the part of Biodiversity.

Bios → Biological organism
 Diversity → variation

Level of Biodiversity

Genetic Species Ecosystem

1) Genetic Biodiversity →

This type of diversity take place due to variation of genes within species.

The genetic diversity is expressed in the form of breeds, races, varieties.

Example All dog are of same species Their genes can tell us whether they are german, shephard, Pug Dog, Leba etc.
 In Birds different colors is due to genetics

2) Species Biodiversity is the No. of different species

that are represented in a given community / area.

Species Abundance → It is the No. of ~~individual~~

~~species~~ individuals per species in a community.

Relative Abundance → ~~This the species is~~ refers

to the common or rare species in an area as compare to the other species.

Species which differ from each other in their genetic makeup do not interbreed while genetically similar species can interbreed.

Species Riches → Particular species present in a particular area in huge amount

Species Eveness → The particular species present in a particular area is less amount.

3) Ecosystem Biodiversity Forest ecosystem

The forest of north India differs from the forest of south India by the types of species found in both ecosystem (temperature, rainfall & other climatic conditions).

Ecosystem Biodiversity

↳ diversity Beta Gamma

- Alpha diversity → (Species Riches)
- Beta diversity → comparison of diversity b/w ecosystem in terms of no. of species.
- Gamma diversity → A measure of overall diversity within a large region.

Scope of Biodiversity

- Medical field
- Industries
- Research
- Environment conservation
- Job opportunity

values of Biodiversity



Direct Values



Indirect Values

Consumptive
value

Productive
value

Social

Ethical

Optional

Aesthetic

Ecological

Pollutant → The substance will cause pollution

Page No.

Date:

i) Direct value

a) Consumptive value

Natural product that are consume directly without passing it through a Market

Ex → Food, Fuel, Fibre: Cotton

b) Productive value

Commercially usable values Product is Marketed and sold

Example → Silk from silk worm, wool from sheep.

ii) Indirect value

a) Ethical value (ethics → concerned principle of right/wrong) also known Existence value

Even if species is of no use to human it can still have a value and right to exist and human have a responsibility to protect them.

Based on concept "live and let live".

b) Informational value

Biodiversity is a storehouse of information.

A lots of Biodiversity is discovered but still

A lots of Biodiversity is not discovered.

c) Aesthetic value

(Aesthetic → Beauty 

Beauty of our earth is due to biodiversity.

Attractive Mountain, colourful flowers they are beautiful and it also attract the people to come and enjoy the beauty it is called

~~Eco.~~ Eco-tourism.

d) Ecological value of biodiversity

Service provide by ecosystem

a) Prevent Flood

b) Prevent Soil erosion

c) Maintain soil fertility.

d) Reduce Global warming.

e) Social value of biodiversity

It associated with social life

Plants are considered to give respect like Tulsi, Mango, people

It also have medicinal value to provide health Benefits.

Threats to Biodiversity

- ① Habitat loss
- ② Poaching of wildlife
- ③ Man-wildlife conflicts.

1) Habitat loss

It consist of Degradation, fragmentation
Habitat means a place where organism live a place which support a large no. of Natural resource for the species to survive

Due to Habitat loss is due to

- a) Rapid urbanisation
- b) Deforestation
- c) Industries process

3) Poaching

CITES (Convention on International Trade of Endangered Species of flora and fauna).

It means not to sell / hunting of endangered species which are less in numbers

In There are some countries in which animals are hunted and then trade illegally in different countries (illegal wildlife global trade Routes).

3) Man wildlife conflict

When human attack on animal and animal attack on human in both the condition there is a loss of both the one

Ex → Tigers attack on humans

Cause of Human wildlife conflict

- i) loss of Habitat
- ii) Availability of food in crop field is less for animals
- iii) High voltage fencing around agriculture field.
- iv) for urbanization
- v) Lack of forest
- vi) Hunting of animals by farmers in village.

4) Invasive Species

An ~~is~~ invasive species can be any kind of living organism it may be plant, insect, fish, bacteria etc that is not native to an ecosystem and cause harm.

Ex → Vilayati Keekar (lots of water it take) an impact on others plants. (it multiply very fast)

(Q) India A Megabiodiversity country.

Ans) India ranks 10th among plant rich countries in world

India ranks 11th in terms of endemic species of higher vertebrates.

India rank 6th among the centres of diversity and origin of ~~old~~ agricultural crops.

Reasons India A Megabiodiversity country.

a) Ten Biogeographical zones

b) centre of origin

c) Endemism

d) 4 Hotspots of biodiversity.

A) i) Ten Biogeographical zones diversity lots of life forms in terms of climatic condition

i) Trans Himalaya

Northern part of country like Jammu & Kashmir
Cold climate.

Snow leopard are found in this area.

ii) Himalaya

North - west part + North east part

Large numbers of species like Pine Tree
change in climate

iii) Desert

Rajasthan

Climate → Hot

Hot climate help for the growth Cactus.

iv) Semi-arid region

parts of Rajasthan & ~~Gujarat~~ Gujarat

Large no. of species like Asiatic Lion

v) Western Ghats

Gujarat, Maharashtra, Karnataka, Kerala

Large species + Hotspot of India
Evergreen forest

- v) Deccan ~~penins~~ peninsula
Less Rainfall
MP, AP
Deciduous forest due to less Rainfall
- vi) Gangetic plains
large agriculture land
- vii) Coasts
Eastern Part of country AP
Coastal diversity is high
- ix) North east
Monsoon came from North - east.
High Rainfall.
- x) Islands
They are surrounded by water
High diversity.
- B) Centre of origin

Rice → Rice is made in India then transfert to other country

Black pepper → (some upper world)

C) Endemic Endemism Species restricted only to a particular area called endemic species.
Example Asiatic Lion is Endemism in Gujarat.

d) Hotspot of Biodiversity

(Discuss later).

Q) Why India is called a major biodiversity nation

A) Total area is 2.4% of world area] India have 8.22% global species are available out of which 7.3% of global fauna and 10.88% of global flora. It has 10th position in global and 4th position in Asia.

It has 10 biogeographical region

One of the 12 major biodiverse nation

It has 5 world heritage site

12 biosphere ~~reserves~~ region & 6 Ramsar wetland.

It has 85 National Park 490 wild life sanctuaries and 2 hotspot biodiversity

Hotspot of Biodiversity / Endangered and endemic species of India

Endemic → The species which found only in a particular area called Endemic

Rare → They are not easily found.

They are very common species

Endangered → Those species which have a risk to be its existence in the ecosystem.

Threatened → Those species which have a risk that it is converted into Endangered.

Those geographical Region

Rich in Endemic, Rare and threatened species

Facing significant threats to habitat loss due to the direct or indirect interference of Human activities.

Condition to become Hotspot

- Species Endemism → 1500 species of vascular plants species in an area.
- It must have lost 70% of its original habitat.

World have 36 ~~hotspot~~ hotspot

4 hotspot in India

- Himalaya
- Indo Burma
- Sundaland
- Western (Sri Lanka, Kerala, Karnataka) (Micronesia island)
- Himalaya 10000 species of plant → 1 endemic (Pc MNTB) Pakistan, China, Tibet
- Indo Burma

North eastern India

Flowering plant

Home of Monkey, Lion

origin Crop plant

Hotspot Main Points

- Rich in Biodiversity
- Large Number of species
- High Species Richness
- High Species Endemism

Vulnerable It is the extent to which a community structure, service and environment is likely to be damaged or disrupted by impact of hazard.

Extinct → Extinct means no longer existing. Species of plants and animals which are vanished are called Extinct. Dinosaurs became extinct a long time ago.

Other points of Hotspot are done in last page

Biodiversity conservation

Biodiversity conservation means protection of biodiversity.

It includes careful protection ~~preser~~ preservation and efficient use of biodiversity.

It also helps in preserving and improving earth's quality and purity.

Biodiversity conservation

In Situ Conservation

Also called on site conservation

* Biodiversity protected in its natural living area

Methods of conservation

- Biosphere Reserve
- wildlife sanctuaries
- National Parks
- Hotspots
- Wetlands
- Sacred groves

Ex situ Conservation

off site conservation

* Biodiversity is protected outside its natural habitat

* varieties breeds, genetic material is protected.

Method of conservation

- zoo
- captive breeding
- Aquarium (Artificial Aquatic habitat)
- Botanical Garden (Live plant)
- Gene Banks (Seeds, Genes)
- Dryo preservation

a) Biosphere Reserves

i) flora fauna is protected

ii) It is established by UNESCO

iii) 18 Biosphere Reserve in India and in world about 700



In India first Biosphere reserve in 1986.

b) Wildlife Sanctuaries

i) Area declared as wildlife sanctuary under provision of wildlife protection act 1972

- i) Capturing, killing, poaching strictly prohibited
 ii) 566 Wildlife Sanctuaries in India
 iii) Sanctuaries

c) ~~Wildlife~~

National Park

To preserve wildlife

Save flora & fauna

d) Hotspot

Biodiversity rich areas

High species endemism

High species richness

e) Wetland

Wetland remain submerged in water either seasonally or throughout the year

Hotspot

i) Himalayan Hotspot

Plant species are also found at 6000 mtrs of altitude

More than 10000 square of vascular plants are presents & 1/3 rd are endemic

ii) Indo-Burma Hotspot

It is spread over a distance of 2 million sq km
13500 plants species found and 50% are endemic

World's highest No. of fresh water turtle sps.

iii) Sundaland Hotspot

located in Malaysia, India

More than 25000 sps of vascular plants and 60% are endemic

iv) Western Ghats

located in India & Sri Lanka

Maharashtra, Tamil Nadu, Kerala, Karnataka

Air Pollution

Whenever there is a undesirable change in Air like physical, chemical and biological property which cause harmful effect, it is called Air pollution.

Source of Air Pollution

Natural Source

forest fire

Volcanic eruption

(Air pollution by Nature)

Man-made source

vehicular emission

fossil fuel burning

(Air pollution by Man)

Point Source → If source of pollution identifiable
it is called Point Source Ex → factory.

Types of Air Pollutants

Primary Air Pollutants

- 1) They are emitted directly by the process such as fossil fuel consumption, volcanic eruption & factories
- 2) CO_x , NO_x , SO_x
- 3) Hydrocarbon
- 4) Particles Matter

Secondary Air Pollutants

- 1) They are not emitted directly. They are formed when primary pollutant react themselves and other components of atmosphere
- 2) Acid rain
- 3) Photochemical Smog
- 4) Ozone layer depletion

Types of air pollutants

Gaseous air pollutants

- Oxide of Sulphur, Nitrogen, carbon
Hydrogen Sulphide, Hydrocarbon, Ozone
oxidents

b) Hydrocarbon

Produced in complete combustion of fuel

Carcinogenic
cause of Cancer

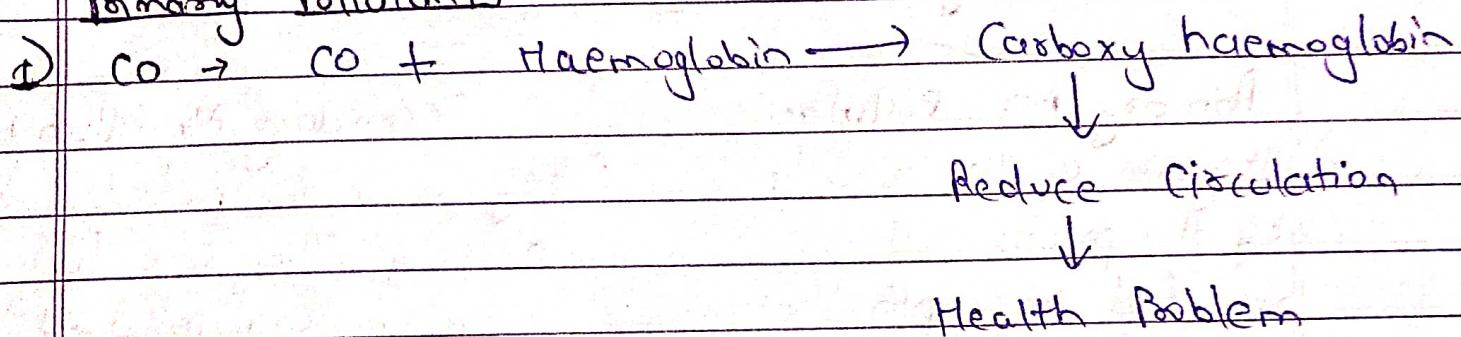
Particulate Pollutants

These are dust, mist, fumes, smoke, smog etc

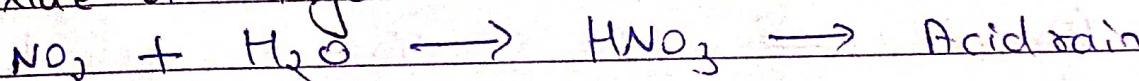
b) Oxide of Carbon

- CO
Colourless, odourless
Tasteless, very poisonous
from carboxy haemoglobin
in blood
- CO_2
(Photosynthesis gas)

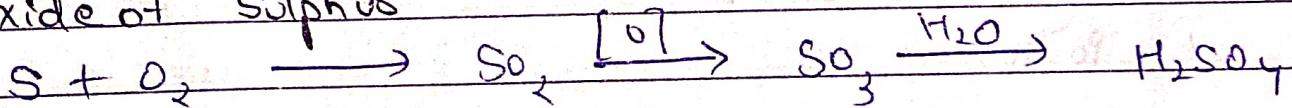
Poisonous Pollutants



2) Oxide of Nitrogen



3) Oxide of Sulphur



4) Particulate Matter

Size $0.002 - 500 \mu\text{m}$

density upto 10^5 cm^{-3}

5) Hydrocarbon

Secondary pollutants

- 1) Photochemical Smog
- 2) Acid rain
- 3) Global warming
- 4) Ozone layer depletion

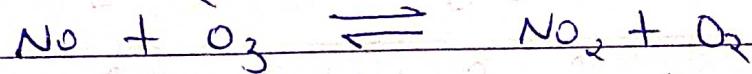
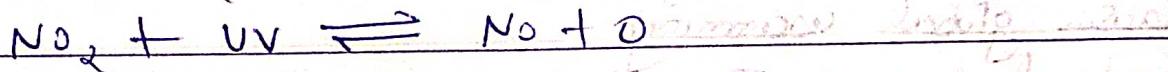
Classical Smog

- i) Occurs in cool, humid climate
- ii) Smoke + Fog + SO_2
- iii) Reducing Smog
- iv) $24^\circ \text{ to } 32^\circ \text{ C}$
- 5) Afternoon

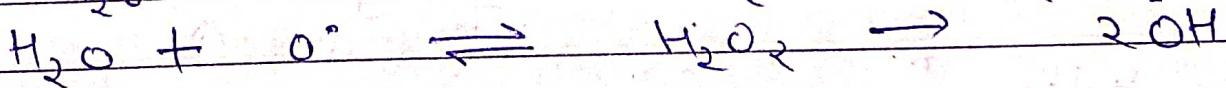
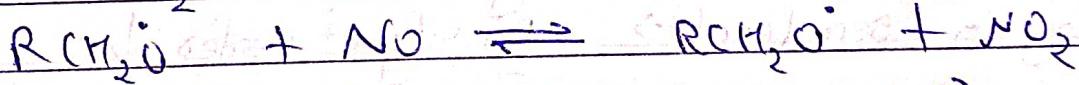
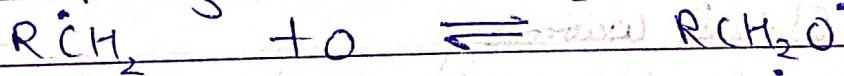
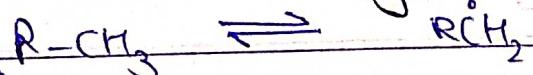
Photochemical Smog

- i) Occurs in warm, dry & sunny climate
- ii) Smoke + Fog + Hydrocarbon + Nitrogen Oxide
- iii) Oxidising smog
- iv) $10^\circ \text{ to } 40^\circ$
- v) Early Morning

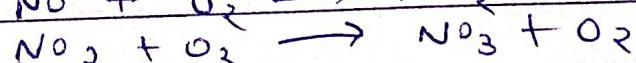
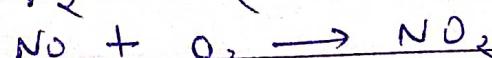
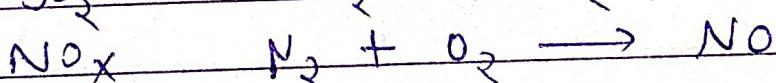
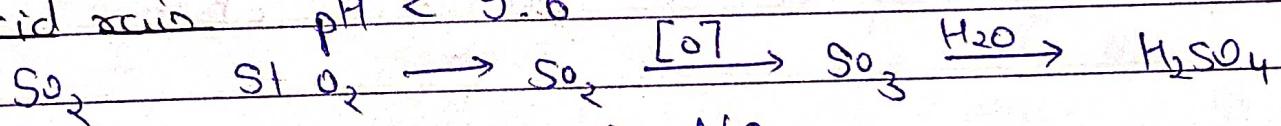
Photochemical reaction



In presence of Hydrocarbon free radical



Acid rain $\text{pH} < 5.6$



Impact on Environment

- i) Destruction of crops
- ii) Damage to buildings
- iii) Degradation of soil quality
- iv) Human Health
- v) Affect aquatic animals

Global warming | Green house effect

Green house gas N_2O , SF_6

- a) CO_2 , CH_4 , CFC , O_3 , N_2O , H_2O vapour

The increased amount of CO_2 in air is responsible for global warming.

It refers to increase in the average surface temperature of our planet due to the effect of greenhouse gases.

Causes global warming

i) Natural causes → It include green house gases

ii) Man-Made → Burning of fossil fuel, deforestation etc.

Impact of Global warming

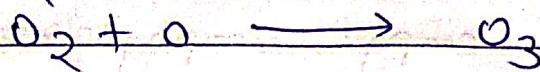
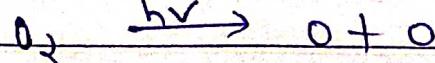
- a) Rising in sea level → Density of water \downarrow
Temperature \uparrow
- b) Melting of ice (Antarctica).
- c) Loss of species of ecosystem change.

Ozone layer

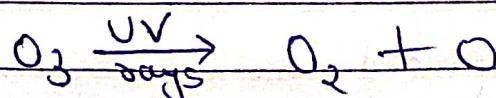
Ozone protect us from harmful ultraviolet radiation ($\lambda = 255 \text{ nm}$)

It is present in stratosphere.

Formation of Ozone (O_3)



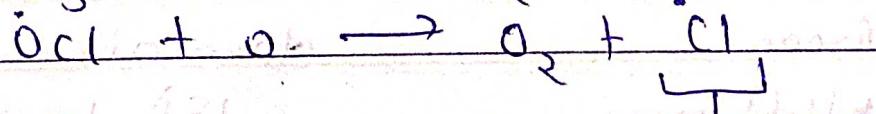
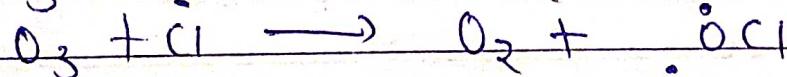
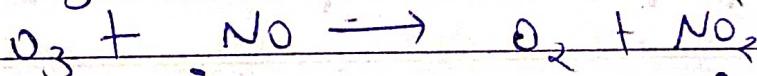
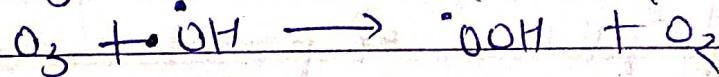
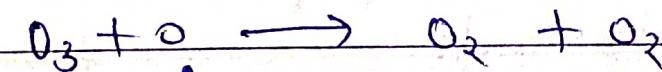
Ozone layer depletion ($O_3 \rightarrow O_2 + O$)



If ~~rate~~ rate of formation is less than the rate of formation depletion of ozone it is called ozone layer depletion.

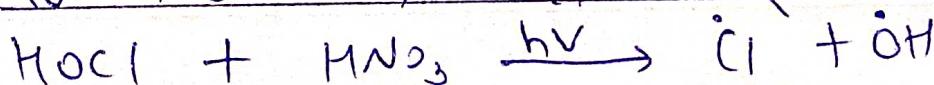
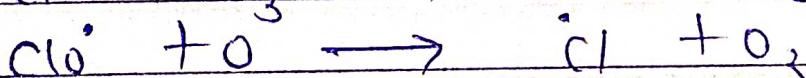
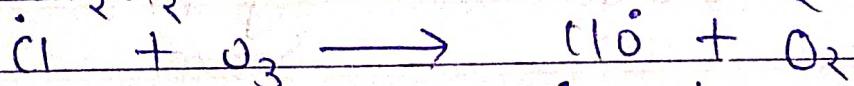
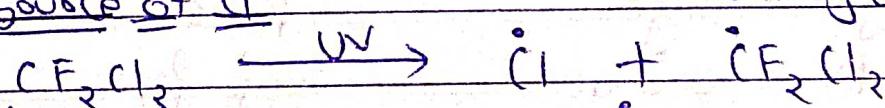
The four species responsible for ozone depletion

- i) Atomic oxygen [O]
- ii) Hydroxyl radical [$\cdot OH$]
- iii) Nitric oxide [NO]
- iv) chlorine / Bromine (Cl / Br)



this is responsible for breaking of 1 lakh ozone

Sources of Cl



Effect of air Pollution

i) Respiratory diseases

ii) Cancer

iii) Asthma

iv) CO_2 carboxyhaemoglobin

SO_2 Bronchitis

NO_2 Bronchitis \downarrow ~~emphysema~~ emphysema

control of Air Pollution

i) Source Modification

ii) Modification of equipment

iii) By implementing Laws

iv) Usage of low sulphur coal

v) Plant tree

vi) Renewable energy

vii) fuel efficient engines in vehicle.

viii) usage of low sulphur fuel

AQI (Air Quality Index)

AQI is a tool for the effective communication of air quality status to people in terms which is easy to understand.

It tells the ^{amount of} pollution ~~of~~ present in air.

| Range | Colour | |
|-----------|--------------|--------------|
| 0 - 50 | Green | clear air |
| 51 - 100 | light Green | satisfactory |
| 101 - 200 | yellow | Moderate |
| 201 - 300 | light orange | Poor |
| 301 - 400 | dark orange | Very Poor |
| 401 - 500 | Red | Severe |

AQI are involved for eight pollutants

- i) Nitrogen dioxide (NO_2)
- ii) Ozone (O_3)
- iii) Carbon Monoxide (CO)
- iv) NH_3
- v) Lead
- vi) SO_2
- vii) PM_{10}
- viii) $\text{PM}_{2.5}$

~~W~~ Control Measure

Source elimination Control device

Rules
Regulation

- Modifying fuel
- Modifying the equipment

Control of
particulate
matter

Control
of
gaseous
pollutant

Gravitation
Separators

Bag
filter

ESP

Wet
scrubber

Absorption

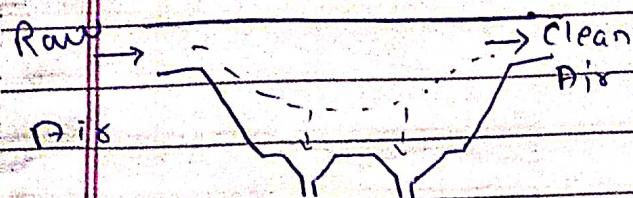
Adsorption

Cyclonic
Separators

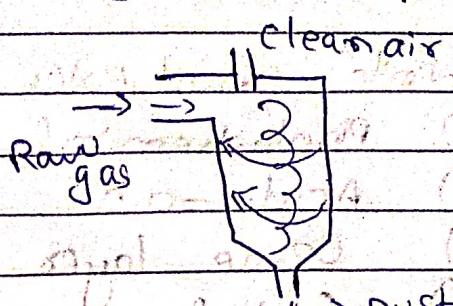
| Pollutant | CO_2 | SO_2 | NO_x | |
|-----------|--------------------------|------------------------|---------------|------------------------|
| Wet | Na_2SO_3 | Na_2OH | KOH | Impurities of absorber |

Page No. _____

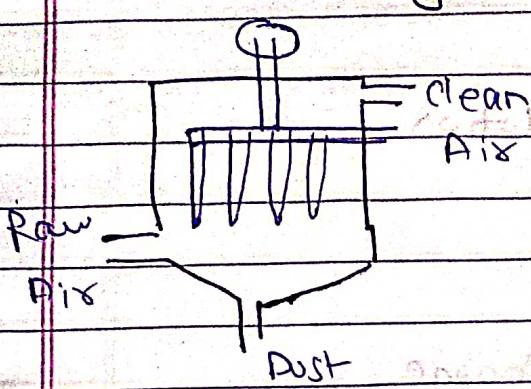
Gravitation Separator



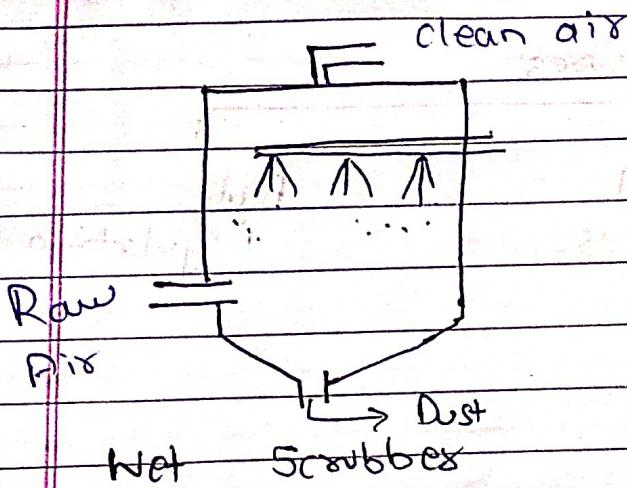
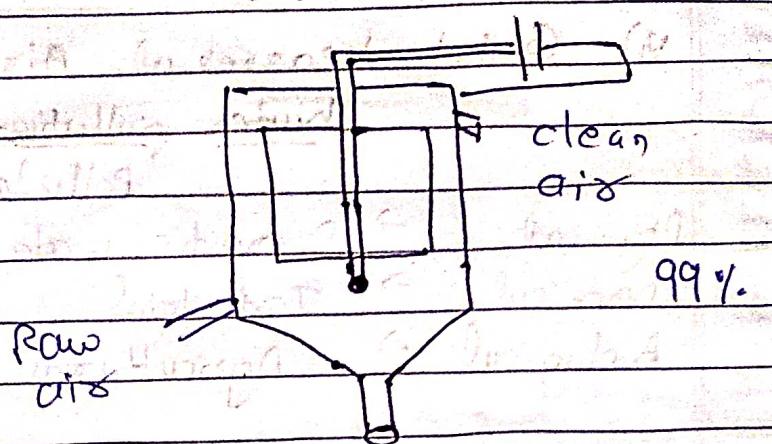
Cyclonic separator



Fabric Filter / Bag filter



ESP



→ Spray tower Scrubber

→ cyclonic ~~tower~~ tower Scrubber

→ Parallel plate Scrubber

→ Venturi Scrubber

Q) Write short Note on

- | | |
|----------------------------|----------------------|
| i) Photochemical smog | v) AOI |
| ii) Acid rain | vi) Control Measures |
| iii) Ozone layer depletion | of Air |

Water Pollution

Water pollution is addition of certain substances in water that may alter physical, chemical and biological property of water which may further result in undesirable effect on living organisms and environment.

Sources of water pollution

Point Source

Easily identify from where the source of pollution take place

Non-Point Source

Not easily identify

Type

Around water

Pollution

It is caused by

Mining

Industrial effluent

Dumping of garbage

surface water

Pollution

It is caused by

Sewage

Industrial effluent

Synthetic detergents
oil

Waste heat

Effect of Water pollution

1) Less Dissolved Oxygen

If water is polluted the amount of oxygen dissolved in water at given temperature is less.

It will create an impact on aquatic animals.

2) Increase in Pathogen

Water is polluted then bacteria will be generated ~~these~~ these caused disease like dysentery, typhoid etc.

3) Eutrophication

If fertiliser & pesticide get entered into the water

If soil work as a nutrient for algae
 then entire water covered by algae
 If algae increase then aquatic animal die.

4) Increase in BOD

BOD (Biological Oxygen Demand) is the amount of oxygen required to by bacteria to break organic waste into simpler form in given volume of water.

5) Biomagnification

6) Disease

If $\begin{matrix} N \\ \sqcup \\ P \\ / \\ K \end{matrix}$

Nitrate Pollution increase
 it will cause Blue baby syndrome
 fluorosis

Control of Water Pollution

i) Use of Biopesticides

ii) Plant more trees

iii) Less usage of agrochemicals

iv) Treatment

Primary treatment

Secondary treatment

Tertiary treatment

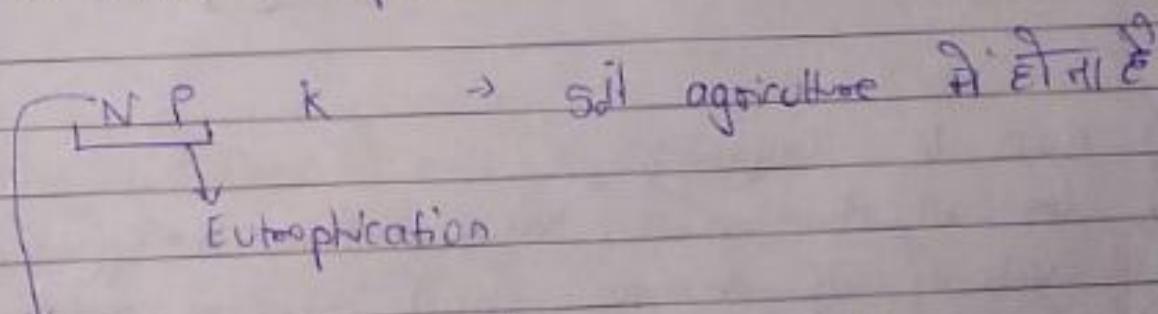
Parameters to calculate water pollution

- a) Dissolve O₂
- b) Residual Cl₂
- c) NH₃
- d) CO₂
- e) Hardness
- f) Alkalinity
- g) Total Dissolve Solid (TDS)
- h) Acidity / Basicity

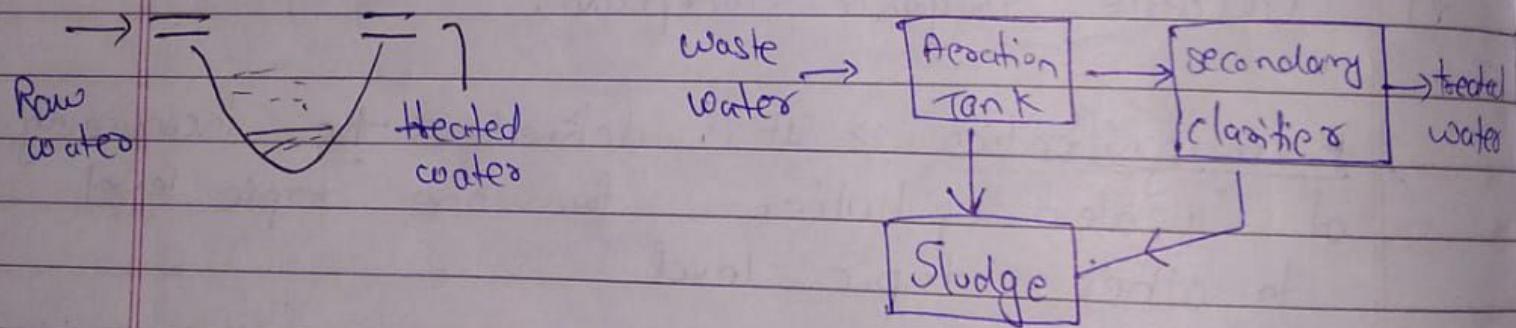
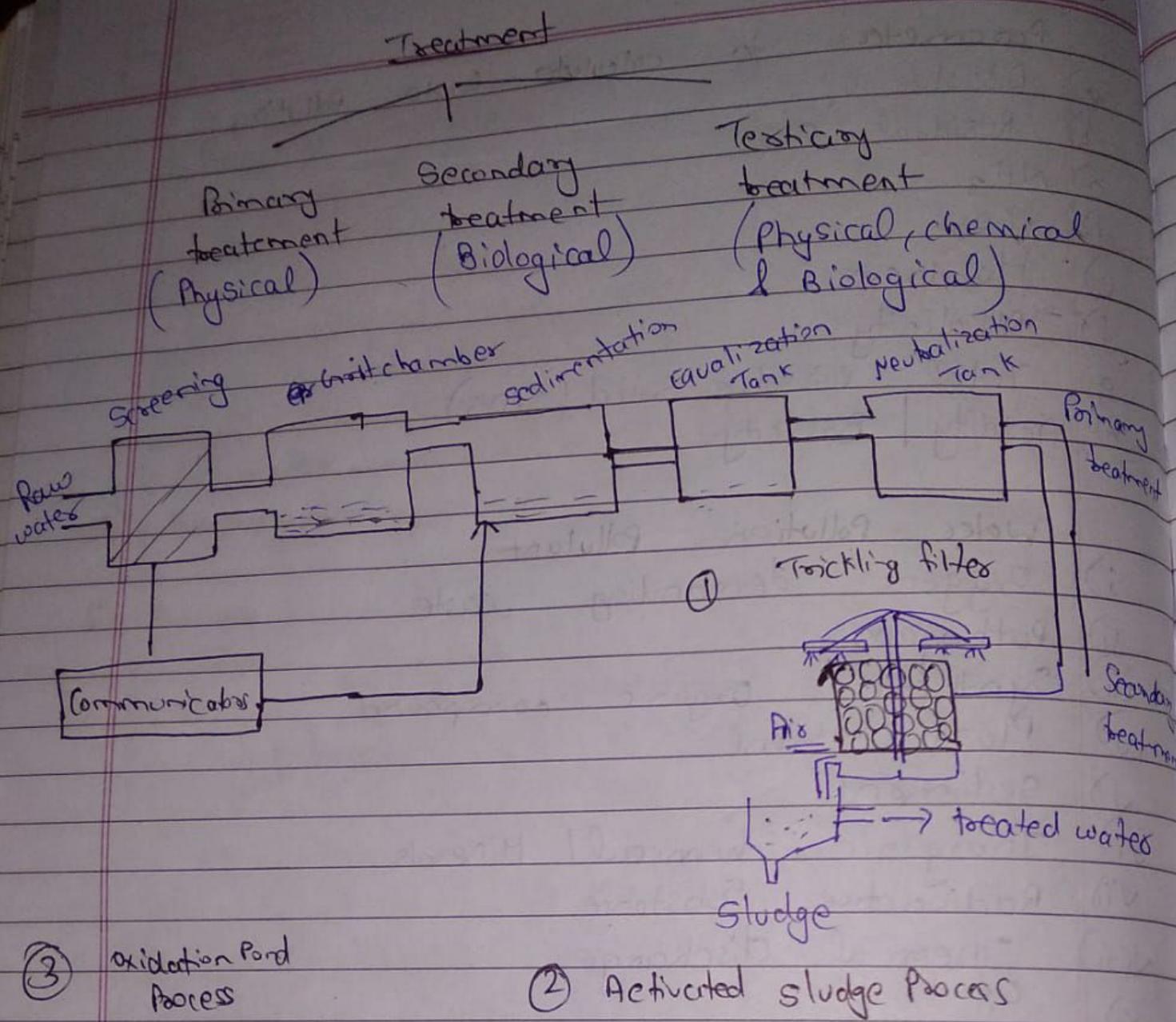
Water pollution Pollutant

- i) Oxygen demanding waste
- ii) Pathogens
- iii) Synthetic & organic compound
- iv) Plant Nutrient
- v) Sediment
- vi) Inorganic chemical / Minerals
- vii) Radioactive Substance
- viii) Thermal discharge
- ix) Oil
- x) Volatile organic compound.

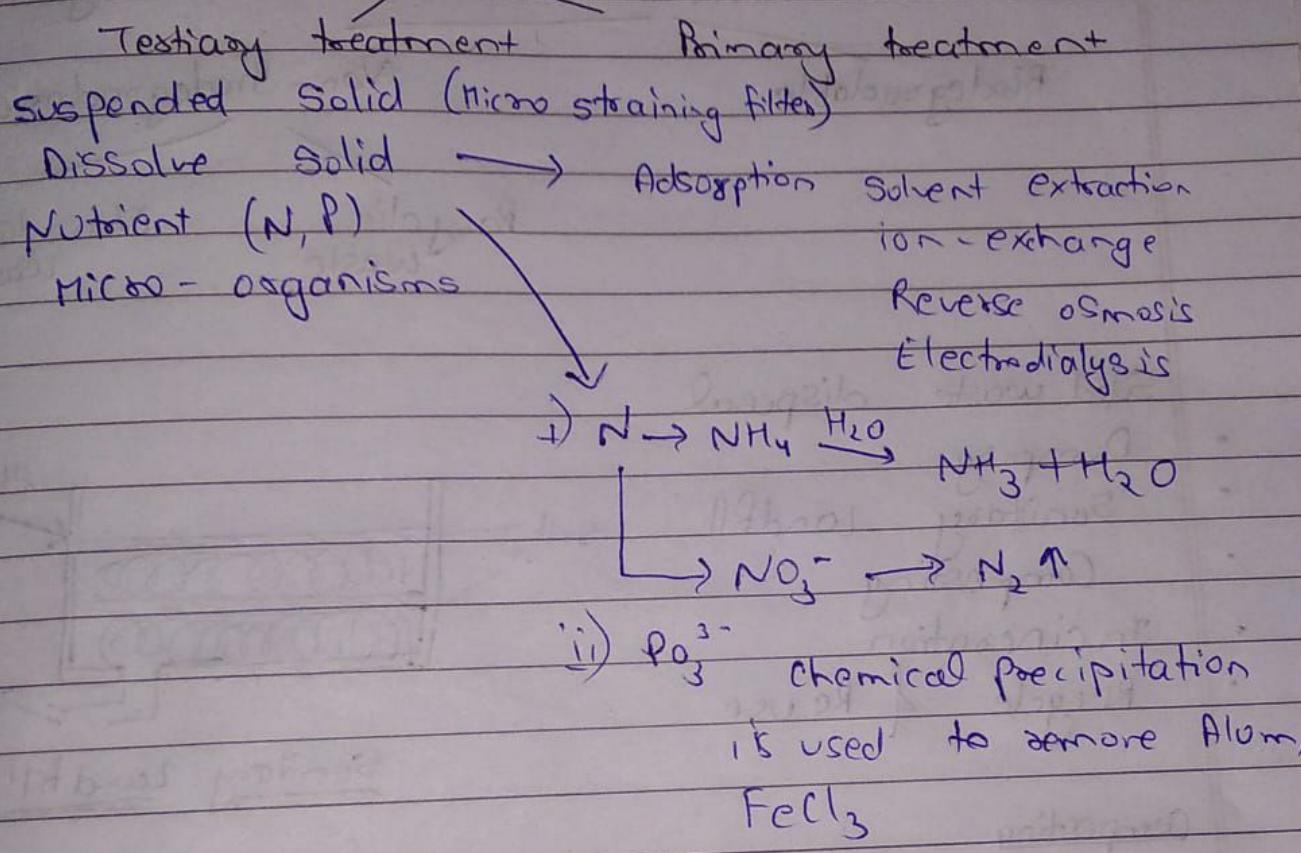
Bioconcentration → It is defined as the increasing of water pollution from one topic level to other topic level



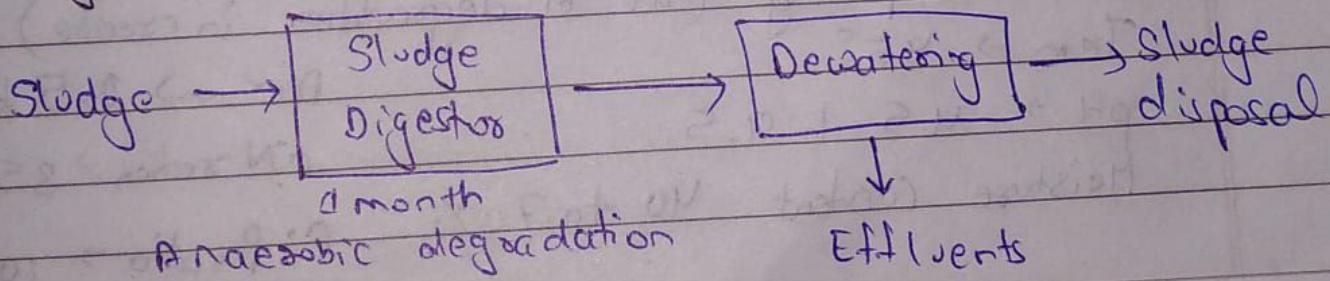
Nitrate pollution → Blue Baby Syndrome



Waste water Treatment



Sludge Disposal



Solid Waste Management

Source

- Industrial waste
- Agricultural waste
- Domestic waste → Garbage, Kitchen waste
- Hospital / Medical waste

Classification Solid waste Management

Biodegradable

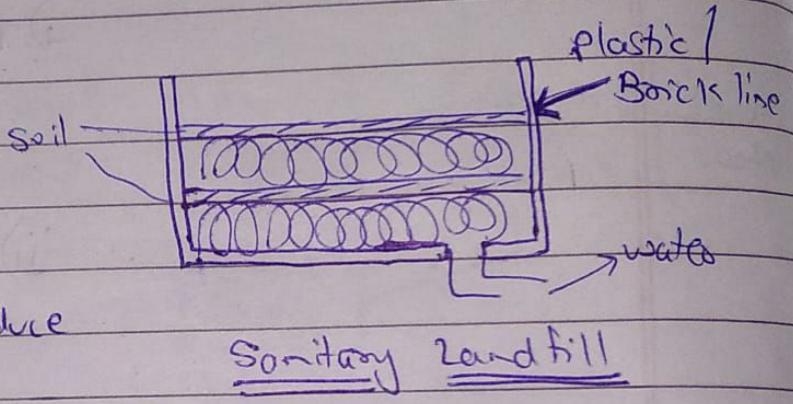
Non-Biodegradable

Recyclic
waste

Non-Recyclic
waste

Solid waste disposal

- Dumping
- Sanitary Landfill
- Composting
- Incineration
- Recycle & Reuse, Reduce
Reproduce & Reuse



Composting

Organic waste → CO + heat

Vermi-composting (Rate of degradation increase)

Temp → 45°

pH → 4.5 to 9.5

Moisture content 40 to 70%

Air → 0.5 to 0.8 m³/day/kg

C:N ratio → 35 or 50:1

C:P ratio → 100:1

Effect of Solid Waste

- i) Affect soil Productivity
- ii) Contaminate Ground water
- iii) Hazardous waste can Release Toxic gas which cause cancer
- iv) Untidy & Unhygienic conditions

Case Study

Love Canal Tragedy
Plastic Waste Management Rule (2016)

Sanitary Landfill

- It is a excellent Method of solid waste Management
- Initially a large pit or depression is made by the removal of top soil
- It is then lined with a synthetic plastic in order to prevent leakage from waste Materials.
- Garbage waste are dumped into the land ~~into the~~ fill and properly compressed using specialised Machines
- Pipe are inserted in order to drain off liquid Material that ooze out following compression
- Methane gas produced by the decomposition of waste is collected into separate pipe
- This is done to prevent explosions; the Methane may now be burnt to generate heat & electricity
- Daily waste are covered by layers of clay and top of Soil in order to prevent exposure to the air & prevent a foul smell

→ Specialized storm water pipes are fitted to divert and control water run off from rains & storms

Thermal Pollution

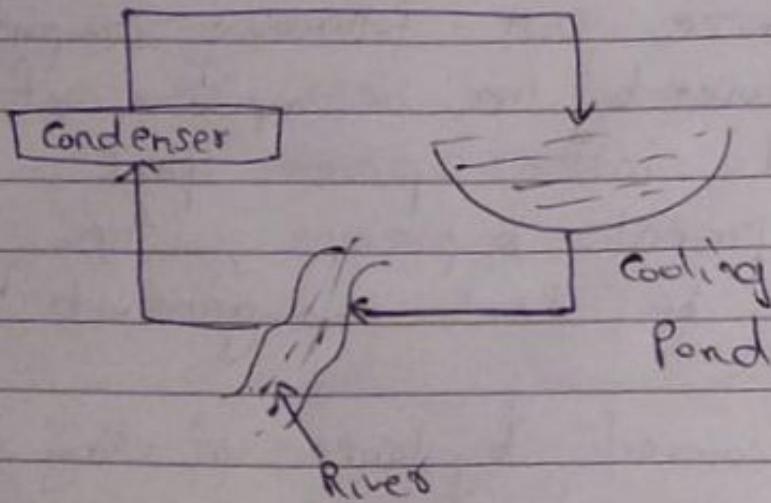
Whenever plants like Nuclear Power Plant, Thermal plant they use cold water in their industrial area to keep their Machine functional so a large amount of heat is trapped in water. When these warm water is released from the factory and get directly into the river water ~~heat~~ and heat get trapped in the river water. Then that kind of pollution is called Thermal Pollution.

Effect of thermal pollution

- i) less dissolved oxygen
- ii) kill fish and affect fish migration
- iii) More toxicity of chemicals
- iv) It change the composition of floral fauna.

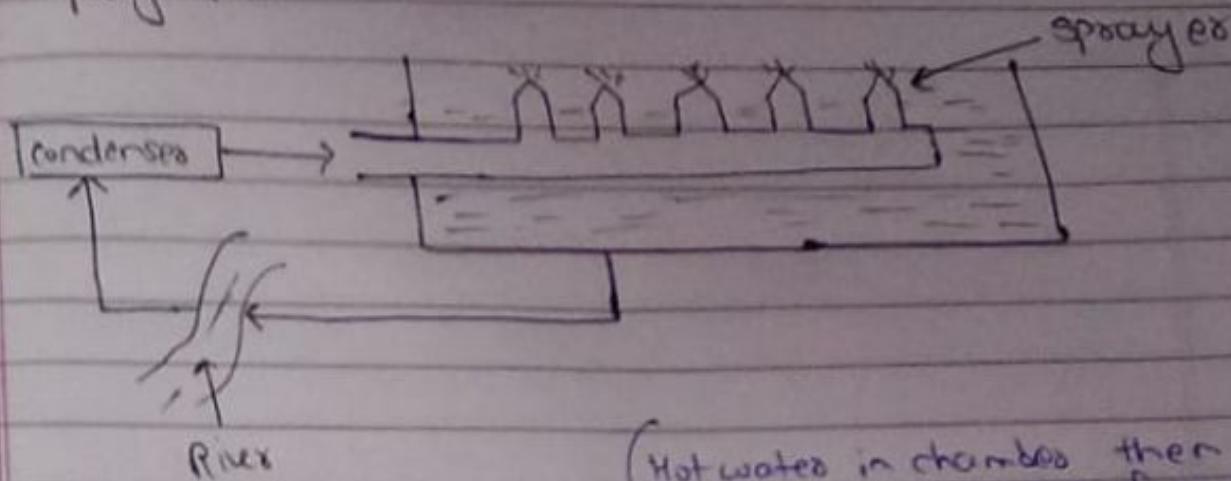
Control of Thermal Pollution

i) Cooling Pond



In cooling pond water is allowed to cool & then flow in river

ii) Spray Pond



iii) Wet Cooling Towers

(Hot water is chambered then pass cool air in middle of gap then cool water comes at bottom)

iv) Dry Cooling Towers

Hot water is pass through
pipe line

rest others is same as
wet cooling towers

Soil Pollution

Source

- i) Domestic waste
- ii) Industrial waste
- iii) Agricultural waste
- iv) Animal excreta

Effect of Soil Pollution

- i) Human Health
- ii) Eutrophication → (chemical added to soil Pesticide, if rain wash it, it in the water, algae more, effect on species)
- iii) Soil Flora & Fauna
- iv) Affect soil fertility

Control of Soil Pollution

- i) Effluent should be properly treated before discharging them on the soil.
- ii) Solid waste should be properly collected and disposed off by appropriate method.
- iii) From waste recycling of useful products should be done
- iv) Biodegradable organic waste should be used for generation of biogas
- v) Cattle dung should be used for methane generation

Noise Pollution

Sound is Mechanical energy from vibrating source
Unpleasant sound and unwanted sound is Noise

Sound Measurement

Frequency (Hertz)

Number of compression
and rarefaction in
unit time

Loudness (decibel)

Sound Pressure level formula

$$SPL = 10 \log_{10} \left(\frac{P^2}{P_0^2} \right)$$

Source

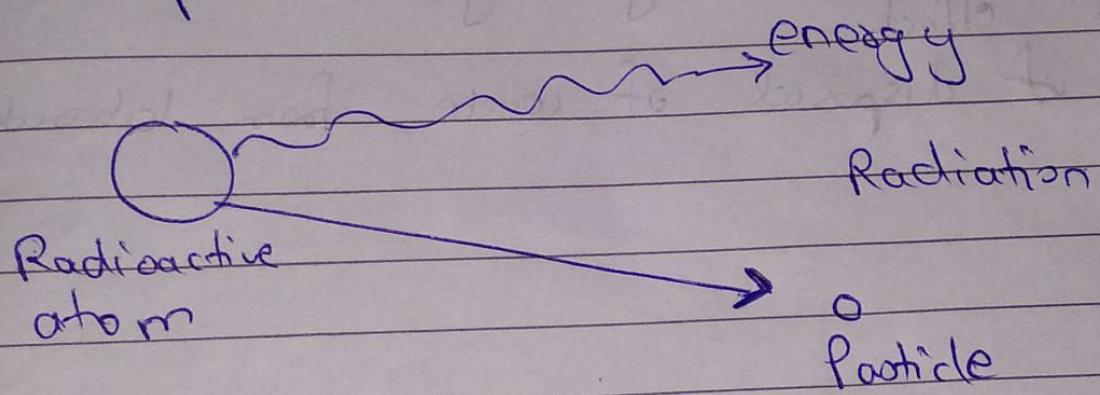
- i) Mode of transportation
- ii) Ceremony (Social, Religious etc)
- iii) Construction activities

Effect

- i) Interference in communication
- ii) Hypertension disorders
- iii) Permanent & Temporary hearing disorders

Radioactive Substance

Radioactive Substance are very dangerous.
Radioactive atom are unstable and they
are easily break down and give a lots of energy
and particles and Radiation



| Radioactive radiation | | |
|---|---|--|
| Alpha | Beta | Gamma |
| They are not more penetrative they cause skin cancer | It has more penetrative power Damage our internal organ | They are more deeply penetrative in our body Damage our internal organ |

Source of radioactive substance

Natural source
Air
Rock
Water

Anthropogenic source
Nuclear power plant
Labs

Effects of radioactive substance

Genetic damage

Somatic damage
 a) Burn
 b) Miscarriage
 c) Eye cataract
 d) Cancer

Control of radioactive substance

- Siting of Nuclear power plant should be carefully done after studying long term and short term effect
- Rules of disposal of waste from laboratory

Disaster Management

Disaster It is a crisis situation that exceeds the capabilities

or

An event natural or man-made, sudden or progressive which has negative impact on living and non-living things.

Disaster Management → Deals with Management of resource and information towards a disastrous event like earthquake, volcanic eruptions, floods etc.

Disasters

Natural disaster
originate from Nature
e.g.) earthquake

Manmade disaster

Earthquake

- i) It occurs due to huge vibration on earth surface sliding of tectonic plates & sometimes due to heavy explosion and Nuclear test
- ii) Measured in ~~Richter~~ Richter Scale
- iii) It occurs due to sudden disturbance in earth crust. Earth crust is made up of tectonic plates. Friction saves these plates from breaking but the plates strike one another due to natural disturbance and break

Prevention

- i) Public awareness & education programme
- ii) Development of warning & technology
- iii) Promote new technology for ~~better~~ building design.

Tsunami

- i) It is called Seismic sea wave
- ii) The velocity of wave depend on the depth of water where the seismic disturbance occurs
- iii) It occurs near coastal area
- iv) Tsunami wave can be destructive in Nature because of its height

Prevention

- i) Government should bring cement law for building
- ii) Public awareness
- iii) Land regulation program should be conducted time to time

Flood

Flood is a disaster which is caused by sudden increase in the level of water bodies like river, pond

Speed of flood may be fast

Prevention

- i) Flood can be controlled by dams
- ii) It can be control by proper information of weather forecasting etc

Problem

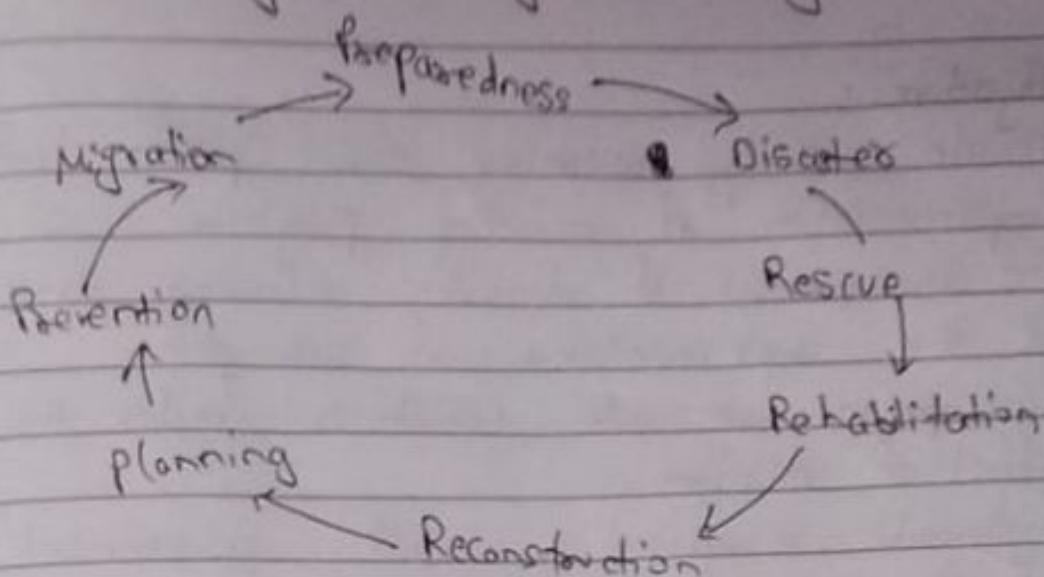
- i) Medical facility
- ii) Huge loss of crop
- iii) Water pollution occur

Man Made Disasters

- Social change by ~~industrial~~ industrialization, globalization & the concept of smart city is increasing which result in loss to environment

- Increase transportation is also a big issue in a government and threat to millions
- Around 40% of population of world wide is facing chemical and nuclear wars.

Disaster cycle Management cycle



i) Disaster phase

Starting phase of disaster event

Some disaster which cannot be predicted but

Some can be predicted to reduce loss of
human life

They called warning phase

ii) Response

It stands for quick action just after disaster

They called emergency phase

iii) Recovery

Process of re-establishing area which is
badly affected by disaster

It consist of Restoring, ~~Restoration~~ & Redevelopment

iv) Mitigation

Some disaster effect can be
prevented when appropriate action is taken

v) Development phase

It deals with reconstruction
of affected site

- a) Preparedness → It is usually regarded as the state of being ready or prepared for the use or action.
- b) Prevention → It is action of controlling the occurrence of something that has harmful effect on communities.

Objective

- i) Provide early warning about public health
- ii) Implementation of recovery program
- iii) The development of disaster recovery plans & the implementation of such plan
- iv) Development of site which is under the effect of disaster.
- v) Systematic incorporation with government & Non-government organization.