

## Water Resources :-

→ Water covers 70% of the earth's crust on surface but only 3% of fresh water out of which 2% is in polar ice & only 1% is usable water in rivers, lakes & aquifers.

## Over Utilization of water Resources :-

→ With the growth of human population <sup>increasing</sup> need for larger amount of water to fulfill the basic needs.

→ Today in many areas this requirement can not be met. Over utilization of water occurs at various levels.

→ Most of us waste water during bathing or during washing process.

→ Many agriculturists use more water than necessary to grow.

## Pollution Surface & ground water :-

→ Agriculture of surface water and underground water by the chemical fertilizers & pesticides.

→ Surface water also polluted by industrial which tends to minimise & Shutter economic by not bothering about its liquid waste & releasing into stream, river & sea.

→ Water can be polluted by washing clothes & by bathing animals.

→

### Floods :-

→ Floods having a serious environmental hazard for centuries.

→ It happens due to deforestation.

→ Wetlands in flow are natural flow control system & act like a temporary sponch by holding water of overflowed rivers.

### Drought :-

→ It is a continued period of dry weather

→ In most area reason of the world the rains are on predictable. This leads to periods when there is a serious scarcity of water to drink use in farms provide for other & industrial use.

## Dams :-

→ Today there are more than 45,000 large than around the world which played a important role in the economics that depend upon these water resources for their economic developments.

## Benefit of Dam :-

- Dams are built control & store water.
- Dams are use mainly for fishing & agricultural purposes.
- Dams are built for generating electricity.
- Fishery can be develop in the than area.

## Problem of Dam :-

- Displacement of tribal people's
- Loss of forest
- Loss of forest plant
- Fishing and travel by boat.

## Energy Resources :-

→ Energy has always been needed for human economic growth & development. There are 2 main types of energy -

1/ Non-Renewable energy

2/ Renewable Energy

3/ Nuclear Energy

## Non-Renewable Energy :-

→ It is use resources that can not be  
in other words non-renewable energy are those  
energy which can not be renewed.

→ It produce electricity from non-renewable resources  
the materials must be ignited.

→ The fuel is placed in a well contained area  
& set on fire.

→ The heat generated ~~turns~~ turns water ~~to~~ steam.

→ Which moves through pipe to turn the blades of  
a turbine. That convert magnetism into electricity,  
which we used various.

→ Non-renewable energy sources generally mineral based hydro carbon, fuel oil, coal & natural gas.

### Oil & its environmental impact:-

- The processing, transportation & utilization, all are serious such as: Leaks in which air & water are polluted & accidental fires that may go on burning for they on which before the fire coming untolled.
- Oil power vehicle. carbondioxide, carbon monoxide which measure of air pollution.

### Coal & its environmental impact:-

- coal is one of the most important cause of global warming.
- Many coal based power generation plant cause air pollution.
- Burning coal also produces oxides sulphur & nitrogen which combined with water vapour leads to acid rain.

### Renewable Energy:-

- Renewable Energy system use resources that are constantly re and are usely less polluting.

→ Ex: Exclude hydro power, solar

Hydroelectric power? -

→ This uses water flowing down a natural gradient to turn turbines to generate electricity which is known as hydroelectric power & it is done by constructing dams across the river.

→ It produces hydroelectric power plant large areas forest & agriculture are submerged.

→ The use of rivers for fishing become difficult as the water is dam for generation of electricity.

→ ~~Resettlement~~ Resettlement of displacement person is a problem for which there is no solution.

→ In such a case large dam can intake silt which is result in.

→ Water ~~can be~~ ~~used~~ for many other <sup>other</sup> proposed <sup>large</sup> power generated complete.

Q What are the sources of energy?

Q state the drawback of nuclear power and their

Ans

An energy source is a system which makes energy in a certain way, for instance a hydroelectric station which uses the current of the river for making electricity.

→ Other sources of energy are solar energy & nuclear energy.

Land Resources :-

⇒ Explain land is a natural resource?

Ans Human & natural activities need space for their location & development.

→ This space is provided by land which is put to various uses like food & energy production, waste disposal, industrial, commercial & residential purposes.

→ Land houses the living species, water resources & raw material resources.

→ Land use involves economic activities leading to environmental problems like

- pollutant distance

- west desposition

→ changes within a particular land category result in major changes in landscape thereby reducing its capacity support a diverse & balance wild life. This reduced tourist & recreational value.

→ Land be used for one purpose may be used for another purpose. The following examples are listed below

1/ Agricultural land may be used for urban area.

2/ Forest land may be cleared for agricultural purposes.

3/ Agricultural land may be used for forest tree.

4/ Forest land may be used for dam purposes.

→ Significant negative effect is seen on the environmental pollution as a result of the above listed land use changes

• - Impact on water cycle

- Impact on ground & surface water

- Emission of water pollutant

- Emission of air pollutant



- Destruction of wild life due to habitat destruction
- Degradation of soil
- Residential areas located near, airport & along highways  
Motorway: Superstore presence due to air pollution.
- Intensive live stock breeding unit are a source of offensive odour to nearby dwellers.
- Development of infrastructure may be affected by birds.

### LAND DEGRADATION:-

- Land degradation refers to deterioration or deterioration or loss of fertility or productive capacity of soil.
- The factors contributing to land degradation are listed below and discussed subsequently.

- 1/ Soil erosion
- 2/ Soil pollution
- 3/ Salinization & water logging
- 4/ Shifting cultivation
- 5/ Desertification
- 6/ Urbanisation

Important //

⇒ What is the meaning of soil erosion? (5 marks)

Ans Soil erosion is the loss or removal of the superficial layer of soil by the action of water, wind or human activities.

⇒ Factor influenced extent of soil erosion are

- \* Distribution, intensity, & amount of rainfall
- \* Slope of the ground
- \* Nature of the soil
- \* Vegetation covered
- \* Soil mgt-management

⇒ What is desertification & what are its causes?

Ans Desertification is a type of land degradation in which a relatively dry land mass becomes increasingly arid, typically crossing its border of water as well as vegetation & wild life.

→ Desertification can be caused by the following reasons

1/ Man made: (By removing trees & transforming a forest into bare land can cause desertification)

2/ Forest grazing: - Forest grazing is the most serious cause of desertification in arid & semi-arid areas

3/ Sitting cultivation:- It cause deforestation which is a cause of desertification.

4/ Excessive population:- It means use of morcelland unnecessarily and this can cause desertification.

Q What do you mean by conservation?

Ans:- Conservation broadly means sound land or water use planning. It is concerned with the maintenance of natural system & with their moderate, systematic plan & regulated utilization & exploitation for the long term benefit of mankind.

→ Conservation has been defined as management of the benefit of all life including human kind of the biosphere show that it may yield sustainable benefit to the present generation while maintaining its present use & exploitation of the future generation.

Observation:-

- To maintain essential ecological processes and life support system
- To preserve biological diversity
- To ensure that any utilization of resources & eco-system is sustainable.

## Mineral Resources :-

- A mineral is a naturally occurring substance of definite chemical composition and identifiable physical properties.
- Minerals are formed over a period of millions of years on the earth's crust.
- An ore is a mineral or combination of minerals from which a metal can be extracted.

## USE :-

- Iron, aluminium, zinc, copper are important raw materials for industrial use.
- Minerals with special properties that humans value for ornamental purposes are gems such as diamonds, rubies.

## Environmental effects of extracting & using mineral resources :-

Minerals & their ores need to be extracted from the earth's interior, so that they can be used. This process is known as mining.

- Mining operations are considered one of the main sources of environmental degradation. Following are the environmental side effects.
- Depletion of available land due to mining.
- Waste from industries.
- Conversion of land to industry.
- Pollution of land, water & air by industrial wastes.

## Food Resources :-

Today our food comes almost entirely from agriculture, animal husbandry & fishing.

→ India is not sufficient in food production.

## World food problems :-

→ In many developing countries where population & food are ~~expanding~~ increasing rapidly, the production of food is unable to keep pace with the growing demand.

→ These countries are unable to produce more food or do not have the financial means to import it.

→ As living standards are improving, people are eating more non-vegetarian food. So the world's demand for feed livestock based on agriculture increases as well. This uses more land per unit of food produced & the result is that the world's poor do not get enough to eat.

## Changes caused by agriculture and over grazing :-

Agriculture is the world's oldest and largest industry, more than half of all the people on the planet on the world still live on farms.

Bt because of production, processing and distribution of food on a larger scale effects on the environment which is unavoidable.

The effects of agriculture on the environment can be broadly classified into 3 groups such as global, regional, local.

### 1/ Global Effects :-

These include climate changes as well as potentially extensive changes in chemical cycles.

### 2/ Regional Effects :-

These generally result from the combined effects of farming practices on the same large region.

→ Regional effects include deforestation, desertification & large scale pollution.

### 3/ Local Effect :-

These occur at or near the site of farming. These effects include soil erosion fertilizers carried by sediments can also transport toxins & destroy local fisheries.

### Changes caused by overgrazing :-

The carrying capacity of land for cattle depends on the fertility of the soil & the rainfall. When carrying capacity is exceeded, the land is overgrazed.

- The changes that result from overgrazing include
- Reduction in the growth of vegetation
  - Reduction in the diversity of plant species
  - Increased soil erosion as the plant cover is reduced.
  - Dominance of plant species that are relatively unpalatable to the cattle.

Effect of Modern Agriculture, fertilization, pesticides, water logging, salinity;

Effect of Modern Agriculture;

- Modern Agriculture makes use of hybrid seeds of single crop variety, technologically advanced equipment, fertilizers, pesticides & water to produce large amount of single crop.

Problems using fertilizers:

- Excess Nitrogenous fertilizer applied of fields reach deep into the soil contaminating the ground water. If the concentration of nitrate in drinking water increases it cause a fatal disease called Blue baby syndrome to new born baby.
- Excess use of fertilizers in field causes micro-nutrient imbalance.
- Excess use of fertilizers depletes the quality of the soil.
- Too much use of fertilizers in soil leads to eutrophication. Fertilizers contain nitrate & phosphate are flushed

into taken & occurs through rain and toxic for aquatic life.

→ Fertilizers contain chemical like methane  $CO_2$ , ammonia & nitrogen which can cause green house effect.

Problem using pesticides →

- Several pesticides not only kills the target species but also several beneficial non target organism.
- pesticides enhanced the risk of cancer
- Most pesticides are non biodegradable.

Water logging :-

- If water stands on land for most of the year. It is called water logging.
- In water logged condition pore-void in the soil get filled with water and soil-air gets depleted. In such a condition the roots of plants do not get enough air for respiration.
- Hence it leads to low mechanical strength of soil & low crop yield.

Cause of Water Logging :-

- Excessive water supply to the crop land
- Heavy rain
- poor drainage



## Salinity:-

If water is not absorbed by the soil & evaporated leaving behind a thin layer of dissolved salts in the top of the soil. This is called salinity of the soil.

→ Saline conditions are exhibited when pH is greater than 8.0.

## Problems in Salinity:-

→ Saline soil yields less crop

## ECO SYSTEM

Concept or principle ecosystem :-

Eco means Environment

System means complex of co-ordinated unit

→ Eco system is defined as a community of organisms interacting with one another and the environment in which they have live.

→ An ecosystem concept is that the living organisms of a community not only interact among themselves but also functional relationship with they non living environment. The structural & functional system of communities & the environment is called ecosystem.

Functional Eco system :-

The environmental system consist of biotic & abiotic components in a habitat.

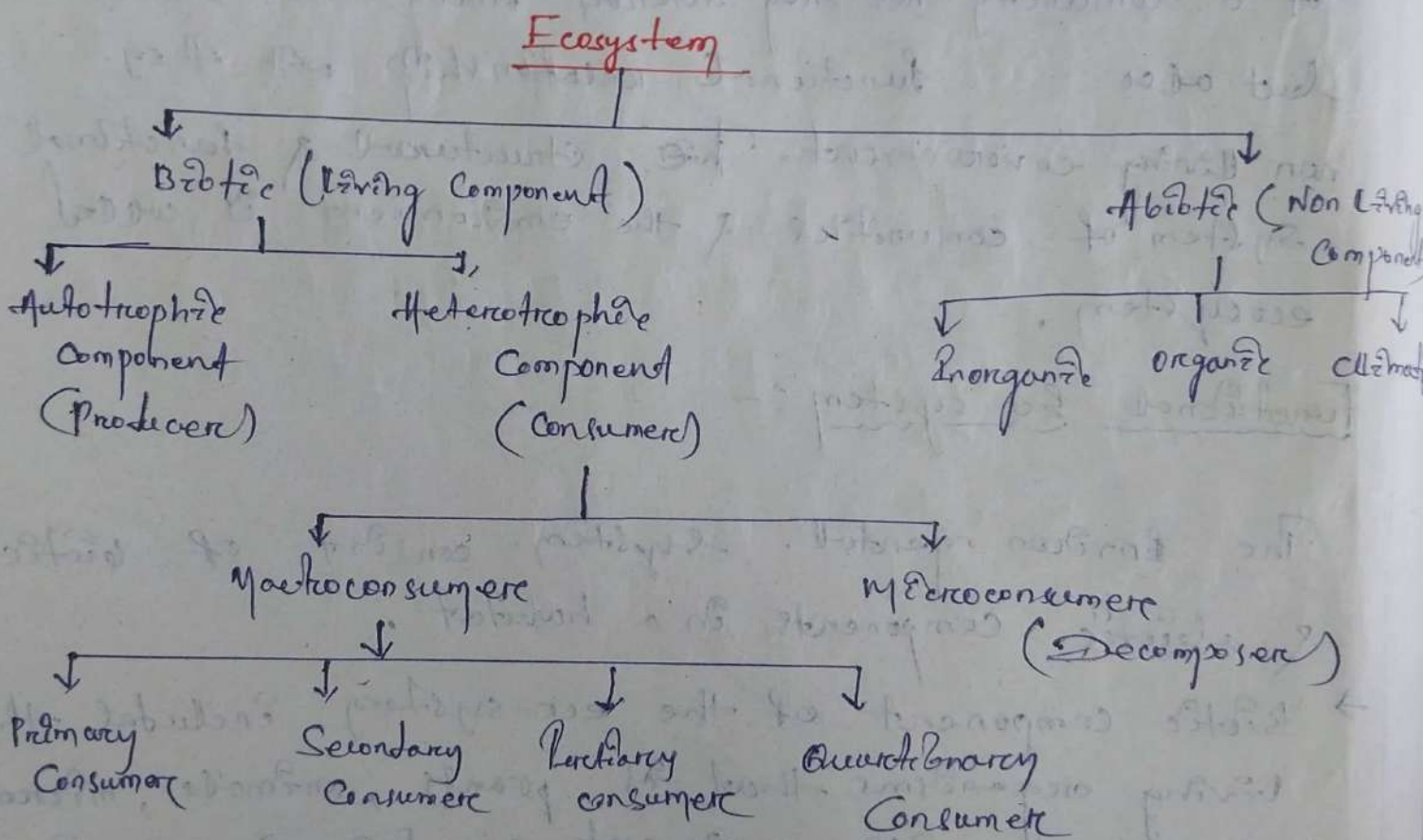
→ Biotic component of the eco-system includes the living organisms that is plants, animals, microbes where as abiotic component includes inorganic matter & energy.

Thus in ecosystem we have the following functional components

- 1/ Inorganic constituents (air, water & mineral salts)
- 2/ Organic constituent (plant, animal & microbes)
- 3/ Angle Energy includes which enters from outside (sun)

✶

Structure of an Ecosystem : ← Long answer (10 marks)



## Producer:-(Plant)

- All green plants are producers.
- They are also called converters or transformers.
- Plants are called the producers in the ecosystem as they manufacture their food by using energy from the sun.

## Consumer:-

- Consumers are heterotrophs.
- They derive their food directly or indirectly from the producers.
- Consumers are of the following types.

### i/ Primary Consumer

- These are called herbivores which feed directly on the producers.

Ex:- Deer, cow, goat etc.

### ii/ Secondary Consumer:-

- They are also called carnivores (meat eaters). They live on herbivorous animals.

Ex:- Tiger, human etc.

### iii/ Tertiary Consumer:-

- In most of ecosystem some organisms that eat other carnivores they are called tertiary consumers.
- Some times lion may be considered as tertiary consumer. -

(omnivores) . (A person or animal eating both plants & animals is called omnivores.)

Ex. Human

Or/ Quaternary Consumer:-

Those feed upon tertiary consumers are quaternary consumers.

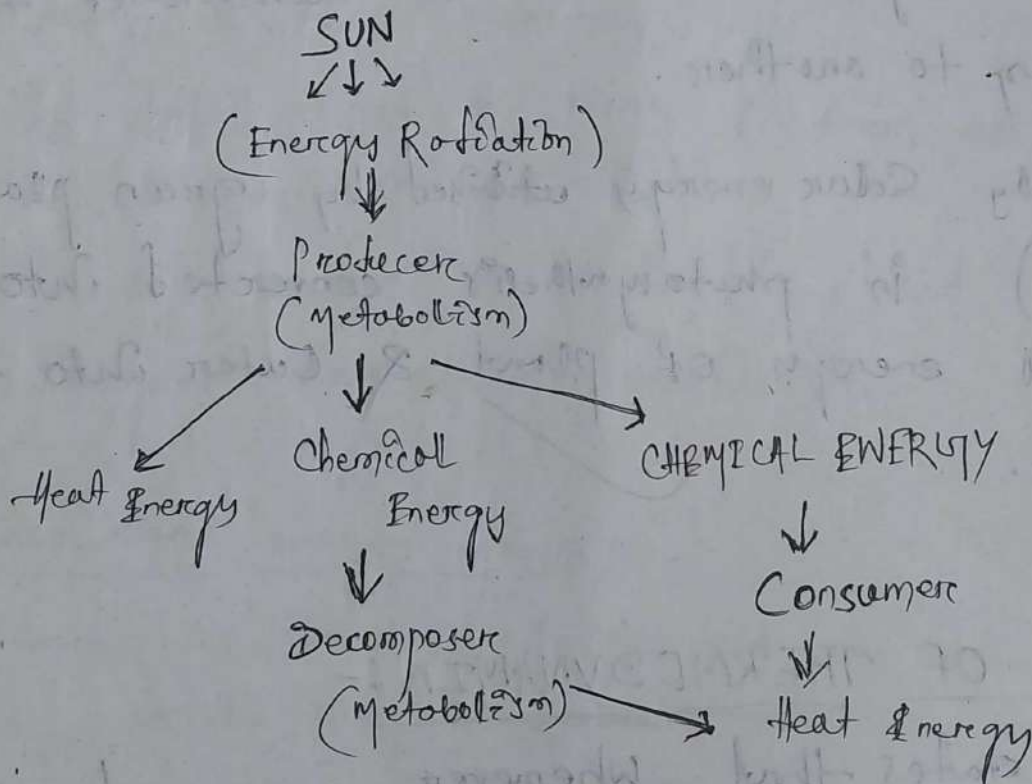
Decomposer:-

- These are also called detritivore.
- These are group of organisms consisting of small animals like worms, insect, bacteria, fungus
- They break down dead organic material in the smaller particles and finally into simpler substances that are used by plant for nutrition.
- Decomposer thus a pitant in nature without all the nutrients would be fixed of. In food & no new life would be produced.

Q Write about energy flow in an ecosystem?

Ans Energy is needed for every biological activities.

- Solar energy is transformed into chemical energy by process of photosynthesis.
- This energy is stored in plant is then transformed into mechanical energy & heat loss during metabolism activity.
- In biological world the energy flows from sun to plant and then to all heterotrophic organisms that is from producer to consumer.



→ Only 1% of total sunlight falling on the green plant is utilized in photosynthesis. This is sufficient maintained on light from this earth.

→ There is no 100% flow of energy from producer to consumer. Some is always lost to environment. Because of this energy can't be recycled in an ecosystem. It can only flow one way.

→ The flow of Energy follows the two laws of thermodynamics.

### • 1st LAW OF THERMODYNAMIC :-

→ The law states that Energy can neither be created nor be destroyed but it can be transformed from one form to another.

→ Similarly Solar energy utilised by green plant (producer) in photosynthesis converted into chemical energy of plant & later into the consumer.

### • 2nd LAW OF THERMODYNAMIC :-

The law states that Whenever energy transformed there is a loss of energy through the release of Heat.

Q Describe energy flow with single channel model?

Ans Due to unidirectional flow of energy that is from sun to producers and then various types of consumers the behaviour of energy in ecosystem is called energy flow.

→ From the energetic point of view energy explained age under

- Efficiency of producers in absorption and conversion of solar energy.
- The use of age and converted chemical form of energy by the consumer.
- The total input of energy in form of food & its efficiency of assimilation.
- The loss caused so respiration, heat, excretion etc.
- The gross primary production.

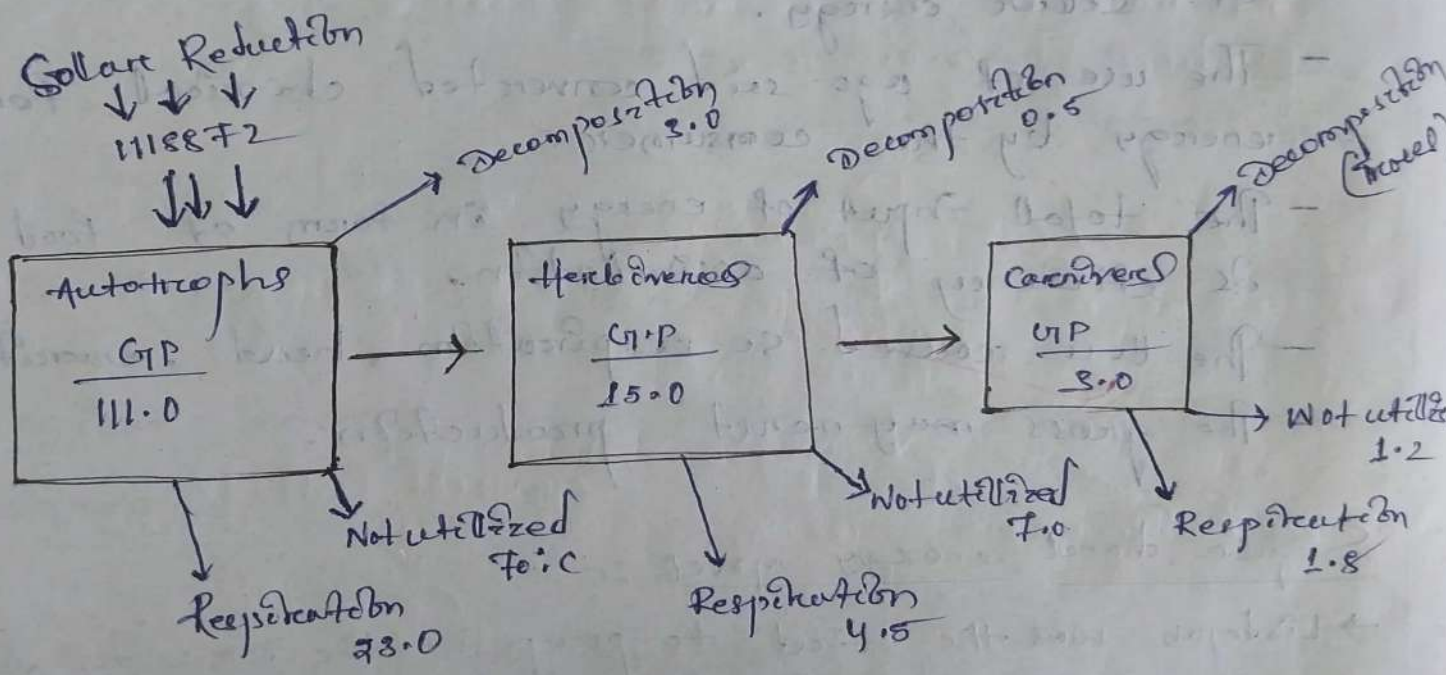
Single channel energy model :-

- Lindeman was the first to propose the community energetic or the trophic dynamic model to ecology
- This enables one investigator to compare the relative rates at which different kinds consuming energy flow through forest ecosystem.



→ By the application of this kind of approach. example by comparing rate of leaf fall to litter production & deposition on the forest floor.

→ The conclusion was that the rates of leaf production are higher and those of litter accumulation in the tropics than at higher altitudes.



The following conclusion can be drawn from the above figure.

- Out of the total incoming solar radiation ( $118872 \text{ kcal/cm}^2/\text{year}$ )
- Producer can utilize only one percentage ( $111 \text{ kcal/cm}^2/\text{year}$ ) in their photosynthesis.
- Again 21% of this energy or ~~23~~  $23 \text{ kcal/cm}^2/\text{year}$  is consumed in metabolic reaction of autotrophs for their growth, development, maintenance & reproduction.
- $15 \text{ kcal/cm}^2/\text{year}$  are consumed by herbivores that graze or feed upon the autotrophs.
- 3% of heat is utilized in decomposition.
- The remainder of the plant material  $70 \text{ kcal/cm}^2/\text{year}$  is not utilized & becomes part of the accumulating litter.

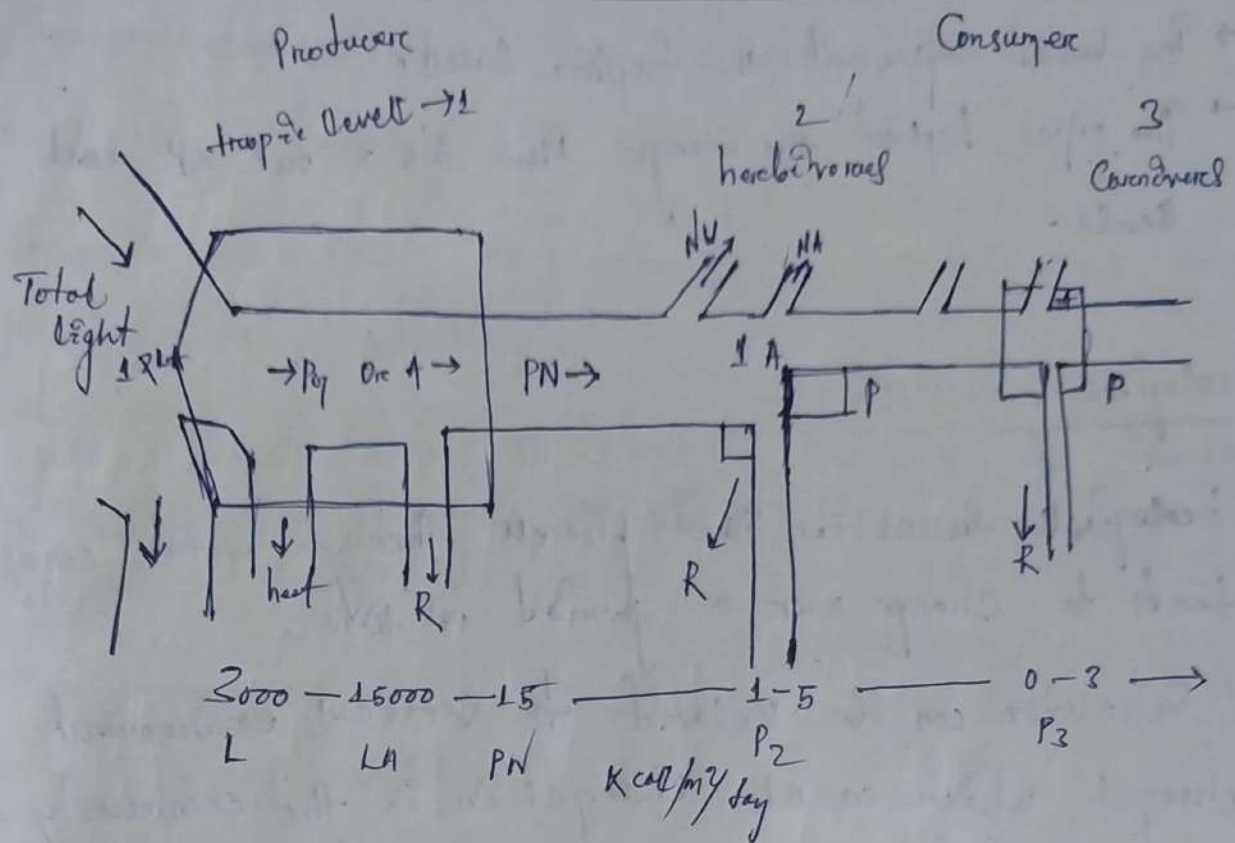
We may conclude

- Various pathway equivalent to an account for total energy capture of the autotroph that is gross production.
- The energy that is decomposed, herbivory & utilized collectively are equivalent to net production.

- Out of total energy which is incorporated at the herbivory that is  $15 \text{ g cal / cm}^2 / \text{year}$  &  $9.5 \text{ g cal / cm}^2 / \text{year}$  is used in metabolic reaction.
- In this way no energy is lost higher respiration by herbivores (30%) than by autotrophs (21%).
- Considerable the energy is available for carnivore mainly  $10.5 \text{ g cal / cm}^2 / \text{year}$ . It is not entirely utilized nearly  $2 \text{ g cal / cm}^2 / \text{year}$  passed to the carnivore.
- The remainder becomes part of the on utilized sediments.

This is unidirectional flow of energy

- The energy that is captured by the autotrophs doesn't reverse back to solar input.
- The energy, which passes does not pass back to the autotrophs. It moves progressively through the various trophic levels.
- Progressive decrease in energy levels seen at each trophic level.



This is a simplified energy flow diagram

- 1/ The diagram depicts 2 trophic levels
- 2/ L. shows total energy input (3000).
- 3/ LA shows light absorbed by plant covers (1500).
- 4/ P<sub>1</sub> shows gross primary production.
- 5/ P<sub>2</sub> shows net primary production.
- 6/ P<sub>3</sub> shows total assimilation.
- 7/ P shows secondary (consumer) production.
- 8/ NA shows energy not used (stored or excreted)
- 9/ NA shows energy not assimilated by consumers
- 10/ R shows respiration.

- The boxes represent the trophic levels
- The pipes depict the energy flow in & out of each level.

## Ecological Succession :-

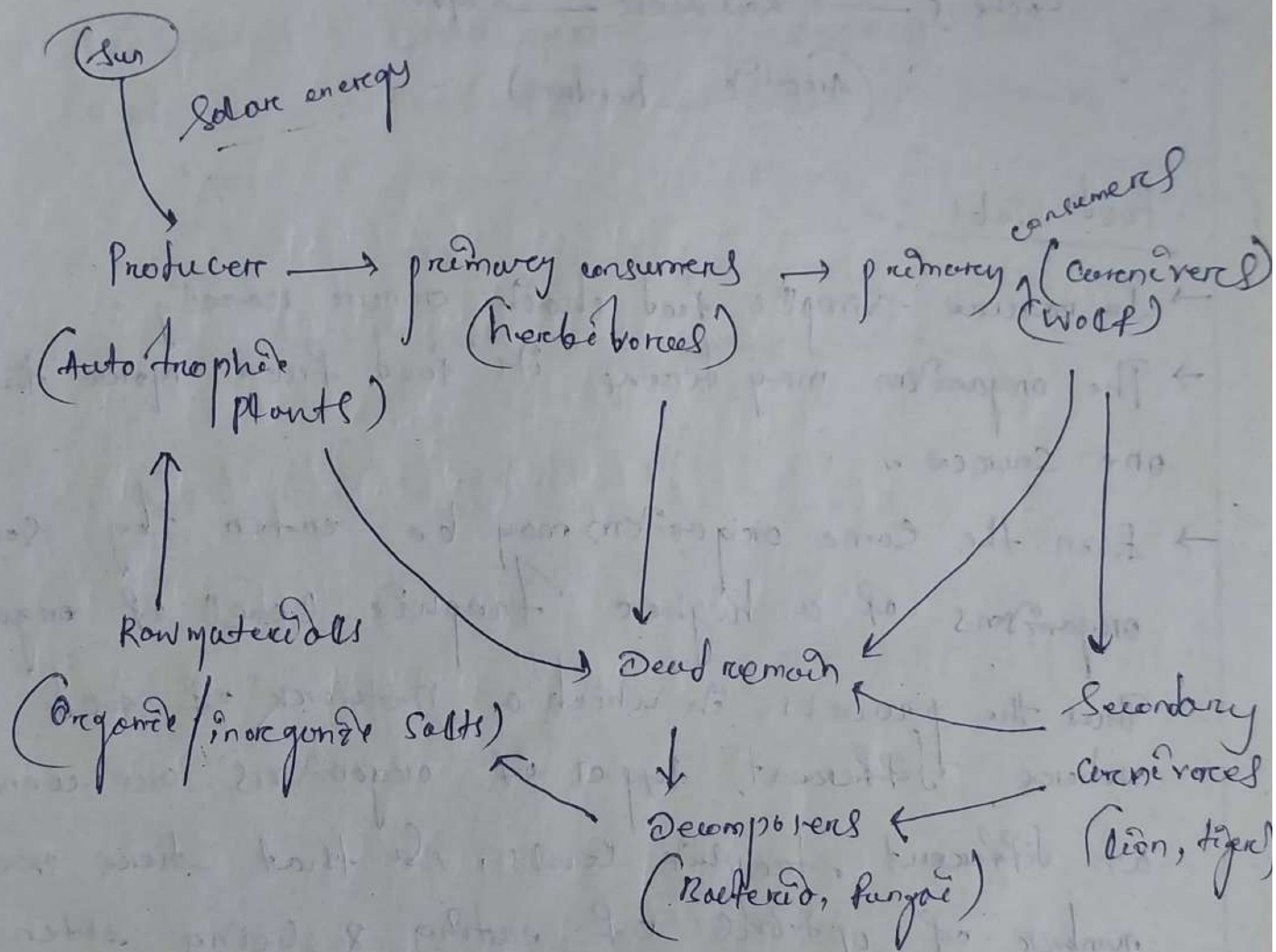
- i) Ecological succession is a process through which ecosystem tends to change over a period of time.
- ii) Succession can be related to seasonal environment changes which create changes in the community of plants and animals living in the ecosystem.
- iii) If a forest is cleared it is totally followed by a certain set of species of plants and animals which undergo change through an orderly process of community development.

(Important)

## Food Chains :-

- The most obvious aspect to nature is that energy must pass from one living organism to another.
- A sheep may eat some grass and then it may be eaten by a person.

- The sequence of eaten and be eaten with the resultant transfer of energy is known as food chain.
- Thus in food chain organisms of an ecosystem are linked to each other.
- Each step is known as trophic level & the study of the energy these step is called trophic level.



The energy flows from primary producer to primary consumers, from primary consumers to secondary consumers & from secondary consumers to tertiary consumers & so on.

This simple chain of eating & being eaten away is known as food chains.

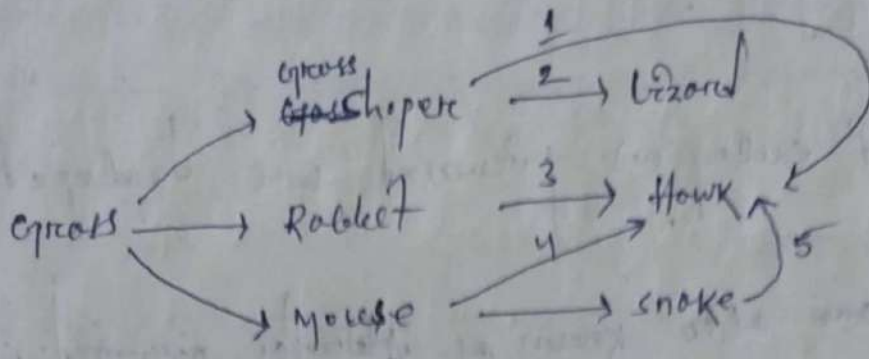
For → grass → rabbit → fox → wolf → lion  
(Grass land ecosystem)

Photoplanktons → Waterfleas → small fish → Terns  
(Pond ecosystem)

Lichens → Reindeer → man  
(Arctic tundra)

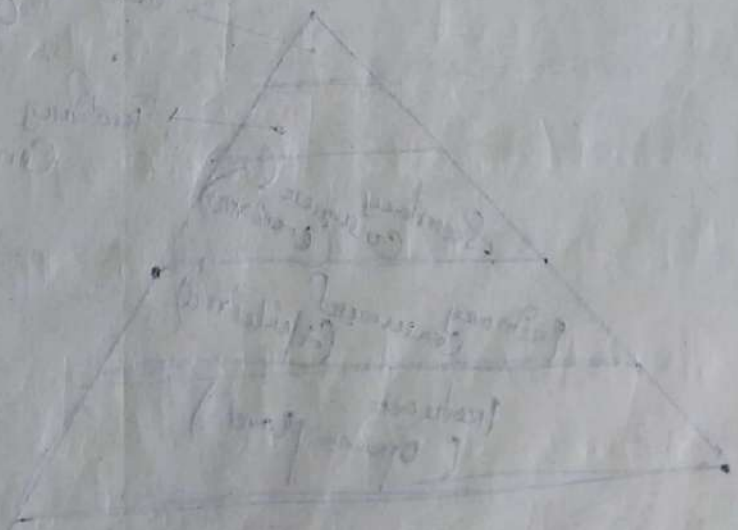
### Food Webs :-

- In nature simple food chains occur rarely.
  - The organism may derive its food from more than one source.
  - Even the same organism may be eaten by several organisms of a higher trophic level of organism.
- Thus the process in which a network of food chains where different types of organisms are connected at different trophic levels, so that there are a number of options of eating & being eaten at each trophic level is called food web.



Above diagram has five types of food chain which are interconnected to form food web.

- 1/ Grass → Grasshopper → predatory bird (Hawk)
- 2/ Grass → Grasshopper → Lizard → Hawk
- 3/ Grass → Rabbit → Hawk (one voltures or man)
- 4/ Grass → Mouse → Hawk
- 5/ Grass → Mouse → Snake → Hawk





## Ecological pyramid :-

→ The concept of ecological pyramid was developed by Charles Hutton.

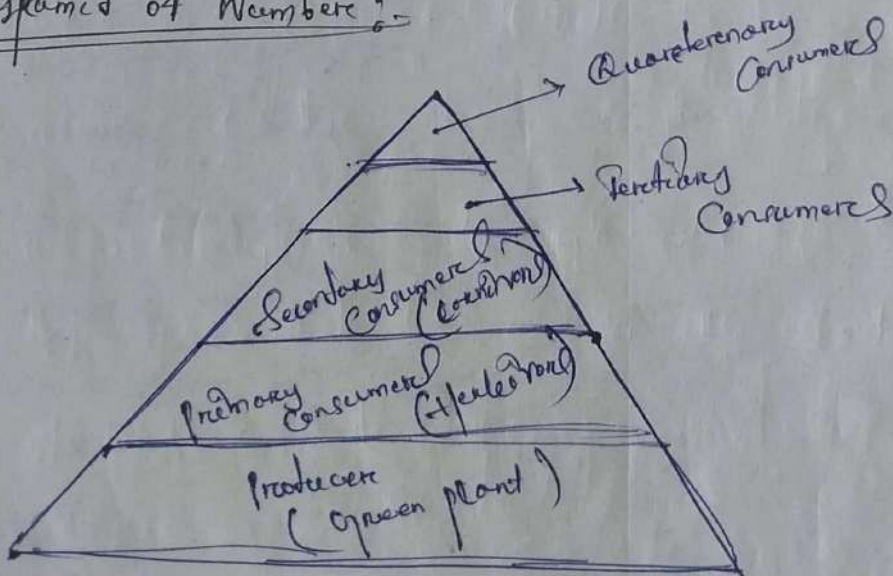
→ The pyramids are also known as Atkinson pyramid.

→ The pyramids are practical representation which depicts the no of organisms, biomass, & productivity at each trophic level.

→ All ecological pyramids begin at the bottom with the producer & proceed through different trophic level.

→ Ecological pyramids are 3 general types  
1st / pyramid of number (best on number of organisms at each level)  
2nd / pyramid of biomass (best on biomass of organisms)  
3rd / pyramid of energy (showing the rate of <sup>energy</sup> flow at successive trophic level)

## Pyramid of Numbers :-



→ It will start with the relation bet<sup>n</sup> the number of producers, herbivores & omnivores has successive trophic level.

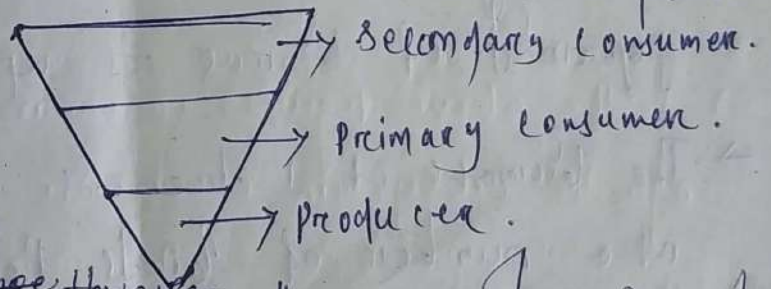
→ At the base of such pyramid is always the number of primary producers & consumers at successive level.

→ In a grass land ecosystem the producers which are mainly grasses are always many in numbers.

→ Their numbers in them decreased towards the apex.

→ Hence the primary consumers or herbivores like rabbit are less in numbers than the grasses.

→ The secondary consumers are lesser in numbers than primary consumers. Finally the top consumer (tertiary) takes form or other animals are least in numbers. Thus the pyramid becomes ~~inverted~~ upright.



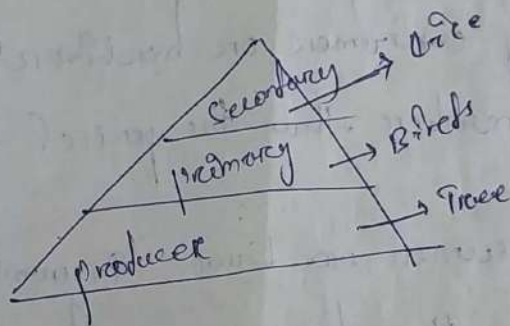
→ In a forest ecosystem ~~where~~ however the pyramid is inverted  
→ Here the number of primary producer (A tree) is less than that of herbivore birds feeding upon the tree food.

→ The number of parasite like ~~bugs~~ <sup>bugs</sup> and ticks living & feeding upon the bird body is small.

→ Thus depending upon the size and bio mass the pyramids of numbers may not be always pyramid it may even be completely inverted space.

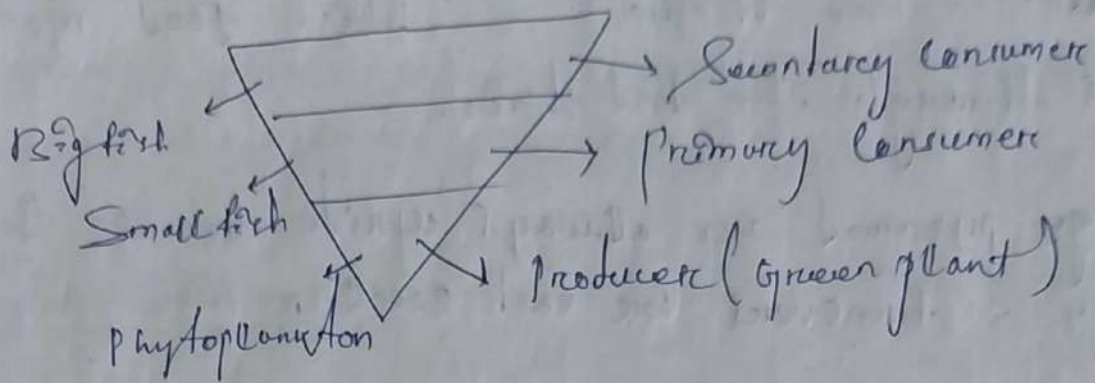
## Pyramid of Biomass :-

- Pyramids of Biomass are comparatively more functional as they in state of geometric factors, show the quantitatively.
- In order to explain the inverted nature of pyramid of numbers, the levels of pyramid of biomass are given where the weight of primary producers forms the base.



- In the given figure the ecosystem is shown when the pyramid of biomass is upside.
- The biomass of 1 tree is very high. The biomass of a number of birds feeding upon the tree is far less than that of the tree.
- Similarly the biomass of even a very large no. of parasite in and on the body of the birds is far less. Thus the pyramid of biomass therefore become upside.

→ But they can be instances where the pyramid of biomass also get inverted.



→ The biomass of phytoplankton is quite negligible as compared to the small herbivores that is fish that feed on them.

→ The biomass of plant animals feeding on small fishes is feed higher. This is the case in most aquatic bodies.

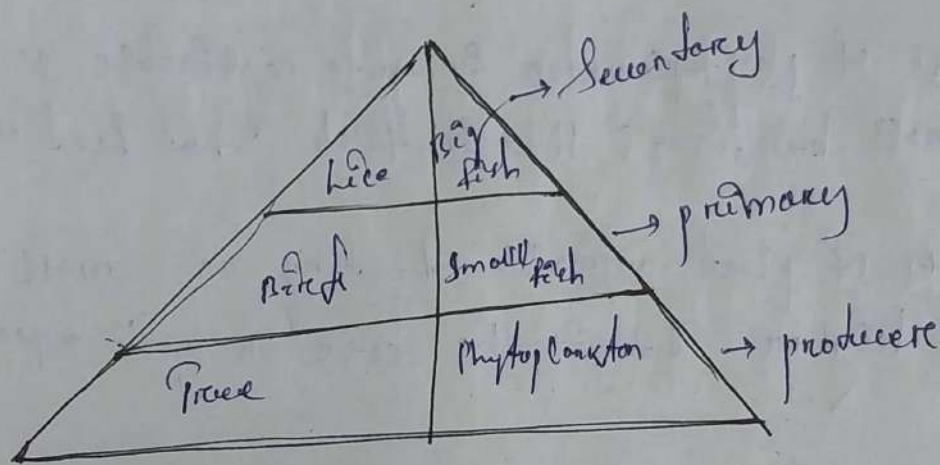
### Pyramid of Energy:-

→ Out of the three types of ecological pyramid best picture of overall nature of the ecosystem.

→ Age against of pyramid of numbers & biomass the shape of the pyramid of energy is always upright because in this the time factor is always taken into

→ The pyramid of energy represent the total quantity of energy utilized by trophic level organism of an ecosystem, per unit area over a set period of time.

- The base upon which the pyramid of energy is constructed is the quantity of organisms produced in an ecosystem per unit time of the which food material passes through the food chain.
- Energy pyramid are always upright because less energy is transferred for each level.



- In the above figure organisms of the terrestrial & aquatic ecosystem as soon.
- The quantity of the energy trapped by the green plant in an area over a period is highest compare to that of organisms of other trophic level & their base the base of the pyramid is.
- The population of phytoplankton in aquatic ecosystem also complete their life cycle & a new-generation in every few hour. The stimulative energy content of the generation of phytoplankton

craft is up.

to be suddenly much more than that of only few generation of fishes in the corresponding space & time.

→ The energy content of a top carnivore is the ~~best~~ best. Therefore the pyramid of energy is upright.

### Ecological Efficiency:-

⇒ The ratio of the amount of energy absorbed & the amount of energy which would be emitted in biomass is known as Ecological Efficiency.

# Biodiversity

- Biodiversity means the variety among living organisms from all sources including terrestrial, marine and other aquatic ecosystem and the ecological complexes of which they are a part.
- Biological diversity or biodiversity deals with the degree of nature's variety in the biosphere.

## Types of Biodiversity:-

⇒ The variety of biodiversity can be observed at three levels.

- 1/ Genetic variability or Genetic diversity within a species.
- 2/ The variety of species or Species diversity within a community.
- 3/ Organization of species or ecosystem diversity in an area.

## 1/ Genetic Diversity:-

→ Each member of any animal or plant species differs before widely from other individuals in its genetic term.

→ Thus for example, Each human being is very different from all others.

- Their genetic variability is essential for a healthy breeding population of a species.
- If the number of individual is reduced the diversity of genetic makeup is reduced & eventually this can lead to extinction of the species.
- The diversity in wild species forms the gene pool from which are crop in domestic animal having been develop over thousands of years.
- modern bio technology manipulate genes for developing better types of medicine & a variety of industrial product.

## 2/ Species diversity :-

- The number of species of plant & animals that are present in region constitutes as species diversity.
- This diversity is both in natural ecosystem & its agricultural ecosystem.
- Some areas are more rich in species than others.
- Natural tropical forest have a much greater species richness than plantation development by forest department for timber production.



- A natural forest ecosystem provides a large number of non-wood products that local people depend on such as fruit, fuel, wood, fibre, gum, medicine & etc. However, finger plantation do not provide the large variety of that are essential for local consumption.
- Thus the value of a natural forest with all its species richness is much greater than a plantation.
- Modern intensity agricultural ecosystem have relatively lower diversity of crops than traditional farming system when multiplication.
- At present scientist have been able to identify 1.5 million species on earth.

Area that are rich in species diversity are called hotspot of diversity

### Ecosystem Biodiversity :-

- There are a large variety of different ecosystem on earth.
- Ecosystem diversity can be described for a specific geographical region on a country or a state.
- Diverse ecosystem include forest, grassland, desert

as well as a quality ecosystem.

→ An ecosystem is said to be natural when it is relatively on fire by human or not fire to other such as farmland.

→ If natural ecosystem are overused or mis used their productivity eventually decrease and they are said to be degraded.

2 marks

## Biogeographically classification of India? -

India can be conveniently divided into 10 major regions based on geography, climate & pattern of vegetation seen & the species found on them. So.

### India's Biogeographic Zone? -

- 1/ The cold mountainous snow covered Arunachal Himalayan region of Latak.
- 2/ The Himalayan ranges & valleys of Jammu, Himachal Pradesh, Uttarakhand, Assam, & North eastern State.
- 3/ The Terai, the low land where the Himalayan river, ~~flow~~ <sup>flow</sup> into the plane.
- 4/ The Ganges & Brahmaputra plains.
- 5/ The thick forest of Rajasthan.
- 6/ The semi arid grass land region of the Deccan plateau Gujarat, Maharashtra, Andhra Pradesh, Karnataka & Tamil Nadu.
- 7/ The North-east State of India.
- 8/ The western part in Maharashtra, Karnataka & Kerala.
- 9/ The Andaman & Nicobar islands. <sup>(10)</sup> the long western & eastern coastal belt with ~~forests~~ <sup>forests</sup> & mangroves.

1/ What is Environmental Study?

Ans The sum of the all living & non living things are called Environmental Study.

4/ What is Waterlogging?

Ans If water stands on the land of most of the year, it is known as waterlogging.

→ Hence it leads to low mechanical strength & low crop yield.

5/ What is drought?

Ans It is a continuous period of dry weather.

→ In most and reason of the world, the rains are unpredictable.

7/ What is salinity?

Ans If water, not absorbed by the soil, it evaporated leaving behind a thin layer of soluble salt on the top of the soil. It is called as salinity.

→ Saline conditions are exhibited when pH is greater than 8.0.

8/ What is renewable Resources, give two examples?

Ans The resources can be renewed or manufactured by human being is known as Renewable Resources.

Ex → Solar, Hydro power.

9/ What is Non-Renewable Resources? Give two examples?

Ans The resources can not be renewed is known as Non-Renewable Resources.

Ex → Petrol, Coal, Iron.

10/ What is soil erosion?

Ans Soil erosion is the loss or removal of superficial layers of the soil by the action of wind, water & human activity.

→ factors of soil erosion are :-

- 1/ slope of the ground
- 2/ nature of the soil.
- 3/ soil mis-management

11/ Desertification :-

→ Desertification is a type of land degradation in which relatively dry land becomes increasingly arid & finally reaching its borders by water, as well as vegetation or will die.

→ Desertification can be caused by the following reasons

- man made
- forest grazing
- shifting cultivation
- increase population

12/ What is land degradation?

Ans Land degradations are related to deforestation or deterioration or loss of fertility or productive capacity of the soil.

→ The factors contributing to land degradation are listed below & hence subsequently.

- Soil erosion
- Soil pollution
- Water logging
- Desertification

13/ What is Land Slide?

Ans The movement of the soil & mass of the earth, or rock from mountain is known as land slide.

14/ What is Ecosystem?

Ans An ecosystem is that the living organisms of a community is not only interact with each other & but also functionally relation with the non living organism.

→ The functional & structural system of a community & the environment is called as an Ecosystem.

15/ What is Ecological Succession?

Ans Ecological succession is the process in which ecosystem tends to change the over period of a time.

16/ What is omnivore?

Ans A person whose eat both animals & plants are called omnivore.

Ex → Human

17/ What is Carnivore?

Ans A person or animal whose eat only meat are called Carnivore.

Ex → Tiger, Leopard, Lion

18/ What is food web & food chain?

Ans Food web :- Food web through how plants & animals are interconnected by different path.

Ex → Grass → Mouse → Snake

Food chain? - Food chain follows a single path as animals eat each other.

Ex → Grass → Rabbit → Hawk

20/ What is Hotspot of biodiversity?

Ans Area that are rich in species diversity is called as Hotspot of biodiversity.

19/ What is Biodiversity?

Ans Biodiversity is the variety of life in an area that is determined by the number of different species in that area.

21/ What is over grazing?

Ans The excessive grazing which causes damage to grassland it happens due to the lack of rainfall or due to doing heavy farming.

22/

Ans The need for environment studies because it teaches us to understand the importance of Environment & ensure to use the natural resources more efficiently & live a Sustainable living.

## Value of Biodiversity:-

1/ Direct value

2/ Indirect value

→ The value of biodiversity is classified into two types

1/ Direct value

2/ Indirect value

→ Direct value of biodiversity is of two types

1/ consumptive use value

2/ productive use value

### Consumptive Use Value:-

→ The consumptive use value is the direct utilization of food, ~~fuel~~ <sup>fruit, wood</sup> by local communities.

→ The biodiversity held in the ecosystem provides the human being all their daily needs. Such as food, variety of other products, building materials etc.

→ High consumptive use value on resources may lead to the following compounds.

1/ Over exploitation of wild life in developing countries

2/ Loss of traditional control on hunting

3/ Loss of wild life population at ~~high~~ <sup>high</sup> level <sup>productive</sup>



## Productive Use value :-

- Productive use value refers to product that are commercially harvestable.
- Rubber, Gums, Essential oil, Gum, drugs, skin, etc. use, honey wax & other forest product they have their high commercial value.
- In addition to these various forms of animal body parts are sold in commercial market at international & national level.
- The futuristic biological diversity is the raw material from which new drug can be identify from plant & animals.
- For agricultural interest to the bio diversity in the wild relative of crop plant in the basis for developing.
- Hence preservation of biodiversity has now become essential for industrial growth & economic development.

## Indirect Value of Bio Diversity :-

- Indirect value provides economic benefits without being harvestable.
- Direct value are open derive from indirect value because plants & animals basis are supported by

the services provided by their environment.

→ Indirect value of biodiversity is of the following types

i) Non <sup>consumptive</sup> consumption value

ii) Optional value

iii) Ethical or Biical value

iv) Information value

1/ Non consumptive value :-

→ This indirect value is its nature function & services.

→ It includes photosynthesis of plant which provides support system for other species.


→

2/ Optional value :-

→ Option value is the indirect value of a species to provide an economic benefit to human society at some point in near future.

→ It is impossible to predict which of present species for traditional variety of crops & domestic animal will be of greater use in the near future.

→ Thus the preservation of biodiversity must also include traditionally used strength already in existence in crops & domestic animal.

  
16/12/21

### 3/ Ethical or Religious Value:-

- Ethical or religious value is also one of the indirect value of the biodiversity.
- The ethical or religious value of biodiversity is stated in the understanding that humanity is a part of nature and that we are just one species among them.
- All species have an inherent right to exist.
- Future generation also have an inherent right to know them and to have the choice of using them or not.
- Religious value also have a significant impact on our attitude towards natural resources.

### 4/ Information value:-

- This is related to the educational, scientific, aesthetic & tourism value of biodiversity in an ecosystem.

### Aesthetic Value:-

- Beautiful plant & animal inspire of to protect biodiversity.
- The most important aesthetic value of biodiversity is eco-tourism.

→ Ex:- People from distant places spend time and

money to visit areas where a can enjoy aesthetic value of biodiversity.

### Social Value :-

- Social value is one of the instrumental value where something has a mean to another end.
- The biodiversity has distinct social value attach with different society. & services provided by ecosystem to our society includes.
  - i/ provision of food, fuel, fibre
  - ii/ Lifetox like medicine & other products
  - iii/ Stabilisation & moderation of our climate
- The loss of biodiversity threaten our existence that is social life,
- Thus it is essential to protect biodiversity.

### Biodiversity And it's Global Level :-

- It is estimated that there exist 5-30 million species of living forms on our earth & of these only 1.5 million have been identified.
- Terrestrial biodiversity of the earth is the largest ecological unit present in different geographic area.

- It is also estimated that 1,20,000 flowering plant species in tropical forest but only about 1-3% of these are known.
- The tropical forest are regarded as the richest in biodiversity.
- According to the scientist more than half of the species on the earth live in moist ~~for~~ tropical forest which is only 7% of the total plant surface.

### Biodiversity at National level:-

- India is located in South Asia bet<sup>n</sup> latitude  $0^{\circ}$  &  $38^{\circ}$  N (North) & longitude  $69^{\circ}$  &  $97^{\circ}$  East.
- India's land mass extending over a total geographic area of about 299 million hectares & is bounded by Himalayas in north, the Bay of Bengal in the east, the Arabian Sea in the west and Indian Ocean in South.
- The wide variety in physical feature & climatic situation & result in diversity of ecological habitats.
- In India about 1,15,000 species of plants & animals

having identified,

- In Florida the country can host 45,000 species, which accounts for 15% of the known world's plant.
- The nearest eastern reason is famous for orchids in the country.
- Nearly about 75,000 animal species about 80% of these are insect and found in India.

### Biodiversity at local level :-

- The Biodiversity at local level can be well understood by de-marketing the points, places, zones rich in biodiversity.
- This can be understood as composition that is rich in plants & animals of some habitat & genetic makeup.
- It is said that environmental variable are responsible for diversity but temperature play an important role in affecting the biodiversity of an area. Thus local area are well affected in heterogeneous & homogeneous habitat.

## Threats to Biodiversity :-

The process or activity which causing or may cause damage to ecosystem or well as biodiversity is known as threat to biodiversity.

→ There are 7 reasons by which a biodiversity may be destroyed. The following are the may threat to biodiversity

- 1/ Human activities & loss of habitat
- 2/ Deforestation
- 3/ Desertification
- 4/ Climate change
- 5/ Pollution

### 1/ Human activities & loss of habitat :-

→ Human activity are causing a loss of biological diversity among animals & plant.

→ Around 30% everyday human activity causes damage to biodiversity.

→ Various human disturbances are changing ecosystem and are thus threatening the biodiversity.

→ Due to habitat degradation wild population become more vulnerable.

→ This is specially true for wild ~~living~~ life we suffer due habitat ~~and~~ fragmentation.

→ The natural forest and grass land which are the natural home's of thousand species are going cleared day by day

For conversion into agriculture land of developmental process.

## 2/ Deforestation :-

- Forest ecosystem contains as most as 80% of the terrestrial biodiversity & provide biomass energy as well as critical components of the global cycle of water & energy.
- Forest ecosystem are being cleared and degraded in many parts of the world.
- Degradation of forest represent a ~~major~~ enormous & potential sources of green house gas emission.
- When forest is destroyed carbon is released into atmosphere. which cause a threat to biodiversity.

## 3/ Desertification :-

- Desertification & deforestation are the main cause of biodiversity
- Both process are influence by expansion of agriculture
- The direct cost of deforestation is reflected in the loss of valuable plant and animal species.
- Desertification cause climate variation.
- Desertification may also cause decreasing soil organic matter as well as soil degrade.



→ By this way desertification  
biodiversity degradation

observed to ~~be~~ for the

#### 4/ Climate change :-

- The climate change is also a factor that causes degradation of biodiversity.
- As climate ~~one~~ <sup>once</sup> species will migrate towards lower latitudes & altitudes in both
- The increase to the amount of  $CO_2$  in the air affects the physiological functioning of plant & species composition.
- Aquatic ecosystem particularly coral reefs, mangroves swamps & coastal wetlands are ~~are~~ <sup>to</sup> changed in climate.

#### 5/ Pollution :-

- By increasing pollution climate changed abruptly.
- This causes changes in different organic & inorganic factors of biodiversity.
- Pollution may be caused by different sources: like - vehicle, industry, power plant, fertilizers, dumping of garbage etc, it ultimately causes the changing ecosystem as well as biodiversity.
- Around 40% habitat are changed every year due to pollution.

# Environmental Pollution

## Air pollution :-

The contamination of air with harmful gases like smoke, dust, chemicals, fog, smog which have harmful effects to the living and nonliving things is called air pollution.

## Types of air pollutants :-

Air pollutants are classified into two types.

i/ Primary pollutants

ii/ Secondary pollutants

### i/ Primary pollutants :-

→ The primary pollutants which are directly emitted into the atmosphere.

→ Ex: CO, NO<sub>2</sub>, SO<sub>2</sub> etc

### ii/ Secondary pollutants :-

→ The secondary pollutants which are formed by the process of intermixing of primary pollutants.

→ Ex :- The smog, which is a combination of fog & smoke.

## Causes of air pollution :-

→ The smoke emitted by factories and thermal power plants due to burning of coal.

→ The smoke emitted from homes by the burning of fuels

Like - wood, kerosene, coal, coke etc.

- The gases emitted by motor vehicles due to burning of petrol and diesel. Motor vehicles are the major cause of air pollution in big cities.
- The factories like stone crushers, cement factories, are also responsible for the air pollution.
- Smoking causes air pollution.
- Forest fires and volcanic eruptions are the natural sources of air pollution which put smoke and dust into the air.
- The mining activities are also causes air pollution by blasting.
- By burning crackers in the festivals are also causing air pollution.

### Remedies :-

- We should avoid usage of crackers.
- We should plant more number of trees which also reduces air pollution.
- We should use public transport which reduces air pollution.
- We should use recycle and reuse the product.
- We should say no to use the plastic bags.
- We should reduce the forest fires and smoking.
- We use of fans instead of air conditioner.

- We should use filters for chimneys in house and factories.

## Water Pollutions :-

- It is the contamination of water bodies, usually as a result of human activities, addition of unwanted substance in water which makes water harmful for living and non living things is called water pollution.

### Causes :-

- Due to industrial waste the water pollution causes.
- The sewage and wastewater also causes water pollution.
- Due to the mining activities it also causes water pollution.
- Due to marine dumping also causes water pollution.
- Due to urban development causes water pollution.
- Putting dead human being into the river also causes water pollution.
- Putting plastic items into the river also causes water pollution.
- Due to natural calamity also causes water pollution.

### Remedies :-

- We should ~~proper~~ do proper water management plant.

- We should do proper construction of proper storm drains and setting ponds.
- We should do proper maintenance of drain line.
- We should do proper rain water harvesting structures.
- We should do proper efficient and sewage treatment plant.
- There should be regular monitoring of water and waste water.
- We should not put plastic items and dead humans things into the rivers.

### Soil pollution :-

- Soil pollution is defined as the presence of pollution or chemical or contaminants present in soil which causes our ecosystem is called soil pollution.

### Causes :-

- Due to industrial activity like extracting minerals from the earth and doing mining activities causes soil pollution.
- Due to using modern pesticides and fertilizers in agricultural activities causes soil pollution.
- By growing the waste disposal also causes soil pollution.
- The acid rain is caused when pollutants present in the air mix up with the rain and back on the ground.

also causes soil pollution.

- By doing over agricultural activities on the soil which loss the fertility of the soil it also causes soil pollution.
- Due to doing construction activities also causes soil pollution.

### Remedies :-

- Make people aware about the concept of reduce, recycle and reuse.
- Reduce the use of pesticides and fertilizers in agricultural activities which reduces soil pollution.
- People should be encouraged to go for afforestation.
- There should be proper treatment of soil of industrial activities or mining activities.

### Marine Pollution :-

- Marine pollution is a combination of chemicals and trash most of which comes from land sources and is washed or blown into the ocean this results in damage to the environment to the health of all organisms.

### Causes :-

- Direct discharge of waste into sea sewage causes marine pollution.

- By doing petroleum mining causes marine pollutions.
- By the spill of toxic substances from ships causes marine pollutions.
- Washed off materials - fertilizers, pesticides also causes marine pollution.
- By throwing plastic items into the ocean, sea, causes marine pollutions.

### Remedies :-

- Reduce your use of single use of plastic.
- Make people aware about the concept of recycle, reuse and reduce.
- People should participate in organize a beach and river clean which reduces marine pollutions.
- Avoid product microbeads (tiny plastic particles) which reduces marine pollution.

### Noise Pollution :-

Noise pollution is considered to any unwanted or disturbing sound that causes irritation or affects the health and well being of human and other organisms is called noise pollution.

## Causes :-

- The noise which created by different vehicles in traffic is called traffic noise which causes noise pollution.
- The sound created by different air crafts is also causes noise pollution.
- Noise that created by constructions or works is also causes noise pollution.
- Noise created by doing house chores also causes noise pollution.
- Noise created by DJ and sound system also causes unwanted sounds which leads to noise pollution.
- Noise created from the industries also causes noise pollution.
- Noise created by different animals and birds also causes noise pollution.

## Remedies :-

- When the unwanted noise coming to room or building close the windows or doors which reduces the noise pollution.
- Put on ear plugs which reduces noise pollution.
- Do wall to wall carpentering which reduces noise pollution.
- Turn off electronic devices or allow the volume which reduces noise pollution.



- Use noise absorbers in noise machinery which reduces noise pollution.
- Do frequent lubrication and better maintenance of machinery which reduces noise pollution.
- plant trees in urbanizing or around highways and even at places we stay which reduces the noise pollution.

### Thermal pollution :-

- Thermal pollution is defined as sudden increase or decrease in temperature of a natural body of water which may be ocean, lake, river or pond by human influence is known as thermal pollution.

### Causes :-

- production and manufacturing plants are the biggest sources of thermal pollution these plants draw water from a nearby source to keep machines cool and then release back to the source with high temp<sup>n</sup> causes thermal pollution.
- Soil erosion that causes thermal pollution.
- Deforestation causes thermal pollution.
- Natural climate causes thermal pollution.

## Remedies:-

- Cooling ponds or reservoirs are the simplest methods of controlling thermal pollution.
- Use of cooling towers which reduce thermal pollution.
- Water recycled for domestic use or industrial heating reduces thermal pollution.

## Nuclear Hazards:-

- Risk or danger to human health or the environment posed by radiation emanating from the atomic nucleus of a given substance or the possibility of an uncontrolled explosion originating from a fusion or fission reaction of atomic nucleus.

## Causes:-

- Due to the non standard operation, mismanagement of nuclear reactors can cause nuclear hazards.
- Due to poor instrumentation causes nuclear hazards.
- Due to lack of well-trained staff causes nuclear hazards.
- Due to errors in operation procedures causes nuclear hazards.
- Due to spills and leaks from nuclear industry, medical, radiology & defense activities causes nuclear hazards.

## Remedies :-

- Do proper ventilation.
- Do spaces for disposal which reduces nuclear hazards.
- People should follow all government management plans.
- All students and people should get proper education and public awareness about nuclear hazards.
- Do ion exchange which reduces nuclear hazards.