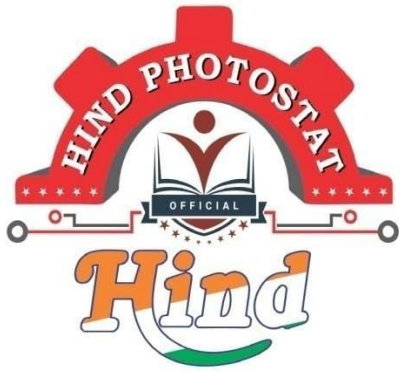




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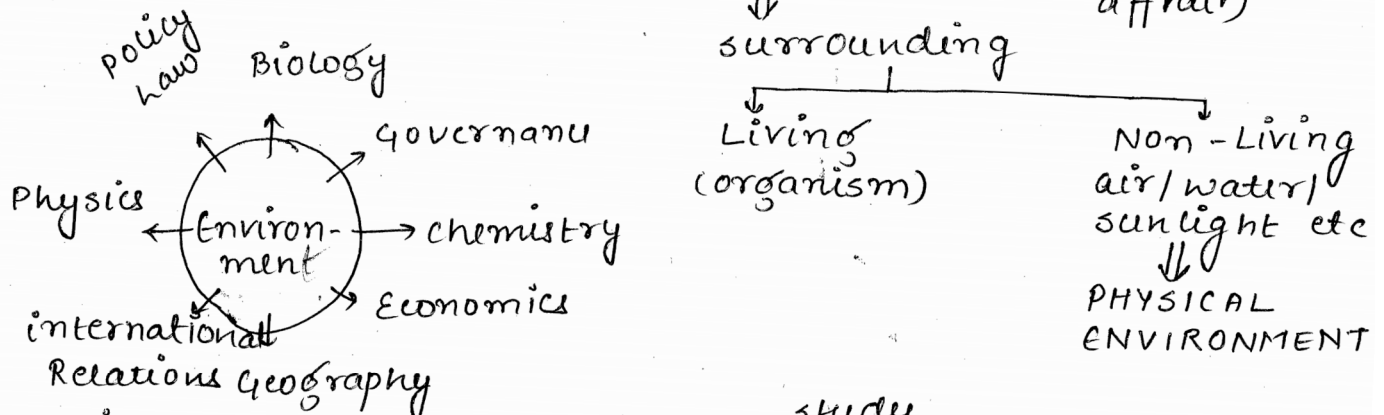
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# Environmental Issues

## Topics

- ① Basics of Environment
- ② Biodiversity
- ③ Energy
- ④ pollution
- ⑤ climate change / EIA

## Basics of Environment (related to current affair)



Environment: study (or) scientific study of the environment including living & Non-living.

Ecology  $\Rightarrow$  sustainable approach (long lasting).  
Ecofriendly approach.

## levels of Ecology:

$\Rightarrow$  Biosphere  $\Rightarrow$  Largest ecosystem of the Earth. Resource management (where life, entire life)

$\Rightarrow$  Biome  $\Rightarrow$  Large size ecosystem (continental dimension) very (community)

$\Rightarrow$  Ecosystem  $\Rightarrow$  Living + Non Living

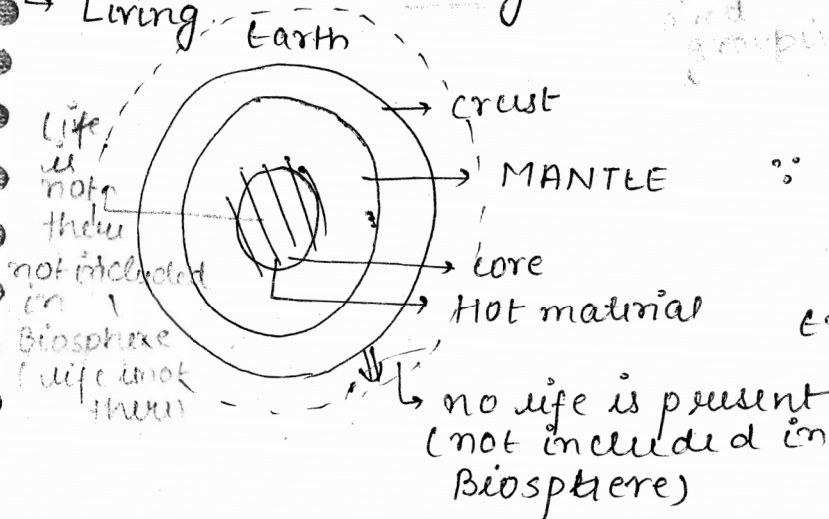
$\Rightarrow$  Community:  $\Rightarrow$  group of different species of organism.

$\Rightarrow$  Population  $\Rightarrow$  Group of organisms of same species

$\Rightarrow$  organism (individual) study

Living

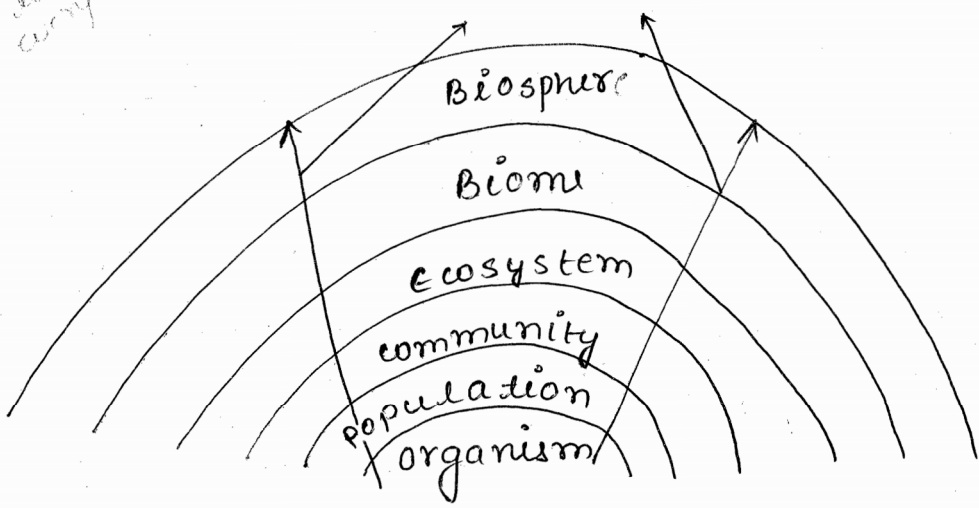
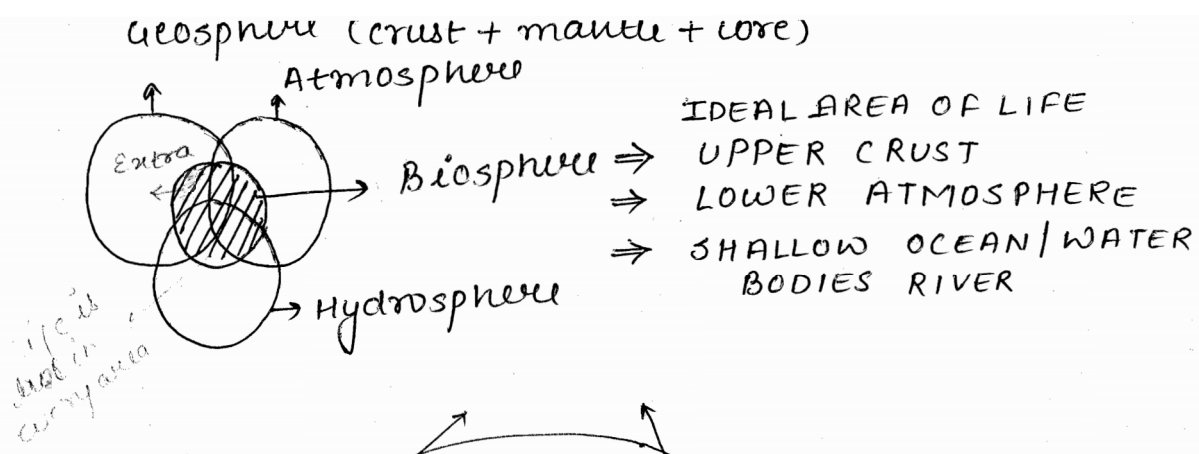
organism capability of interbreeding among themselves  $\Rightarrow$  flourishing generation



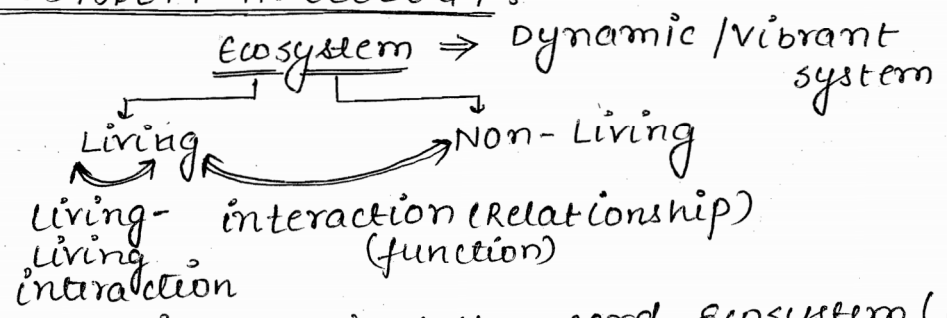
Earth

is biosphere (Living part)  
entire Earth is not biosphere.

ocean  
cold  
no life (not called biosphere)



# STUDY OF ECOSYSTEM IN ECOLOGY:

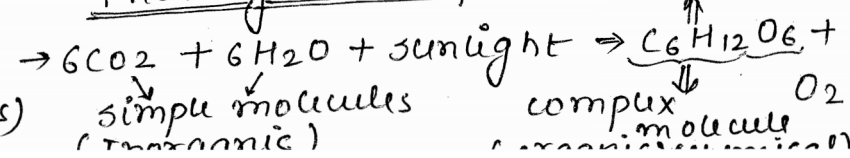
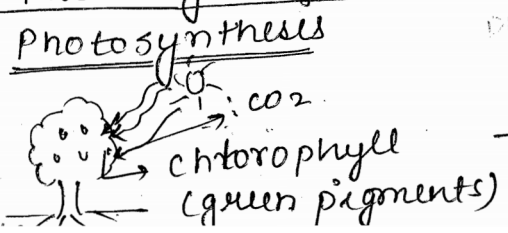
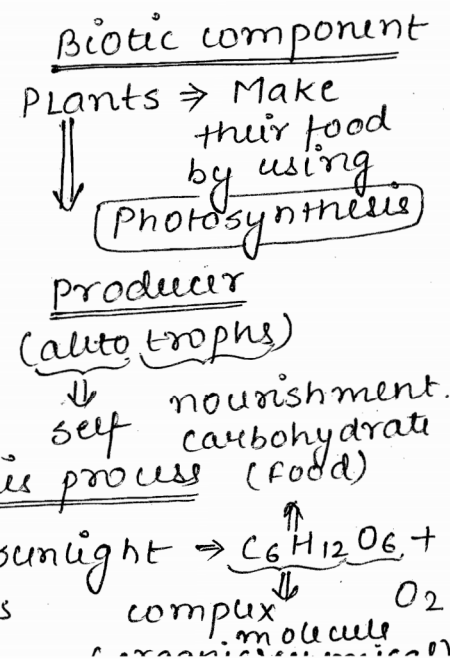
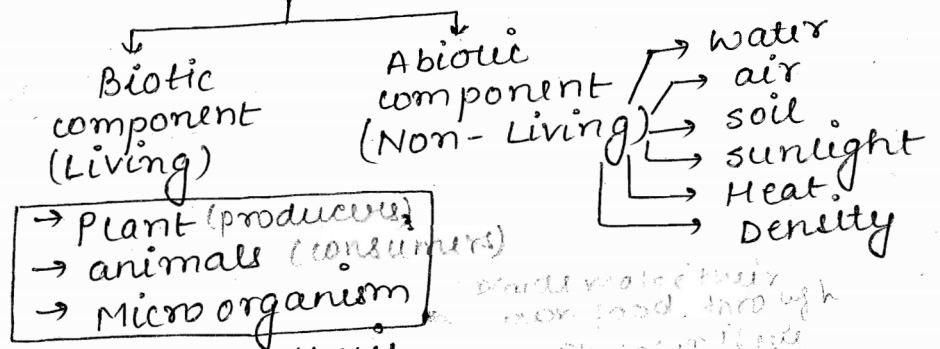


A G Tansley (British)  $\Rightarrow$  coined the word Ecosystem (1935)

Ecosystem:-

- ① structure of ecosystem
- ② functions of ecosystem

## ① structure



- In photosynthesis light energy is converted into chemical energy.
- Through photosynthesis  $\rightarrow$  simple molecular structure (inorganic) <sup>converted</sup> into complex molecular structure (organic)
- light energy  $\rightarrow$  chemical energy  $\rightarrow$  plants reduce  $CO_2$  by absorbing hence decreasing global warming.
- $O_2$  is released
- $CO_2$  is absorbed
- \* Plants (Carnivores)  $\rightarrow$  Nitrogen participates in photosynthesis

ANIMALS  $\rightarrow$  Derives their food from living organisms.

$\downarrow$   
consumers

LATIN : - HETEROTROPHS  
Others Nourishment.

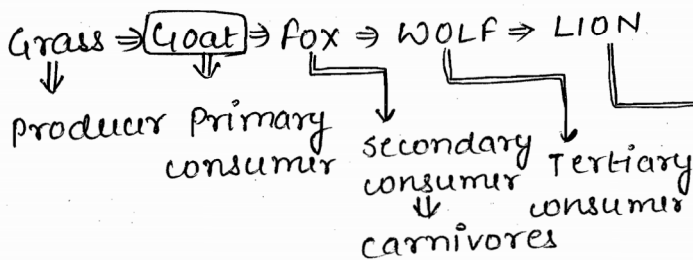
Types of consumers :-

① primary consumer :- depend on plant. (Herbivores)

② secondary consumer :- depend on herbivores. (carnivores)

③ Tertiary consumer :- (carnivores)

④ Quaternary consumer (carnivores).



OMNIVORES : Both herbivores / carnivores

Eg :- Human being / cat / dog / BEAR / ---

Animals are called Macro consumers.

Scavengers :- are those animals which eat dead parts of animals (toxic parts of the dead life) (start decomposing)

Eg: Vulture, Hyena, crow, Earthworm

Biotic Structure :  $\rightarrow$  Plants  
 $\rightarrow$  animals  
 $\rightarrow$  micro organism

Help in the process of decomposition process

complex molecule

$\downarrow$   
simple molecule

(C / H / O / N / S / P)  $\rightarrow$  give to soil for oxidation  $\rightarrow$  heat.  
 $\rightarrow$  give to atmosphere.

Bacteria / fungi needs oxygen to perform aerobic decomposition. Lack of oxygen will lead to perform slow decomposition.

Release enzyme from outside (acidic in nature) absorbs the  $O_2$  is used for oxidation  $\rightarrow$  heat.

$\leftarrow$  { Bacteria (single cell)  
Fungi  $\rightarrow$  multicellular  
single cell (Yeast)

they also participate in cleaning the part. (But most of the part is left) which is cleaned By Bacteria fungi.

## Through decomposition:-

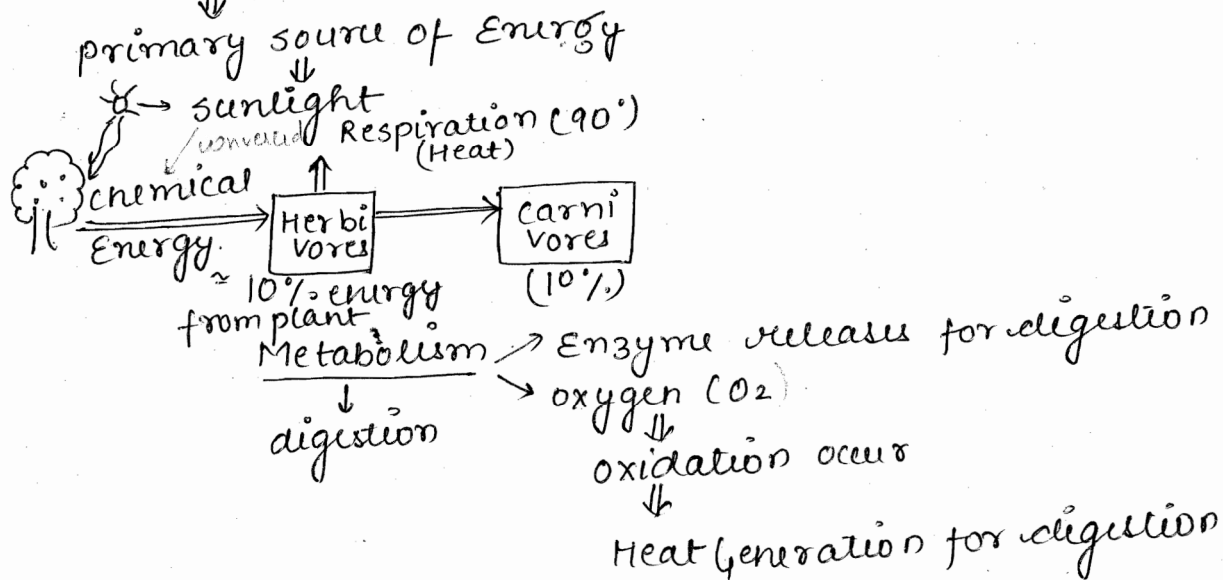
- complex molecular structure (organic)  $\Rightarrow$  simple molecular structure (inorganic)
- $\text{CO}_2$  is released
- $\text{O}_2$  is absorbed generally
- Decomposition is opposite of photosynthesis.

- soil fertility  $\uparrow\uparrow$
- dead part waste opportunity  $\xrightarrow{\text{decompose}}$  in simple molecule  $\xrightarrow{\text{N/O/P goes}}$  in soil increase the soil fertility.
- Bacteria & fungi are called decomposers (saprotrophs) microorganism (micro consumer)
- If any dead parts of animals are there then it is called Dead waste (Detritus) (Detritivores) who eat the dead waste.

## Functions of Ecosystem:

- $\rightarrow$  Energy flow
- $\rightarrow$  Nutrients cycling
- $\rightarrow$  Biotic interaction
- $\rightarrow$  productivity
- $\rightarrow$  Biotic succession  $\uparrow$  efficiency.

① Energy flow :-  $\approx 10\%$   $\rightarrow$  Energy flow is unidirectional



Energy flow  
unidirectional  
≈ 10% efficiency

- Three ways  
→ (i) Food chain  
(ii) Food WEB  
(iii) Energy pyramid

Food chain is composed of number of TROPHIC LEVELS

Trophic level ① ⇒ Bottom level

↓  
Trophic level ②  
↓  
Top level  
↓  
energy decreases

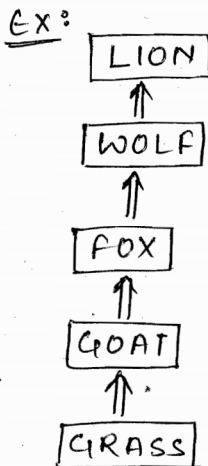
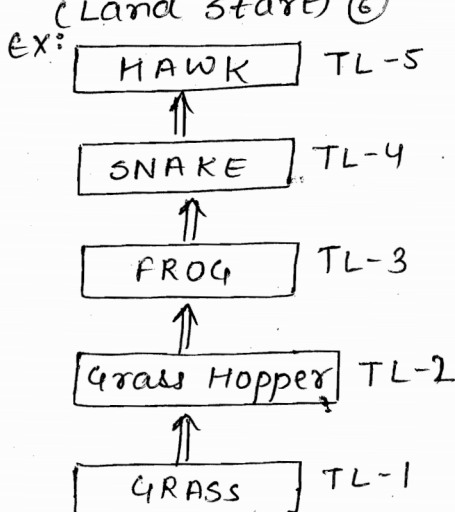
Food chains :-

Grazing food chain  
↓  
starts from living part

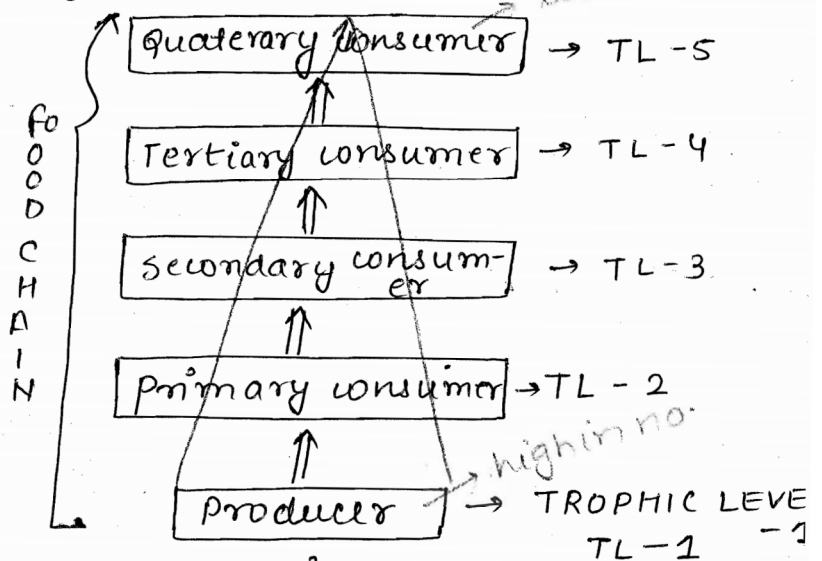
Detritus food chain  
↓  
starts from the Dead/Waste

• Grazing Food chain :-

Terrestrial food chain ⑤ or ⑥  
(Land start)



(a) Food chain



⇒ stabilises around ⑤ levels  
⇒ Food chain is large is Bad  
Because energy is less and competition is high.  
Eg- Suppose if TL-5 consumers increase the no. of energy decrease as we move up or so competition fight of energy will or food will be there.

Lake/Ocean (Lack of soil) ⇒

Rootless plants ⇒ small/simple

⇒ Phytoplanktons  
(survive in upper portion of water)

⇒ Plant floaters  
(and in upper portion)

Eg :- diatom/algae  
tiny fish → weak swimmer

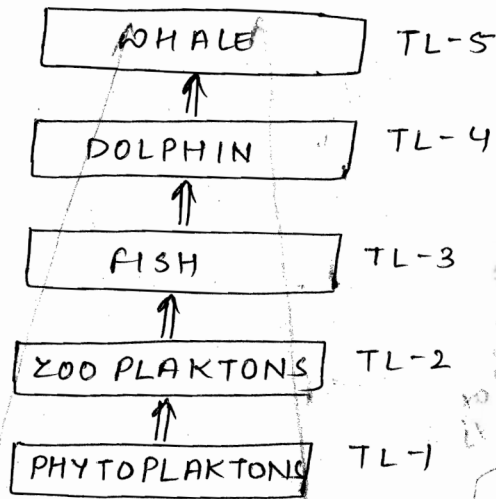
⇒ ZOO planktons  
floaters

animals

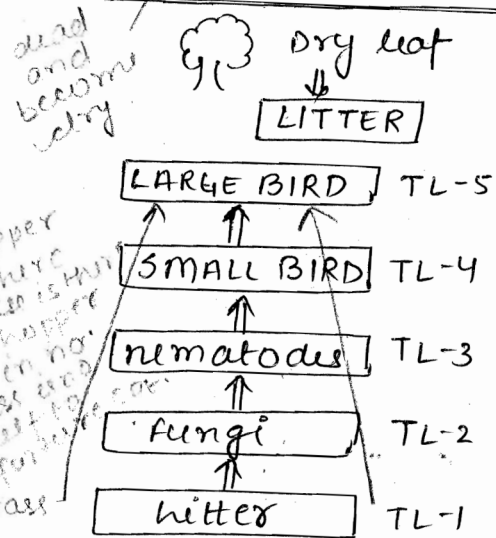
small

⇒ eg: crustaceans

## AQUATIC FOOD CHAIN

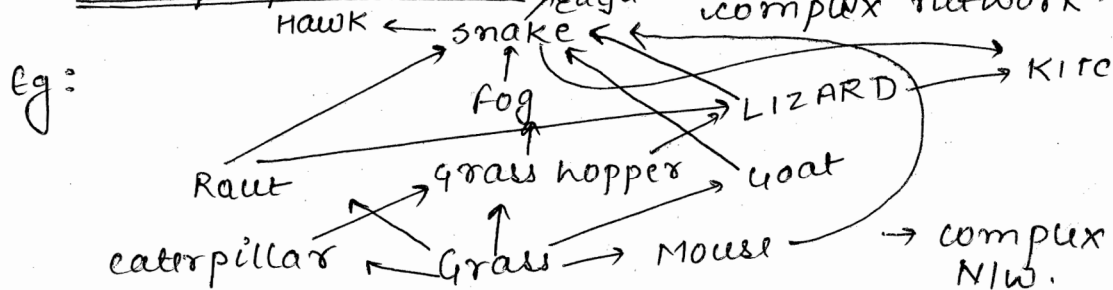


## Detritus food chain



- single food chain is less stable, more vulnerable, more weaker. because if suppose grass hopper is only there it will eat all the grass & no more grass is left to eat → hence less stable.

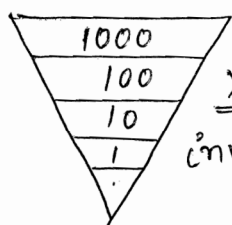
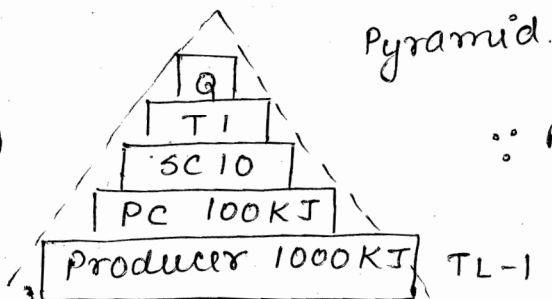
- Multiple food chain ⇒ intersecting each other ⇒ complex network.



- multiple food chains are called foodweb.
- they are highly diversity.
- they are more stable / strong / Resilient.
- single food chain → less stable.

## Energy pyramid:

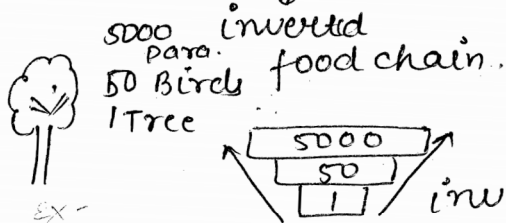
upright pyramid  
(not inverted)



Pyramid → Energy pyramid → always upright  
 weight of consuming animal increases → Number pyramid → generally upright  
 Biomass Pyramid → generally upright  
 (weight Kg) Ex up. (convert forest Bi (spindle))

② Number pyramid: parasitic food chain

\* Exemption → Inverted (parasitic) → small organism



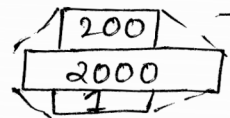
derive nutrients → take worm from the body of host → Round worm, leeches  
 eg- suppose 1 tree is there, 50 birds are sitting & taking 5000 organisms are eating by other and 50 birds.



\* Forest: Dominated by Trees.

\*  no. of herbivores is more eg: birds, goats  
 500 trees

20,000. Herbivores Birds / Insects / monkey / Deer.  
 200, carnivores (cheetah / leopard)



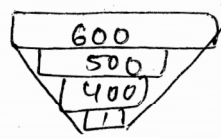
spindle shape  


Forest Bird Ecosystem.  
 number pyramid  
 middle is Broad  
 Top is narrow / Bottom narrow.

③ Biomass pyramid: Exemption → Aquatic food

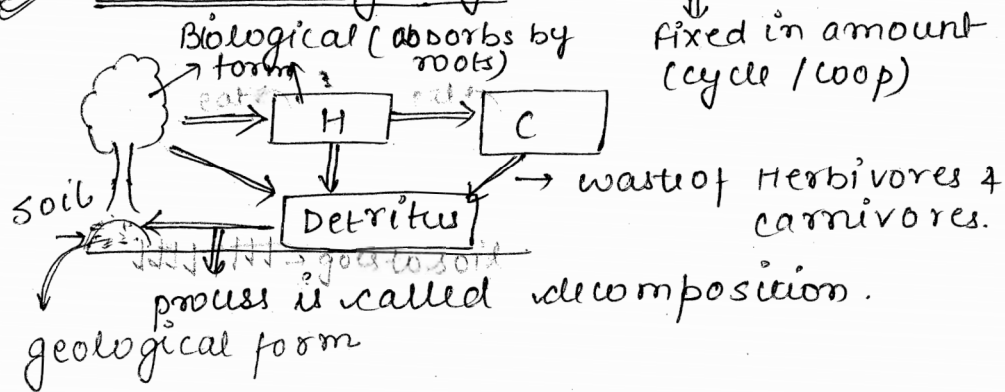
Phytoplanktons weight ↓ decrease.  
 Life span is less  
 has larger life span (24-3Y)  
 simple plants  
 Reproduction Rate ↑↑↑  
 less life span

zoo planktons  
 complex life  
 long life span



inverted pyramid  
 Bio-geo-chemical cycling

② Nutrient cycling:



## Nutrients:

- carbon
- water
- Nitrogen
- phosphorous
- sulphur

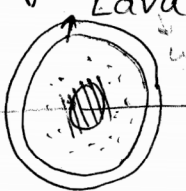
gaseous cycle

sedimentary cycle  
ROCK

Carbon cycle → gaseous cycle

$CO_2$

inside the earth called magma



volcanic eruption

MAGMA  
+  $CO_2$  / water vapour  
 $NH_3$

gases which are inside the earth comes with in the earth inside due to volcanic eruption because Magma has gaseous.

⇒ Releases  
⇒ absorbs.

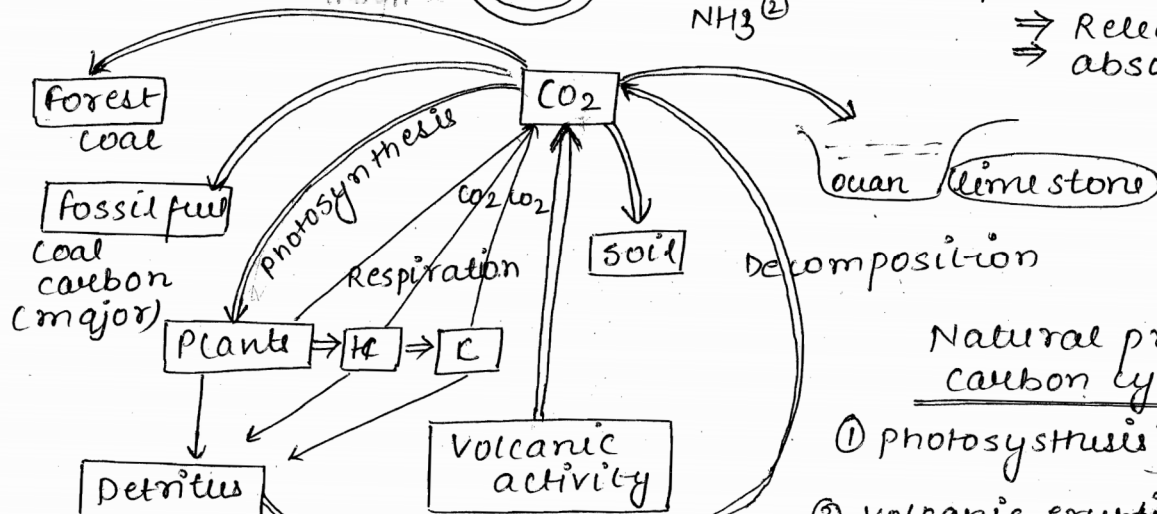


fig: carbon cycle

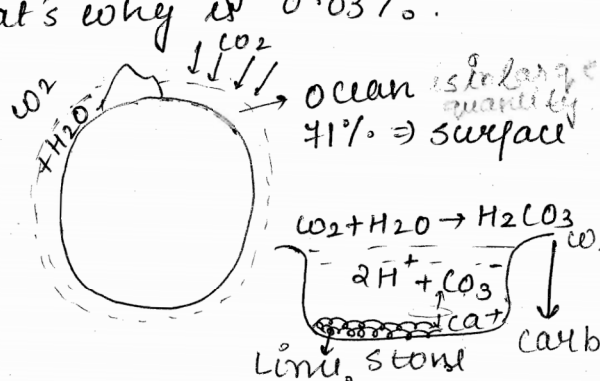
Natural process of carbon cycle:

- ① photosynthesis } carbon absorption
- ② volcanic eruption } Releases the  $CO_2$ .
- ③ Decomposition
- ④ Respiration

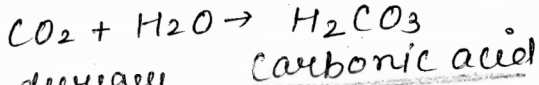
In atmosphere →  $N_2 = 78.08\%$ ,  $O_2 = 20.94\%$ , Ar = 0.93%.

$CO_2$  is absorbing somewhere else that's why is 0.03%.

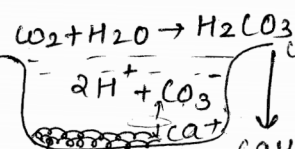
$CO_2 = 0.03\%$  → less



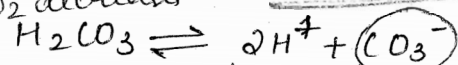
$CO_2$  will react with ocean in plenty (71%) so,



Carbonic acid

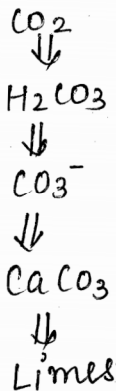


$CO_2$  decreases

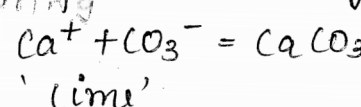


ocean acidification

animals in ocean → SHELL bearing animals



when these shell bearing animals died the decomposition of shell is very slow so it becomes lime



To protect them- self shell is made by animal

Oceans are major carbon sink.

in water calcium absorbing / storing the carbon

carbonic acid react with calcium & form  $CaCO_3$  Limestone Rock & absorbs  $CO_2$ .