


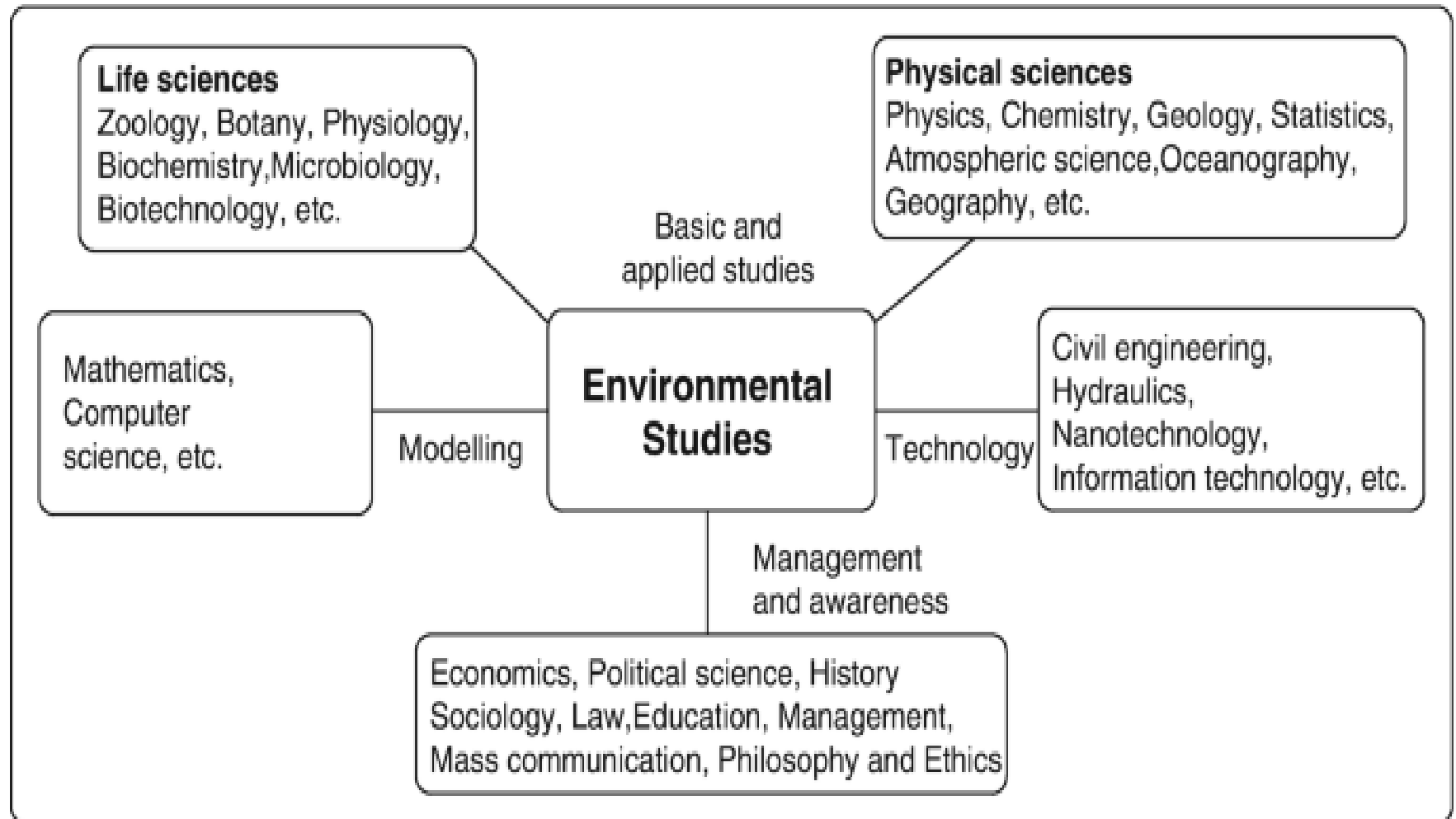
UNIT 1

ENVIRONMENT & ECOSYSTEM

French word **ENVIRONNER**  means encircle/surround

Environment as the sum total of water, air and land, their interrelationship among themselves and with the human beings, other living beings and property.

MULTIDISCIPLINARY NATURE



Objectives and Guiding Principles of Environmental Studies

According to UNESCO (1971), the objectives of environmental studies are-

- (a) Creating the awareness about environmental problems among people.**
- (b) Imparting basic knowledge about the environment and its allied problems.**
- (c) Developing an attitude of concern for the environment.**
- (d) Motivating public to participate in environment protection and environment improvement.**
- (e) Acquiring skills to help the concerned individuals in identifying and solving environmental problems.**
- (f) Striving to attain harmony with Nature.**

1. Natural / Global Environment

without interference of human beings / widely distributed

2. Anthropogenic / Manmade / Contained Environment

modified by human activities according to their need resulting in degradation / confined to a particular area or location.

Components of Environment

(i) Atmosphere

blanket of gases surrounding the earth

(ii) Hydrosphere

composed of various water bodies on the earth. It includes the oceans, lakes, rivers, etc.

(iii) Lithosphere

contains various types of soils and rocks on earth

(iv) Biosphere

composed of all living organisms and their interactions with rest of the environment, viz. atmosphere, lithosphere, and hydrosphere

Atmosphere is the protective thick gaseous mantle, surrounding the earth which sustains life on earth and saves it from unfriendly environment of outer space.

Characteristic Features

- 1. Atmos meaning, an envelope of gases include nitrogen, oxygen, argon, carbon dioxide, traces of carbon monoxide, oxides of nitrogen, sulphur and hydrocarbon, and very little amount of water vapour.**
- 2. It is mobile, elastic, compressible and expandable as made up of gases.**
- 3. The atmosphere protects the earth's biosphere by absorbing a major portion of the electromagnetic radiation and most of the cosmic rays. The atmosphere also absorbs infra-red radiation and thereby maintains the temperature of the earth at life sustaining levels.**

Structure of the Atmosphere (Miller's Profile)

Five Regions-

Troposphere: The upper boundary known as the tropopause
70 % of the atmosphere's mass
height from 10 -17 km above the equator
at the tropopause the temp is -55°C – 60°C

Stratosphere: The upper boundary known as the stratopause
extends from the tropopause to about 50 km
the top of the stratosphere may be near freezing
the O₃ molecule, present here, absorbs UV rays
shields life on earth from the effects of UV rays

Mesosphere: The upper boundary known as the mesopause
the height reaches upto 80 to 85 km
the mesopause is the coldest place
average temperature around -85°C

Thermosphere: The layer is also called ionosphere
extends upto 500- 700 km
the temperature is maximum, about 1200°C
atmospheric gases such as O₂ and nitric oxide
split into atoms and then undergo ionization

Exosphere: The uppermost layer of the atmosphere
extends up to a height of about 1600 km
gives way to interplanetary space

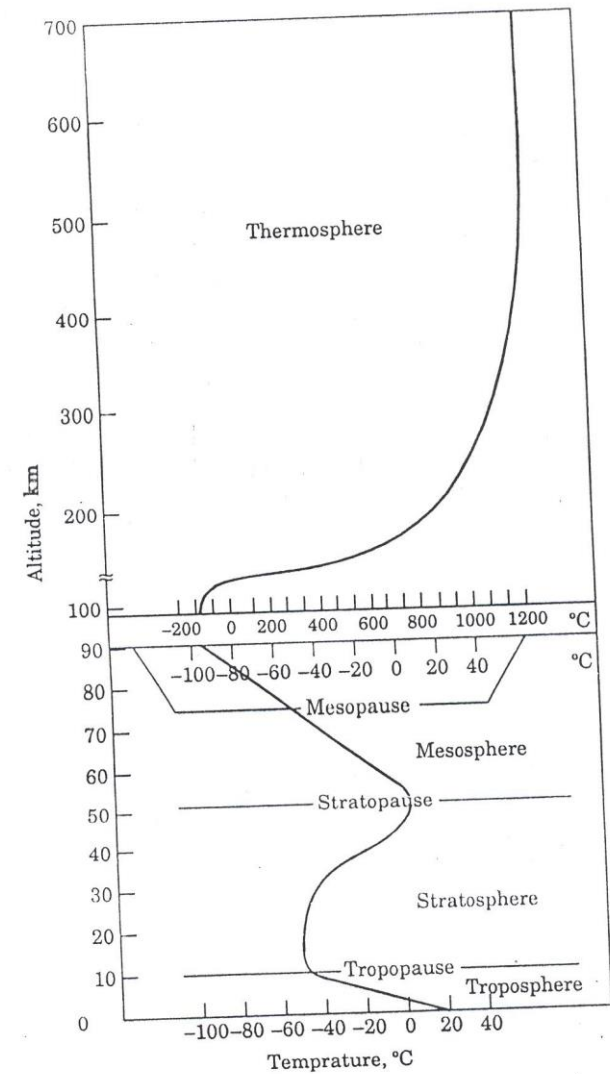
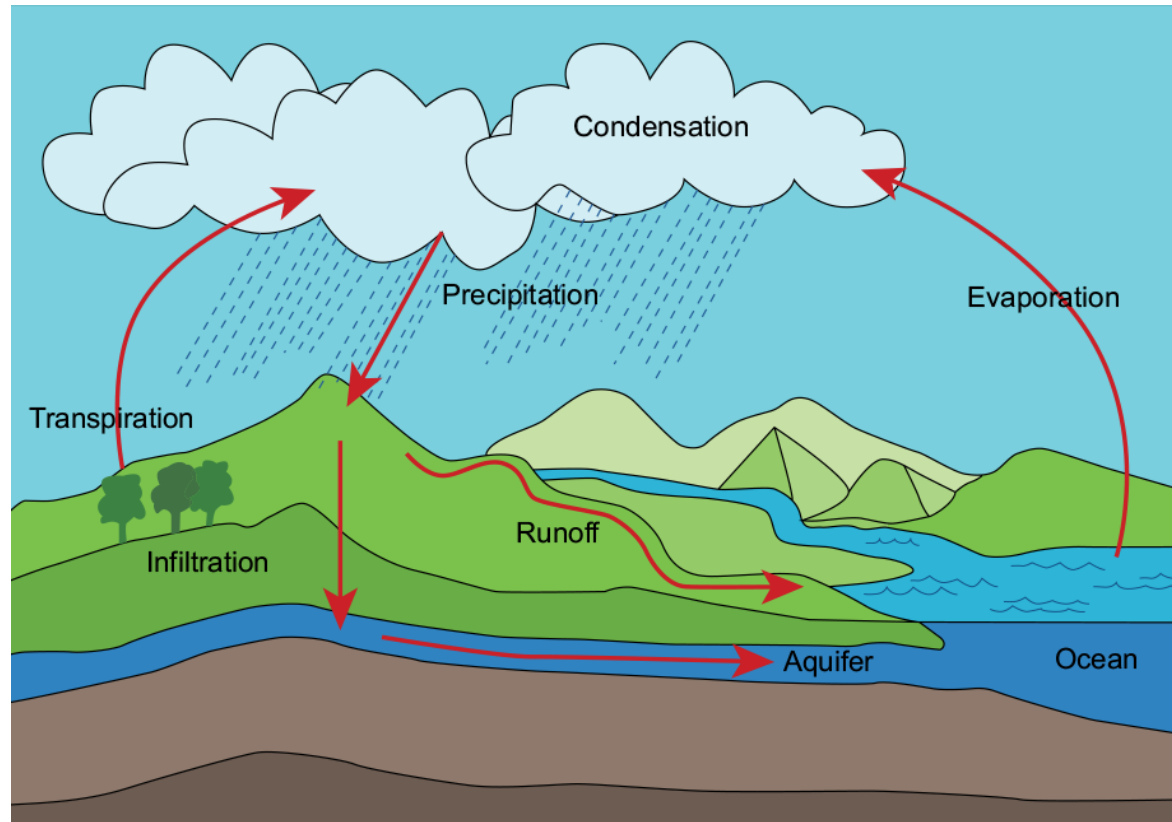
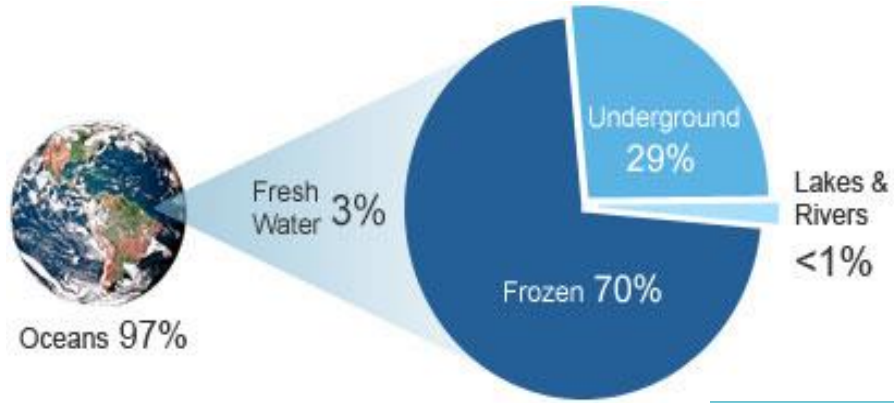
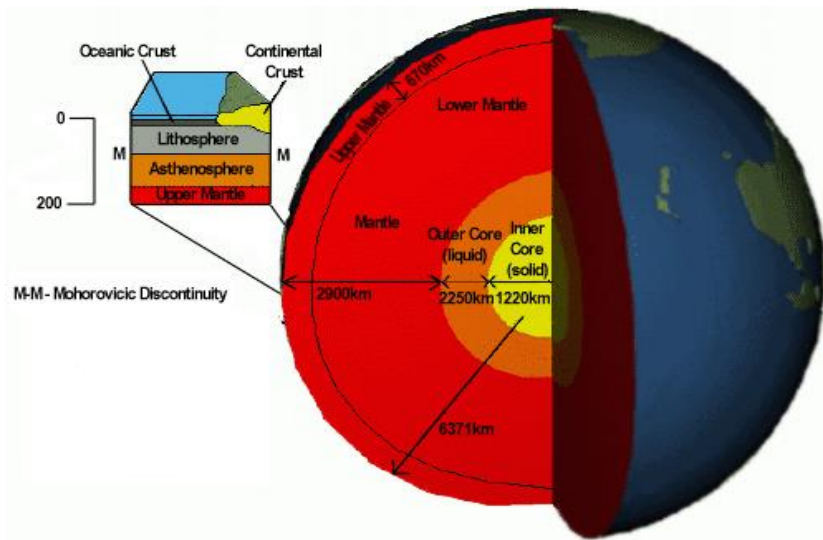


Fig. 1.1. : Temperature profile of the atmosphere (From Miller)

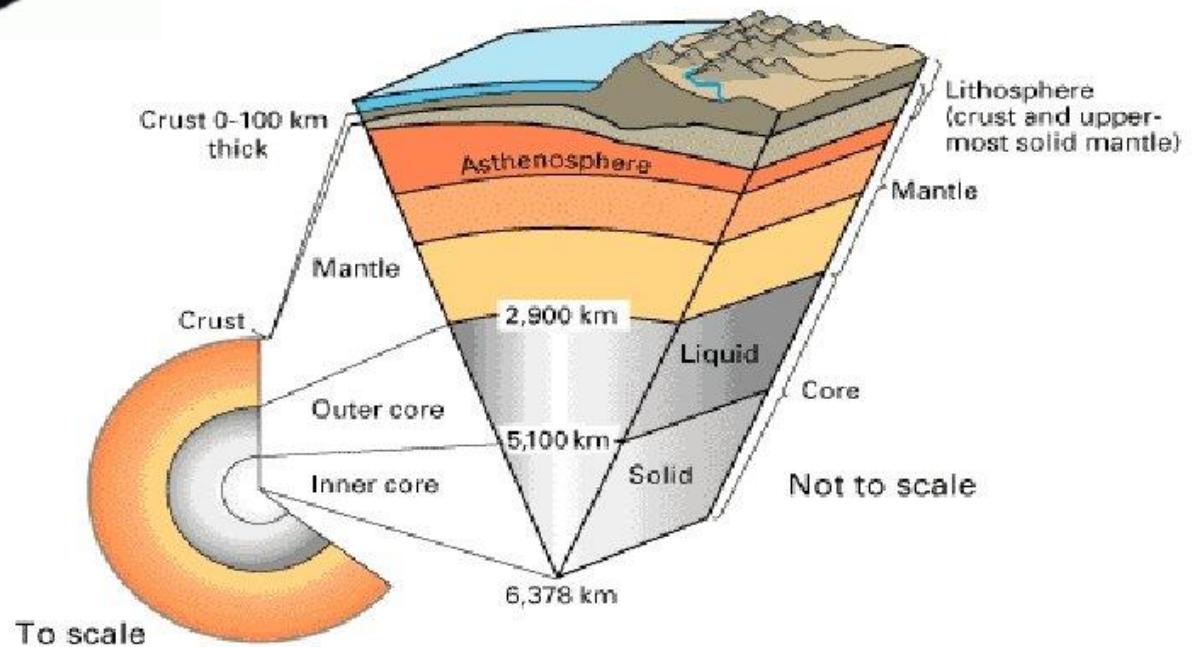
Hydrosphere- WATER (HYDROLOGICAL) CYCLE



Lithosphere

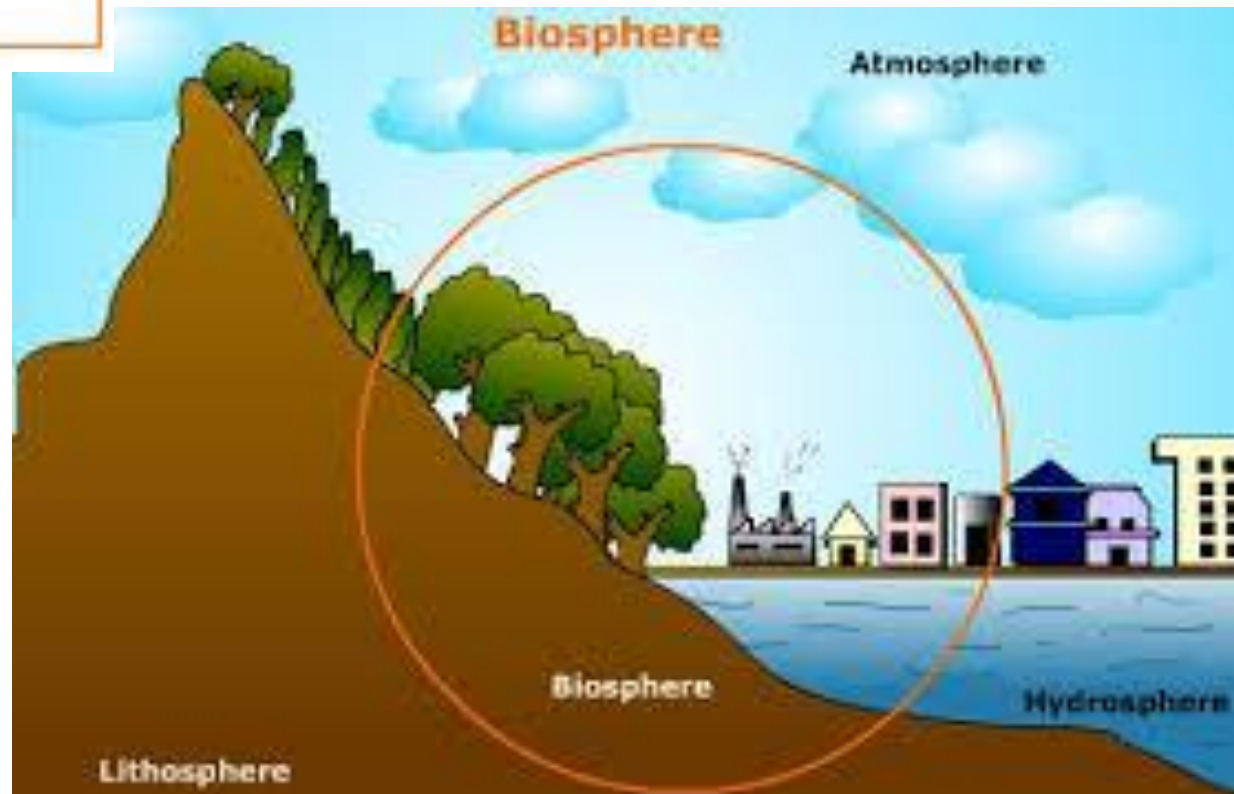
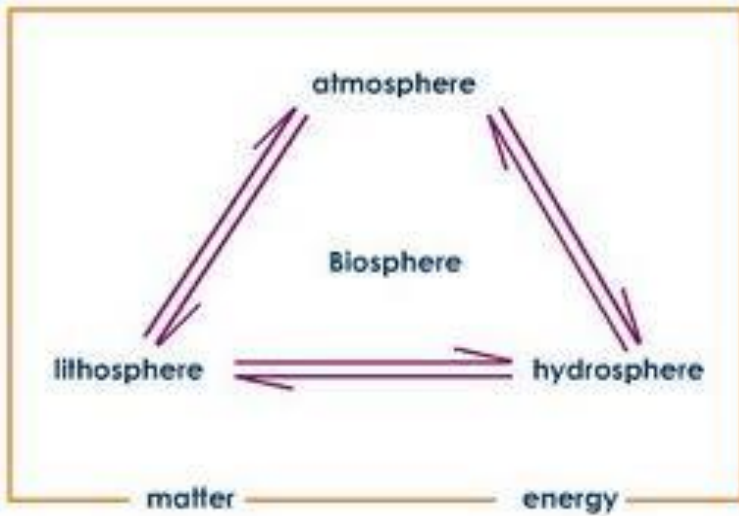


The Layers of the Earth



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Biosphere



Segments of Environment

PESTEL Analysis- Six segments of the general environment-

(1)Political

(2)Economic

(3)Social

(4)Technological

(5)Environmental

(6)Legal

- i) Conservation of natural resources**
- ii) Ecological aspects**
- iii) Pollution of the surrounding natural resources**
- iv) Controlling the pollution**
- v) Social issues connected to it**
- vi) Impacts of human population/activities on the environment**

Importance of Environment

- **Atmosphere-**

Contains Lifesaving gases- Oxygen, Carbon Dioxide, Nitrogen.
Protects from unfriendly environment of outer space.

- **Hydrosphere-**

Provides water for Domestic, Industrial and Agricultural uses

- **Lithosphere-**

Helps in establishment of organisms.
Provides mechanical support to grow

- **Biosphere-**

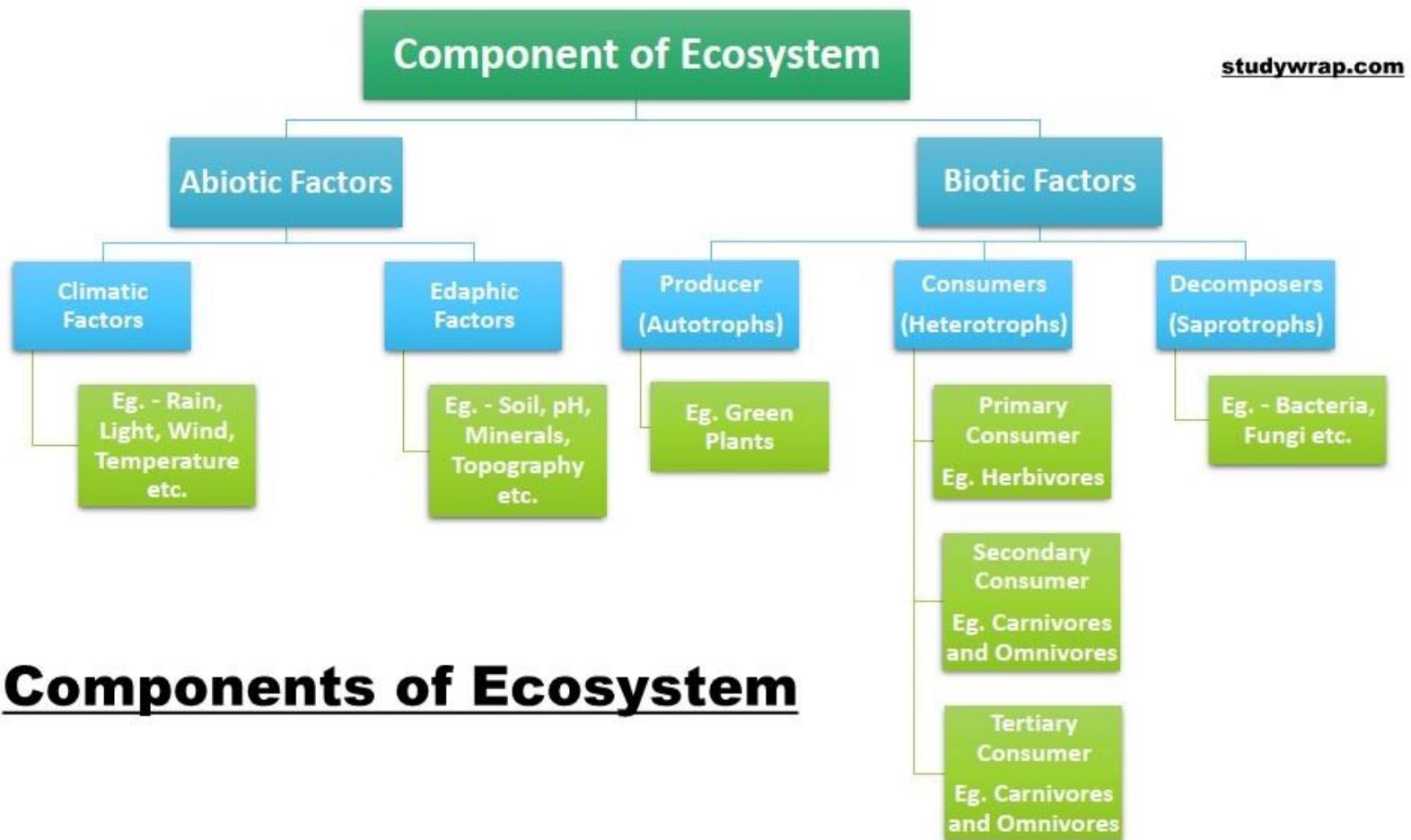
Our entire life support system is dependent on the well-being of all of the species living on earth.

This association is visible in food chains, food web and ecological pyramids which are following the rule of the nature- **“Let others Live and Live”**.

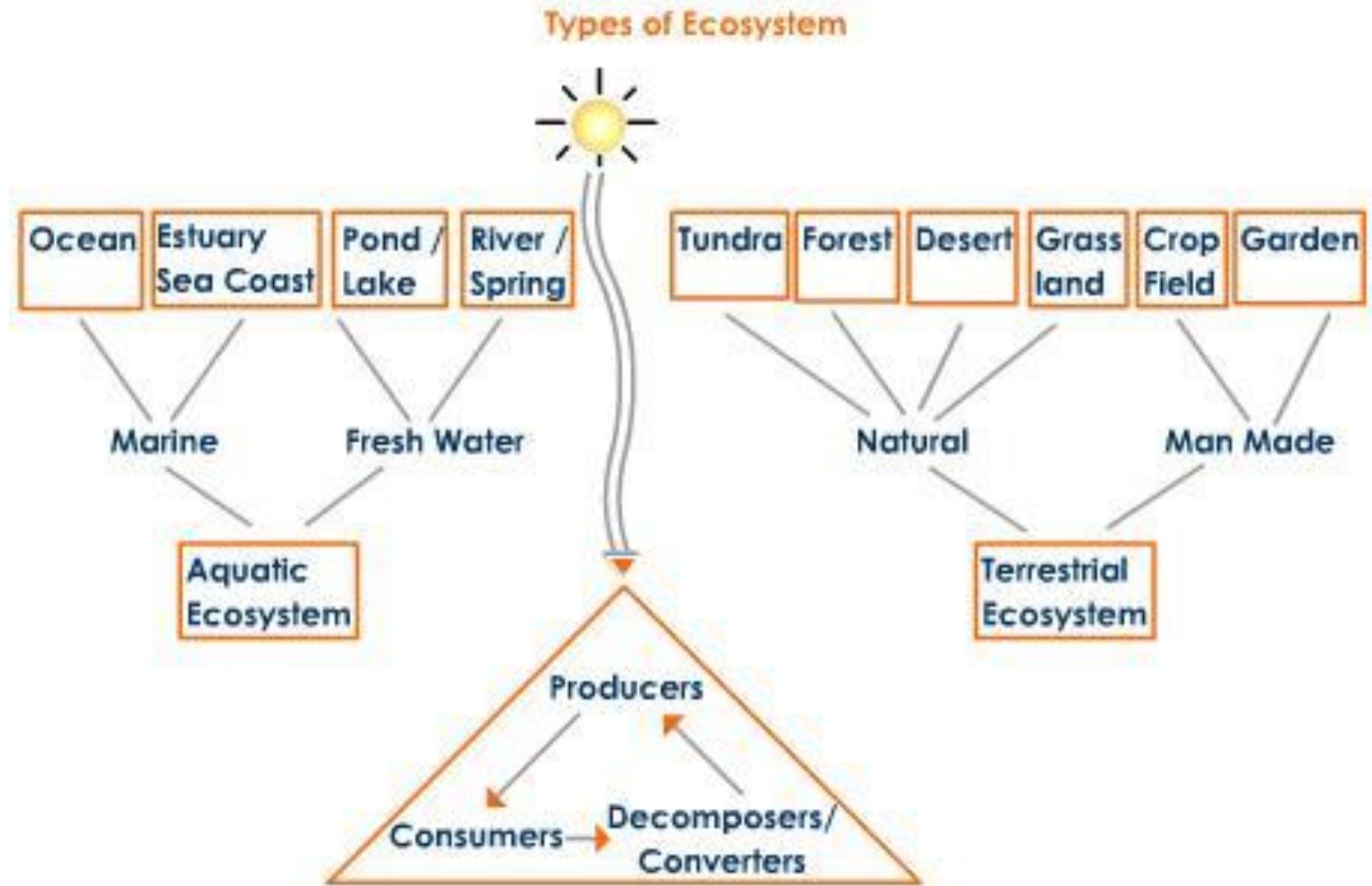
‘Ecology’ first proposed by the German biologist Ernst Haeckel in 1869.

‘Ecosystem’ first proposed by British Ecologist A.G. Tansley in 1935.

An ecosystem is a community of living organisms (plants, animals and microbes) in conjunction with the nonliving components of their environment (things like air, water and mineral soil), interacting as a system.



Types



The Earth's Giant Ecosystem

Forest Ecosystem

30% of area should be covered with forest. At present it is only 8-10%.

Abiotic Components-

Light conditions may vary due to complex stratification in plants.

Minerals are abundant.

Organic matter adds to the soil from debris and litter accumulation.

Biotic Components-

Producers- Much species diversity mainly trees or shrubs. *Shorea robusta*, *Tectona grandis*, *Thuja*, *Juniperous*

Consumers-

Primary- Ants, Flies, Bugs, Spiders (on leaves): Elephant, Deer, Squirrel (leaves, Fruits)

Secondary- Snakes, Birds, Lizards, Wolf

Tertiary- Lion, Tiger

Decomposer-

Fungi- *Aspergillus*, *Ganoderma*, *Fusrium*

Bacteria- *Bacillus*, *Clostridium*

Actinomycetes- *Streptomyces*

Desert Ecosystem

17% of total land area is desert. Extremely low rainfall, dry condition so vegetation is scarce.

Abiotic Components-

Temperature very high, low rainfall.

Nutrient recycling is poor due to scanty biota.

Biotic Components-

Producers- Grassy shrubs and few thorny trees.

Cactus, Lichen, Mosses.

Consumers- Insects, Reptiles, Birds, Camel.

Decomposer- very few Fungi, Bacteria.

Lentic (Pond/Lake Ecosystem)

Abiotic Components- Chemicals especially in dissolved state. Climate suitable.

Biotic Components-

Producers-

Phytoplanktons- *Ulothrix, Spirogyra, Volvox, Anabaena*

Macrophytes- *Hydrilla, Utricularis, Azolla, Lemna.*

Consumers-

Primary- Zooplanktons, Annelids, Molluscs.

Secondary- Insects, Fishes

Tertiary- Large Fishes

Decomposers- Fungi, Bacteria, Actinomycetes

Abiotic Components- Combination of fresh and marine ecosystem (brackish water ecosystem). Most productive ecosystem.

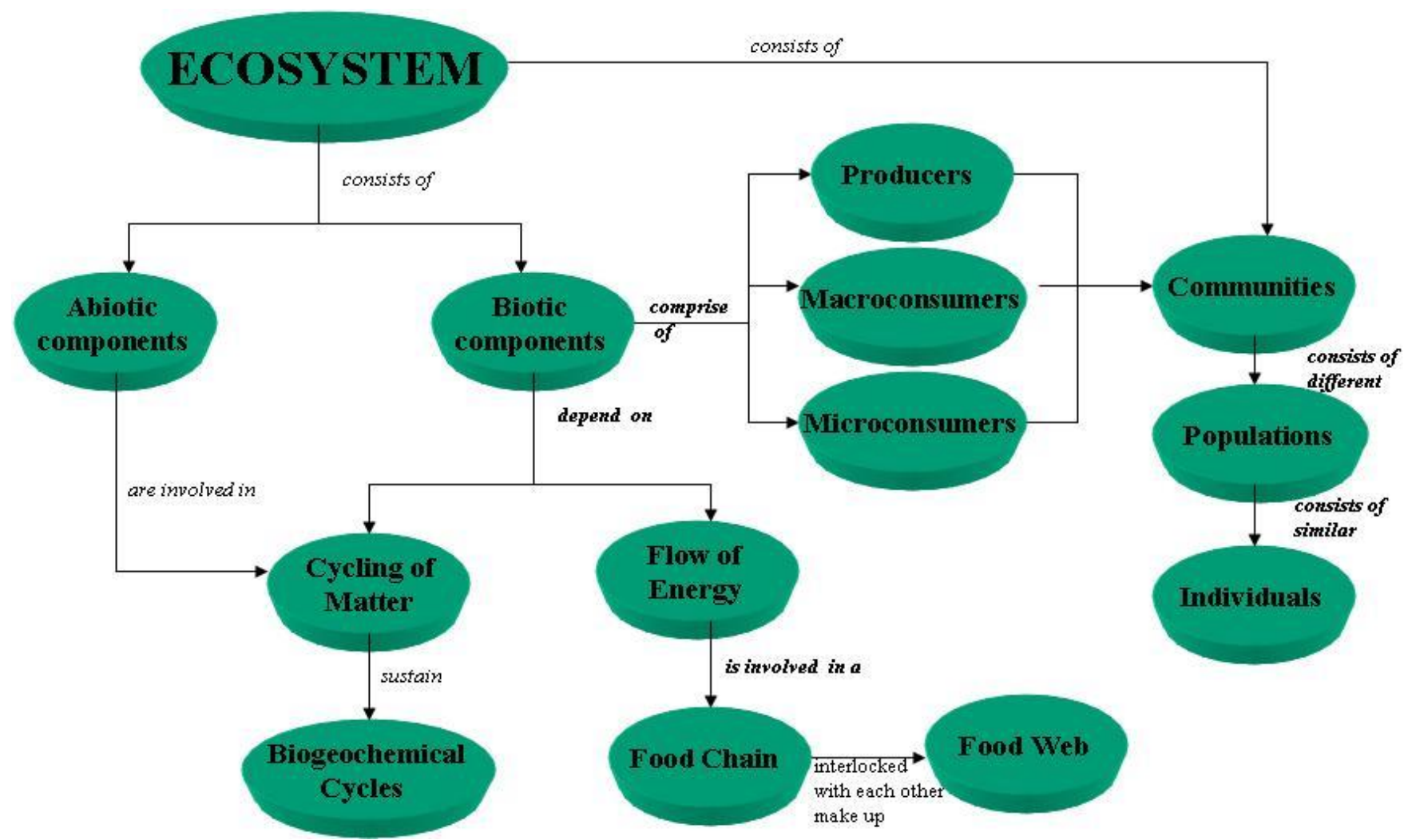
Biotic Components-

Producers- Sea grasses, Sea Weeds, Phytoplanktons, Algae

Consumers- Oysters, Crabs, Fishes.

Decomposer- Fungi, Bacteria, Actinomycetes

Structure of Ecosystem



Food Chains

Three important types of Food chains-

1. Grazing food chain-

Terrestrial

Grasses → Grasshopper → Frog → Snake → Hawk

Aquatic

Phytoplanktons → Zooplanktons → Fish → Crane → Hawk

2. Detritus Food Chain-

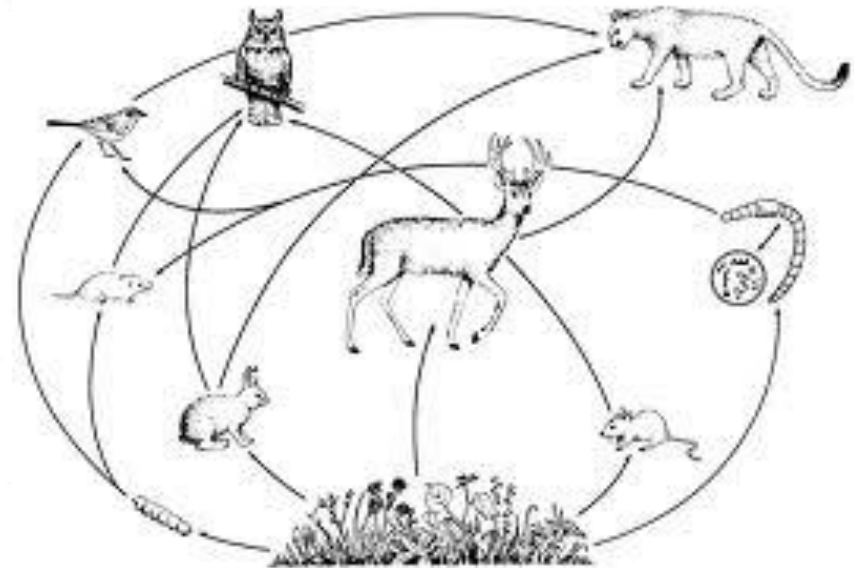
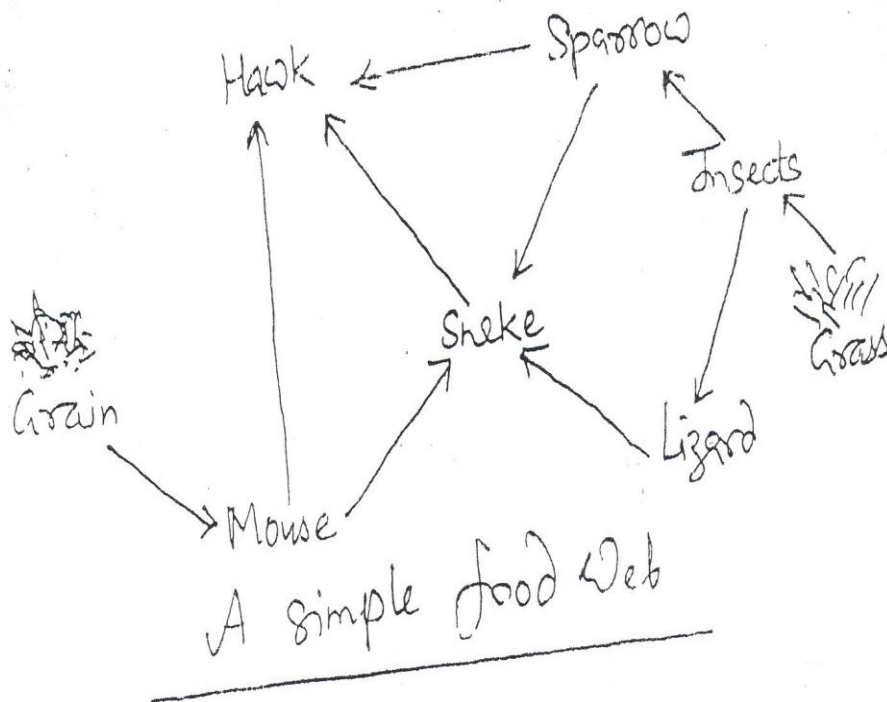
Detritus → Microorganisms → Crabs and Shrimps → Small Fishes → Large Fishes

3. Parasitic Food Chain

Tree → Birds → Insects/Mites → Microorganisms

Food Web

A network of food chains which are interconnected at various trophic levels, so as to form a number of feeding connections amongst different organisms of a biotic community is called food web.



Graphical presentation of various trophic levels in successive manner, one after another.

Three shapes are possible-

- ⌚ Straight or Upright Pyramids ▲
- ⌚ Inverted Pyramids ▼
- ⌚ Rhomboidal Pyramids
(Partially Inverted, Partially Upright)

Pyramids may be of 3 types-

1. Pyramids of Numbers
2. Pyramids of Biomass
3. Pyramids of Energy

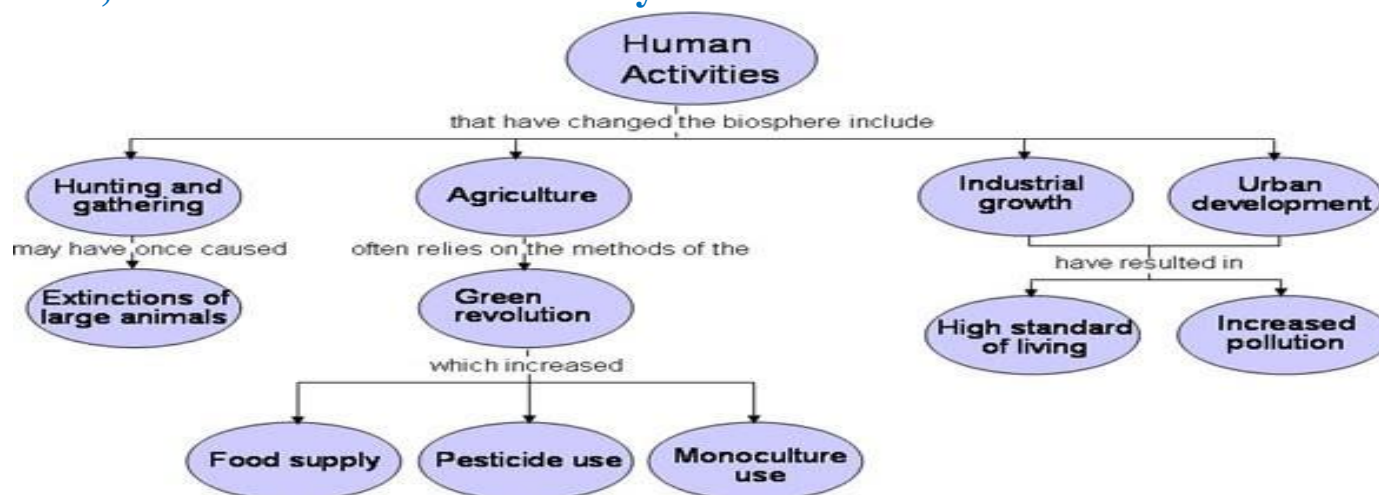
	Pyramid of Number	Pyramid of Biomass	Pyramid of Energy
Ecosystems ↓			
Grassland	Upright ▲	Upright ▲	Always Upright ▲
Forest	Rhomboidal (Partially Inverted, Partially Upright)	Upright ▲	
Pond	Upright ▲	Inverted ▼	
Parasitic	Inverted ▼	Upright ▲	

Ecosystem which ensures survival of man with a reasonably good quality of life supporting sustainable development. It satisfies following conditions-

- **The population of the any species is limited to the available food resource potential.**
- **The species diversity is adequate for the efficient recycling of materials in the ecosystem.**
- **The pollution loads do not exceed the self-purification capacity of the system.**
- **The energy consumption system is minimized and dependent on renewable sources of energy.**
- **The system is capable of continuing indefinitely without heading up towards the dead end.**
- **The system dynamics proceeds towards new evolutionary trends without losing stability.**

Effects of Human Activities on Environment

Effects of Human Activities such as Food, Shelter, Housing, Agriculture, Industry, Mining, Transportation, Economic and Social security



Negative impacts of humans on the environment

Impacts	Details
Overpopulation and overconsumption	<ul style="list-style-type: none">- Decrease in finite resources- Increase in waste- Decrease Earth sustainable productivity
Pollution	<ul style="list-style-type: none">- Health problems- Death (humans/wildlife/plants)- Dead zones in oceans- Acid rain: ruin infrastructure and monuments, decrease crop yields, increase health problems, changes pH of water- Ocean acidification: creates carbonic acid, prevents formation of shells
Global warming and climate change	<ul style="list-style-type: none">- Increase greenhouse effect, Warms oceans, Melts glaciers and ice sheets, Glacial retreat, Decreased snow cover, Increased frequency of extreme events, Sea level rise
Agriculture and gene modification	<ul style="list-style-type: none">- Point source pollution, excessive use of water, stream modification, use of pesticides, clearance of forests, grazing, release of greenhouse gases- Unexpected outcomes of gene modification- Choke crops
Deforestation and land degradation	<ul style="list-style-type: none">- Loss in biodiversity- Wildlife damage human settlement- Increased greenhouse effect- Decreased air filtering

Environment Impact Assessment (EIA)

UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers.

The EIA process-The eight steps of the EIA process are-

1. **Screening**
2. **Scoping**
3. **Impact analysis**
4. **Mitigation**
5. **Reporting**
6. **Review of EIA**
7. **Decision-making**
8. **Post monitoring**

Advantages of EIA

- Reduced cost and time of project implementation and design
- Avoided treatment costs and impacts of laws and regulations
- Lays base for environmentally sound projects
- Greater awareness of environmental legislation
- Protection of Environment
- Optimum utilization of resources
- Informs decision makers
- critical component of India's environmental decision-making process
- It acts as a detailed study of the potential impacts of proposed projects
- It helps in predicting environmental impacts at an early stage in project planning and design
- Based on these reports, the Environment Ministry or other relevant regulatory bodies may or may not grant approval to a project
- The EIA reports are also important to define measures that the project could take in order to contain or offset project impacts
- EIA-based approvals for most projects also involve the process of conducting public hearings, so that who are likely to be affected can be taken on board before approving the project
- EIA links environment with development
- The goal is to ensure environmentally safe and sustainable development

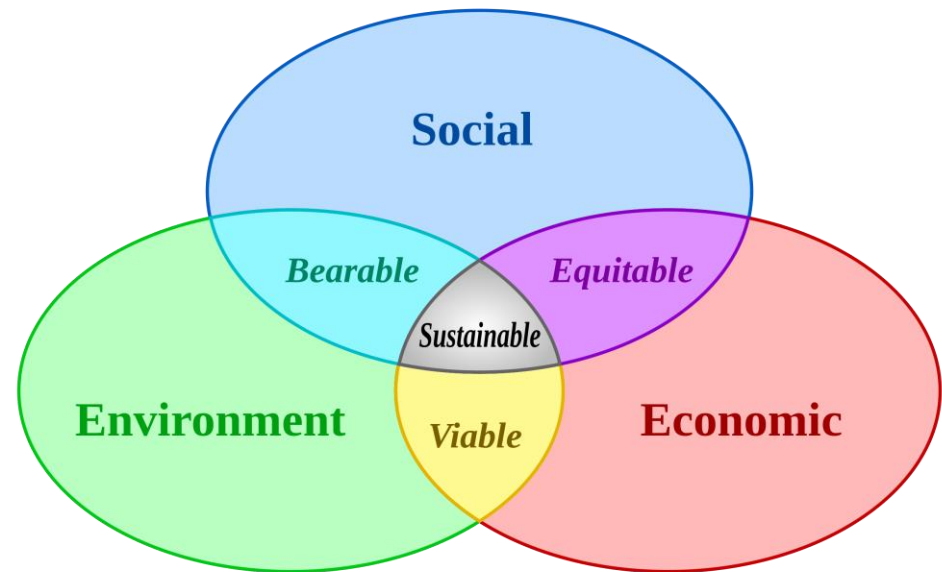
Limitations of EIA

- Time-consuming
- Little public participation in actual implementation
- Sometimes too focused on the scientific analysis
- Compliance monitoring after EIA is seldom carried out
- Impact assessment processes are in place and applied in many countries, yet biodiversity is often inadequately addressed
- There is a growing recognition of the need to better reflect biodiversity considerations in environmental impact assessments and strategic environmental

Sustainable development can be defined as an approach to the economic development of a country without compromising with the quality of the environment for future generations.

Sustainable Development Goals

- To promote the kind of development that minimizes environmental problems.
- To meet the needs of the existing generation without compromising with the quality of the environment for future generations.



Achieving Sustainable Development

- It can be achieved by restricting human activities.
- Technological development should be input effective and not input utilising.
- The rate of consumption should not surpass the rate of salvation.
- For renewable resources, the rate of consumption should not surpass the rate of production of renewable substitutes.
- All types of pollution should be minimized.
- It can be achieved by sensible use of natural resources.

Few Examples of Sustainable Development are-

- ❑ Wind energy
- ❑ Solar energy
- ❑ Crop rotation
- ❑ Sustainable construction
- ❑ Efficient water fixtures
- ❑ Green space
- ❑ Sustainable forestry



Definition

“Social security is the protection which society provides for its members through a series of public measure, against the economic and social distress that otherwise would be caused by the substantial stoppage of earning resulting from :- sickness , maternity ,injury , unemployment, old age and death.



Need of Social Security

- Protects not just the subscriber but also his/her entire family by giving benefit packages in financial security and health care.
- **Acts as a facilitator** - helps people to plan their own future through insurance and assistance.
- **For a worker/employee-** a source of Social Security protection for himself and his family.
- **An employer-** responsible for providing adequate social security coverage to all your workers.



Methods

Social insurance scheme protects an individual from falling to the depths of poverty and nursery

Social assistance is one of the device according to which benefits are given as a legal right to workers who are eligible for such assistance.

Social Assistance

➤ A method to provide benefits to persons usually of small means in amounts sufficient to meet a minimum standards of living from general revenues of the state.

➤ Non contributory

➤ For the vulnerable groups of the community (children, mothers, invalids, aged people, disabled)

➤ Cannot be claimed as a matter of right (Provided)

Social Insurance

➤ A method to provide benefits as a matter of right for persons of small earnings, in amounts which combine the contributions of the beneficiaries with subsidies from the employer and the state

➤ Contributory

➤ For the well-organized, legally regulated, financially stable community.

➤ Can be claimed as a matter of right



Schemes in India

Prevention

Promotion

Protection



Preventive Schemes

:

Preventive Schemes are

- ❖ aimed at risk prevention.
- ❖ In the strategy of social management of risks, preventive approach tries to prevent poverty
- ❖ helps people under below poverty line to come above poverty line.
- ❖ Preventive health care, vaccinations against diseases forms part of the preventive strategies. Majority of the schemes are of social assistance in nature.



Promotional Schemes

:

Promotional social security schemes are mainly means of tested Social Assistance type to guarantee minimum standards of living to vulnerable groups of population

The Governments at the State and Centre draft schemes financed from the general revenues of the Government.

These are the strategies of risk mitigation.

These guarantee: Food and Nutritional Security ,Employment security ,Health Security ,Education Security Women Security



Examples of schemes in the Promotional Social Security

:

Food for work

Jawahar Rojgar Yojana

Rural Landless Laborers Employment Guarantee Schemes Programmes of Integrated Rural Development Project Drought prone area Programmes

Sakshara

Integrated Child Development Scheme (ICDS)

Public Distribution System

Reservations for the disabled in services

Special educational institutions for the disabled persons etc.



Protective Social Security Programmes

:

The protective social security programmes help the poor in removing/reducing contingent poverty. In India, the protective social security programmes have been designed to address the contingent poverty or the contingencies defined by the ILO. These programmes take care of , Old-age income needs (Old age pension) Survival benefits (Provident Funds) Medical need of insured families (Medical Insurance) Widow and children/dependant economic needs (Widow/Children/orphan, and dependent pension) Maternity benefits Compensation for loss of employment and Work injury benefits.



Protective Social Security Programmes

:

The benefits are extended only to working population majority of whom are in the organized sector through legislations like:

Workmen's Compensation Act, 1923

Employees State Insurance Act, 1948

Employees Provident Fund and

Miscellaneous Provisions Act, 1952

Maternity Benefits Act, 1961

Payment of Gratuity Act, 1972



Advantages and Disadvantages

Advantages-

- ❖ help to make people capable of earning an income and to increase their productive potential;
- ❖ help to maintain effective demand at the national level; and help create conditions in which a market economy can flourish,
- ❖ by encouraging workers to accept innovation and change.

Disadvantages-

- ❖ discourages people from working and saving
- ❖ reduce international competitiveness and employment creation, and
- ❖ encourages people to withdraw from the labor market prematurely.

FOOD SECURITY

Food security means availability, accessibility and affordability of food to all people at all times.

Food security

Food security has the following dimensions

- (a) availability of food means food production within the country, food imports and the previous year's stock stored in government granaries.
- (b) accessibility means food is within reach of every person.
- (c) affordability implies that an individual has enough money to buy sufficient, safe and nutritious food to meet one's dietary needs.

Food security is ensured in a country only if

- (1) enough food is available for all the persons
- (2) all persons have the capacity to buy food of acceptable quality
- (3) there is no barrier on access to food.

Need of security

During natural calamity such as drought, production of food grains get decreased, creating a shortage of food in the affected areas.

The prices get increased due to shortage of food. People cannot afford to buy food and if such a calamity happens in a very wide spread area or is stretched over a longer time period, it might cause a situation of starvation.

Massive starvation might take a turn into a famine. A Famine is characterised by widespread deaths due to starvation and epidemics caused by forced use of contaminated water or decaying food and loss of body resistance due to weakening from starvation.

Who are food-insecure?

In India, a large section of people suffers from food and nutrition insecurity. People having little or no land, traditional artisans, petty self-employed workers and destitute including beggars are the worst affected groups.

In the urban areas, the food-insecure families are those who are generally employed in ill-paid occupations and the casual labour market. These workers are largely engaged in seasonal activities and are paid very low wages.

The social composition along with the inability to buy food also plays a role in food insecurity. People who have either poor land-base or very low land productivity are prone to food insecurity.

People affected by natural disasters, who migrate to other areas in search of work, are among the most food-insecure people. A large proportion of pregnant and nursing mothers and children under the age of 5 years constitute an important segment of the food insecure population.

Another aspect of food insecurity is hunger, which is not just an expression of poverty, it brings about poverty. Hunger has chronic and seasonal dimensions. Chronic hunger is a consequence of diets persistently inadequate in terms of quantity and/or quality. Seasonal hunger is related to cycles of food growing and harvesting.

India is aiming at self-sufficiency in food grains. After Independence, Indian policymakers adopted all measures to achieve self-sufficiency in food grains. In the field of agriculture, India adopted a new strategy, which resulted in the ‘Green Revolution’

Food Security in India

Since the Green Revolution, the country has avoided famine even during adverse weather conditions. India has become self-sufficient in food grains during the last 30 years because of a variety of crops grown all over the country. The availability of food grains has been ensured with a carefully designed food security system by the government.

This system has two components:

- (a) buffer stock,
- (b) public distribution system.

Buffer stock

Buffer Stock is the stock of food grains, namely wheat and rice, procured by the government through the Food Corporation of India (FCI).

The stock of wheat and rice are purchased by the FCI from the farmers where there is surplus production.

The farmers are paid a pre announced price for their crops, called Minimum Support Price (MSP).

Every year, the MSP is declared by the government before the sowing season to provide incentives to farmers for raising the production of these crops.

Buffer Stock is created to distribute foodgrains in the deficit areas and among the poorer section of the society at a price lower than the market price also known as Issue Price.

Public Distribution System

FCI distributes the food procured from the farmer through government-regulated ration shops. It is called the Public Distribution System (PDS). Ration shops also, known as Fair Price Shops, keep stock of food grains, sugar, and kerosene for cooking. Rationing in India was introduced during the 1940s against the backdrop of the Bengal famine. In the mid-1970s, three important food intervention programmes were introduced:

1. Public Distribution System (PDS) for food grains
2. Integrated Child Development Services (ICDS) a
3. Food-for-Work (FFW).

At present, there are several Poverty Alleviation Programmes (PAPs), mostly in rural areas, which have an explicit food component also. Employment programmes greatly contribute to food security by increasing the income of the poor.

Current Status of Public the Distribution System

Public Distribution System (PDS) is the most important step taken by the Government of India towards ensuring food security. In 1992, Revamped Public Distribution System (RPDS) was introduced in the country. From June 1997, Targeted Public Distribution System (TPDS) was introduced to adopt the principle of targeting the 'poor in all areas'. In 2000, two special schemes were launched Antyodaya Anna Yojana (AAY) and Annapurna Scheme (APS). Over the year, the PDS proved to be the most effective instrument of government policy in stabilising prices and making food available to consumers at affordable prices.

Role of cooperatives in food security

In India, the cooperatives are also playing an important role in food security especially in the southern and western parts of the country. The cooperative societies set up shops to sell low priced goods to poor people. Some of the examples of cooperative societies are Mother Dairy in Delhi, Amul from Gujarat, Academy of Development Science (ADS) in Maharashtra.

Balanced Diet

A balanced diet is one that contains all of the essential elements that the human body needs. Carbohydrates, lipids, vitamins, minerals, proteins, fiber and water are all essential components in a well-balanced diet. A nutritious, well-balanced diet lowers the risk of disease and enhances general health.

Malnutrition

Malnutrition can mean undernutrition or overnutrition. It can also mean an imbalance of macronutrients (proteins, carbohydrates, fats) or micronutrients (vitamins and minerals). Undernutrition is characterized by a lack of nutrients and insufficient energy supply, whereas overnutrition is characterized by excessive nutrient and energy intake.

Shelter is basic need of life not only for humans but also for animals. Shelter provides security from harsh environment conditions and also from dangerous animals.

Shelter: Primary Need of Life

Shelter is one of the key elements of survival along with food and water. Birds, animals, insects, humans, and all other organisms need shelter to survive. Shelter provides protection from weather and any other kind of danger. Shelter can be terrestrial, grassland, temperate, tropical, aquatic etc.

Shelter can be classified into:

1. Permanent Shelter: These are the places where human or animal lives for very longer duration e.g. houses, caves, nest of birds etc. Permanent place are made up of cement and bricks and they are strong in structure.

2. Temporary Shelter: These are the place where animals and humans live only for short duration and for any specific purpose. e.g. bus shelters, house boats, migratory birds' nest at different place, tent houses, caravan, shelter home etc.

Despite the absence of a specific legislation on the human right to adequate housing in India, the courts have interpreted Article 21 in the Constitution of India to include the right to housing as an integral part of the right to life.

Need of Shelter Security:

1. Shelter security is an issue of great concern, since the number of homeless people worldwide has grown considerably in recent years.
2. With increasing population, there is also increasing pressure on finite land resources for housing.
3. Fast depletion of natural resources, shrinking land, rising pollution levels and associated health problems have forced us to re-look at the structure and design of buildings by introducing environmental approach to buildings.

Bio-magnification

- Bio-magnification stands for Biological Magnification, which refers to the growth of harmful compounds in food chains.
- Heavy metals such as mercury and arsenic, pesticides such as DDT and polychlorinated biphenyls (PCBs) are among the contaminants that are taken up by organisms as a result of the food they eat.
- These toxic compounds then accumulate within the cells of the organism. The build-up of toxic substances in the tissue of a certain organism is known as **bio-accumulation**.
- As these compounds are slowly eliminated or metabolized/broken down, their concentration in organisms increases as they go up the food chain.
- This usually happens throughout a food chain and affects all creatures, but animals higher up the food chain are more affected.

Example of Bio-magnification

1. Entry of Toxins Into Phytoplanktons

Small plants that float in the sea and absorb pollutants are known as phytoplankton. Toxins are absorbed and remain in their body's tissues without being eliminated or broken down. Toxins accumulate in high quantities of up to 200 parts per trillion over time, representing a fourfold increase in toxin accumulation.

2. Entry of Toxins Into Zooplanktons

Small marine invertebrates that float in the seas are referred to as zooplankton. They eat the phytoplankton and absorb the poison as a result. Toxins are trapped in the tissue of the organism and are not eliminated or broken down. The toxin concentration rises to two parts per billion over time, which is a ten-fold increase over the prior concentration.

3. Consumption of Zooplanktons by Small Fish

When little fish consume zooplanktons, they absorb the poisons. They are then absorbed into their fatty tissues. As a result, buildup develops, resulting in concentrations of around 20 parts per billion, a ten-fold increase.

4. Consumption of Small Fish by Larger Ones

When giant fish graze on smaller fish for nourishment, the poisons that build in their fatty tissues are consumed. The concentrations increase until they reach 80 to 100 parts per billion. The hazardous levels have increased by four to five times.

5. Organisms on Top of the Food Chain

When enormous fish are consumed, the species at the top of the food chain, such as dolphins, sea birds, and humans, gradually accumulate poisons in their tissues, such as their liver. The concentrations reach the highest ranges of 10,000 to 15,000 parts per billion in this area. Since the effects interfere with the normal functioning of essential organs, the animals' fertility is affected, and they are more susceptible to effects.

Effects of Bio-magnification

1. Impact on Human Health

- Mercury, cadmium, lead, cobalt, chromium, and other chemicals make people more susceptible to cancer, liver and kidney failure, respiratory illnesses, birth defects in pregnant women, brain damage, and heart disease and even death.
- Consumption of mercury and polycyclic aromatic hydrocarbon-tainted seafood, for example, has been linked to ailments like hepatitis and cancer (PAHs).

2. Effects on Reproduction and Development of Marine Creatures

- The accumulation of hazardous substances and elements in the critical organs of aquatic species has an impact on their reproduction and growth.
- Seabird eggs, for example, have thinner shells than typical, which can lead to the birds breaking their eggs rather than incubating them.
- Selenium and other heavy metals, such as mercury, have a negative impact on fish reproduction by destroying their reproductive organs.

3. Destruction of the Coral Reefs

- Cyanide, which is used in gold leaching and fishing, destroys coral reefs. Various sea creatures use the reefs as spawning, feeding, and living grounds and thus get damaged.

