

# ENVIRONMENTAL STUDIES (CCC-704)



**Dr. Prem Chandra Pandey**  
*(UoL United Kingdom)*  
**Assistant Professor**  
**Department of Life Sciences**  
**School of Natural Sciences**  
**Shiv Nadar Institution of Eminence (Deemed to be University)**  
**Email:** [prem.pandey@snu.edu.in](mailto:prem.pandey@snu.edu.in)



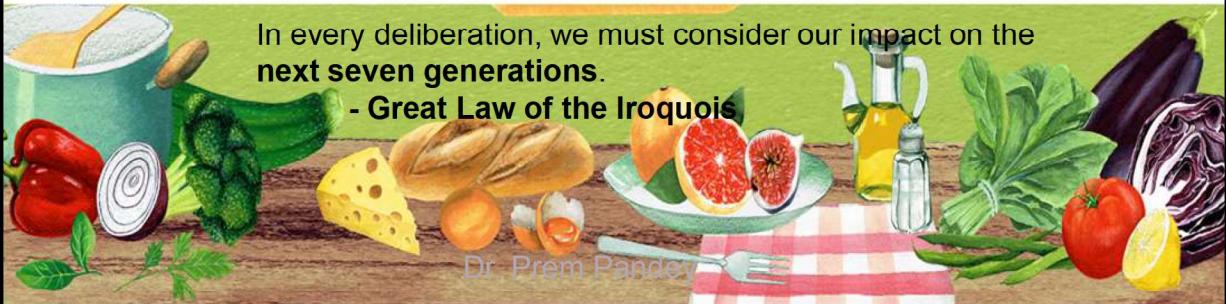
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In every deliberation, we must consider our impact on the  
**next seven generations.**

- Great Law of the Iroquois



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# Environment...

- Surrounding of any object / living form.
- Non living and Living things.
- Living things live in their environment.
- Interaction among them

## Environment:

- They constantly interact with it and adapt themselves to conditions in their environment.
  - Eg. Plants, hydrophytes, deer & tiger, Shark and fish, Penguin and seal, elephant and grasses
- We cannot survive without a **healthy environment**. How we **interact** with the environment is important.
- Generally speaking Environment is considered as **external conditions** or surroundings, especially those in which people live or work.



## Within the environment:

- There are different interactions between animals, plants, soil, water, and other living and non-living things.
  - Eg. Elephant- Grasslands- Tropical forests-Warm climate-Bamboos

## The environment affects the growth and development of the person.

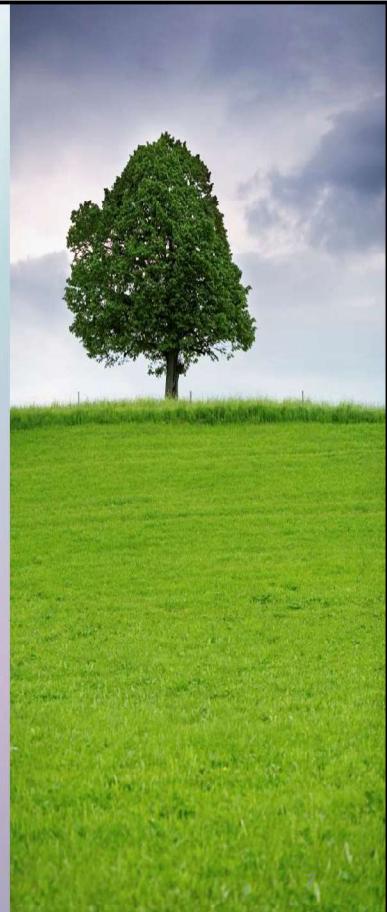
- It affects the person's behaviour, body, mind and heart.

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# Environment...

- Since everything is part of the environment of something else, the word 'environment' is used to talk about many things.
- People in different fields of knowledge (like history, geography or biology or computer science) use the word environment differently.



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# Environment types...



Class Room Environment



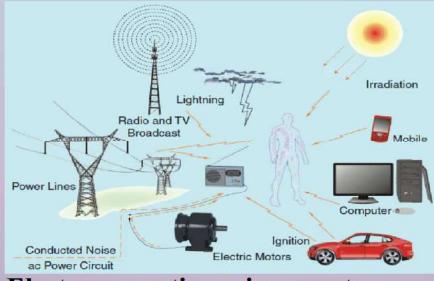
Office Environment



Home &amp; Hostel Environment

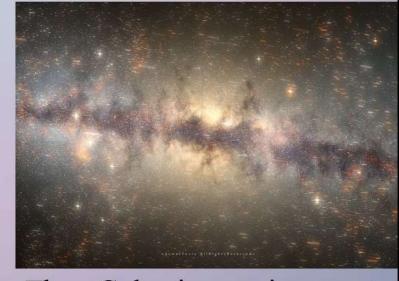


Road Environment



**Electromagnetic environment:**  
radio waves and  
other electromagnetic  
radiation and magnetic fields

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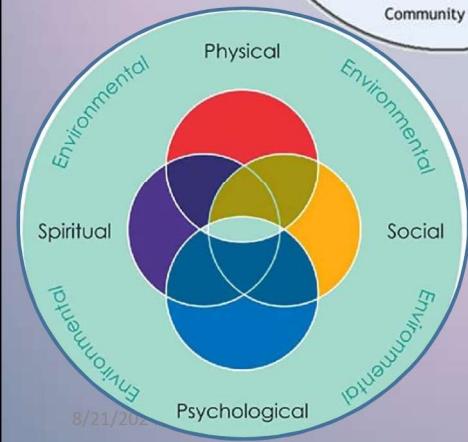
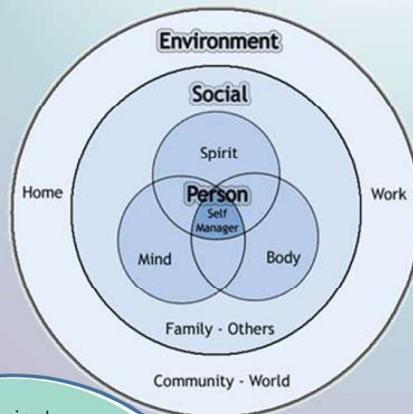
The Galactic environment:  
conditions between the  
galaxies and stars.

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# Environment

## Psychology and Medicine:

- a person's environment is the people, physical things, places, and various things that the person lives with.



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## Biology and Ecology:

- The environment is all of the natural materials and living things, including sunlight.
- If those things are natural, it is a natural environment.

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# Environment – Deteriorating conditions



At first, population growth and development were considered positive, today our opinion has changed. With increased demand for resources, we see several environmental problems:

- Resource Depletion
- Pollution of water, land and air
- Loss of Biodiversity
- Agriculture and Food Production Challenges
- Over use of Land- conversion of one type of land categories to other types- like forest to agriculture .

## Population Growth



Nearly 8 billion people live on this planet. The increase in human population in the last 100 to 200 years can be attributed to two events in recent human history...

1. The Agricultural Revolution
  - ✓ **Transition** from hunters to gatherers.
  - ✓ Growing crops, raising animals, and live in villages.
2. The Industrial Revolution (1760-1840)
  - ✓ **Transition / Shift** from rural life with animal powered agriculture to urban lifestyle using fossil fuels.
  - ✓ Advances in medicines, manufacturing, transportation, communication, etc.

# Environment – Deteriorating conditions

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Continuing problems.....

- Pollution- Air, Land, Water
- Biodiversity loss –extinction of species
- Deforestation -Loss of forests,
- Municipal solid waste (MSW) disposal,
- Plastic pollutions

**Overall degradation of environment,**

- Declining natural resources,
- Loss of biodiversity and Economic productivity,
- Global warming, Climate Change
- Depletion of ozone layer, and

All these affecting national economy and security have made every one aware of these environmental issues.

## What Do We Do? Environment – Deteriorating conditions

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Strike a balance?

Allow resources to renew?

Use resources that renew themselves more quickly?



- Learn from the past?
- Do Nothing?
- What we are learning from the present scenario ?
- Let Nature take its course?
- Find ways to share effectively?



What Do You Think We Should Do?  
What Do Environmental Scientists  
Think?  
What will be the role of Science?

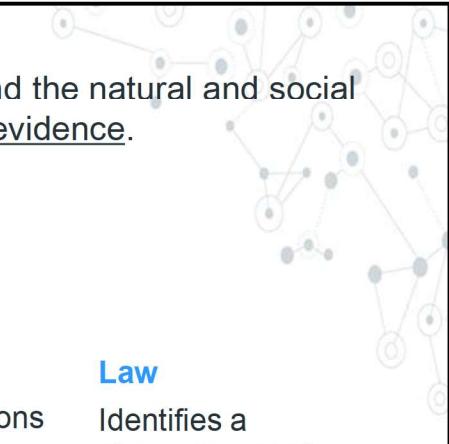


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Science is a process that seeks to understand the natural and social world through the collection and analysis of evidence.



<b>Fact</b>	<b>Hypothesis</b>	<b>Theory</b>	<b>Law</b>
Simple observation we make about the world.	Testable (via experiment) explanations of observations. Conditions is met or not.	Broad explanations that have been tested and confirmed through observation and experimentation.	Identifies a phenomenon of nature with / without explaining it.



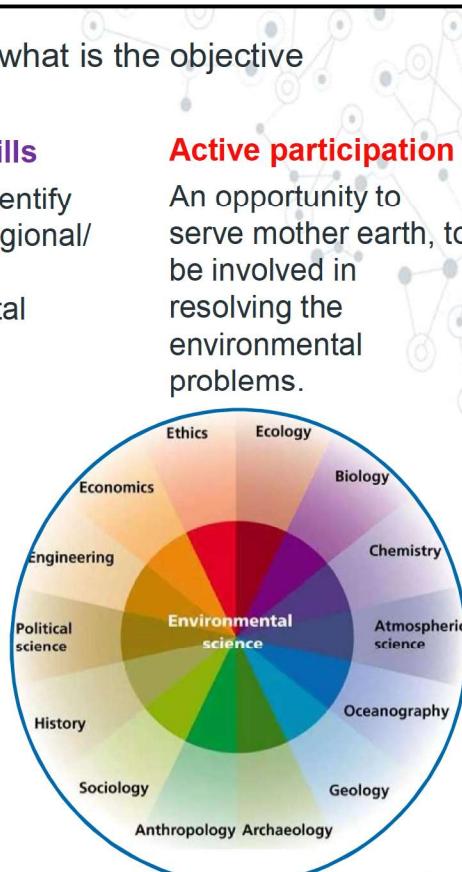
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## Environmental Science – why to study and what is the objective

<b>Awareness</b>	<b>Attitude</b>	<b>Develop skills</b>	<b>Active participation</b>
This is about our environment and its components, linked to associated problems.	Concern for the environment and willingness to improve and protect it.	It helps to identify and solve regional/ global environmental problems.	An opportunity to serve mother earth, to be involved in resolving the environmental problems.

### Knowledge & Management

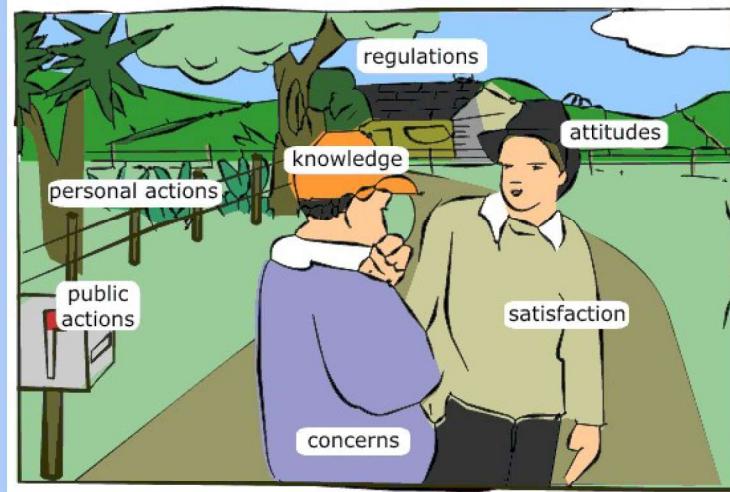
Acquire basic understanding, experience, feeling about our surrounding, and associated components.



# Environmental Awareness

It is extremely important that each individual realize his/her responsibility for preserving the environment, to make it a part of daily life, create the same attitude in their families, and spread it to the community –

## *Environmental Ethics*

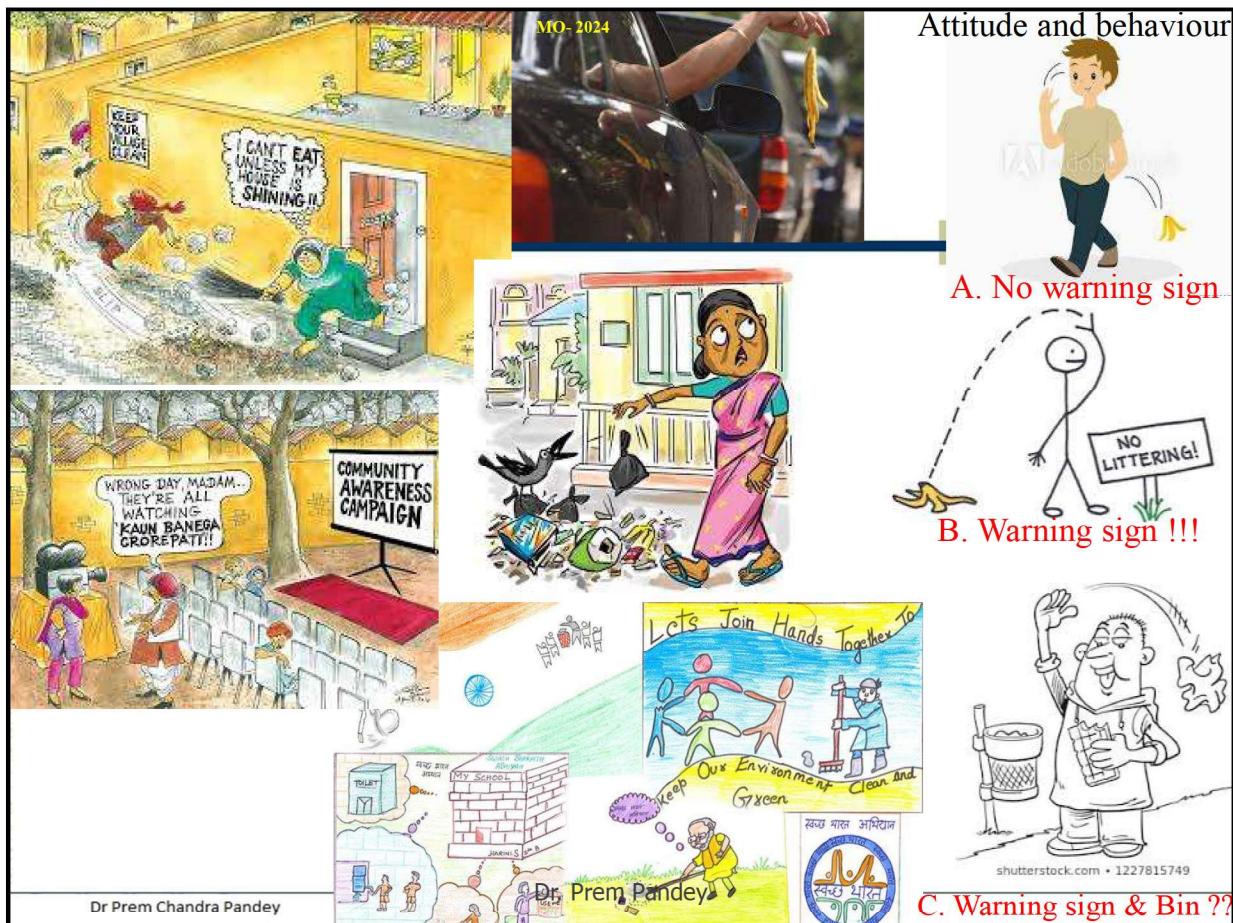


**Environmental Awareness is important because it helps to spread environmental education, especially in the non-formal system among different sections of the society.**

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## Environmental Science:

- ◎ The systematic & Scientific study of our environment and our role in it. This branch of science includes the knowledge of pure science & to some extent social science.
  - ◎ It is an **interdisciplinary academic field** which combines physics, chemistry, biology, medical science, life science, agriculture science, forestry, public administration, management.
- Knowledge and information**
- ◎ **Interdisciplinary field** & requires the study of interactions among physical, chemical and biological components.
  - ◎ It provides an integrated, quantitative, and interdisciplinary approach to the study of environmental systems.

## Environmental Studies:

- ◎ The branch of study concerned **with environmental issues**. It has a broader coverage than environment Science and includes the social aspects of the environment.
- ◎ It is a broad interdisciplinary field of study that includes the natural environment, built environment, and the sets of relationships between them.
- ◎ It is the academic field which **systematically studies human interaction with the environment**.

## Application and applied actions

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## Reasons to Learn About the Environment

Humans are integrally linked with all living things on our planet, Earth.

- However, recent events show that our day-to-day existence severely **impacts the Biosphere** that we share with all other organisms.
- The study of Environment promotes the development of problem-solving skills.

There are alternatives to the way we live today.

By studying about the Environment, we can learn,

- why we need to change,
- what we need to change, and
- how we can change.

So that, we can all live harmoniously in an environmentally sustainable way improving the quality of our lives and of the planet.

# Environmental Education

“The basic aim of environmental education is:

- To succeed in making individuals and communities understand the complex nature of the natural and the built environments resulting from the interaction of their biological, physical, social, economic and cultural aspects,
- To acquire,
  - the knowledge,
  - values,
  - attitudes and
  - practical skills
- to participate in a responsible and effective way in anticipating and solving social problems,
- And in the **management** of the quality of environment”.

# Environment – we learn from it

- The study of **how** the natural world works, how environment **affects us**, and how **we affect** our environment.
- **Understanding the interactions** between humans and the environment is the first step in understanding our environmental problems.
- Objective approach to environmental challenges and issues.

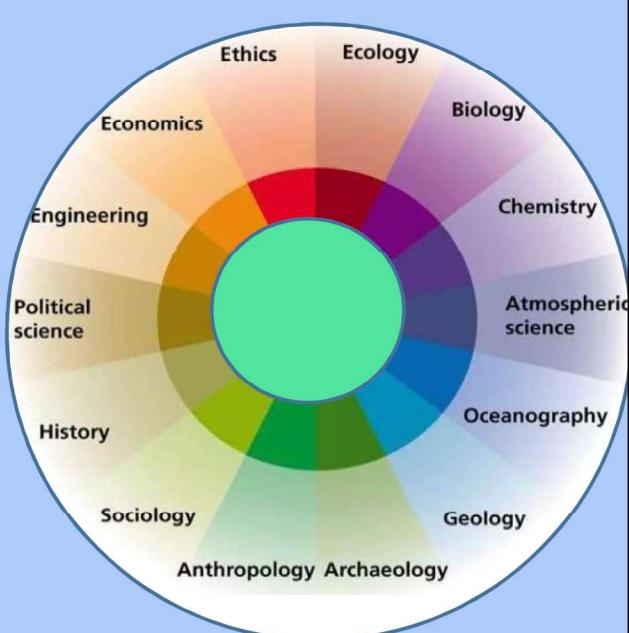


# Environmental Studies

- In spite of the deteriorating status of the environment, study of environment did not receive adequate attention in our academic programs.
- Recognizing this, the Hon'ble Supreme Court directed the UGC to introduce a basic course on Environment at every level in college education.
- Accordingly, the matter was considered by UGC and it was decided that a six months compulsory core module course in Environmental Studies to be compulsorily implemented in all the University/ Colleges of India.
- NEP (National Education Policy)** also stressed on Environmental Studies, to make students aware about the problems related to Environment.



# Environmental Studies



- Environmental studies deals with every **issues/aspects** that affects an individual/ organism.
- It is essentially a **multidisciplinary** approach that brings about an appreciation of our natural world and human impacts on its integrity.
- Multidisciplinary subject - Its components include biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers and philosophy.
- It is an **applied science** as its **seeks practical answers** to making human civilization sustainable on the earth's finite resources.

## Study of Environmental Studies– why to study

- Considering the present day **environmental problems** and **issues** challenging the society, study of Environmental Science / Studies has become very important for bringing an awareness for protecting our environment.
- It is hoped that the course will **inculcate environmental ethics** in the students and,
- They will not **only practice** it in their every day life but **spread the message in the society**.



## Environment



- Ecologically, Environment is defined as **external surroundings**, including living and non-living factors, in which a plant or animal lives and which tend to influence the organism, its population or ecological community, its survival, behaviour and overall development.
- Environmental conditions crucial for the sustenance and survival of an organism.

# ENVIRONMENT

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AIR



HUMIDITY



MINERALS



SOIL



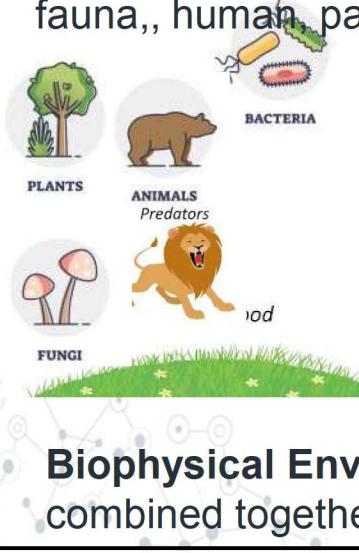
TEMPERATURE

## ABIOTIC

Light, humidity, water, temperature,  
Atmospheric gases, altitude, latitude

## BIOTIC

Plants- flora and microorganisms, Animals-  
fauna,, human parasites



## ENERGY

Solar energy,  
Geothermal energy,  
Water energy, Wind  
energy, Nuclear  
energy

**Biophysical Environment:** Biotic and Abiotic factors  
combined together.

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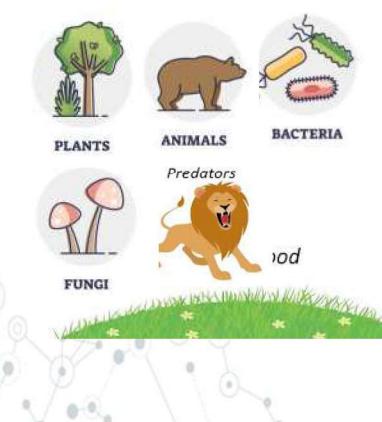
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# ENVIRONMENT

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## Dynamic Nature

An Environment is never static; it undergoes a process of continuous change, which affects all biotic and abiotic components.



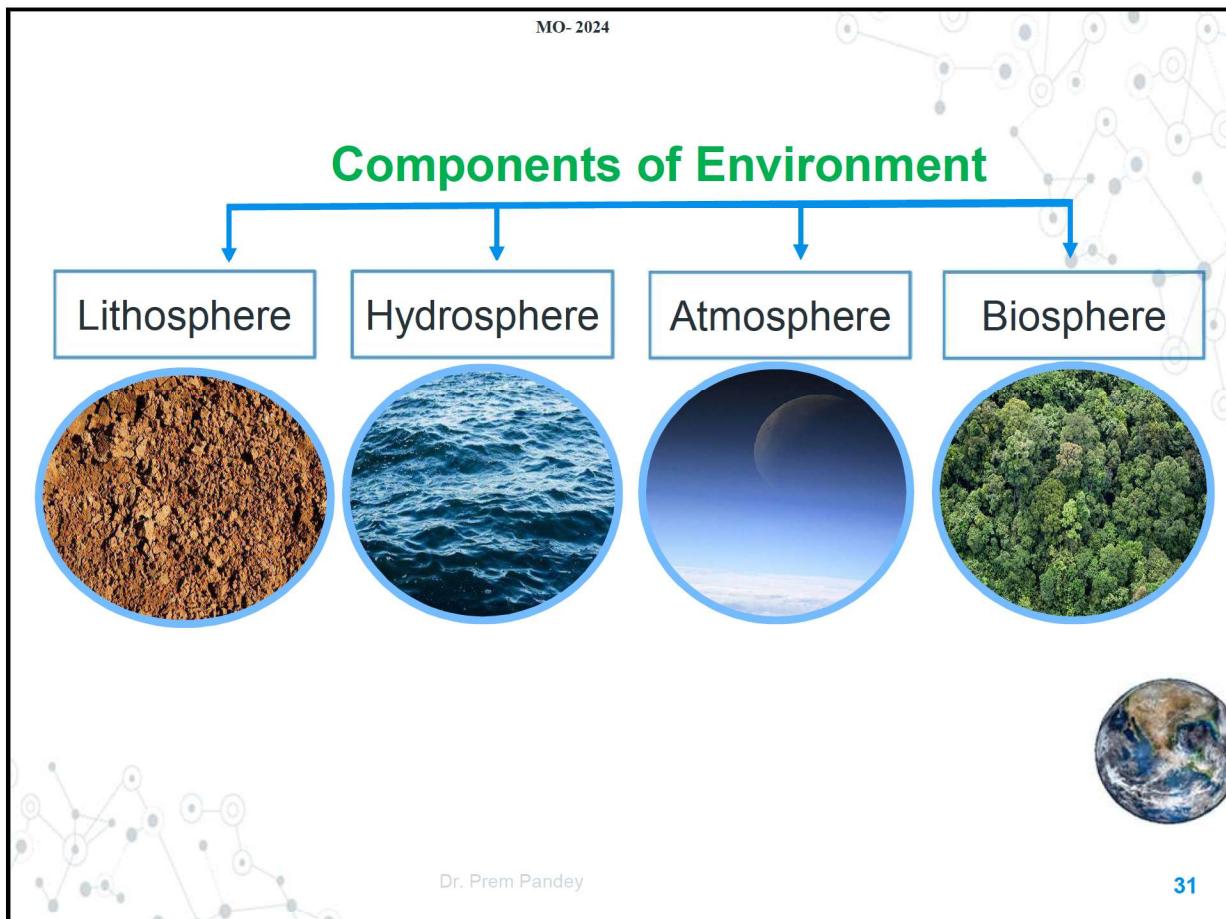
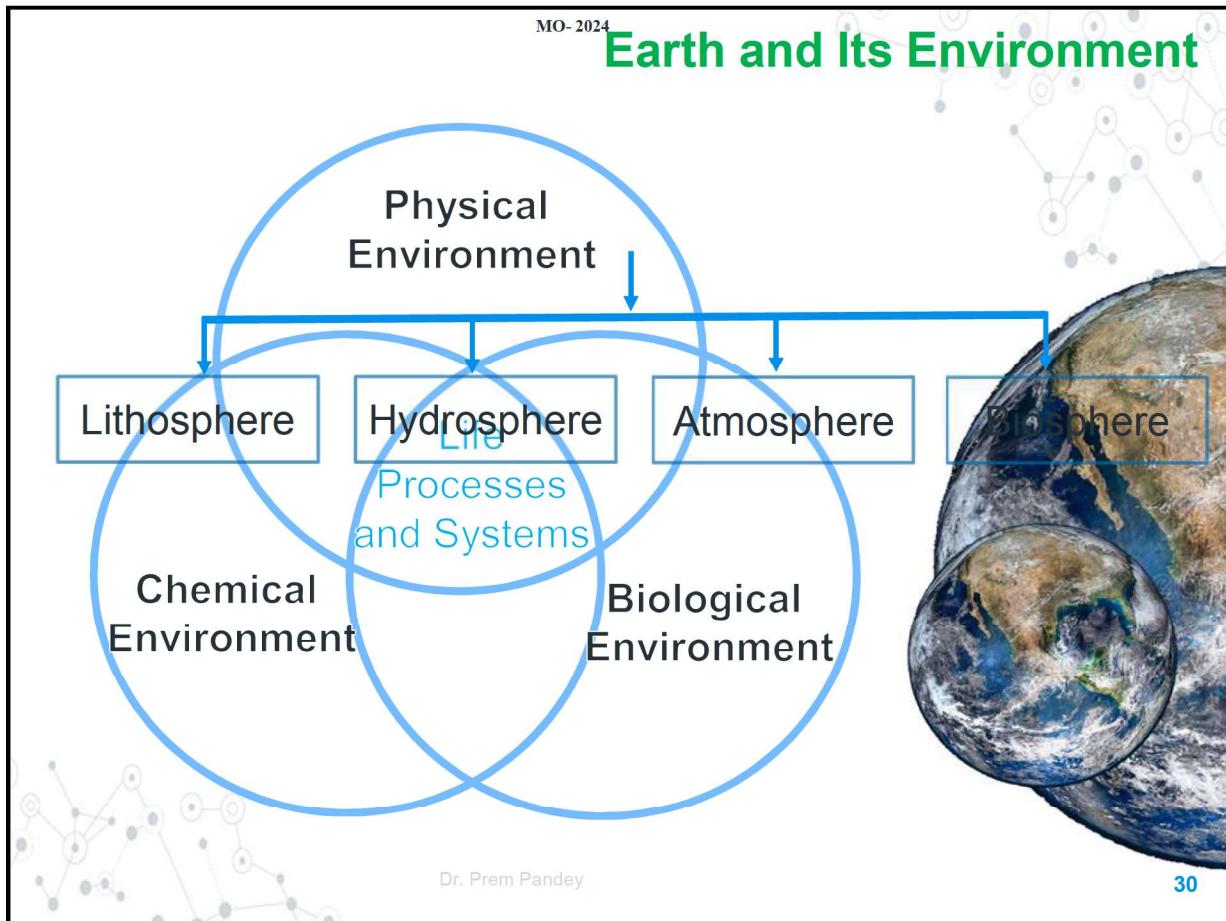
## Respond

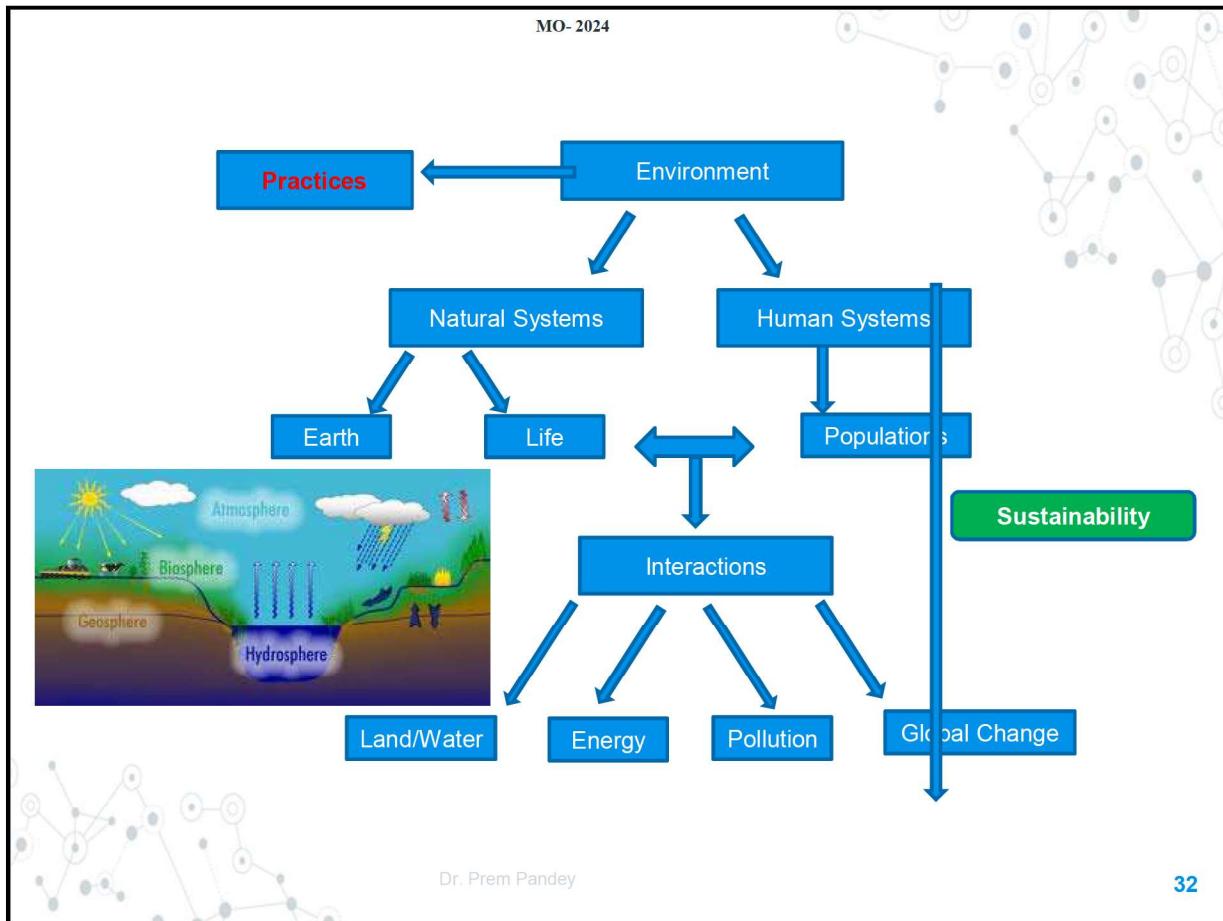
Organisms respond to changes in their biophysical environment by evolutionary adaptations in form and behaviour.



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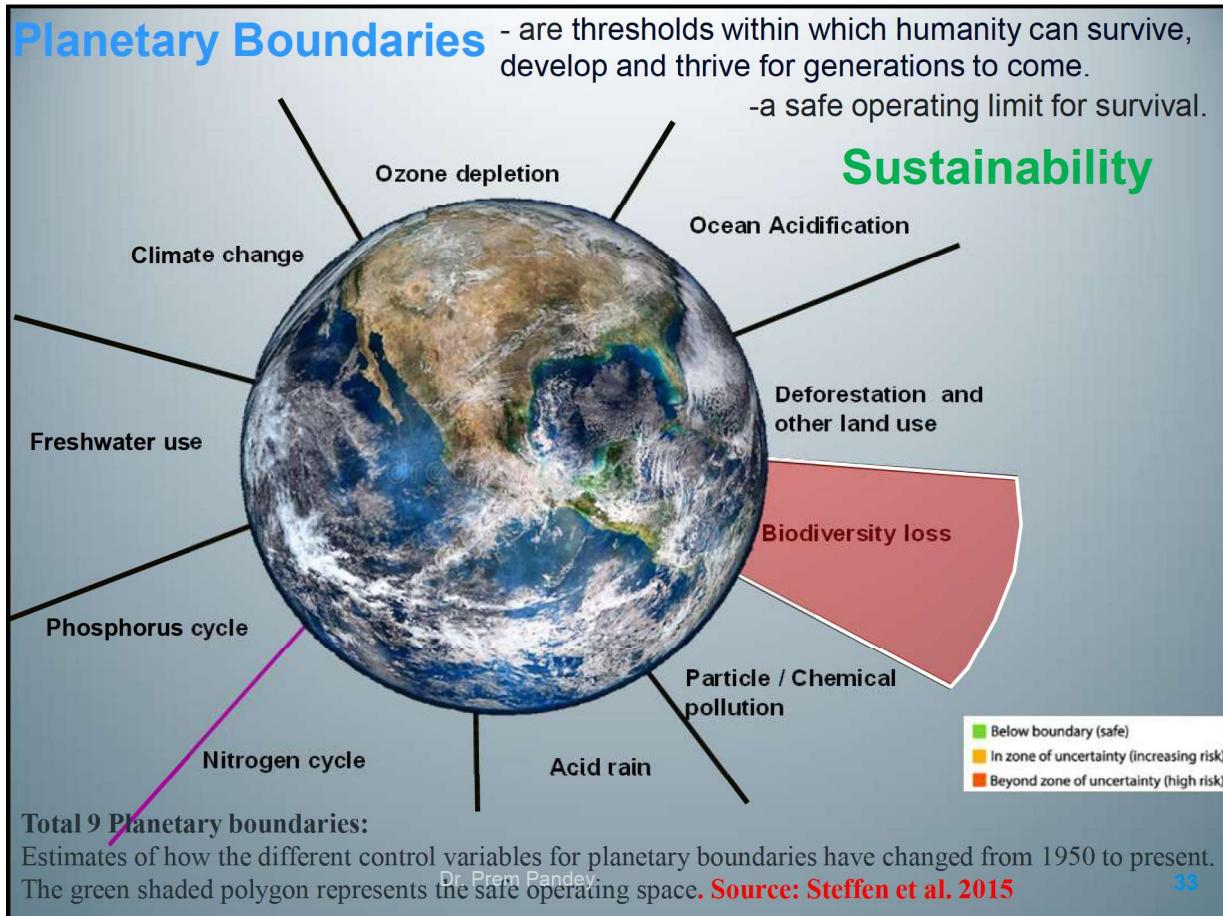
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# Planetary Boundaries- Uncertainties



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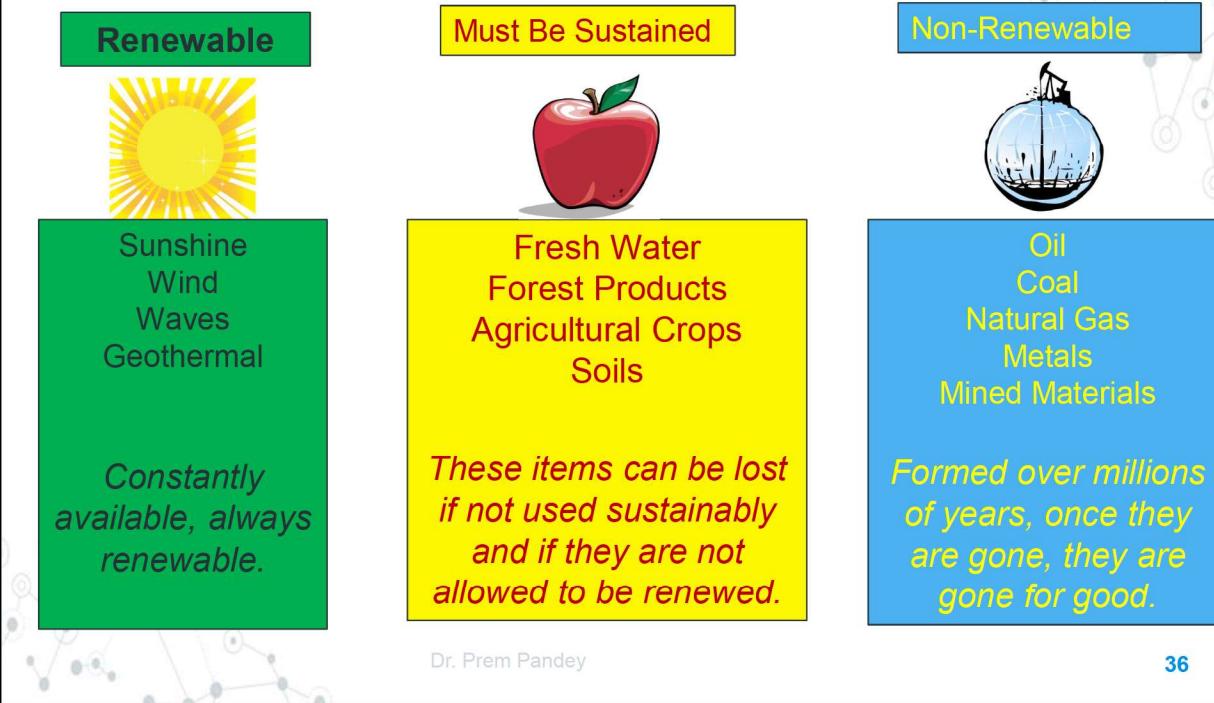


Fourth Pillar- Governance

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# The Renewability Continuum



## Natural Resource Classifications

<b>Inexhaustible</b>	<b>Renewable</b>
Cannot exhausted completely.	Will be replaced, but often at a slower rate than they are used.
Sunlight	Soil, timber.
<b>Nonrenewable</b>	<b>Recyclable Nonrenewable</b>
Not replaced within the human time scale.	Not replaced within the human time scale.
Single-use	Can be reused repeatedly
Coal, oil, natural gas	Minerals, metals

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- Our environment on Earth includes interactions between the life forms, air, crust and water.
- We often refer to these different parts of the environment as many 'spheres.'
  - The Biosphere includes the life forms.
  - The Atmosphere includes the Air.
  - The Geosphere (sometimes called Lithosphere) includes the crust.
  - The Hydrosphere includes the water.
- All these 'spheres' interact together to produce the environment on Earth.
- One of the most spectacular of these environments is the marine environment.



## <sup>MO- 2024</sup> **Earth and its Environment- four components**

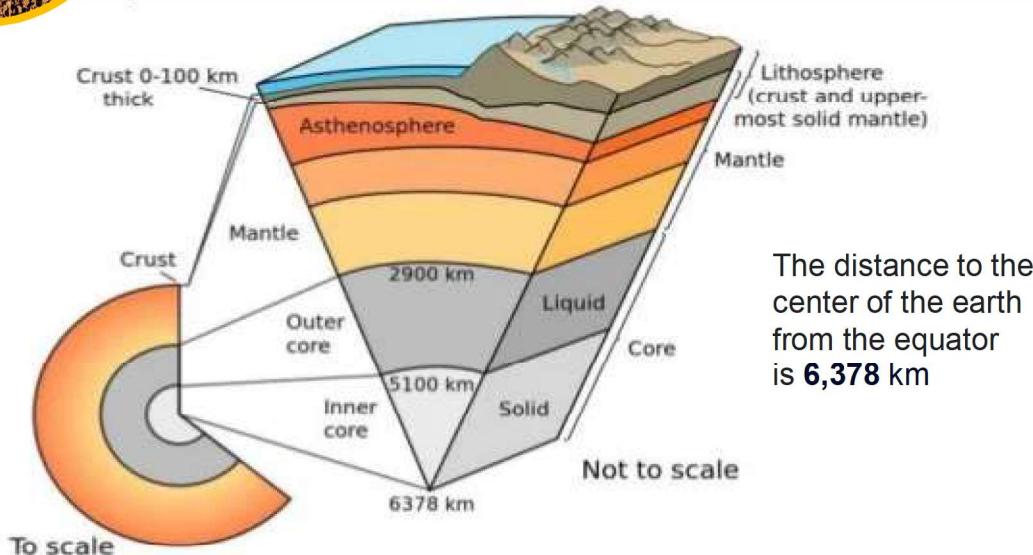
- The place where Earth's components interact most intensively is a narrow zone called the **life zone**;
- Conditions favorable for life are created by interactions between the Lithosphere, Hydrosphere and Atmosphere, and modified by the Biosphere





# 1. The Lithosphere (Geosphere)

- Geosphere- Solid earth – continental and oceanic crust , and various layers of the Earth’s Interior.

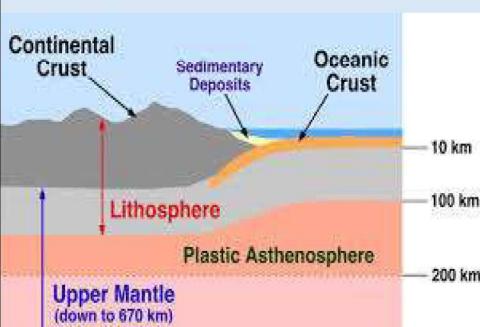


The asthenosphere (from Ancient Greek ἀσθενός (asthenós) 'without strength')  
is the mechanically weak and ductile region of the upper mantle of Earth. 8/21/2024 Dr. Prem Pandey 42



# 1. The Lithosphere (Geosphere)

## Lithosphere



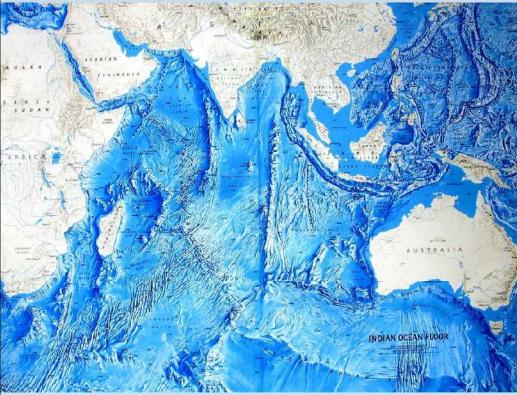
- It is the solid earth, the upper 100 km composed mainly of rock and regolith (a layer of loose, heterogeneous material covering solid rock);
- it includes dust, soil, broken rock, and other related materials);
- Rocks are subjected to continuous processes of physical, chemical and biological weathering;
- The resulting soil plays an important role for living as it produces food for human, animals and plants;

- Human activities affect the Lithosphere:
  - soil pollution; pollutants include pesticides, fertilizers, industrial wastes, sewage and domestic wastes



## 2. The Hydrosphere

- The totality of Earth's water including oceans, lakes, streams, underground water, and all snow and ice
- Hydrosphere covers 2/3 of earth's surface.
  - Oceans account for 97% of water on Earth.
  - From the remaining 3%,
    - about 2% is blocked in polar ice caps and glaciers and
    - only 1% is available as fresh water in surface or as groundwater.



**Cryosphere:** The perennially frozen parts of the hydrosphere collectively. Arctic, Antarctic, Glaciers

- The hydrosphere and the atmosphere store, purify, and continually
  - redistribute water

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## 3. The Atmosphere

- Earth's atmosphere: layer of gases surrounding the planet Earth
  - retained by the Earth's gravity.
  - very thin layer, but protects life on Earth
    - by absorbing ultraviolet solar radiation and
    - reducing temperature extremes between day and night.
- Chemical Composition of Earth's atmosphere:
  - contains roughly 78% Nitrogen,
  - 21% Oxygen,
  - 0.97% Argon,
  - 0.04% Carbon dioxide, and
  - trace amounts of other gases, in addition to water vapour.
- This mixture of gases is commonly known as air.



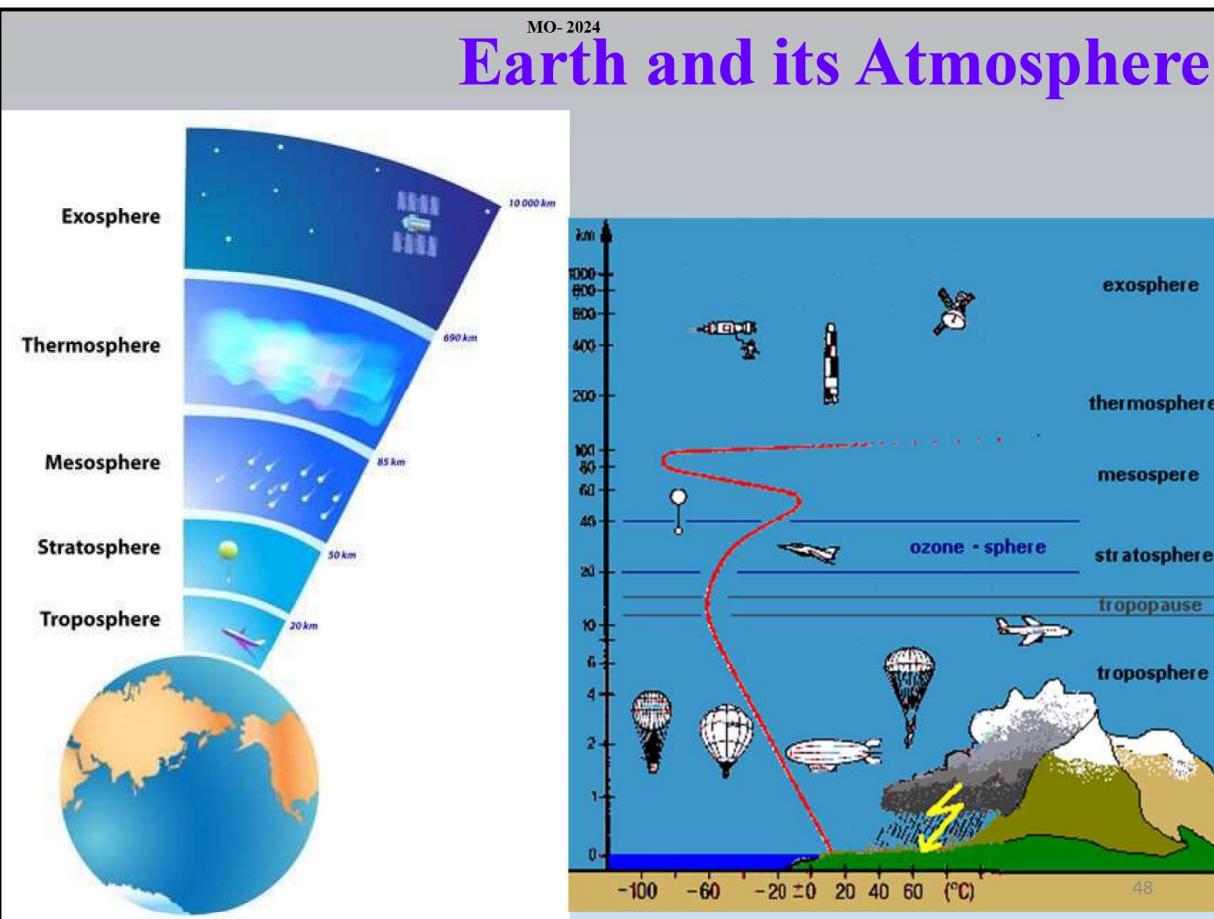
# The Atmosphere



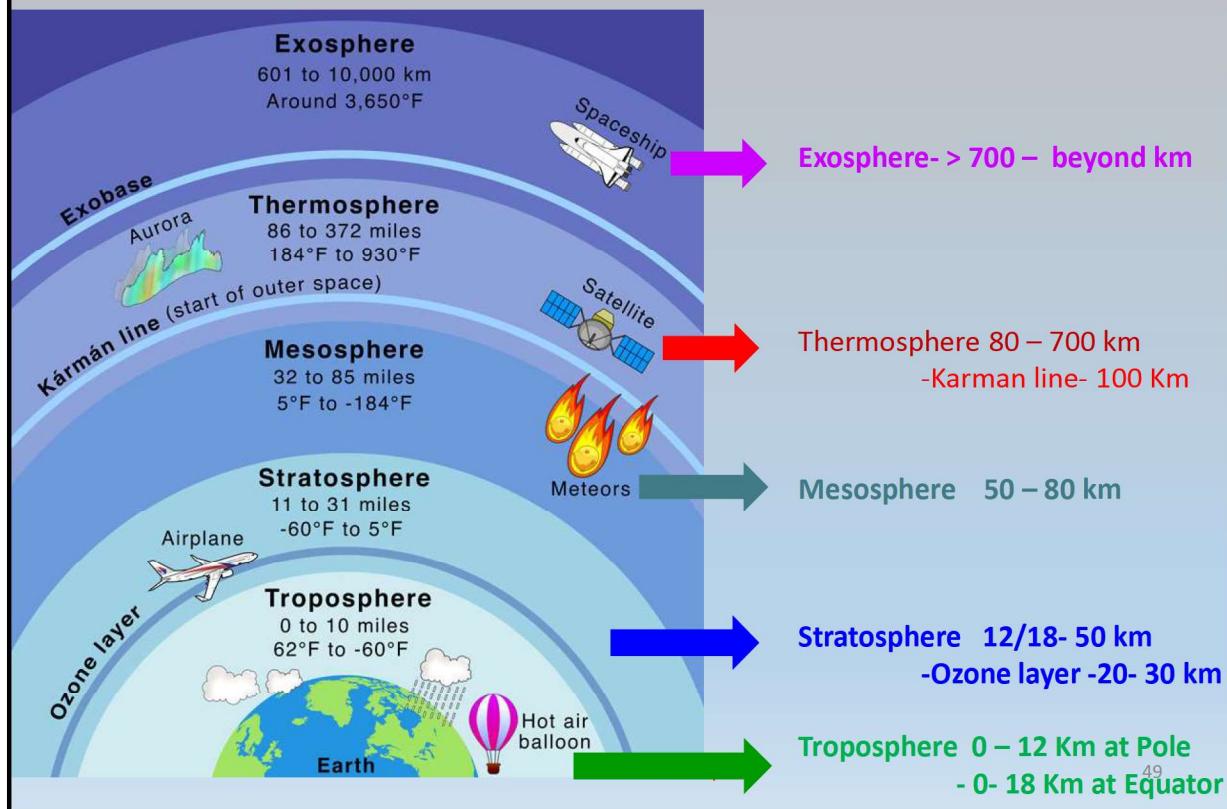
- Earth's Atmosphere –
  - Dense part of atmosphere (97% of mass) lies within 30 km of the Earth (so about same thickness as continental crust).
- The Earth's Atmosphere has no abrupt cut-off .
  - It slowly becomes thinner and fades away into space.
  - There is no definite boundary between the atmosphere and outer space.
  - Exosphere- It is the outer boundary of the Earth system.
- You may think that in the upper layers of the atmosphere there is no air.
  - This is not the case. Air is in fact present, although, of course, there is not enough for a person to breathe at, say, the altitude of the International Space Station (ISS), about 400 km above the Earth's surface.

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# Earth and its Atmosphere

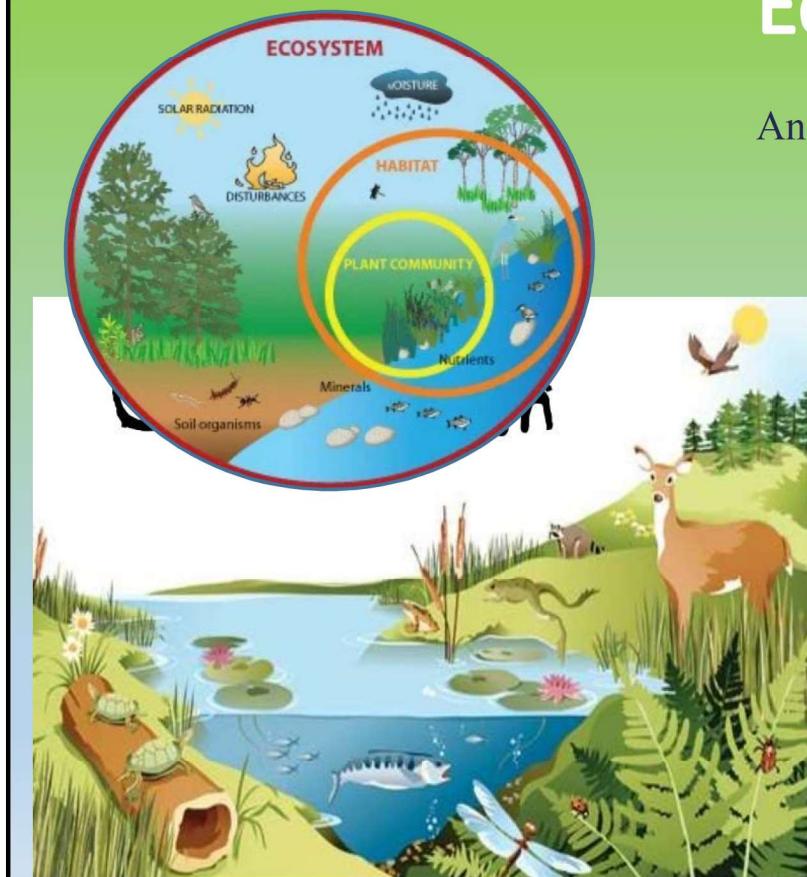


## 4. Zone of life on Earth- The Biosphere



- From the broadest bio-physiological point of view, the Biosphere is,
  - the global ecological system integrating all Living beings and their relationships.
  - including their interaction with the elements of Non-living lithosphere, hydrosphere, and atmosphere.
- In a broader sense, Biospheres
  - are closed systems.
  - It is only open for (solar and cosmic radiation and heat from the interior of the Earth),
  - self-regulating systems containing Ecosystems;

# Ecosystem

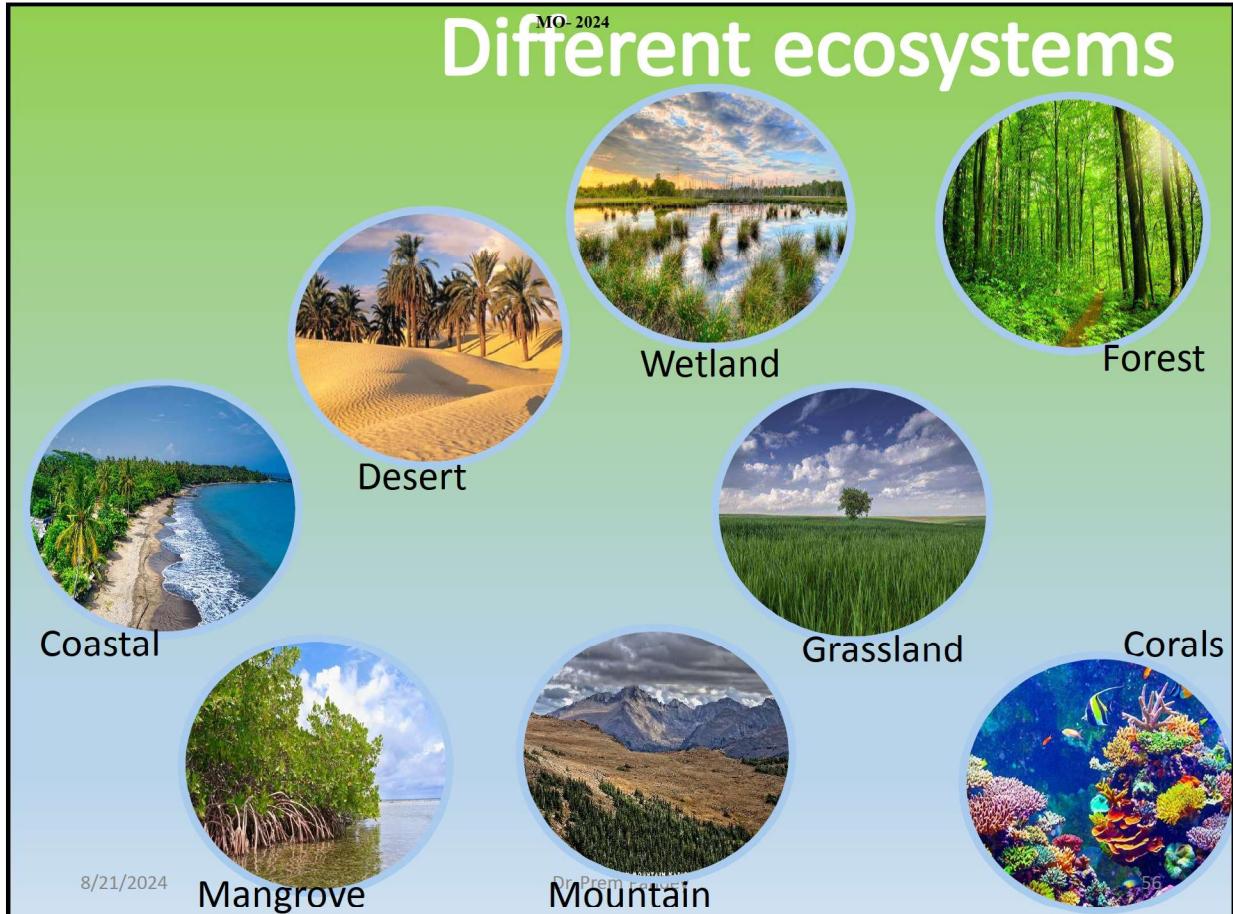


An Ecosystem:

- 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 self regulating system.

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## MO- 2024 Different ecosystems



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# Urban Built-up environment



Agriculture



Urban Built up



Horticulture

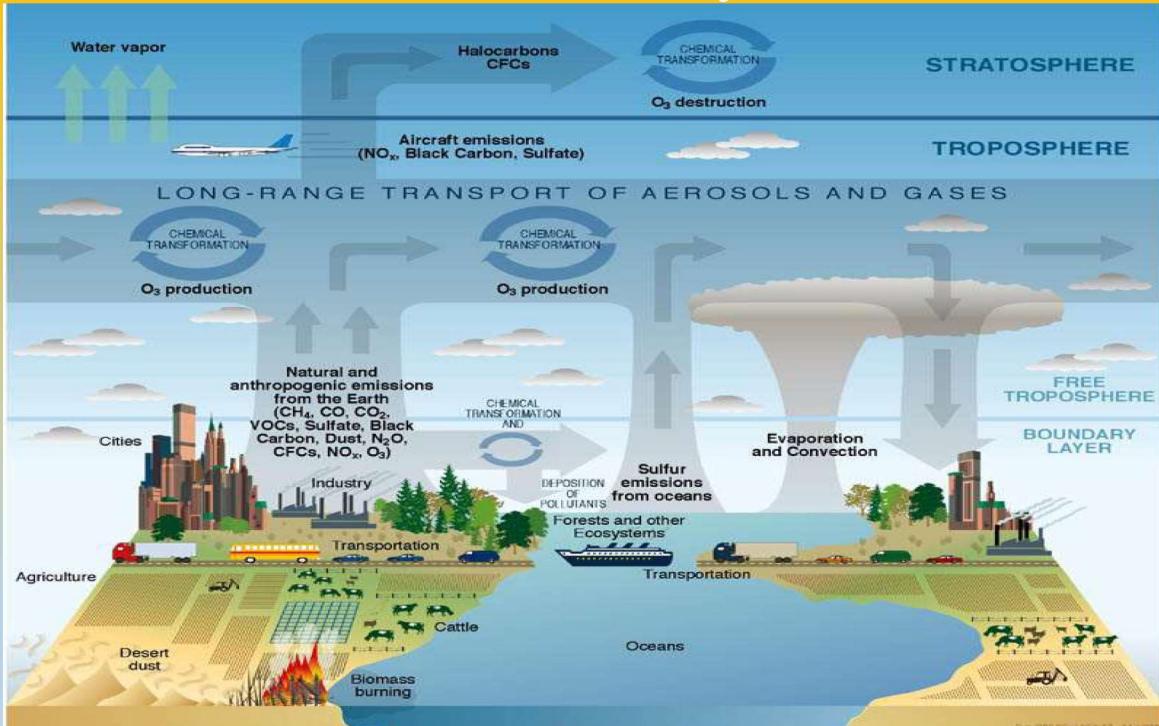
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# Earth and its Ecosystem-



Natural and Man-made (Built)

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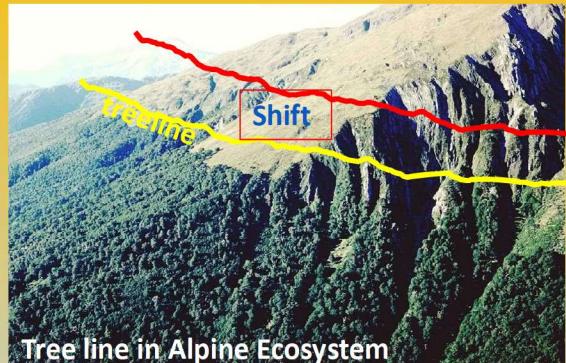
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# Earth and its Ecosystem- Natural

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Alpine Ecosystem



Tree line in Alpine Ecosystem

The **snowline** is the line around the mountains above which snow is on the ground all year round.

The **treeline** is the line around the mountains above which no trees will grow.

Above treeline, tree species may grow as low, prostrate, or stunted individuals (<2 m). This zone is often referred to as **the krummholz zone**, and its upper limit as **krummholz limit** or **tree-species limit**.

**Krummholz** also called knieholz ("knee timber")

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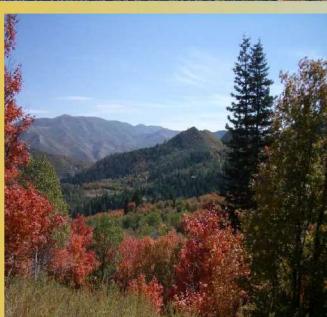
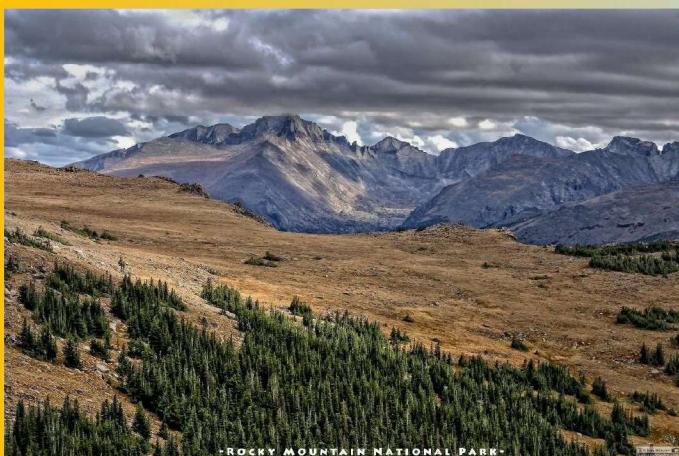
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## BIOSPHERE Mountain Ecosystem

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Mountain Ecosystem



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# BIOSPHERE Tropical Forest Ecosystem

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**AMAZON Rain Forests  
Brazil**

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# BIOSPHERE Tropical Rain Forest Ecosystem

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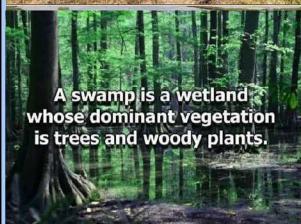
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# BIOSPHERE- Wetland Ecosystem

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Loktak Lake in Moirang, Manipur, India is the largest freshwater lake in Asia.

It is also the only place where you can find the dancing deer SANGAI.



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Another important zone on the edges of streams and rivers is called the Riparian Zone.

# BIOSPHERE- Grassland Ecosystem

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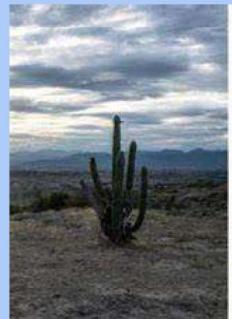
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# BIOSPHERE- Desert Ecosystem

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# BIOSPHERE –Marine Coastal Ecosystem-Kerala

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# Great Barrier Reef, Australia- Heron Island



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## BIOSPHERE- Marine coral Ecosystems MO- 2024

**Some of the famous Corals across the WORLD.**

1. Great Barrier Reef – Australia
2. Coral / Tubbataha reef | Philippines |
3. Rainbow Reef – Fiji
4. New Caledonia Barrier Reef
5. Raja Ampat – Indonesia
6. Tubbataha Reefs Natural Park, Philippines |
7. Palancar Reef – Cozumel, Mexico
8. Wakatobi Islands – Indonesia
9. Belize Barrier Reef – Belize
10. Apo Reef – Philippines
11. Bonaire Reef – Dutch Caribbean
12. The Grand Central Station and Chimneys – Fiji
13. Red Sea Coral Reef – Red Sea



Coral / Tubbataha reef |  
Philippines |



Great Barrier Reef – Australia



Rainbow Reef – Fiji



New Caledonia Barrier Reef



Red Sea Coral Reef – Red Sea

14. Andmaan & Nicobar –
  1. Agatti Island
  2. Neil Island



Raja Ampat – Indonesia

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# BIOSPHERE- Marine coral Ecosystems

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## Great Barrier Reef – Australia



Inside view:  
Great Barrier Reef – Australia

View from Space- Great Barrier Reef – Australia

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# BIOSPHERE : Man made Ecosystems

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## Agro-ecosystems

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## Horticulture Ecosystems

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# BIOSPHERE : Man made Ecosystems

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Urban Ecosystems- Built-up environment

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## Biosphere –Urban Ecosystems

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Urban Landscape Cambridge, UK

Oxford Botanical Garden, UK

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# Biosphere –Urban Ecosystems



LONDON



SYDNEY



MUMBAI

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## MO- 2024 Ecosystem-How does the environment affect us (people)?

- Several ways in which the environment affects people.
- The environment in a big city is quite different from the environment in the village in natural setting.
- Same way environment in a **Forest** is quite different from the environment in an **Agriculture field or wetland**.
- In the natural environment, far away from cities; in villages the air is much purer and devoid of pollutants.
- As compared to plains, hills and mountains have much purer air.
- Unfortunately, we have polluted the world so much, that there are very few areas where nature exists in its pure state.



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# Ecosystem-How does the environment affect us (people)?

MO-2024

## Direct services:

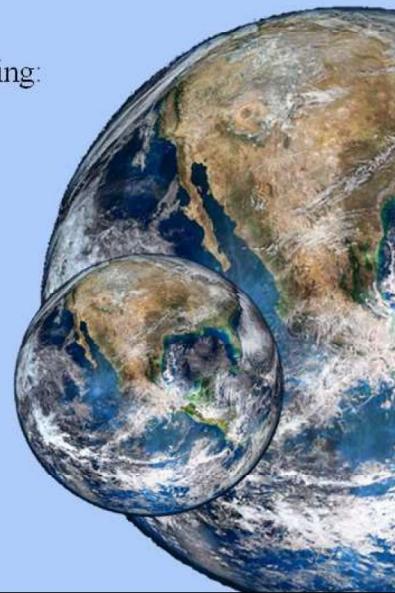
- The environment provides
  - **resources** and **raw materials** such as water, timber and minerals that are required as inputs for the production of goods and services; and

Indirectly, the major services provided by ecosystems including:

- Food sources,
- Forest & Non timber forest products,
- Climate moderation & Carbon sequestration,
- Biogeochemical Cycle- i.e. recycling of O<sub>2</sub> and CO<sub>2</sub>
  - Nutrient cycling
- Rain water, water purification,
- Coastal flood risks
- 

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# Ecosystem-How does the environment affect us (people)?

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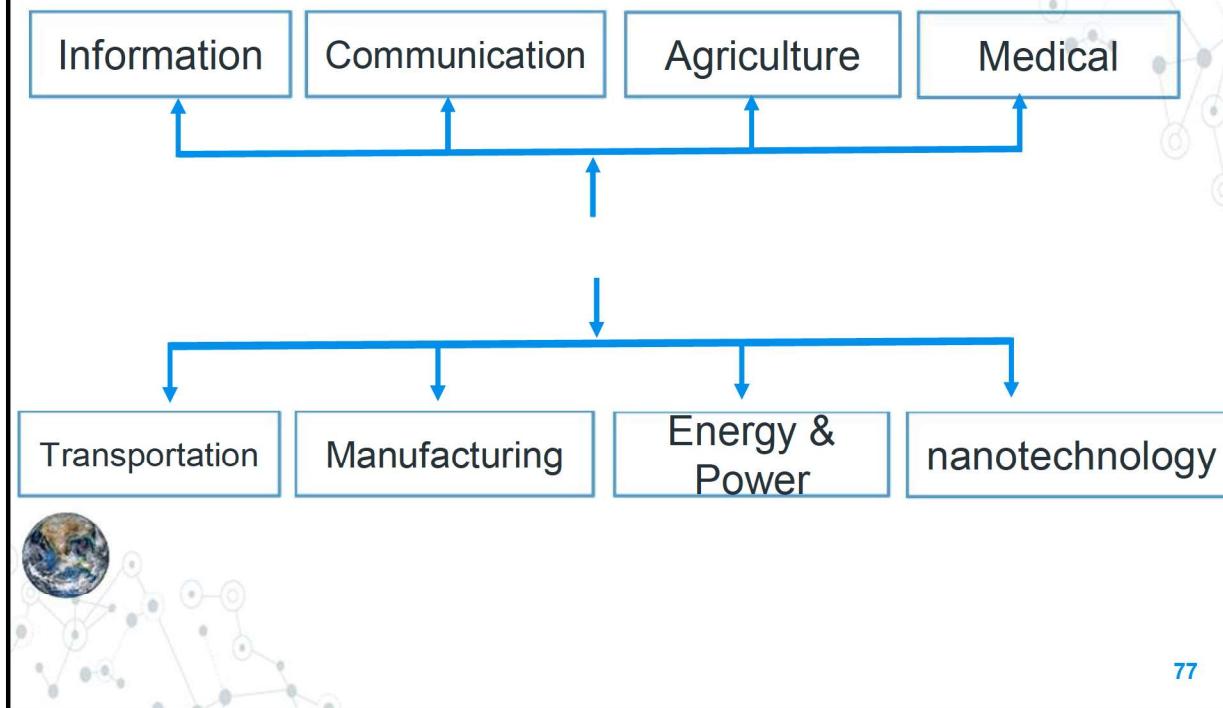
- The environment affects people's growth and development in various aspects like the economy where, if the economy is good, people will be able to sustain themselves and prosper and healthy.
- It also gives the people **food security** so that they are satisfied and well nourished;
- Life has to be adapted to the conditions of its environment.
  - Temperature,
  - light,
  - humidity,
  - soil nutrients
    - all of them influence all the organisms, within any environment.

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## How does technology address Human needs and wants?



# How we have affected the environment?

## Impact of technology on Environment



**POSITIVE**

## Positive Impact

- Waste treatment plants to reduce
  - Electricity generation options
  - Uses of bio-fuels

**NEGATIVE**

## Negative Impact

- Direct impact: Accidents, nuclear pollution,
  - Indirect Impact:
    - Use of fossil fuel (pollution)
    - Green house effects
    - Acid rain
    - Global Warming

# How we have affected the environment ?

This means what is the human impact on the Environment

- After 18<sup>th</sup> century (industrial revolution) expansion started and full utilization of resources.
- During the past six decades
  - due to industrialization and expansion of urban regions, humans have impacted the environment adversely including biophysical environments, biodiversity and other natural resources resulting in overall degradation of our environment, including air, water and land environment.
  - (i) Pollution- air, water, land
  - (ii) Biodiversity Loss – Forest loss, Unsustainable utilization of natural resources, Urbanization, Industrialization, Invasive species
  - (iii) Land use- Land cover changes- Urbanization, Loss of forests, Agricultural lands, Industrialization, Highways, Hydro-electric dams
  - (iv) Climate Change -Greenhouse gases, Ozone depletion, Global warming,
  - (v) Disasters: Landslides, Flash floods, etc.





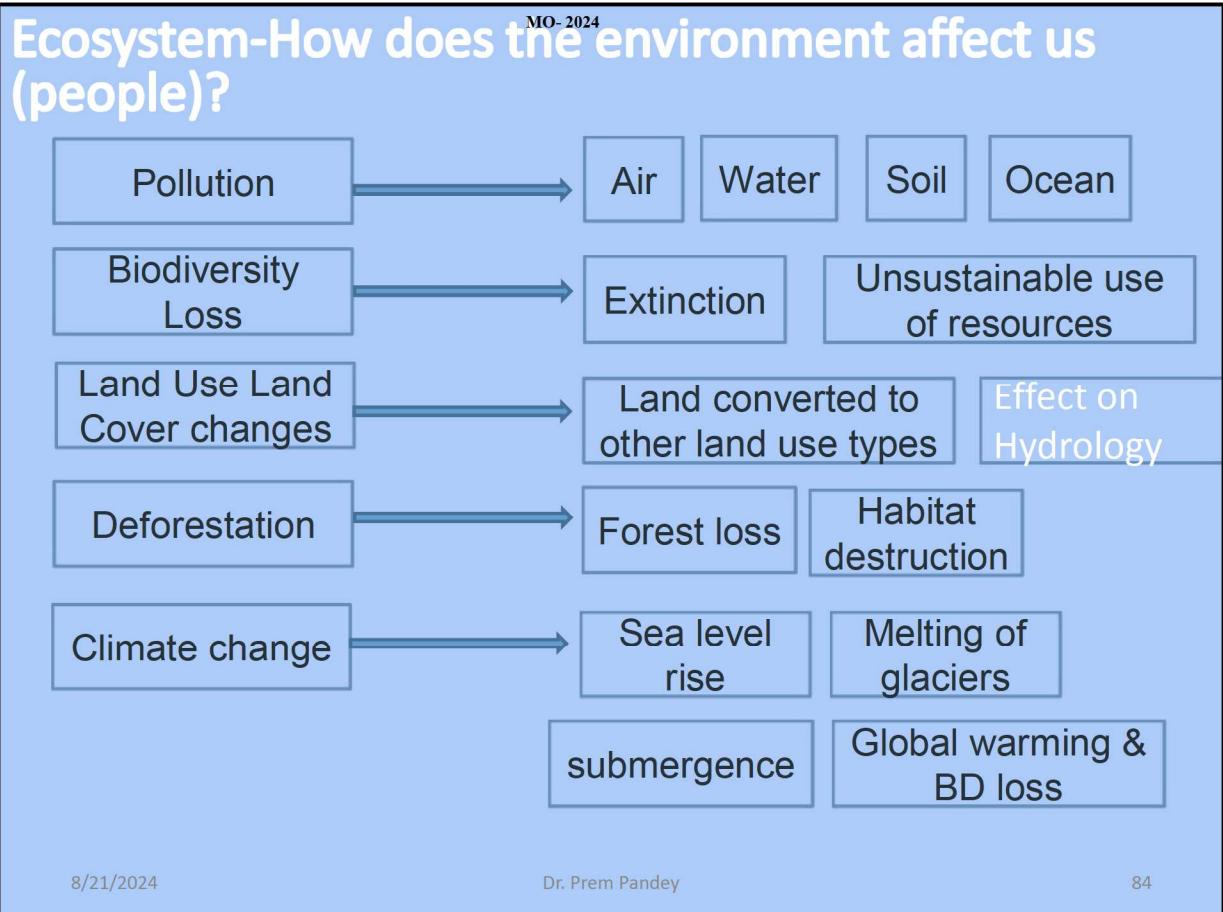
Drosera Sun dew plant

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# MO-2024

# Why is it important to conserve and protect the Environment

- Environment provides **Goods and Services**
- The natural environment is a source for a **wide range of resources** that can be exploited for economic benefit; for example NTFPs and medicinal plants are collected from forests;
- Role and relevance of protecting forests- Environmental and economic benefits
- For the **sustenance** of human beings and wildlife on this planet we have to protect and conserve the environment.
- If the health of environment is deteriorated it will affect all living beings.
- Wild plants and animals still constitute a substantial part of the **diet** of human beings.
  - $\frac{3}{4}$  of the world's population is directly dependent on wild plants and animals for its medicinal needs.
- Agriculture still depends on traditional crop varieties and wild relatives for genetic improvements in yield and better traits.

# MO-2024

# Why is it important to conserve and protect the Environment

## - Forests

- Forests, renewable natural resource, are getting depleted at a faster rate due to human pressure and increasing use and misuse of resources;
- Forests sustain human and other animal life on planet earth –
- Home to 70% of world's animals and plants – more than 13 million distinct species.
- Forests protect the **hill slopes** from soil erosion and ensure **perennial water supply** to the rivers and streams which in turn promote agriculture and other developmental activities.
- Forests play a major role in regulating the ecosystem; moderating climate.

# Why is it important to conserve and protect the Environment

MO-2024

## - Forests

- Forests are Source of water, streams –
  - intercept rainfall,
  - absorb excessive rainfall that is gradually released later;
  - Tree roots enhance
    - soil porosity,
    - reduce compaction,
    - facilitate infiltration.
- Forests influence local and global climates-
  - Mitigate Environmental problems (greenhouse effect, degradation) challenging human society;
  - Absorb atmospheric CO<sub>2</sub> (carbon sequestration) and
  - replenish O<sub>2</sub> in the air;
- Trees act as wind-break, reduce the force of desiccation.

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## MO-2024

# World Environment Days

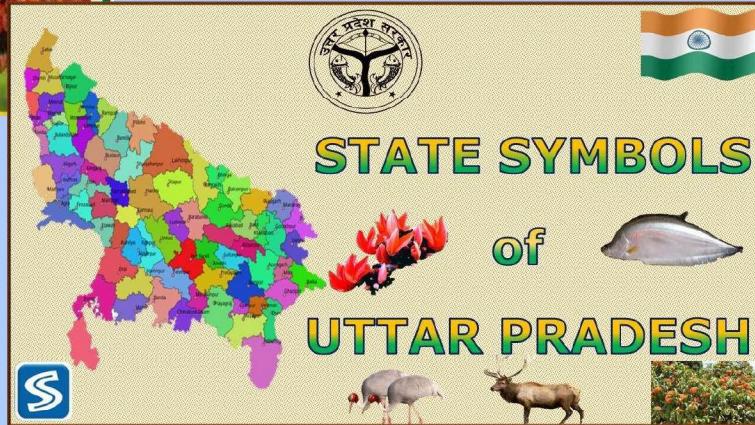
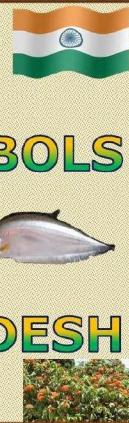
S. No	Date	Event	
1	September	Clean Up The World Campaign	
2	16 <sup>th</sup> September	International Day for Prevention of Ozone Layer	
3	18 <sup>th</sup> September	World Water Monitoring Day	
4	22 <sup>nd</sup> September	World Car-Free Day	
5	4 <sup>th</sup> October	World Animal Day	
6	5 <sup>th</sup> October	World Habitat Day	
7	16 <sup>th</sup> October	World Food Day	
8	17 <sup>th</sup> October	International Day for Eradication of Poverty	
9	6 <sup>th</sup> November	International Day for Preventing the Exploitation of the Environment in War and Armed Conflict	
10	2 <sup>nd</sup> December	National Pollution Prevention Day	
11	11 <sup>th</sup> December	International Mountain Day	
12	2 <sup>nd</sup> February	World Wetland Day	
13	21 March	World Forest Day	
14	22 <sup>nd</sup> March	World Water Day	
15	23 <sup>rd</sup> March	World Metrological Day	
16	22 <sup>nd</sup> April	Earth Day	
17	9 – 10 May	World Migratory Birds Day	
18	22 <sup>nd</sup> May	International Day for Biological Diversity	
19	23 <sup>rd</sup> May	World Turtle Day	
20	5 <sup>th</sup> June	World Environment Day	
21	8 <sup>th</sup> June	World Ocean Day	
22	15 <sup>th</sup> June	Global Wind Day	
23	17 <sup>th</sup> June 2024	World Day to Combat Desertification	
		World tourism day	September 27
		World habitat day	October 3
		International day for natural disaster reduction	October 12
		World food day	October 16
		World cities day	October 31
		International day for prevention of the exploitation of the environment in armed conflicts	November 6

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# Uttar Pradesh State Symbols:

State Flower-Palash

State Fish- *Chitala chitala*State Tree –**Sita Ashok**

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State Animal - Swamp deer (Barasingha)

State Bird- **Sarus crane**

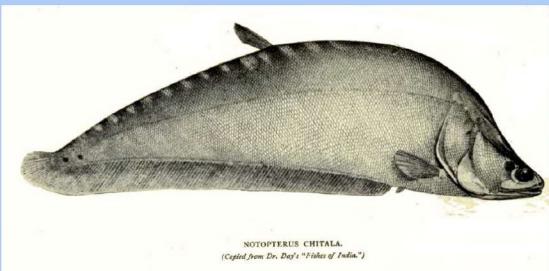
## 1. State Animal – Swamp Deer Barasingha

**Native to the Indian subcontinent.**

- The barasingha (*Rucervus duvaucelii* syn. *Cervus duvaucelii*),
  - also called swamp deer.
- Currently found in isolated localities in northern and central India and southwestern Nepal.
- It is extinct in Pakistan and Bangladesh.
- The swamp deer differs from all the Indian deer species in that the **antlers carry more than three tines**.
  - Because of this distinctive character it is designated barasingha, meaning "twelve-tined."
  - Mature stags have 10 to 14 tines, and some have been known to have up to 20.



## 2. State Fish- **Chitala chitala (Clown knifefish :**



### Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Actinopterygii
Order:	Osteoglossiformes
Family:	Notopteridae
Genus:	<i>Chitala</i>
Species:	<i>C. chitala</i>
Binomial name:	

***Chitala chitala* F. Hamilton, 1822**

## State Fish- **Chitala chitala (Clown knifefish :**

- Chitala chitala or **clown knifefish**
- A fish of the genus Chitala found in India, Indonesia and other countries in Southeast Asia.
- Main foods are smaller fishes and fish pellets (in aquarium).
- They have been introduced to some areas of the United States.
- As an aquarium fish, they are popular in the United States and have likely been released from aquarium environments.
  - South Florida anglers have been known to catch the fish when attempting to bass fish.
- They are also considered delicacies in other countries especially due to their immense size.

### 3. UP State Bird- Sarus Crane (*Grus Antigone*)

- The Sarus Crane is a large **non-migratory bird**,
- **It is found in wetlands and grasslands** in the Indian Subcontinent, Southeast Asia and Australia.
- The tallest of flying birds, standing at a height of up to 1.8 m, they are conspicuous and iconic species of open wetlands.
- weighing up to 8 kg.
- it is a symbol of prosperity, good luck, and longevity.



The state government of Uttar Pradesh has taken several measures to protect the sarus crane, including creating protected areas and promoting ecotourism.

- It is an important State Symbols of Uttar Pradesh.



- The **Sarus Crane** is easily distinguished from other Cranes in the region,
  - ❑ the overall grey colour and
  - ❑ the contrasting red - head and upper neck.
- Sarus Crane numbers have declined greatly in the country due to poaching and
- It has been estimated that the current population is a tenth or less (perhaps 2.5%) of the numbers that existed in 1850s.



## 4. State Flower- ***Palash (Butea monosperma)***

Common names include Palash, Dhak, Palah, **Flame of the Forest**, Bastard Teak, Parrot Tree, Keshu (Punjabi) and Kesudo (Gujurati).

- *Butea monosperma* is a species of *Butea* native to tropical and sub-tropical parts of the Indian Subcontinent,
- It is found in the dry deciduous forests of northern and central India.
- Spread- Southeast Asia, across India, Bangladesh, Nepal, Sri Lanka, Myanmar, Thailand.

Palash is an important tree species, and it has been designated as the state tree of Uttar Pradesh to raise awareness about its conservation and protection.

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A deciduous tree that is known for its bright **orange-red flowers** that bloom in the spring season.



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- *Butea monosperma* (Punjabi: ਪੇਸੂ, Sanskrit: किशुक, Hindi: पलाश, Bengali: পলাশ, Marathi: पळस)
- A species of *Butea* native to tropical and sub-tropical parts of the Indian Subcontinent and Southeast Asia.
  - across India,
  - Bangladesh,
  - Nepal,
  - Sri Lanka,
  - Myanmar,
  - Thailand,
  - Laos, Cambodia, Vietnam, Malaysia, and western Indonesia.
- It is a medium sized dry season-deciduous tree, growing to 15 m tall.
- It is a **slow growing tree**, young trees have a growth rate of a few feet per year.
- The leaves are **pinnate**, with an 8–16 cm petiole and three leaflets, each leaflet 10–20 cm long.
- The flowers are 2.5 cm long, bright orange-red, and produced in racemes up to 15 cm long.
- The fruit is a pod 15–20 cm long and 4–5 cm broad.
- These flowers are not only **beautiful but also have several traditional and medicinal uses**. The flowers are used to make dyes, and the gum produced by the tree is used in traditional medicine to treat several ailments.



## 5. State Tree- **Ashok Tree (*Saraca asoka*):**

### **Ashok Tree (*Saraca asoka*)**

*Saraca asoca* is a plant belonging to subfamily of the legume family. It is an important tree in the cultural traditions of the Indian Subcontinent and adjacent areas.



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## 5. State Tree- **Ashok Tree (*Saraca asoka*):**

- The Ashoka is a rain-forest tree. It is also an endangered tree.
  - Its original distribution was in the central areas of the Deccan plateau, as well as the middle section of the Western Ghats in the western coastal zone of the Indian Subcontinent.
  - The Ashoka is prized for its beautiful foliage and fragrant flowers.
  - It is a small, erect evergreen tree, with deep green leaves growing in dense clusters.
- Its flowering season is around February to April.
- The Ashoka flowers come in **heavy, lush bunches**.
- They are **bright orange-yellow** in color, turning **RED** before wilting.
- As a wild tree, the Ashoka is a vulnerable species.
- It is becoming rarer in its natural habitat, but isolated wild Ashoka trees are still to be found in the foothills of central and eastern Himalayas, in scattered locations of the northern plains of India as well as on the west coast of the Subcontinent near Mumbai.

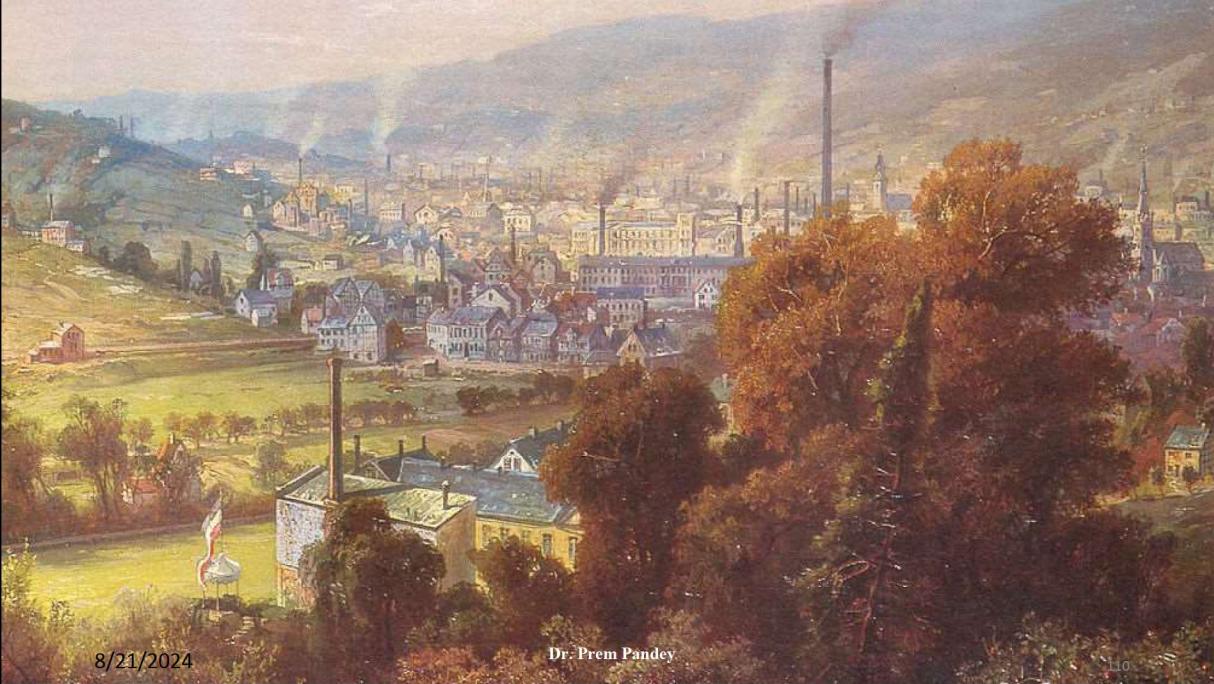


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- The Industrial Revolution marked the transition to coal power, electricity, and factory production.
- from about 1760 to 1840.
  - What unintended consequences and resource depletion took place?



## Tragedy of the Commons



- Pamphlet published by an economist in 1833 describing a major cause of resource depletion:
  - Greed; individuals pursuing personal wealth at the expense of the society as a whole.
- Commons are resources that are shared and not owned.
- Term was made popular by Garrett HARDIN in his 1968 essay The tragedy of commons

- Two small villages both consist of sheep farmers who raise and sell sheep to a nearby city.

- The first village has an unregulated, shared pasture for grazing.



- The second village passes a law assigning each farmer a fenced section of the pasture.



**Which is more likely to experience resource depletion?**

- Two small villages both consist of sheep farmers who raise and sell sheep to a nearby city.

- The first village has an unregulated, shared pasture for grazing.



**Which is more likely to experience resource depletion?**

The first village due to people overgrazing (**tragedy**) the shared pasture (**commons**).



- Overexploitation of natural resources, pollution, and climate change are all modern examples of the tragedy of the commons.

## The Progressive Era MO- 2024

- The Progressive Era began at the turn of the 20<sup>th</sup> century.
  - Greater emphasis on conserving resources and protecting land.



# The Progressive Era

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- During the progressive era, the **Antiquities Act** was passed, allowing the federal government (US) to protect cultural and natural resources.



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## MO-2024 Modern Environmentalism



- The **modern environmental movement**, starting in the 1960s, ushered in a wave of public awareness and legislation...
  - Reducing air and water pollution
  - Preserving ecosystems and biodiversity
  - Promoting sustainability
- This movement was triggered by a series of environmental disasters that occurred in the previous decades.



- In 1946, nuclear bomb testing in the Marshall Islands exposed native islanders and Navy sailors to radioactive fallout.
  - This material was **carcinogenic**, meaning it increased the risk of cancer.



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- In 1948, air pollution from a zinc and steel plant caused a dense smog that sickened thousands in Donora, Pennsylvania.
  - **Air pollution** is the introduction of particles and gases into the atmosphere that are harmful to living organisms.

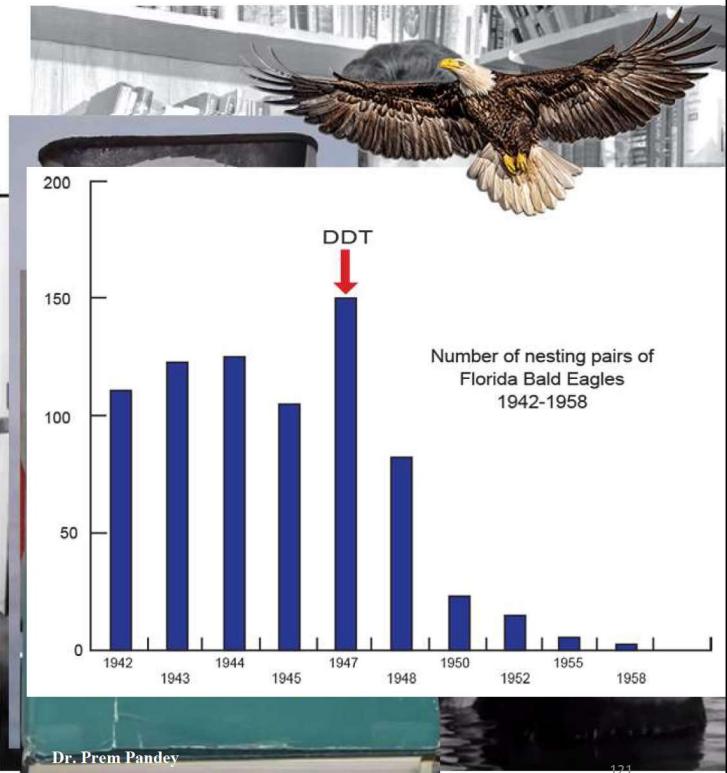


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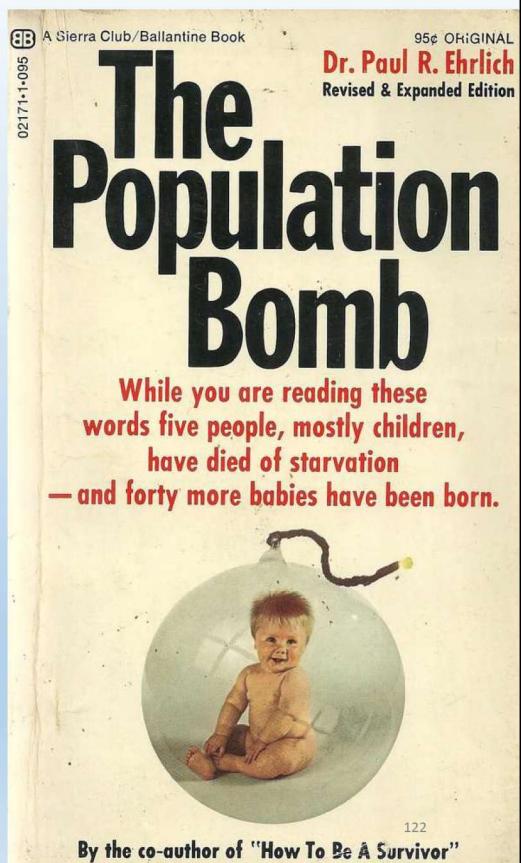
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- In 1962, Rachel Carson published *Silent Spring*, documenting the impacts that pesticides like DDT were having on wildlife.
  - DDT is **persistent**, meaning it is not biodegradable and will not break down naturally.
- Many species of birds, including the bald eagle, nearly went extinct.
  - **Extinction** is the complete loss of a species from the Earth.



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- In 1968, *The Population Bomb* is published, blaming many environmental problems on human overpopulation and predicting a global famine.
  - A **famine** is an extreme shortage of food.



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- In 1969, oil-soaked debris caught fire in the Cuyahoga River, Ohio bringing the problem of water pollution to the public's attention.
  - **Water pollution** is the contamination of lakes, rivers, oceans, and groundwater.

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- In 1978, the city of Love Canal, New York was abandoned and demolished due to a leaking hazardous waste dump buried underneath it.
  - **Hazardous waste** includes chemicals known to be dangerous to human health.



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# Environmental Rules and Laws Acts- INDIA

## Wildlife (Protection) Act

focussing on the conservation of wildlife species and their habitats in India.  
(1993-amended)

1927

1972

## Indian Forest Act.

regulate the collection of forest produce by forest dwellers and some activities declared as offences and imprisonment and fines

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**Water (Prevention And Control Of Pollution) Cess Act**  
levy and collection of a cess on water consumed by person

1974

1974

**Water (Prevention and control of Pollution) act**  
Restricts pollution of the water- surface water- rivers (lays down the framework for the prevention and control of water pollution).

1980

**Air (Prevention & Control of Pollution) Act**  
Restricts pollution of the atmosphere.  
Provide for the prevention, control and abatement of air pollution in India.  
Amended in 1987

1981

1986

**Forest (Conservation) Act**  
provides the framework for the conservation of forests,  
(Amended- 1988)

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**The Noise Pollution (Regulation and Control) Rules,**  
regulate the level of noise in any area

2000

2002

**Biological Diversity Act**  
provides for the conservation and sustainable use of biological resources

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## The Environment (Protection) Act, 1986 (EPA)

The **umbrella legislation** for environmental protection in India. It empowers the union government to initiate various steps for environmental protection and improvement

**Solid Waste Management Rules, 2016;**

**E-Waste (Management) Rules, 2016;**

**Plastic Waste (Management) Rules, 2016**

**The Coastal Zone Regulation Notification, 2019 (CRZ Notification);**

**The Environmental Impact Assessment Notification, 2006 (EIA Notification)**  
provides that an environmental impact assessment must be carried out when seeking an environmental clearance (EC) for new projects

**Hazardous and Other Wastes (Management) Rules, 2016.**

National Policy on Resettlement & Rehabilitation, 2007

# Environmental Rules and Laws Acts- INDIA

- The Public Liability Insurance Act and Rules 1991 and Amendment, 1992
- The National Environmental Tribunal Act, 1995, Amendment, 2010
- The National Environment Appellate Authority Act, 1997
- The Biomedical Waste (Management and Handling) Rules, 1998
- The Environment (Siting for Industrial Projects) Rules, 1999
- The Municipal Solid Wastes (Management and Handling) Rules, 2000
- The Batteries (Management and Handling) Rules, 2001
- The Noise Pollution (Regulation and Control) (Amendment) Rules, 2010
- The Air (prevention and control of pollution) Act, 1981
- Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA)
- The Forest (Conservation) Act, 1980
- The Wildlife Protection Act, 1972
- The Water (Prevention and Control of Pollution) Act, 1974
- The Ozone-Depleting Substances (Regulation And Control) Rules, 2000
  - Coastal Regulation Zone Notification, 2018
- The Energy Conservation Act, 2001
- The Biological Diversity Act, 2002
- The National Green Tribunal Act, 2010
- The Wildlife (Protection) Act, 1972
  - The Wildlife (Protection) Amendment Bill, 2021

Source: <https://www.ecology.edu/environmental-legislation.html>

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## WORLD -



- The Environmental Protection Agency (EPA) was established in 1970 to enforce federal environmental laws.

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# Field Visit plan

## Block these 5 dates

Saturday - **Of each week Sep/Oct**

Inform me before planning your vacation.

## India is a party to various **International environmental treaties**

**The Declaration of the United Nations Conference on Human Environment or Stockholm Declaration (1972):** first international effort to place environmental issues at the forefront of global concerns.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975), (CITES)

**The Montreal Protocol on Substances that Deplete the Ozone Layer (1987),**

The Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal (1989),

The Convention on Biological Diversity (1992) (**CBD**) , and

**The Rio Declaration on Environment and Development (1992).**

# Global Environmentalism

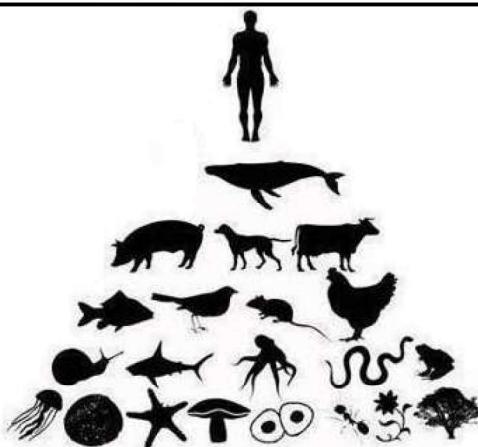
➤ Following the 1970s, environmentalism began to consider issues that affected the entire planet:

- Biodiversity loss
- Food production
- Climate Change
- Human population growth
- Economic inequality between nations



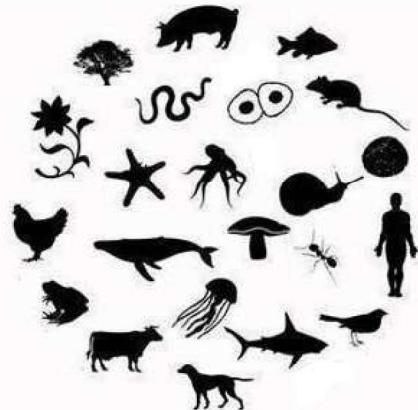
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## Anthropocentrism

- Human-centered philosophy
- Human interests and well-being come first
- E.g Advocated to build the dam



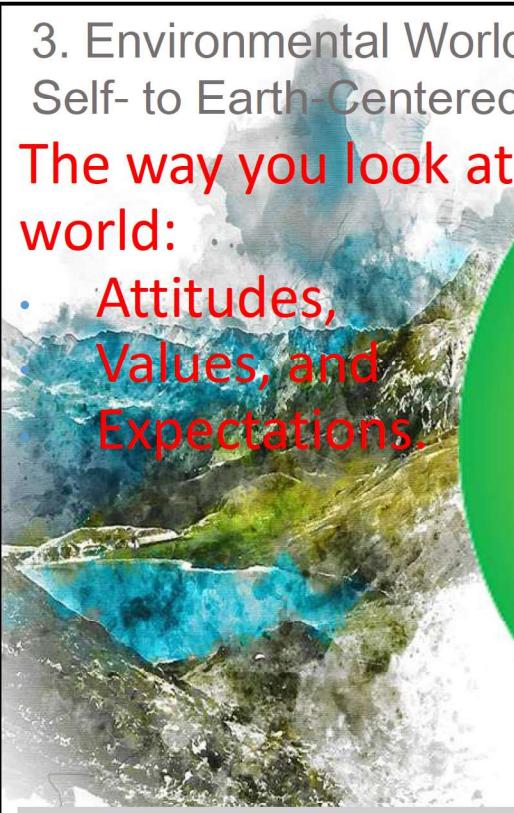
## Ecocentrism

- Nature-centered philosophy
- Preserving ecosystems comes first
- E.g .Advocated to leave the valley untouched

### 3. Environmental Worldviews Lie on a Continuum—from Self- to Earth-Centered

The way you look at the world:

- Attitudes, Values, and Expectations.



\* Intrinsic Values play bigger role

& Instrumental Values play bigger role

## Environmental Worldviews

### Planetary Management

- Humans “rule” the Earth.
- Technology and ingenuity will prevent the loss of resources.
- Economic potential is unlimited.

### Stewardship

- Human needs come first but we must care for other species too.
- Conserve resources for future generations when possible.
- Prefer economic growth that does not harm the environment.

### Environmental Wisdom

- Humans are no more important than any other species.
- Resources are finite, wastes do not “go away”.
- Our survival depends on sustaining the Earth.

Anthropocentric

Ecocentric

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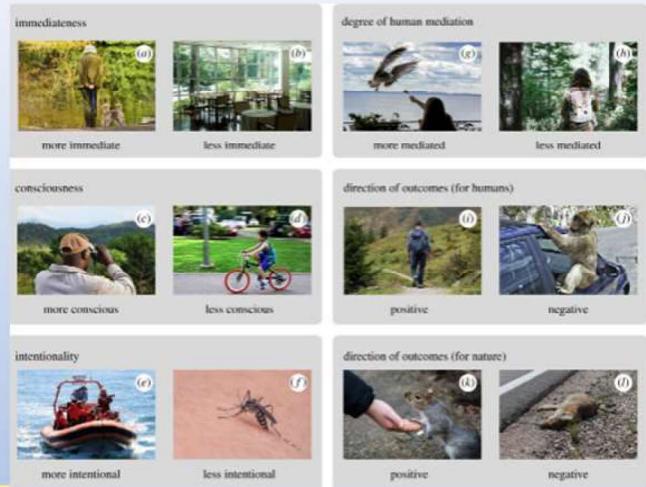
➤ 1. Planetary Management worldview policies prioritize short-term economic growth.

- Permitting dam building in Tehri and Highways in National Wildlife
- Expansion of oil pipelines in coastal regions
- Reduction in automotive fuel standards.
- Removal of caps on carbon emissions.

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➤ 2. Stewardship worldview policies try to balance economic growth with sustainability.

- Winding down fossil fuel subsidies in favor of wind, solar, and geothermal ones.
- Revision of Clean Air Act regulations to include new pollutants.
- Continuous monitoring of emissions from Stacks.
- Subsidies for public transit and efficient building construction.



The Stewardship Worldview assumes :

- we have an ethical responsibility as humans to be
  - caring and
  - responsible managers, or stewards, of the Earth

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➤ 3. Environmental Wisdom policies prioritize environmental protection over economic growth.

- Carbon neutrality for electricity generation by 2050.
- Banning of certain types and applications of plastics.
- Ban of Plastics of certain thickness and size
- Taxing all carbon emissions.

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Environmental protection is often seen in conflict with

- individual freedom and
- economic growth.

The proponents of environmental protection suggest:

- the environment is a global resource that must be protected for future generations, even at the expense of
  - economic growth and
  - Individual freedoms.

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## Organizations Involved in Environmental Protection

1. CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora
2. IUCN - International Union for Conservation of Nature
  1. IUCN-SSC- (Species survival commission)
3. WWF – World Wildlife Fund
4. UN – United Nations
5. UNEP – United Nations Environment Programme
6. *Greenpeace*



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Go Green ! Love your Environment !  
Pledge towards a greener Environment

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