Environment Conservation

BA Semester I (Elective Subject)

PRESENTATION I

By : Dr.Amanpreet Kaur
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Welcome to the Class!

"Lets nurture the nature so that we can have a better future "

Robert Orbern

About the Subject

Environment Conservation is a milestone in interdisciplinary teaching at higher education level. It covers the basic issues pertaining to Environment with detailed solutions and Conservation practices.

SEMESTER I
PAPER: ENVIRONMENT AND FORESTRY

About the Paper

- UNIT I Environment & Ecosystem
- UNIT II Natural Resources
- UNIT III Forestry
- UNIT IV Indoor Environment

UNIT I - Topic for the Day

Definition, Scope and Importance of Environment

Environment is sum total of physical, chemical, biological and socio-cultural factors that affect man in one way or the other

Understanding the Definition

PHYSICAL FACTORS

AIR, WATER, SUNLIGHT, LANDSCAPE, SOIL, BUILD UP STRUCTURES, NON LIVING THINGS

CHEMICAL FACTORS

GASES, CHEMICAL COMPOUNDS, METALS, NON-METALS

BIOLOGICAL FACTORS

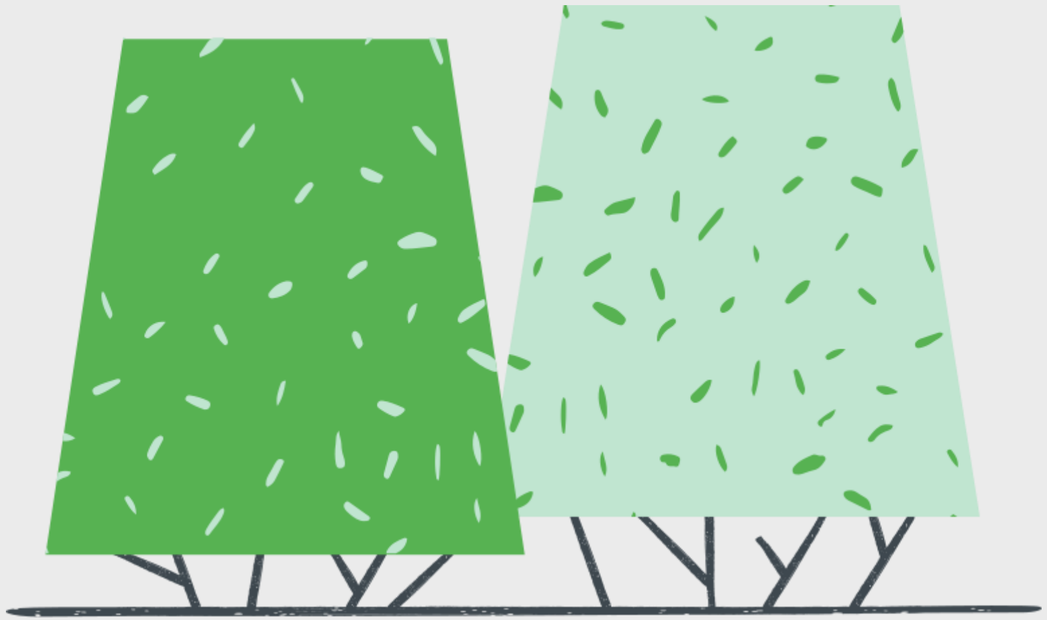
PLANTS, ANIMALS, MICRO-ORGANISMS, HUMANS

SOCIO-CULTURAL FACTORS

TRADITIONS, SOCIAL STRUCTURE, LIFESTYLE, RELIGIOUS PRACTICES

All these factors make our surroundings and affects us!!!!!

MULTIDISCIPLINARY APPROACH



To study Environment of an area, requires knowledge and understanding of :

- Biological Sciences
- Chemistry
- Physics
- Math & Statistics
- Geography
- Sociology

IMPORTANCE OF ENVIRONMENT

Watch this Video !

https://www.youtube.com/watch?v=iHiXmBrmoao#action=share

IMPORTANCE OF ENVIRONMENT

FOOD TO EAT

WATER TO DRINK

CLEAN AIR TO BREATHE

MEDICINE AND HEALTH

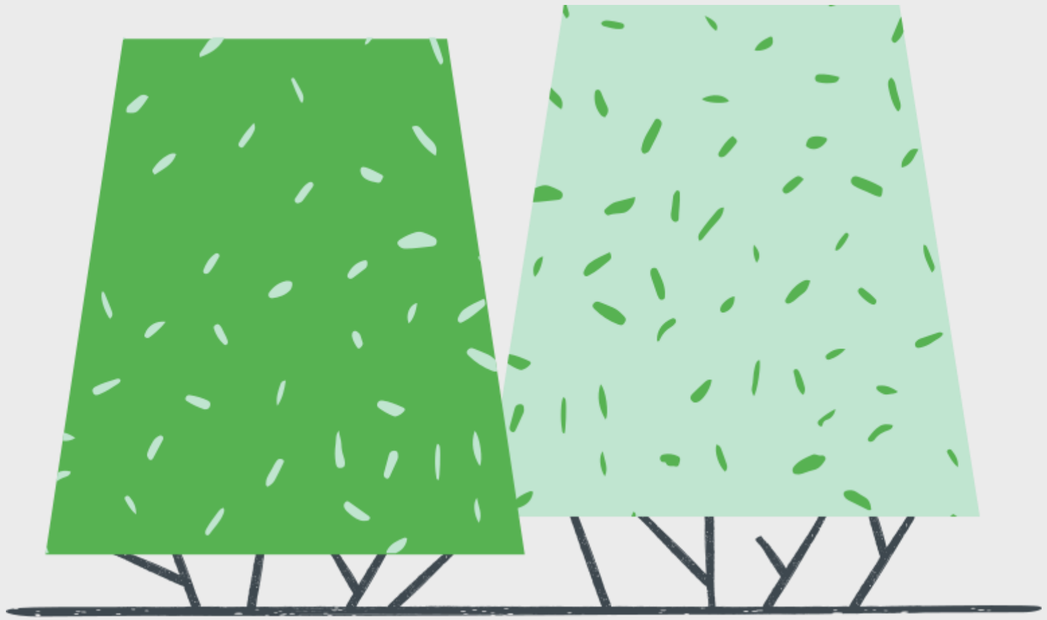
HABITAT FOR WILDLIFE

RESEARCH & DEVELOPMENT

RESOURCES FOR DEVELOPMENT

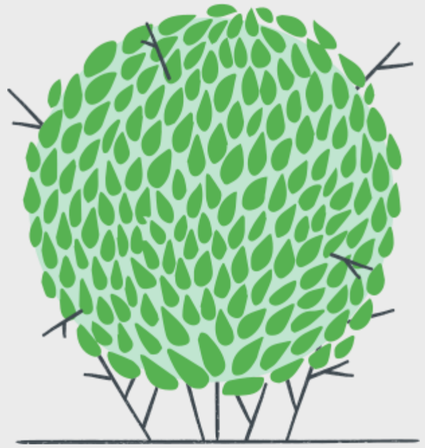
MINERALS &METALS FOR INDUSTRIES

SCOPE OF ENVIRONMENT



Environment Studies is applied in various fields like:

- Conservation of Resources
- Pollution Control
- Agriculture Sciences
- Economic Growth
- Social Issues
- Health Science
- Lifestyle Problems
- Naturopathy



Comprehension Questions

Question 1

Explain the interdisciplinary nature of the Environment as a subject.

Question 2

Can you imagine life anywhere else except Earth?

RESOURCE: http://ecoursesonline.iasri.res.in/mod/page/view.php?id=128611#:~:text=The%20scope%20of%20environmental%20studies,human%20population%20on%20the%20environment.

UNIT I - Topic for the Day

A Brief Introduction of Physical & Biological Environment

Wholistic view of Environment encompasses all the surroundings, studied as different segments of Earth.

Four Segments of Earth

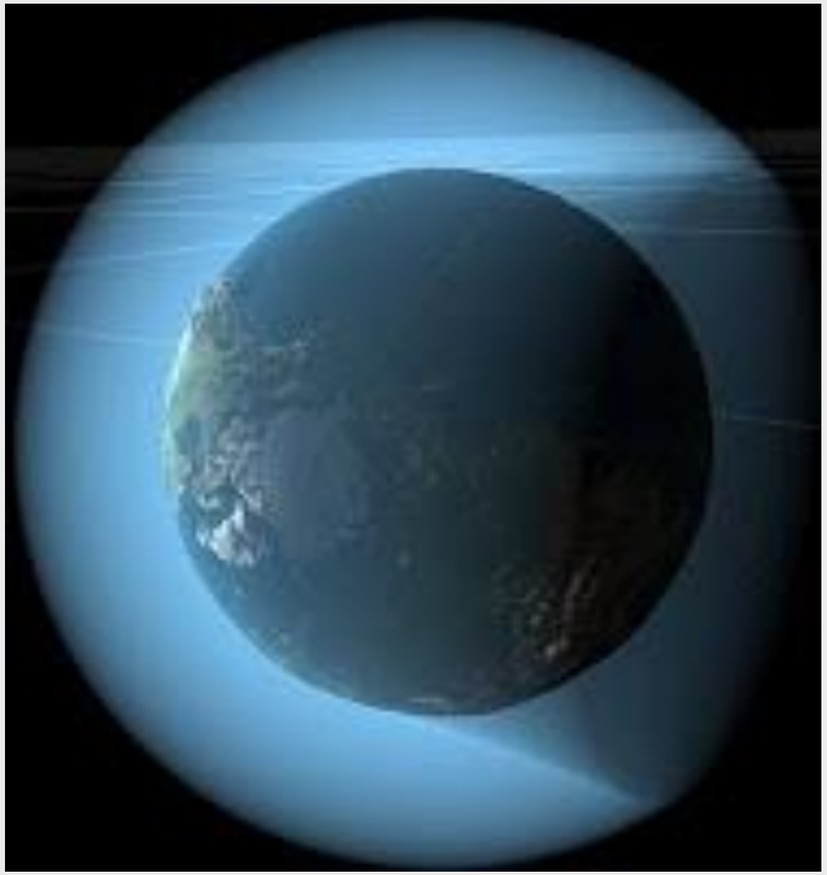
ATMOSPHERE

LITHOSPHERE

HYDROSPHERE

BIOSPHERE

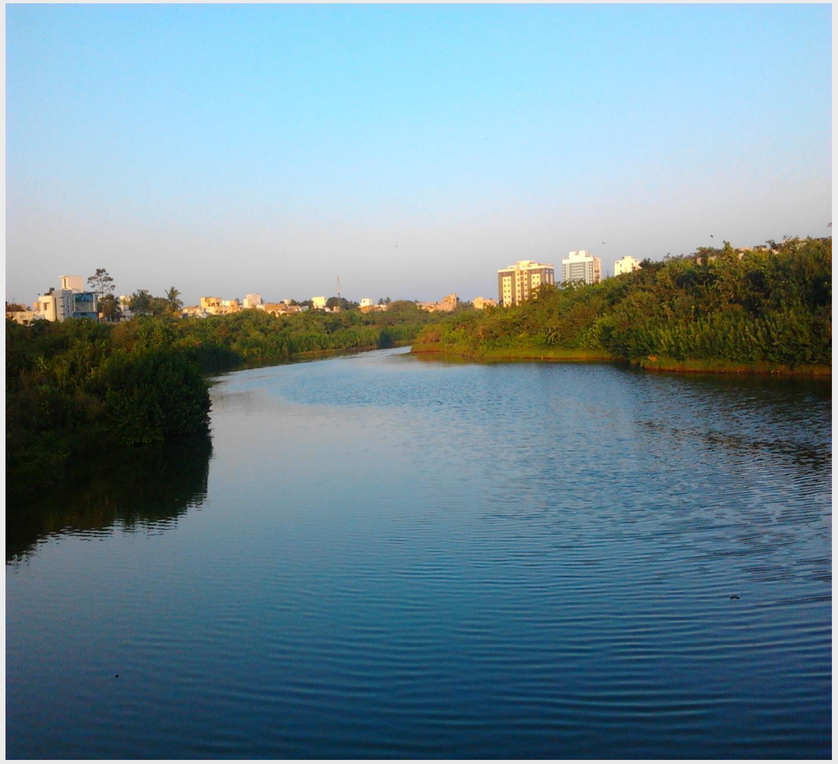
ATMOSPHERE



Thick layer of gases enveloping Earth

- Extends from 0 to 10,000 km
- Vertically stratified into layers
- Temperature and Composition of gases changes with altitude
- Nitrogen – the most abundant gas
- Essential for life

HYDROSPHERE



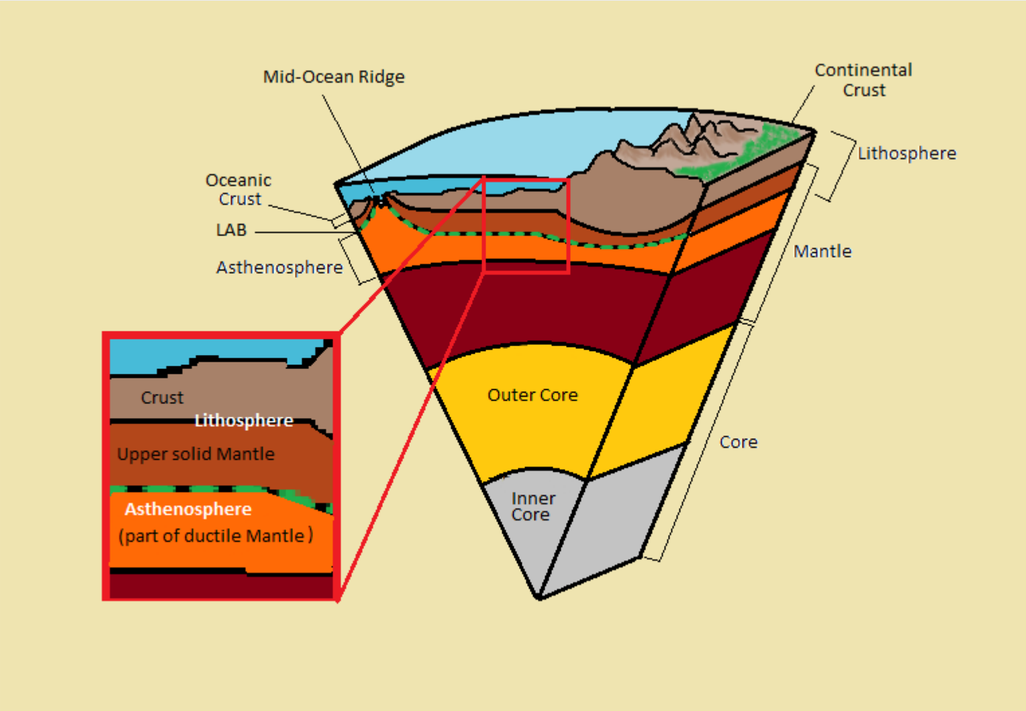
Total amount water on Earth (Blue planet)

- Comprises water on surface, underground and in the air
- Exists in liquid, solid and gaseous form
- Majority 97.5 % as Ocean
- Elixir of Life

Watch this Video !

https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/57d00d7216b51c2f9810a8e7

LITHOSPHERE



Uppermost layer of Earth Surface comprising Crust & Upper mantle:

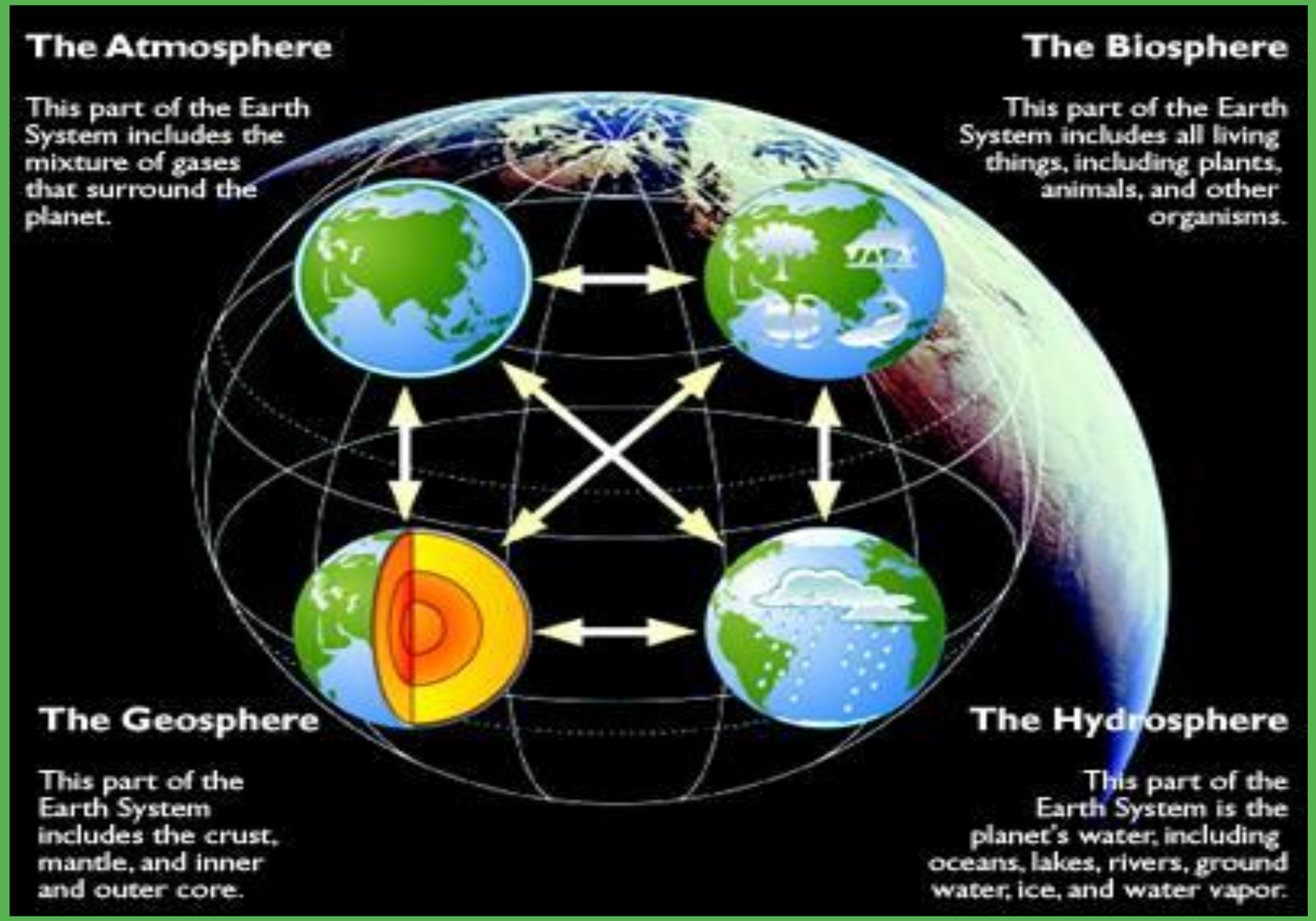
- Not a continuous layer
- Divided into 7 major and 2 minor plates
- Asthenosphere –a semi solid mantle lies below it
- Topmost layer – Soil supports all life

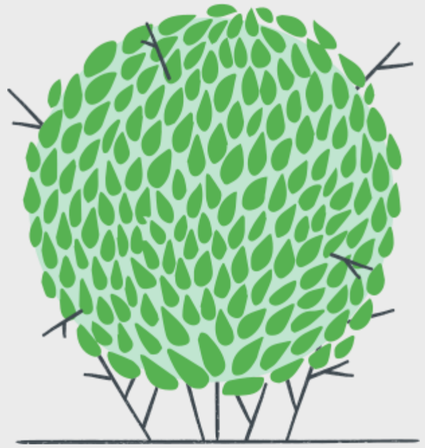
BIOSPHERE

All living organisms on Earth:

- Comprises terrestrial, marine, aquatic life
- Connects all the spheres
- Essential for cycling for minerals and energy
- Unique sum of all ecosystems

Inter linking of the Four Spheres





Comprehension Questions

Question 1

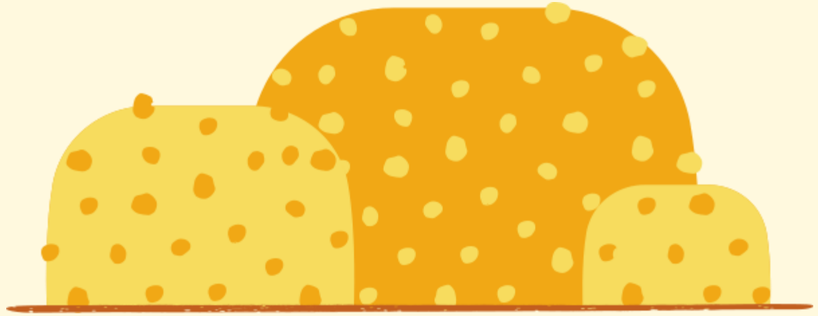
How is life possible on Earth? Explain

Question 2

70% of Earth’s surface is covered with water. Yet , water is scarce. Explain

Resource:
http://www.nationalgeographic.org/encyclopedia/biosphere/

Thank you for joining today's class.



Environment Conservation

BA SEMESTER I ELECTIVE SUBJECT

PRESENTATION II

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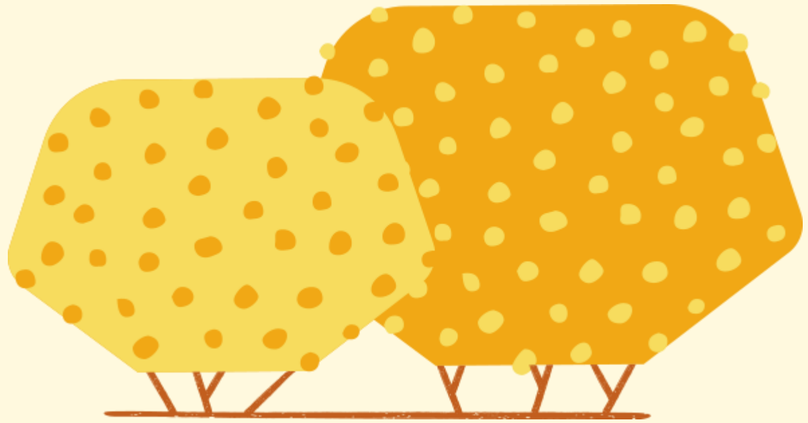
UNIT- I Topic for the Day

ECOLOGY- LEVELS AND TYPES



ECOLOGY

The term was coined by Ernst Heckel in 1886.

Ecology is defined as the study of interrelationship between living organisms and the non living environment.

It is a complex subject.

Two Components of Ecology

Living

Non-Living

Individual study of these components is easy.

But study of interrelations of all living organisms with all non living components is complex and complicated

Levels of Ecology

BIOME

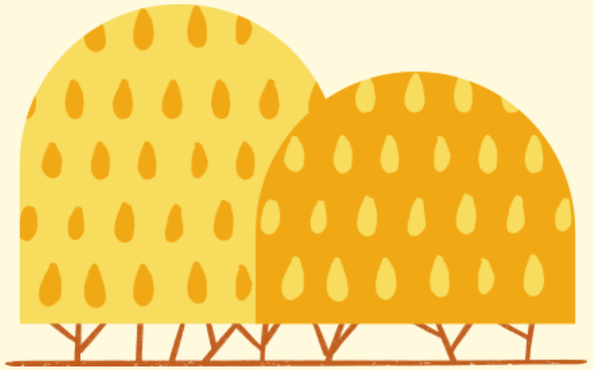
ECOSYSTEM

COMMUNITY

POPULATION

ORGANISM

Supplemental Video



https://www.youtube.com/watch?v=izRvPaAWgyw

Types of Ecology

Types of Ecology

Autecology

Study of interactions of a single organism with environment

Synecology

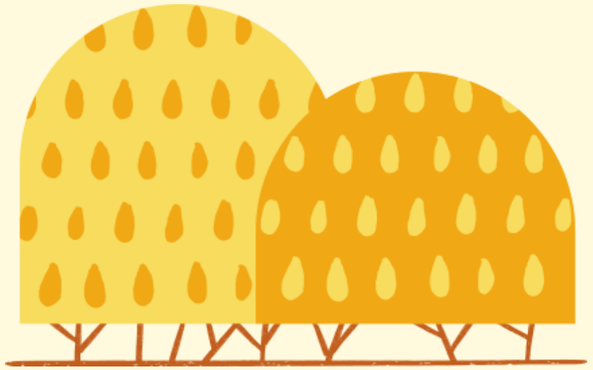
Study of interactions of group organisms with environment

Types of Ecology

Synecology is of different types based on different grouping of organisms

- **Population ecology**
- **Community ecology**
- **Ecosystem ecology**

Study and research at all levels of ecology depicted “Ecosystem” level as the best level for further research and study

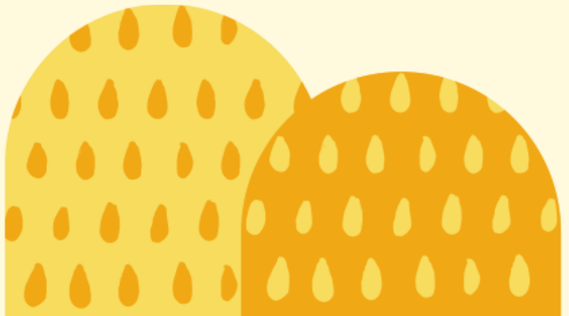


Thus, Ecosystem is the basic unit of Ecology

Worksheet

Question 1: Why is Ecology considered a complex science?

Question 2: Explain levels of Ecology with example of a forest ecosystem.



RESOURCE

Thank you for joining today's class.

ENVIRONMENT CONSERVATION

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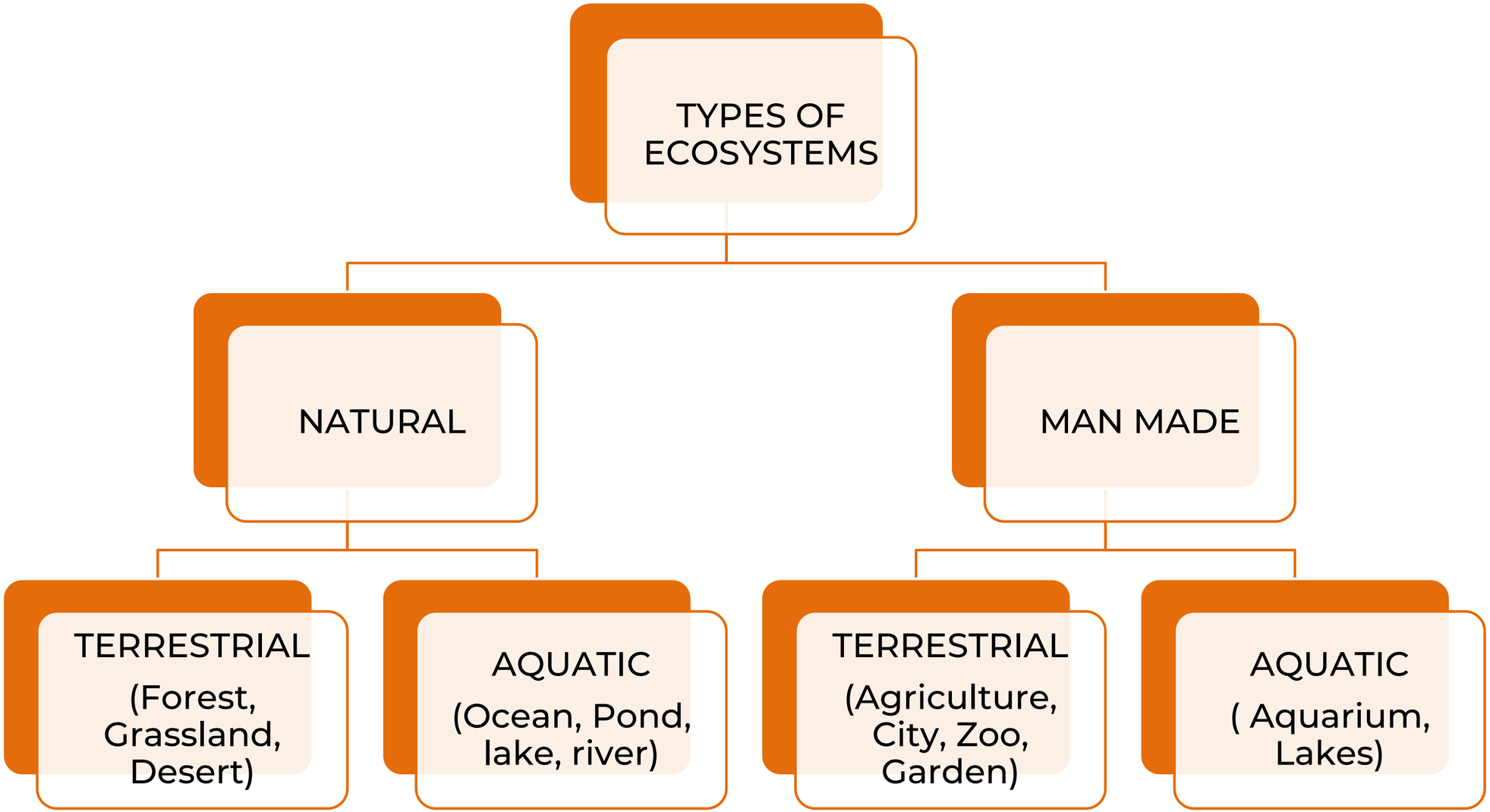
Ecosystem

The term Ecosytem was given by a British ecologist A.G. Tansley, in 1935. Ecosystem is the interactions and inter-relations between living organisms and non-living environment leading to

- formation of trophic structure
- flow of energy
- biodiversity
- cycling of matter


TYPES OF ECOSYSTEMS
NATURAL
MAN MADE
TERRESTRIAL
(Forest, Grassland, Desert)
AQUATIC
(Ocean, Pond, lake, river)
TERRESTRIAL
(Agriculture, City, Zoo, Garden)
AQUATIC
(Aquarium, Lakes)

Components of Ecosystem

BIOTIC
LIVING

ABIOTIC
NON-LIVING

Biotic Components

- PRODUCERS/AUTOTROPHS - Organisms which make their own food eg. plants
- CONSUMERS/HETEROTROPHS- Organisms which depend on others for food. They are of two types-

Primary Consumers/ Herbivores- Organisms which feed on plants

Secondary Consumers/Carnivores- Organisms which feed on animals

Biotic Components

- PARASITES- Disease causing small organisms which live on /in the body of large host organism drawing shelter and nutrition from it. For eg. lice, ticks
- SCAVANGES AND DETRIVORES- Organisms which feed on dead plant/ animal matter. For eg. Vulture, crow (Scavangers); termite, ants (detrivores)
- DECOMPOSERS/ MINERALIZERS- Micro organims which completely breakdown all living matter back into mineral form. For eg. Virus, bacteria

TROPHIC LEVELS

- PRODUCERS -T1
- PRIMARY CONSUMERS / HERBIVORES - T2
- SECONDARY CONSUMERS/ CARNIVORES
  - PRIMARY CARNIVORE-T3,
  - SECONDARY CARNIVORE -T4,
  - TOP CARNIVORE-T5
- PARASITES- T2 , T3, T4
- SCAVANGERS AND DETRIVORES- T2, T3, T4
- DECOMPOSERS- T6

Abiotic Components

- MINERAL MATTER - It includes all the mineral matter in the environment in form of soil and rocks.For eg. N, P, K, B
- ORGANIC MATTER- It includes all the dead palnt and animal matter in the environment called humus.
- PHYSICAL FEATURES - It includes Weather conditions, landscape and climate like temperature, rainfall, humidity, wind, sunlight.

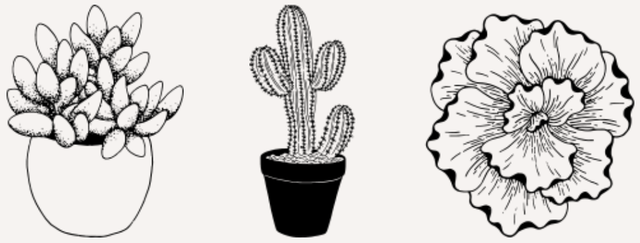
Comprehension Questions

Question 1
Which is the most stable ecosystem and why?

Question 2
Describe biotic and abiotic components of a agriculture as an ecosystem?

RESOURCE
https://www.researchgate.net/publication/328306598

Thank You for joining the class today



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PRESENTATION IV

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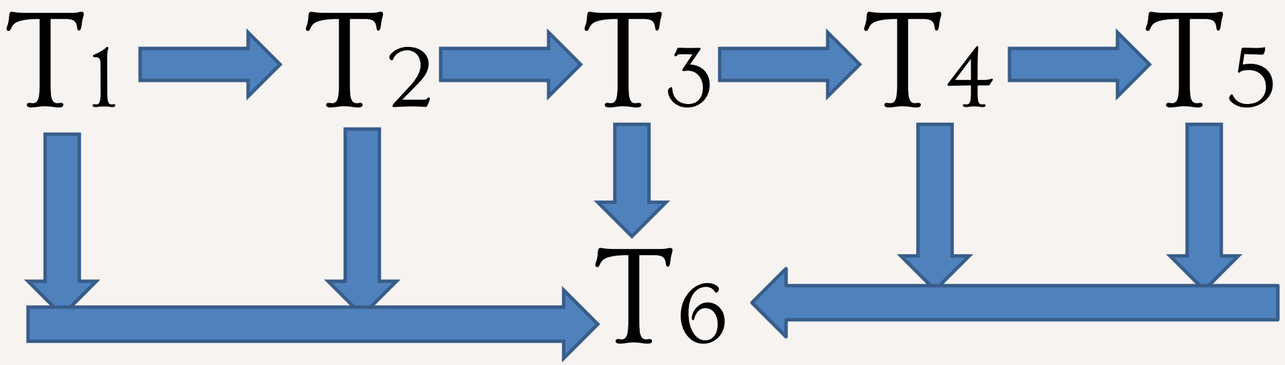
Unit -1 Topic of the Day

Food Chain, Food Web, Ecological Pyramids and Biogeochemical Cycles

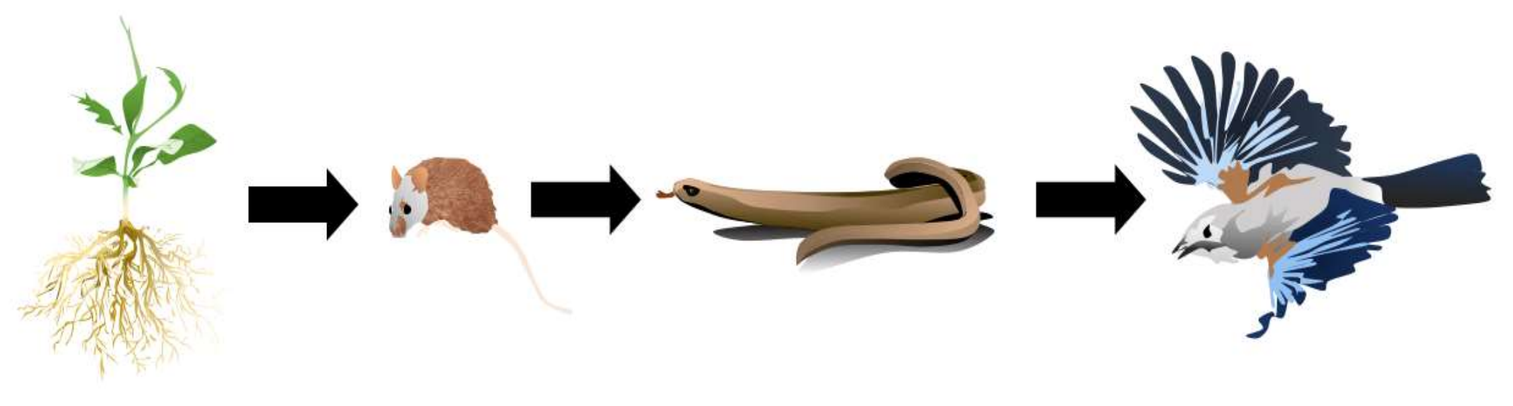
FOOD CHAIN

- Arrangement of organisms one after the other based on their food preferences
- Begins with Trophic Level I
- Unidirectional flow of energy
- Generalized food chain represents all trophic levels

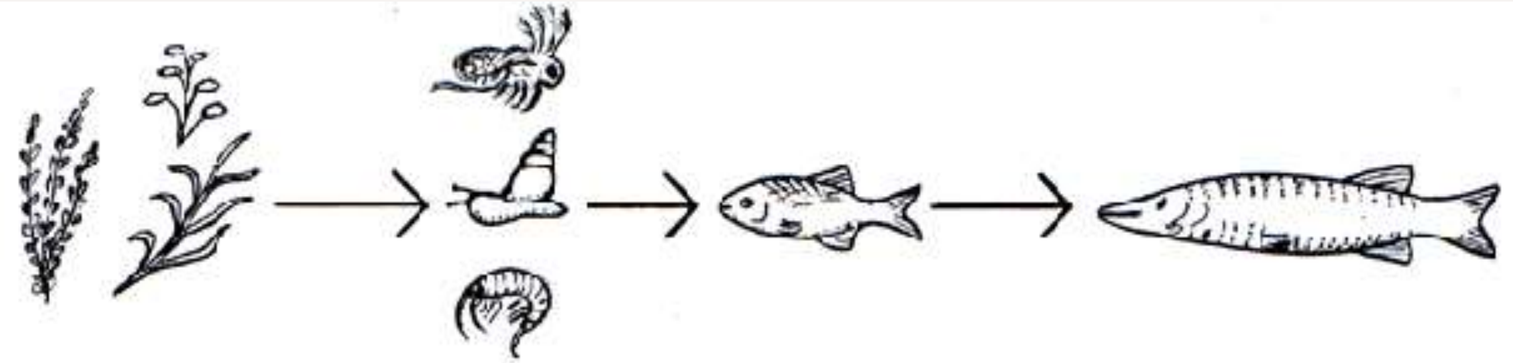


Look at the Examples

Terrestrial Food Chain



Aquatic Food Chain



Types of Food Chain

Predatory	Grass → Grasshopper → Frog → Snake → Peacock
Detritus	Fallen leaves → Earthworm → Blackbird → Hawk
Parasitic	Grass → Sheep → Liverfluke

Worksheet

Question 1: Why Decomposers are not depicted in food chains?

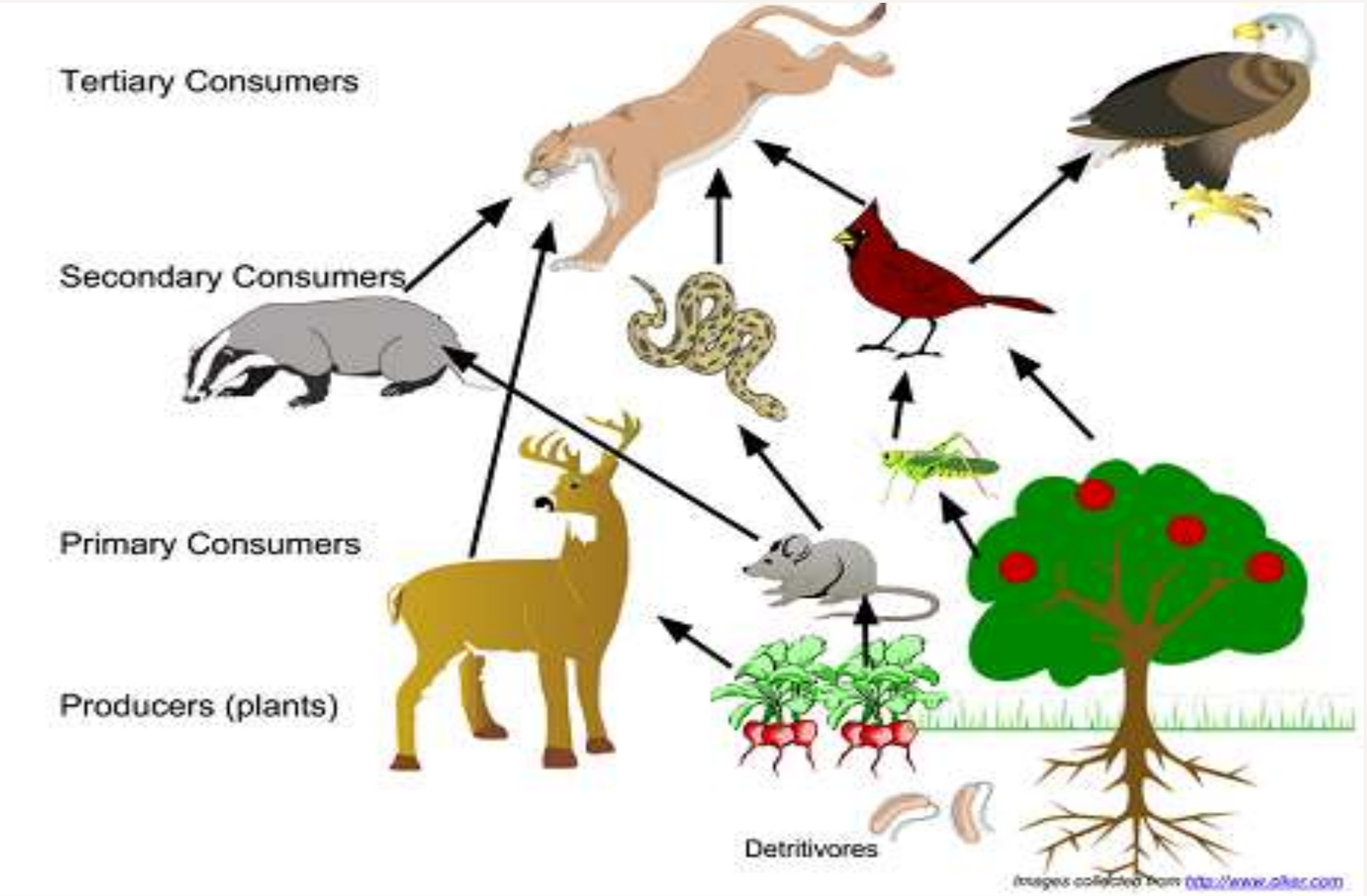
Question 2: Assign Trophic levels to the food chains done in types of food chain

Resource

https://www.researchgate.net/publication/328306598_Ecology_and_Ecosystem

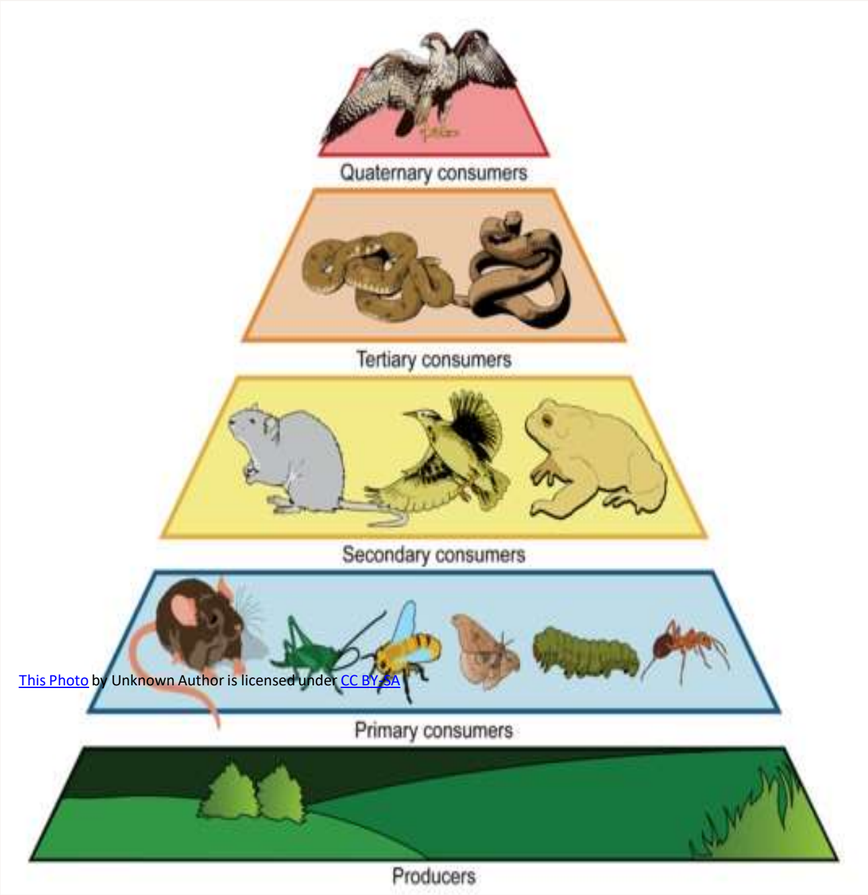
Food Web

Inter linking of food chains at different trophic levels forms a food web. More complex the food wen more stable is the ecosystem !



Ecological Pyramids

- Concept of Ecological Pyramids was given by Charles Elton, 1927
- Graphic arrangement of trophic levels
- Begins with Trophic Level I at the bottom

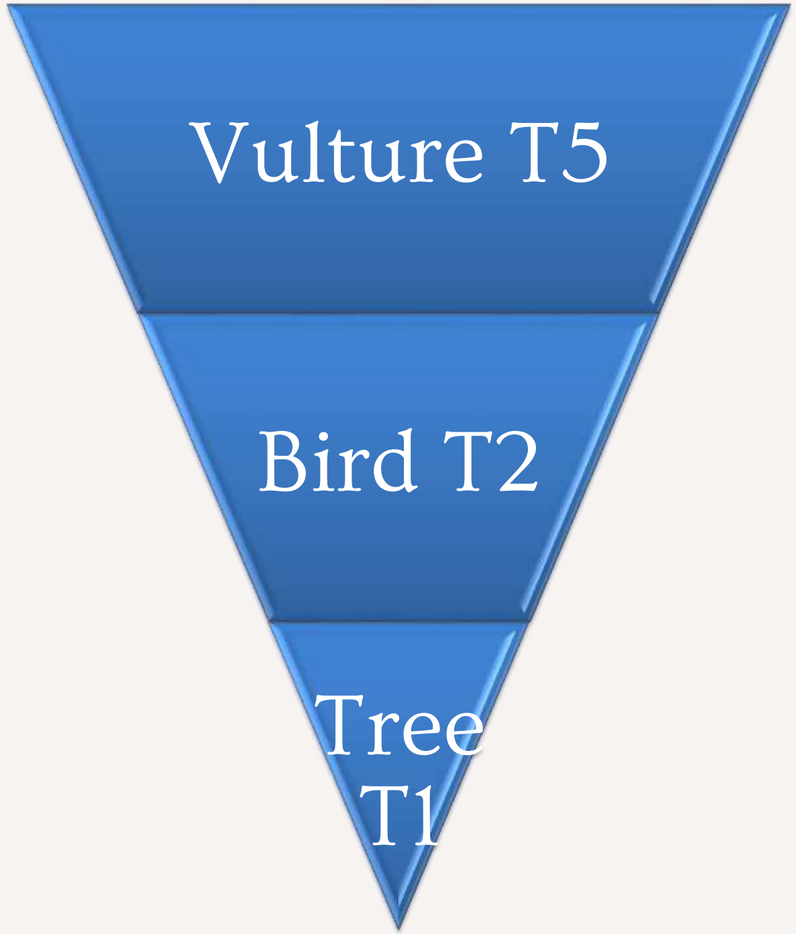


Types of Pyramids

Pyramid of Number	Represents number of organisms at each trophic level. Shapes: Upright (grassland), inverted(tree) and spindle (parasitic)
Pyramid of Biomass	Represents total weight of organisms at each trophic level. Shapes: Upright (Terrestrial), inverted(Marine)
Pyramid of Energy	Represents total energy at each trophic level. Shapes: Always Upright

Pyramid of Number

UPRIGHT

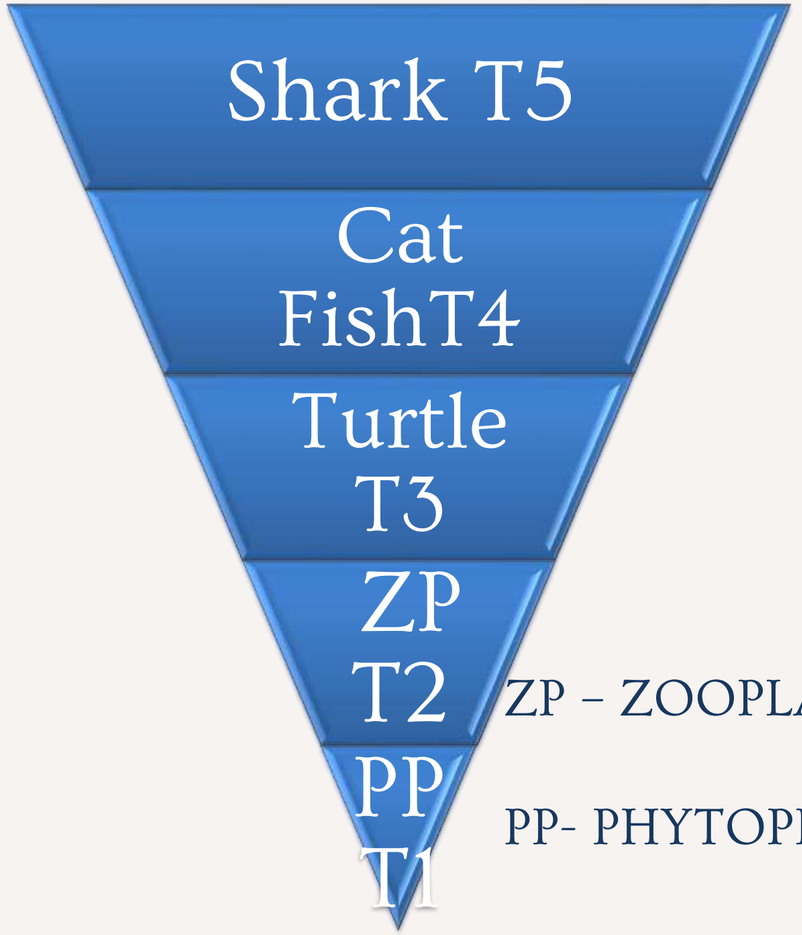


INVERTED

SPINDLE

Pyramid of Biomass

UPRIGHT



ZP – ZOOPLANKTON

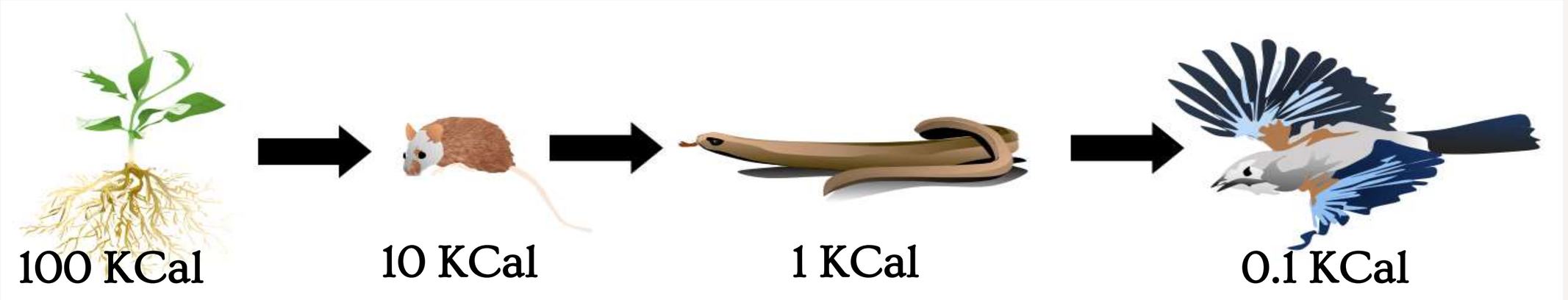
PP- PHYTOPLANKTON

INVERTED

Pyramid of Energy

ALWAYS UPRIGHT

Flow of Energy



- Energy flow is Unidirectional from producers to consumers
- Follows 10% law: Only 10% energy is transferred from one trophic level to another

Worksheet

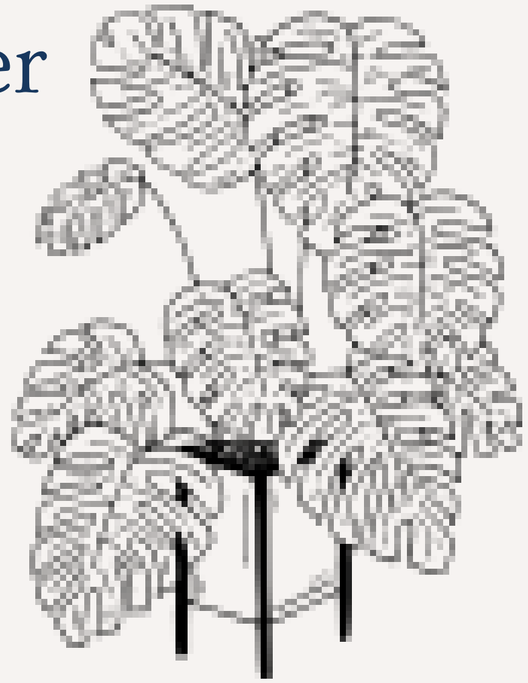
Question 1: Why is Pyramid of Energy always upright ?

Question 2: More complex the food web, more stable the ecosystem. Explain

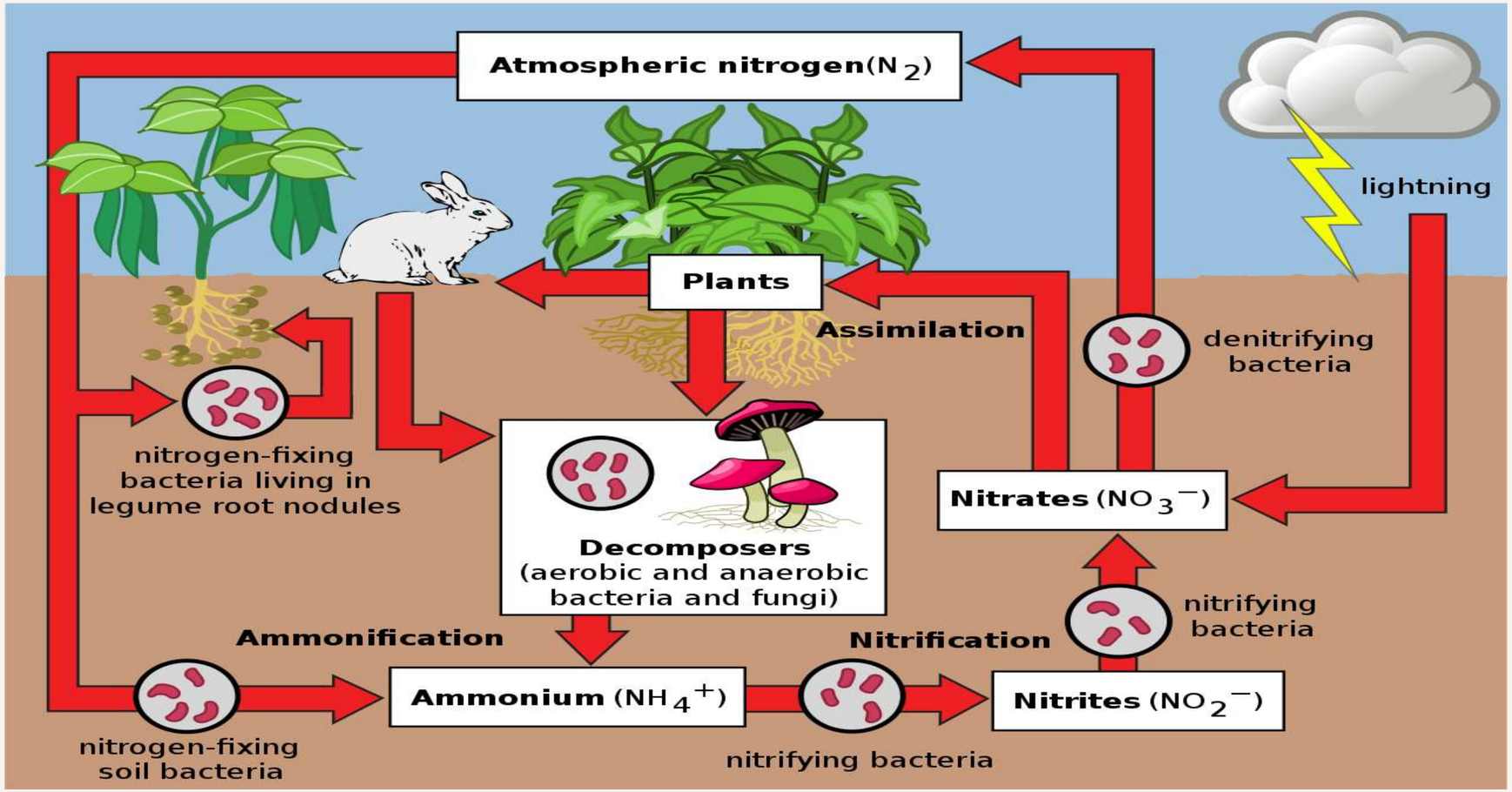
Resource
https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/5727046481fccb029d2f2f18

Biogeochemical Cycles

- Cycling of matter and minerals
- Continuous process
- Cycling among living and non-living
- Active pools = Plants, animals, air, water bodies, soil
- Storage pools = Leaching into Earth's interior

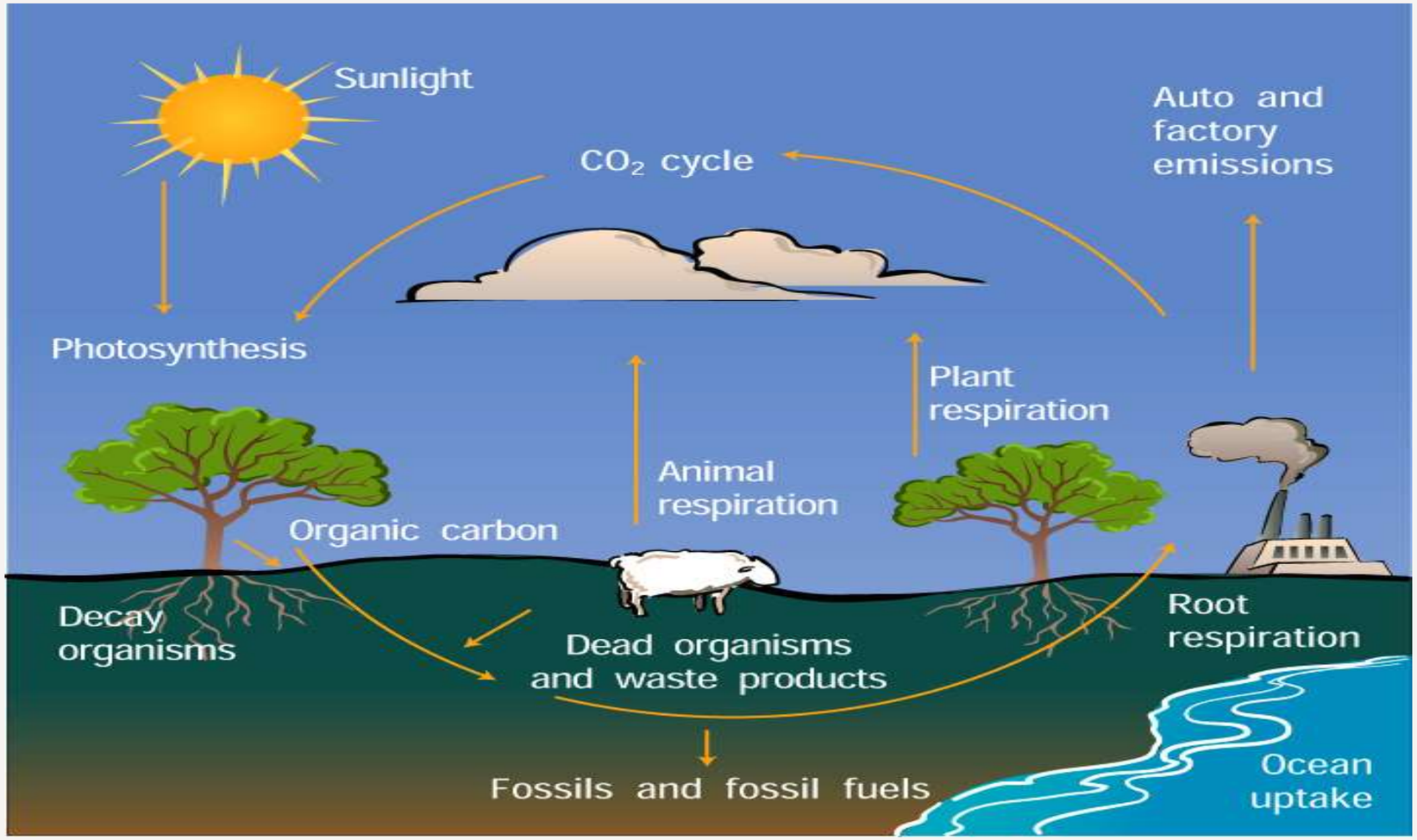


Nitrogen Cycle



Watch the Video
https://www.youtube.com/watch?v=o3k7I1JPjQE

Carbon Cycle



Watch the video
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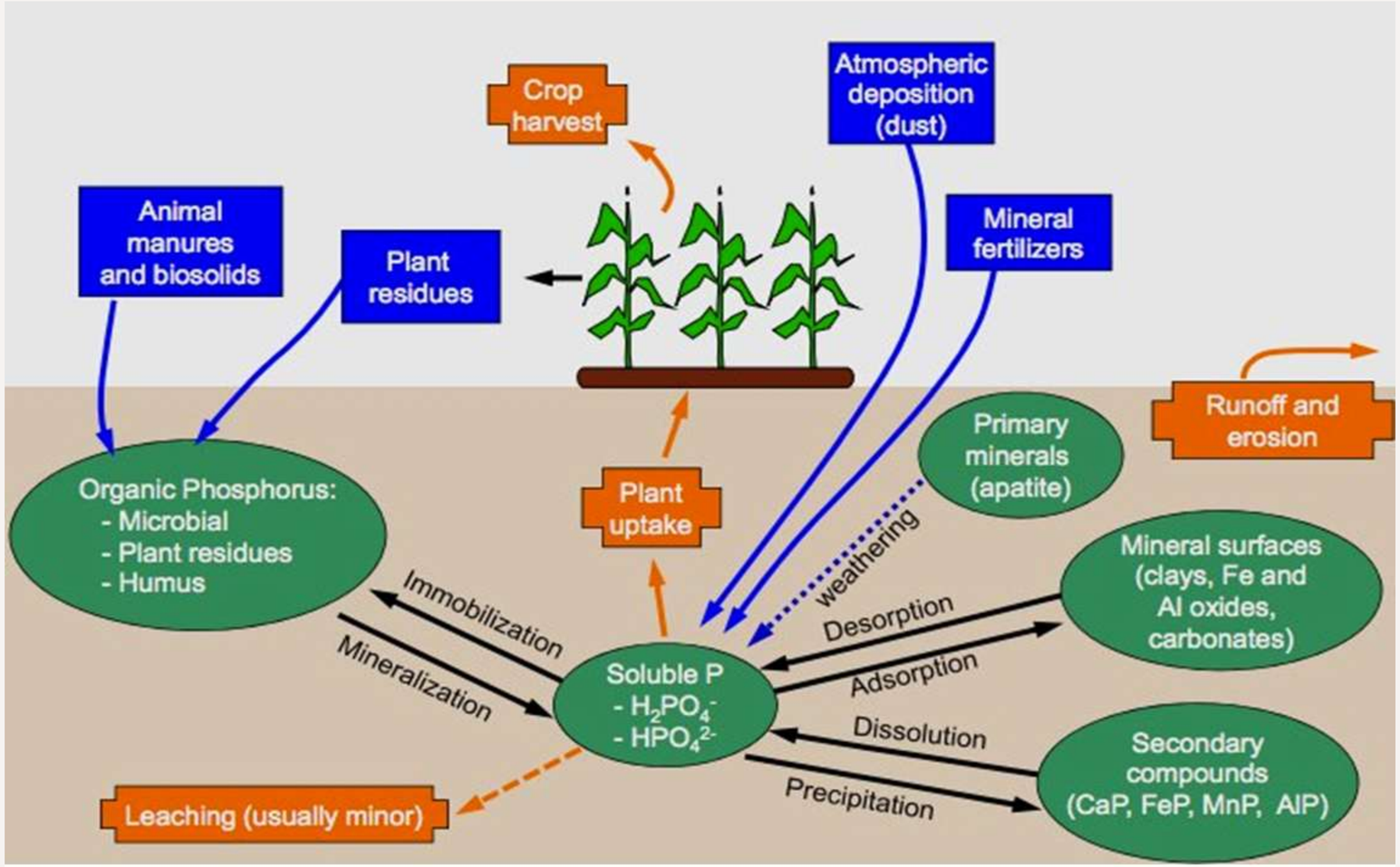
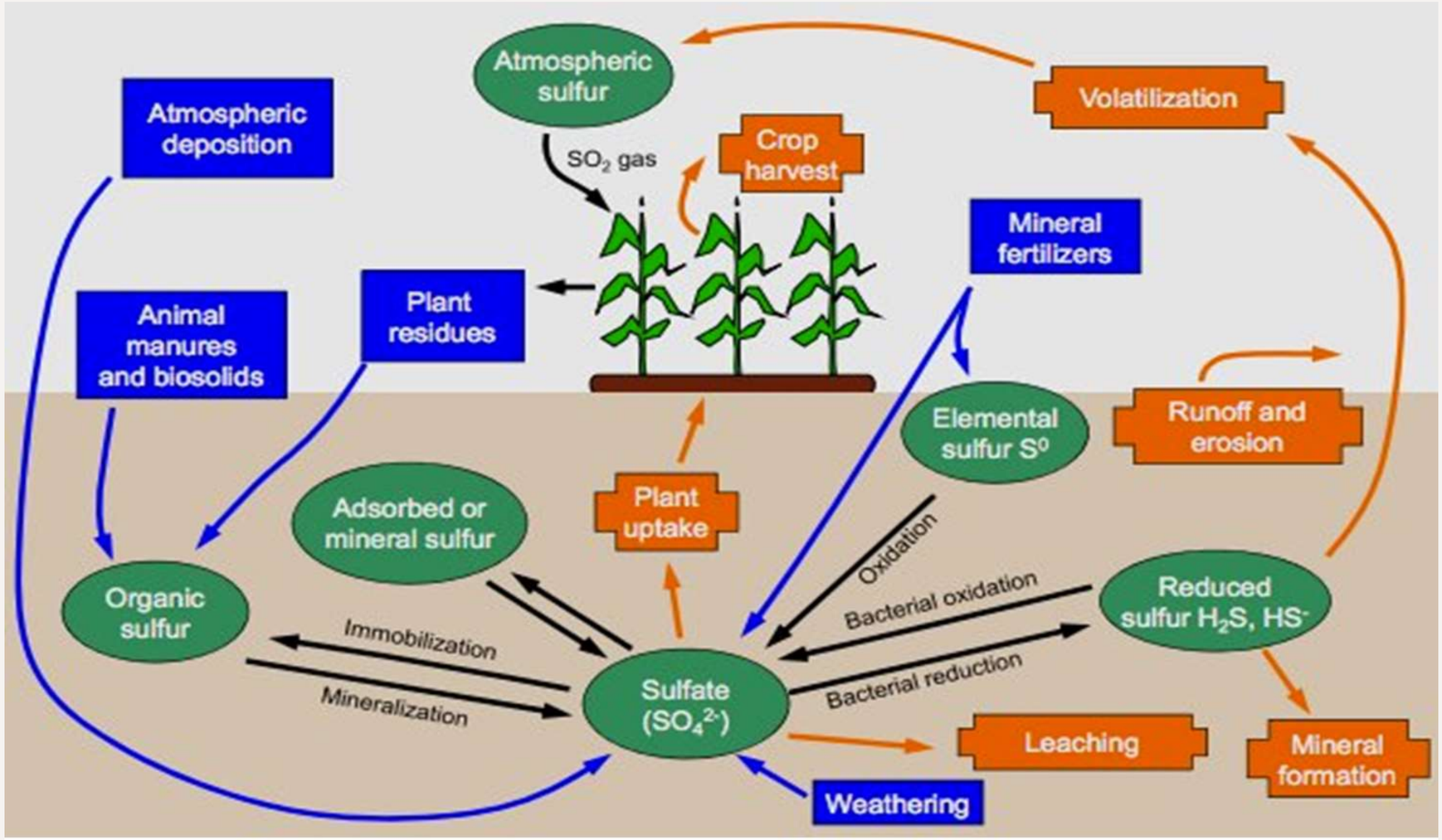
Phosphorus Cycle



Watch the Video:
https://www.youtube.com/watch?v=FB-zzOjGjYY

Sulphur Cycle



Watch the Video:
https://www.youtube.com/watch?v=FB-zzOjGjYY

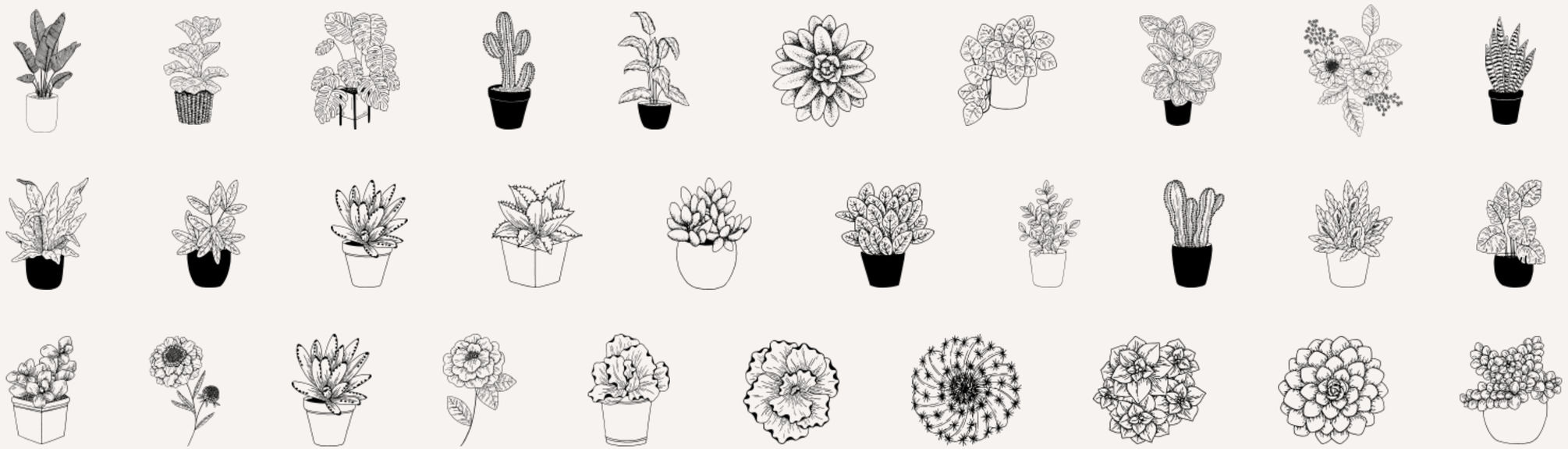
Worksheet

Question 1: If carbon is cycled regularly in environment, then how is carbon concentration in atmosphere increasing?

Question 2: Identify and explain the storage pools in C, N, P, and S cycles.

Resource:
https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/5e79006716b51c232c3fb941

Thank You for joining the class today!



Environment Conservation

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PRESENTATION V

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Welcome to class!

Today's Agenda

UNIT-II
NATURAL RESOURCES

Topic for the day: Natural Resources and their classification

Resource

- satisfies a need
- be developed and used
- be accessible to humans
- have some economic or social value
- be cheap
- suits requirements of new technology

Natural Resource

Naturally occurring materials that support life as well as satisfy human need like air water, sunlight, minerals, fuel etc.

Classification of Natural Resources

On the basis of :

1. ORIGIN
2. STAGE OF DEVELOPMENT
3. DISTRIBUTION
4. AVAILABILITY

Origin

- **Biotic/ Living Natural Resources**

  Eg. plants, forest, animals

- **Abiotic/ Non-Living Natural Resources**

  Eg. coal, petroleum, air

Stage of development

- **Potential Natural Resources**

Eg. Tidal energy, Geothermal Power

- **Actual Natural Resources**

Eg. Iron ore, coal

Watch this Video

https://www.youtube.com/watch?v=7pPa0mRCky4

Distribution

- National Natural Resources

Eg. plants, forest, coal, biodiversity

- Multinational Natural Resources

Eg. rivers, migratory birds

- International Natural Resources

Eg. air, ocean, sunlight

Availability

- **Inexhaustible Natural resource**

Eg. air, ocean, sunlight

- **Exhaustible Natural resource**

<u>Renewable</u>

Eg. Forest, Soil

Animals

<u>Non-Renewable</u>

Eg. Coal, Petroleum

Minerals

Comprehension Questions

QUESTION 1

How gifts of nature become resources over a period of time?

QUESTION 2

Is Soil a biotic or abiotic resource? Explain

Resource:
https://www.tutorialspoint.com/environmental_studies/environmental_studies_natural_resources.htm

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PRESENTATION VI

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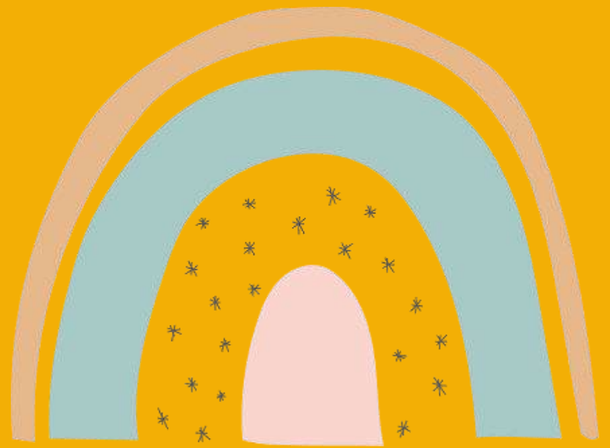


UNIT I NATURAL RESOURCES

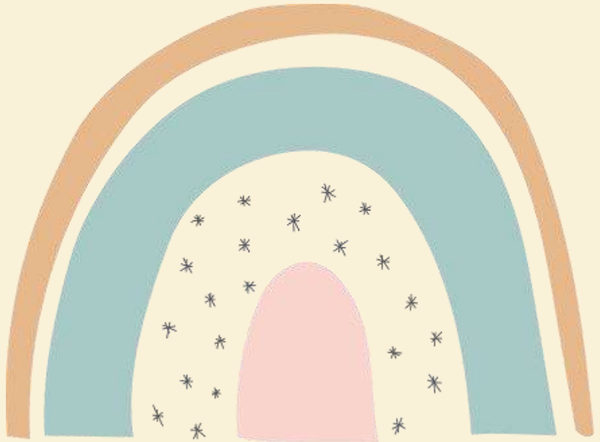
Topic for the day: Conservation

EARTH

- Only definite system where life exists
- Resources are limited
- Unplanned development
- Rapid industralization
- Unprecedented growth in population
- Poverty and deprivation

CONSERVATION

Act of preservation of a resource/ environment along with its judicious use and its regeneration



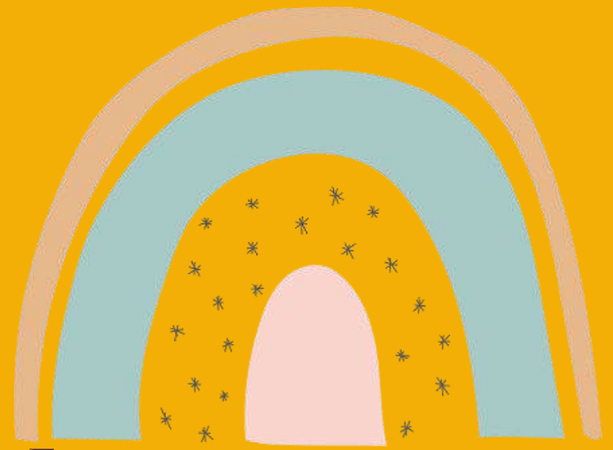
CONSERVATION

HUMAN USE OF BIOSPHERE FOR SUSTAINABLE LONG LASTING BENEFIT FOR PRESENT GENERATION AND TO MEET THE NEEDS AND ASPIRATIONS OF FUTURE GENERATIONS

DEVELOPMENT

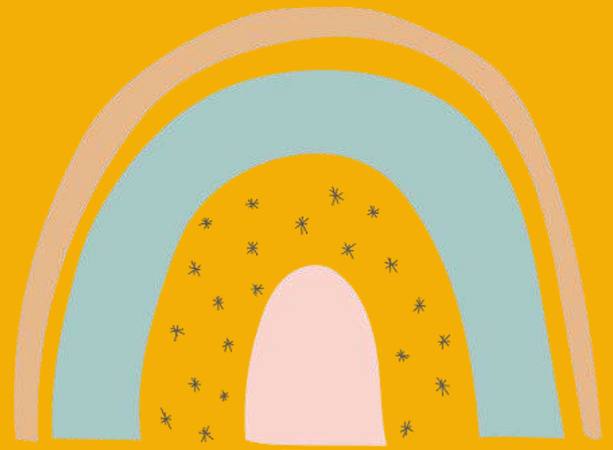
MODIFICATION OF BIOSPHERE, APPLICATION OF HUMAN, FINANCIAL, LIVING AND NON-LIVING RESOURCE TO SATISFY HUMAN NEEDS AND IMPROVE QUALITY OF LIFE

AIMS OF CONSERVATION



- To maintain quality environment for the present and the future
- To maintain continuous yield of living and non-living resources
- To take care of evolution

❑ OBJECTIVES OF CONSERVATION

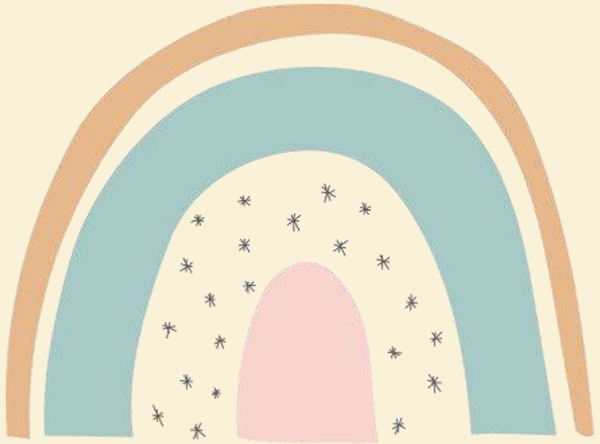


- ❑ To maintain essential ecological process and life support systems
- ❑ To preserve genetic diversity for breeding programs, scientific advancement and security of living resource based industries
- ❑ To ensure sustainable utilization of species and ecosystems

Supplemental Video

https://video.nationalgeographic.com/video/00000155-598c-de5e-abf7-7faf9d850000

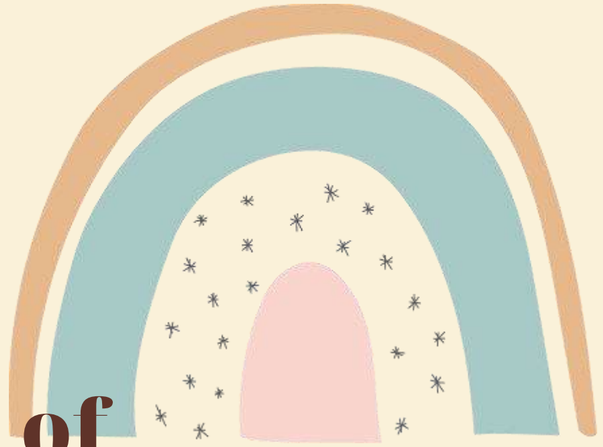
POLICIES OF CONSERVATION



Special Interest Conservation Policy

Total Ecosystem Conservation Policy

Special Interest Conservation Policy



- Aims to conserve various aspects of environment in different isolated projects and invariably leads to more problems
- Ecological (backlash) boomerang defined as unforeseen detrimental consequence of environment modification which cancels out projected gains and often create more problems then it solves

Total Ecosystem Conservation Policy

- It has holistic approach where, man is considered a part of environment which must be studied, treated and modified on a whole
- Conservation is always for whole ecosystem and not of isolated areas

Conservation Stories

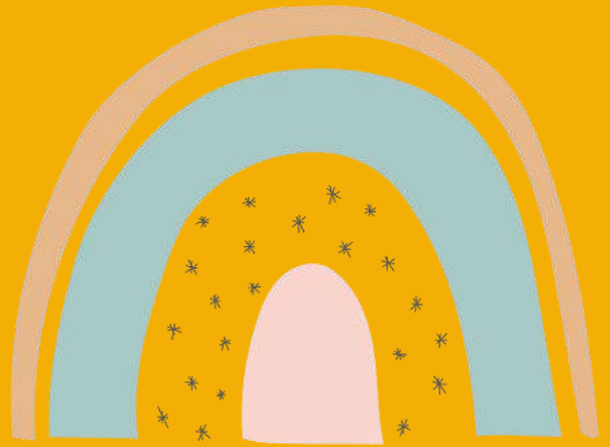
Communities join hands to keep alive the hoolock gibbon’s song in Northeast India

A community radio gives voice to the climate-vulnerable in Tamil Nadu

Going organic brings hope to MP’s cotton farmers and wildlife

Restoration of Ansupa Lake Orissa brightens wetland conservation hope

Worksheet



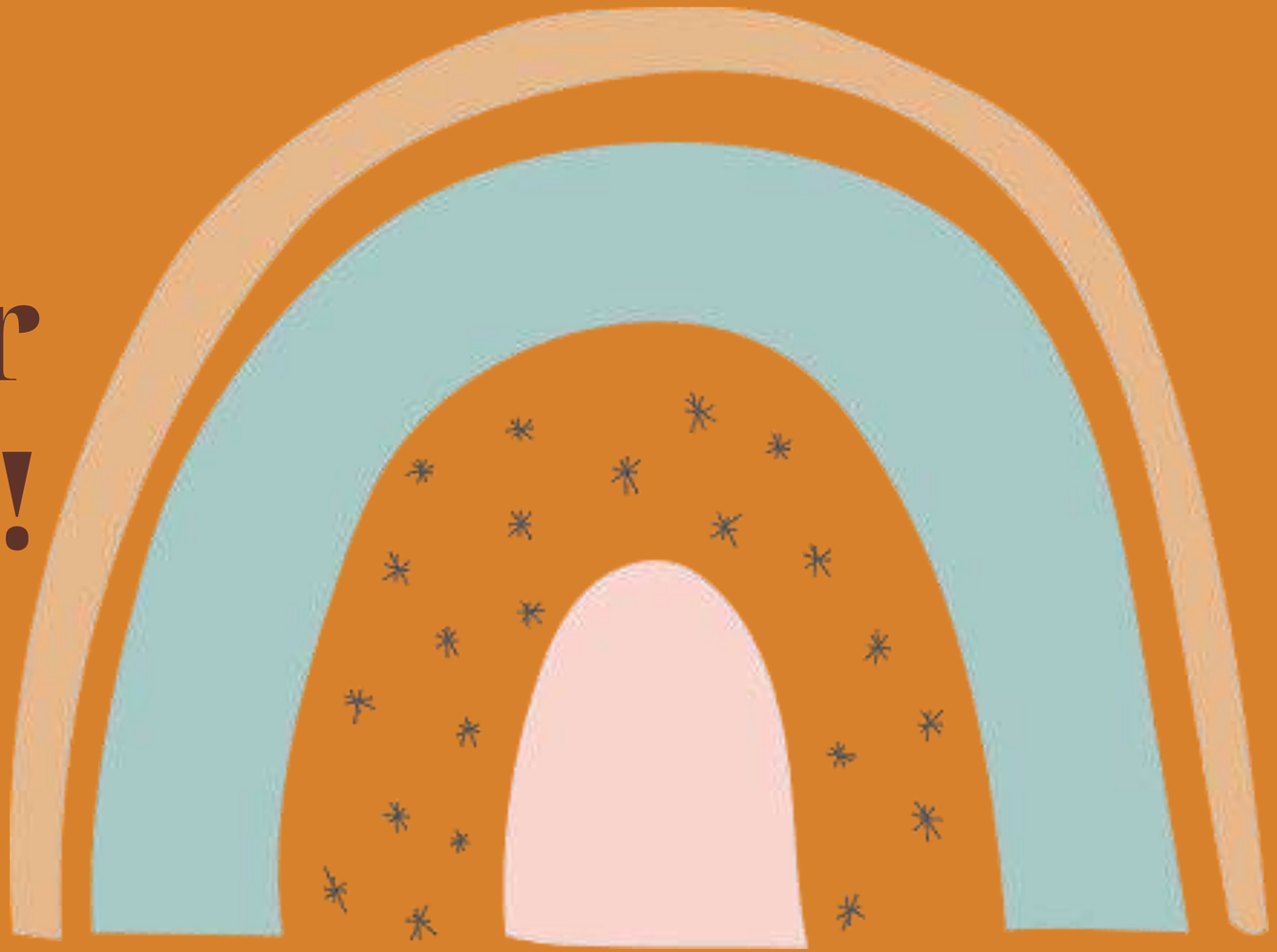
Question 1: How conservation aids evolution ? Explain with example.

Question 2: Why do we need conservation?

Question 3: Compare policies of conservation.

Resource: http://www.a21italy.it/medias/31C2D26FD81B0D40.pdf

Thank you for participating!



Environment Conservation

BA Semester I
Elective Subject

PRESENTATION VII

By: Dr. Amanpreet Kaur
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UNIT II NATURAL RESOURCES

Topic for the day: Energy Resources

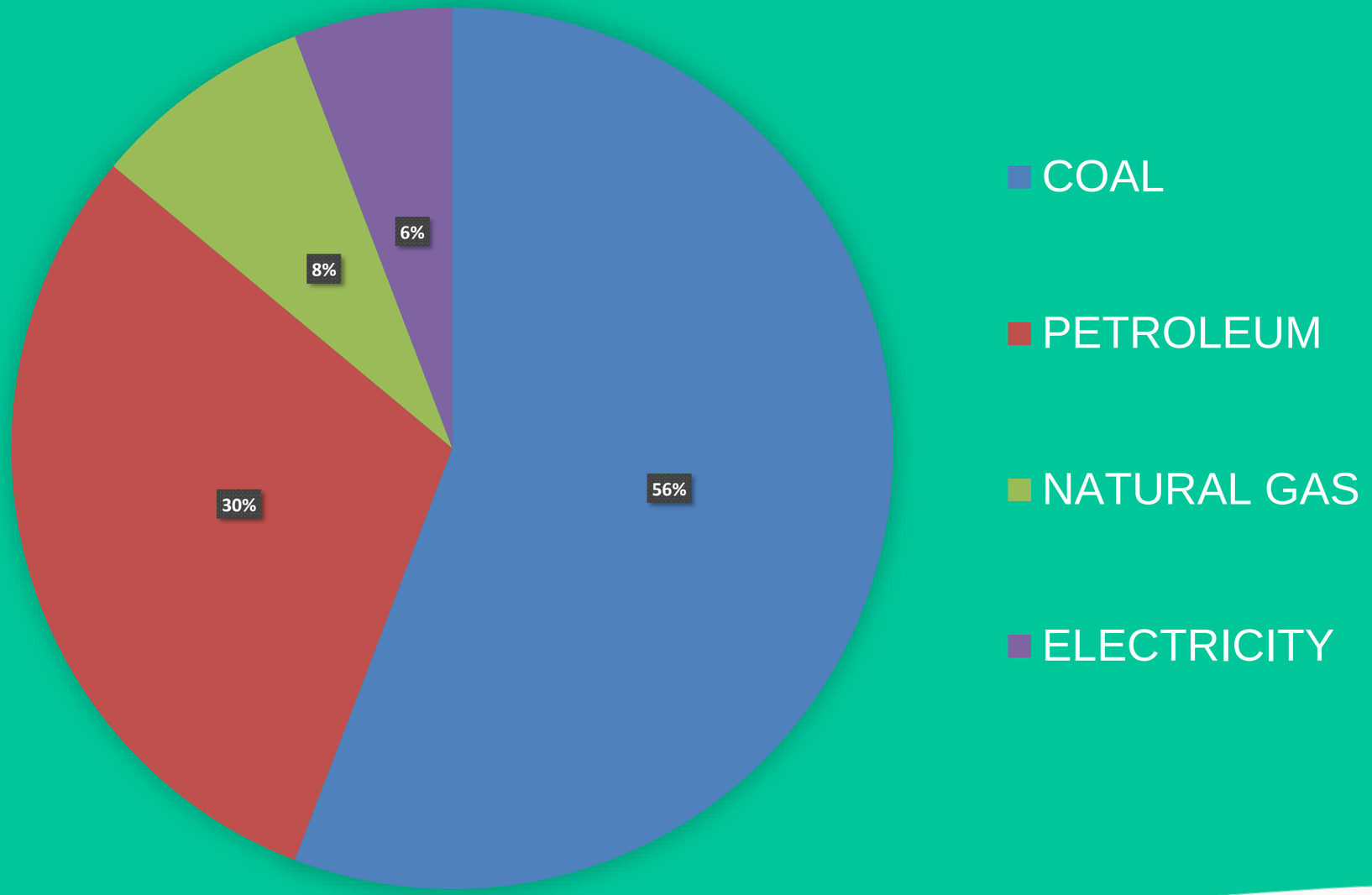
Energy

- Energy is the ability to do work.
- Energy makes change
- Energy comes in different forms.
- Energy is the capacity of a physical system to do work

Sources of Energy

- Conventional
  - Primary (Fossil Fuels, Nuclear Energy)
  - Secondary (Electricity, Gasoline)
- Non Conventional
  - Solar
  - Geothermal
  - Tidal
  - Biomass

Energy Sector in India



Fossil Fuels

- Primary energy source
- Non-renewable
- Formed over millions of years
- Limited reserves
- Major source of pollution

- Three major types

  COAL

  PETROLEUM

  NATURAL GAS

Coal

- Coal exists in many forms
- Basically Carbon in chemical composition
- Formed by Coalification
- Decaying of plant and animal matter forms peat
- Over many years, thick peat layers formed, change into coal
- Major raw material of thermal power plants

Merits

- Most abundant fossil fuel
- High net energy yield
- Easy to burn
- Affordable and reliable energy source
- Would last for 300 yrs. at current consumption rates

Demerits

- Harmful byproducts and gas emissions
- Dirtiest fuel releases highest Carbon Dioxide
- Depletion fast due to high consumption
- Coal Mining ruins environment
- Threat to human health

Watch the Videos

https://www.youtube.com/watch?v=jjfs_7kwRks

https://www.youtube.com/watch?v=YTnE0OQPTEo

Petroleum

- Liquid mixture of hydrocarbons with S, O, N as impurities
- Formed from remains of planktons, plants and animals over millions of years
- Oil drilling to pump up crude oil
- Refined into different fuels like petrol, diesel, kerosene
- Used in manufacture of plastics, pesticides

Merits

- Extracted easily
- Broad area of application
- High net energy yield
- Low cost with high subsidies
- Easily transported within and between countries
- Generation of employment

Demerits

- Major contributor to Green House Gases
- Depleting fast due to high consumption
- Oil drilling harms marine life
- High maintenance
- Exposure to it is toxic all life on Earth

Natural Gas

- Hydrocarbon gas mixture primarily methane
- Colourless, tasteless, odourless, highly flammable
- Found in deep underground rock formations
- Source of energy for heating, cooking and electricity generation
- Transported via pipelines

Merits

- Available in abundance
- Safe to use and easy to deliver
- High net energy yield
- Economical and convenient fuel
- Environmentally clean fuel

Demerits

- Long processing period
- Requires expensive infrastructure for extraction
- Highly flammable makes it dangerous
- High chances of leakage
- It is toxic

Comprehension Questions

Question 1: What is the future of fossil fuels for mankind ?

Question 2: According to you, Which fossil fuel is best to use ?

Question 3: Discuss the importance of secondary fuels ?

Resource: https://shodhganga.inflibnet.ac.in/bitstream/10603/15703/8/08_chapter%202.pdf

Limitations of Fossil Fuels

- Non Renewable
- Environmental hazard
- Cause of Global Warming
- Cause of Acid Rain
- Hazardous to humans, plants, animals and aquatic life
- High cost of extraction and refining

Need to explore the road ahead

The Renewables

THANK YOU FOR ATTENDING!

Environment Conservation

BA Semester I
Elective Subject

PRESENTATION VIII

By: Dr. Amanpreet Kaur
Assistant Professor
Dept. of Env. Studies
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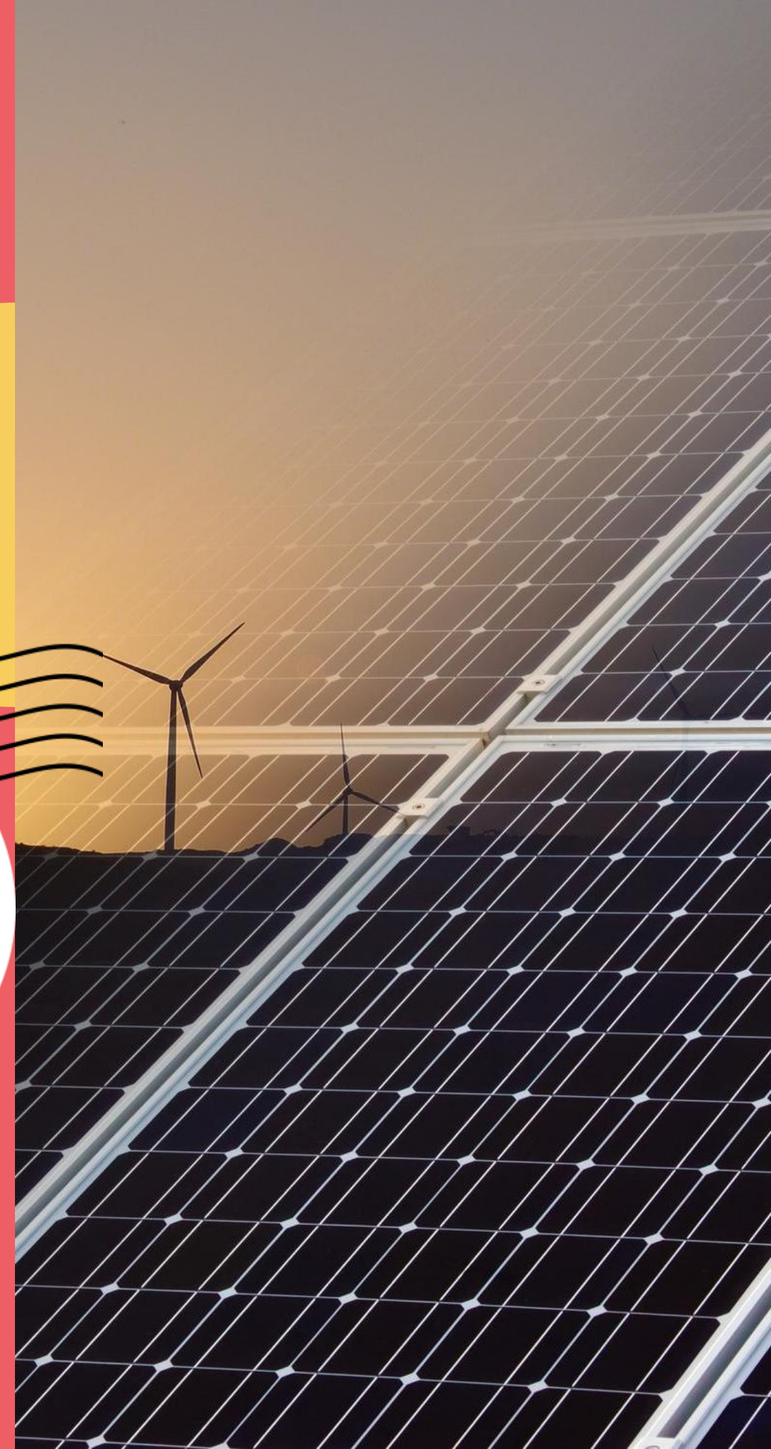
UNIT II Natural Resources

Topic for the day: Renewable Energy



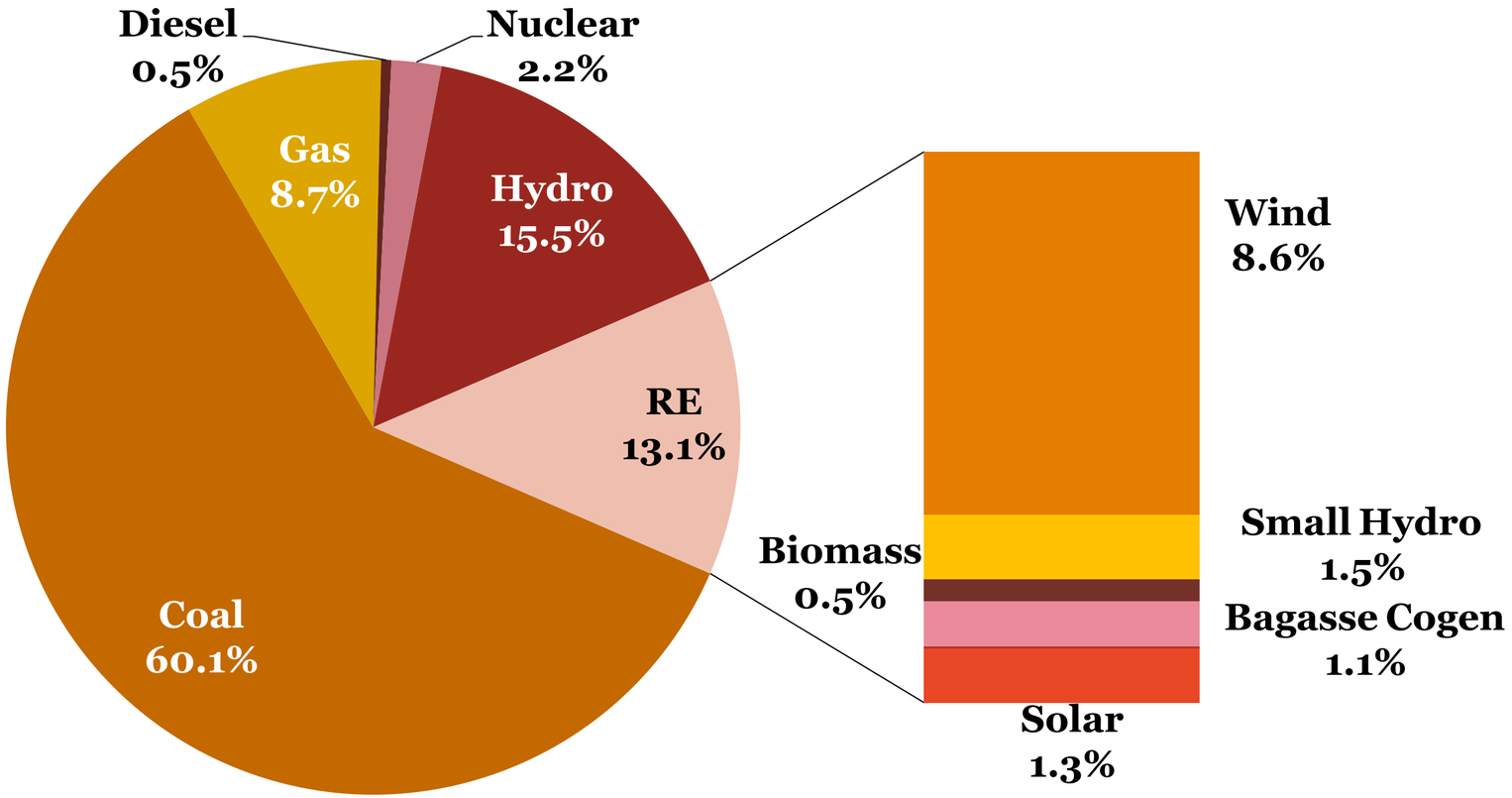
Renewable Energy

- Energy generated from natural resources
- Naturally replenished
- Clean Energy
- Wind, Hydro, Solar, Biomass

Why Renewable Energy?

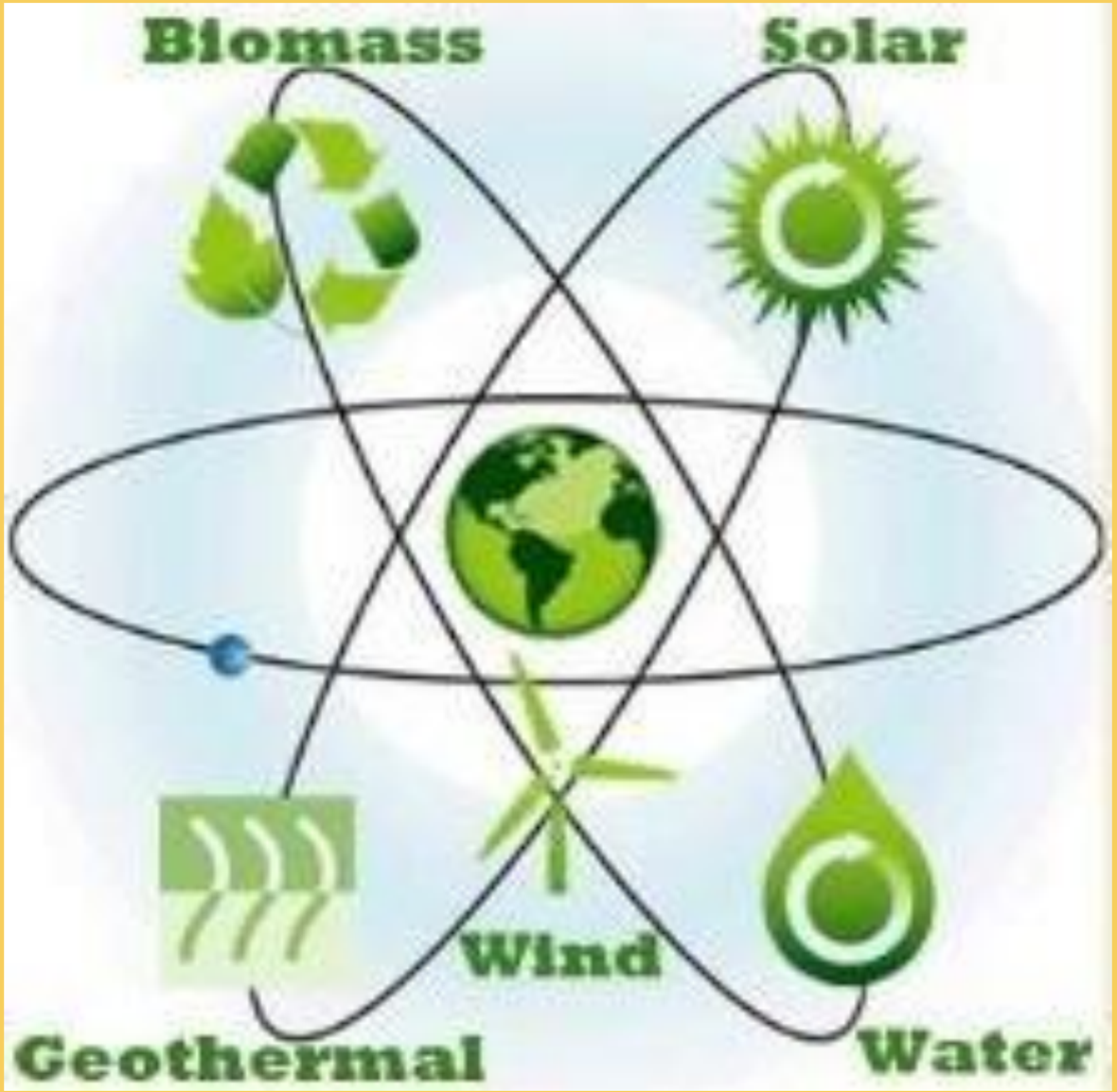
- Fossil Fuels are non-renewable
- Oil prices rising
- Increasing Environmental pollution
- Avert Climate Change
- Fast Depleting Oil, Coal, Natural Gas reserves

Energy Sector in India



Sources: CEA, MNRE

Major Sources



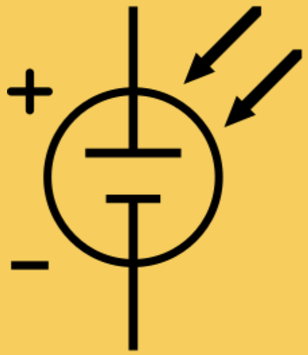
Wind Energy

- Most promising renewable energy source in India with 32 GW installed capacity
- Accounts for 68% of total installed capacity of renewable power in India
- Scalable clean state of the art technology available
- Extensive wind resource assessment with 800 monitoring stations
- Installation in shallow water few kms from seashore called Offshore Wind Power
- Off shore wind power development exploits the broad coastline of the country

Wind Energy

- Wind power involves converting wind energy into electricity by using wind turbines
- A wind turbine usually has three propellers-like blades called *rotors.* The rotor is attached to a tall tower about 20m high.
- The wind makes the rotor spin, as the rotor spins, the movement of the blades drives a generator that creates energy
- The motion of the blades turning is *kinetic energy.* It is this power that we convert into electricity
- A wind turbine captures the wind, which then produces a renewable energy source

Solar Energy

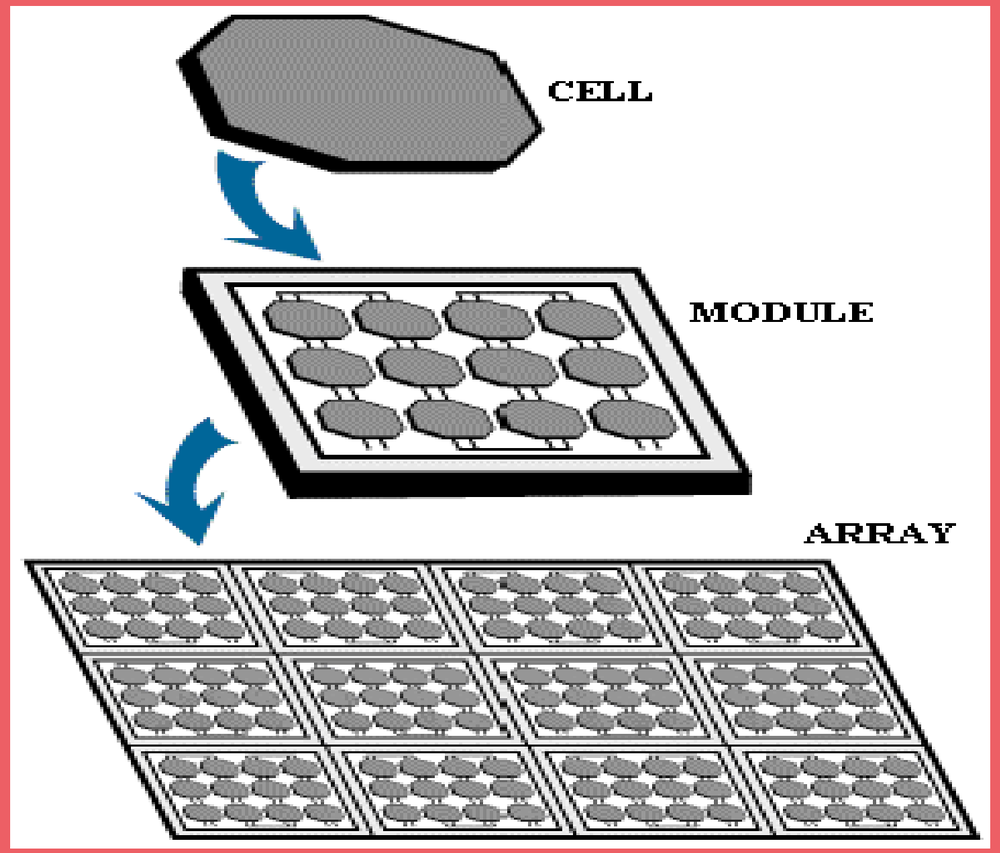


- Earths most available energy source
- Abundant and clean energy source
- India receives 300 days of solar radiations

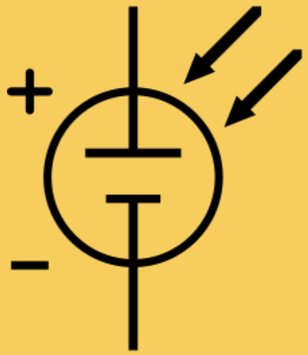
Equivalent to 5000 trillion kwh/year

- Accounts for 10% of total installed capacity of renewable power in India
- Government support for Solar PV systems, Water pumping system and Model Solar Cities
- Can operate in stand alone as well as integrated mode

Solar Energy



Solar Energy



- Photovoltaic cells made of silicon convert sunlight directly into electricity; When sunlight hits a cell, the energy knocks electrons free of their atoms, allowing them to flow through the material
- Solar thermal collectors use heat-absorbing panels and a series of attached circulation tubes to heat water or buildings.
- Solar concentration systems use mirrors arranged in a large round dish or a circle surrounding a power tower to focus the sun's reflected rays on a heat-collecting element
- Passive solar design is the creative use of windows, skylights and sunrooms, building site and orientation, and thermal construction materials to heat and light buildings, or to heat water, the natural way

Watch this Video:

https://www.youtube.com/watch?v=sk0mYHHWlYk

Biomass Energy

- Bio-Energy derived from biological sources
- Biomass is organic matter from plants, aquatic life, crop residue, wood, animal manure etc.
- It also includes crops specifically grown for energy
- It makes for 1/3rd of primary energy use
- Commercially exploited biomass include
  - Wood
  - Ethanol
  - Crops like Jatropha
  - Biogas
  - Landfill gas

Biomass Energy Conversion Techniques

✓ Combustion :is the most conventional method of obtaining heat from biomass; the chemical energy of biomass is converted into heat energy

✓ Gasification: process of converting solid biomass fuel into a combustible gas by burning biomass in limited supply of air

✓Anaerobic Digestion: is a natural process of the microbiological conversion/decomposition of organic matter into methane in the absence of oxygen Eg. Biogas Plant

✓Liquid Bio-fuels: Process converting biomass into liquid fuels by hydrolysis, fermentation and distillation Eg. Ethanol, Biodiesel

Processing of Biofuels

BIOMASS

Treatment and Conversion

Product Upgradation and Development

Ethanol
Hydrogen
Biodeisel
Bioethyl Ether
Methanol

BIO FUELS

Geothermal Energy

- Heat Energy trapped inside earth; deeper α hotter
- Rising hot water and steam is trapped in permeable rocks forming Geothermal Reservoirs like Hot Springs, Geysers
- Estimated potential in India about 10000 MW
- Seven geothermal provinces in India : the Himalayas, Sohana, West coast, Cambay, Son-Narmada-Tapi (SONATA), Godavari, and Mahanadi

Use of Geothermal Energy

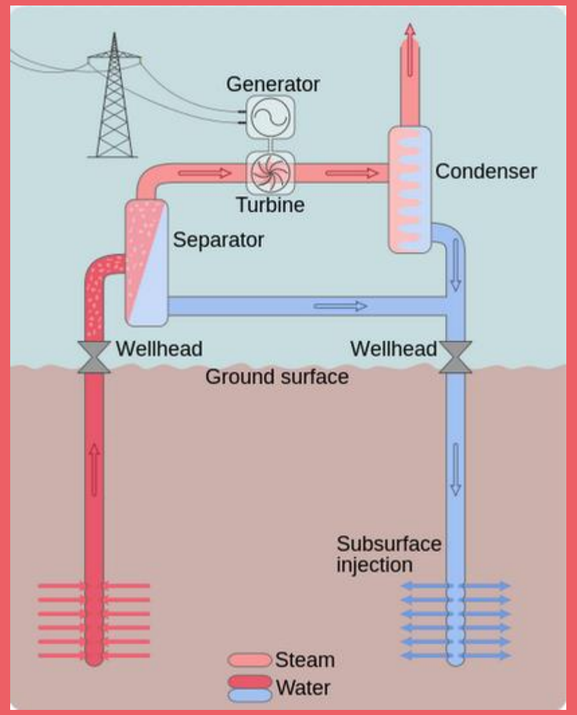
Direct Use

- Hot Springs used as spa
- Heating water for fish farms
- Heating buildings
- Drying Crops
- Maintaining Greenhouse
- Industrial heating Processes

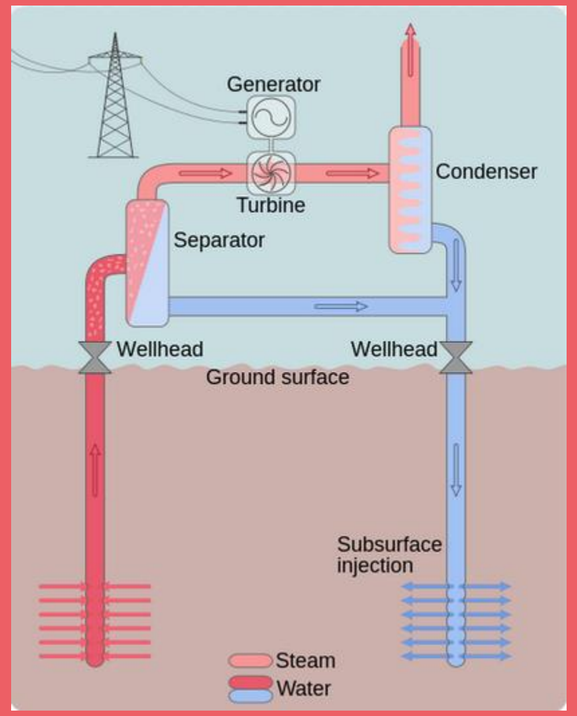
Indirect Use

- Electricity Generation
- Geothermal Power Plants
- Hot water or steam is extracted from the Earth through a series of wells and feeds the power plant

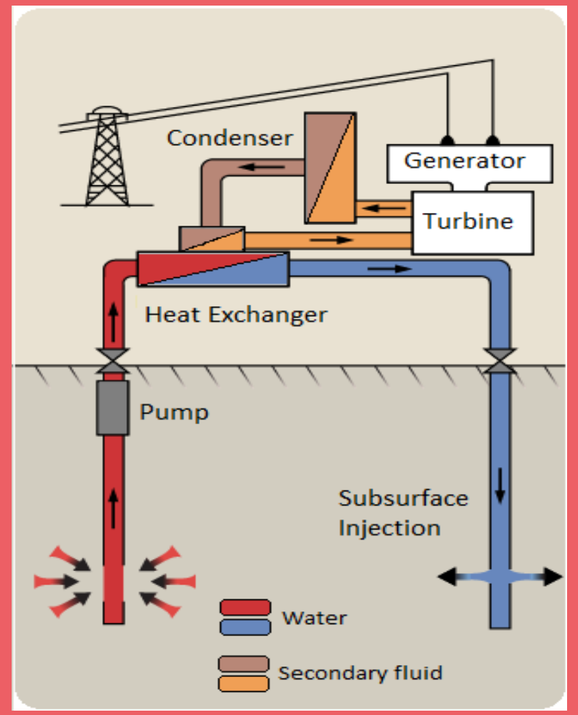
Geothermal Power Plants



DRY STEAM PLANT



FLASH CYCLE STEAM PLANT



BINARY CYCLE PLANT

Important Resource:
https://energyeducation.ca/encyclopedia/Geothermal_power_plants

Clean, Green,
Sustainable Feature!
Renewable Energy
is the future!!!!

Comprehension Questions

Resource:
https://www.vssut.ac.in/lecture_notes/lecture1428910296.pdf

Question 1: All renewable sources are manifestation of Sun's energy. Explain.

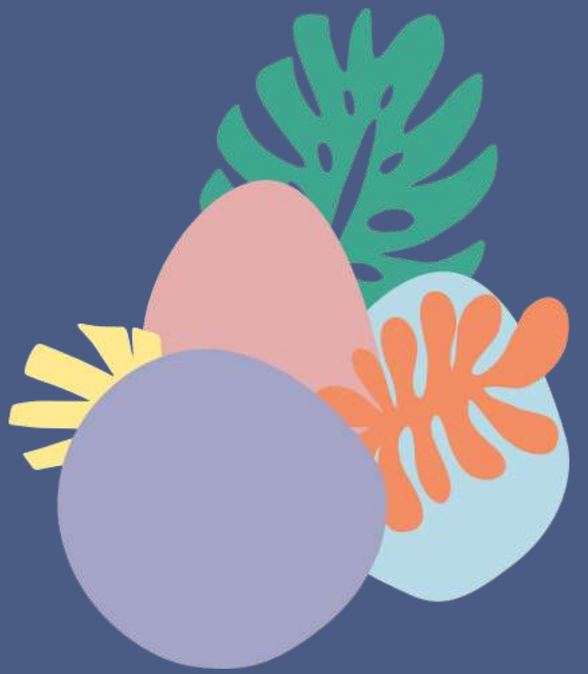
Question 2: Biomass energy is the oldest renewable . How ?

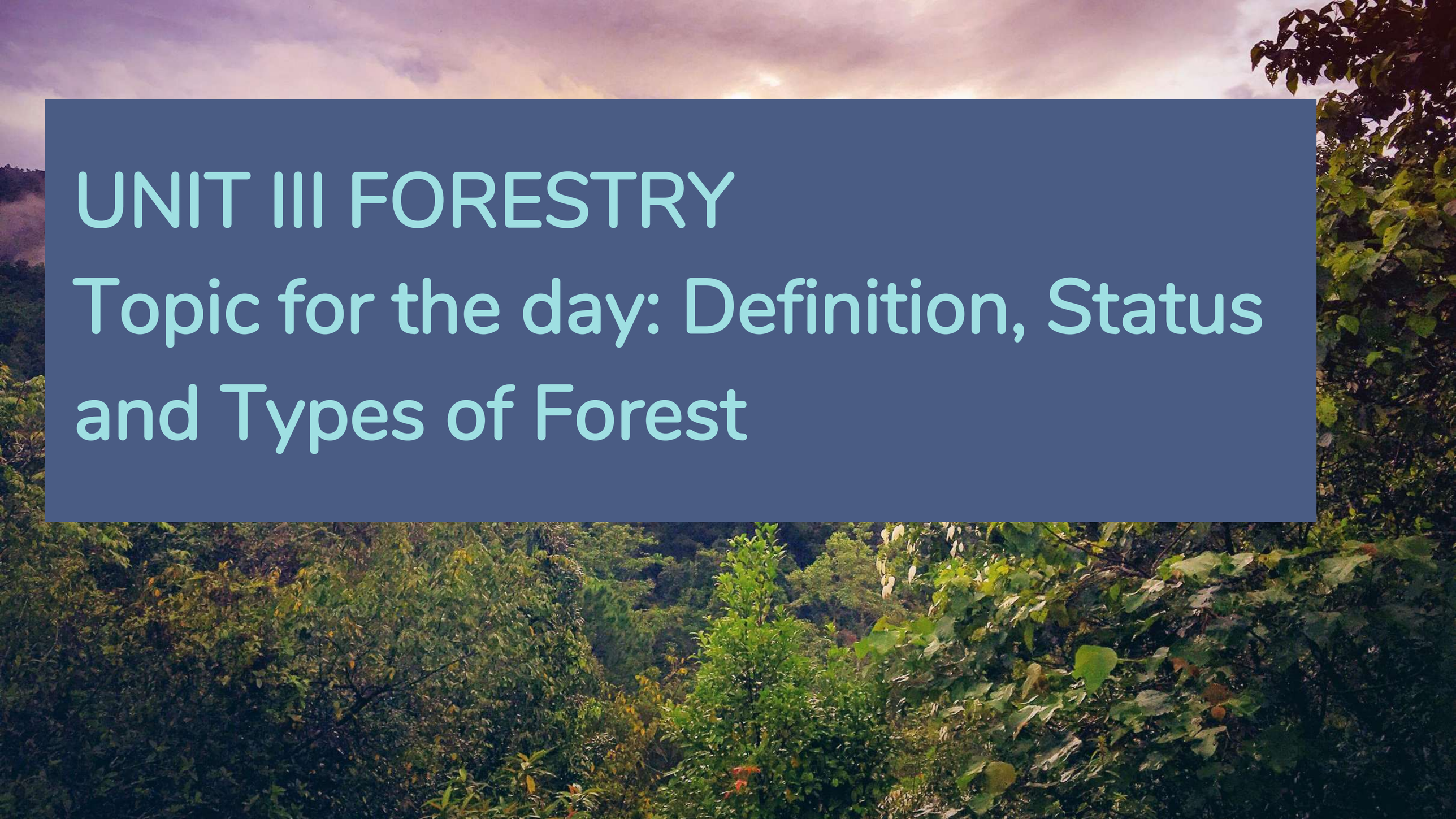
Question 3: According to you, which is the most promising renewable energy source ?

THANK YOU FOR ATTENDING!

Environment Conservation

BA Semester I Elective Subject





UNIT III FORESTRY

Topic for the day: Definition, Status and Types of Forest

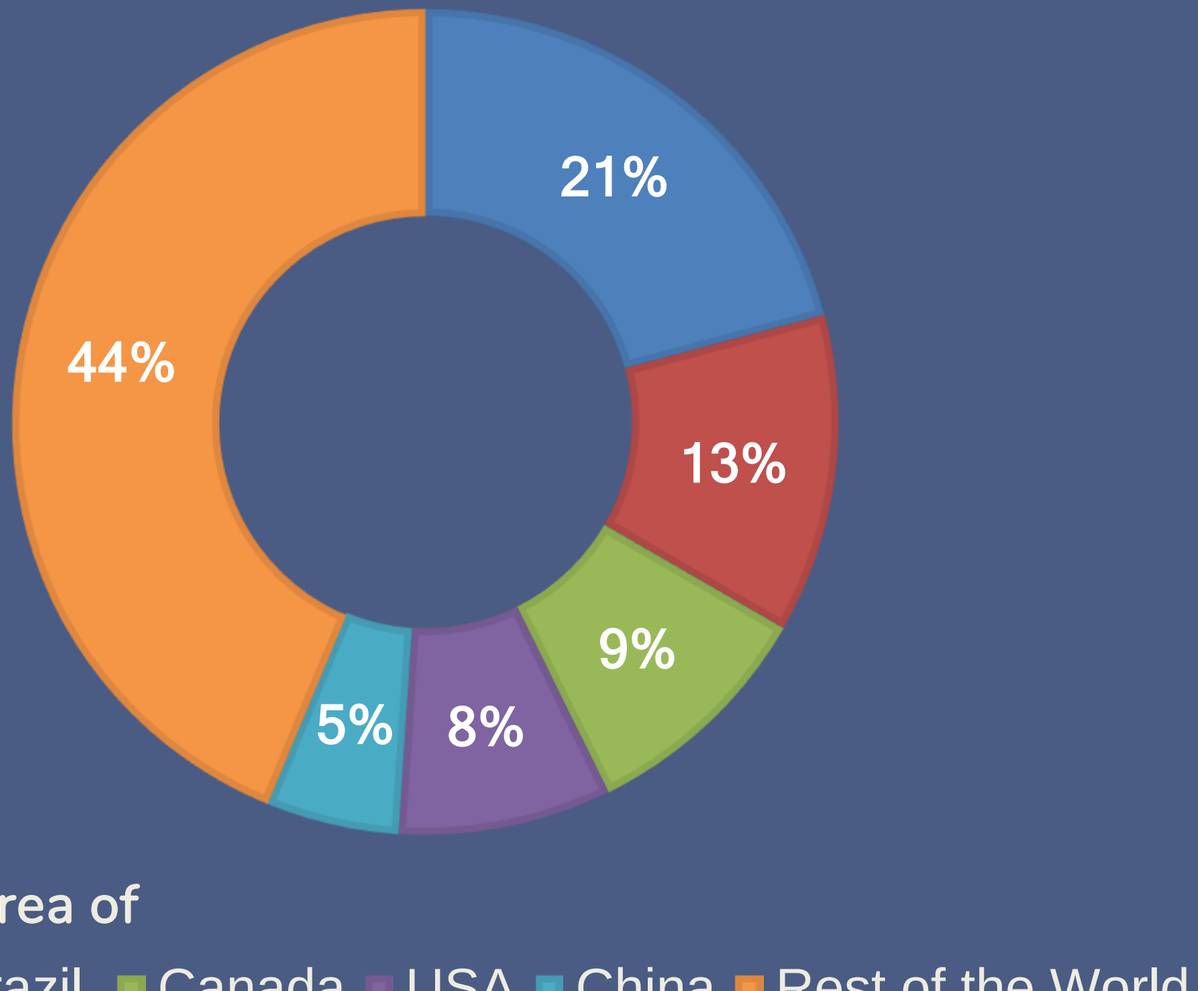
Definition

According to FAO, Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent is termed a forest

- Forest is an area where trees grow wildly without any interference of man
- It consists of trees, small trees, shrubs, bushes, grasses supporting variety of wildlife

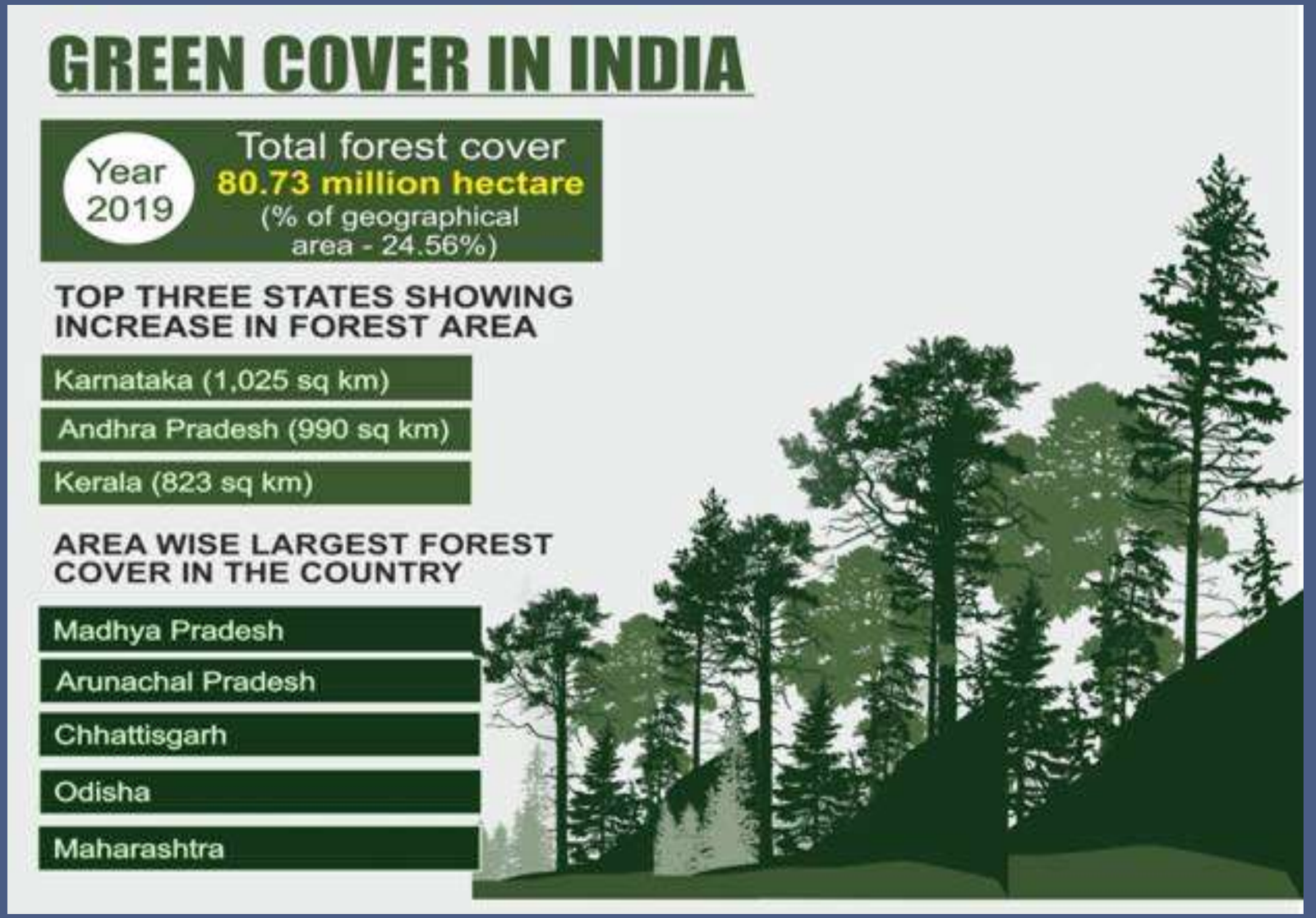
Status of Forest- World

Forests currently cover 4.06 billion hectares i.e. 31% of the global land area



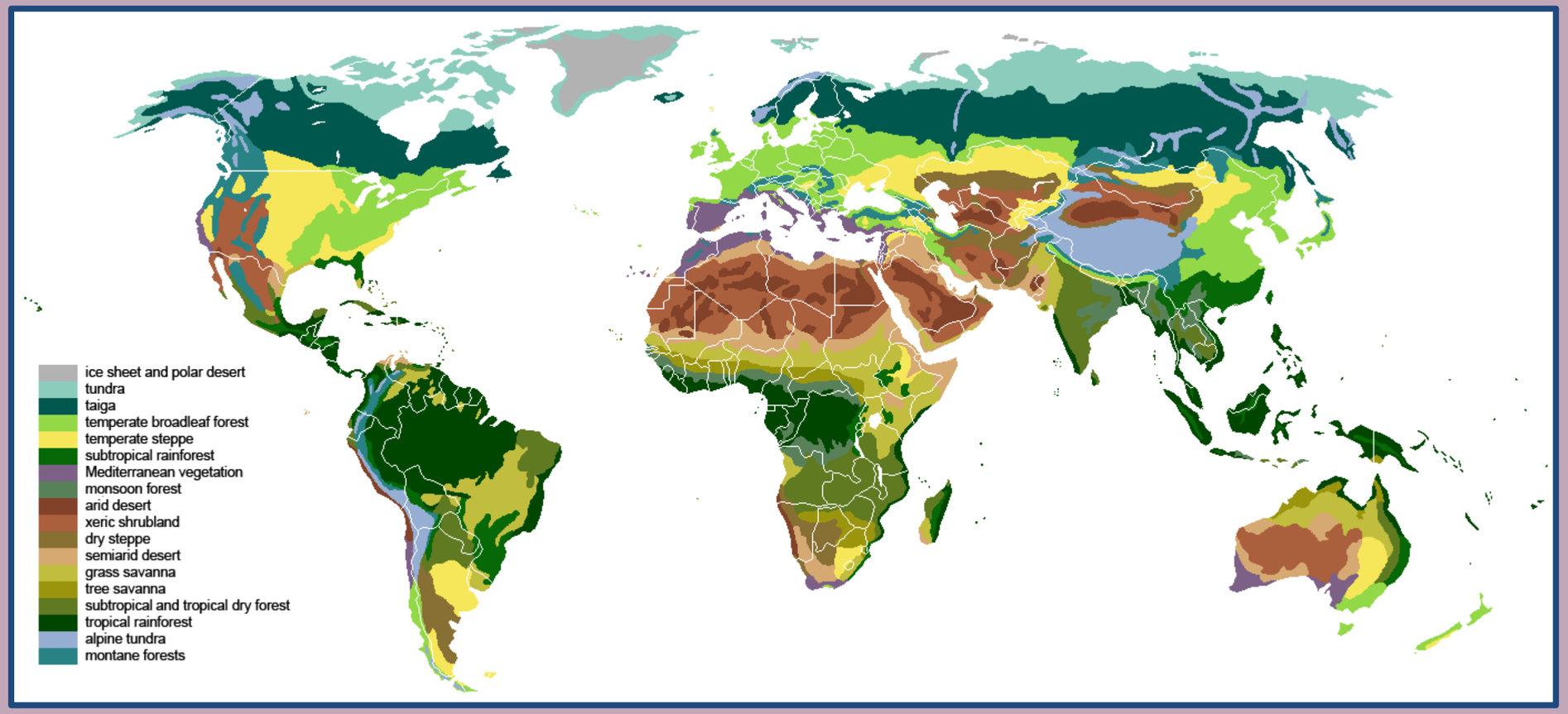
Source: FAO, 2020

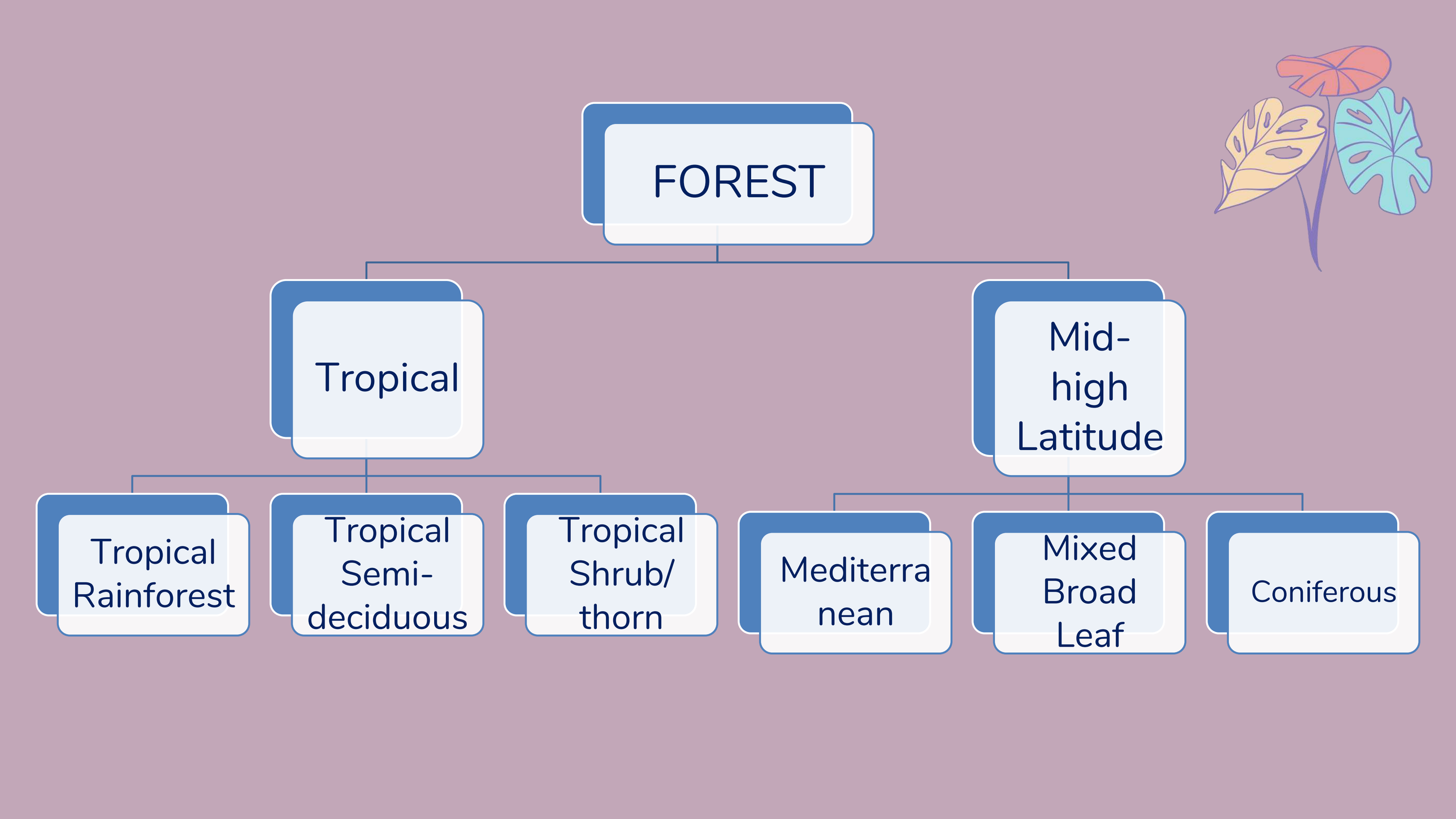
Status of Forest- INDIA



Source: FSI, 2019

FOREST BIOME




FOREST
Tropical
Mid-high Latitude
Tropical Rainforest
Tropical Semi-deciduous
Tropical Shrub/ thorn
Mediterranean
Mixed Broad Leaf
Coniferous

Forest in India

- Tropical Forests
- Sub-Tropical Forests
- Temperate Forests
- Alpine Forests

Watch this Video

https://youtu.be/Z8jOcYEtyc0

Tropical Forests

- Indian Tropical Moist Semi-Evergreen: of two types
  - a) North TMSE-Assam, Bengal, Orissa; Rainfall-150-300cm; Temp-24°C
  - b) Southern TMSE- Kerala; Rainfall-200-300cm; Temp- 26°C
- Indian Tropical Moist Deciduous- Found in major parts of India; Kerala, Karnataka, MP, UP, West Bengal, and Bihar
- Tropical Littoral& Swamp- found along the coasts; rainfall-76-500cm

Tropical Forests

- Tropical Dry Deciduous- Temp-24 to 27°C; Rainfall- 90-115cm
  In north- Punjab, UP, Bihar, Orissa
  In south- AP, TN, MP, Karnataka.
- Tropical Dry Evergreen- low forests with short trees and complete canopy Found in coastal Karnataka
- Tropical thorn/Desert Thorn- thorny trees with short trunk; forest floor dry and devoid of vegetation. Found in South Punjab, Rajasthan, Deccan area and Peninsular India

Sub-Tropical Forests

Cooler than tropical and warmer than temperate, includes trees of both tropical and temperate area

These are of three types:

- Sub-Tropical Broad leaved- lower Himalayas
- Sub-Tropical Pine- North west Himalayas
- Sub-Tropical Dry- Shivaliks & western Himalayas

Temperate Forests

On Southern slopes of mountains comprising oaks, conifers and abundant grasses

- Montane Wet Temperate forest – Eastern Himalayas above 1500mts
- Himalayan Moist Temperate forest- 1500-3000mts altitude
- Himalayan Dry Temperate forest

Alpine Forests

Above 3500mts altitude; Trees are dwarf and grow shorter with altitude

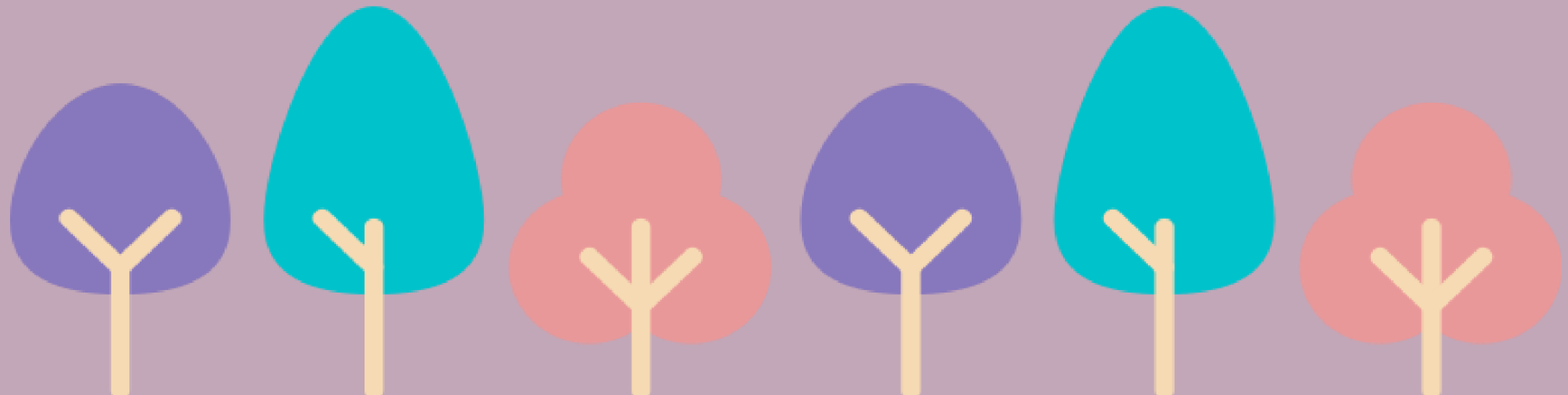
- Sub-alpine- has dense growth of small trees and large bushes; Trees are broad leaved up-to 10 mts and coniferous up-to 30mts.
- Moist alpine- scrub vegetation
- Dry alpine- vegetation of xerophytes

Comprehension Questions

Q1. Describe a Forest ecosystem.

Q2. Which is the most abundant forest in India and Why?

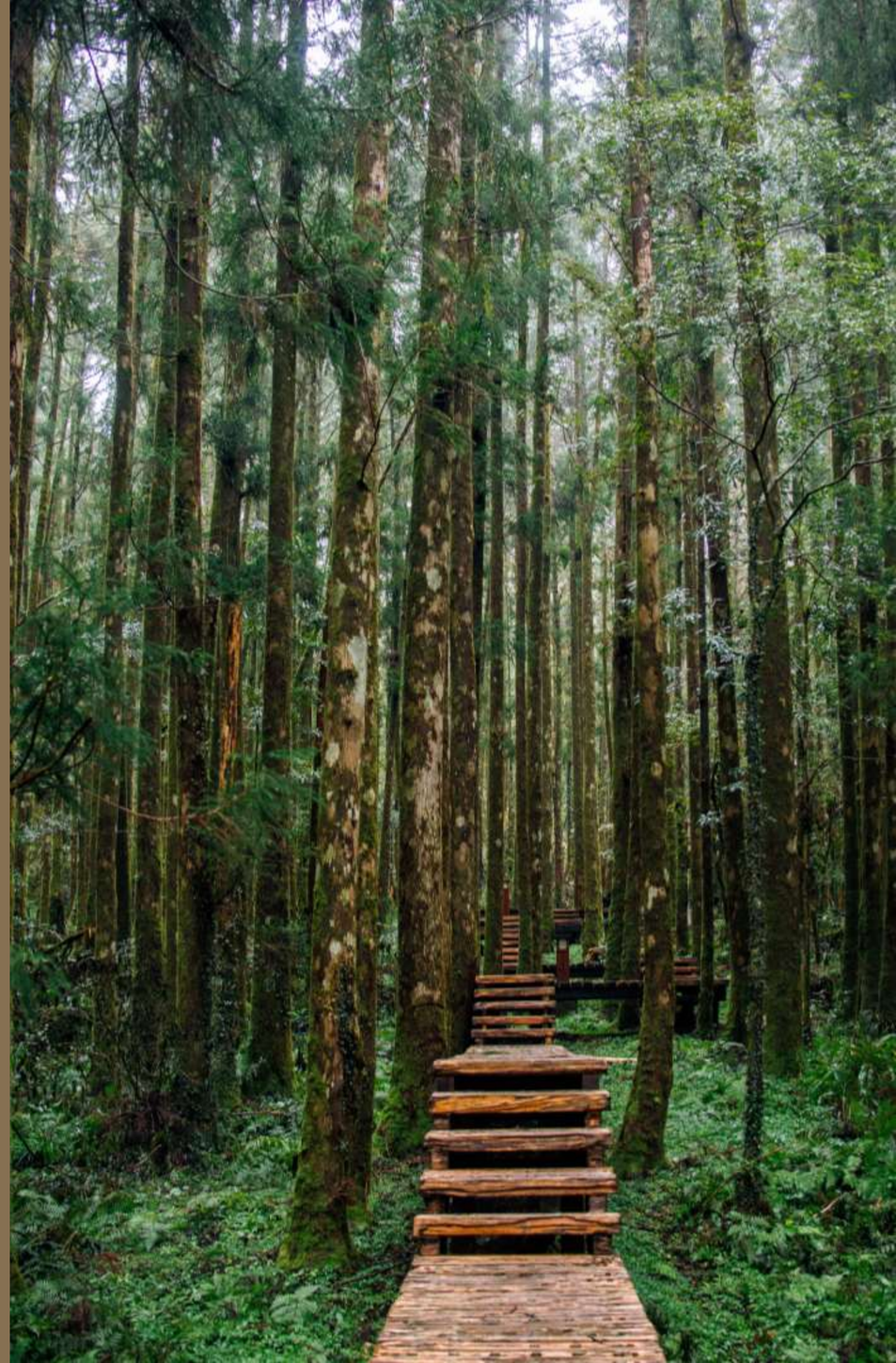
Resource: https://ncert.nic.in/ncerts/l/kegy105.pdf



Thank You !

Environment Conservation

BA SEMESTER I
ELECTIVE SUBJECT



UNIT III Forestry

Topic for the day: Importance of Forest, Causes and Effects of Deforestation

Importance of Forest

Food, fodder, fibre, fuel, fertilizer

Oxygen

Rainfall

Energy

Soil Conservation

Temperature Moderation

https://www.youtube.com/watch?v=HTgRjhr_owM

Major and Minor Forest Products

MAJOR	MINOR
• TIMBER • FUELWOOD • HARDWOOD(FUEL) • SOFTWOOD (CONSTRUCTION AND PAPER)	• BAMBOO, CANES, GRASSES • TANS, DYES • OILS • GUMS AND RESINS • FIBRES • SPICES • DRUGS • EDIBLE PRODUCTS • ANIMAL PRODUCTS

Resource: https://player.uacdn.net/lesson-raw/3KJ4PF4PCR7IZQT4VS64/pdf/3339062875.pdf

Deforestation

Purposeful clearing of forested land for agriculture and animal grazing, and to obtain wood for fuel, paper, furniture, manufacturing and construction

Deforestation

- Every second a chunk of forest equal to size of soccer field is lost
- In last 30 years, India has lost large forests to 23,716 industrial projects
- India’s Forest cover is 24.56%

Causes of Deforestation

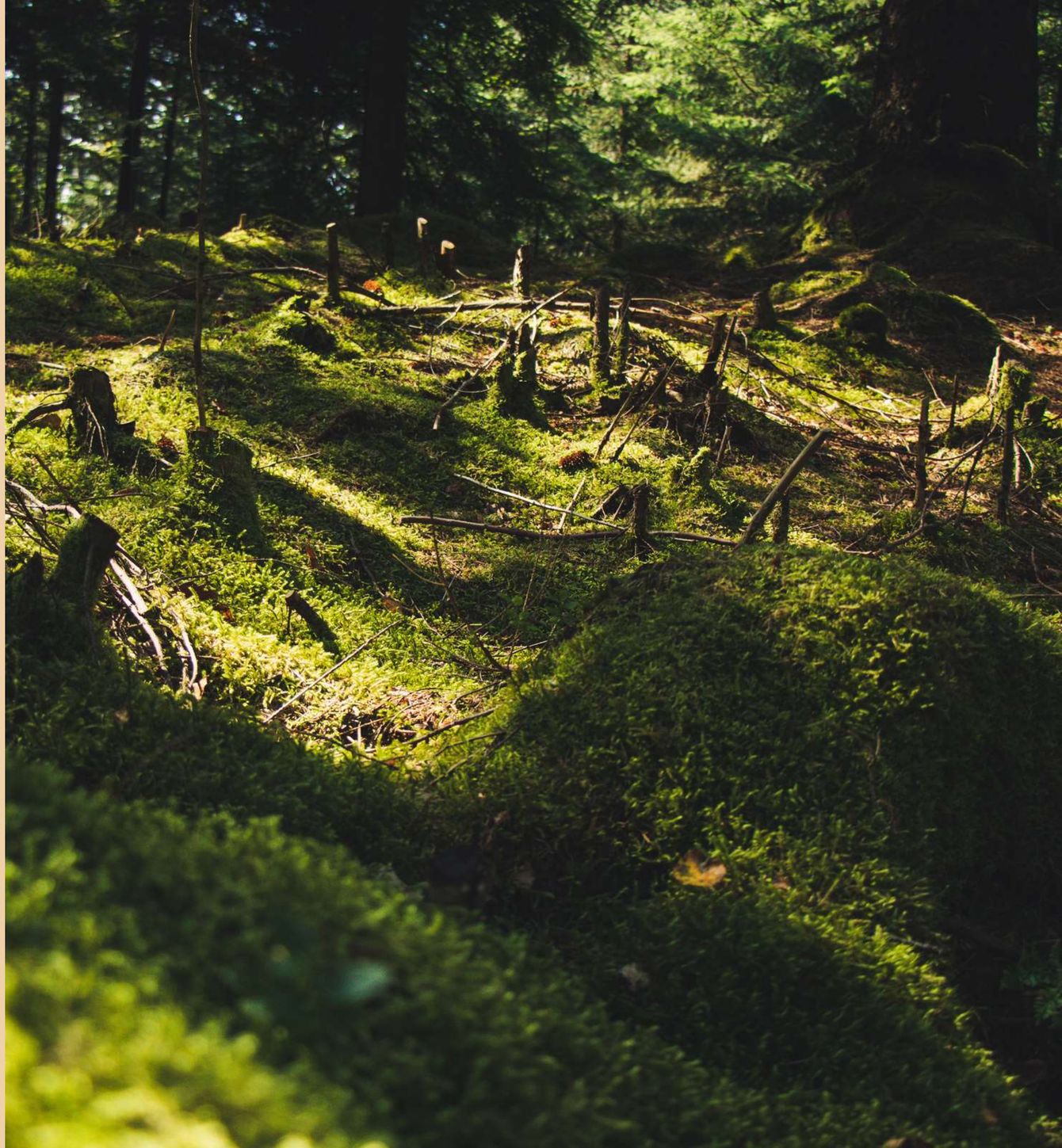
- Agriculture
- Commercial logging
- Mining
- Construction of dam reservoirs
- Industrialization and urbanization
- Forest Fires
- Overgrazing
- Increase in population

Effects of Deforestation

- ❑ Soil erosion
- ❑ Flooding
- ❑ Loss of Biodiversity
- ❑ Climate Change
- ❑ Food Scarcity
- ❑ Displacement of Indigenous community
- ❑ Health problems

Watch the Videos!

- https://youtu.be/_dWJVHIE9S8
- https://youtu.be/nUstYj4o2VQ



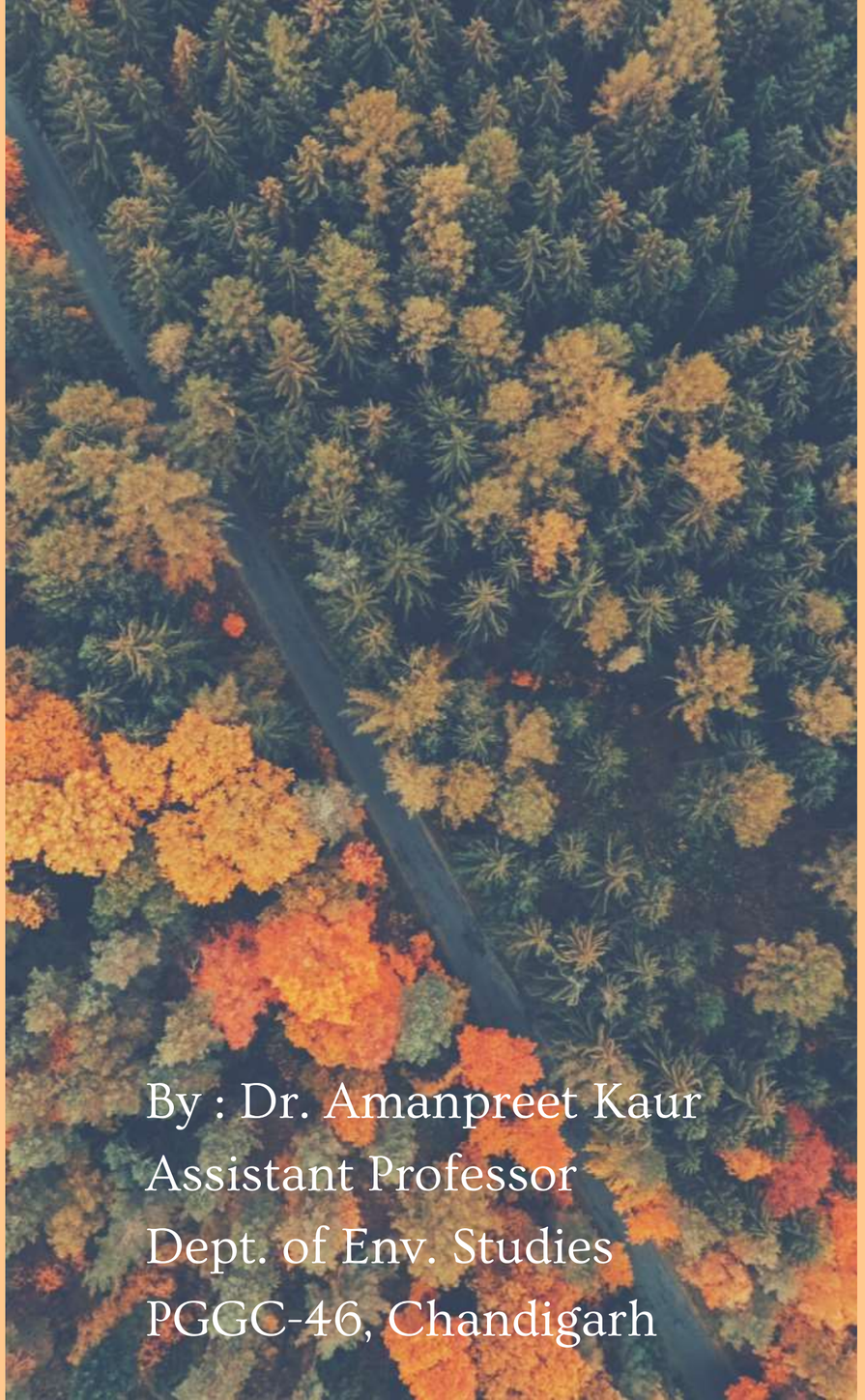
Go to
link https://www.globalforestwatch.org/map/global/

RESOURCE:
https://cdn.intechopen.com/pdfs/36125/InTech-Deforestation_causes_effects_and_control_strategies.pdf

Gracias!!!!

Environment Conservation

ELECTIVE SUBJECT BA SEMESTER I



By : Dr. Amanpreet Kaur
Assistant Professor
Dept. of Env. Studies
PGGC-46, Chandigarh

UNIT III
FORESTRY

Topic of the day:
Conservation of Forests

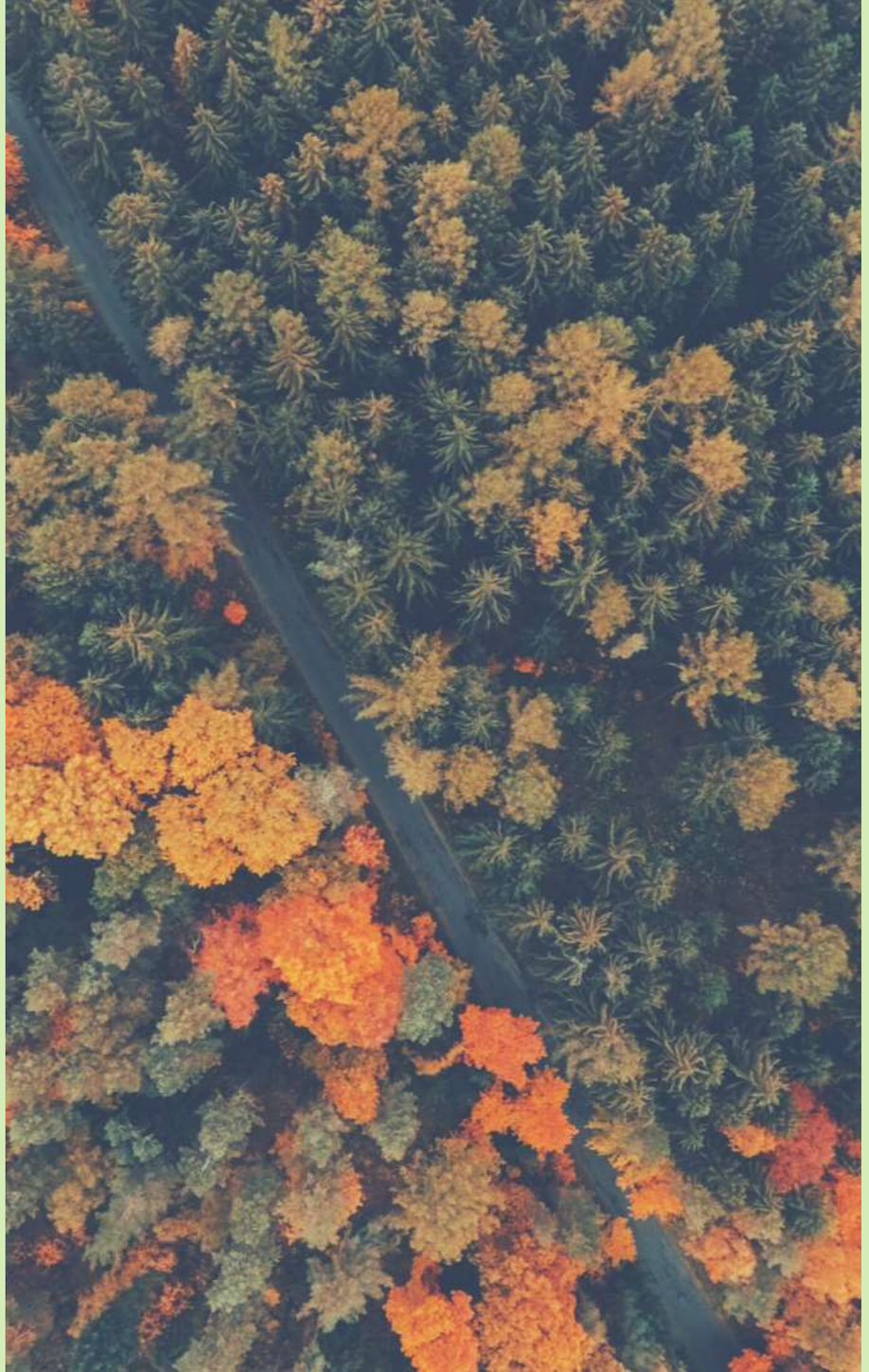
Forest Conservation

Conservation of forest is the practice of planting more trees and maintaining the forested areas for the sustainability for future generations.

Forests are an important natural resource and are beneficial to humans in several ways. Following are some of the major steps for conservation of forest:

1.Regulating felling of trees

2.Forest fires control using latest fire fighting techniques



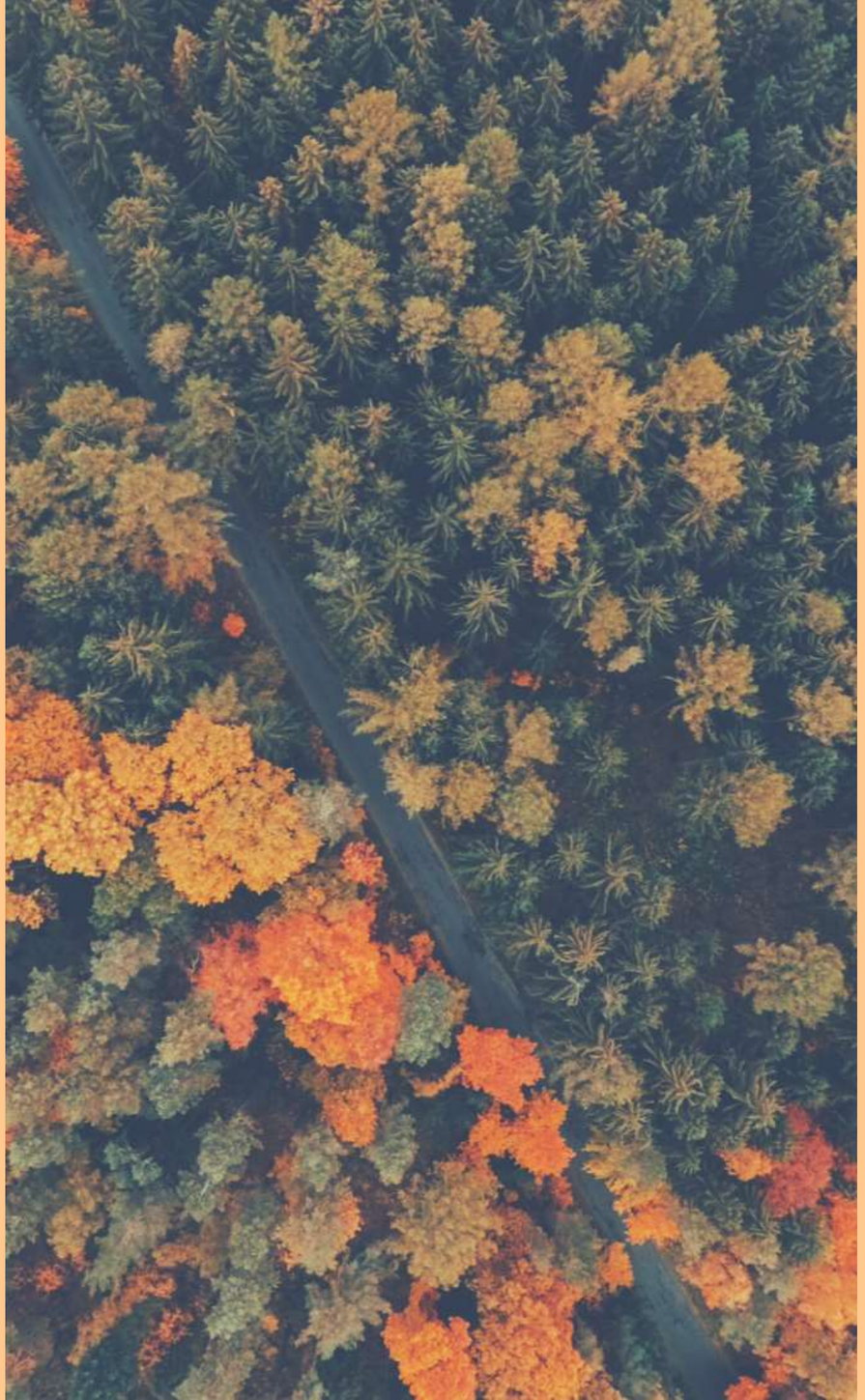
Forest Conservation

3. More trees should be planted to increase the forest cover.

4. Trees should be selected according to the geographical conditions of a particular region and proper care should be taken during the growth of trees.

5. Prevention of exploitation of forestry and forest products is necessary for the conservation of forest.

6. The existing forests should be protected from diseases by spraying chemicals, antibiotics or development of pest-resistant strains of trees.



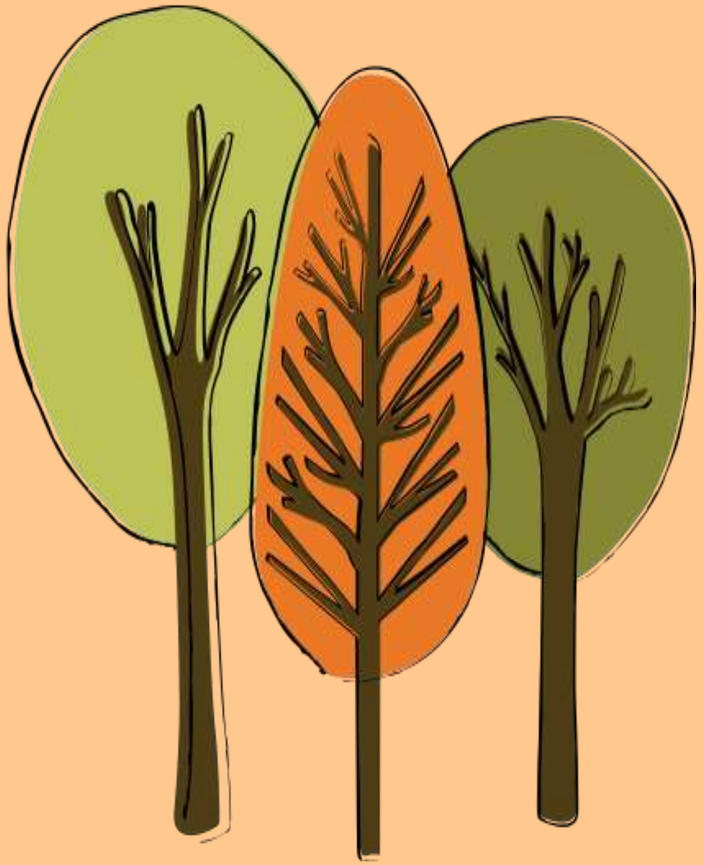
Methods of Forest Conservation

Reforestation

- planting trees on land that was previously forest
- Maintaining old forest

Afforestation

- planting trees on land which was not a forest
- Creating new forest



Resource: https://enb.iisd.org/forestry/conserve.html

Forestry Programmes of India

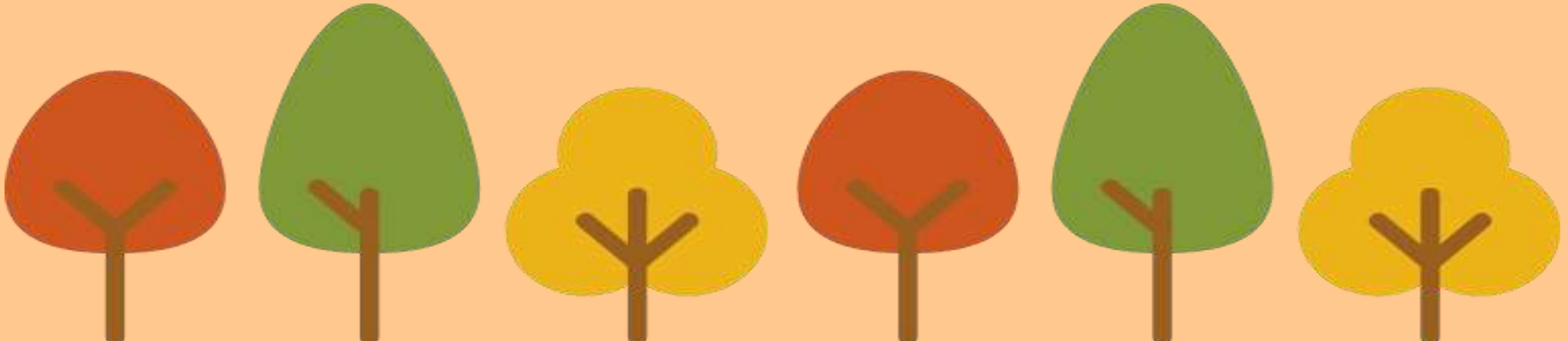
- Launched by Ministry of Agriculture in 1950
- Van Mahotsav declared as mass planting of trees in July and Feb through out the country
- Nationwide Five year Afforestation programmes started

Concept of Social Forestry

- The term was coined by J.C. Westoby
- Social forestry is the practice of forestry on lands outside the conventional forest area for the benefit of the rural and urban communities
- The scope of social forestry includes farm forestry, community woodlots and reforestation in degraded lands
- Projects started for development of trees on community lands and waste lands in country by involving people and society for forest protection
- Forestry of the people, by the people and for the people

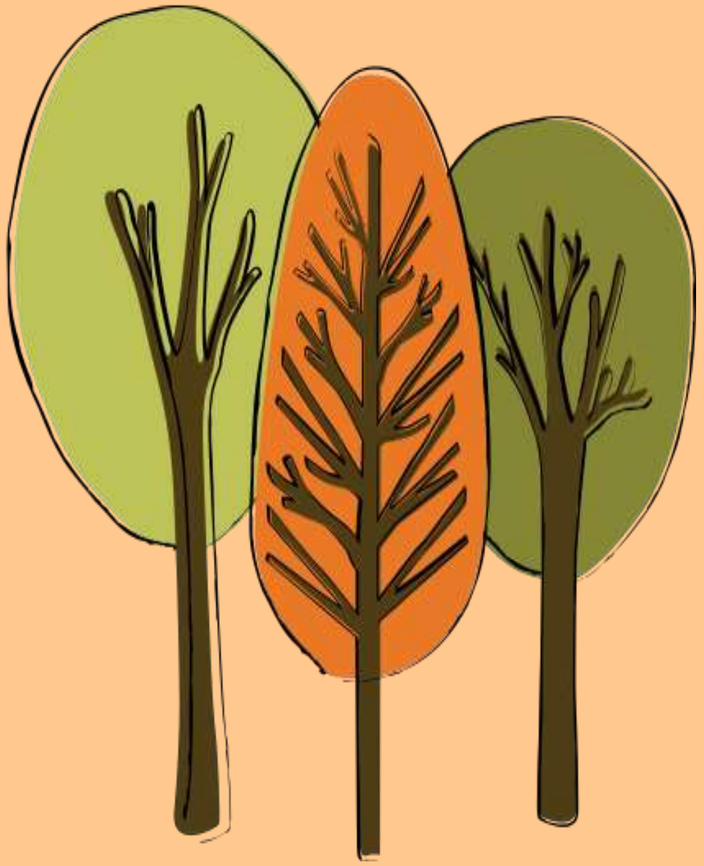
Social Forestry

- Agroforestry- growing of trees with the crops in agricultural fields also called as silviculture.
- Rural forestry- Planting of trees on community lands in villages
- Urban forestry- Planting of trees in cities, eg. Chandigarh
- Commercial forestry- Growing of economically important trees and earning profit from it.
- Extension forestry- Planting of trees on road sides, canals, railway lines etc



Agroforestry

- ✓ Management and integration of trees, crops or/and livestock
- ✓ Flexible concept
- ✓ Based on principles of ecology
- ✓ Both small sized and large sized land holdings
- ✓ Different species of trees can be planted with many types of crops in a variety of patterns.



Desirable characteristics of tree species

- **Easily established:** require minimum labour for planting and maintenance.
- **Fast growing:** benefits become available to the farm family as soon as possible.
- **Good sprouting:** hedgerows continue to grow regularly after pruning.
- **Nitrogen fixing:** leguminous (nitrogen-fixing) species can contribute to crop nutrition.
- **Heavy and palatable foliage**: provide more green manure and acceptable fodder.
- **Deep root system:** nutrients and water are drawn from lower soil layers.
- **Easy to propagate:** generally, growing hedgerows from seed requires less labour than vegetative propagation

Benefits of Agroforestry

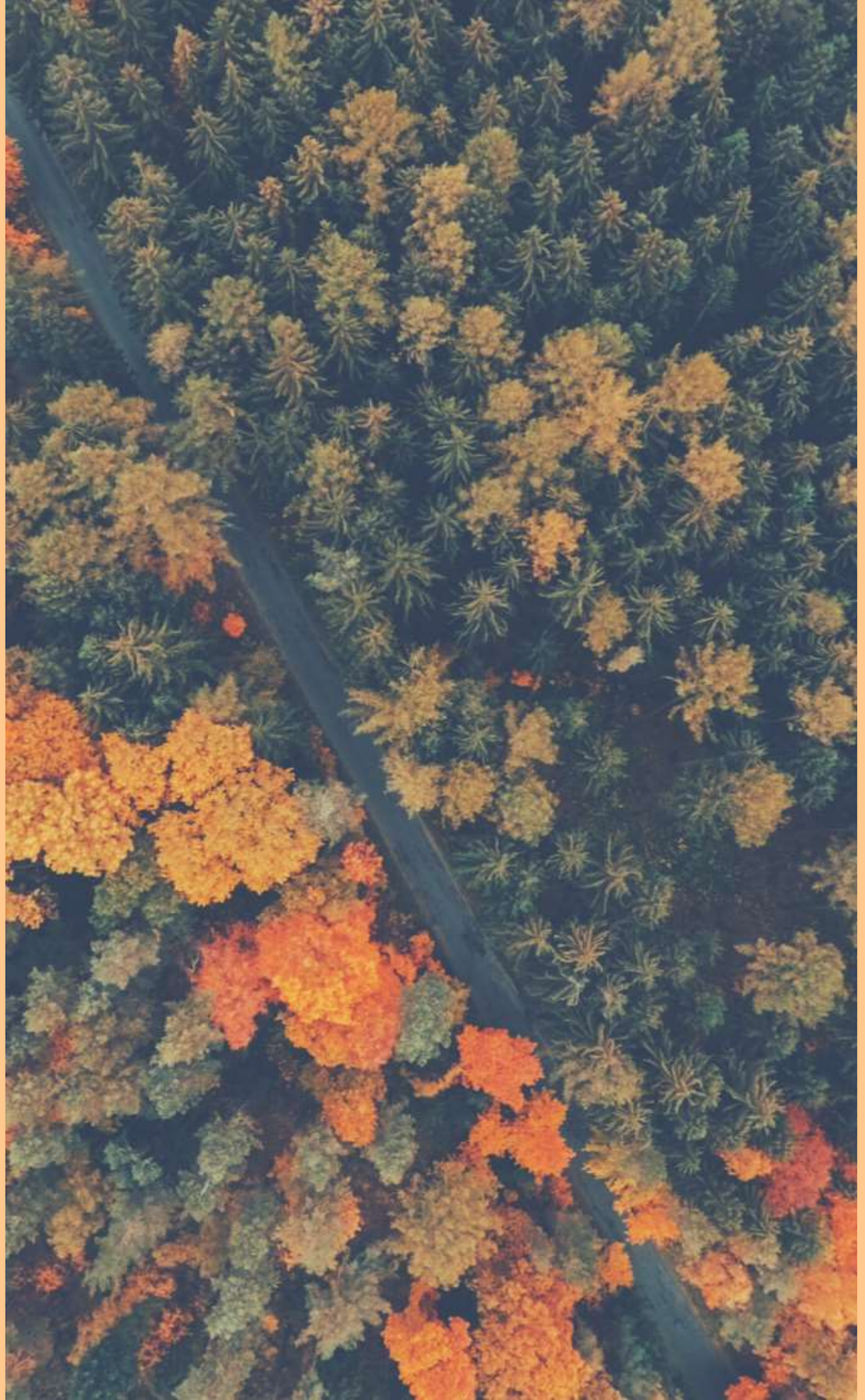
- Control runoff and soil erosion
- Maintain soil organic matter and biological activity
- Maintain more favourable soil physical properties than agriculture, through organic matter maintenance and the effects of tree roots.
- Lead to more closed nutrient cycling than agriculture and hence to more efficient use of nutrients
- Checks development of soil toxicities, or reduce exiting toxicities-both soil acidification and salinization
- Utilize solar energy more efficiently than monocultural systems different height plants, leaf shapes and alignments all contribute

Benefits of Agroforestry

- Lead to reduced insect pests and associated diseases
- Augment soil water availability to land use systems
- Nitrogen-fixing trees and shrubs can substantially increase nitrogen inputs to Agroforestry systems
- Decomposition and addition of tree and pruning contribute to maintenance of soil fertility
- Release of nutrients from the decomposition of tree residues fulfills nutrient requirements of associated crops.
- Provide a more diverse farm economy and stimulate the whole rural economy, leading to more stable farms and communities
- Economics risks are reduced when systems produce multiple products

Community Forestry

- Community forestry is a set of practices, techniques and methods to manage the forest and its natural resources
- It is regulated by a specific legal framework that organizes local communities' participation
- Community forestry is making local communities responsible for managing the forest and its resources including non-timber forest products, animal biodiversity, ecotourism, lumber



Community Forestry in India

Formation of Van Panchayats

- Van Panchayat lands are located within the revenue boundary of the villages
- Van Panchayats are free to make their own rules and regulations to protect and manage the forest, grazing, grass and fuelwood collection
- They ensure equitable distribution of forest produces to the right holders, prevent encroachment and incident of fire in Van Panchayat land, etc.

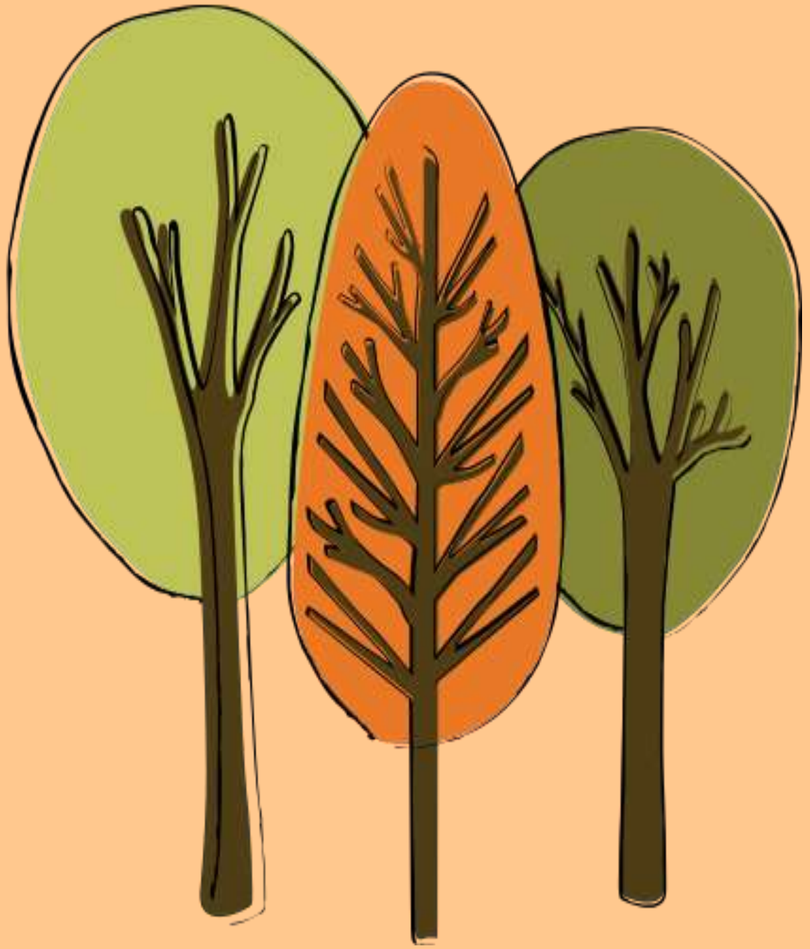
Community Forestry in India

Declaration of Gramya Jungle

- Gramya Jungle lands are located inside the village boundary
- Rules authorize the village institution to manage these jungle lands as per the norms of the village
- Village has complete rights over the produces from these jungle lands which are apportioned among the villagers as per rules of the village institution
- It has rights to make provisions for protection and management of the Gramya Jungle
- Legal ownership of the Gramya Jungle lands rests with the revenue department

Joint Forest Management

- Concept of developing relationships between fringe forest groups and forest department
- Jointly defined roles and responsibilities for forest protection and development
- The Joint Forest Management Guidelines of 1990 of the Government of India



CASE STUDIES

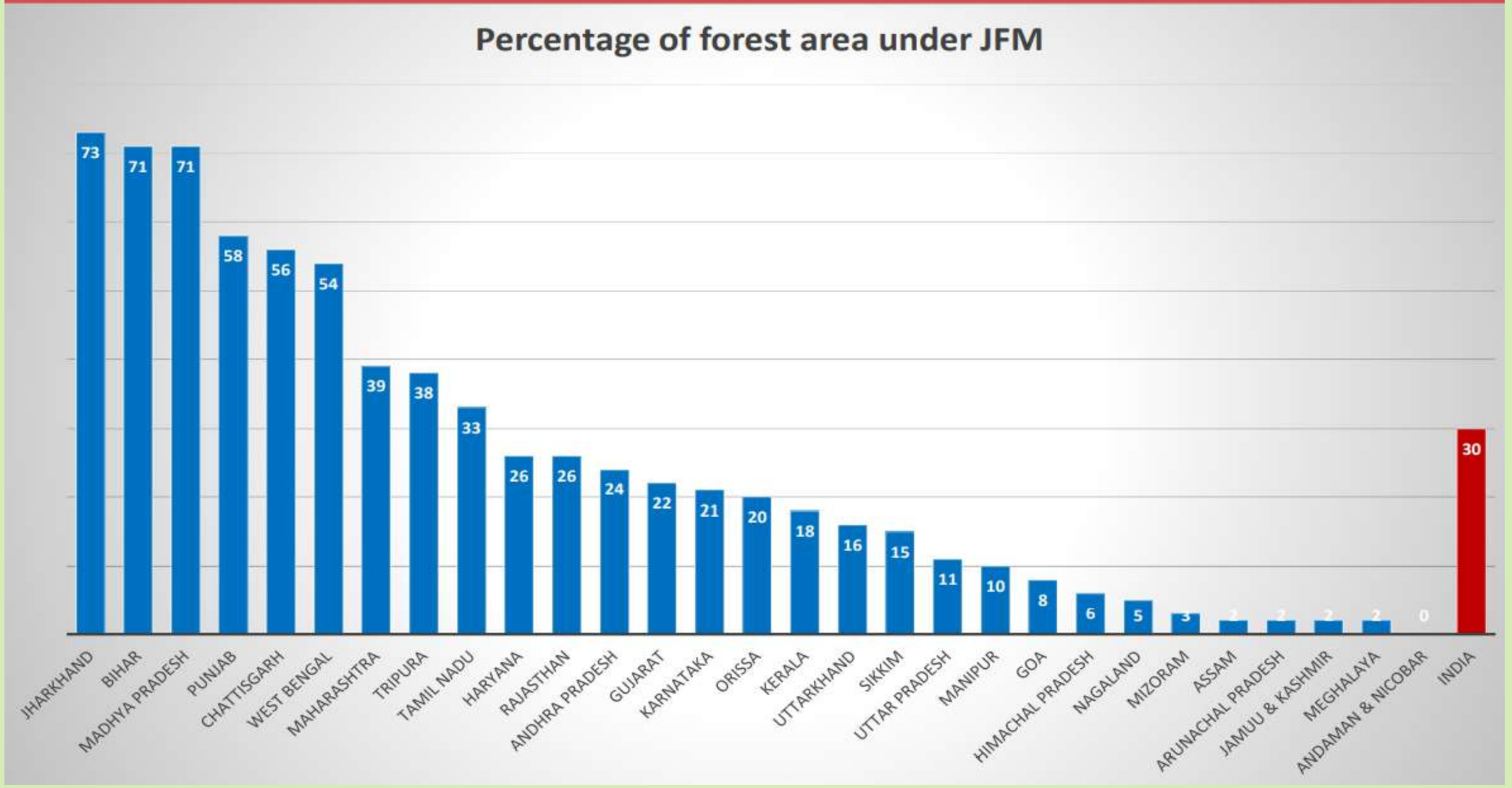
❖ Arabari, West Bengal

The forest official and representatives of eleven local villages and negotiated the terms of a contract with an *ad hoc* Forest Protection Committee. 25% of profits from the forests were shared with the villagers. The experiment was successful and was expanded to other parts of the state in 1987.

❖ Sukhomajri, Haryana

In 1977, villagers were persuaded that instead of grazing on erosion-prone hills, building small dams would help agricultural output on areas currently under cultivation. The program led to reforestation of many hills in the state.

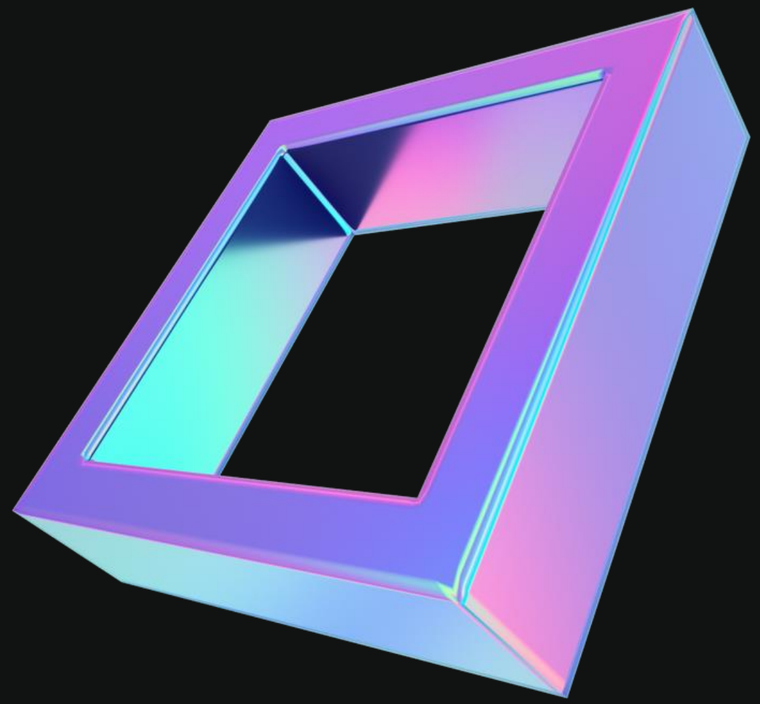
JOINT FOREST MANAGEMENT



Resources:

- file:///C:/Users/jaspr/Downloads/publishedNovember2015.pdf
- https://enb.iisd.org/forestry/conserve.html
- http://ifs.nic.in/Dynamic/pdf/JFM%20handbook.pdf

UNIT–IV
INDOOR
ENVIRONMENT



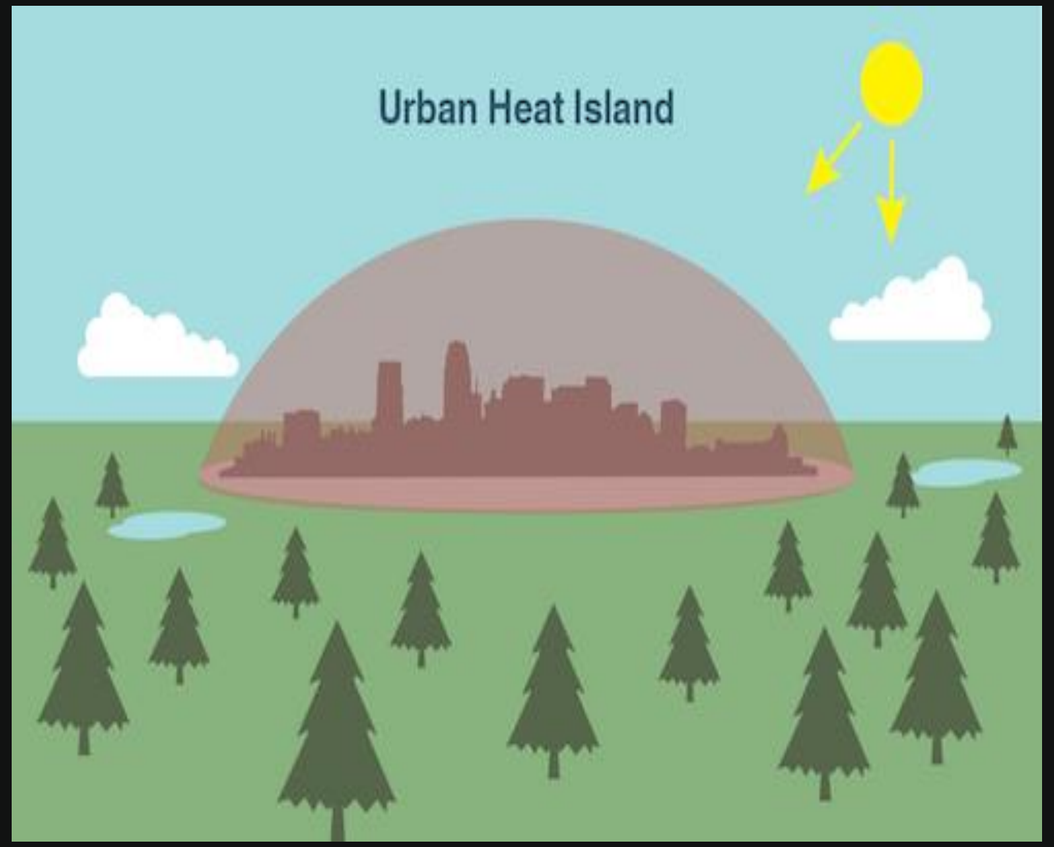
Topic for the day: Environmental Problems linked with Rural and Urban Areas

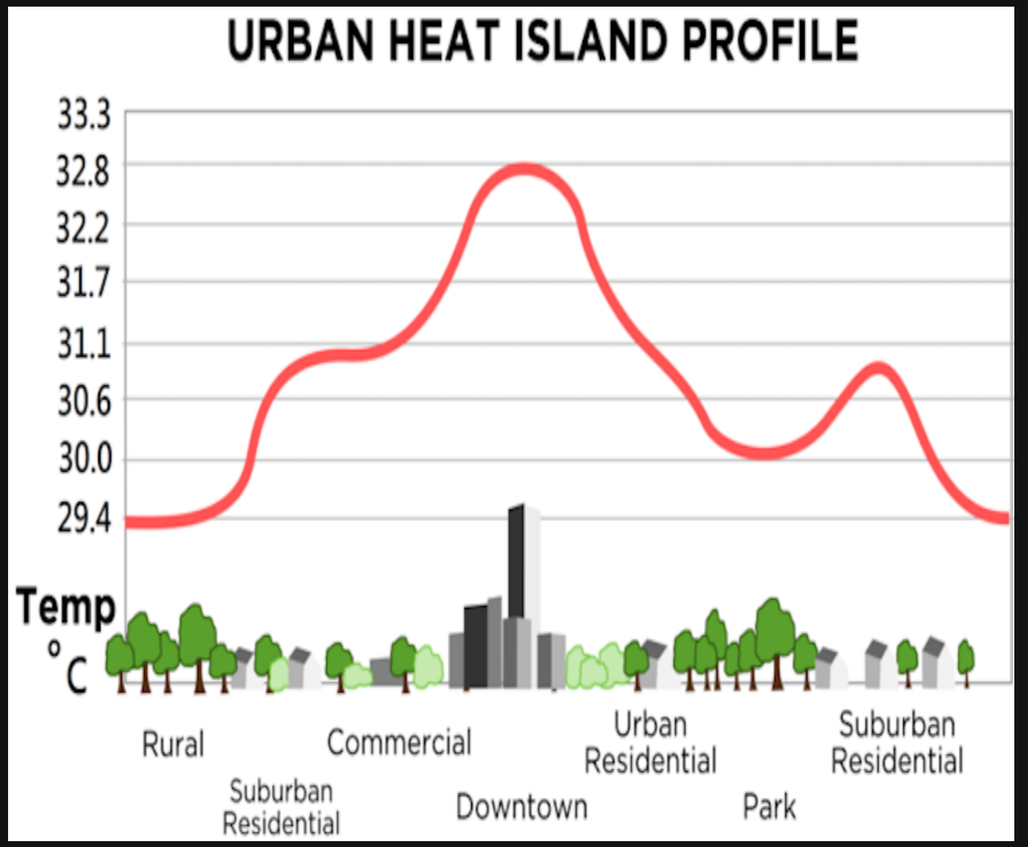
Environmental Problems -Rural Area

- Poor sanitation
- Land use change
- Desertification
- Salination
- Water pollution
- Soil erosion
- Agricultural Chemicals pollution
- Fuelwood
- Accumulation of toxins

Environmental Problems -Urban Area

- Air Pollution
- Noise pollution
- Over population
- Traffic Congestion
- Availability of land space
- Housing problems
- Development of Slums
- Social evils and crimes
- Inflation


Urban Heat Island

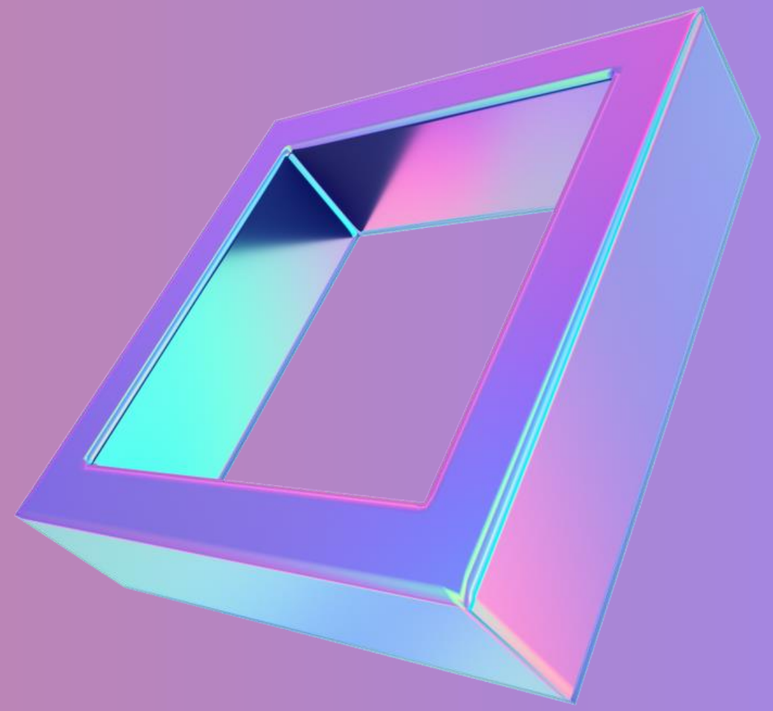

URBAN HEAT ISLAND PROFILE
33.3
32.8
32.2
31.7
31.1
30.6
30.0
29.4
Temp °C
Rural
Suburban Residential
Commercial
Downtown
Urban Residential
Park
Suburban Residential

Topic for the day:
Indoor Pollution

What's in indoor air ?

Major Indoor Air Pollutants

- ❑ Built environment
- ❑ Particulate matter
- ❑ Second-hand tobacco smoke
- ❑ Volatile organic compounds
- ❑ Biological pollutants
- ❑ Asbestos



Ergonomics- Built Environment

- Architecture – Basic structure of the building
- Interior design- Furnishing and upholstery
- Building services- Air , Thermal control
- Structure- Form and structure including ventilation
- Materials – Building materials used including paints
- Microclimate –Effect of outdoor weather changes

Indoor Particulate matter

Major Sources

- ❑ Cooking
- ❑ Combustion activities like burning of candles
- ❑ Use of fireplaces
- ❑ Use of unvented space heaters or kerosene heaters
- ❑ Cigarette smoking
- ❑ Biological origin like pollens

Environmental Tobacco Smoke

Environmental tobacco smoke (ETS) originates from the smoldering end of the tobacco product in between puffs, known as side-stream smoke (SS), and from the smoker's exhaled smoke . The smoke that the smoker inhales is known as mainstream smoke (MS)

Environmental Smoke = Side-stream +Exhaled

Also known as involuntary smoke or passive smoke

Environmental Tobacco Smoke

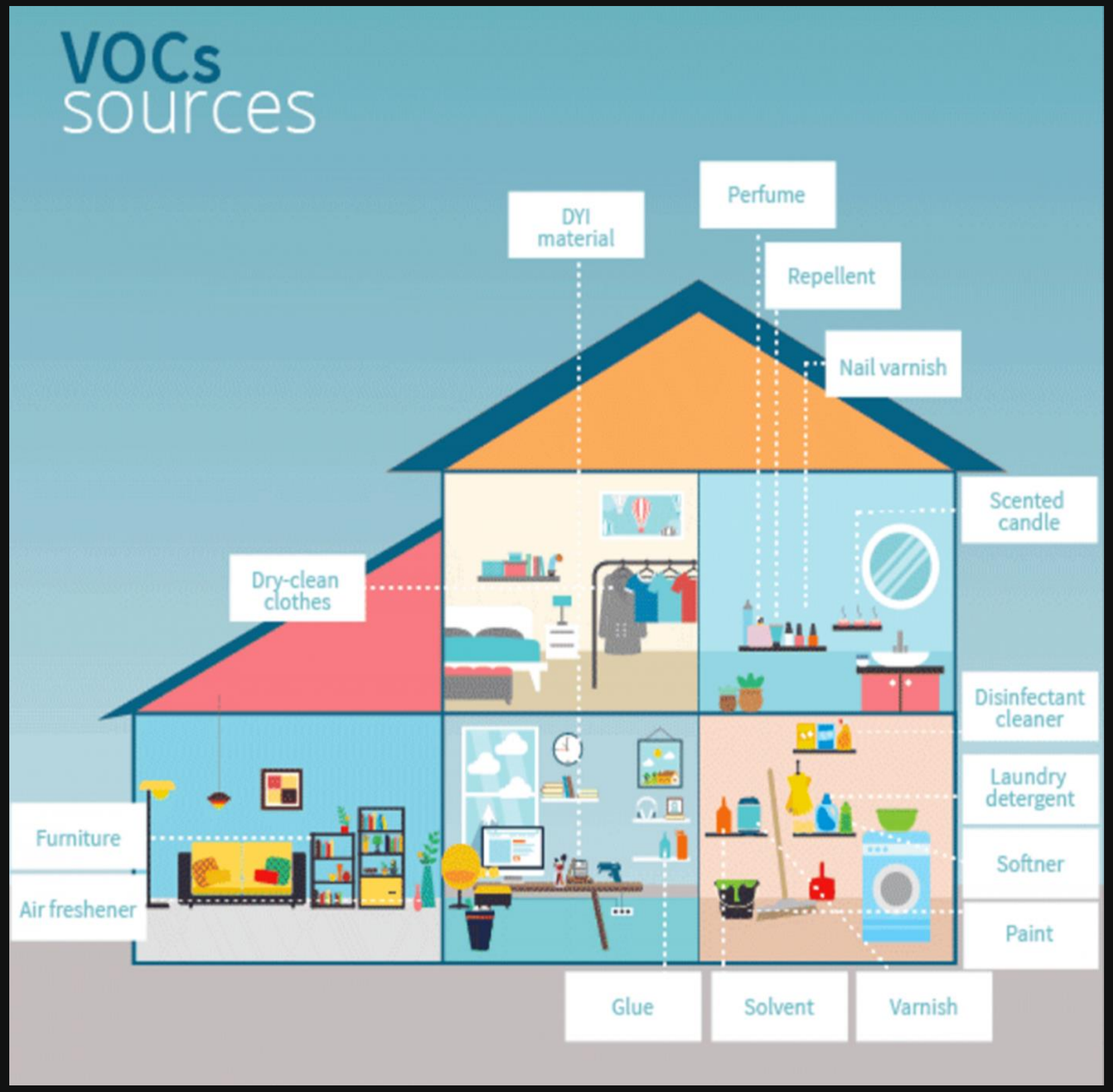
Tobacco smoke is made up of thousands of chemicals, including at least 70 known to cause cancer.

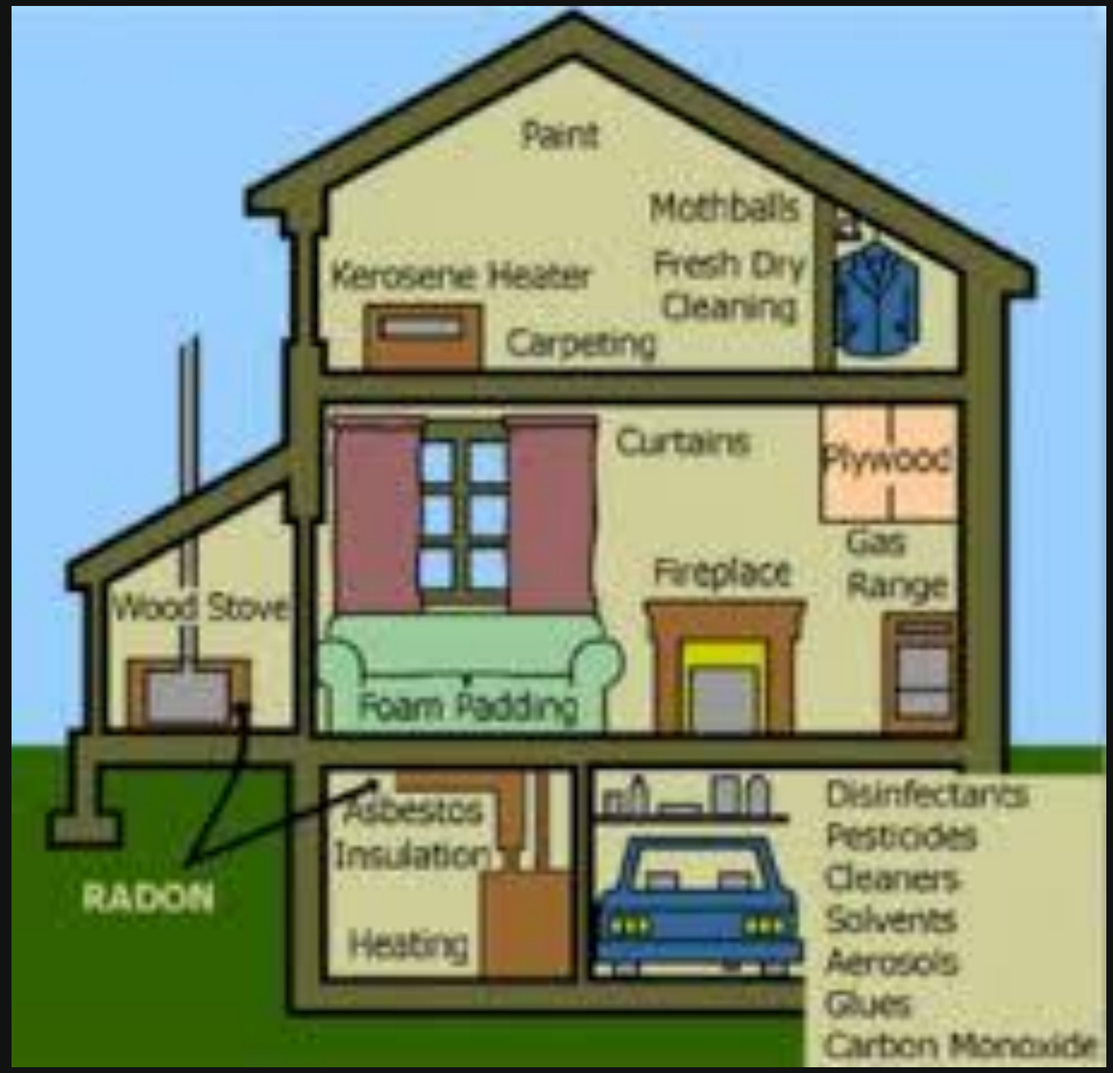
- ❑ Nicotine (the addictive drug that produces the effects in the brain that people are looking for)
- ❑ Hydrogen cyanide
- ❑ Formaldehyde
- ❑ Lead
- ❑ Arsenic
- ❑ Ammonia
- ❑ Radioactive elements like polonium-210
- ❑ Benzene
- ❑ Carbon monoxide
- ❑ Tobacco-specific nitrosamines (TSNAs)
- ❑ Polycyclic aromatic hydrocarbons (PAHs)


VOCs
Volatile Organic
Compounds

Volatile Organic compounds

- Compounds that have a high vapor pressure and low water solubility
- Human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants
- These are emitted as gases from certain solids or liquids
- VOCs typically are industrial solvents, such as trichloroethylene; fuel oxygenates, such as methyl tert-butyl ether (MTBE)
- By-products produced by chlorination in water treatment, such as chloroform
- Components of petroleum fuels, hydraulic fluids, paint thinners, and dry cleaning agents.


VOCs
sources
DYI material
Perfume
Repellent
Nail varnish
Scented candle
Dry-clean clothes
Disinfectant cleaner
Laundry detergent
Softner
Paint
Furniture
Air freshener
Glue
Solvent
Varnish


Paint
Mothballs
Kerosene Heater
Fresh Dry Cleaning
Carpeting
Curtains
Plywood
Gas Range
Fireplace
Wood Stove
Foam Padding
Asbestos Insulation
Heating
RADON
Disinfectants
Pesticides
Cleaners
Solvents
Aerosols
Glues
Carbon Monoxide

Volatile Organic compounds

VOCs act as common ground-water contaminants

These chemicals have short- and long-term adverse health effects as following:

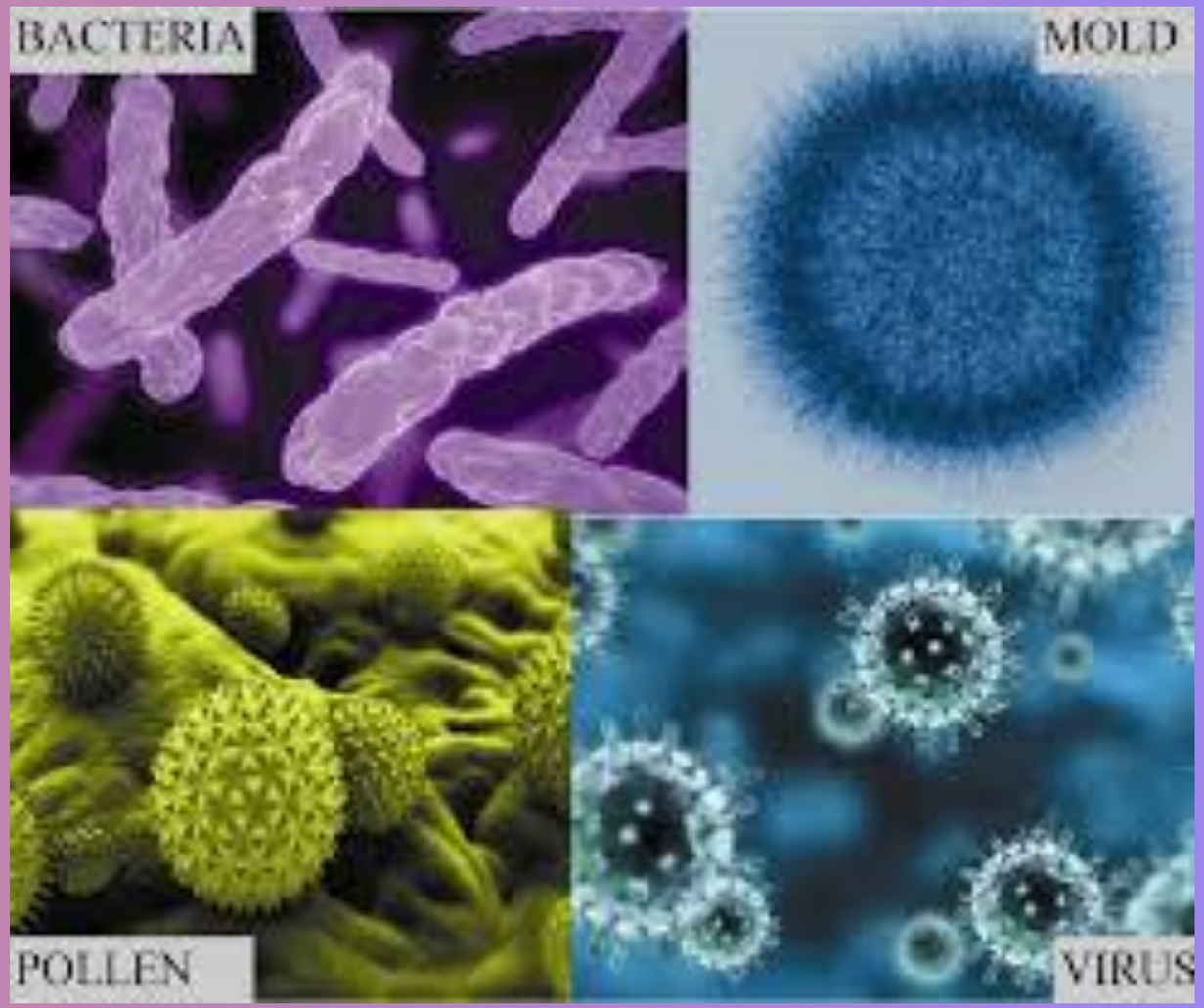
- Eye, nose and throat irritation, shortness of breath
- Headaches, fatigue, nausea, dizziness, skin problems
- Higher concentrations may cause irritation of the lungs
- Damage to the liver, kidney, or central nervous system
- Long-term exposure may also cause damage to the liver, kidneys or central nervous system
- Some VOCs are suspected of causing cancer and some have been shown to cause cancer in humans

Volatile Organic Compounds

- The health effects caused by VOCs depend on the concentration and length of exposure to the chemicals
- Most people are not affected by short-term exposure to the low levels of VOCs found in homes
- Some people may be more sensitive, such as people with asthma.
- For long-term exposure to low levels of VOCs, research is ongoing to better understand any health effects from these exposures

Biological Pollutants

- Biological pollutants are or were living organisms that promote poor indoor air quality
- Biological pollutants can travel through the air, are often invisible
- Include bacteria, molds, mildew, viruses, animal dander and cat saliva, house dust, mites, cockroaches, and pollen



Biological Pollutants

SOURCES

- Pollens originate from plants
- viruses are transmitted by people and animals
- bacteria are carried by people, animals, and soil and plant debris
- household pets are sources of saliva and animal dander
- Protein in urine from rats and mice is a potent allergen as on drying, it can become airborne
- Contaminated central air handling systems can become breeding grounds for mold, mildew, and other sources of biological contaminants

Biological Pollutants

EFFECTS

Allergic reactions are the most common health problem associated with biological pollutants

These reactions can range from mildly uncomfortable to life-threatening, as in a severe asthma attack

- ✓ Watery Eyes
- ✓ Runny nose and Sneezing
- ✓ Nasal Congestion
- ✓ Itching
- ✓ Coughing
- ✓ Wheezing and difficulty breathing
- ✓ Headaches
- ✓ Fatigue

KILLER A'S

ASBESTOS

AJINOMOTO

ASPARTAME

AZO DYE

Asbestos

Asbestos is a naturally occurring silicate minerals made up of thin, microscopic fibers. Asbestos offers heat and chemical resistance, fireproofing and strength. It is fibrous in nature and carcinogenic

•Asbestosis- Asbestosis is a serious, chronic, non-cancerous respiratory disease. Inhaled asbestos fibers aggravate lung tissues, which cause them to scar. Symptoms of asbestosis include shortness of breath and a dry crackling sound in the lungs while inhaling. In its advanced stages, the disease may cause cardiac failure

•Lung Cancer - Incidence of lung cancer in people who are directly involved in the mining, milling, manufacturing and use of asbestos and its products is much higher than in the general population

•Mesothelioma-Rare form of cancer that most often occurs in the

Azo dyes

A large class of synthetic organic dyes that contain nitrogen as the azo group —N=N— Oldest and strongest colouring agents used in textiles, leather and cosmetics especially hair colours.

These chemicals have multiple health effects:

1. Loss of natural colour
2. Eye and skin irritation and inflammation
3. Blurred vision
4. Breathing difficulty and Asthma
5. Effect on pregnancy
6. Effect on Central Nervous system

Aspartame

- Aspartame is a widely used, low-calorie, artificial sweetener and one of the most popular sugar substitutes in low-calorie food and drinks, including diet sodas.
- It is also a component of some medications.
- It is a synthetic nucleotide compound. Its structure is quite similar to the nucleotides of our DNA
- When consumed regularly for long time , it interferes with DNA structure and replaces the nucleotides in it

Ajinomoto

Ajinomoto, the most popular ingredient flavor that enhances the food taste. It is frequently used in Chinese dishes. Its chemical name is Monosodium Glutamate.

Major harmful effects of Monosodium Glutamate or Ajinomoto are:

- Hypertension
- Headache
- Effects on Nerves
- Sleeping Disordered Breathing
- Risk of Cancer
- Degeneration of brain cells
- Alzheimers disease