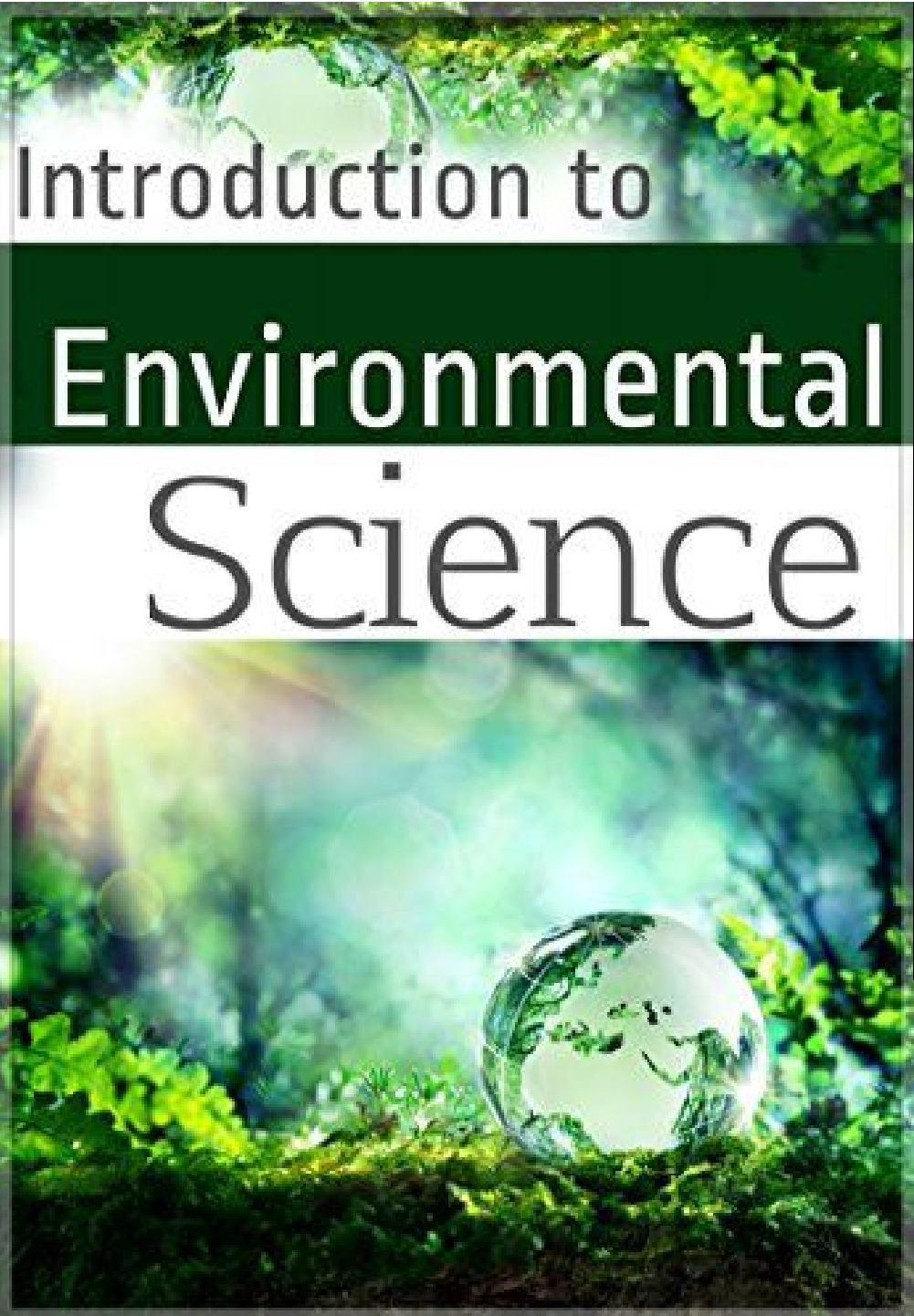
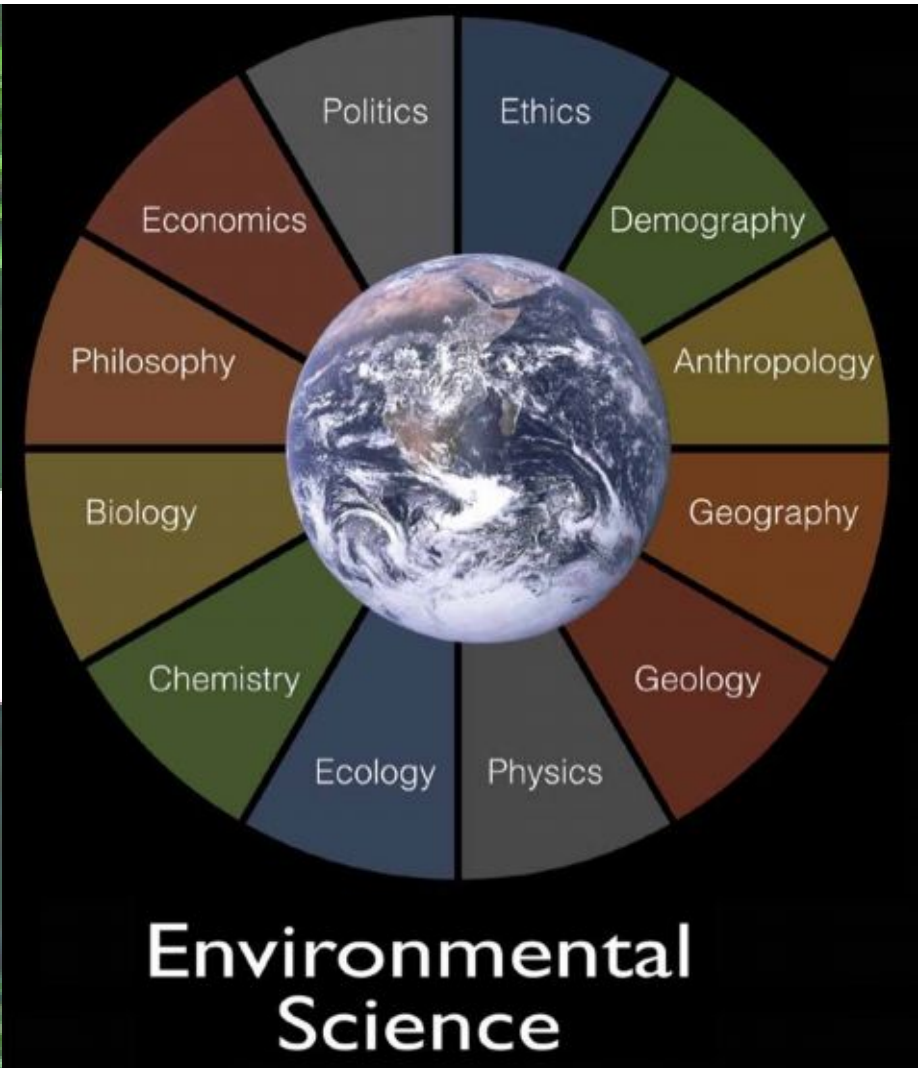




Introduction to Environmental Science



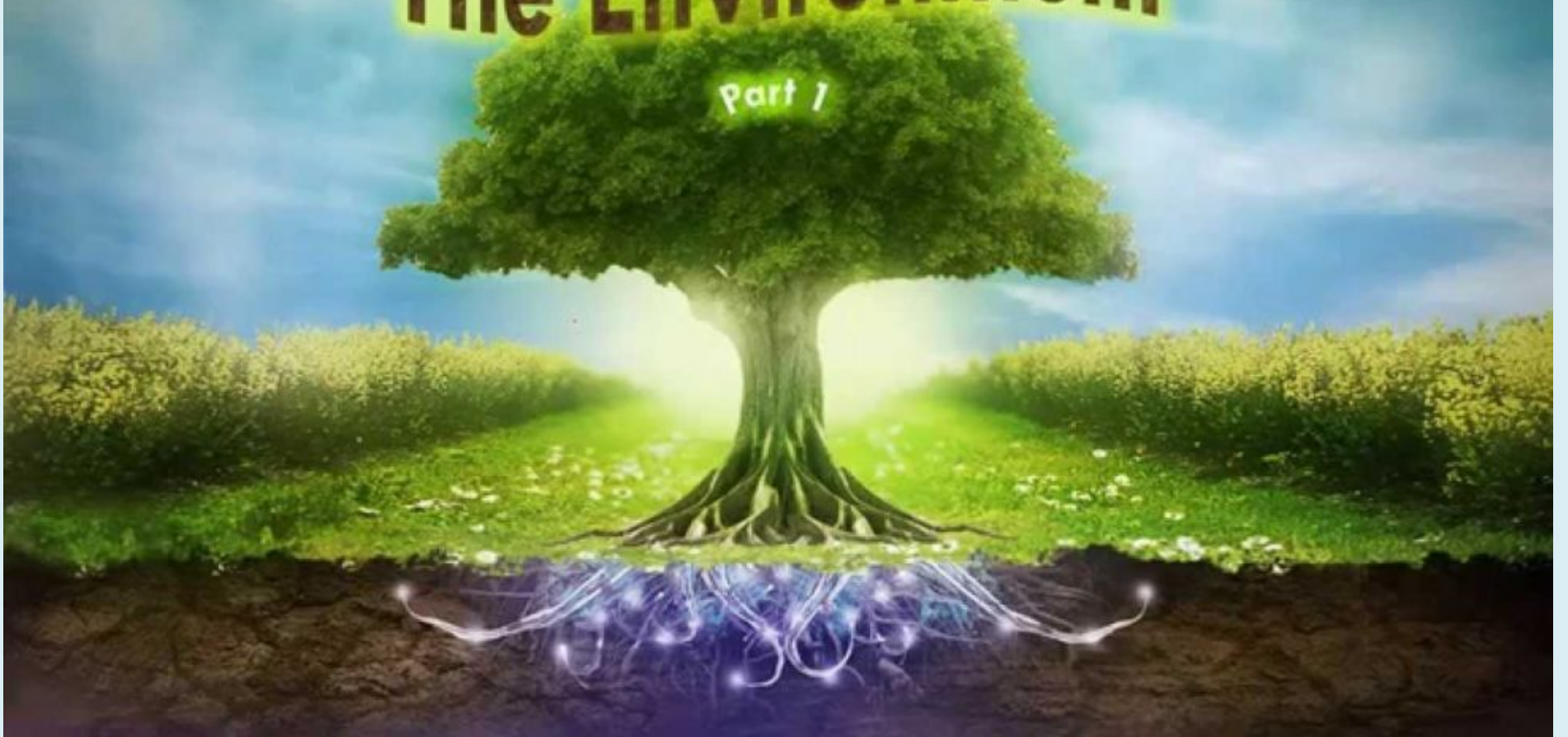
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Unit 1: Introduction to environmental studies

- Multidisciplinary nature of environmental studies
- Scope and importance; Concept of sustainability and sustainable development.

The Environment

Part 1



ENVIRONMENT

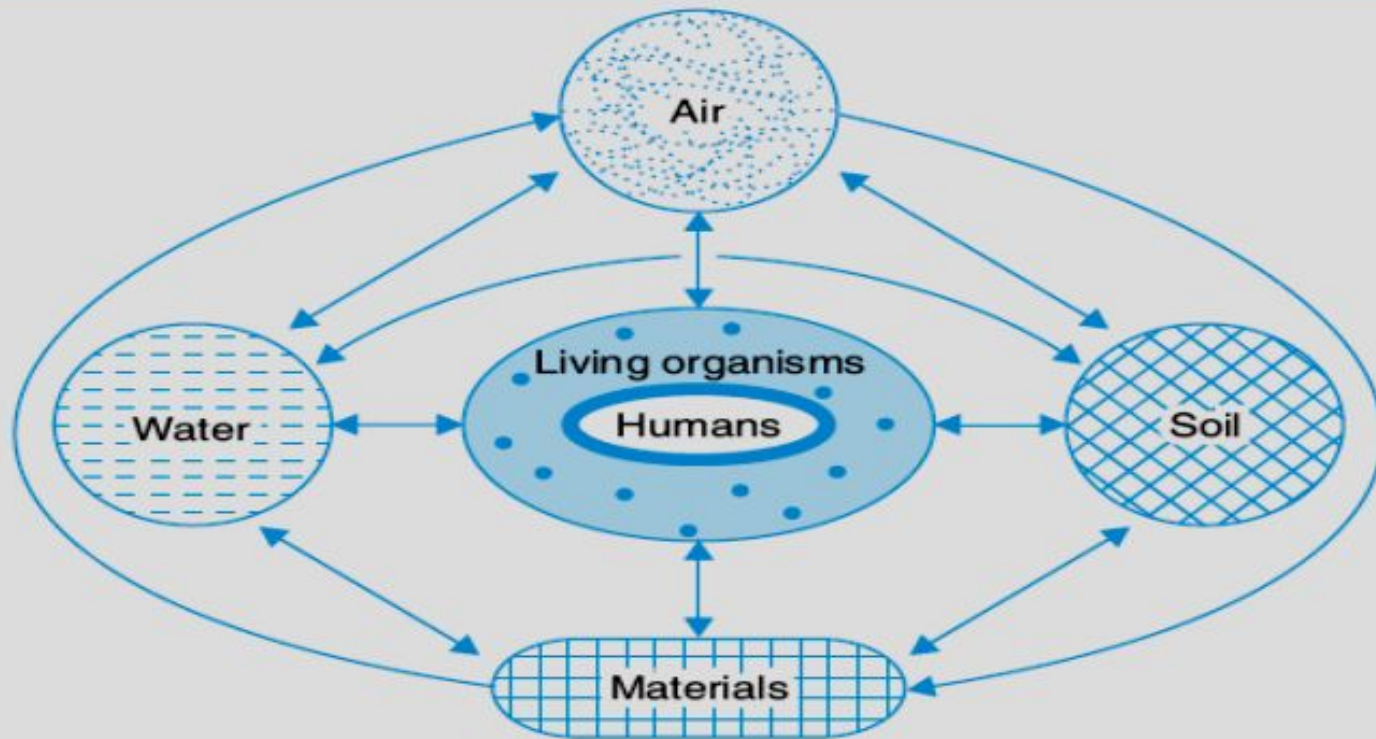


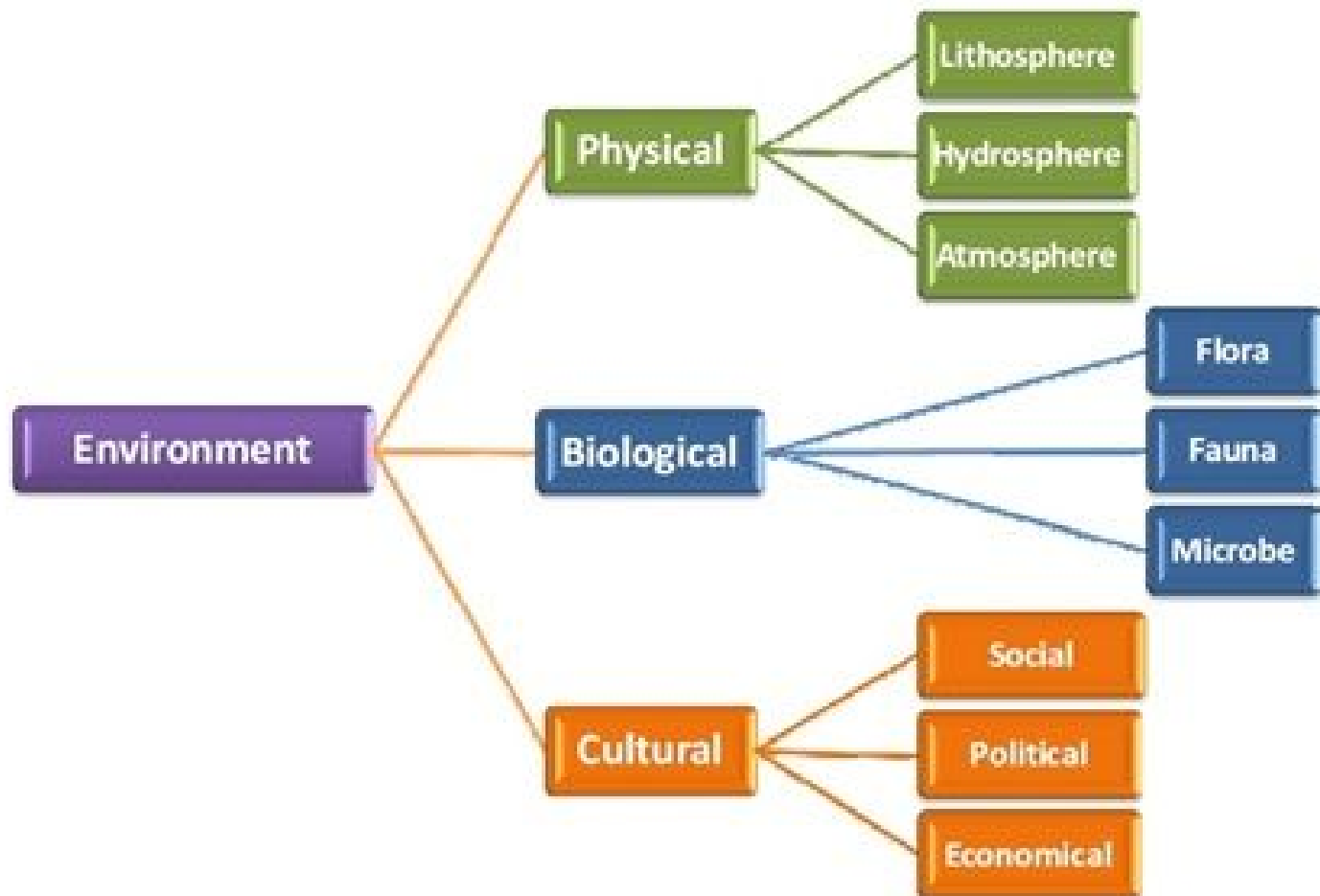
Fig. 1.1 Concept of Environment: air, water, land, living organisms and materials surrounding us and their interactions together constitute environment.

ENVIRONMENTAL STUDIES

- The word environment is derived from the French word “Environ” meaning Surroundings .
- Every organisms is surrounded by materials and forces which constitute its environment.
- Environment creates favourable conditions for the existence and development of living organisms.
- Environment – The sum of total of all the living and non-living things around us influencing one another.

- Environmental science the scientific study of human interactions with the environment.
- It is the branch of science concerned with the relations between organisms and their environment.
- Literally, environment means the surrounding external conditions influencing development or growth of people, animal or plants; living or working conditions etc.

Types of Environment



Types of Environment

Natural environment

- Natural environment is characterized by natural components.
- All biotic (living) and abiotic (non-living) are created through a natural process.
- Natural components do not require any human support.

Man-made environment

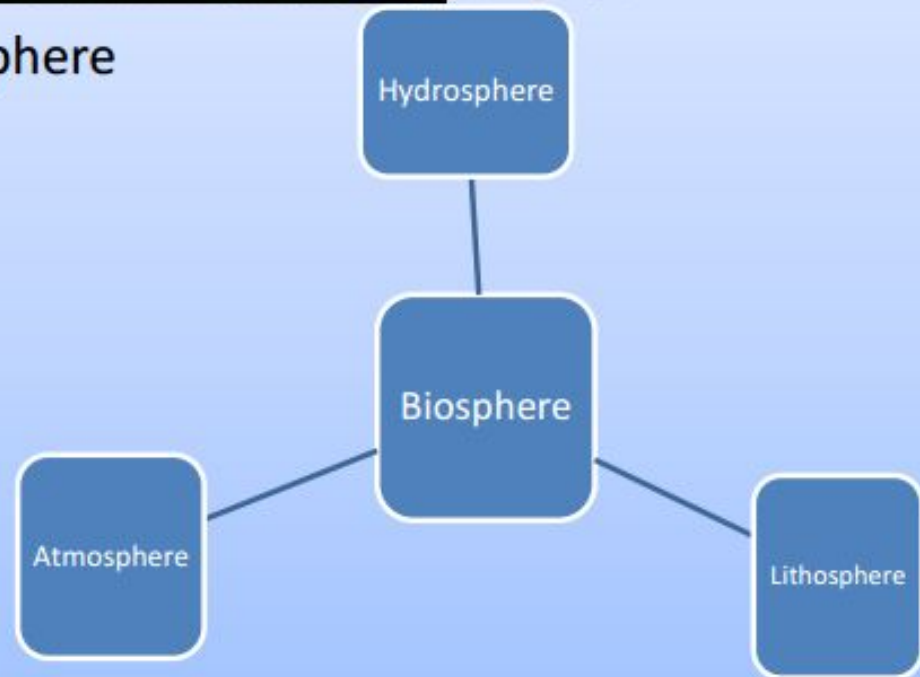
It is powerful environment modified using modern technologies according to the needs created by humans.

Components of the Environment

- Abiotic or Non-living components
- Biotic or Living components
- Energy components

Biosphere

- Bios-life sphere-area
- Largest unit of Environment.
- That part of earth in which life exists.
- Term biosphere was coined by **Vladimir Vernadsky** in 1929.
- There are 3 sub division of biosphere
 1. Lithosphere
 2. Hydrosphere
 3. Atmosphere



Biotic or Living components

- Example: Animals, plants and micro organisms.

Biosphere:

The living organism live and interact with physical environment (soil, water and air) is called biosphere.

Functions:

Plants ↔ animals

Components of Environment

ABIOTIC COMPONENTS-

- It includes non living components.
- Include two factors **climate** (temp., water, light, humidity etc) and **edaphic** (soil and substratum) .

BIOTIC COMPONENTS-

- The living organisms form the biotic components of the environment.
- PRODUCERS(green plants) – CONSUMERS(animals) – DECOMPOSERS(fungi, bacteria).

Abiotic or Non-living or Physical components

- Example : Air, water, soil and minerals.

Abiotic components enter the body of living organisms directly or indirectly take part in metabolic activities and then return to the environment.

- Abiotic – three categories

1. Atmosphere
2. Lithosphere
3. Hydrosphere

1. Atmosphere

- Air envelopes the earth is known as atmosphere. It extends up to 500 kms from the earth surface.
- It comprises 78% of Nitrogen, 21% of oxygen and 1% of other gases.

Segments of Environment

1. Atmosphere:

The atmosphere implies the protective blanket of gases, surrounding the earth.

Layers of atmosphere:

1. Troposphere
2. Stratosphere
3. Mesosphere
4. Thermosphere

2. Hydrosphere:

The Hydrosphere comprises all types of water resources oceans, seas, lakes, rivers, streams, reservoirs, polar icecaps, glaciers, and ground water.

3. Lithosphere:

Lithosphere is the outer mantle of the solid earth. It consists of minerals occurring in the earth's crusts and the soil.

Structure of atmosphere

Sl no.	Region	Altitude in km	Temperature in C	Chemical species
1	Troposphere	0-18	15 to -56	N ₂ , H ₂ O, CO ₂ , O ₂
2	Stratosphere	18-50	-56 to -2	Ozone
3	Mesosphere	50-85	-2 to -92	NO ⁺ , O ₂ ⁺
4	Thermosphere	85-500	-92 to 1200	NO ⁺ , O ⁺ , O ₂ ⁺
5	Exosphere	Upto 1600	Very high	He, H ₂

Composition of Atmospheric Air

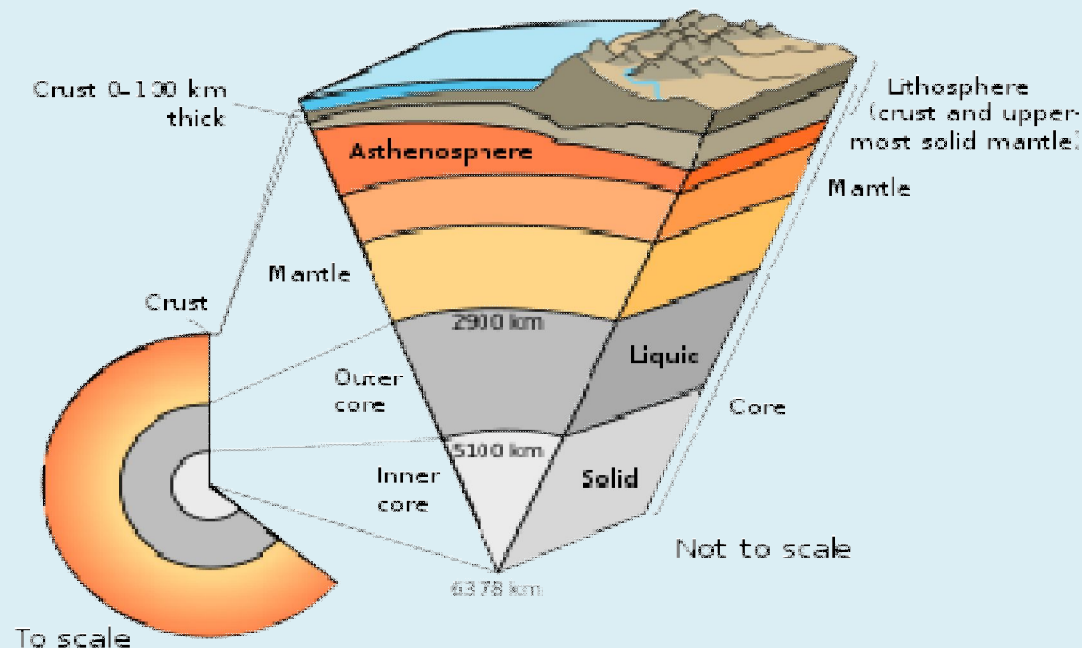
Gas	Relative %by Volume
Nitrogen (N ₂)-	78.09
Oxygen (O ₂)-	20.93
Argon (A)-	00.93
Carbon-di-oxide- (CO ₂)-	0.032
Miscellaneous-	0.02
Total	100.000

Functions of atmosphere

- It maintains the heat balance on the earth by absorbing the IR radiations
- The gaseous constituents play an important role in sustaining life on earth
- Oxygen - supports life of living organisms
- CO₂- essential for photosynthetic activity of plants
- Nitrogen – essential nutrient for plant growth

Lithosphere

- The soil and rock components of the earth
- Functions :
 1. Home for human beings and wildlife
 2. Storehouse of minerals and organic matter



Hydrosphere

- The aqueous envelope of the earth . Oceans, lakes, streams, rivers and water vapour constitute hydrosphere.
- 97% of earth water is in oceans. 3% is available as fresh water.

Functions :

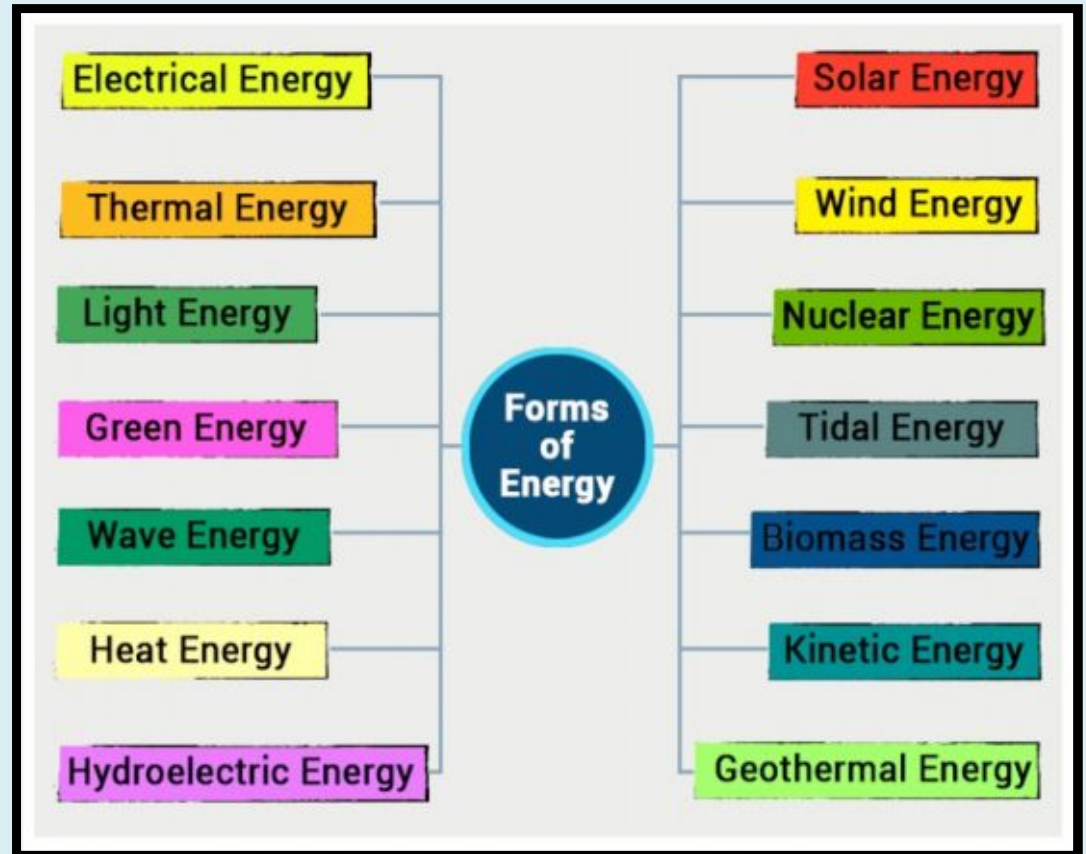
1. It is used for drinking purpose and also supports the aquatic life.
2. It is also used for irrigation, power production, industries and transport.

Energy components

- The components of energy flows across biotic and abiotic components .

Example :

Solar energy,
Nuclear energy,
Geochemical energy,
Thermo electrical
energy, etc.



Importance of Environment Education

- Promotes the use of eco-friendly technology or engineered technology .
- Educate us to conserve our fast depleting natural resources.
- promote reduce, reuse & recycle the waste material.
- Helps in inculcating the attitudes, values and strong feeling of concern for the environment and the motivation to act in protecting and improving it.
- Directs attentions towards the problem of population explosion, pollution of environment, threats to biodiversity and the methods of solving such problems.

Importance of Environment Education

It provides knowledge about :

- The hazardous impact of intensive agricultural practices and people will be made aware of these impacts. This will help society to move towards sustainable agricultural practices.
- The aspects of mining operations involving exploration of resources, degradation of land and social unrest due to displacement will be studied. Understanding these issues will help in finding the solution.
- Various global problems like green house effect, global warming, acid rain etc. will be discussed. The knowledge of these will help in finding the solutions.
- The negative impacts of deforestation and awareness in this regard will give an acceleration to afforestation, social forestry etc.
- The importance of conserving wildlife and ways to do so.
- Understanding of various problems associated with energy intensive life styles, will probably help in judicious use of energy resources.
- Impact of water scarcity and this will help us in changing our approach towards misuse of water resources.
- It will help in assessing and evaluating the effects of various environmental hazards.

THE MULTI-DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

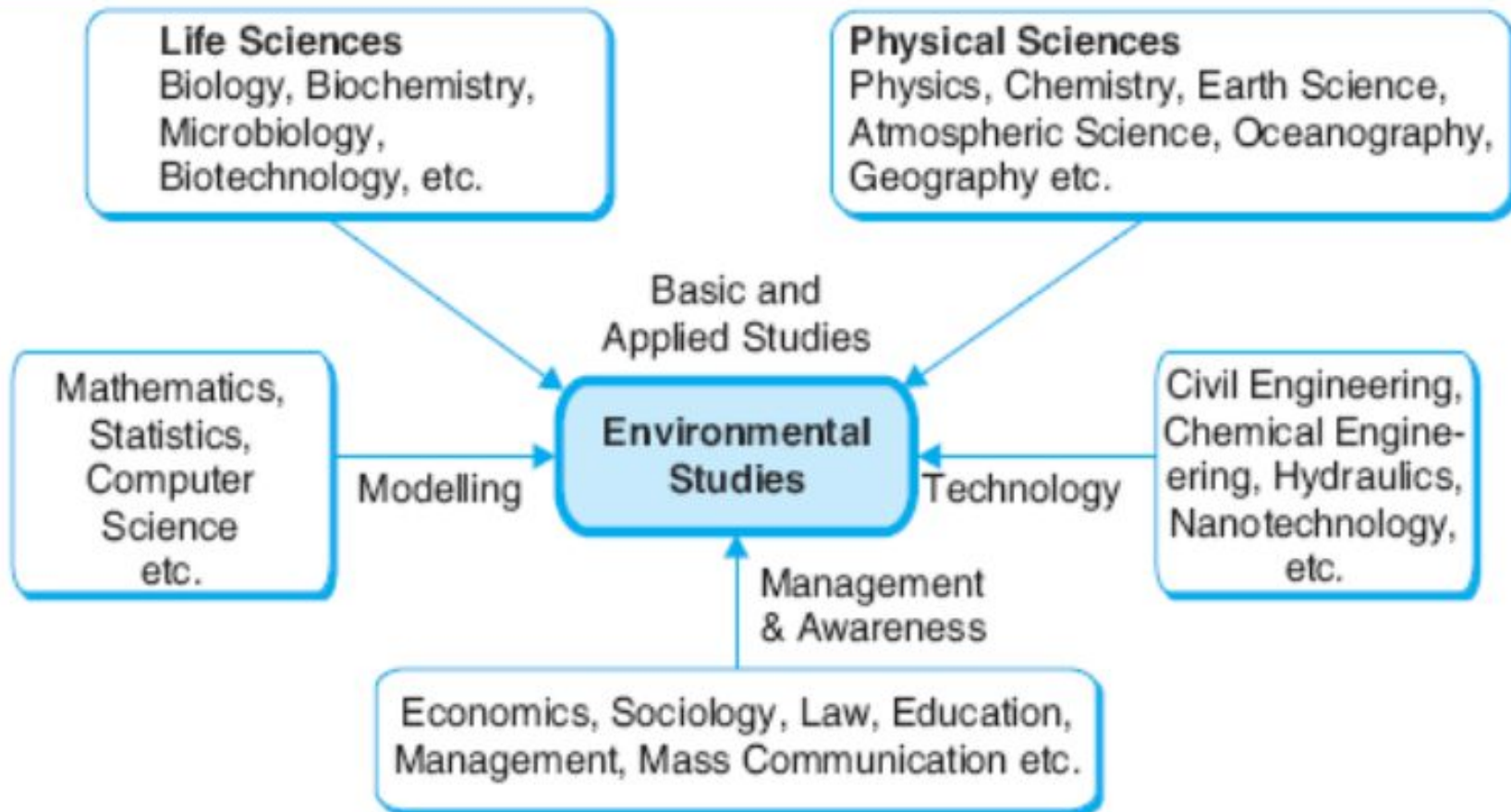


Fig 1.2 Multidisciplinary nature of environmental studies.

NEED FOR PUBLIC AWARENESS

Public awareness- making the people conscious, concerned about various aspects of environment.

In India public awareness about the environment protection is in its infant stage.

- Any government at its own level can not achieve the goal of sustainable development until the public is made aware about the complexities of environment or environmental crises. The public must know about the fact that if we are degrading our environment we are actually imbalancing our ecosystem.
- Our country has witnessed many successful environmental movements which are a results of awareness e.g. Narmada Bachao Andolan, Chipko movement.

“if you plan for one year, plant rice, if you plan for 10 year plant trees & if you plan for 100 years, educate people”.

Reasons for Environmental Ignorance-

- The matter concerned with environment protection are often considered anti- development.
- Our education system failed to integrate the environmental aspect in different courses.
- Illiteracy in people.
- Our policy makers do not incorporate environmental aspect with in their policies.

NOBEL PEACE PRIZE, 2004 FOR ENVIROMENTALIST

The 2004 Nobel Peace Prize was awarded to Kenyan Environmentalist **Wangari Maathai** for her contribution to sustainable development, democracy and peace. This is the greatest recognition given to the cause of environment at international level. The Norwegian Nobel Committee, while awarding the prize, expressed the views “*Peace on Earth depends on our ability to secure our living Environment*”.



Maathai, Kenya's Deputy Environment Minister is the founder of Kenya based **Green Belt Movement**. This movement comprising mainly of women has planted about 30 million trees across Africa. This has helped in slowing desertification, preserving forest habitats for wildlife and food for future generations and has helped combat poverty.

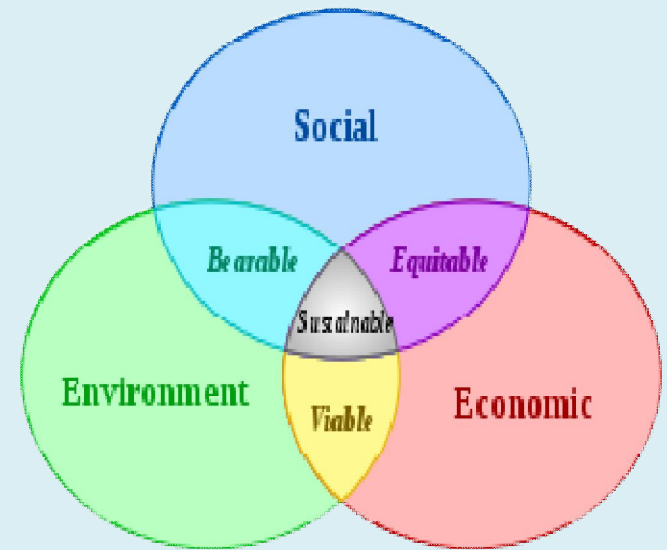
Maathai has given a beautiful slogan “*When we plant new trees, we plant the seeds of peace.*”

Environmental Calender

World Wetland Day	February 2
World Forest Day	March 21
World Day for Water	March 22
World Meteorological Day	March 23
Earth Day	April 22
International Biodiversity Day	May 22
Anti-tobacco Day	May 31
World Environment Day	June 5
World Ocean Day	June 8
World Population Day	July 11
Ozone Week	Sept. 16–23
World Car-free Day	Sept. 22
Green Consumer Day	Sept. 28
World Farm Animal's Day	Oct. 2
World Habitat Day	Oct. 3
World Animal Welfare Day	Oct. 4
Wildlife Week	Oct. 1–7
World Conservation Day	Oct. 24
International Day for Natural Disaster Reduction	Oct. 13
International Day for Biological Diversity	Dec. 29

Sustainable development

- Sustainable development is defined as **Development that meets the needs of the present without compromising the ability of future generations.**
- It also looks at the equity between countries, races and gender and ages.
- It includes social and economic development on one hand and the requirements of environment on the other.
- It is a process which leads to a better quality of life while reducing the impact on the environment.





The Principles of Sustainable Development

Sustainable development

Causes

1. Raising population
2. Increasing poverty
3. Pollution loads



Measures to be taken

1. Use of appropriate Technology
2. Minimize the use of resources
3. Creating awareness
4. Discourage earth degrading behavior
5. Govt Programmes to reduce population, poverty and pollution

Any economic activity without healthy balance between environment leads to **Unsustainability**



1 NO
POVERTY



2 ZERO
HUNGER



3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



7 AFFORDABLE AND
CLEAN ENERGY



8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



10 REDUCED
INEQUALITIES



11 SUSTAINABLE CITIES
AND COMMUNITIES



THE GLOBAL GOALS

For Sustainable Development

12 RESPONSIBLE
CONSUMPTION
AND PRODUCTION



13 CLIMATE
ACTION



14 LIFE BELOW
WATER



15 LIFE
ON LAND



16 PEACE AND JUSTICE
STRONG INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS



Food for a Week, Darfur Refugees, Chad, Africa



Source: Menzel, 2005

Food for a Week, for German Family

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ALLEMAGNE 1500 sortes de saucisses, 1200 restaurants McDonald's, 750 millions de kebabs avalés chaque année... Plus de la moitié des Allemands sont en surpoids ou obèses.

Source: Menzel, 2005



Suggestions
Questions
Problems

