

Elements of Environment

1. Environment - Definition

- ♣ C.C. Park : Environment refers to the sum total of all conditions which surround man at a given point in space and time.
- ♣ Douglas and Holland: 'The term environment is used to describe, in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms.'

2. Types of environment Environment

Physical /Abiotic

Biological/Biotic

Manmade

Lithosphere (Solid) Floral (Bio sphere) Economic , Hydrosphere (Liquid) Faunal Social, cultural Atmospheric (Gas)

3. Physical or abiotic components

♣ Atmosphere

♣ Lithosphere

♣ Hydrosphere

Composition of atmosphere

- ♣ Atmosphere includes the thick gaseous mantle surrounding the earth.
- ♣ It spreads up to 300 km. above the earth surface.
- ♣ Apart from gases there are water vapor, industrial gases, dust and smoke particles in suspended state, micro organism etc.

3 major constituents of atmosphere Major Components Minor Components

Trace Components

Gases in atmosphere Major components Nitrogen (78.09) Oxygen (20.94) Water vapour (0.1)

Minor Components Argon (0.9) Carbon dioxide (0.032)

Trace components Neon (0.0018) Helium (0.0005) Methane (0.0002)

Major layers of the atmosphere Region Altitude range (km) Temperature range (C)
Important chemical species Troposphere 0-20 15 to - 56 Nitrogen, oxygen, water vapour, carbon dioxide Stratosphere 20 - 50 -56 to -2 Ozone Mesosphere 50 - 85 -2 to -92 Oxygen +, nitric oxide Thermosphere 85 - 500 - 92 to 1200 Oxygen + nitric oxide

Composition of the Atmosphere

- ♣ The present composition of the atmosphere is as follows: Gas Percentage by volume Nitrogen 78.08 Oxygen 20.95 Argon 0.93 Carbon Dioxide 0.03 Neon 0.0018 Helium 0.00052 Others (Methane, Krypton, Hydrogen, Xenon, Ozone etc).

Layers of the Earth's atmosphere

♣ TheTroposphere

♣ The troposphere is where all weather takes place;

♣ There is a thin buffer zone between the troposphere and the next layer called the tropopause.

♣ The Stratosphere and Ozone Layer

♣ In stratosphere, air flow is mostly horizontal.

♣ The thin ozone layer in the upper stratosphere has a high concentration of ozone.

♣ The Mesosphere and Ionosphere

- ♣ Above the stratosphere is the mesosphere and above that is the ionosphere (or thermosphere), where many atoms are ionized.
- ♣ Ionosphere is very thin, but it is where aurora take place, and is also responsible for absorbing the most energetic photons from the Sun, and for reflecting radio waves, thereby making long-distance radio communication possible.

Main layers of Atmosphere

Lithosphere

- ♣ The word lithosphere originated from a Greek word mean "rocky" + "sphere" i.e. the solid outermost shell of the rocky planet.
- ♣ The Earth is an oblate spheroid. It is composed of a number of different layers. These layers are:
- ♣ The Core which is approximately 7000 kilometers in diameter (3500 kilometers in radius) and is located at the Earth's center.
- ♣ The Mantle which surrounds the core and has a thickness of 2900 kilometers.
- ♣ The Crust floats on top of the mantle. It is composed of basalt rich oceanic crust and granitic rich continental crust.

Core

- ♣ 2 layers – inner core & outer core
- ♣ Inner core theorized to be solid
- ♣ Density 13 gram /cubic cm
- ♣ Radius about 1220 km
- ♣ Rich in iron & nickel
- ♣ Outer core is liquid
- ♣ Density 11 gram /cubic cm
- ♣ Radius -2250 km

MANTLE ♣ Mantle surround the core and is divided in 2 parts.

- ♣ Upper mantle - 670 km radius
- ♣ Composed of ultramafic rock – olivine, pyroxene
- ♣ Lower mantle -2230 km in radius
- ♣ Hot & plastic

♣ Asthenosphere : the weaker, hotter, and deeper part of the upper mantle is known as asthenosphere. It is 100-200 km in stretch.

Crust

- ♣ Crust is divided in two parts:
- ♣ Oceanic crust is thin and measures between 5 to 10 km.
- ♣ Composed of basalt
- ♣ Density 3.0 gram/cubic cm
- ♣ Continental crust is 20 – 70 km thick
- ♣ Composed of lighter granite
- ♣ Density – 2.7 gram/ cubic cm.

Hydrosphere

- ♣ The hydrosphere includes all water on Earth.
- ♣ 71% of the earth is covered by water and only 29% is terra firma.
- ♣ The range of surface temperatures and pressures of our planet permit water to exist in all three states: solid (ice), liquid (water), and gas (water vapor).

- ♣ Most of the water is contained in the oceans.
- ♣ It buffers the Earth surface from large temperature changes such as those observed on the moon.
- ♣ Water is the universal solvent and the basis of all life on our Planet.
- Biotic component of Environment
- ♣ Forest and Wildlife are necessary biotic component.
- ♣ 3 basic Biomes of India are-
 - a. Tropical humid forest
 - b. Tropical dry and deciduous forest
 - c. Warm desert and dry desert.
- ♣ In India total forest area 63.73 mha (19.39% of the total land area).
- Types of vegetation ♣ Forest and Grassland are 2 types of vegetation found in India.
- ♣ 4 main types of forest found in India are
 - 1) Tropical
 - 2) Montane sub tropical
 - 3) Temperate
 - 4) Alpine
- Grassland ♣ 3 major types of grassland are found
 - 1) Xerophilous
 - 2) Mesophilous
 - 3) Hygrophilous
- Faunal Variety of India
- ♣ Total 77,000 types of species.
- ♣ These includes 53,000 types of insects
- ♣ 1200 birds
- ♣ 453 reptiles
- ♣ 372 mammals
- ♣ 5000 mollusks
- ♣ 2500 fish