CHE 110: Environmental Studies

Unit - 1

INTRODUCTION TO ENVIRONMENTAL STUDIES

Unit: 1_Lecture: 5_CHE110_VK

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Desertification/ Desertization

- A process of land degradation in arid, semi-arid and sub-humid areas due to various factors including climatic variations and human activities.
- Due to that the biological productivity of dry lands (arid and semiarid lands) has been reduced.
- Desertification, in short, is when land that was originally of another type of biome
- Desertification is characterized by de-vegetation and loss of vegetal over, depletion of groundwater, salinization and severe soil erosion.
- **Causes of Desertification**
  - ✓ Denuding of forest land
  - ✓ lacking of vegetation which hold back the surface run-off, water drains off quickly before it can soak into the soil to sustain the plants or to refill the groundwater.
  - ✓ This increases soil erosion, loss of fertility and loss of water.

Effects of Desertification

- ✓ Rapid soil erosion
- ✓ Poor soil quality
- ✓ Unfavorable climate
- ✓ Low water table, salty and hard water
- ✓ Huge economic losses

https://www.youtube.com/watch?v=qNTOq1uEObc

Control of Desertification

- ✓ Promoting large-scale plantation of trees
- ✓ Changing agricultural practices and promoting dry land farming
- ✓ Development of pasture lands (suitable for Grazing) and control of overgrazing
- ✓ Promoting equitable use of water resources
- ✓ Development of water catchment areas

- ❑ **The desertification is increasing significantly in Bhuj in northern Gujarat**
- ❑ **Over usages of ground water for last 20 years.**
- ❑ **Water tables going down by 3 m/ year.**

Causes and impacts due to mining

- ✓ Minerals are the natural resources which play an important role in the economic development of the country.
- ✓ But the extraction and mining of these natural resources leads to some adverse effect on our environment as well.
- ✓ It leads to the emission of dust, suspended particle and gases which cause air pollution.
- ✓ Release of harmful trace element e.g., CO, Pb, Cd etc. leads to the contamination of surface water.
- ✓ Underground water is contaminated due to seepage and infiltration of leached drainage.

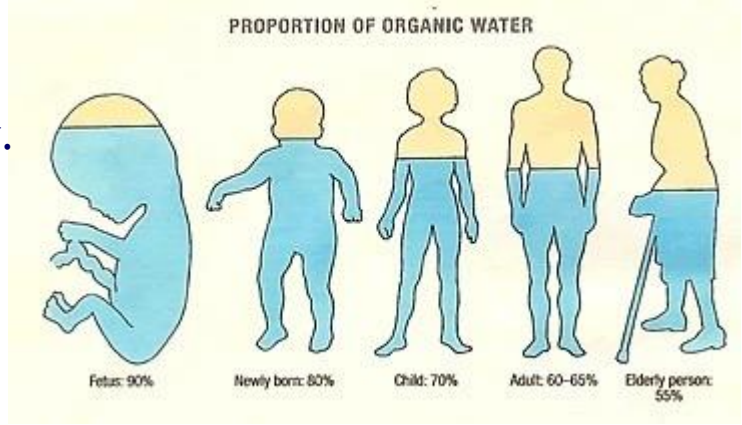
Causes and impacts due to mining

- ✓ Mining leads to the degradation of soil quality, fertility and makes it toxic.
- ✓ Natural vegetation get adversely effected due to leached trace element
- ✓ The major consequences is deforestation which results in loss of flora and fauna.
- ✓ Affect the ecosystem and its stability as many species are killed due to toxicity
- ✓ Mining results in wastage of land as it neither remain suitable for agricultural purposes.
- ✓ Mining directly results in the loss of landscape and beauty of surrounding.

Water Resources

❑ Importance of Water

- Water is the basic component of every living cell.
- It is the basic input required for agriculture.
- Hydro power can be used for generating hydroelectricity.
- It provides habitat to aquatic flora and fauna.
- Common salt can be obtained from water.
- Most important source of water is rainfall.



- Only 3 % of total reserved water is fresh which is also locked up in polar ice caps.
- Only 0.003 % is available to us as ground water and surface water.
- Most usable groundwater occurs upto a depth of 750 m.
- After precipitation, the amount of water that does not percolate down into the ground or does not return to the atmosphere as evaporation or transpiration and enters the rivers, streams, lakes, ponds, wetland etc constitutes the surface water.

Save WATER | Save WORLD :)

PRESERVE IT FOR THE NEXT GENERATION.....

Sources of Water

Ground Water

Water that is hidden underground in spaces between soil and rock particles.

This ground water is the source of water for wells, springs, and even to rivers.

Rainwater seeps into the ground, some are clings to particle or to the plant root

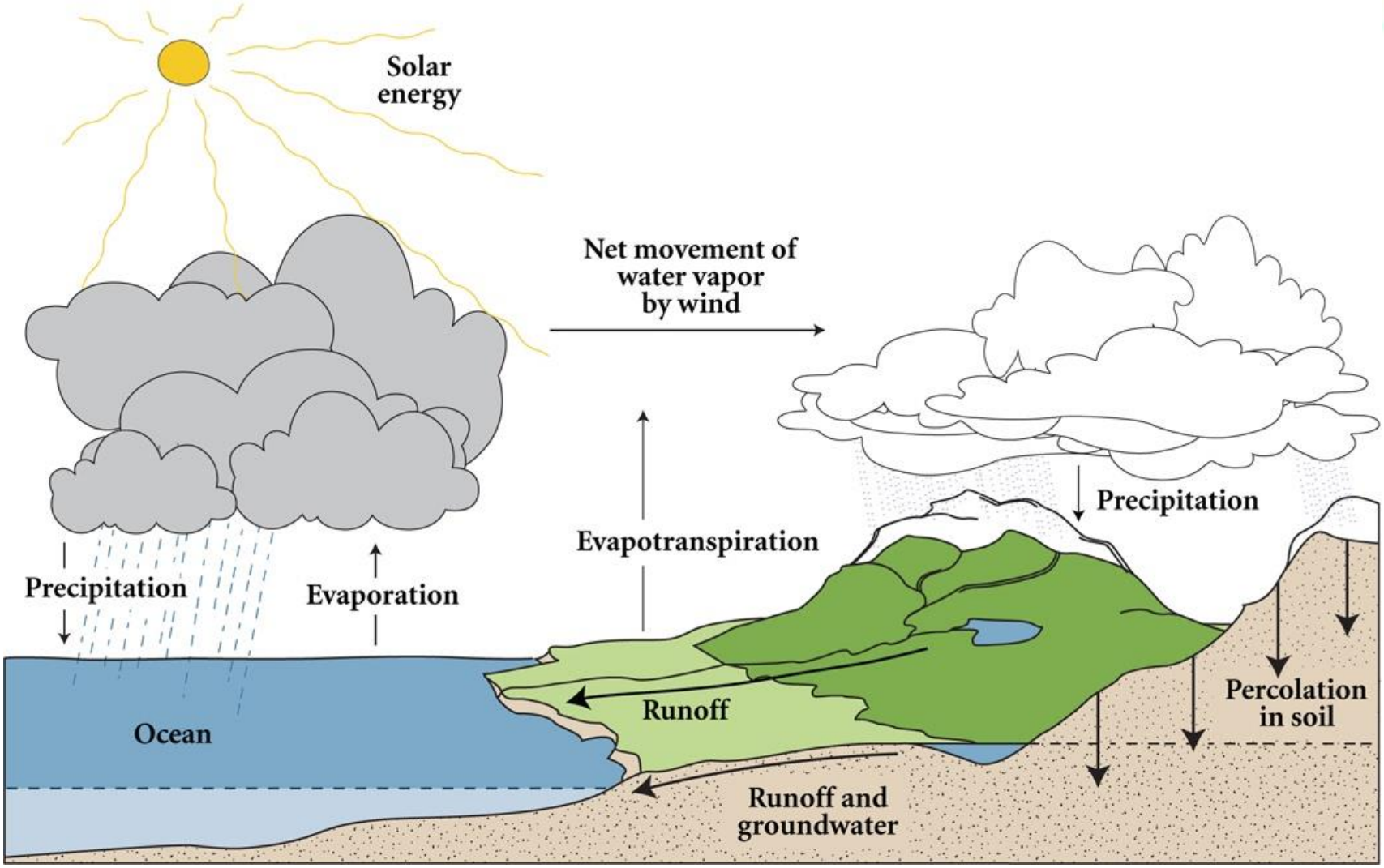
This moisture is provided to the plants for their growth. Most water moves deeper into ground. Most usable water is at depth of 750 m.

Surface Water

After precipitation, the amount of water that does not percolate down into the ground or does not return to the atmosphere by evaporation or transpiration and enters the rivers, streams, lakes, ponds, wetland, or artificial reservoirs constitutes *surface water*.

Ground water is purer than surface water, the chance of pollution is less in ground water.

Water Cycle



Water never leaves the Earth. It is constantly being cycled through the atmosphere, ocean, and land

Effects of Over-utilization of Ground Water

- Reduced flow of surface water
- Lowering of water table
  - (in some places upto 40 m.)
- Water logging
  - (saturation of the soil by groundwater)
- Subsidence
  - (To sink to a lower or normal level)
- Degradation of water quality
- Increased salt content
- Increased power costs

Aquifer

- The upper surface of this zone of saturation is called the water table.
- The saturated zone beneath the water table is called an aquifer, and aquifers are huge
- An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well.
- Aquifers may occur at various depths.

Water Calamities: Floods and Droughts

Floods

Floods refers to the presence of unusually large amount of water at any place or more water that can be handled by the drainage of the area. The types of floods

- Flash Floods (Due to sudden heavy rain fall, dam failure)
- River floods (when rain over large the catchment area slowly, melting of snow)
- Coastal Floods (Due to cyclonic activity like hurricanes, tropical cyclones)

Drought

- A drought is a condition in which a region suffers from a severe scarcity in its water availability.
- **The various kinds of drought**
  - Meteorological Drought (Actual rainfall is less than climatological mean of that area)
  - Hydrological Drought (Running down of surface water leading to a very low stream flow and drying of lakes, rivers.
  - Agricultural Drought (Inadequate soil moisture result in fall in agricultural productivity)

Water Woes: Junagarh

- Junagarh in Gujrat, indiscriminate consumption of ground water has caused an alarming decrease in the water table.
- Motors are used to withdrawn large amount of water.
- Reduction of water tables by 20% in every summer.
- Women have to move up to 4 km in search of water.
- Ingress of sea water is another problems, faced by villagers, increases the salinity in ground water and soil,
- Health issues are increased.
- Hardness is increased in water.

Related links

Importance of water: https://www.youtube.com/watch?v=kxqbpPWTl6A

Water cycle: https://www.youtube.com/watch?v=al-do-HGuIk
https://pmm.nasa.gov/education/videos/water-cycle-animation

Sources of water : https://www.youtube.com/watch?v=m4WBbSv_N7U

1. Use of surface and groundwater: https://www.youtube.com/watch?v=5lK_fs3p7yc

2. Over-exploitation of surface and ground water:
https://www.youtube.com/watch?v=n1gsyhuHGgc

3. Floods
https://www.youtube.com/watch?v=uPdT-osZNkE
http://study.com/academy/lesson/what-are-floods-causes-types-prevention.html

4. Droughts
http://video.nationalgeographic.com/video/101-videos/droughts?source=relatedvideo

5. Conflicts over water
https://www.youtube.com/watch?v=_v8MEaejTok

Energy Resources

- All living creatures on the earth, either it is a plant, an animal or a microbe need energy to perform their vital functions.
- The earth is a vast storehouse of energy.
- The fossil fuels beneath its surface, the wind and water on its surface, the plants growing on it, the sunlight falling upon it, these are all sources of energy.

- 90% of the energy used today is in the form of fossil fuels.
- Forms of energy OTHER than fossil fuels are termed “alternative” energy sources.
- Alternative energy sources can be divided into two main categories.