

Evapotranspiration

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What is the concept of evapotranspiration?



Evapotranspiration includes **water evaporation into the atmosphere from the soil surface, evaporation from the capillary fringe of the groundwater table, and evaporation from water bodies on land.**

Evapotranspiration also includes transpiration, which is the water movement from the soil to the atmosphere via plants.

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- Evapotranspiration (ET)
- Difference between evaporation & transpiration
- Types of evapotranspiration
- Factors affecting evapotranspiration
- How to determine evapotranspiration?
- Significance of ET

What is evapotranspiration ?

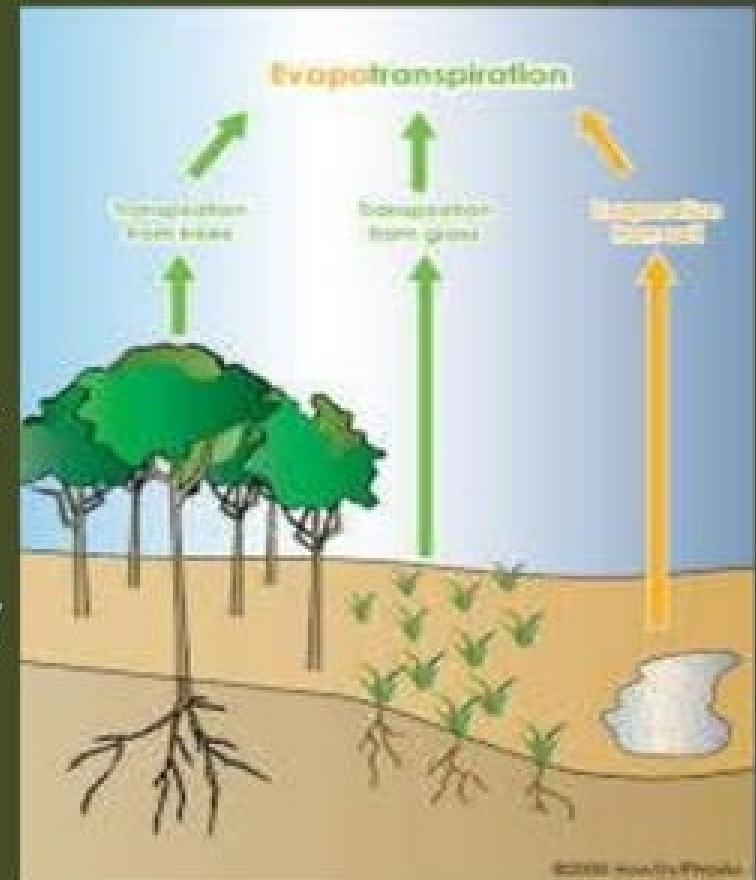
- It is a combination of two separate processes

Evaporation:

Loss of water from the soil surface or any other open water body

Transpiration:

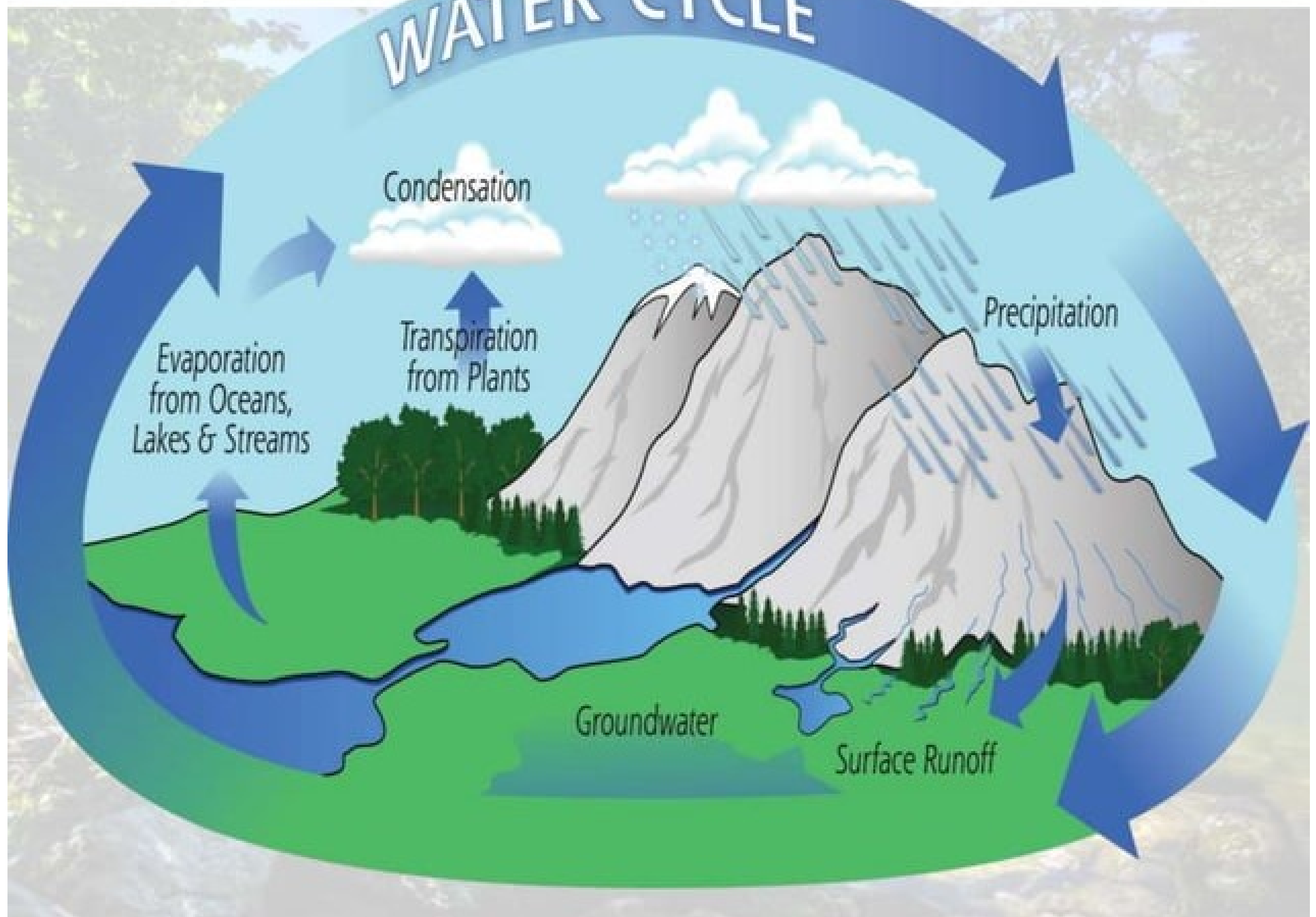
from plant surface

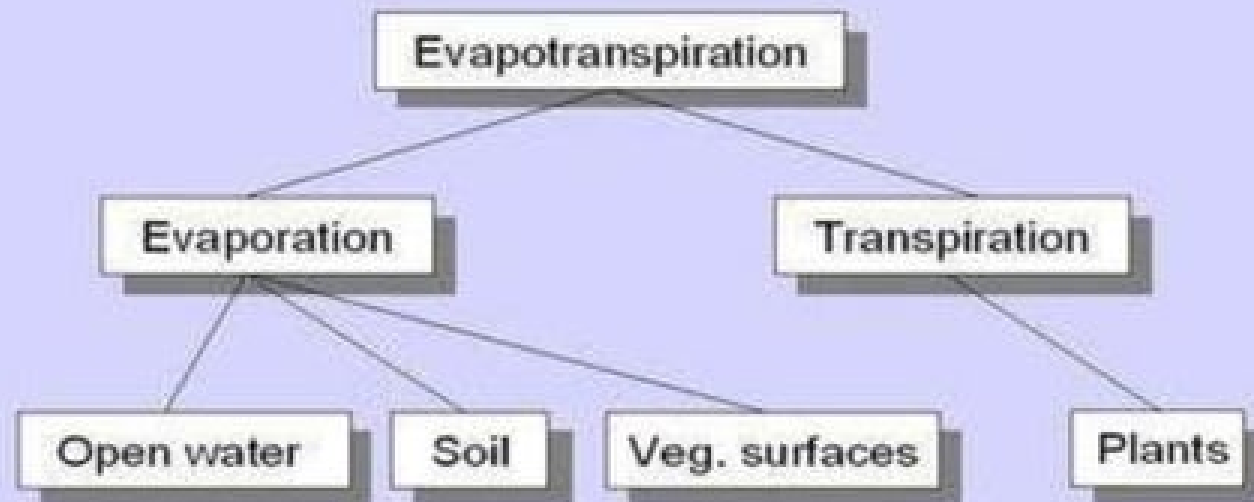


Difference between evaporation & transpiration

Transpiration	Evaporation
Transpiration is physiological process	Evaporation is physical process.
It is loss of water from the free surface of cells.	It is loss of water from the free surface of water.
Regulated process.	Non regulated process.
Guard cell involved.	No role of guard cell.
It is comparatively slow process.	It is faster process.
Influenced by anatomy of plants.	There is no such influence.

WATER CYCLE

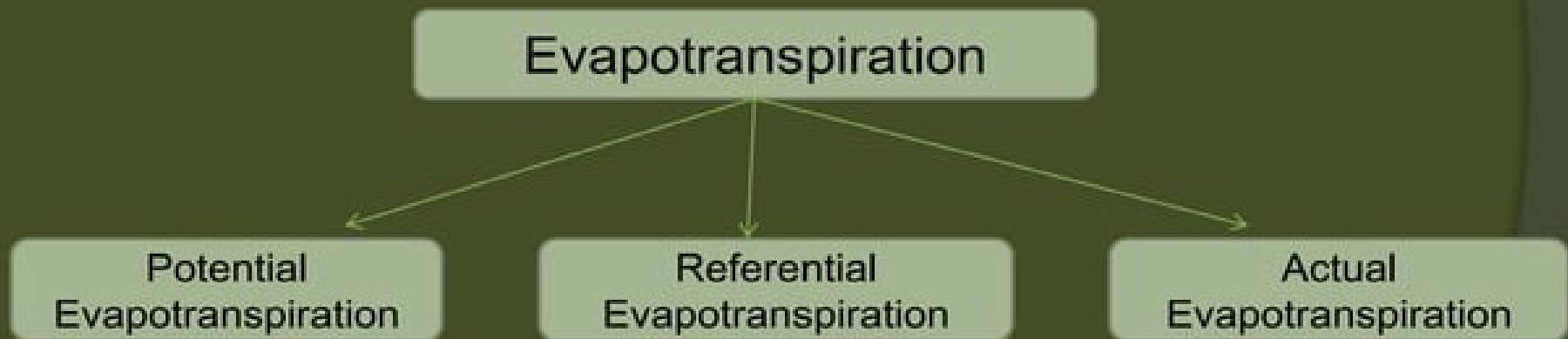




Evapotranspiration divided into subprocesses

Types of evapotranspiration

- Evapotranspiration may be classified as:



Potential ET:

- Concept given by Thornthwait.
- It is the highest rate of ET from an actively growing short height vegetation completely covering the ground with abundant water supply at a given climatic condition.

Referencial ET:

- Concept given by Doorenboss and Pruitt
- It is the rate of ET, not highest from an extended area completely covered by grasses of 12-15cm high completely covering the ground. It is the abundant soil moisture substance.

Actual ET:

- It is the actual ET of a crop at particular locality and at particular time. It depends upon crop, soil, climate, and management factors.

Factors affecting ET-:

1. Environmental factors
2. Plant crop factor
3. Geographical factor
4. Soil factors

1. Environmental factors

Several factors affecting a plant's rate of transpiration and therefore evapotranspiration.

1. **Air temperature**, as temperatures increase, evapotranspiration also goes up.
2. **Humidity**, as the air becomes more and more saturated, less water is able to evaporate into that air.
3. **Movement of wind and air** increases, evaporation and transpiration does as well because moving air is less saturated than stagnant air.

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4. **Moisture/ water available**, less water available means plants begin to transpire less water in an effort to survive. This in turn decreases evapotranspiration.
5. **Solar radiations**, more solar radiations more will be the rate of evapotranspiration.

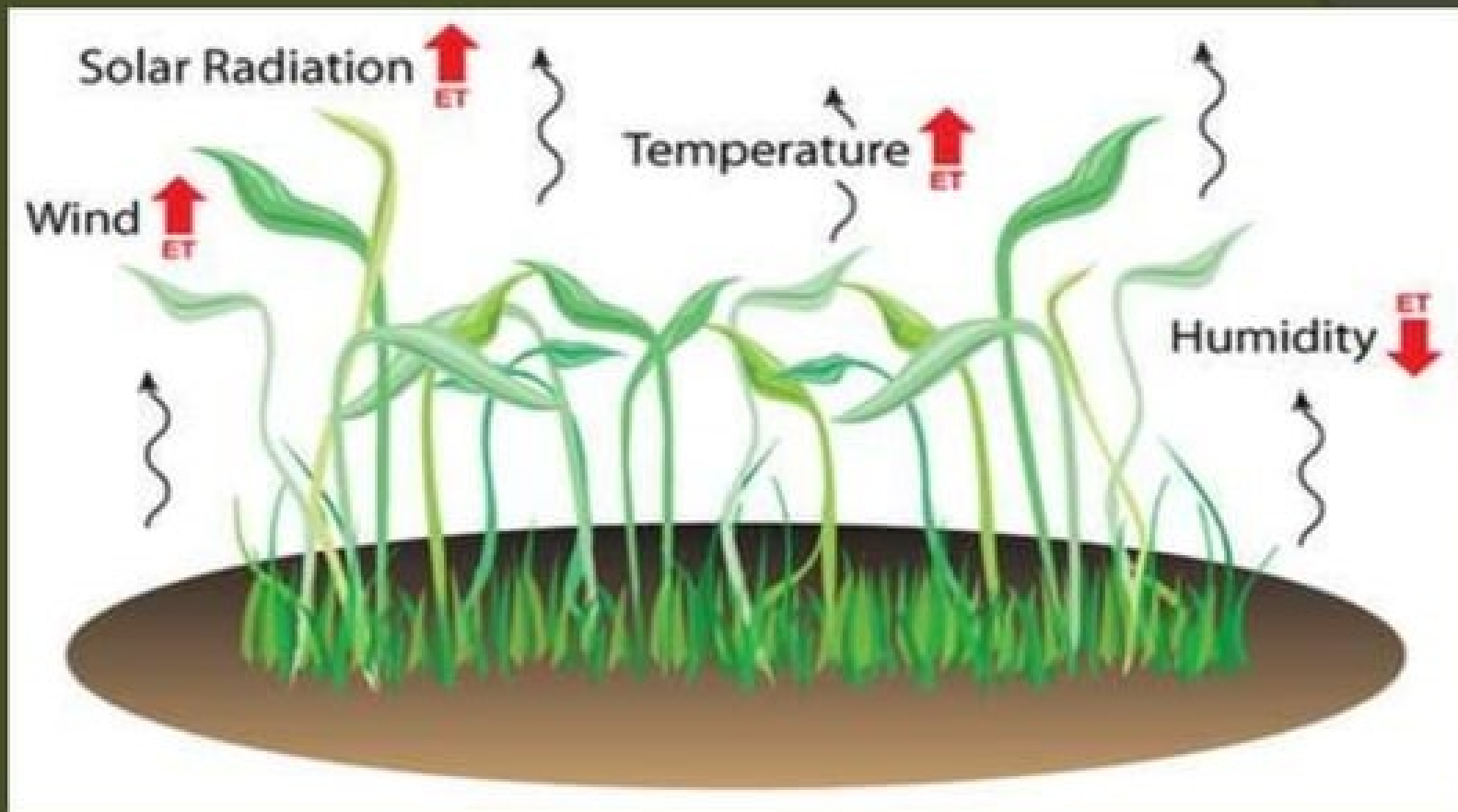


Figure: ET is an energy driven process, increases with temperature, solar radiation and wind speed. ET decreases with increasing humidity.

2. Plant and crop factors-:

- Vegetative cover
- Leaf shape and size
- Type of plant

3. Geographical factors-:

- ET is also dependent upon an area's geography, latitude and climate.
- Regions on the globe with the most solar radiation experience more evapotranspiration.
- Evapotranspiration rates are also highest in areas with a hot and dry climate.
- ET is less in higher latitudes.

4. Soil factors-:

- ET depend upon water table depth, soil moisture and capillary character.
 - When soil is lacking moisture, plants begin to transpire less water in an effort to survive, this in turn decreases evapotranspiration.



Thanks