

# Evapotranspiration

Evapotranspiration combines the movement of water molecules from plants and groundwater bodies into the atmosphere. [Evaporation](#) refers to the movement of water molecules from different water bodies, rivers, ponds, streams, etc., into the atmosphere. And transpiration refers to the movement of water molecules from the leaves of plants into the atmosphere.

## Evapotranspiration Meaning

Evapotranspiration meaning refers to the process of evaporation and transpiration both. In hydrology, loss due to [precipitation](#) can be categorized into various forms. These may be water loss due to evaporation, transpiration, interception, infiltration, etc. Evaporation and transpiration can be combined, and it is known as evapotranspiration. Hence, evapotranspiration can be written as evaporation + transpiration.

## What is Potential Evapotranspiration?

Evapotranspiration can be classified into Potential evapotranspiration (PET) and actual evapotranspiration (AET). These parameters are explained below:

### Potential Evapotranspiration (PET)

Potential evaporation is defined as the water loss from a large area of the catchment, which is uniformly covered with actively grown green crops; In this condition, water should be adequately available in the entire area. PET is the highest limit of the ET for a particular crop at a given time. The PET rate depends on the surrounding air's evaporative power, which is governed by humidity, temperature, solar radiation, wind velocity, etc. PET does not depend on plant and soil factors.

### Actual Evapotranspiration (AET)

AET is the amount of water that is used for the proper growth of plants. This includes the metabolic activities of the plants. And the requirement of water for all these activities can also be referred to as the consumptive use of the crop. So, sometimes consumptive use of the crop can be correlated with the Actual Evapotranspiration of the crops.

Based on these parameters aridity index can be defined as; **Aridity index =  $\frac{[(PET) - (AET)]}{(PET)}$**

## Factors Affecting Evapotranspiration

Factors affecting evapotranspiration are the factors on which evaporation on transpiration process depends because it is the combined form of evaporation and

transpiration. Evapotranspiration occurring in a particular catchment area depends on various factors, including soil characteristics, environment characteristics, soil-moisture relationships etc. The presence of the water table, the available moisture content in the soil, density of the vegetation in the area have more effects on the overall evapotranspiration for the whole catchment basin. It may also be affected by the geometry of the crops, root zone depth, plant cover, and morphology.

The presence of water is also one of the main factors affecting transpiration and evaporation both. When water is available for it, then the rate of evaporation mainly depends on metrological factors like temperature, wind velocity, solar radiation, the deficit of vapor pressure, etc. Atmospheric weather is also one factor affecting the rate of evapotranspiration. It affects due to the change in heat energy of the environment, Humidity, temperature, etc.

## Difference Between Transpiration and Evapotranspiration

Evapotranspiration is the loss of water with the process of evaporation and transpiration. In these processes, water molecules move from the soil surface or the plant surface to the atmosphere. Evapotranspiration is the combined form of evaporation and transpiration. And transpiration is the process of the movement of water molecules from the plant surface or leaves to the atmosphere.

Evapotranspiration can be written as  $\text{Evaporation} + \text{Transpiration}$ . The process of transpiration does not include the loss of water due to evaporation. In evaporation, water molecules move into the atmosphere from or below the soil surface due to capillary action.

## Measurement of Evapotranspiration

There are various methods of measurement of evapotranspiration. These can be categorized as direct methods and indirect methods. Direct measurement methods are not generally used because they are costlier and more time-consuming. Here a few direct methods of measurement are listed below:

- Soil moisture sampling
- Atmometers
- Lysimeter
- Pan's
- Equipment fixed in the soil

Indirect measurement methods are used where the direct way of measurement is unsuitable. Indirect methods are mostly the empirical method of the determination of evapotranspiration. Metrological data can be used for the empirical methods of calculation of ET