

Types of Rainfall

The precipitation process, when it occurs in the form of water droplets, is called rainfall. This usually happens when the size of the water droplets exceeds 5mm. When the size is less than 0.5 mm, it is called a drizzle. In the case of the temperature being less than 0 degrees, the precipitation still occurs but in the form of small flakes of snow which is then called snowfall. Based on its origin, types of rainfall are generally classified into three categories:

- Convective rainfall
- Cyclonic rainfall / Frontal rainfall
- Orographic or Relief rainfall

The different types of rainfall in India affect its flora and fauna in various ways. India is an agriculture-based economy, and rainfall is a major factor contributing to its growth and development. Let us look at the various types of rainfall in India.

Convective Rainfall

Convective rainfall got its name from the 'convection currents' created in the atmosphere. Convective rainfall occurs when the heat of the Sun raises the Earth's temperature to an extreme level, resulting in air evaporation. We can understand this process in a few simple steps as follows:

- The air present on Earth in a particular area warms up and gets lighter. This results in evaporation, and the air moves up in the atmosphere through convection currents.
- The air then moves up and reaches a high altitude; it expands and cools down the Earth's atmosphere for that specific region/area.
- Condensation of water vapour then takes place, resulting in the formation of 'cumulus' clouds.
- This process is usually followed by thunderstorms and lightning, resulting in heavy rainfall in a specific area.
- Convective rainfall is majorly 'localized' in its rainfall pattern in India and carries on for a short period.
- Convective rainfall is accompanied by heavy rain or thundershowers during a hot sunny day.

Convective rainfall occurs on scorching days or summers, raising the Earth's temperature. It mainly occurs in Equatorial regions and is the most common type of rainfall worldwide.

Cyclonic Rainfall

Cyclonic rainfall is the last among the three types of rainfall in India and the world. It is also referred to as **Frontal rainfall**. As the name suggests, this type of rainfall results from 'cyclonic activity'. A cyclone is composed of a large mass of air moving toward a strong atmospheric pressure centre.

Cyclonic rainfall is also called Frontal rainfall as it occurs on the fronts of a cyclone. Cyclonic rainfall occurs when the hot air collides with the cool air. Both these air masses have different densities and temperatures.

- The warm or hot air becomes lighter and moves higher above the cool air.
- As this hot air reaches a higher altitude than the cooler air, it starts to cool down.
- The air's moisture condenses due to saturation and converts into a cloud.
- This results in heavy cyclonic rainfall, which carries on for a few hours and sometimes extends upto a few days.

According to the annual data released by the Meteorological department, the average rainfall in India is around 118 cm.

Orographic Rainfall

Orographic rainfall is also known as **Relief rainfall**. This type of rainfall occurs in the area where mountains along with the sea are majorly present. Its whole process is directly connected to the mountains. The frequent occurrence of relief rainfall happens in the regions wherever the sea accompanies the mountains.

- The air or wind filled with moisture rises from the sea and hits the mountain, increasing it to a higher altitude. This leads to the expansion of air and the lowering of the temperature.
- The air now cools down, condenses, and initiates the formation of clouds.
- These clouds are filled with water vapour, and when reaching the point of saturation, they begin precipitation on the sea-facing side of the mountain.
- The front of the mountain is called the windward side, and the relief rainfall usually occurs on this side. The other side is called the leeward side, which faces fewer rain showers due to a lack of moisture.
- The area located on the leeward side of the mountain is called the 'rain-shadow' area.

The Relief or Orographic rainfall is widespread in Sierra Nevada, Hawaii, and the Andes.

Difference Between Conventional, Orographic and Cyclonic Rainfall

The three types of rainfall differ on various bases like region, temperature, and other weather conditions. Major differences between the three types of rainfall are listed below:

Characteristics	Conventional	Orographic	Cyclonic Rainfall

Cause	Occur when there is a rise in the temperature of the earth's surface, thus causing the vapour to rise and because of which a saturation point is reached in the atmosphere causing condensation, and then precipitation	Occur in the mountainous regions where consistent winds where the air is forced up to reach from low elevation to high elevation on the side of the mountain thus creating a saturation point in the atmosphere causing condensation and then precipitation.	Occur in the areas of weather disturbances where air masses of different densities and less dense or warmer override the colder to high denser air. Under the right conditions, condensation occurs, followed by precipitation.
Abundance	Occurs in the region of the tropics where the temperature is usually high. Occur during the summer in the hotter part of the day.	Occur in the mountain region with a moist climate due to persistent wind at the side of the mountain.	Occur in low-pressure areas.
Duration	Occurs for a shorter period of time.	Occur for a consistent and notable period of time	Duration cannot be determined

Types of Rainfall Based on Humidity

Apart from the various types of rainfall we experience, we can also classify them based on humidity levels. Based on the extent of humidity, rainfall can be classified into the following three types:

- Light Rainfall - If the humidity rate ranges between 0 - 2.5 millimetres, it is called 'light rainfall'.
- Moderate Rainfall - In this type of rainfall, the humidity falls in the range of 2.6 - 7.6 millimetres.
- Heavy Rainfall - The type of rainfall can be called 'heavy' when the humidity reaches above 7.6 millimetres.