Weather and Climate

Introduction

Weather plays an important role in our lives. If it is cold, you wear a sweater. If it's hot and sunny, you wear light clothes. The weather of place is never constant. It can alter every day or even every hour. For instance, the weather might be sunny in the morning in an area but rainy in the evening. These are due to day-to-day atmospheric conditions in terms of temperature, humidity, wind speed, and other elements.

In this chapter, we will learn about the weather and climate of many locations, the adaptation of biological organisms to various climates. Apart from that, we will also study many faunal species, animals and birds that live in different weather or climatic conditions.

Weather

The day to day condition of atmosphere at a particular place with respect to temperature, humidity, rainfall, wind speed, etc. is called weather. The weather can be comfortable, or can be too hot or cold.

Weather Report: The daily report about weather, usually released by the meteorological department is called **weather report**. Weather report is often shown along with the news on television.

The government has a special department called the **Meteorological Department** that predict the weather of a place and prepare the weather report.

The weather report is generally published in newspapers, radio and television.

The weather forecast is important for people because many our day-to-day activities are based on weather conditions. **For example,** we can check the possibility of rainfall on a particular day and carry an umbrella with us accordingly.

Weather and Climate

Elements of Weather: The various elements of weather are: temperature, humidity, rainfall, wind-speed, etc.

- **Temperature:** Temperature depends upon the duration of sunshine. During the summer season, the duration of the sunshine is longer. Due to this, the temperature is high in summer. The day temperature is minimum in the morning and maximum at noon.
- **Humidity:** Humidity is the amount of moisture present in air. Humidity is generally measured in percentage. Humidity is generally at the highest level, during the rainy season.
- **Rainfall:** Amount of rainfall is measured in terms of mm. For this, an apparatus, called rain gauge is used.
- **Wind-speed:** Speed of wind also affects the condition of weather.
- **Precipitation:** It is the term given to moisture that falls from the air to the ground. Precipitation includes snow, hail, fog, mist, etc.
- **Atmospheric pressure:** It is the weight of air resting on the earth's surface. Pressure is shown on a weather map often called a synoptic map, with lines called **isobars**.
- **Cloudiness:** Clouds often signal an imminent weather change. Rising cloud levels indicate clearing weather. Thickening and lowering clouds signify precipitation. Clouds form when water vapor is cooled below its dew point and condenses into tiny but visible droplets or ice crystals. The cloud base indicates the level at which rising air reaches its dew point.

Weather and Climate

Department of Meteorology: This is a Government Department. The Meteorological Department measures the elements of weather and keeps their record. Meteorologists use data from satellites and analyse the data to forecast about the weather.

Climate:

- Climate is the long term condition of a particular region. The climate changes in the particular region are based on the atmosphere and environmental conditions of that region.
- The average weather pattern taken over a long time say 25 years is called as the climate of the place.
- If we find that the temperature at a place is high most of the time, then we say that the climate off that place is hot.
- If there is also heavy rainfall on most of days in the same place, then we can say the climate of that place is hot and wet.
- The mean temperatures for given month is found two steps :
- First we find the average of the temperatures of recorded timings during that month.
- Second, we calculate the average of such average temperatures over many years.
- By taking information about climate of two places in India, we can compare climate of these regions. For e.g. Jammu & Kashmir and Kerala. We find that Kerala is very hot & wet in comparison to Jammu and Kashmir.

Weather and Climate

- Similarly data of western region of India i.e. Rajasthan, shows that the temperature is very high during most of the year. Winter lasts for a few months and temperature is quite low. This region receives very little rainfall, thus this is a typical desert climate and it is hot and dry.

- The north-eastern part of India receives rain in most of the year. Thus, the climate is wet.

Factors that affect the climate of a place

Latitude: The places located at higher altitudes lie far from the equator and receive less sunlight and places that are situated towards the equator receives more sunlight and are hotter than the places located at higher latitudes. Sunlight also causes low precipitation or rainfall.

Elevation: The place at higher region or at high altitude the atmosphere experiences less pressure. As the gas residing in the atmosphere rises, it experiences feeling less pressure, hence causing it to expand.

Ocean Currents: Ocean currents are able to transfer heat energy from land to sea or vice versa thus affecting the temperature of the region.

Topography: Topography refers to the shape of the land. Latitudes and elevation ranges are the key factors that lead to fluctuation in surface temperatures hence leading to climate change.

Vegetation: The vegetation mainly comprises trees in the region. Due to the release of water vapor during photosynthesis into the air, it alters the surface energy fluxes and leads to potential cloud formation.

Weather and Climate

Prevailing winds: Winds distribute and spread particular air masses. The direction of the wind helps to determine the climate of a region. The wind coming from the humid region brings cool air while that from the dry region would bring hot air.