Bangladesh is located in the tropical monsoon region and its climate is characterized by high temperatures, heavy rainfall, and often excessive floods. In this regard, discuss about the climate of Bangladesh.

Climate is the average condition of the atmosphere near the earth's surface over a long period, taking into account temperature, precipitation, humidity, wind, cloud, barometric pressure, etc. Geographical location and physical settings govern the climate of any country. Bangladesh extends from 20°34'N to 26°38'N latitude and from 88°01'E to 92°41'E longitude. Except for the hilly southeast, most of the country is a low-lying plain land. It is surrounded by the Assam Hills in the east, the Meghalaya Plateau in the north, and the lofty Himalayas lying farther to the north. To its south lies the BAY, and to the west lies the plain land of BENGAL and the vast tract of the Gangetic Plain.

Bangladesh is located in the tropical MONSOON region and its climate is characterized by high temperatures, heavy rainfall, often excessive humidity, and fairly marked seasonal variations. The most striking feature of its climate is the reversal of the wind circulation between summer and winter, which is an integral part of the circulation system of the South Asian subcontinent. From the climatic point of view, three distinct SEASONS can be recognized in Bangladesh - the cool dry season from November through February, the pre-monsoon hot season from March through May, and the rainy monsoon season which lasts from June through October. The month of March may also be considered as the spring season, and the period from mid-October through mid-November may be called the autumn season.

The dry season begins first in the west-central part of the country by mid-December, where its duration is about four months, and it advances toward the east and south, reaching the eastern and southern margins of the country by mid-March where its duration is about one month.

The pre-monsoon hot season is characterized by high temperatures and the occurrence of THUNDERSTORMS. April is the hottest month when mean temperatures range from 27°C in the east and south to 31°C in the west-central part of the country. In the western part, summer temperature sometimes reaches up to 40°C. After April, the temperature dampens due to increased cloud cover. The pre-monsoon season is the transition period when the northerly or northwesterly winds of the winter season gradually change to the southerly or southwesterly winds of the summer monsoon or rainy season (June-September). During the early part of this season, the winds are neither strong nor persistent. However, with the progression of this season wind speed increases, and the wind direction becomes more persistent.

During the early part of the pre-monsoon season, a narrow zone of air mass discontinuity lies across the country that extends from the southwestern part to the northeastern part. This narrow zone of discontinuity lies between the hot dry air coming from the upper Gangetic plain and the warm moist air coming from the Bay of Bengal. As this season progresses, this discontinuity weakens and retreats toward the northwest, and finally disappears by the end of the season, making room for the onset of the summer monsoon. The rainy season, which coincides with the summer monsoon, is characterized by southerly or southwesterly winds, very high humidity, heavy rainfall, and long consecutive days of rainfall which are separated by short spells of dry days. Rainfall in this season is caused by the tropical Depressions that enter the country from the Bay of Bengal.

Atmospheric pressure and winds are characterized by seasonal reversals between summer and winter in Bangladesh. During the winter season, a center of high pressure lies over the northwestern part of India. A stream of cold air flows eastward from this high pressure and enters the country through its northeast corner by changing its course clockwise, almost right-angle. This wind is part of the winter monsoon circulation of the South Asian subcontinent.

During this season, wind inside the country generally has a northerly component (flowing from north or northwest).
On the other hand, during the summer season, a center of low pressure develops over the west-central part of India because of intense surface heat. As a result, a stream of warm and moist air from the Bay of Bengal flows toward the above-mentioned low pressure through Bangladesh (a similar flow prevails from the Arabian Sea toward India). This wind is part of the summer monsoon circulation of the sub-continent. So, the prevailing wind direction in Bangladesh during the summer season has generally a southerly component (flowing from the south, southwest, or southeast). However, wind directions during the transition seasons (in spring and autumn) are variable. Generally, winds are stronger in summer (8-16 km/hr.) than in winter (3-6 km/hr.). The mean pressure is 1,020 milliards in January and 1,005 milliards during March through September.
Temperature January is the coldest month in Bangladesh. However, the cold winter air that moves into the country from the northwestern part of India loses much of its intensity by the time it reaches the northwestern corner of the country. Average temperatures in January vary from about 17'C in the northwestern and northeastern parts to 20°-21°C in the coastal areas. In late December and early January, the minimum temperature in the extreme northwestern and northeastern parts of the country reaches within 4 to 7 degrees of the freezing point. As the winter season progresses into the pre-monsoon hot season, the temperature rises, reaching the maximum in April, which is the middle of the pre-monsoon hot season. Average temperatures in April vary from about 27°C in the northeast to 30°C in the extreme west-central part of the country. In some places in Rajshahi and Kushtia districts, the maximum temperature in the summer season rises to 40°C or more. After April, temperature decreases slightly during the summer months, which coincides with the rainy season. Widespread cloud covers because of the dampening of temperature during the latter part of the pre-monsoon season. Average temperatures in July vary from about 27°C in the southeast to 29°C in the northwestern part of the country.
Humidity March and April are the least humid months over most of the western part of the country. The lowest average relative humidity (57%) was recorded in Dinajpur in March. The least humid months in the eastern areas are January to March. Here the lowest monthly average of 58.5% has been recorded at Brahmanbaria in March. The relative humidity is everywhere over 80% from June through September. The average relative humidity for the whole year ranges from 78.1% at Cox's Bazar to 70.5% at Pabna.
Clouds in Bangladesh, the cloud cover has two opposing seasonal patterns, coinciding with the winter monsoon and the summer monsoon. As a result of the flow of cold-dry winds from the northwestern part of India during the winter season, the cloud cover is at a minimum. On average, the cloud cover in this season is about 10% almost all over the country. With the progression of the season, the cloud cover increases, reaching 50-60% by the end of the pre-monsoon hot season. During the summer monsoon season, which is also the rainy season, the cloud cover is very widespread. In July and August, which is the middle of the rainy season, the cloud cover varies from 75 to 90% all over the country. However, it is more extensive in the southern and eastern parts (90%) than in the northwestern part (75%). After the withdrawal of the summer monsoon, the cloud cover decreases rapidly, dropping to 25% in the northern and western parts, and 40-50% in the southern and eastern parts.
Rainfall The single most dominant element of the climate of Bangladesh is rainfall. Because of the country's location in the tropical monsoon region, the amount of rainfall is very high. However, there is a distinct seasonal pattern in the annual cycle of rainfall, which is much more pronounced than the annual cycle of temperature. The winter season is very dry, and accounts for only 2%-4% of the total annual rainfall. Rainfall during this season varies from less than 2 cm in the west and south to slightly over 4 cm in the northeast. The amount is slightly enhanced

in the northeastern part due to the additional uplifting of moist air provided by the Meghalaya Plateau. As the winter season progresses into the pre-monsoon hot season, rainfall increases due to intense surface heat and the influx of moisture from the Bay of Bengal. Rainfall during this season accounts for 10%-25% of the total annual rainfall which is caused by thunderstorms or NOR'WESTER (locally called Kalbaixakhi [Kalbaishakhi]).

The amount of rainfall in this season varies from about 20 cm in the west central part to slightly over 80 cm in the northeast. The additional uplifting (by the Meghalaya Plateau) of the moist air causes a higher amount of rainfall in the northeast. Rainfall during the rainy season is caused by the tropical depressions that enter the country from the Bay of Bengal. These account for 70% of the annual total in the eastern part, 80% in the southwest, and slightly over 85% in the northwestern part of Bangladesh. The amount of rainfall in this season varies from 100 cm in the west central part to over 200 cm in the south and northeast. Average rainy days during the season vary from 60 in the west-central part to 95 days in the southeastern and over 100 days in the northeastern part. The geographic distribution of annual rainfall shows a variation from 150 cm in the west-central part of the country to more than 400 cm in the northeastern and southeastern parts. The maximum amount of rainfall has been recorded in the northern part of Sylhet district and the southeastern part of the country (Cox's Bazar and Bandarban districts).

Climatic stations Bangladesh Meteorological Department is responsible for the observation, recording, and archiving of climatic data for various stations in the country. Climatic stations are scattered around the country - to record the diverse geographic conditions of the country. The major climatic stations from which long-term climatic data are available are - Barisal, Bhola, Bogra, Chittagong, Comilla, Cox's Bazar, Dhaka, Dinajpur, Faridpur, Feni, Hatiya, Ishwardi, Jessore, Khepupara, Khulna, Kutubdia, Madaripur, Maijdi Court, Mymensingh, Patuakhali, Rajshahi, Rangamati, Rangpur, Saidpur, Sandwip, Sitakunda, Sreemangal, Sylhet and Teknaf.

Weather report Bangladesh Meteorological Department prepares the weather reports of the country. The department is responsible for the observation, recording, operation, and maintenance of weather stations and weather instruments, and for reporting daily/weekly weather information to the public. Every day, all weather stations around the country transmit their recorded data electronically to the Headquarters of the meteorological department in Dhaka. The details of the data are analyzed, interpreted, and mapped here. The result of the analysis, combined with the observation of upper air, satellite imagery, and radar imagery (collected in Dhaka) are used for weather forecasting. Observation and interpretation of satellite and radar imageries are important for the prediction of severe weather and CYCLONES. Weather bulletins and forecasting by the Bangladesh Meteorological Department for 6-hour, 12-hour, and 24-hour periods are broadcast on radio and television. During an impending cyclone, observation and forecasting are made and warnings are issued almost continuously through radio and television. In addition to radio and television, daily newspapers publish weather reports regularly based on information supplied by the meteorological department.

Climatic change Any climatic change in Bangladesh will, of course, be a part of worldwide climatic changes. It is generally claimed that the temperature of the earth has been increasing since the beginning of the 20th century. This phenomenon, called GLOBAL WARMING, is attributed to the increase in atmospheric carbon dioxide (CO_2) due to the burning of fossil fuels. However, not all scientists subscribe to the global warming hypothesis.

It has been estimated by some scientists that the concentration of CO_2 in the atmosphere during the pre-industrial period was 285-290 ppmV (parts per million by volume). The observed concentration of CO_2 in the atmosphere at the Mauna Loa Observatory in Hawaii shows an increasing trend, from 315 ppmV in 1958 to 352 ppmV in 1988. If this trend continues, then it will reach 450 ppmV by the year 2050. The temperature of the earth has increased by 0.3-1°C since the beginning of the 20th century as a consequence of increased CO_2 in the atmosphere.

Computer simulation of global temperature change shows that if the CO2 concentration of the atmosphere doubled from its present-day value, then global temperature would increase 1.3°-4°C. In low and tropical latitudes the change would be very small (only 0.05°-0.25°C). On the other hand, temperature increase would be much higher in the middle and high latitude regions (5°-9°C). Moreover, there will be differential temperature increases in summer and winter - temperature increases in the winter season will be higher than that in the summer.

According to some analysts, the effects of increased temperature will have both destructive and beneficial consequences - destructive to some areas and beneficial to other areas. Global warming will cause the polar ice caps and Himalayan ice caps to melt at a slow pace. As a consequence, it is estimated that the SEA LEVEL will rise 2-3 meters by the year 2050. In that case, all low coastal plains and DELTA areas around the world will be submerged - thereby reducing the area of fertile agricultural lands and food production, and increasing food shortage, hunger, poverty, and human misery on a global scale. If this prediction comes true, then a significant area of the southern half of Bangladesh will be submerged by the Bay of Bengal. However, there is another side to the argument. Climatic changes on a global scale do not occur overnight; in fact, they occur only over a time scale of thousands of years.