



### Seasonal climatology of Monsoon in Bangladesh:

In Monsoon season, the surface wind changes to southerly direction over the southern and the central districts and to southeasterly over the northern districts of the country.

The normal date of onset of southwest monsoon over the coastal districts of the country is 2 June and progressively engulfs the whole country by 14 June. Generally heavy to very heavy rain with overcast skies characterizes the season. On the average there are 20-25 rainy days per month during June to August and decreasing to 12-15 days in the month of September. About 71 percent of the total annual rainfall occurs in this season. The rainfall is greater over the northeastern, the southern and the southeastern districts than over the central, western and northwestern districts. With the advance of the monsoon, the summer extreme temperatures fall appreciably throughout the country. The mean temperature falls hardly by one degree and the maximum temperature falls by 2-5°C over most part of the country except the coastal districts where the fall is by 5-6°C.

Tropical depressions and storms form in the Bay of Bengal during the season and generally move northwestwards over India and sometimes cross Bangladesh coasts. Storms, however, seldom attain hurricane intensity in this season.

### Seasonal weather condition:

The Southwest monsoon set in over Teknaf on 28<sup>th</sup> May, 5 days earlier than normal. It advanced up to central part of Bangladesh gradually and covered whole Bangladesh on 18<sup>th</sup> June, one day later than normal monsoon onset date.

In monsoon season 2014 Bangladesh received 4% below normal rainfall. Seasonal Rainfall was below normal over Dhaka, Rajshahi, Rangpur, Khulna, Barisal and Sylhet divisions by 5%, 10%, 18%, 18% and 20% respectively and was above normal over Chittagong division by 6% and over Sylhet division by 1%. Out of 34 stations 12 station received above normal rainfall and rest of the stations received below normal rainfall.

A low pressure area (19<sup>th</sup> – 22<sup>nd</sup> June) formed over coastal areas of Bangladesh and neighborhood under the influence of a cyclonic circulation over northwest Bay of Bengal and neighborhood. It increased the rainfall activity over Bangladesh. Under the influence of the low pressure area torrential rain occurred over Chittagong and caused severe water logging that paralyzed normal life in the port city. Heavy downpour overnight accompanied by tidal water of the Kharnaphuli River submerged almost the entire city. A big chunk of mud from a hill collapsed on two buildings



Mr. Md. Shah Alam, Director, BMD WMO/ESCAP & TC consultants Mr. Dr. Y.E.A. Raj, Mr. Abdul Majid, Mr. Ahmed Kamal and all participants of SOP Training workshop held in BMD, Dhaka Bangladesh at 22, 25 & 26 January 2015

### SOP's Workshop on Coastal Multi- hazard Early Warning:

The hands on Training and Technical Assistance for Interpretation and Improvement of Standard Operating Procedures (SOP's) for users and Issuers of Coastal Multi-hazard Early Warning system held in Bangladesh Meteorological Department (BMD) 22, 25 & 26 January 2015. Director, Bangladesh Meteorological Department (BMD) inaugurated the session at BMD conference room of Dhaka, Bangladesh. Director, BMD mentioned in his inaugural speech that SOP's are important because SOP's indicate the most efficient and effective ways to perform an operation. All organizations can use SOP's to ensure consistent delivery of services and products to partner agencies and to the public.

Co-ordination, Collaboration, Support and assistance are needed both horizontally with other agencies at the same level of government, but also vertically to improve all levels of government and citizens. SOP's can help to ensure the most effective, efficiency steps are taken during a natural disaster emergency to provide the highest level of quality service.

during torrential rains at Baghaghona in Lalkhan Bazar under Khulshi Police Station in the city on Sunday (June 22, 2014). However, no casualty was reported. On 22<sup>nd</sup> June During Monsoon Season 2014 most of the time, mean temperature was above normal. In this season average maximum temperature, average minimum temperature and mean temperature was above normal by 1.0°C, 0.5°C and 0.7°C respectively.

**Rainfall:**

During whole monsoon season, most of the time daily country average rainfall was below normal and there were mainly three pick (fig-1).

In the month of June as a whole country received 18% above normal rainfall. Chittagong, Rajshahi and Dhaka divisions received above normal rainfall by 43%, 32% and 14% respectively, on the other hand Rangpur, Barisal, Sylhet and Khulna divisions received below normal rainfall

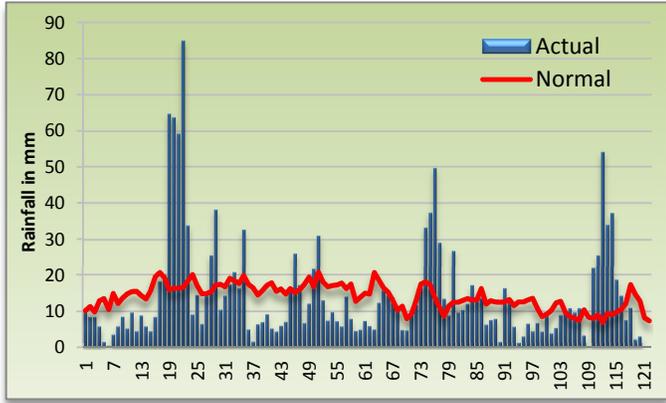


Fig-1: Variation of daily actual and normal rainfall over Bangladesh during monsoon (June-September) 2014

by 20%, 20%, 7% and 2% respectively. The Spatial distribution of deviation (%) of rainfall from normal in June 2014 is shows (fig.2) that above normal rainfall occurred over Chittagong and adjoining area, some parts of Dhaka and Rajshahi divisions with highest positive anomaly over Chittagong area (137%). The highest negative anomaly was found over Rangpur area.

July is the highest rainfall occurring month in Bangladesh but in July 2014, Bangladesh received 34% below normal rainfall. All divisions of Bangladesh received below normal rainfall. Out of 34 stations only 4 stations received 1-10% above normal rainfall and rest of the stations received below normal rainfall by 4-79% with highest positive anomaly over Jessore (10%) and highest negative anomaly

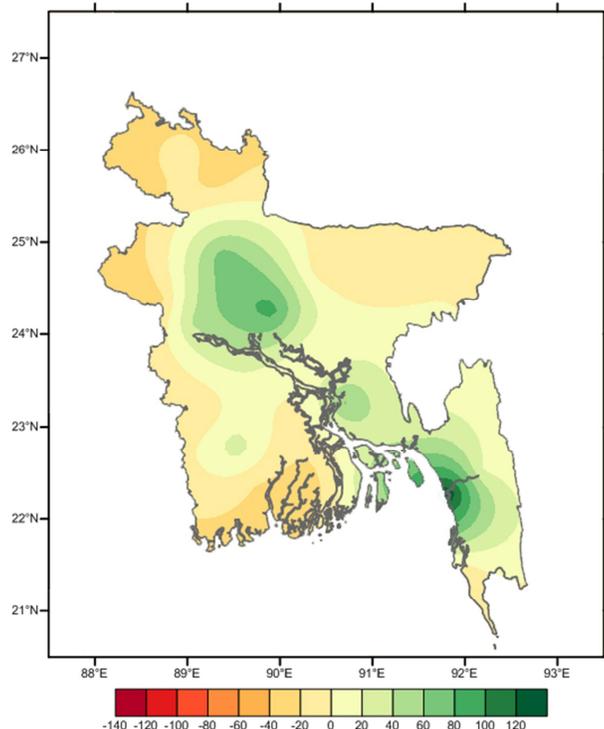


Fig 2: Deviation (%) Rainfall from Normal in June 2014

over Rangpur (-79%). The figure-3 shows the spatial distribution of deviation (%) of rainfall from normal in July 2014.

In August 2014 country as a whole received 5% above normal rainfall. Sylhet, Dhaka, Chittagong and Rajshahi divisions received above normal rainfall by 27%, 18% 11% and 5% respectively, on the other hand Khulna, Barisal, and Rangpur divisions received below normal rainfall by

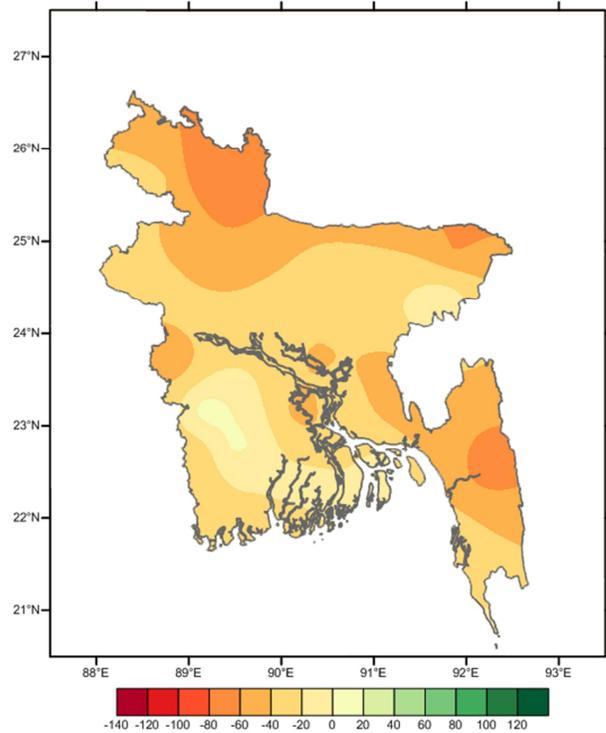


Fig 3: Deviation (%) Rainfall from Normal in July 2014

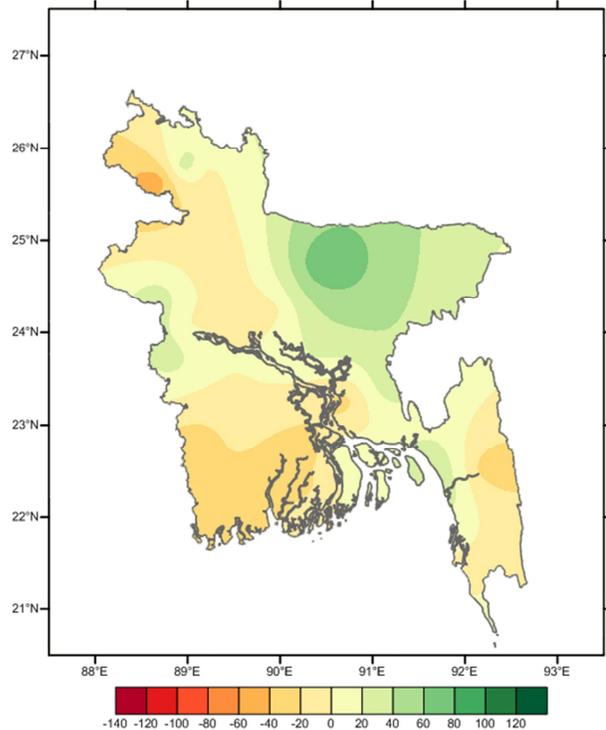


Fig 4: Deviation (%) Rainfall from Normal in August 2014

18%, 11% and 10% respectively. The Spatial distribution of deviation (%) of rainfall from normal in August 2014 shows (fig-4) that above normal rainfall occurred over northeastern Bangladesh with highest positive anomaly over Mymensingh area (79%).

Country received normal rainfall (+0.5%) in September 2014. Chittagong, Sylhet and Rangpur division received above normal rainfall by 18%, 47% and 16% respectively but Dhaka, Rajshahi, Khulna and Barisal divisions received below normal rainfall by 13%, 29%, 31% and 26% respectively. The Spatial distribution of deviation (%) of rainfall from normal in September 2014 shows (fig-5) that above normal rainfall occurred over northeastern Bangladesh, most part of Chittagong division and parts of Rangpur division with highest positive anomaly over Srimangal area (71%) and highest negative anomaly over Chuadanga and adjoining area (-56%).

During monsoon season 2014, Bangladesh received normal

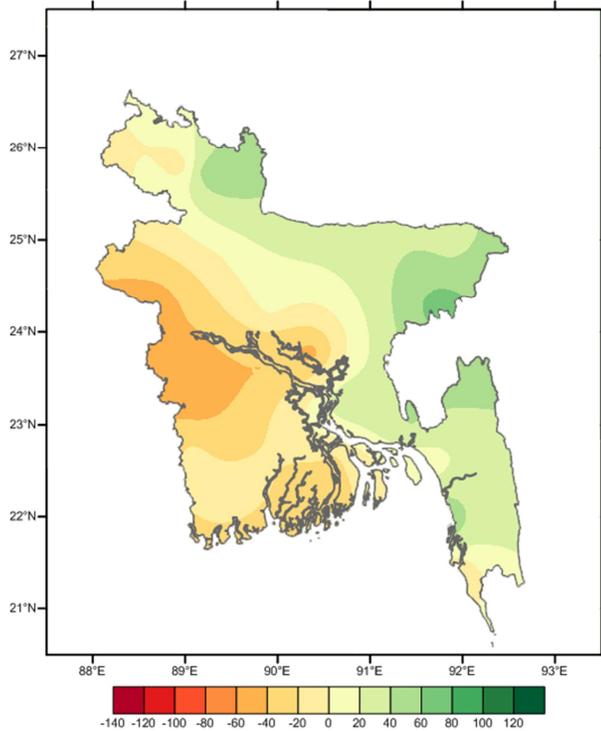


Fig 5: Deviation (%) Rainfall from Normal in September 2014

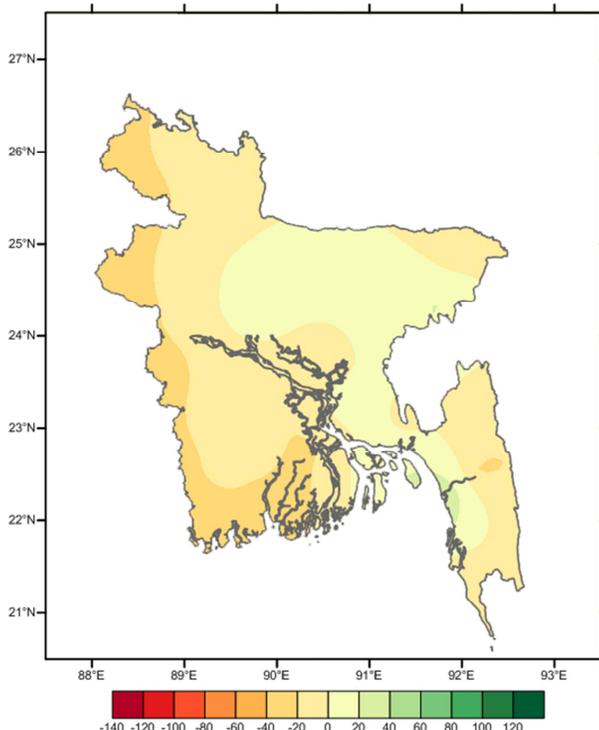


Fig 6: Deviation (%) Rainfall from Normal in Monsoon 2014



Inaugural Ceremony of Training Workshop on Tsunami Exercises held in Bangladesh Meteorological Department during 25-28 August 2014

(-4%) rainfall. The Spatial distribution of deviation (%) of rainfall from normal in monsoon season 2014 shows (fig-6) that most part of the country received below normal rainfall, maximum positive anomaly was over Chittagong area (36%) and maximum negative anomaly was over Chuadanga area (-27%).

#### Temperature:

In June 2014, the country average mean temperature was mainly above normal except first two days of the month and during 20-24<sup>th</sup> June it was below normal (Fig-7). During June 2014 the country average maximum, minimum and mean temperature were above normal by 1.0°C, 0.5 and 0.8°C respectively. The spatial distribution of deviation of mean temperature from normal in June 2014 is shown in

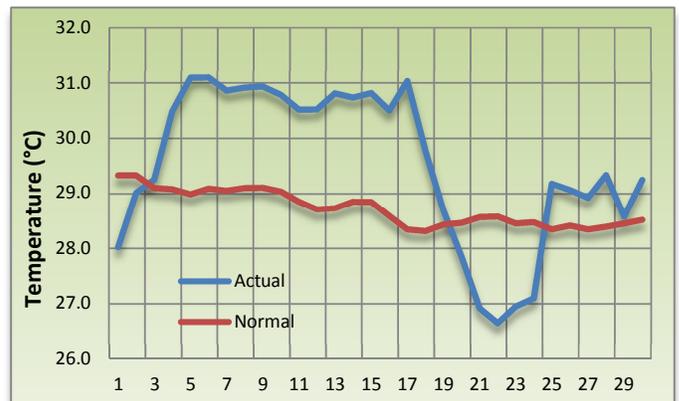


Fig 7: Variation of daily mean temperature in June 2014.

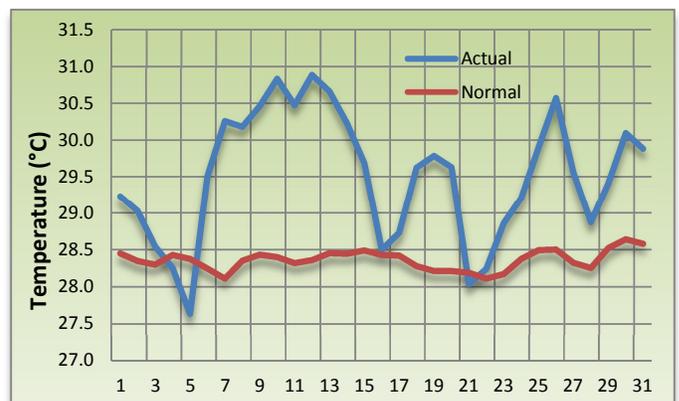


Fig 8: Variation of daily mean temperature in July 2014.

figure-11.a. The mean temperature was above normal over the country with maximum positive deviation of 1.7°C over Cox's Bazar and Teknaf region. The country highest maximum temperature of 39.3°C was recorded on 12<sup>th</sup> of this month at Chuadanga and country lowest minimum temperature of 21.6°C was recorded on 1<sup>st</sup> June at Khulna.

The mean temperature was above normal almost throughout the month of July 2014 with highest maximum value of on 12<sup>th</sup> July (figure-8). In this month only three days the mean temperature was below normal. The monthly maximum, minimum and mean temperature was above normal by 1.4°C, 0.8°C and 1.1°C respectively. The spatial distribution of deviation of mean temperature from normal in July shows (fig-11.b) that mean temperature was above normal over the country ranges from 0.3-3.3°C. The country highest maximum temperature of 37.7°C was recorded at Rajshahi on 26<sup>th</sup> July and lowest minimum temperature of 23.3°C was recorded at Chittagong on 3<sup>rd</sup> July.

As a continuation of rise in temperature at the end of July, mean temperature was above normal throughout the month of August 2014 except for first half of the third week and last day of the month when mean temperature was below normal (Fig-9). Monthly average maximum and mean temperature was above normal by 0.6°C and 0.5°C respectively but minimum temperature was nearly normal (0.3°C). The spatial distribution of deviation of mean temperature from normal in August 2014 shows (fig-11.c) that mean temperature was above normal by all over the country. The country highest maximum temperature of 37.1°C was recorded on 1<sup>st</sup> of this month at Rajshahi and country lowest minimum temperature of 23.0°C was

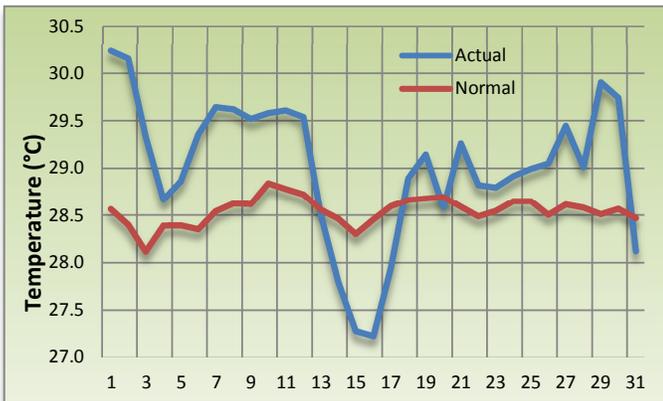


Fig 9: Variation of daily mean temperature in August 2014.

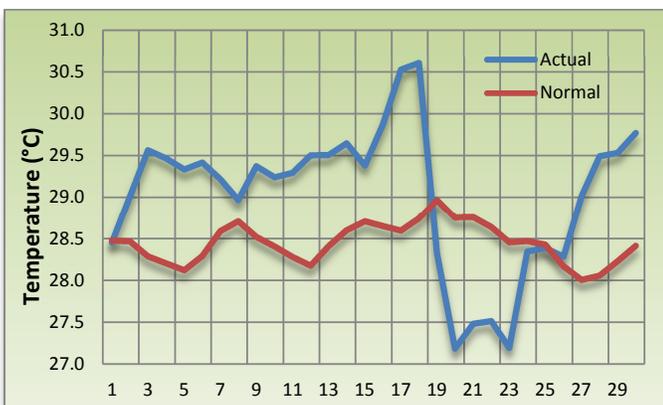


Fig 10: Variation of daily mean temperature in September 2014.

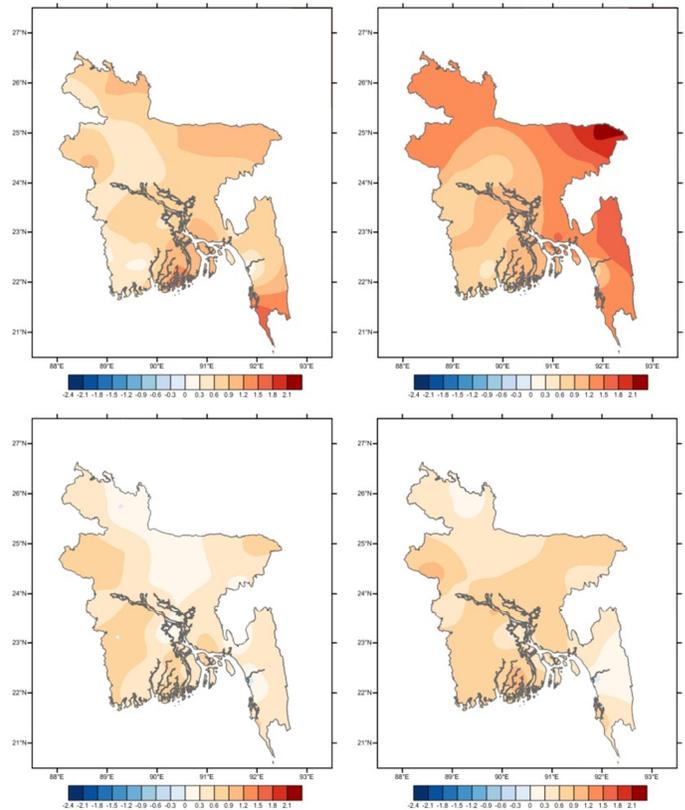


Fig 11: Spatial distribution of monthly mean temperature from normal in June 2014(a), July 2014 (b), August 2014 (c) and September 2014 (d).

recorded on 15<sup>th</sup> September at Feni.

In September 2014, the country average mean temperature was mainly above normal except 19-25<sup>th</sup> September when it was below normal (Fig-10). During September 2014 the country average maximum and mean temperature by 0.9°C and 0.5°C respectively but minimum temperature was nearly normal (0.3°C). The spatial distribution of deviation of mean temperature from normal in September 2014 is shown in figure-11.d. The mean temperature was above normal over the country and maximum positive anomaly found over Rajshahi region. The country highest maximum temperature of 37.5°C was recorded on 18<sup>th</sup> of this month at Rajshahi and country lowest minimum temperature of 22.4°C was recorded on 29<sup>th</sup> September at Sayedpur.

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