



**Rainfall and Temperature Forecast of Bhutan
for
Summer Monsoon
(June – September 2026)**

**National Centre for Hydrology and Meteorology
Royal Government of Bhutan
2026**

Acknowledgement

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1. Background

Seasonal forecasting and climate predictions are important adaptation measures to climate variability and change. Regional Climate Outlook Forums (RCOFs) were created to bring together countries having common climatological characteristics and to produce a joint assessment of the state of the regional climate. Thus, South Asian Climate Outlook Forum (SASCOF) came into existence in 2010 with specific focus on the information needs of countries affected by the monsoon climate in South Asia.

Seasonal forecasts generally consist of an outlook of precipitation and temperature for a particular region. The seasonal forecast of Bhutan is prepared with inputs from global and regional prediction centres, and national climate data. The final outlook is also based on the consensus outlook of the South Asian Climate Outlook Forum (SASCOF), products from World Meteorological Organization (WMO) Global Producing Centres (GPCs) of Long-Range Forecast, various other international sources, and the prevailing global climate conditions such as El Niño Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) affecting the monsoon. The summer monsoon outlook must be used and interpreted along with the extended, medium, daily weather forecasts and other advisories released by the Centre.

2. SASCOF-34 consensus on prevailing conditions

2.1 ENSO Conditions over the Pacific Ocean

The El Niño/Southern Oscillation (ENSO) is a global climate conditions having significant influence on the variability of the monsoon precipitation and the surface temperatures over South Asia. At present, ENSO-neutral conditions in the equatorial Pacific are transitioning toward an El Niño conditions over the equatorial Pacific. Latest forecasts from the Monsoon Mission Climate Forecast System (MMCFS) and global climate centers suggest a high probability of El Niño emerging during the April to June 2026 season. These El Niño conditions are likely to persist and potentially strengthen throughout the 2026 southwest monsoon.

2.2 Conditions over the Indian Ocean

The Sea Surface Temperature (SSTs) of the Indian Ocean also influence the monsoon of the region. A positive (negative) Indian Ocean Dipole (IOD) is associated with a stronger (weaker) than normal monsoon. Neutral Indian Ocean Dipole conditions currently prevail over the Indian Ocean, and climate models indicate that a positive IOD phase is likely to emerge later in the monsoon season.

2.3 Snow Cover over the Northern Hemisphere

The NH winter and spring snow cover extent has a general inverse relationship with the subsequent summer monsoon rainfall over South Asia. The northern hemisphere snow cover areas during January to March 2026 were observed to be slightly below normal.

3. SASCOF-34 Outlook for JJAS 2026 Southwest Monsoon over South Asia

A regional climate outlook for the 2025 Southwest monsoon over South Asia was prepared based on assessment of the prevailing large-scale climate indicators, experimental models developed during capacity-building workshops of previous SASCOF sessions, statistical and dynamical long-range forecasts of NMHSs in the region and various other climate centres of the world. Factors such as ENSO, IOD, tropical Atlantic Sea surface temperatures, Eurasian land heating etc. are considered for the SASCOF outlook.

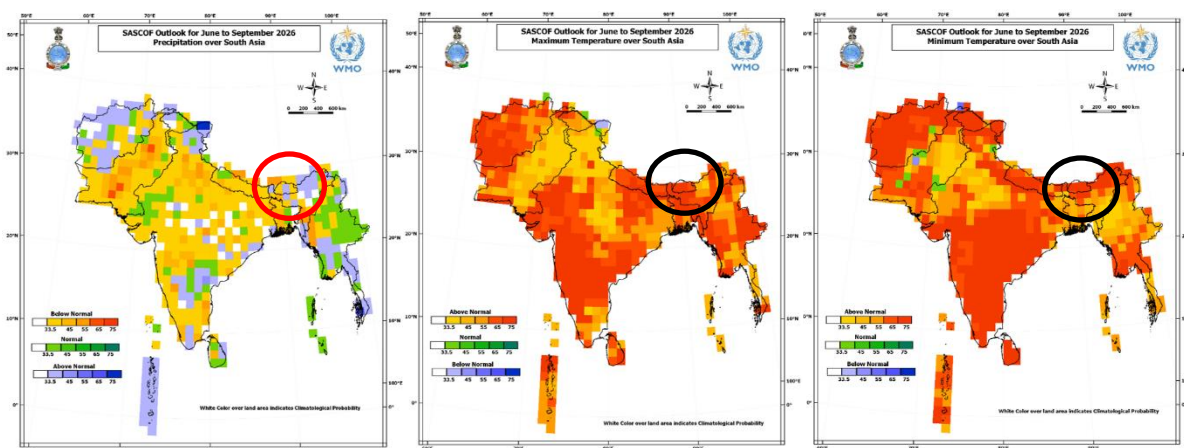


Figure 1: Outlook for JJAS 2026 rainfall over South Asia (left), maximum temperature (middle) and minimum temperature (right) over South Asia

The Figure shows grid wise most likely tercile probability category for each 1x1 degree grids. As depicted in Figure 1, the outlook indicates that during the summer season JJAS 2025, the rainfall is most likely to be above normal over most parts of South Asia. The below normal rainfall is expected over the isolated parts of extreme north and eastern region of South Asia. The remaining regions are likely to experience climatological probabilities.

The outlook suggests that below normal rainfall is most likely during the 2026 southwest monsoon season (June–September) over most parts of South Asia, particularly across the central parts of the region. However, some areas over the north-western, north-eastern, and parts of the southern region are likely to experience normal to above normal rainfall. The white shaded areas within the land represent no forecast signal from the model, where the models do not show a strong consensus signal.

The SASCOF outlook for maximum temperatures during the June to September 2026 season suggests that seasonal maximum temperatures are most likely to be above normal over South Asia. The consensus outlook on minimum temperatures for June to September 2026 season suggests during the season, above normal minimum temperatures are most likely over South Asia except some isolated regions over the north-western part of the region where normal temperatures are most likely.

Since the rainfall and temperature during the southwest monsoon season depicts strong intra-seasonal variability, it is recommended to follow the extended and medium range forecast besides seasonal forecast for better planning.

4. Summer Seasonal Outlook JJAS 2026 from International and Regional Climate Centres

4.1 WMO Lead Centres

Probabilistic multi-model ensemble forecast of all the GPCs of WMO forecast show slightly below normal for rainfall and above normal temperature during JJAS 2026 over Bhutan.

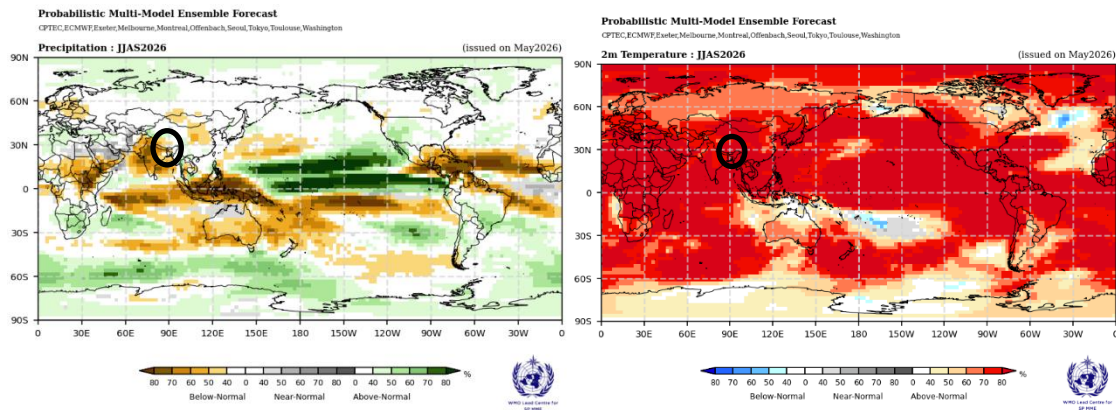


Figure 2: JJAS 2026 rainfall (left) and temperature (right) forecast from WMO GPCs

4.2 International Research Institute for Climate and Society (IRI)

The IRI forecast indicates slightly below normal rainfall and the temperature is likely to be above normal during JJA 2026 over Bhutan.

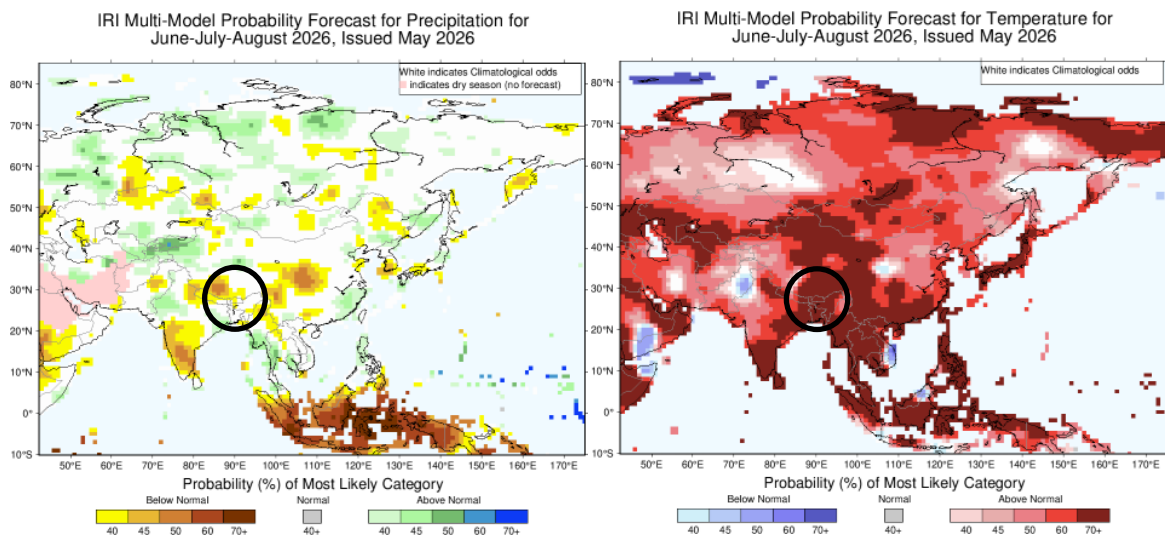


Figure 3: JJA 2026 rainfall (left) and temperature (right) forecast from IRI

4.3 APEC Climate Center (APCC)

The APCC forecast indicates no skill for rainfall and above normal temperature during JJA 2026 over Bhutan.

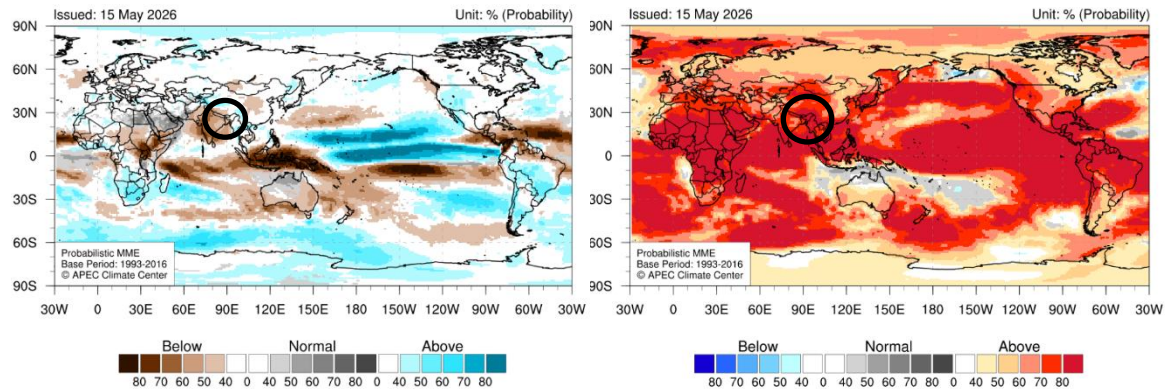


Figure 4: JJA 2026 rainfall (left) and temperature (right) forecast from APCC

4.4 Copernicus Climate Change Service (C3S)

According to C3S forecast, there is no skill for the rainfall. The temperature is likely to be above normal during JJA 2026 over Bhutan.

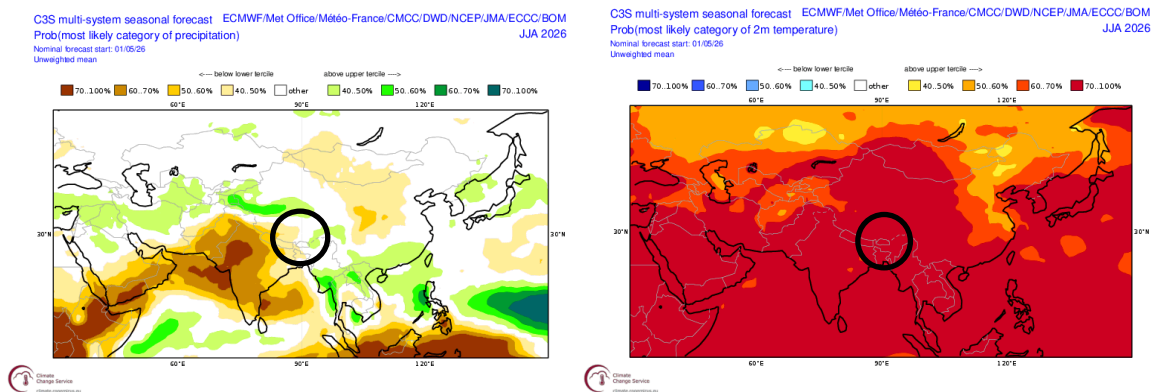


Figure 5: JJA 2026 rainfall (left) and temperature (right) forecast from C3S

4.5 Japan Meteorological Agency (JMA) forecast

The JMA forecast indicates slightly below normal for rainfall and above normal temperature during JJA 2026 over Bhutan.

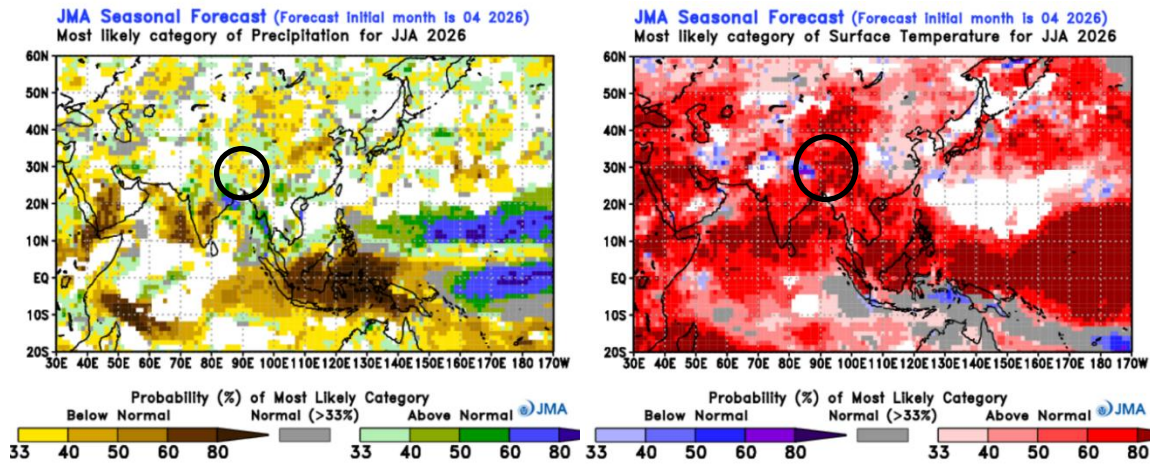


Figure 6: JJA 2026 rainfall (left) and temperature (right) forecast from JMA

4.6 FOCUS-X forecast, RIMES

According to FOCUS-X, there is a high probability of slightly below-normal rainfall and above-normal temperature over Bhutan during JJAS 2026, based on the ECMWF Re-analysis (ERA) observations.

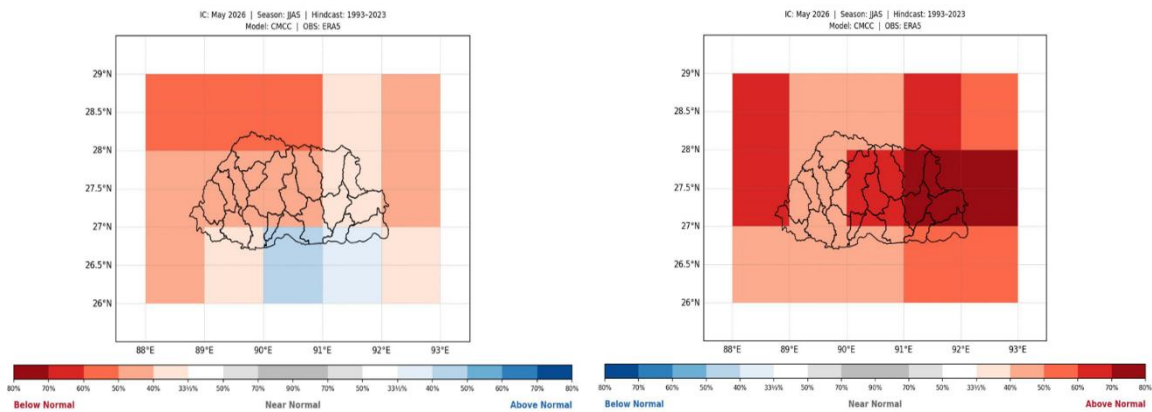


Figure 7: JJAS 2026 rainfall (left) and temperature(right) forecast based on ERA5 data

4.7 Forecast from NCHM using Climate Predictability Tool (CPT)

The CPT forecast indicate slightly below normal rainfall, above normal maximum temperature and slightly above normal minimum temperature during JJAS 2026.

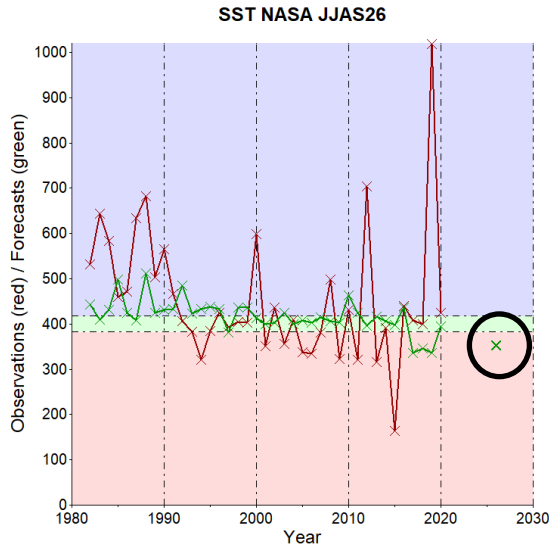


Figure 8: JJAS 2026 Rainfall forecast from CPT

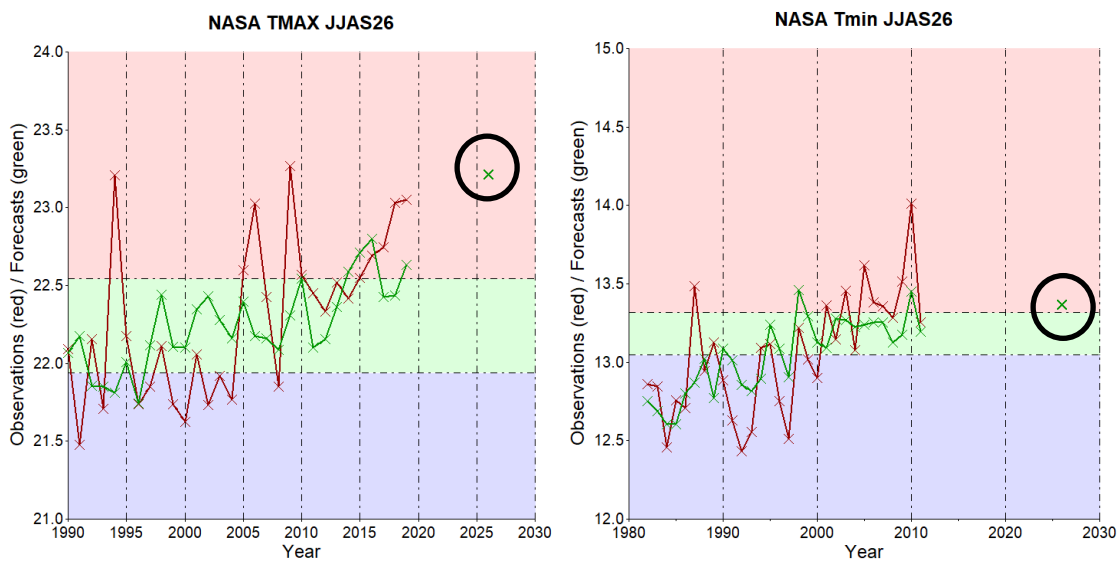


Figure 9: JJAS 2026 maximum (left) and minimum temperature (right) forecast from CPT

5. ENSO and IOD outlook JJAS 2026

Strong El Niño ENSO and positive IOD conditions are likely to prevail during this season.

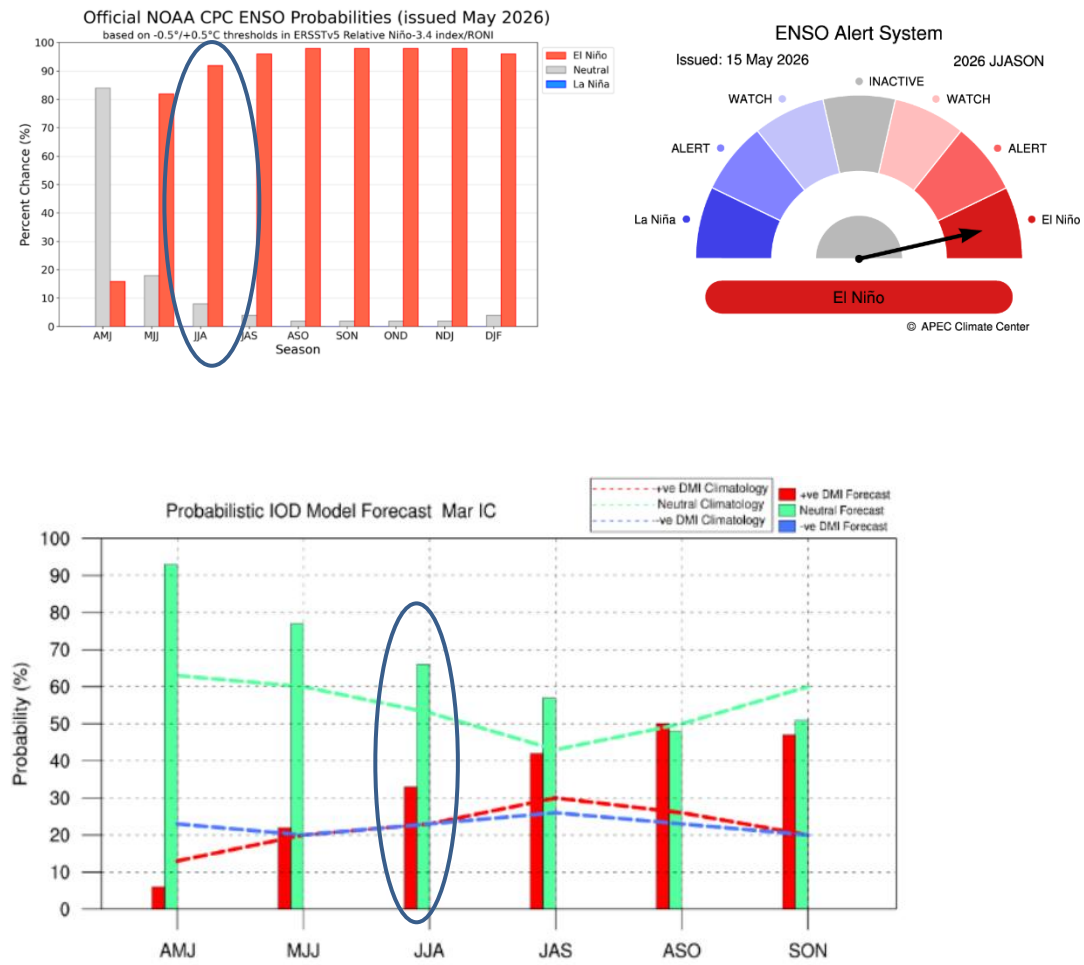


Figure 10: ENSO condition (Top) and IOD condition (Bottom)

The final outlook of summer season JJAS 2026 over Bhutan is based on the forecast products from various sources.

Table 1: Summary of results from various sources

Sl No.	Indicators	Rainfall	Maximum Temperature	Minimum Temperature
1	CPT	Slightly below normal	Above normal	Slightly below Normal
2	FOCUS-X	Slightly below normal	Above normal	
3	GPCs	Slightly below normal	Above normal	
4	IRI	Slightly below normal	Above normal	
5	APEC	Climatological Probability	Above normal	
6	C3S	Climatological Probability	Above normal	
7	JMA	Slightly below normal	Above normal	
8	SASCOF	Normal to slightly below normal	Above normal	Above normal
9	ENSO	Strong El Nino Conditions likely to develop		
10	IOD	Positive IOD conditions likely to develop		

6. Consensus Monsoon outlook JJAS 2026 for Bhutan

The National Centre for Hydrology and Meteorology release the outlook for precipitation and temperature for the 2026 summer season, for the months of June to September 2026. The consensus forecast was prepared with inputs from global and regional prediction centres, and national climate data. The final outlook is also based on the consensus outlook of the South Asian Climate Outlook Forum (SASCOF-34) held from 28 – 30 April, 2026, outlook from WMO GPCs and various other international sources. The summer monsoon outlook must be used and interpreted along with the extended, medium, daily weather forecasts and other advisories released by the Centre.

a. Rainfall Forecast for 2026 Summer Season

The summer rainfall for Bhutan during the 2026 JJAS monsoon season is likely to be normal to slightly below normal. Normal is the average rainfall for the summer season (JJAS) of Bhutan from 1996 to 2025.

b. Temperature Forecast for 2026 Summer Season

The maximum and minimum temperature in Bhutan during the 2025 JJAS monsoon season is likely to be above normal. Normal is the average temperature (maximum and minimum) for the summer season (JJAS) of Bhutan from 1996 to 2025.

