



भारत सरकार  
**Government of India**  
पृथ्वी विज्ञान मंत्रालय (एम. ओ. ई. एस.)  
**Ministry of Earth Sciences (MoES)**  
भारत मौसम विज्ञान विभाग  
**INDIA METEOROLOGICAL DEPARTMENT**

**Long Range Forecast for the Rainfall during Second Half (August –September)  
of the 2019 Southwest Monsoon**

**Highlights:**

- **Quantitatively, the rainfall over the country as a whole during the second half of the season is likely to be 100% of the long period average (LPA) with a model error of  $\pm 8\%$ .**
- The rainfall during August is likely to be  $99 \pm 9\%$  of LPA as was predicted in June.
- The season (June to September) rainfall over the country as a whole is likely to be normal ( $96\% \pm 4\%$  of LPA) as was predicted in June.

**1. Background and details of the 5- Parameter Operational Model**

The forecast for the rainfall over the country as a whole for the second half of the 2019 monsoon season has been prepared using a Principal Component Regression (PCR) Model and Monsoon Mission Coupled Forecasting System (MMCFS). PCR model is based on 5 predictors with a model error of  $\pm 8\%$  of LPA. The LPA of the rainfall over the country as a whole for the second half of the monsoon season (August to September) based on the 1961-2010 period is 42.83 cm (49% of the average season rainfall) with a coefficient of variation (CV) of 14%.

**2. SST conditions in the Pacific and the Indian Oceans**

Currently, the sea surface temperatures (SSTs) as well as the atmospheric conditions over equatorial Pacific Ocean indicate El Nino Southern Oscillation (ENSO) neutral to borderline El Niño conditions. The latest forecasts from both MMCFS and other global models indicate that these conditions are likely to continue during the remaining part of the monsoon season.

In addition to ENSO conditions over Pacific, other factors such as the Indian Ocean SSTs have also some influence on Indian monsoon. Currently, positive Indian Ocean Dipole (IOD) conditions are prevailing over equatorial Indian Ocean. MMCFS forecast indicates that positive IOD conditions are likely to continue during the remaining part of the monsoon season and weaken thereafter.

### **3. Monsoon Mission Coupled Dynamical Forecast System (MMCFS)**

Forecast based on the MMCFS suggests that rainfall during the second half (August to September) of the 2019 monsoon season averaged over the country as a whole is likely to be 99% of LPA.

### **4. Forecast for the Rainfall during the Second Half of the 2019 Southwest Monsoon Rainfall**

- (a) Quantitatively, the rainfall for the country as a whole during the second half of the season is likely to be 100% of LPA with a model error of  $\pm 8\%$ .
  
- (b) The probabilistic forecast suggests that the rainfall over the country as a whole during second half of southwest monsoon season (August to September) is most likely to be normal (94 -106% of LPA) with a probability of 45%.