



भारत सरकार

**Government of India**

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**Ministry of Earth Sciences (MoES)**

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**INDIA METEOROLOGICAL DEPARTMENT**

**Long Range Forecast of the 2019 Southwest Monsoon Rainfall**

### Summary of the Forecast Assessment

- a)** Southwest monsoon seasonal (June to September) rainfall over the country as a whole is likely to be near normal.
- b)** Quantitatively, the monsoon seasonal (June to September) rainfall is likely to be 96% of the Long Period Average (LPA) with a model error of  $\pm 5\%$ . The LPA of the season rainfall over the country as a whole for the period 1951-2000 is 89 cm.
- c)** Weak El Niño conditions are likely to prevail during the monsoon season with reduced intensity in the later part of the season.

The sea surface temperature (SST) conditions over the Pacific (El Niño/La Niña) and Indian Oceans (Indian Ocean Dipole-IOD) which are known to have strong influence on Indian monsoon are being continuously monitored. Overall, the country is expected to have well distributed rainfall scenario during the 2019 monsoon season, which will be beneficial to farmers in the country during the ensuing kharif season.

IMD will issue the second stage Monsoon-2019 Forecast during the first week of June, 2019.

## 1. Background

India Meteorological Department (IMD) issues operational forecast for the southwest monsoon season (June to September) rainfall for the country as a whole in two stages. The first stage forecast is issued in April and the second stage forecast is issued in June. These forecasts are prepared using state-of-the-art Statistical Ensemble Forecasting system (SEFS) and using the dynamical coupled Ocean-Atmosphere global

Climate Forecasting System (CFS) model developed under Monsoon Mission of the Ministry of Earth Sciences.

IMD's SEFS model for the April forecast uses the following 5 predictors that require data upto March.

S. No	Predictor	Period
1	The Sea Surface Temperature (SST) Gradient between North Atlantic and North Pacific	December + January
2	Equatorial South Indian Ocean SST	February
3	East Asia Mean Sea Level Pressure	February + March
4	Northwest Europe Land Surface Air Temperature	January
5	Equatorial Pacific Warm Water Volume	February + March

## **2. Forecast for the 2019 Southwest monsoon Season (June – September) rainfall over the country as a whole**

### **2a. Forecast based on the Monsoon Mission CFS Model**

For generating the forecast for the 2019 southwest Monsoon season rainfall, global atmospheric and oceanic initial conditions up to March 2019 were used involving 47 ensemble members.

The forecast based on the CFS model suggests that the monsoon rainfall during the 2019 monsoon season (June to September) averaged over the country as a whole is likely to be 94%  $\pm$  5% of the Long Period Average (LPA).

### **2b. Forecast based on the Operational SEFS**

- (a) Quantitatively, the monsoon seasonal rainfall is likely to be 96% of the Long Period Average (LPA) with a model error of  $\pm$  5%.
- (b) The 5 category probability forecasts for the Seasonal (June to September) rainfall over the country as a whole is given below:

<b>Category</b>	<b>Rainfall Range (% of LPA)</b>	<b>Forecast Probability (%)</b>	<b>Climatological Probability (%)</b>
Deficient	< 90	<b>17</b>	16
Below Normal	90 - 96	<b>32</b>	17
Near Normal	96 -104	<b>39</b>	33
Above Normal	104 -110	<b>10</b>	16
Excess	> 110	<b>2</b>	17

Forecast suggests that the 2019 Southwest monsoon rainfall is likely to be near normal. However, there is very less chance for the monsoon rainfall to be above normal or excess.

Overall, the country is expected to have well distributed rainfall scenario during the 2019 monsoon season, which will be beneficial to farmers in the country during the ensuing Kharif season.

### **3. Sea Surface Temperature (SST) Conditions in the equatorial Pacific & Indian Oceans**

At present, weak El Niño conditions (SST anomalies between 0.5<sup>0</sup> C & 1.0<sup>0</sup> C) are prevailing over the equatorial Pacific Ocean. The latest forecasts from the Monsoon Mission CFS & other global climate models indicate such conditions are likely to persist during the monsoon season but with reduced intensity in the later part of the monsoon season. It is noted that El Niño predictions made in February/March generally have more uncertainties compared to the El Niño predictions made in June.

At present, neutral IOD conditions are prevailing over the Indian Ocean. The latest forecasts from the models indicate positive IOD conditions development likely during the monsoon season. Positive IOD conditions tend to associate with the normal monsoon over India.

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