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INDIA METEOROLOGICAL DEPARTMENT
Long Range Forecast Update for
The 2019 Southwest Monsoon Rainfall

Highlights

- ✚ Rainfall over the country as a whole for the 2019 southwest monsoon season (June to September) is most likely to be **NORMAL** (96% to 104% of long period average (LPA)).
- ✚ Quantitatively, monsoon season rainfall for the country as a whole is likely to be **96%** of the LPA with a model error of **±4%**.
- ✚ Region wise, the season rainfall is likely to be **94%** of LPA over North-West India, **100%** of LPA over Central India, **97%** of LPA over South Peninsula and **91%** of LPA over North-East India all with a model error of **± 8 %**.
- ✚ The monthly rainfall over the country as whole is likely to be **95%** of its LPA during July and **99%** of LPA during August both with a model error of **± 9 %**.
- ✚ The current **weak El Niño** conditions over Pacific are likely to continue during the monsoon season with some possibility of these conditions to turn to neutral ENSO conditions during the latter part of the monsoon season.

IMD will issue forecast for the rainfall during the second half of the season in the end of July 2019.

1. Background

India Meteorological Department (IMD) had issued the first stage operational long range forecasts for the southwest monsoon season (June-September) rainfall over the country as a whole on 15th April. Now IMD has prepared update for the April forecast, which is presented here. In addition, forecasts for the monthly rainfall for July & August over the country as a whole, and forecast for the season rainfall for the 4 broad geographical regions of India (NW India, NE India, Central India and South Peninsula) are also presented. The operational forecasts were prepared based on the state-of-the-art statistical models developed through in-house research activities.

The update forecast for the southwest monsoon season (June-September) rainfall over the country as a whole was prepared using a 6-parameter Statistical Ensemble Forecasting System (SEFS). The seasonal rainfall over the 4 broad geographical regions and monthly rainfall for the July and August over the country as a whole were prepared using Principal Component Regression (PCR) models with different set of parameters for each model. Experimental forecast based on the Monsoon Mission coupled forecasting system (MMCFS) is also presented.

2. Sea Surface Temperature Conditions in the Pacific & Indian Oceans

The weak El Niño conditions developed in the equatorial Pacific in early part of this year persisted through May. The latest forecast from MMCFS & other global models together indicates weak El Niño conditions may continue during the monsoon season with reduced intensity. Some models even suggest Neutral ENSO conditions during the later part of the monsoon season.

At present, neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean. The latest forecast from the MMCFS and global models together indicate that positive IOD conditions are likely to develop during the middle of the monsoon season and persist during the monsoon season.

3. Monsoon Mission Coupled Forecasting System (MMCFS)

The latest experimental forecast based on the ESSO-IMD-IITM coupled dynamical 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 97% ± 4% of LPA.

4. Status of Monsoon Progress

Monsoon was set over the south Andaman sea & some parts of south Bay of Bengal on its normal date of 18th May. It further advanced into some more parts of south Andaman Sea on 25th May and into southernmost parts of Maldives-Comorin area, some more parts of southwest and southeast Bay of Bengal, remaining parts of Andaman sea and Andaman Islands and some parts of eastcentral Bay of Bengal on 30th May 2019. As on 31st May, the Northern Limit of Monsoon (NLM) passes through Lat. 5°N/Long. 75°E, Lat. 5°N/Long. 80°E, Lat. 10°N/Long. 87°E, Lat. 13°N/Long. 90°E and Lat. 16°N/Long. 94.5°E. It is very likely to advance further into extreme southern parts of Arabian Sea and some more parts of Maldives and Comorin area, southwest, southeast and eastcentral Bay of Bengal during next 72 hours. Thereafter, monsoon is likely to strengthen further and set over Kerala around 6th June as predicted by IMD earlier.

5. The second Stage Forecasts for the 2019 Southwest Monsoon Rainfall

i) Seasonal (June-September) Rainfall over the country as a whole

Quantitatively, the season rainfall for the country as a whole is likely to be 96% of the long period average (LPA) with a model error of $\pm 4\%$. The LPA rainfall over the country as a whole for the period 1951-2000 is 89 cm.

The 5 category probability forecasts for the Season (June to September) rainfall over the country as a whole is given below.

Category	Rainfall Range (% of LPA)	Forecast Probability (%)	Climatological Probability (%)
Deficient	< 90	15	16
Below Normal	90 - 96	32	17
Normal	96 - 104	41	33
Above Normal	104 - 110	10	16
Excess	> 110	2	17

ii) Season (June-September) Rainfall over Broad Geographical Regions

The season rainfall is likely to be 94% of LPA over North-West India, 100% of LPA over Central India, 97% of LPA over South Peninsula, and 91% of LPA over North-East India all with a model error of $\pm 8\%$.

iii) Monthly (July & August) Rainfall over the country as a whole

The rainfall over the country as a whole is likely to be 95% of its LPA during July and 99% of LPA during August both with a model error of $\pm 9\%$.
