

INDIA METEOROLOGICAL DEPARTMENT

Long Range Forecast Outlook for the 2010 September Rainfall

1. Background

India Meteorological Department (IMD) issues operational monthly and season rainfall forecasts for the southwest monsoon Season (June to September) over the country as a whole. The first forecast for the season rainfall over the country as a whole is issued in April. The update for the April forecast and forecast for the monthly rainfall (for July and August) over the country as a whole is issued in June. In June, along with these forecasts for the country as a whole, season rainfall over the four geographical regions of the country (Northwest India, Central India, Northeast India and South Peninsula are also issued. In addition, forecast outlook for the rainfall during second half (August-September) of the monsoon season is issued in July and that for the September rainfall is issued in August. IMD has now prepared a forecast outlook for the 2010 September rainfall.

2. Summary of Operational Long Forecasts issued Till July, 2010

Summary of IMD's operational long range forecasts for the 2010 south-west monsoon season (June to September) issued between April & July, 2010 are given in the table below. In the last column, the actual rainfall received so far is also given.

Region	Period	Date of Issue	Forecast (% of LPA)	Actual Rainfall Computed based on data till 25th August (% of LPA)
All India	June to September	23 rd April	98 ± 5	98
All India	June to September	25 th June	102 ± 4	
Northwest India	June to September		102 ± 8	107
Central India	June to September		99 ± 8	98
Northeast India	June to September		103 ± 8	80
South Peninsula	June to September		102 ± 8	116
All India	July		98 ± 9	103
All India	August		101 ± 9	103
All India	August to September		30 th July	107 ± 7%

3. 4-Parameter Model for the rainfall during September

The long period average (LPA) of the September rainfall over the country as whole is 17.47cm based on the 1941-90 climatology. The coefficient of variation (C.V) of the September rainfall time series is 23%. For the forecast of September rainfall over the country as a whole, a Multiple Linear Regression (MR) Model based on 4 predictors has been used. The model error of 4-parameter MR model is 15% of LPA.

4. La Nina conditions over Equatorial Pacific

The weak La Nina conditions which emerged during the mid June reached to moderate strength during July and persist over the equatorial Pacific. The latest model forecasts from a majority of the dynamical and statistical models indicate very high probability (more than 90%) for the La Nina conditions with at least moderate strength to continue during the remaining part of 2010.

Other factors such as the Indian Ocean Sea surface temperatures also influence the monsoon rainfall over India in addition to El Niño and La Niña events. During the monsoon season so far, basin wide warming of sea surface temperatures has been observed over tropical Indian Ocean. A weak negative Indian Ocean Dipole pattern has also been observed. These conditions to some extent had a role in inhibiting the formation of monsoon depressions over the Bay of Bengal during this monsoon season so far. The latest forecasts from various climate models suggest continuation of these conditions.

5. Summary of the Forecast outlook for 2010 September Rainfall

Rainfall over the country as a whole for the 2010 September rainfall is likely to be normal. Quantitatively, September rainfall for the country as a whole is likely to be 115% of long period average (LPA) with a model error of $\pm 15\%$.

The outlook for the 2010 Southwest Monsoon Season Rainfall is that the monsoon season (June to September) rainfall for the country as a whole is likely to be within the normal limits as predicted by IMD earlier. The season (June to September) rainfall over the 3 geographical regions (Northwest India, Central India and South Peninsula) is also likely to be within the normal limits. However, the season rainfall over Northeast India is likely to be below normal.