

**Earth System Science Organization (ESSO)  
Ministry of Earth Sciences (MoES)  
INDIA METEOROLOGICAL DEPARTMENT**

**Long Range Forecast  
For the 2015 Southwest Monsoon Season Rainfall**

**1. Background**

ESSO-India Meteorological Department (IMD) issues various monthly and seasonal operational forecasts for rainfall during the southwest monsoon season. Operational models are critically reviewed regularly and further improved through in-house research activities. Operational forecasts for the southwest monsoon season (June – September) rainfall are issued in two stages. The first stage forecast is issued in April and the second stage forecast is issued in June.

The ESSO-IMD's Ensemble Statistical Forecasting system for the April forecast uses the following 5 predictors.

<b>S. No</b>	<b>Predictor</b>	<b>Period</b>
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. Sea Surface Temperature (SST) Conditions in the equatorial Pacific & Indian Oceans**

For the last about six months, positive SST anomalies have been prevailing over the western and the central Pacific Ocean. However, the SSTs over eastern Pacific after remaining near to below normal between late December 2014 and mid-March 2015 have now become above normal. Thus currently, weak El Nino conditions are prevailing over the Pacific. The latest forecast from the IMD-IITM coupled model forecast indicates El Nino conditions are likely to persist during the southwest monsoon season.

At present, slight negative Indian Ocean Dipole (IOD) conditions are prevailing over Indian Ocean. The latest forecast from the coupled model indicates negative IOD conditions are likely to persist during the monsoon season.

As the extreme sea surface temperature conditions over Pacific and Indian Oceans particularly ENSO conditions over Pacific (El Nino or La Nina) are known to have strong influence on the Indian summer monsoon, IMD is carefully monitoring the sea surface conditions over Pacific and Indian oceans.

### 3. Experimental Coupled Dynamical Model Forecasting System - ESSO Monsoon Mission Model

The ESSO-Indian Institute of Tropical Meteorology (IITM), Pune is coordinating and working along with different climate research centers from India and abroad on the development of a coupled model for the forecasting of Indian summer monsoon rainfall under ESSO's Monsoon Mission project. The latest high resolution research version of the Coupled Forecasting System (CFS) originally developed by the National Centers for Environmental Prediction (NCEP), USA has been implemented at the ESSO-IITM. This model was used to generate the experimental update forecast for the 2015 southwest Monsoon season rainfall using the February initial conditions. The model has moderate skill.

*The experimental forecast based on the coupled dynamical model forecasting system suggest that the monsoon rainfall during the 2015 monsoon season (June to September) averaged over the country as a whole is likely to be  $91 \pm 5\%$  of long period model average (LPMA).*

### 4. Summary of the ESSO-IMD's Operational long range Forecast for the 2015 Southwest monsoon rainfall

(a) Quantitatively, the monsoon seasonal rainfall is likely to be 93% 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.

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

Category	Rainfall Range (% of LPA)	Forecast Probability (%)	Climatological Probability (%)
Deficient	< 90	<b>33</b>	16
Below Normal	90 - 96	<b>35</b>	17
Normal	96 -104	<b>28</b>	33
Above Normal	104 -110	<b>3</b>	16
Excess	> 110	<b>1</b>	17

ESSO-IMD will issue the update forecasts in June, 2015 as a part of the second stage forecast. Along with the update forecast, separate forecasts for the monthly (July and August) rainfall over the country as a whole and seasonal (June-September) rainfall over the four geographical regions of India will also be issued.