



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 2021 November Rainfall**

**Highlights**

- a)** Monthly rainfall for November 2021 over the South Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Puducherry & Karaikkal, Coastal Andhra Pradesh & Yanam, Rayalaseema, Kerala & Mahe and South Interior Karnataka) is most likely to be above normal (>122% of Long Period Average (LPA)).
- b)** Currently La Niña conditions are prevailing over Equatorial Pacific Ocean and neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean. The latest global model forecasts indicate that the La Niña conditions are likely to prevail until March 2022 and neutral IOD conditions are likely to continue during the upcoming seasons.

As the changes in the Sea Surface Temperature (SST) conditions over the Pacific and the Indian Oceans are known to influence the Indian climate, IMD is carefully monitoring the evolution of sea surface conditions over these Ocean basins.

## 1. Background

The South Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Puducherry & Karaikkal, Coastal Andhra Pradesh & Yanam, Rayalaseema, Kerala & Mahe and South Interior Karnataka) receives good amount of rainfall during the November to January (NDJ) season. This year, IMD has adopted a new strategy for issuing monthly and seasonal operational forecasts for the rainfall over the country. The new strategy is based on the existing statistical forecasting system and the newly developed Multi-Model Ensemble (MME) based forecasting system. The MME approach uses the Coupled Global Climate Models (CGCMs) from different global climate prediction and research centers including IMD's Monsoon Mission CFS (MMCFS) model. Accordingly, IMD had issued various seasonal forecasts for the 2021 Southwest Monsoon seasonal (June to September) and monthly rainfall over the country and Post-monsoon seasonal (October to December (OND)) rainfall over South Peninsular India as well as the spatial distribution of probabilistic forecasts for the OND season rainfall over the country.

Now, IMD has prepared the forecast outlook for the month of November of 2021.

- a. Probabilistic forecast for the November rainfall averaged over the South Peninsular India.
- b. Spatial distribution of probabilistic rainfall forecasts over the country for November 2021.

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

Currently, the Sea Surface Temperatures (SSTs) and the atmospheric conditions over the Equatorial Pacific Ocean indicate La Niña conditions. The latest forecasts from MMCFS and other global models suggest that La Niña conditions are likely to continue until March 2022.

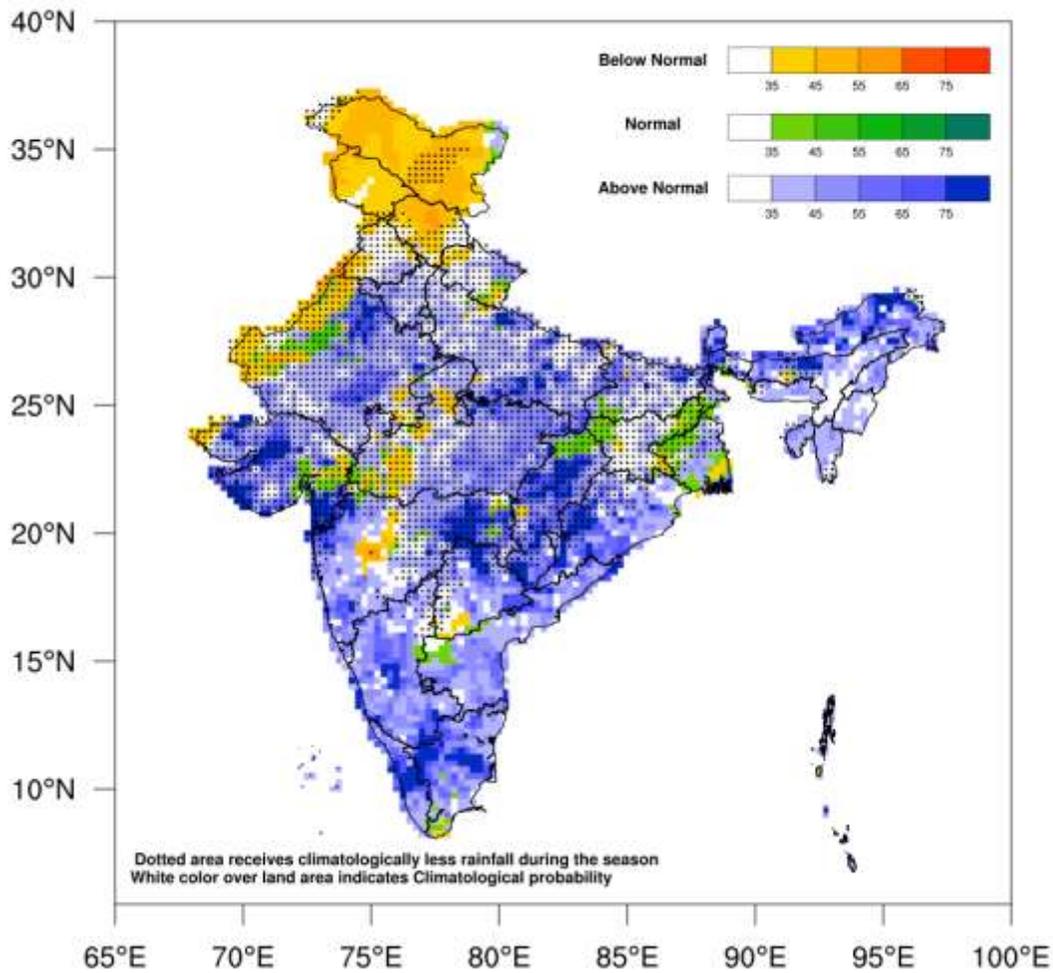
In addition to ENSO conditions over the Pacific, other factors such as the Indian Ocean Sea Surface Temperatures (SSTs) also influence on Indian climate. Currently, the neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Equatorial Indian Ocean. The latest forecasts from MMCFS and other global models indicate that neutral IOD conditions are likely to continue during the upcoming seasons.

## 3. Probabilistic Forecast for the Rainfall during November 2021

The 2021 November rainfall averaged over the South Peninsular India is most likely to be above normal (>122% of LPA). The LPA of rainfall over South Peninsular India during November based on data of 1961-2010 is about 117.46 mm.

The spatial distribution of probabilistic forecasts for tercile categories (above normal, normal and below normal) over the country for the November rainfall is shown in Fig.1. The spatial distribution suggests normal to above normal rainfall over most parts of South Peninsular India except a few small pockets of the region. It is predicted that below normal to normal rainfall probability is likely over many areas of north India and over some parts of northwest India and central India. Normal to above normal rainfall is most likely over remaining part of the country. The dotted area showed in the map climatologically receives very less rainfall during November and the white shaded areas within the land areas represent climatological probabilities.

probability rainfall forecast for 2021 NOV



**Fig.1.** Probability forecast of tercile categories\* (below normal, normal and above normal) for the 2021 November rainfall over India. The figure illustrates the most likely categories as well as their probabilities. The dotted areas showed in the map climatologically receive very less rainfall during November month and the white shaded areas over the land represent climatological probabilities. The probabilities were derived using the MME forecast prepared from a group of Coupled Climate Models. (\*Tercile categories have equal climatological probabilities of 33.33% each).