**PRESS RELEASE**
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भारतसरकार
**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 the 2024 Southwest Monsoon Season Rainfall

### Highlights

**a)** The 2024 southwest monsoon seasonal (June to September) rainfall over the country as a whole is most likely to be above normal (>104% of **the Long Period Average (LPA)).** Quantitatively, the seasonal rainfall over the country as a whole is likely to be **106% of LPA with a model error of ± 5%.** The LPA of the season rainfall over the country as a whole for the period **1971-2020 is 87 cm**.

**b)** Currently, moderate El Niño conditions are prevailing over the equatorial Pacific region. The latest Monsoon Mission Climate Forecast System (MMCFS) as well as other climate model forecasts indicate that the El Niño condition is likely to weaken further to neutral El Nino Southern Oscillation (ENSO) conditions during early part of the monsoon season and La Niña conditions are likely to develop during second half of monsoon season.

**c)** At present, neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean and the latest Climate model forecasts indicate that the positive IOD conditions are likely to develop during the later part of the southwest monsoon season.

**d)** The northern hemisphere snow cover extent during the last three months (January to March, 2024) was below normal. Winter and spring snow cover extent over Northern Hemisphere as well as Eurasia has a generally inverse relationship with the subsequent Indian summer monsoon rainfall.

IMD will issue the **updated forecasts for monsoon season rainfall in the last week of May, 2024.**

## 1. Background

Since 2003, India Meteorological Department (IMD) has been issuing the operational long-range forecast (LRF) for the southwest monsoon seasonal (June-September) rainfall averaged over the country as a whole in two stages. The first stage forecast is issued in April and the second stage updated forecast is issued by the end of May. In 2021, IMD has implemented a new strategy for issuing monthly and seasonal operational forecasts for the southwest monsoon rainfall over the country by modifying the existing two stage forecasting strategy. The new strategy uses both dynamical and statistical forecasting system. Multi-Model Ensemble (MME) forecasting system based on coupled global climate models (CGCMs) from different global climate prediction centres, including IMD's Monsoon Mission Climate Forecast System (MMCFS) are used in dynamical forecast system.

As per the new LRF strategy, the first stage forecast issued in middle of April consist of quantitative and probabilistic forecasts for the country as a whole and the spatial distribution of probabilistic forecasts for the tercile categories (above normal, normal, and below normal) of the seasonal rainfall (June-September) over the country.

The second stage forecast issued around end of May consists of update for the seasonal rainfall forecast issued in April along with the probabilistic forecasts for the seasonal rainfall over the four homogenous regions of India (northwest India, central India, south Peninsula and northeast India) and monsoon core zone (MCZ). In addition, quantitative and probabilistic forecasts for the country as a whole and the spatial distribution of probabilistic forecasts of rainfall (above normal, normal, and below normal) over the country during June are also issued during the second stage forecast.

In continuation to the above forecasts, monthly rainfall forecast is issued around end of June, July and August respectively for the subsequent one month. In addition, quantitative and probabilistic forecasts for the country as a whole, and the spatial distribution of probabilistic forecasts of rainfall for the second half (August – September) of the season is issued around end of July along with the forecast for August.

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

The forecast based on both dynamical and statistical models suggests that quantitatively, the monsoon seasonal rainfall during June to September is likely to be **106% of the Long Period Average (LPA) with a model error of ± 5%.** The LPA of the season rainfall during June to September over the country as a whole based on the data of **1971-2020 is 87 cm**.

The five category probability forecasts for the Seasonal (June to September) rainfall over the country as a whole are given below. It suggests that there is high probability (61%) of southwest monsoon seasonal rainfall to be above normal (>104% of LPA).

| Category | Rainfall Range (% of LPA) | Forecast Probability (%) | Climatological Probability (%) |
|---|---|---|---|
| Deficient | < 90 | 2 | 16 |
| Below Normal | 90 - 96 | 8 | 17 |
| Normal | 96 -104 | 29 | 33 |
| Above Normal | 104 -110 | 31 | 16 |
| Excess | > 110 | 30 | 17 |

The MME forecast for the 2024 southwest monsoon season rainfall was prepared based on the April initial conditions and using a group of coupled climate models which have highest prediction skill over the Indian monsoon region.

The spatial distribution of probabilistic forecasts for tercile categories (above normal, normal and below normal) for the seasonal rainfall (June to September) is shown in Fig.1. The spatial distribution suggests that above normal seasonal rainfall is very likely over most parts of the country except some areas over Northwest, East and Northeast India, where below normal rainfall is very likely. The model has no clear signal over the white shaded areas of the country as presented in Fig.1.

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

Currently, moderate El Niño conditions are prevailing over the equatorial Pacific region. The latest MMCFS as well as other climate model forecasts indicate that El Niño conditions are likely to weaken further to neutral El Nino Southern Oscillation (ENSO) condition in the early part of the monsoon season and La Niña conditions are likely to develop during second half of monsoon season.

At present, neutral Indian Ocean Dipole (IOD) conditions are prevailing over the Indian Ocean and the latest climate model forecasts indicate that the positive IOD conditions are likely to develop during the later part of the southwest monsoon season.

As sea surface temperature (SST) conditions over the Pacific and the Indian Oceans are known to have a strong influence on the Indian monsoon, IMD is carefully monitoring the evolution of sea surface conditions over these Ocean basins.

## 4. Snow Cover over the Northern Hemisphere

Winter and spring snow cover extent over Northern Hemisphere as well as Eurasia has a generally inverse relationship with the subsequent Indian summer monsoon rainfall. The northern hemisphere snow cover areas during January to March 2024 were observed to be below normal.

The expected La Nina, positive IOD and below normal snow cover over northern hemisphere would be favourable for rainfall during southwest monsoon season, 2024.

**Probablistic rainfall forecast for monsoon season (June – September), 2024**

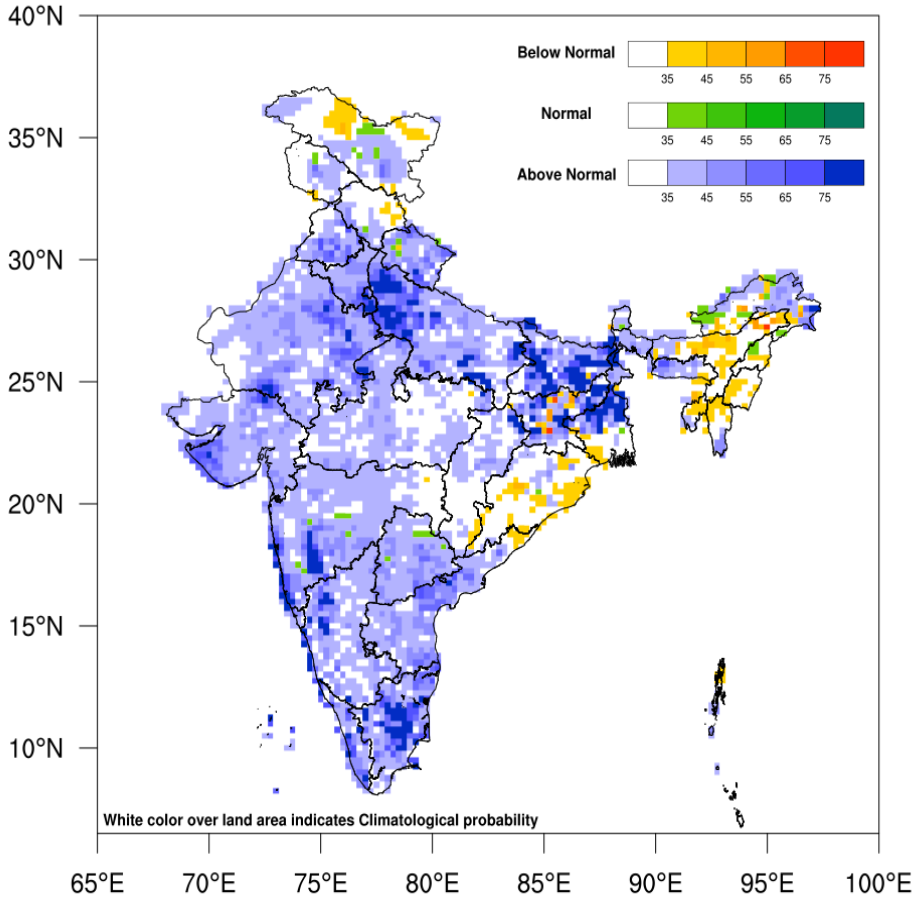


**Fig.1.**Probability forecast of tercile categories* (below normal, normal, and above normal) for the seasonal rainfall over India during monsoon season (June - September), 2024. The figure illustrates the most likely categories as well as their probabilities. The model has no clear signal over the white shaded areas of the country. (Tercile categories have equal climatological probabilities, of 33.33% each).

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## প্রেস বিজ্ঞপ্তি

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**India Meteorological Department (IMD ) বা ভারত আবহাওয়া বিজ্ঞান বিভাগের অন্তর্গত আবহাওয়া বিজ্ঞান কেন্দ্র ,আগরতলার উদ্যোগে আজ বিশ্ব আবহাওয়া দিবস-২০২৪ দিনটি বিদ্যালয়ের ছাত্রছাত্রীদের অংশ গ্রহণের মাধ্যমে পালন করা হয়। এই উপলক্ষে দিনটির তাৎপর্য ব্যাখ্যা করেন আবহাওয়া কেন্দ্রের আধিকারিক ডা. পার্থ রায় (Scientist-C ) । অন্য আধিকারিকরা দপ্তরের বিবর্তন , পর্যবেক্ষণ ও পুর্বাভাস এবং ব্যবহৃত প্রযুক্তি সম্পর্কে বিস্তারিত আলোচনা করেন । সর্বশেষে ছাত্রছাত্রীদের মধ্যে একটি কুইজ প্রতিযোগিতার আয়োজন করা হয়। প্রতিযোগিতায় মহাত্মা গান্ধী মেমরিয়াল উচ্চতর মাধ্যমিক বিদ্যালয় প্রথম এবং সুখময় উচ্চতর মাধ্যমিক বিদ্যালয় দ্বিতীয় স্থান লাভ করে।**

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