



කාලගුණ විද්‍යා දෙපාර්තමේන්තුව
வளிமண்டலவியல் திணைக்களம்
DEPARTMENT OF METEOROLOGY
ශ්‍රී ලංකාව இலங்கை SRI LANKA

Consensus Seasonal Weather Outlook
December, January and February (DJF2024/25)
Seasonal Rainfall and Temperature for Sri Lanka

These forecasts are prepared using

- The prevailing global climate conditions.
- Forecasts from different climate models from around the world.
- Statistical downscaling of GCM output using CPT

Issued by Centre for Climate Change Studies (CCCS)

and

Research Division

1. Prevailing global climate conditions

During the last four weeks, equatorial SSTs were above average across the western Pacific Ocean, around the Maritime Continent, across the Indian Ocean, and in most of the Atlantic Ocean. Near-to-below average SSTs were evident in most of the east-central and eastern Pacific Ocean. (source-CPC-NOAA)

El Nino and La Nina update

According to the Climate Prediction Center-NOAA, USA, ENSO-neutral conditions are present. Equatorial sea surface temperatures (SSTs) are near-to-below-average in the central and eastern Pacific Ocean. La Niña is favored to emerge during October-December (57% chance) and persist through January-March 2025. The majority of dynamical models indicate an imminent transition to La Niña, lasting through January -March 2024, while the average of statistical models predicts ENSO neutral through winter 2024-25. However, the Bureau of Meteorology, Australia's model suggests SSTs are likely to remain within the ENSO-neutral range (-0.8°C to $+0.8^{\circ}\text{C}$) throughout the forecast period.

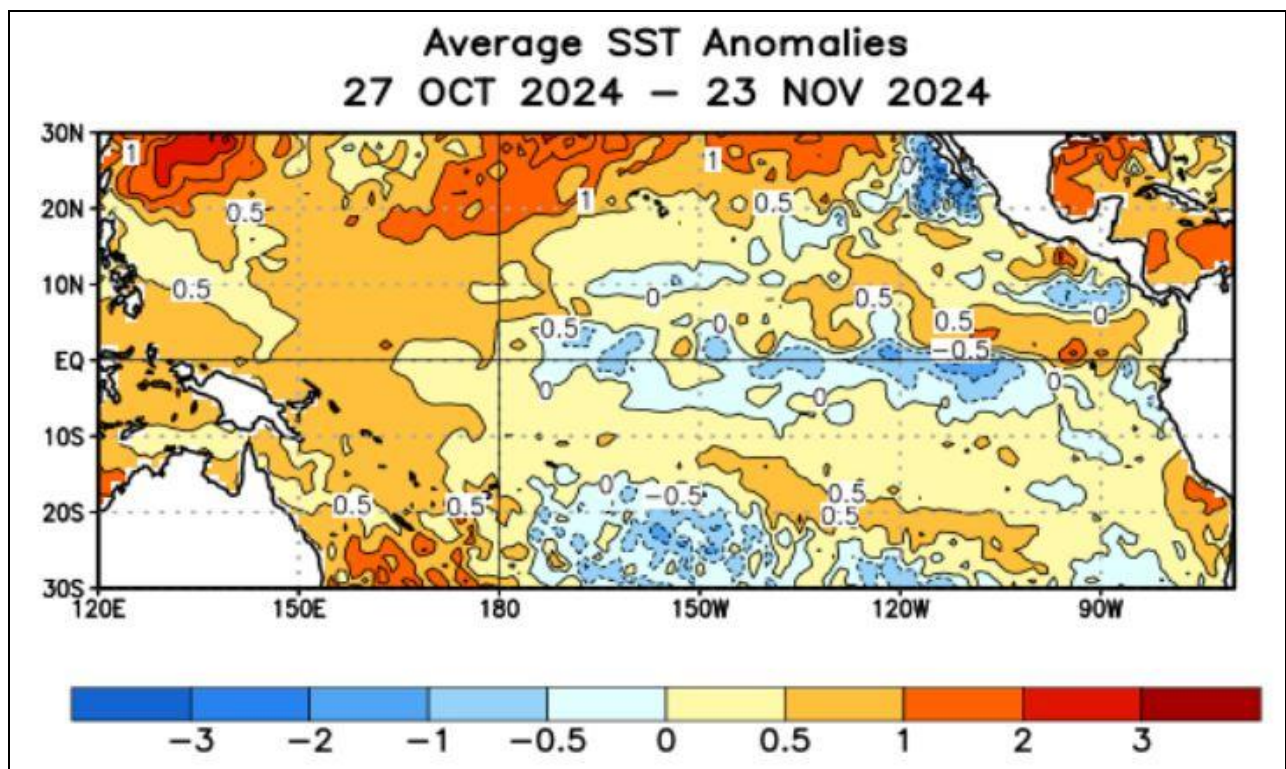


Fig 1: Observed Average Sea surface temperature (SST) anomalies ($^{\circ}\text{C}$)

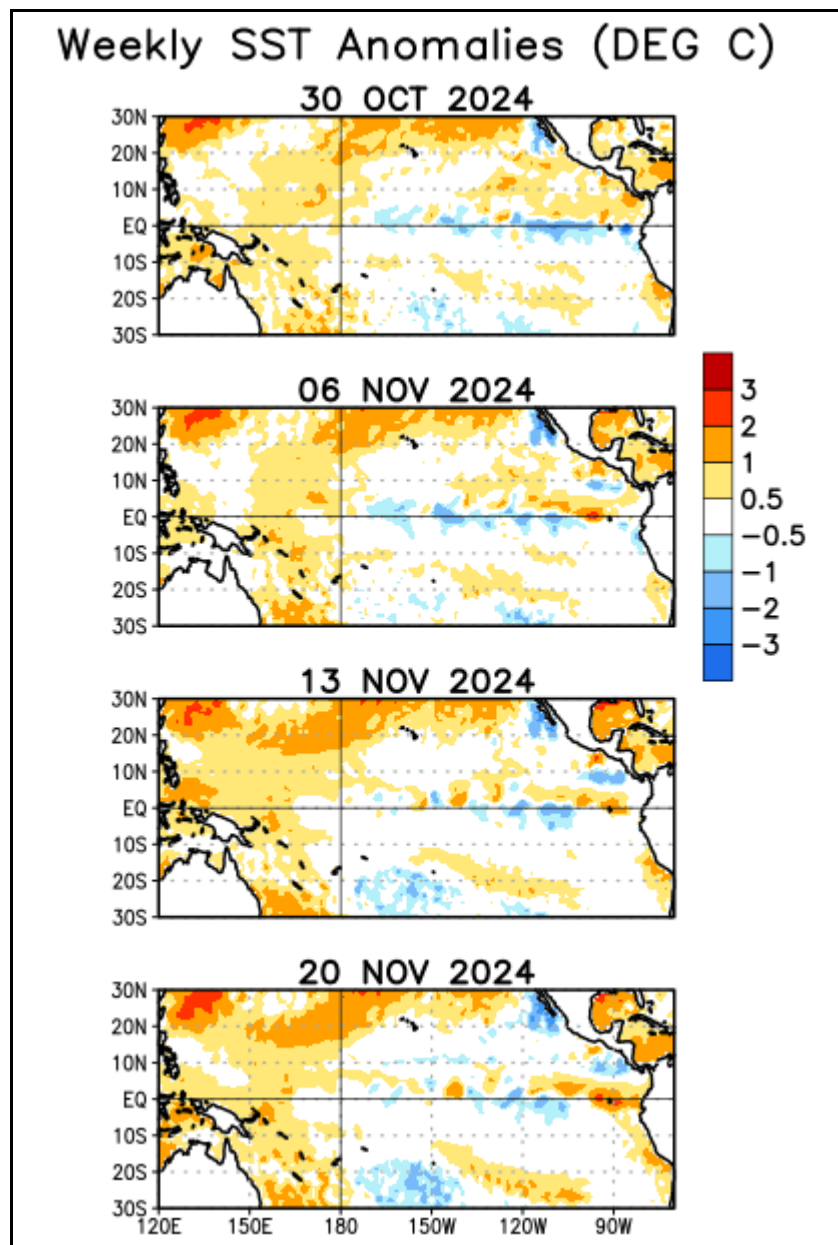


Fig 2: Weekly Observed Average Sea surface temperature (SST) anomalies (°C)

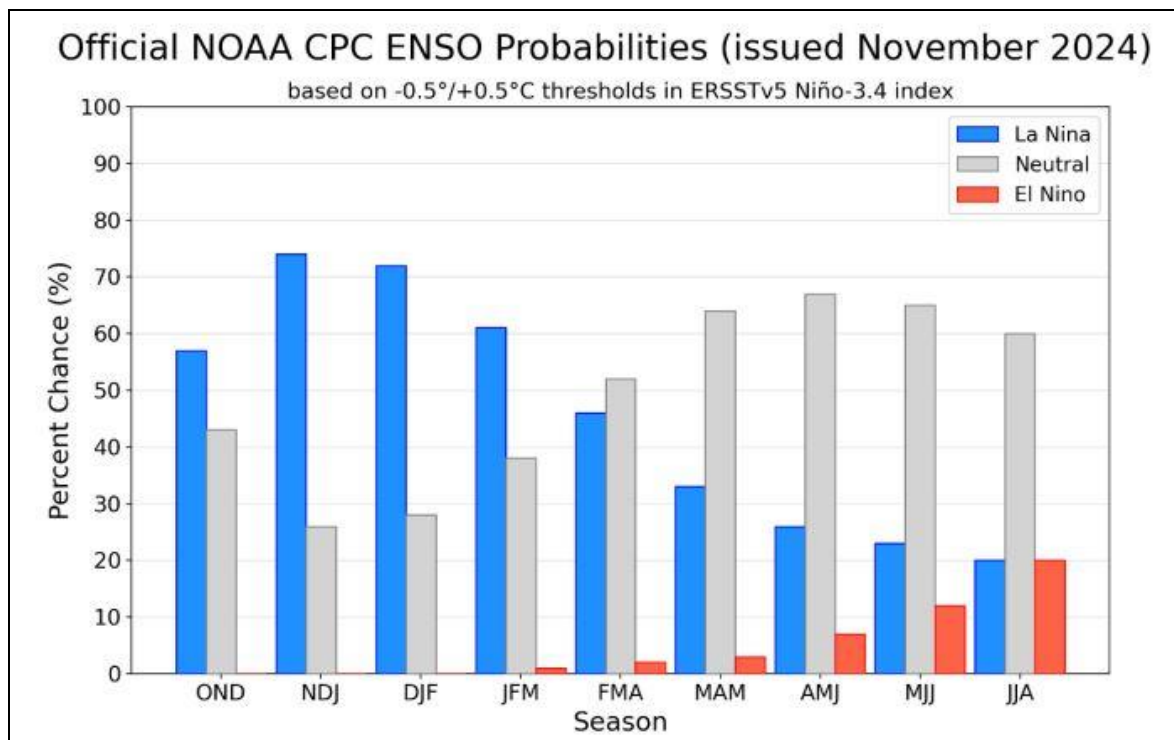


Fig 3a: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast

1.1.1 Impacts of La nina on monthly rainfall anomaly during December, January and February

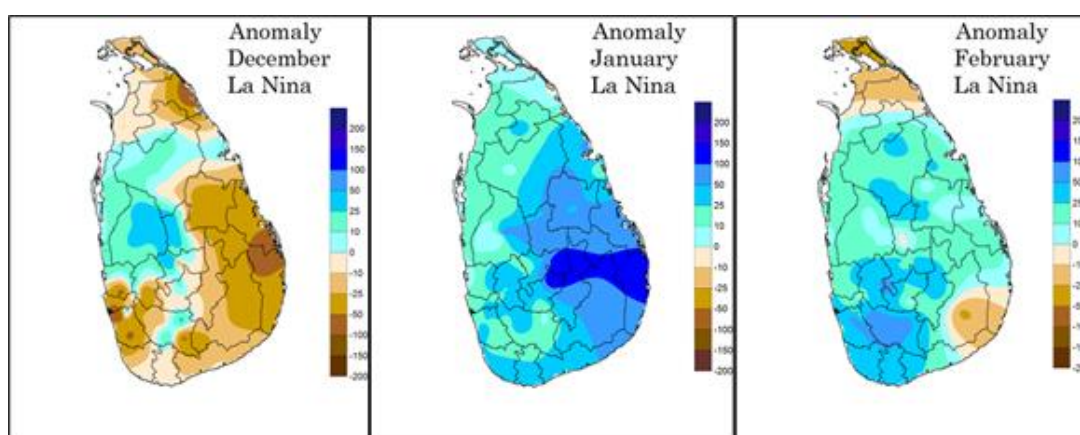


Fig 3b: Monthly Rainfall Anomaly maps of the months of December(A), January (B) and February (C) during La Nina years (Hapuarachchi et al 2016)

Research conducted by the Department of Meteorology, it has been found that, below normal rainfalls are possible over Western, Southern, Northern and Uva provinces and some areas in Sabaragamuwa and Eastern provinces and Polonnaruwa and Nuwara Eliya districts and above or near normal rainfalls are possible over remaining areas of the country during the month of December. During the month of January, above normal rainfalls are likely over most parts of the country and also during the month of February above normal rainfalls are likely over most parts of the country except some areas in Northern province and Monaragala, Hambantota and Ampara

districts, where below normal rainfalls are prevailed, while the La Nina conditions were prevailed. (Fig 3b).

1.2 The Indian Ocean Dipole (IOD) update

The Indian Ocean Dipole (IOD) index for the week ending 24 November was $-0.54\text{ }^{\circ}\text{C}$, having been below the negative IOD threshold ($-0.4\text{ }^{\circ}\text{C}$) since mid-October. (To be classified as a negative IOD event, the IOD index needs to be at values below the negative IOD threshold ($-0.4\text{ }^{\circ}\text{C}$) for at least 8 weeks). Sea surface temperatures (SSTs) for the week ending 24 November were $0.8\text{--}2\text{ }^{\circ}\text{C}$ warmer than the 1991–2020 average across much of the central and eastern Indian Ocean and $0.4\text{--}1.2\text{ }^{\circ}\text{C}$ warmer than average in the western equatorial Indian Ocean, meaning the western Indian Ocean is cooler than the eastern Indian Ocean. This ocean pattern is typical of a negative IOD phase (source- BOM,Australia).

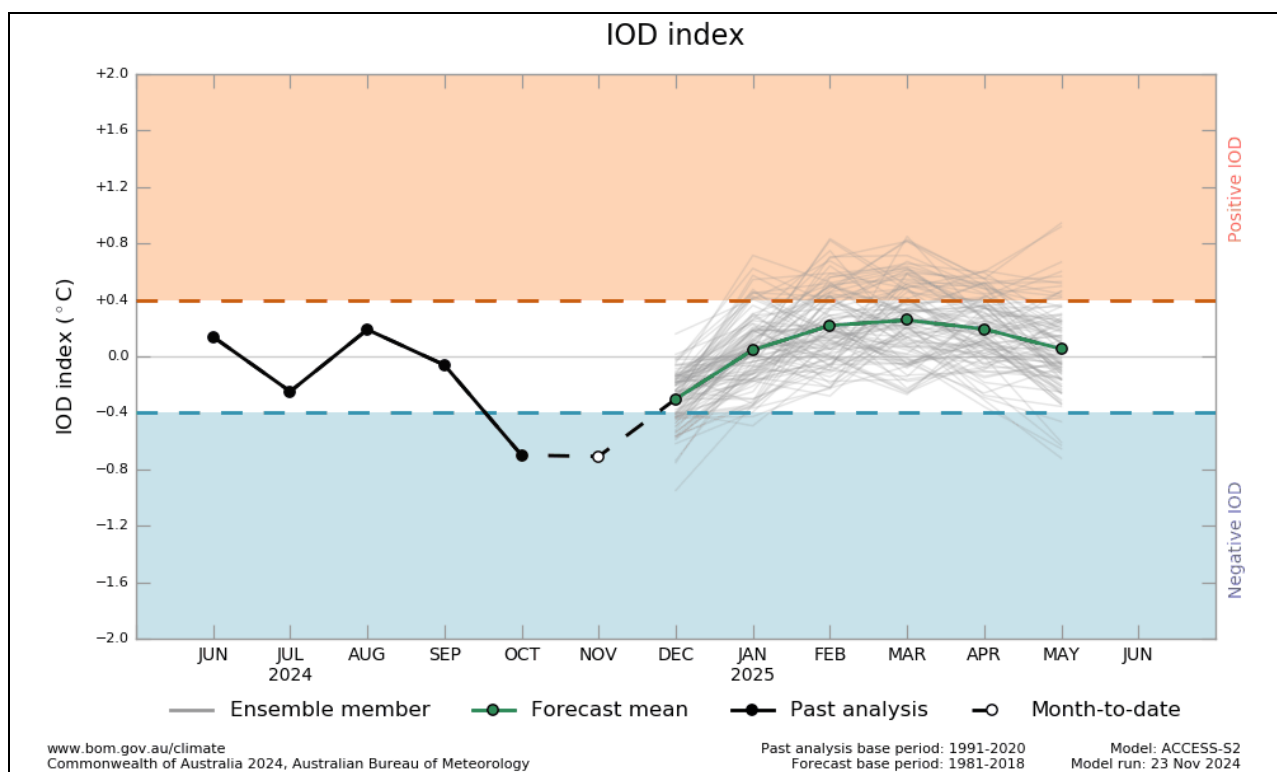


Figure 4a: IOD forecast from Australian Bureau of Meteorology

2. Forecasts from different climate models from around the world

2.1 December to February (DJF) 2024 season

Figure 5 shows the probabilistic multi model ensemble forecast which prepared by using dynamical models from 14 Global Producing Centers (GPC) for DJF season. According to that above normal rainfalls are possible over Northern, Northcentral, Northwestern provinces and

Trincomalee district. There is no clear signal indicated over remaining parts of the country during the DJF 2024/25 season.

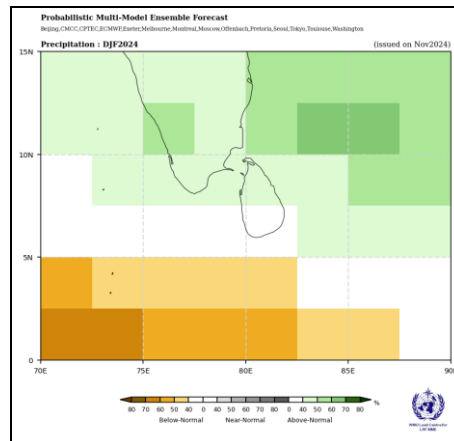


Fig 5: Probabilistic multi model ensemble forecast for DJF using dynamical models from 14 WMO global producing centers (GPC).

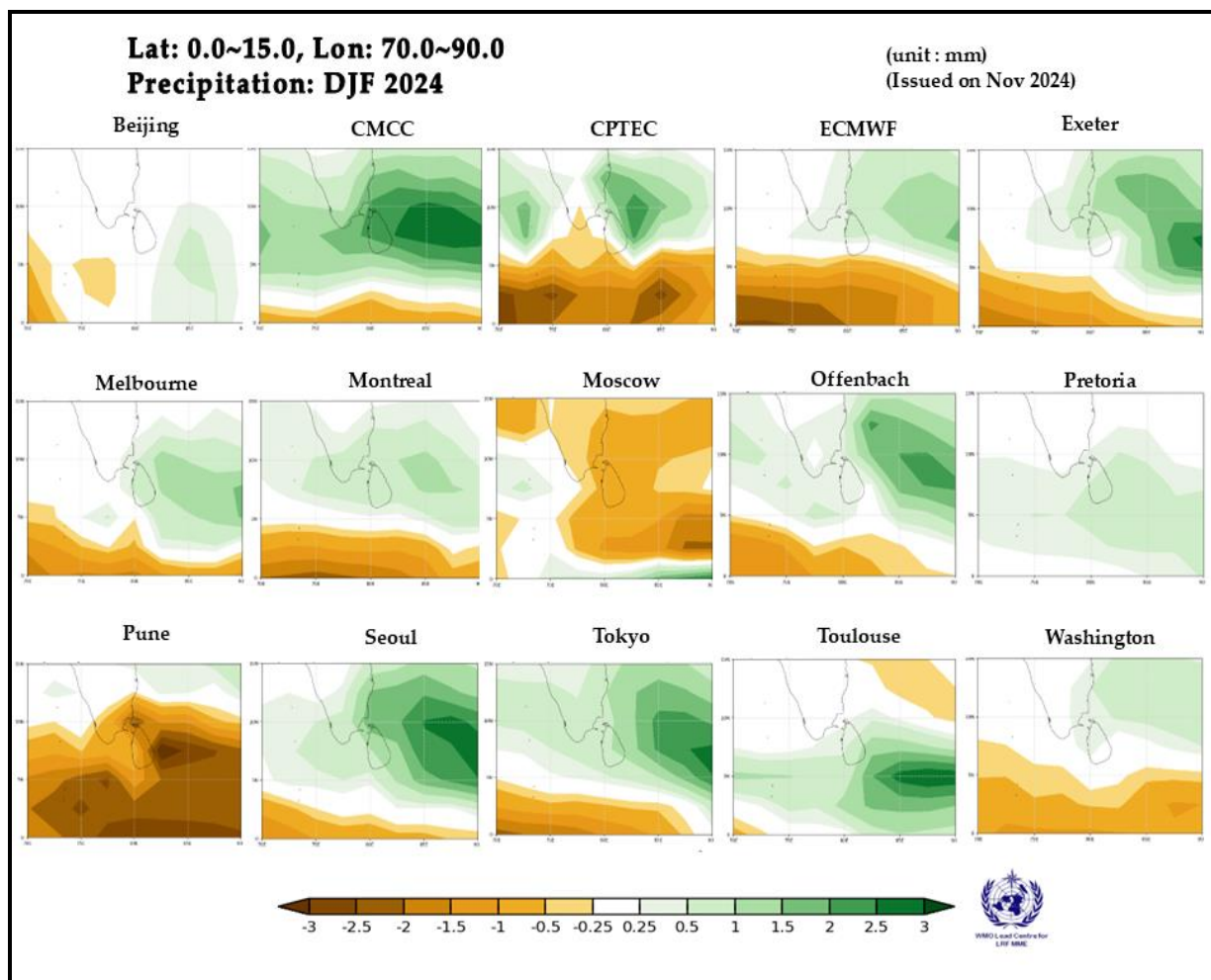


Fig 6: Individual forecasts for DJF 2024/25 season by dynamical models from 15 WMO global producing centers (GPC).

Figure 6 depicts individual forecasts provided by same GPC centers for the DJF season. Out of 15 GPC individual models, 8 GPC models predicted above normal rainfall and 2 GPC model

predicted below normal rainfall. There is no clear signal indicated in 5 GPC models. Accordingly, above normal rainfalls can be expected over the country during DJF 2024/25 season.

2.2 Monthly Forecast for December 2024, January and February 2025

Figure 7 shows the probabilistic multi model ensemble forecasts, which are prepared by using dynamical models from 14 global producing centers (GPC), for the months of December 2024, January and February 2025. According to that during the months of December and January above normal rainfalls are likely over Northern, Northcentral and Northwestern provinces and Trincomalee District. There is no clear signal indicated for remaining area of the country. During the month of February above normal rainfalls are likely all over the country. Equal chances exist of receiving below, about or above normal rainfall over no signal areas of the country during the period.

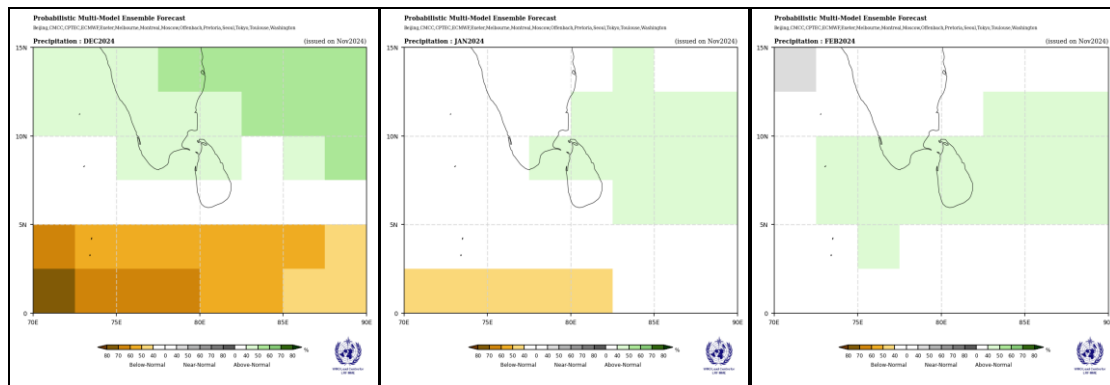


Fig 7: Probabilistic multi model ensemble forecast for December (left) 2024, January (middle) and February (right) 2025 using dynamical models from 15 WMO global producing centers (GPC).

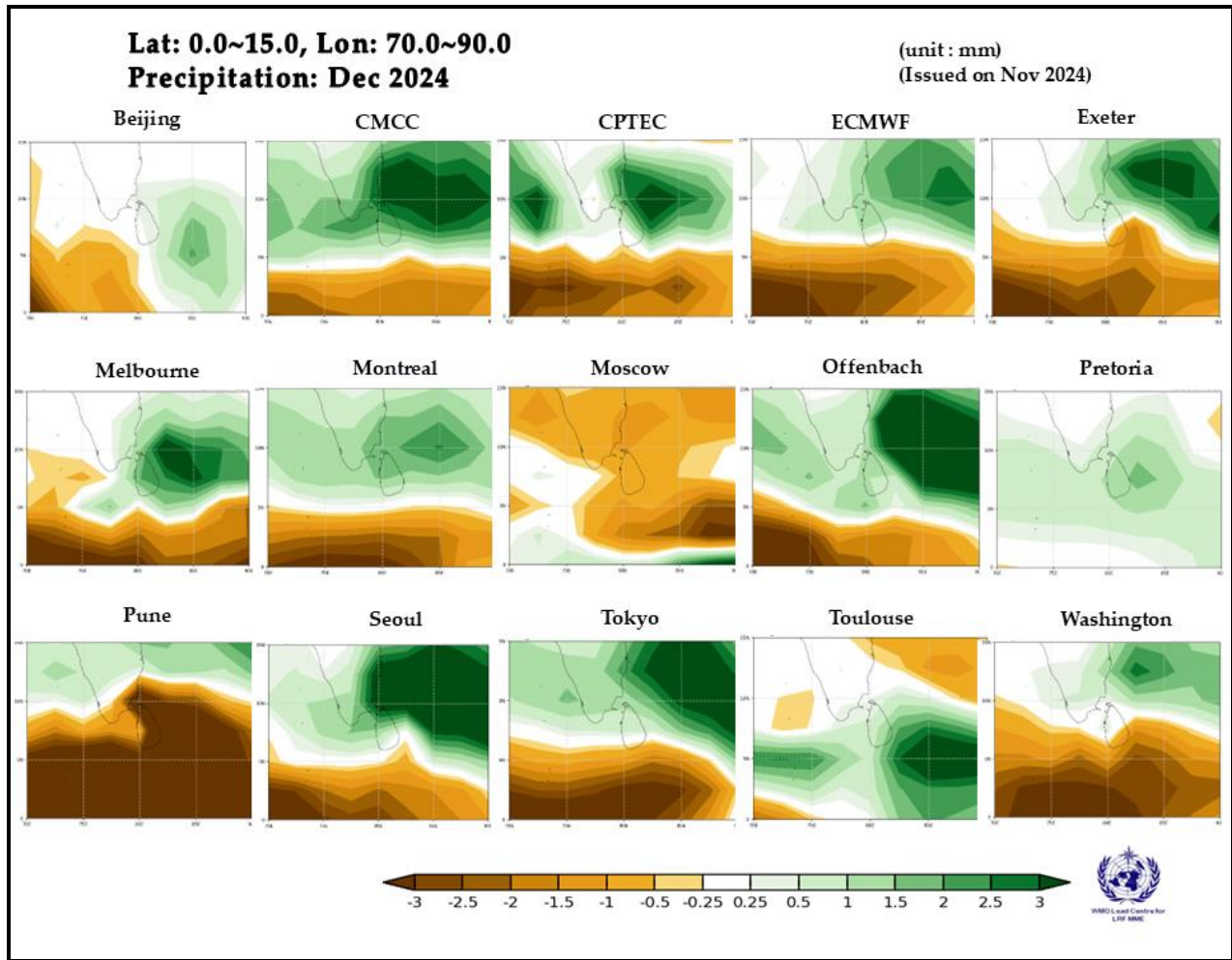


Fig 8: Individual forecast for December 2024 by dynamical models from 15 WMO global producing centers (GPC).

Figure 8 shows the 15 monthly forecasts from individual global producing centers (GPC) for December 2024. Out of 15 GPC forecasts, 6 GPC models predicted above normal rainfalls and 2 GPC model predicted below normal rainfalls over the country. There is no clear signal indicated in 7 GPC models. Accordingly, there is a possibility of below, about or above normal rainfall over the country during the month of December 2024.

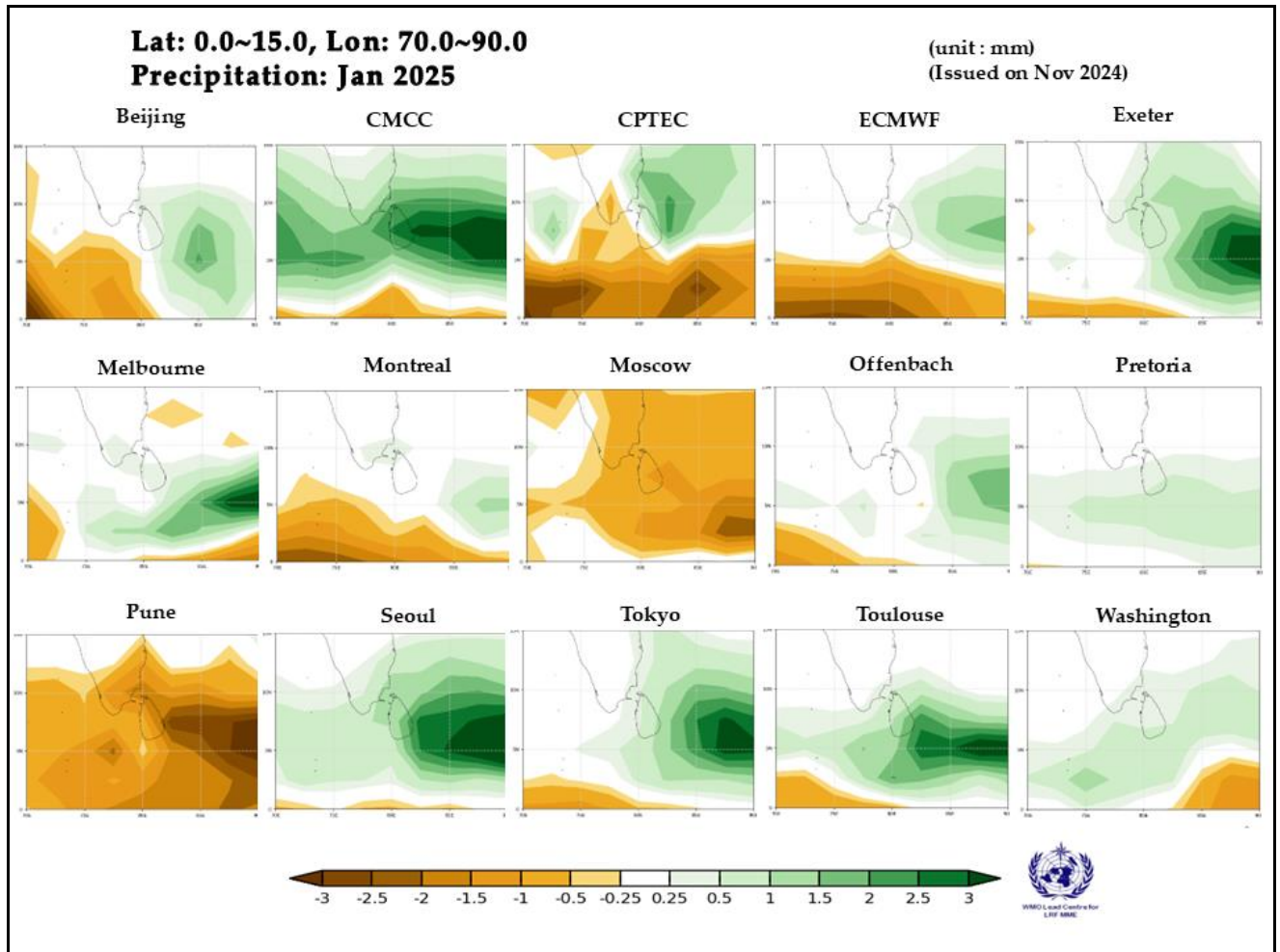


Fig 9: Individual forecast for January 2025 by dynamical models from 15 WMO global producing centers (GPC).

Figure 9 shows the monthly forecasts from individual global producing centers (GPC) for January 2025. Out of 15 GPC forecasts, 6 GPC models predicted above normal rainfall and 2 GPC model predicted below normal rainfall over the country. There is no clear signal indicated in 7 GPC models. Accordingly, below, about or above normal rainfall can be expected over the country during the month of January 2025.

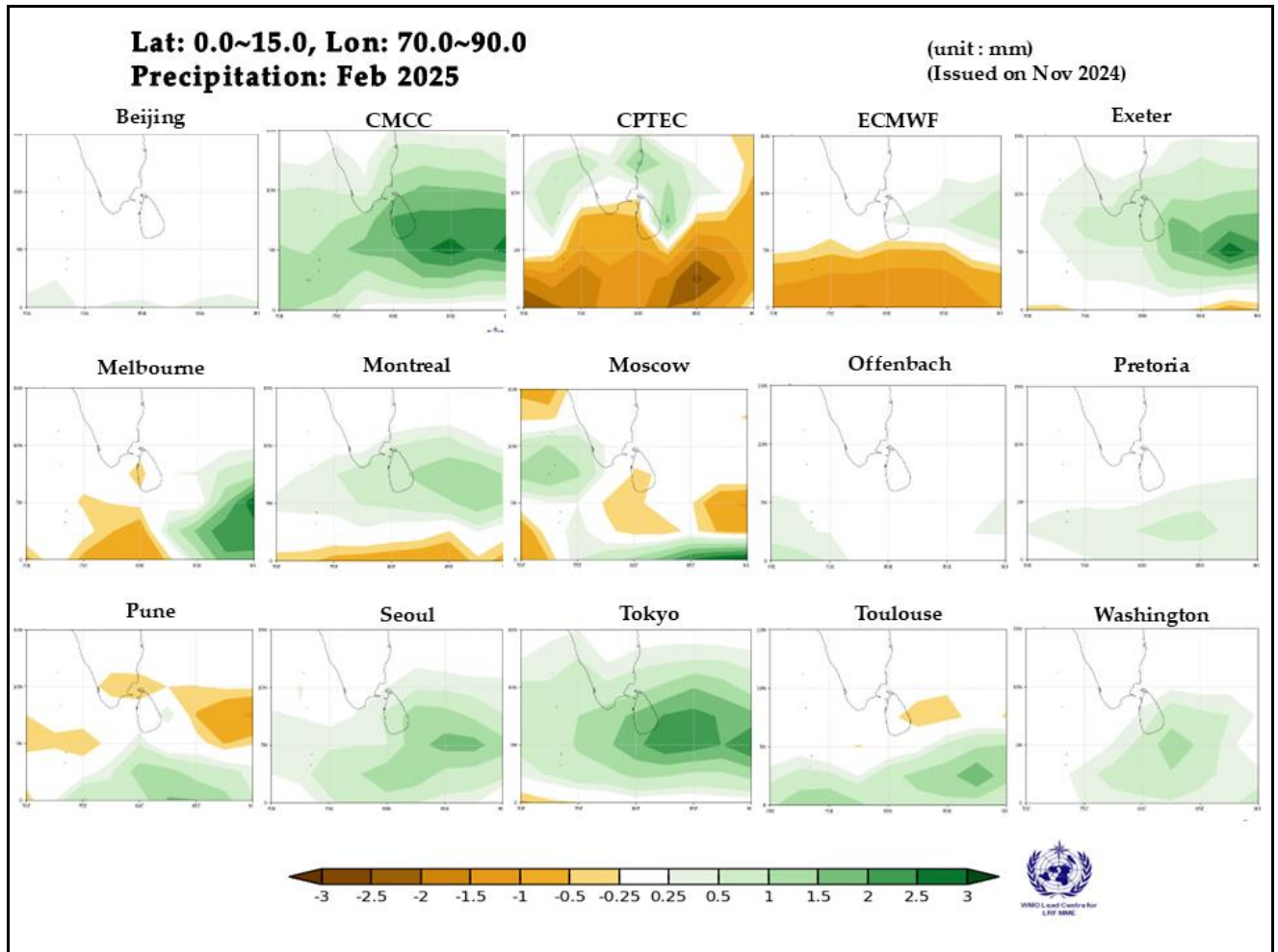


Fig 10: Individual forecast for February 2025 by dynamical models from 15 WMO global producing centers (GPC).

Figure 10 shows the monthly forecasts from 15 individual global producing centers (GPC) for February 2025. Out of 15 GPC forecasts, 5 GPC models indicate above normal rainfall over the country. There is no clear signal indicated in 10 GPC models. Accordingly, it can be expected below, about or above normal rainfall over the country during the month of February 2025.

3. Statistical downscaling of CFSv2 global forecast output

3.1 Probabilistic rainfall forecast for DJF season 2024/25 using Climate Predictability tool (CPT)

The following district wise probabilistic rainfall forecasts for the season of DJF 2024/25 have been prepared with the multi model ensemble method to downscale, SST data of CFSv2, CCSM4, GFDL and ECMWF by using CPT.

The district wise 30-year average rainfalls during DJF season are given in the column 2 of the table 1. Chance (probability) of receiving below/about/above average is given in the columns 3, 4, and 5 respectively in the table 1.

District	Average rainfall (mm) –DJF (1981-2010)	Probability%		
		Below	Normal	Above
Colombo	361.3	30	30	40
Kalutara	490.9	50	30	20
Galle	465.4	40	30	30
Matara	416.5	10	20	70
Hambantota	280.5	10	15	75
Ampara	665.7	20	25	55
Batticaloa	695.5	20	25	55
Trincomalee	516.4	20	25	55
Mullaithivu	403.9	20	25	55
Jaffna	341.5	20	30	50
Killinochchi	373.8	20	30	50
Mannar	301.4	25	30	45
Puttalam	201.4	20	25	55
Gampaha	256.4	25	30	45
Kegalle	337.6	20	25	55
Ratnapura	470.0	15	10	75
Monaragala	455.0	10	20	70
Badulla	683.5	30	30	40
Pollonnaruwa	597.6	20	30	50
Vavuniya	366.8	20	30	50
Anuradapura	360.0	25	30	45
Kurunegala	239.2	20	30	50
Matale	689.7	50	30	20
Kandy	537.5	40	30	30
Nuwaraeliya	466.6	25	30	45

Table 1: Probabilistic Rainfall Forecast for DJF season 2024/25 using CPT

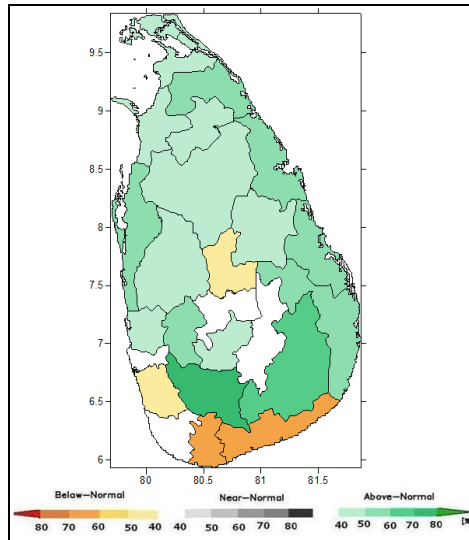


Fig 11: Probabilistic rainfall forecast for December 2024 –February 2025 using CPT

According to the CPT (Fig 11 and table 01), above normal rainfalls can be expected in Northern, Northwestern, Northcentral, Sabaragamuwa, Eastern provinces and Monaragala, Nuwara Eliya and Gampaha districts. Below normal rainfalls are expected in Kalutara, Matara, Hambantota and Mathale districts. There is no clear signal indicated over remaining areas of the country. Accordingly, equal chances exist of receiving below, about or above normal rainfall over no signal areas of the country for DJF Season 2024/25.

3.2 Multi-model ensemble mean forecast of NMME models

This probabilistic forecast is developed by combining direct Forecasts from 5 NMME models (CFS, Can SIPS, GFDL, COLA and NASA) with the forecasts obtained by statistically processing of each model.

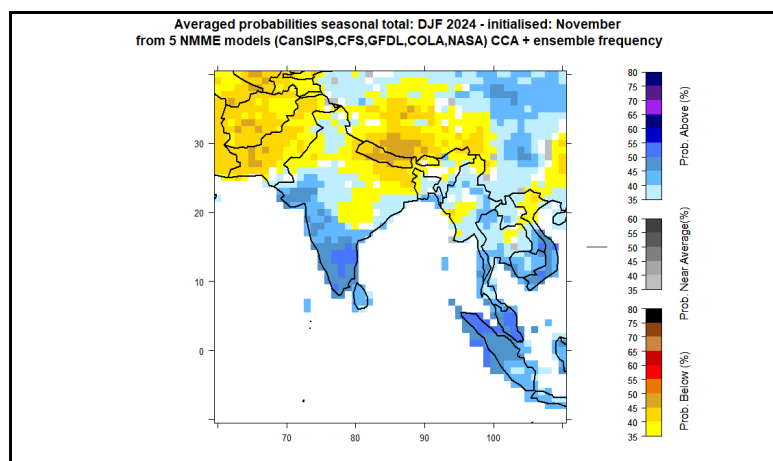


Fig 12. Average probability forecast of NMME models for DJF 2024/25

According to the model above normal rainfall can be expected over most parts of the country during DJF 2024/25 season.

3.3 Probabilistic rainfall forecast for DJF 2024/25 season using RIMES FOCUS System

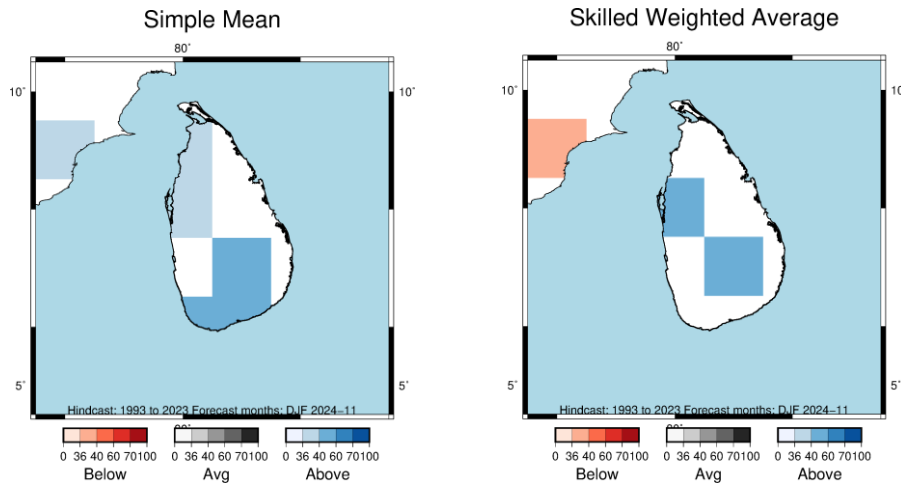


Fig 13. Probabilistic rainfall forecast for December 2024-February 2025 using RIMES FOCUS System

Figure 13 depicts the Probabilistic rainfall forecast for DJF 2024/25 season, which has been prepared by using RIMES FOCUS System. According to the model it can be expected near or above normal rainfall over the country during DJF season 2024/25.

4. SUMMARY:

SUMMARY of MODEL FORECAST for DJF 2024 season for SRI LANKA						
SEASON	WMO LC MME	WMO GPC	CPT	FOCUS	Impact of Global conditions	Final Rainfall Forecast
DJF season 2024/25	AN-Northern, Northcentral, Northwestern provinces and Trincomalee district. No Signal - Elsewhere	AN	AN - Northern, Northwestern, Northcentral, Sabaragamuwa, Eastern provinces and Monaragala, Nuwara Eliya and Gampaha districts. BN - Kalutara, Matara, Hambantota and Mathale districts	AN or NN		Near or slightly above normal over Northern, North-central and Northwestern provinces and in Trincomalee district and no signal for remaining areas
December 2024	AN-Northern, Northcentral, Northwestern provinces and Trincomalee district. No Signal - Elsewhere	No Signal				Near or slightly above normal over Northern, North-central and Northwestern provinces and in Trincomalee district and no signal for remaining areas
January 2024	AN-Northern, Northcentral, Northwestern provinces and Trincomalee district. No Signal - Elsewhere	No Signal				Near or slightly above normal over Northern, Eastern, North-central, Uva and Northwestern provinces and no signal for remaining areas
February 2025	AN	No Signal				Near normal over most parts

Table 2: Summary of Model Forecasts for DJF season 2024/25

BN: Below Normal

NN: Near Normal

AN: Above Normal

CP: Climatological Probability

4.1 Summery of prevailing global climate conditions

ENSO-neutral conditions are present. Equatorial sea surface temperatures (SSTs) are near-to-below-average in the central and eastern Pacific Ocean. La Niña is favored to emerge in October-December (57% chance) and is expected to persist through January-March 2025.

The Indian Ocean Dipole (IOD) index for the week ending 24 November was $-0.54\text{ }^{\circ}\text{C}$, having been below the negative IOD threshold ($-0.4\text{ }^{\circ}\text{C}$) since mid-October.

5. Consensus Seasonal outlook for December 2024, January and February 2025

Considering the prevailing global climate conditions, forecasts from different global climate models and statistical downscaling of GCM output using CPT, consensus forecasts for December to February 2024/25 season is concluded as follows.

5.1 Rainfall forecast for the three months period during December-January-February (DJF) 2024/25

There is a possibility for having near or slightly above normal rainfall over Northern, North-central and Northwestern provinces and in Trincomalee district and no signal for remaining areas of the country during DJF 2024/25 as a whole. In addition to that development of the synoptic scale systems such as wavy type disturbances, lows, depressions and cyclones are also possible during the months of December and January. If so, rainfall can increase.

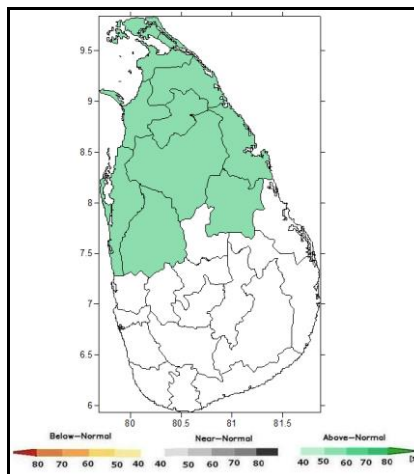


Fig 14. Consensus Probabilistic rainfall forecast for December 2024–February 2025

5.2 Rainfall forecast for December 2024

There is a higher chance of having near or slightly above normal rainfalls over Northern, North-central and Northwestern provinces and in Trincomalee district and no signal for remaining areas during the month of December 2024. There is a possibility for developing atmospheric disturbances, such as wavy type disturbances, depressions and cyclones during the month. If so, rainfall will increase.

5.3 Rainfall forecasts for January 2025

There is a possibility for near or slightly above normal rainfall over Northern, North-central, Northwestern, Eastern and Uva provinces and no signal for remaining areas during the month of January 2025.

Development of the synoptic scale systems such as lows, depressions and cyclones are also possible during the month. If so forecast can be deviated.

5.4 Rainfall forecasts for February 2025

According to the available global model forecasts, there is a possibility for near normal rainfall over most parts during the month of February 2025.

****Remarks-:** The predictability is also limited due to strong day-to-day atmospheric variability caused by the passage of the synoptic scale systems such as lows and depressions. Intraseasonal Oscillations such as Madden Julian Oscillations (MJO) is also another atmospheric phenomenon which can't be underestimated.

5.5 Probabilistic Temperature Forecast from December to 2024/2025 (DJF)

The probabilistic Temperature forecast for December, January and February season (DJF) 2024/2025 for Sri Lanka as given below.

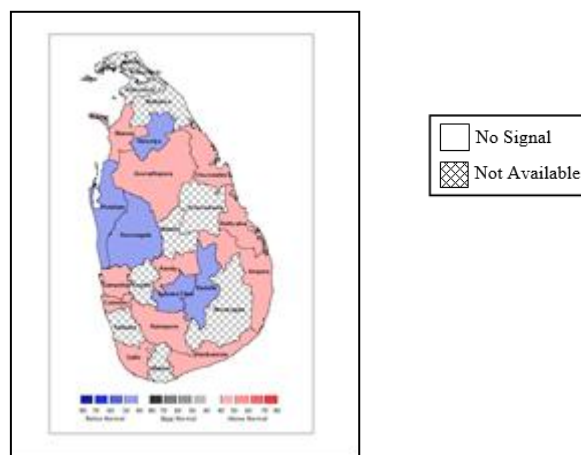


Fig 15: Probabilistic forecast for Maximum Temperatures for DJF season 2024/25

Fig 15 and Table 3 show the probabilistic forecast for Maximum Temperatures during DJF season 2024/2025.

There is a higher chance of experiencing slightly above the normal Maximum Temperatures in Mannar, Anuradhapura, Gampaha, Colombo, Galle, Rathnapura, Hambantota, Kandy, Ampara, Batticaloa and Trincomalee districts and below the normal Maximum Temperatures in Vavuniya, Puttalam, Kurunegala, Badulla and Nuwara Eliya districts (Fig 15) for the DJF season 2024/2025.

The district wise average Maximum Temperatures are given in the column 2 of the table 3 and the chance (probability) of receiving below/about/above averages are given in the columns 3, 4, and 5 respectively.

District	Average Maximum Temperature (°C) – (DJF)	Probability %		
		Below	Normal	Above
Anuradhapura	31.0	30	30	40
Badulla	26.4	45	30	25
Batticaloa	28.6	25	35	40
Colombo	31.2	30	30	40
Galle	30.0	25	35	40
Hambantota	30.5	30	25	45
Katugastota	28.9	25	30	45
Katunayake	32.1	30	30	40
Mannar	29.8	25	35	40
MahaIlluppallama	30.1	40	30	30
NuwaraEliya	20.2	40	30	30
Pottuvil	30.0	30	30	40
Puttalam	31.2	40	30	30
Ratnapura	32.5	25	30	45
Ratmalana	31.7	30	30	40
Trincomalee	29.1	25	20	55
Vavuniya	30.4	40	30	30
Kurunegala	31.7	45	30	25
Bandarawela	23.3	45	30	25

Table 3: probabilistic forecast for Maximum Temperature for DJF season 2024/2025

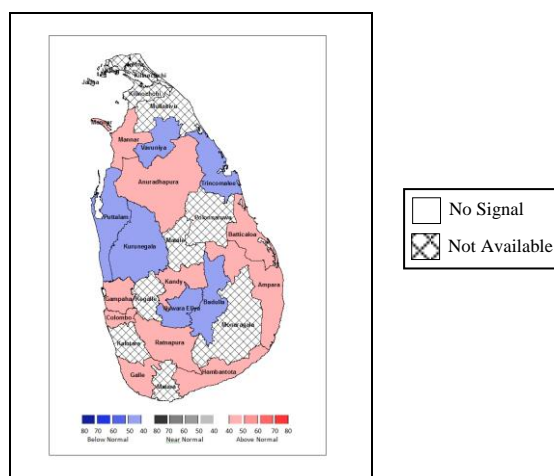


Fig 16: Probabilistic forecast for Minimum Temperatures for NDJ season 2024/2025

Fig 16 and Table 4 provide the probabilistic forecast for Minimum Temperatures during DJF season 2024/2025.

Accordingly, there is a higher chance of experiencing slightly above the normal Minimum Temperatures in Mannar, Anuradhapura, Gampaha, Colombo, Galle, Hambantota, Rathnapura, Ampara, Kandy and Batticaloa districts and below the normal Minimum Temperatures in Vavuniya, Puttalam, Kurunegala, Badulla, Trincomalee and Nuwara Eliya districts (Fig 16) during DJF season 2024/2025.

District	Average Minimum Temperature (°C) – (DJF)	Probability %		
		Below	Normal	Above
Anuradhapura	21.9	25	25	45
Badulla	18.0	45	35	25
Batticaloa	23.6	30	30	40
Colombo	23.1	30	30	40
Galle	23.4	25	35	40
Hambantota	23.3	25	25	50
Katugastota	19.0	30	30	40
Katunayake	22.4	30	30	40
Mannar	23.9	30	30	40
MahaIlluppallama	21.1	25	25	50
NuwaraEliya	10.5	40	30	30
Pottuvil	22.3	30	30	40
Puttalam	22.1	40	35	25
Ratnapura	22.2	30	30	40
Ratmalana	23.0	30	30	40
Trincomalee	24.1	40	30	30
Vavuniya	21.0	45	30	25
Kurunegala	21.3	40	30	30
Bandarawela	15.2	30	35	35

Table 4: Probabilistic forecast for Minimum Temperatures for DJF season 2024/2025

Note- Temperature forecasts are not available in **Matara, Kegalle, Kalutara, Monaragala, Polonnaruwa, Jaffna, Killinochchi, Mullativu and Mathale** districts due to unavailability of Climate data.