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

Consensus Seasonal Weather Outlook

June, July and August(JJA2024)

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 and central Pacific Ocean, the Indian Ocean, and the Atlantic Ocean. Near-to-below-average SSTs were evident in the east-central and eastern Pacific Ocean. (CPC-NOAA)

El Nino and La Nina update

El Niño is transitioning toward ENSO-neutral. Equatorial sea surface temperatures (SSTs) are above average in the western and central Pacific Ocean, and below-average SSTs are emerging in the east-central and eastern Pacific Ocean. A transition from El Niño to ENSO-neutral is likely in in the next month. La Niña may develop in June-August 2024 (49% chance) or July-September (69% chance).(CPC-NOAA)

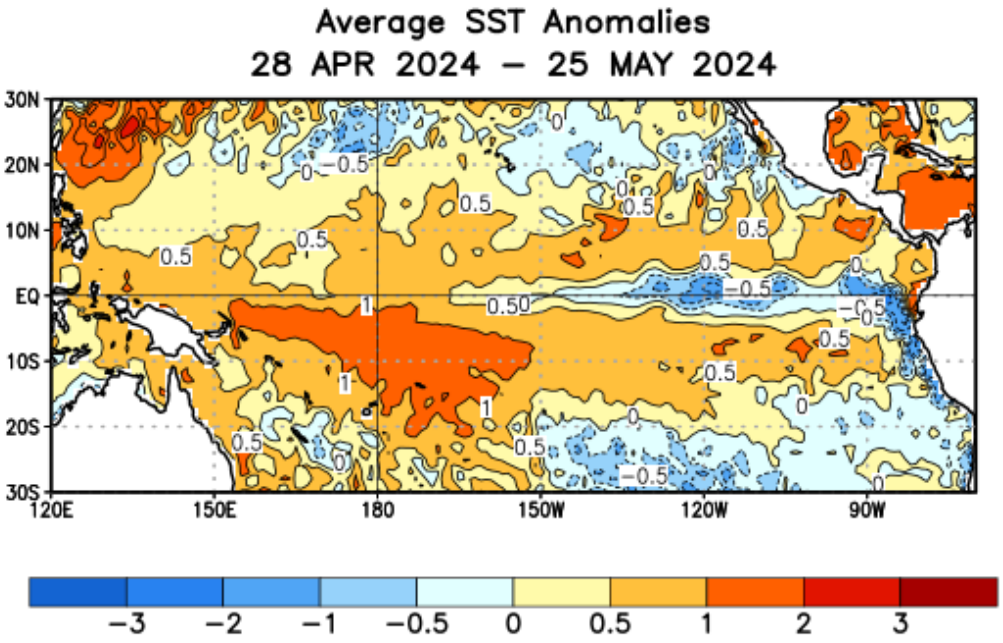

Fig 1: Observed Average sea surface temperature (SST) anomalies (°C)

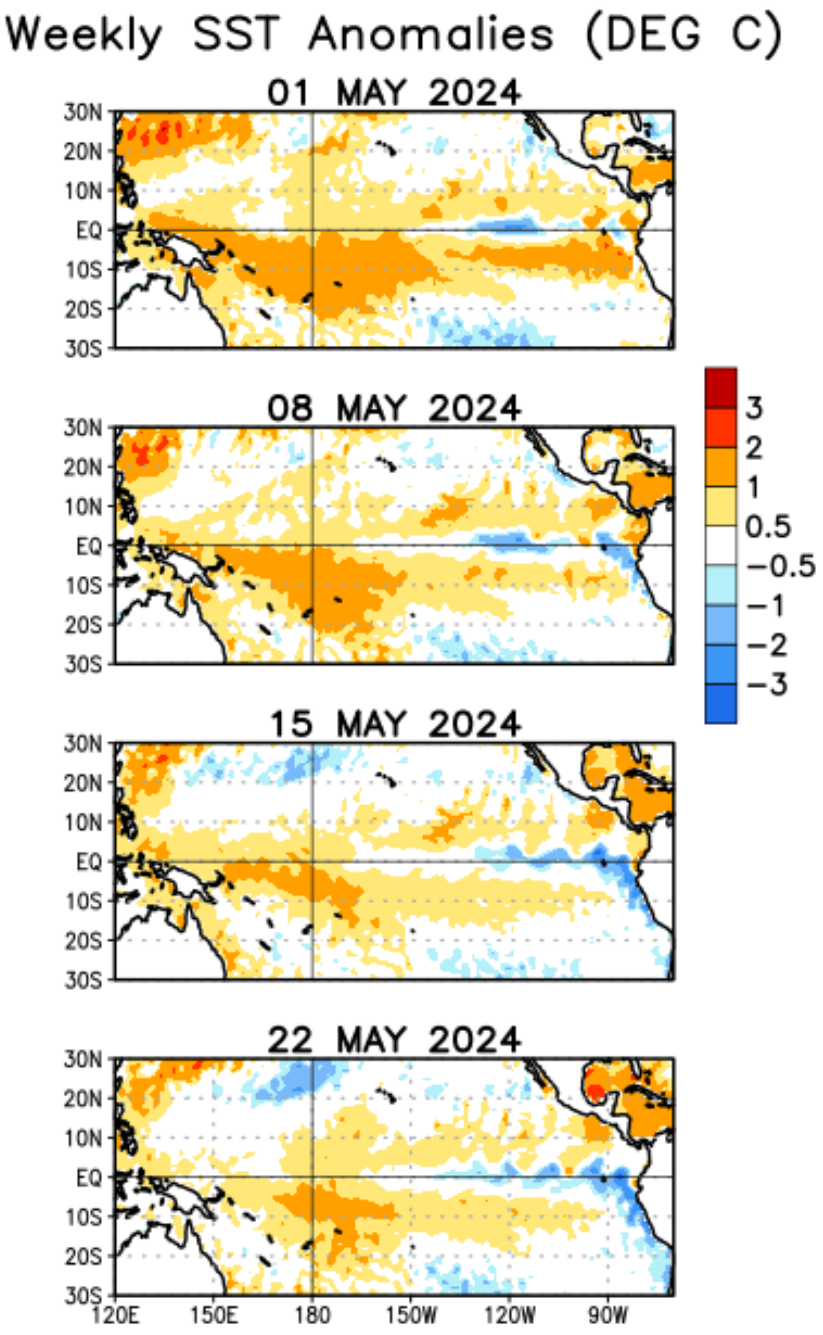

Fig 2: Weekly Observed Average sea surface temperature (SST) anomalies (°C)

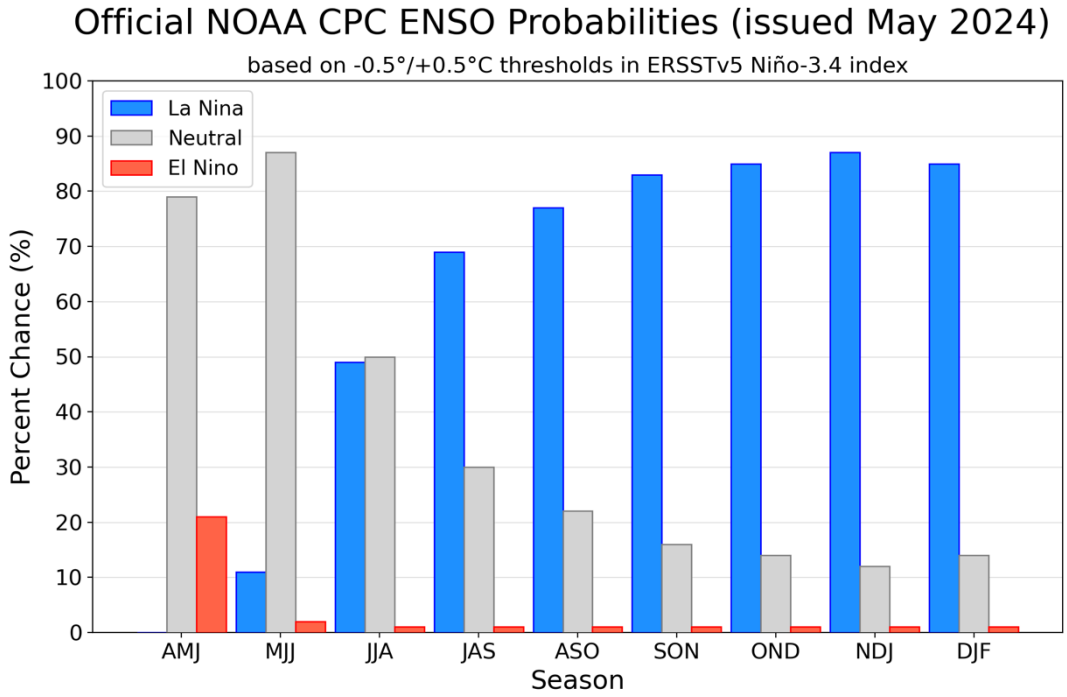

Fig 3a: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast

1.1.1 Impacts of La nina on monthly rainfall anomaly during June, July and August

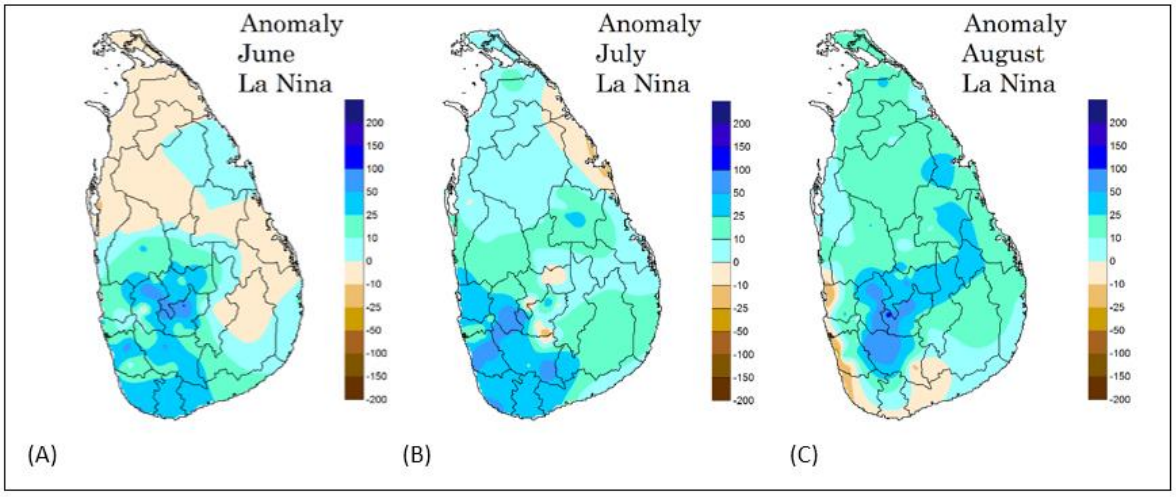

Fig 3b: Monthly Rainfall Anomaly maps of the months of June(A), July (B) and August (C) during La nina years (Hapuarachchi et al 2016)

A research conducted by the Department of Meteorology, it has been found that, above normal rainfalls over the south western part and near or slightly above normal rainfalls over remaining areas of the country during the months of June and July while the La nina conditions were prevailed. It has been observed above normal rainfalls over most parts of the country during the month of August (Fig 3b).

1.2 The Indian Ocean Dipole (IOD) update

The Indian Ocean Dipole (IOD) is currently neutral. The most recent 4 weeks have seen the IOD index within neutral thresholds, with the latest weekly value (+0.38 °C) just below the positive IOD threshold of (+0.40 °C).(source- BOM,Australia).

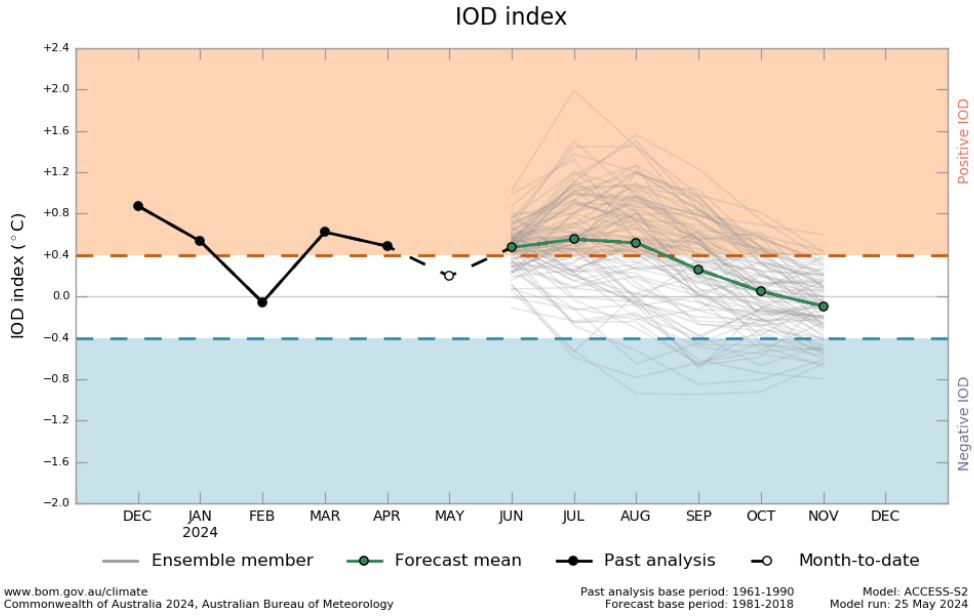

Figure 4a: IOD forecast from Australian Bureau of Meteorology

1.2.1 Impacts of positive IOD on monthly rainfall anomaly during June, July and August

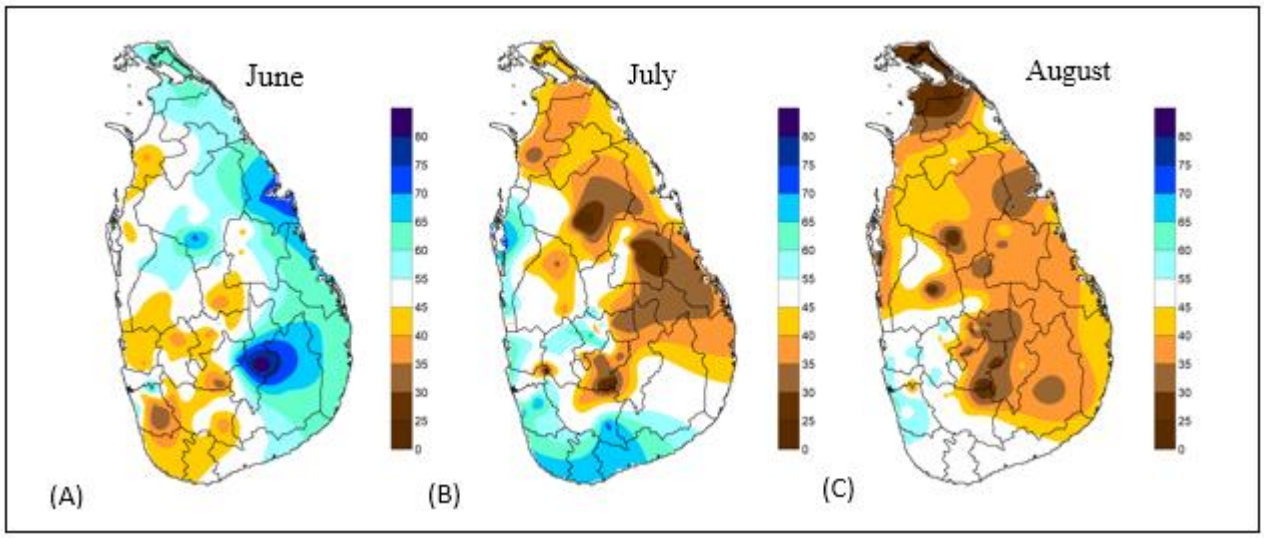

Fig 4b: Median Based Composite maps of Monthly Rainfall during June (A), July (B) and August (c) during positive IOD years (Hapuarachchi et al 2018)

Previous studies conducted by the Department of Meteorology identified that there is a higher probability of getting below normal rainfall all over some parts in Western, Southern, Sabaragamuwa and Central provinces and Mannar district and near or slightly above normal

rainfalls are likely over remaining areas during the month of June(Fig 4b(A)). During the month of July it is showing a higher probability of getting above normal rainfalls in some areas in Western and Southern provinces and Kandy, Kegalle and Puttalam districts and below normal rainfalls are likely over most of the remaining areas of the country (Fig 4b (B)) under the positive IOD condition. During the month of August near normal rainfalls are likely over southwestern parts and below normal over remaining parts of the country under the positive IOD condition (Fig 4b (C)).

2. Forecasts from different climate models from around the world

2.1 June to August (JJA) 2024 season

Figure 5 shows the probabilistic multi model ensemble forecast which prepared by using dynamical models from 13 Global Producing Centers (GPC) for JJA season. According to that above normal rainfall can be expected for JJA 2024 season.

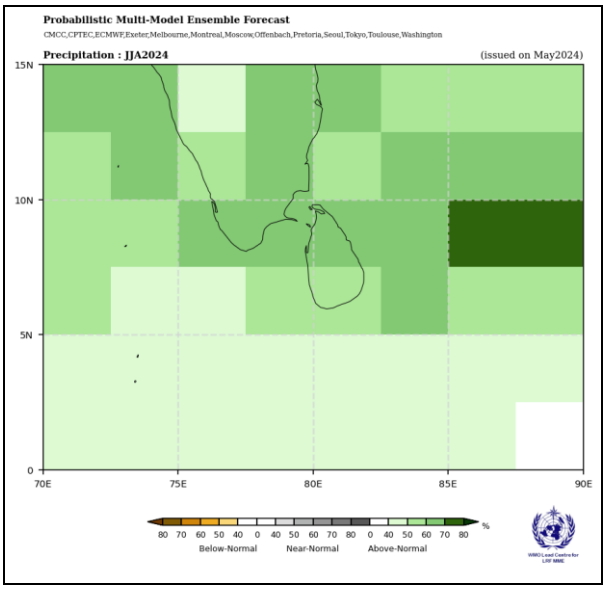

Fig 5: Probabilistic multi model ensemble forecast for JJA using dynamical models from 13 WMO global producing centers (GPC).

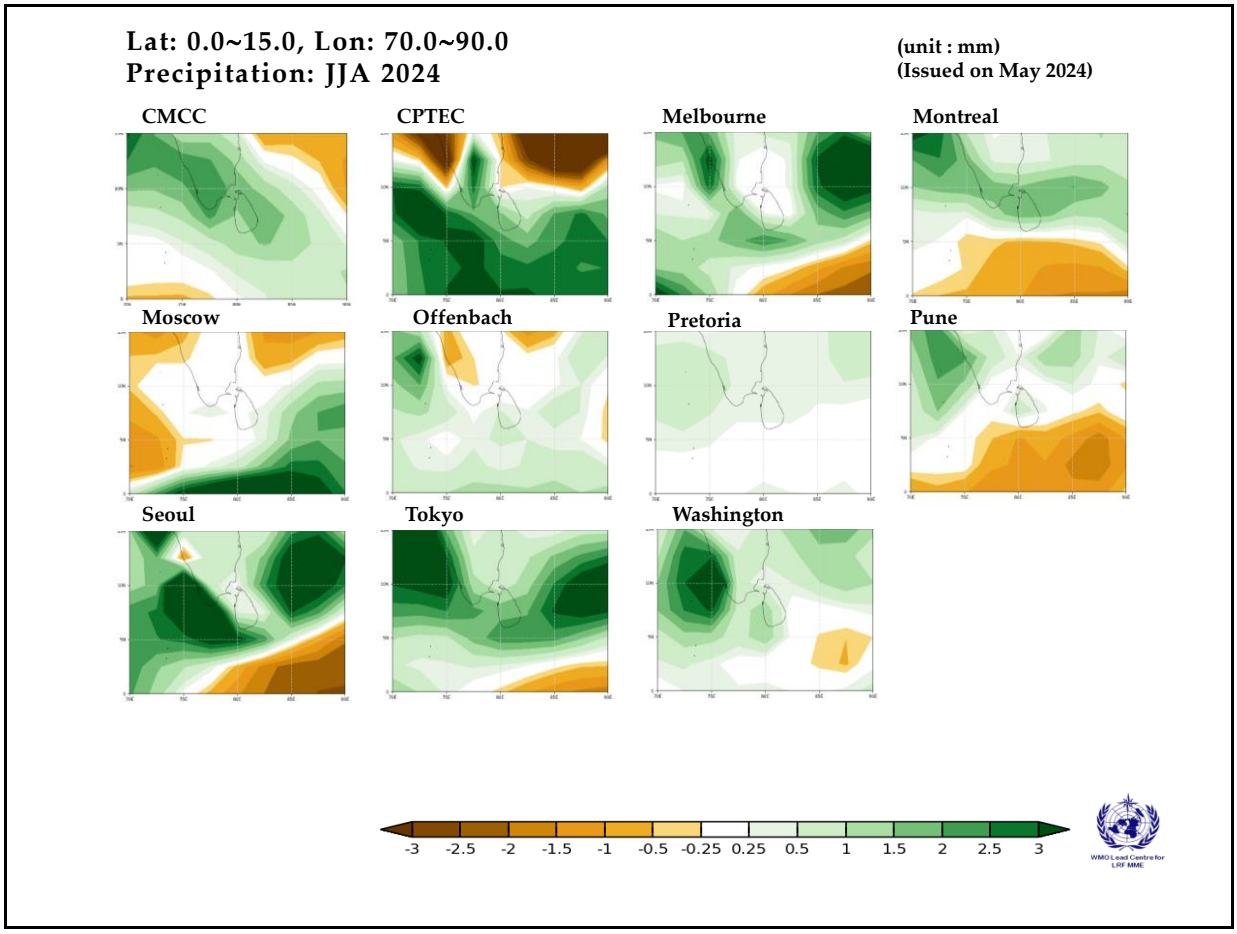

Fig 6: Individual forecasts for JJA 2024 season by dynamical models from 11 WMO global producing centers (GPC).

Figure 6 depicts individual forecasts provided by same GPC centers for the JJA season. Out of 11 GPC individual models, 7 GPC models predicted above normal rainfall over the country and there is no clear signal indicated in 4 GPC models. Accordingly above normal rainfalls can be expected over the country during JJA 2024 season.

2.2 Monthly Forecast for June, July and August 2024

Figure 7 shows the probabilistic multi model ensemble forecasts, which are prepared by using dynamical models from 13 global producing centers (GPC), for the months of June, July and August 2024. According to that during the months of June, July and August it can be expected above normal rainfall over most parts of the country.

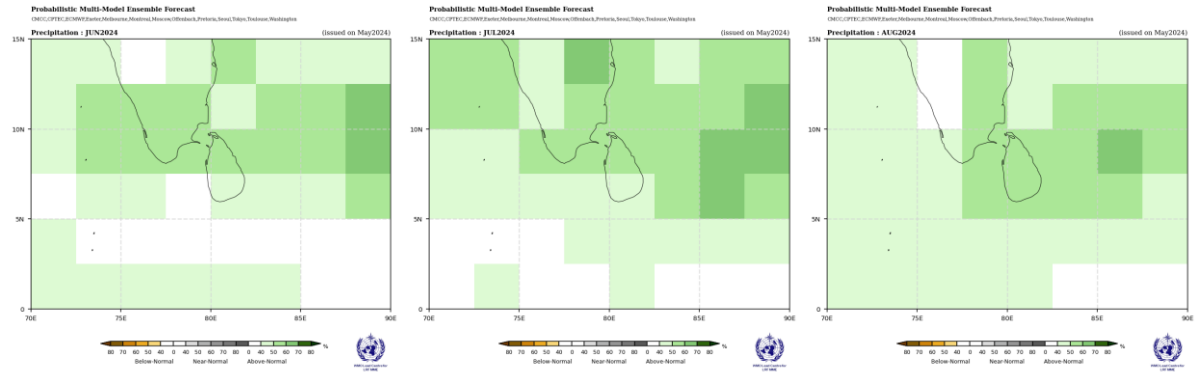

Fig 7: Probabilistic multi model ensemble forecast for June (left), July (middle) and August (right) 2024 using dynamical models from 13 WMO global producing centers (GPC).

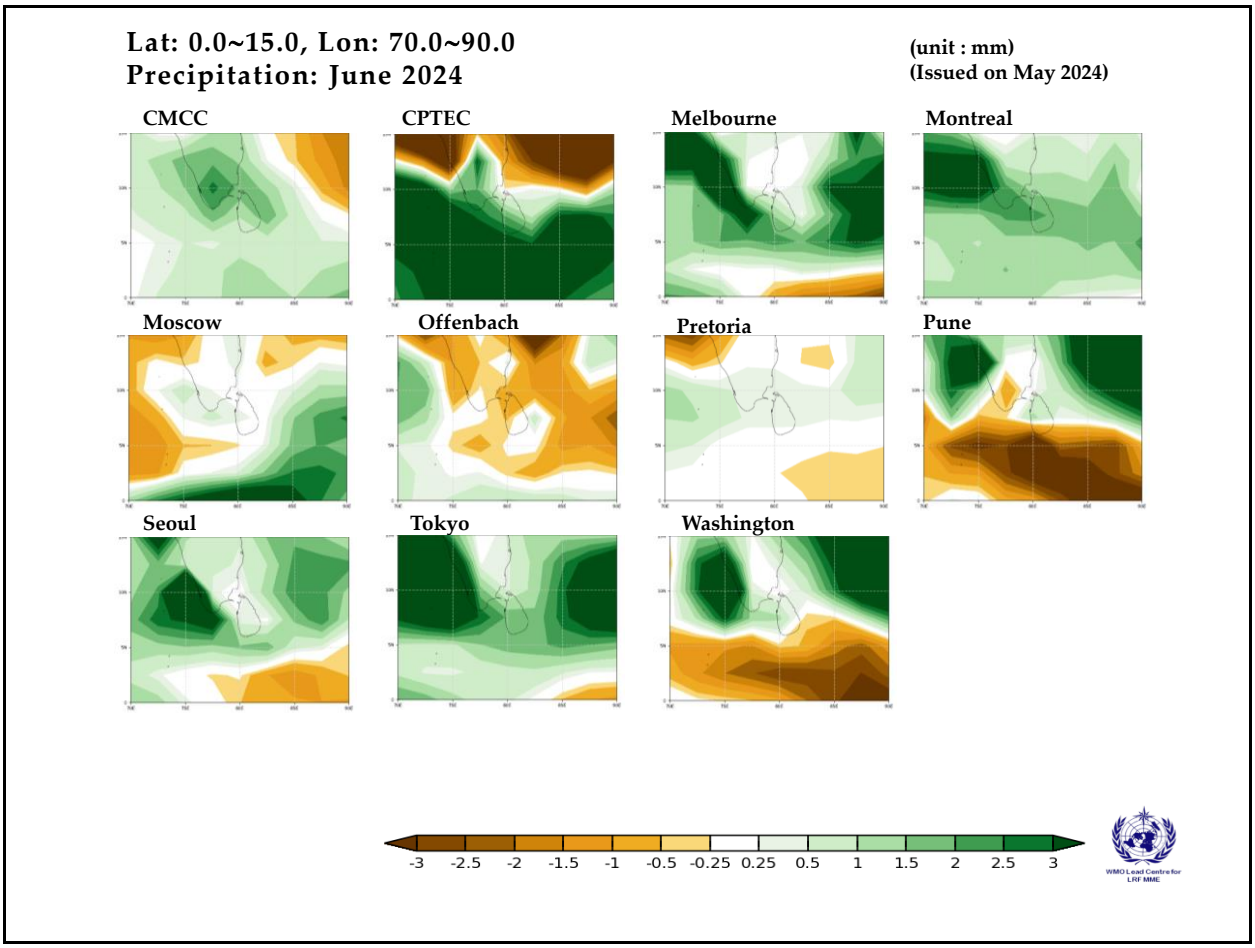

Fig 8: Individual forecast for June 2024 by dynamical models from 11 WMO global producing centers (GPC).

Figure 8 shows the 11 monthly forecasts from individual global producing centers (GPC) for June 2024. Out of 11 GPC forecasts, 7 GPC models predicted above normal rainfalls and there is no clear signal indicated in 4 GPC models. Accordingly above normal rainfalls are possible over the country during the month of June 2024.

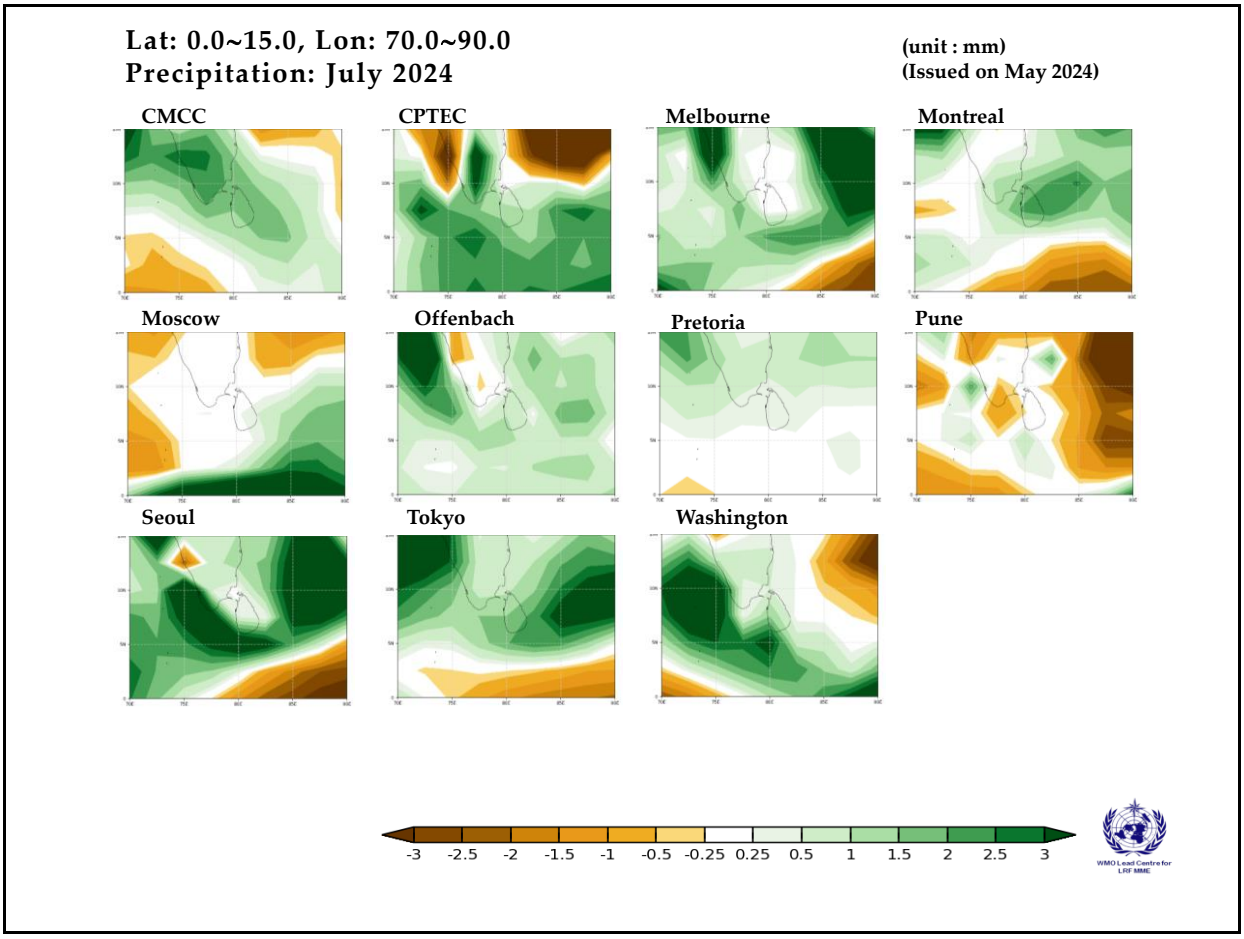

Fig 9: Individual forecast for July 2024 by dynamical models from 11 WMO global producing centers (GPC).

Figure 9 shows the monthly forecasts from individual global producing centers (GPC) for July 2024. Out of 11 GPC forecasts, 8 GPC models predicted above normal rainfall over the country. There is no clear signal indicated in 3 GPC models. Accordingly above normal rainfalls can be expected over the country during the month of July 2024.

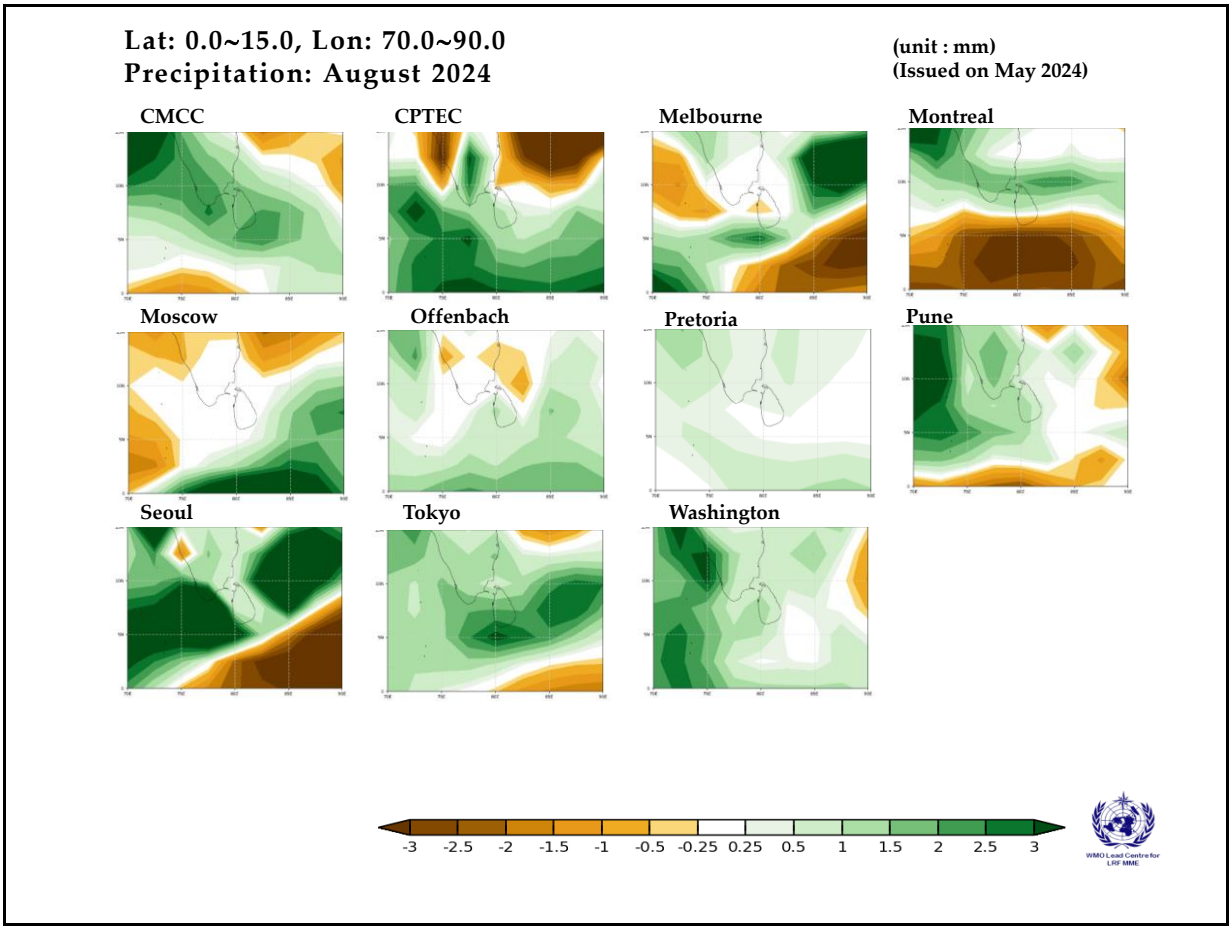

Fig 10: Individual forecast for August 2024 by dynamical models from 11 WMO global producing centers (GPC).

Figure 10 shows the monthly forecasts from 11 individual global producing centers (GPC) for August 2024. Out of 11 GPC forecasts, 7 GPC models indicate above normal rainfall and there is no clear signal indicated in 4 GPC models. Accordingly it can be expected above normal rainfall over most parts of the country during the month of August 2024.

3. Statistical downscaling of CFSv2 global forecast output

3.1 Probabilistic rainfall forecast for JJA season 2024 using Climate Predictability tool (CPT)

The following district wise probabilistic rainfall forecasts for the season of JJA 2024 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 JJA 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) –JJA (1981-2010)**	**Probability%**		
		Below	Normal	Above
Colombo	556.0	40	30	30
Kalutara	813.3	40	30	30
Galle	725.7	40	30	30
Matara	564.5	20	20	60
Hambantota	126.8	20	20	60
Ampara	105.8	20	20	60
Batticaloa	110.6	20	20	60
Trincomalee	142.6	20	20	60
Mullaithivu	93.4	20	20	60
Jaffna	81.3	20	20	60
Killinochchi	70.4	20	20	60
Mannar	42.8	20	20	60
Puttalam	99.2	25	30	45
Gampaha	442.1	40	30	30
Kegalle	852.8	30	30	40
Ratnapura	671.3	20	20	60
Monaragala	114.9	20	20	60
Badulla	160.9	20	20	60
Pollonnaruwa	97.9	20	20	60
Vavuniya	101.0	20	30	50
Anuradapura	89.6	20	20	60
Kurunegala	183.1	20	20	60
Matale	148.6	20	20	60
Kandy	420.7	20	20	60
Nuwaraeliya	748.4	20	20	60

Table 1: Probabilistic Rainfall Forecast for JJA season 2024 using CPT

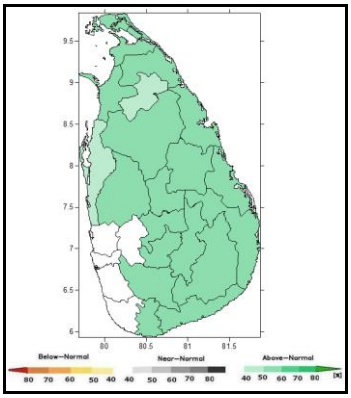

Fig 11: Probabilistic rainfall forecast for June –August 2024 using CPT

According to the CPT (Fig 11 and table 01), above normal rainfalls can be expected in most parts of the country except Gampaha, Kegalle, Colombo, Kalutara and Galle districts. There is no clear signal indicated for Gampaha, Kegalle, Colombo, Kalutara and Galle districts and accordingly equal chances exist of receiving below, about or above normal rainfall over no signal areas of the country for JJA Season 2024.

3.3 Probabilistic rainfall forecast for JJA 2024 season using RIMES FOCUS System

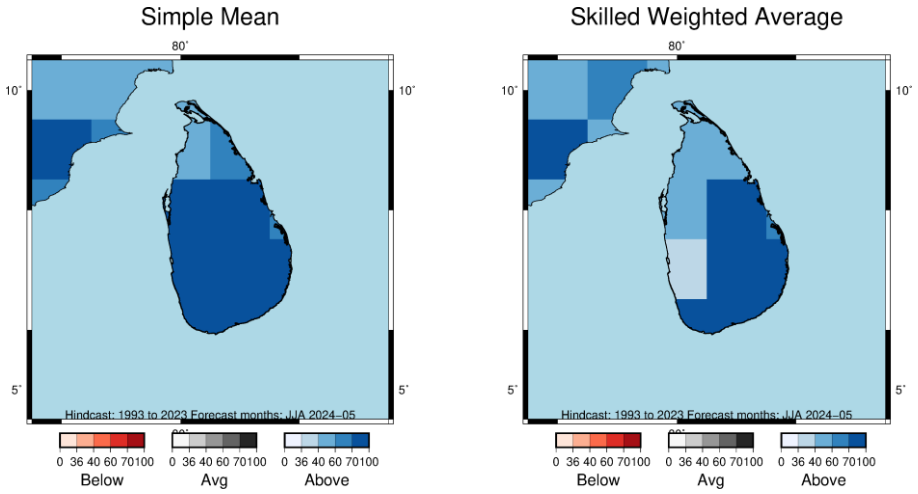

Fig 12. Probabilistic rainfall forecast for June-August 2024 using RIMES FOCUS System

Figure 12 depicts the Probabilistic rainfall forecast for JJA 2024 season, which has been prepared by using RIMES FOCUS System. According to the model outputs above normal rainfalls are likely over most parts of the country for JJA season 2024.

4. SUMMARY :

SUMMARY of MODEL FORECAST for JJA 2024 season for SRI LANKA						
Season	**WMO LC MME**	**WMO GPC**	**CPT**	**FOCUS**	**Impact of Global conditions**	**Final Rainfall Forecast**
JJA season 2024	**AN**	**AN**	**No Signal-** Gampaha, Kegalle, Colombo, Kalutara, Galle	**AN**		Above normal rainfalls are likely over most parts
June 2024	**AN**	**AN**				Near normalrainfalls are likely over most parts.
July 2024	**AN**	**AN**				Above normal rainfalls are likely over Western, Southern Sabaragamuwa, Uva and Central provinces and in Puttalam district near normal over remaining areas
August 2024	**AN**	**AN**				Above normal rainfalls are likely over most parts

Table 2: Summery of Model Forecasts for JJA season 2024

BN: Below Normal **NN**: Near Normal **AN**: Above Normal **CP**: Climatological Probability

4.1 Summery of prevailing global climate conditions

A transition from El Niño to ENSO-neutral is likely in in the next month. La Niña may develop in June-August 2024 (49% chance) or July-September (69%).(CPC-NOAA)

The Indian Ocean Dipole (IOD) is currently neutral. The most recent 4 weeks have seen the IOD index within neutral thresholds, with the latest weekly value (+0.38 °C) just below the positive IOD threshold of (+0.40 °C).(source- BOM,Australia).

5. Consensus Seasonal outlook for June, July and August 2024

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

5.1 Rainfall forecast for the three months period during June-July-August (JJA) 2024

Above normal rainfalls are likely over most parts during June- August 2024 season (Fig. 13).

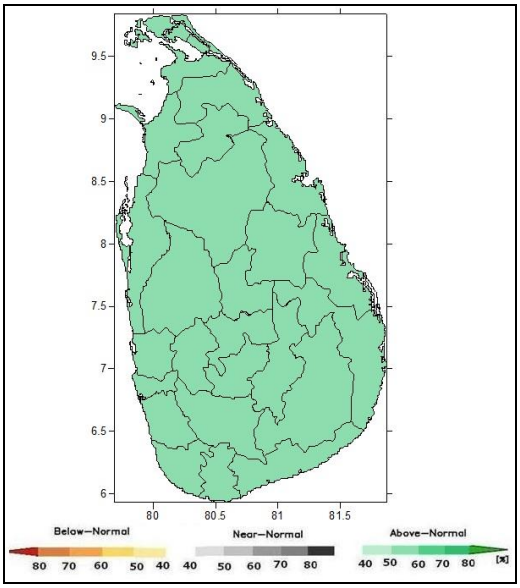

Fig 13. Consensus Probabilistic rainfall forecast for June–August 2024

5.2 Rainfall forecast for June 2024

There is a higher chance of having near normal rainfalls over most parts of the country during the month of June 2024.

5.3 Rainfall forecasts for July 2024

There is a probability of having above normal rainfalls over Western, Southern, Sabaragamuwa, Central and Uva provinces and in puttlam distict and near normal rainfalls over elsewhere during the month of July 2024.

5.4 Rainfall forecasts for August 2024

There is a chance of having above normal rainfalls over most parts of the country during the month of August 2024.

**In addition, 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 phenomena which can’t be underestimated.

5.5 Probabilistic Temperature Forecast from June to August 2024 (JJA 2024)

The probabilistic Temperature forecast for June, July and August 2024 (JJA 2024) season for Sri Lanka as given below.

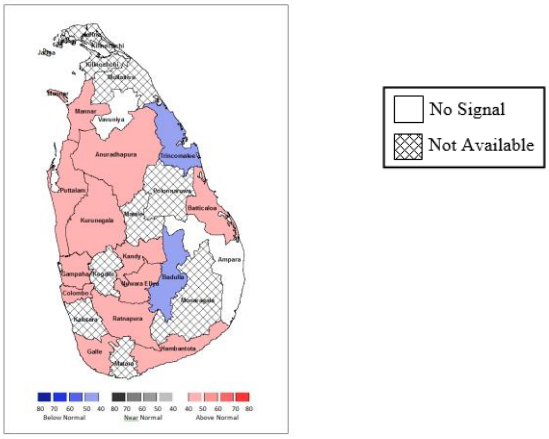

Fig 14: Probabilistic forecast for Maximum Temperatures for JJA season 2024

Fig 14 and Table 3 show the probabilistic forecast for Maximum Temperatures during JJA season 2024.

There is a higher chance of experiencing slightly above the normal Maximum Temperatures in Mannar, Anuradapura, Puttalum, Kurunegala, Gampaha, Colombo, Galle, Hambantota, Rathnapura, Kandy, Nuwara Eliya and Batticaloa districts and below the normal maximum temperatures in Badulla and Trincomalee districts (Fig 14) for the JJA season 2024.

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 (^{0}C) –(JJA) (1981-2010)	Probability %		
		Below	Normal	Above
Anuradhapura	33.3	30	30	40
Badulla	31.3	40	30	30
Batticaloa	33.9	35	35	30
Colombo	30.3	25	30	45
Galle	29.0	30	30	40
Hambantota	30.9	30	30	40
Katugastota	28.2	25	30	45
Katunayake	30.6	30	30	40
Mannar	31.1	30	30	40
MahaIlluppallama	32.7	30	30	40
NuwaraEliya	18.8	25	30	45
Pottuvil	34.3	35	30	35
Puttalam	31.6	30	30	40
Ratnapura	30.6	25	30	45
Ratmalana	31.0	25	30	45
Trincomalee	35.1	40	30	30
Vavuniya	34.5	35	30	35
Kurunegala	31.1	25	30	45
Bandarawela	26.4	25	30	45

Table 3: probabilistic forecast for Maximum Temperature for JJA season 2024

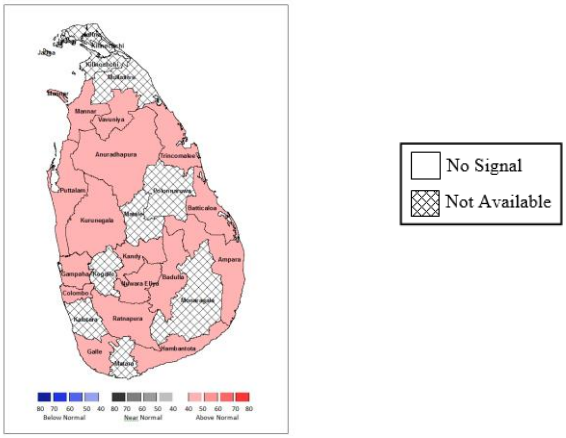

Fig 15: Probabilistic forecast for Minimum Temperatures for JJA season 2024

District	Average Minimum Temperature (^{0}C) – (JJA) (1981-2010)	Probability %		
		Below	Normal	Above
Anuradhapura	25.0	30	30	40
Badulla	18.9	30	30	40
Batticaloa	25.4	30	30	40
Colombo	25.7	30	30	40
Galle	25.3	30	30	40
Hambantota	25.0	30	30	40
Katugastota	21.4	30	30	40
Katunayake	25.3	30	30	40
Mannar	26.6	30	30	40
MahaIlluppallama	24.6	30	30	40
NuwaraEliya	13.3	30	25	45
Pottuvil	24.9	30	30	40
Puttalam	25.8	30	30	40
Ratnapura	23.8	30	30	40
Ratmalana	25.7	30	30	40
Trincomalee	25.8	30	30	40
Vavuniya	24.7	30	30	40
Kurunegala	24.1	30	30	40
Bandarawela	17.9	30	30	40

Table 4: Probabilistic forecast for Minimum Temperatures for JJA season 2024

Fig 15 and Table 4 provide the probabilistic forecast for Minimum Temperatures during JJA season 2024.

Accordingly, there is a higher chance of experiencing slightly above the normal Minimum Temperatures in Vavuniya, Mannar, Anuradapura, Puttalam, Kurunegala Gampaha, Colombo, Galle, Hambantota, Rathnapura, Kandy, Nuwara Eliya, Badulla, Ampara, Batticaloa and Trincomalee districts(Fig 15) during JJA season 2024.

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