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**வளிமண்டலவியல் திணைக்களம்**  
**DEPARTMENT OF METEOROLOGY**  
ශ්‍රී ලංකාව இலங்கை SRI LANKA

## **Consensus Seasonal Weather Outlook**

**May, June and July(MJJ2024)**

### **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

In the last four weeks, equatorial SSTs were above average across most of the Pacific Ocean, with the largest anomalies in the central and east-central Pacific. Below-average SSTs were evident in the eastern Pacific Ocean. (NOAA CPC). During the last four weeks, negative SST anomaly changes were observed over most of the equatorial Pacific, but were strongest in the far eastern Pacific.

### El Niño and La Niña update

A transition from El Niño to ENSO-neutral is likely by April-June 2024 (85% chance), with the odds of La Niña developing by June-August 2024 (60% chance). Fig 3a). (Climate Prediction Center / NCEP).

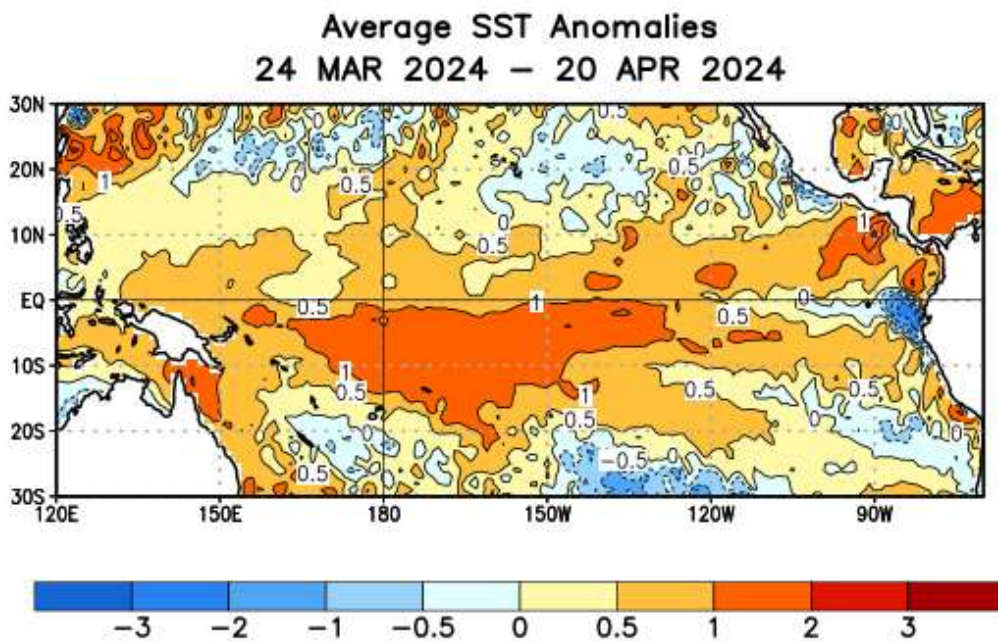


Fig 1: Observed Average sea surface temperature (SST) anomalies (°C)

## Weekly SST Anomalies (DEG C)

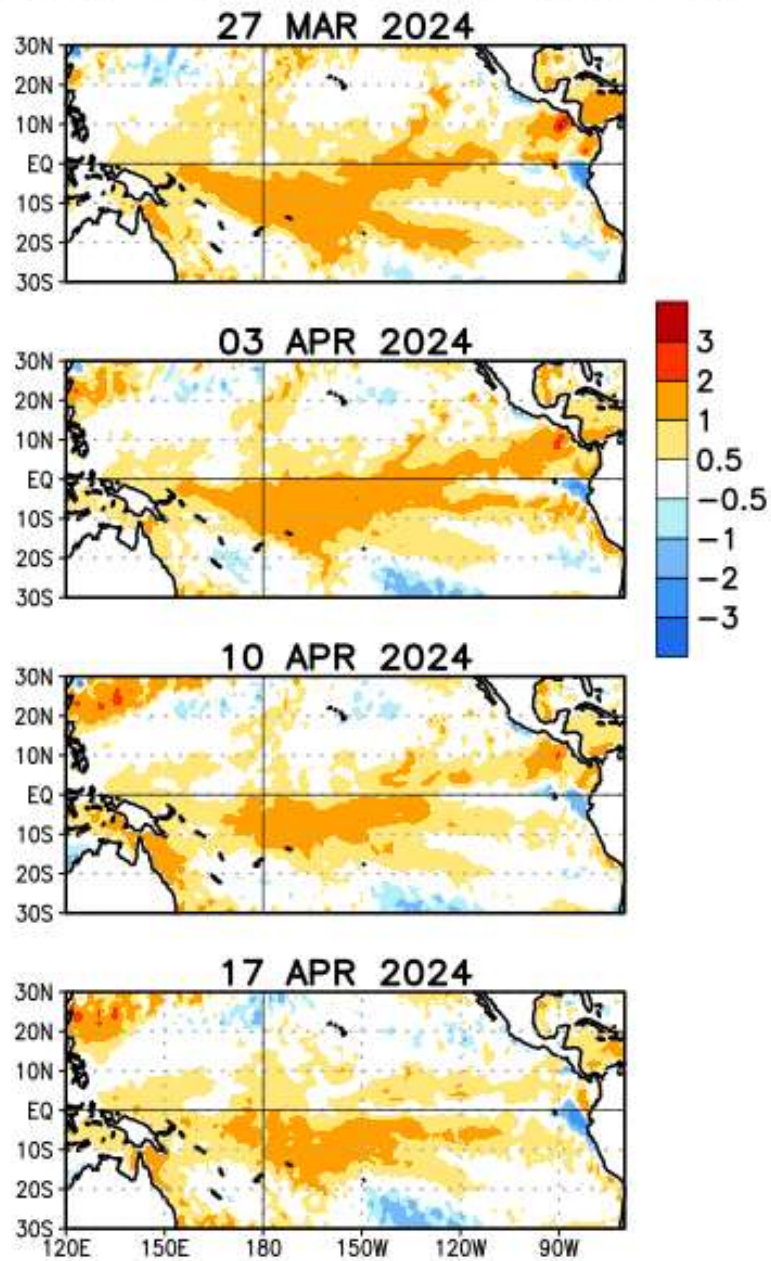


Fig 2: Weekly Observed Average sea surface temperature (SST) anomalies (°C)

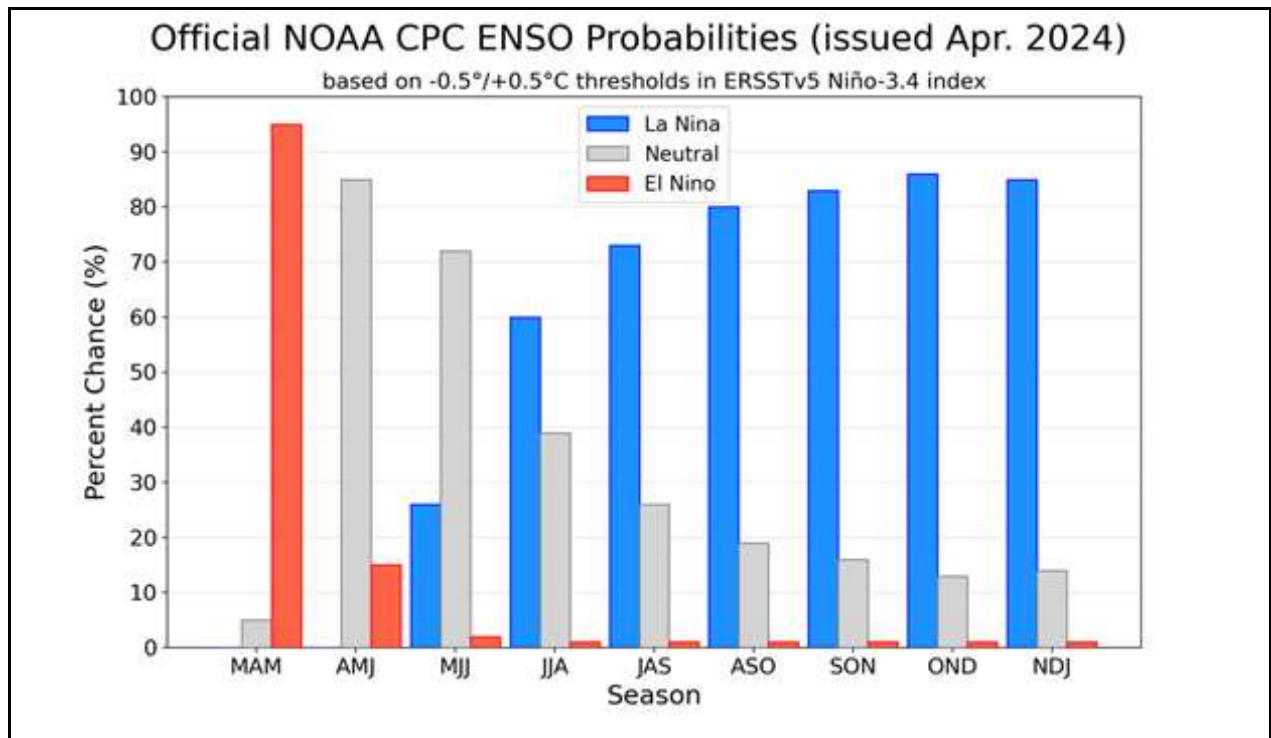


Fig 3a: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast

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

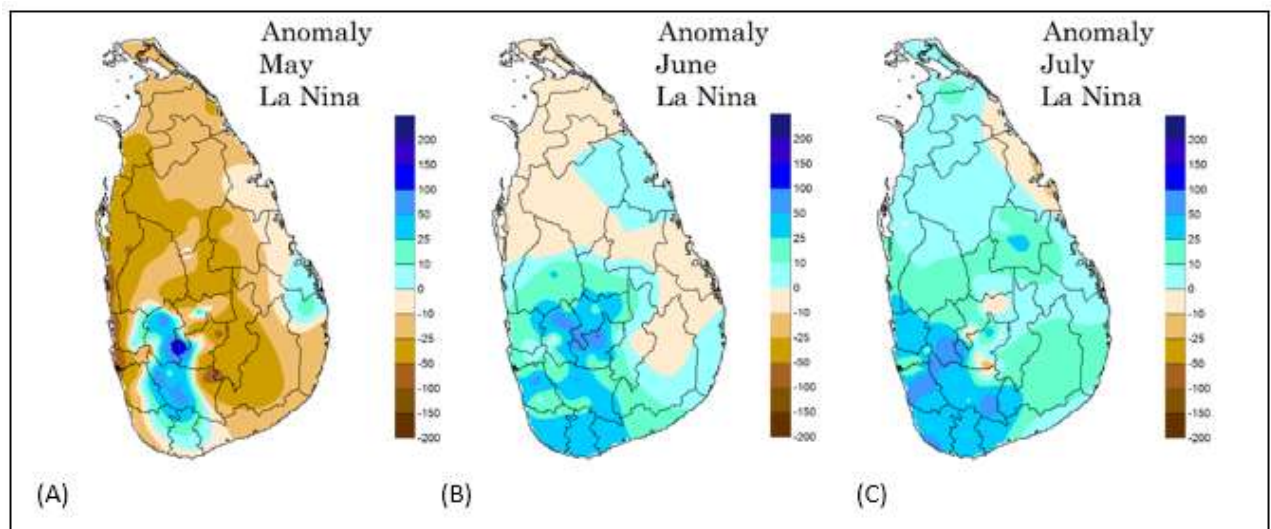


Fig 3b: Monthly Rainfall Anomaly maps of the months of May(A), June (B) and July (C) during La nina years (Hapuarachchi et al 2016)

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

## 1.2 The Indian Ocean Dipole (IOD) update

The Indian Ocean Dipole (IOD) index for the week end 14 April 2024 is  $+0.57\text{ }^{\circ}\text{C}$ . While the IOD index is above the positive IOD threshold, the IOD is currently neutral. Currently, record warm ocean temperatures in the north-west Indian Ocean are leading to these positive values of the IOD index. While the positive IOD values are mostly from record warmth in the north-west Indian Ocean, atmospheric indicators in the east may be consistent with developing positive IOD. (source-BOM,Australia).

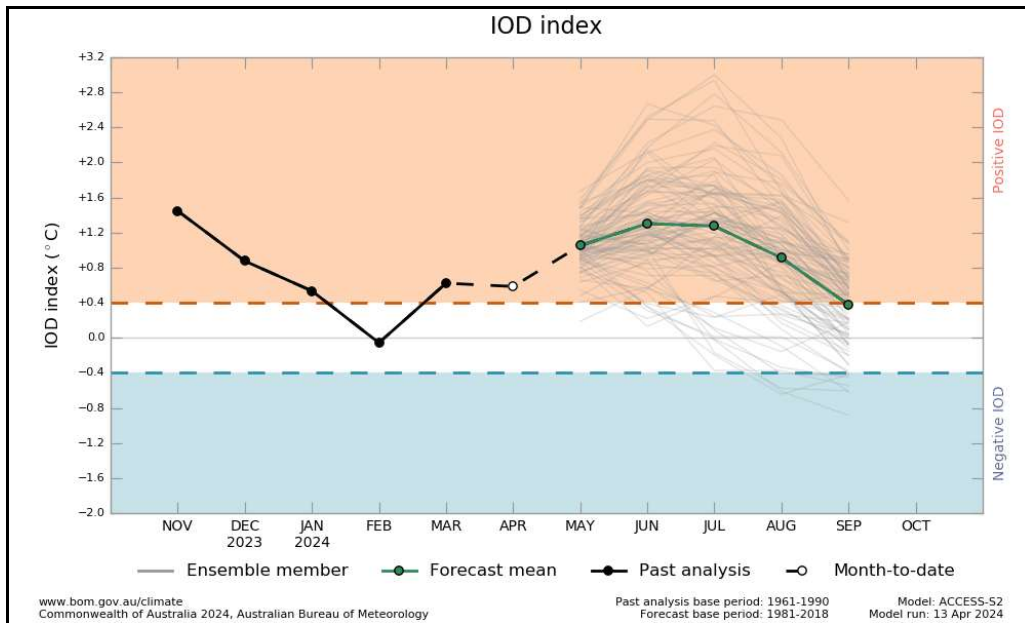


Figure 4a: IOD forecast from Australian Bureau of Meteorology

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

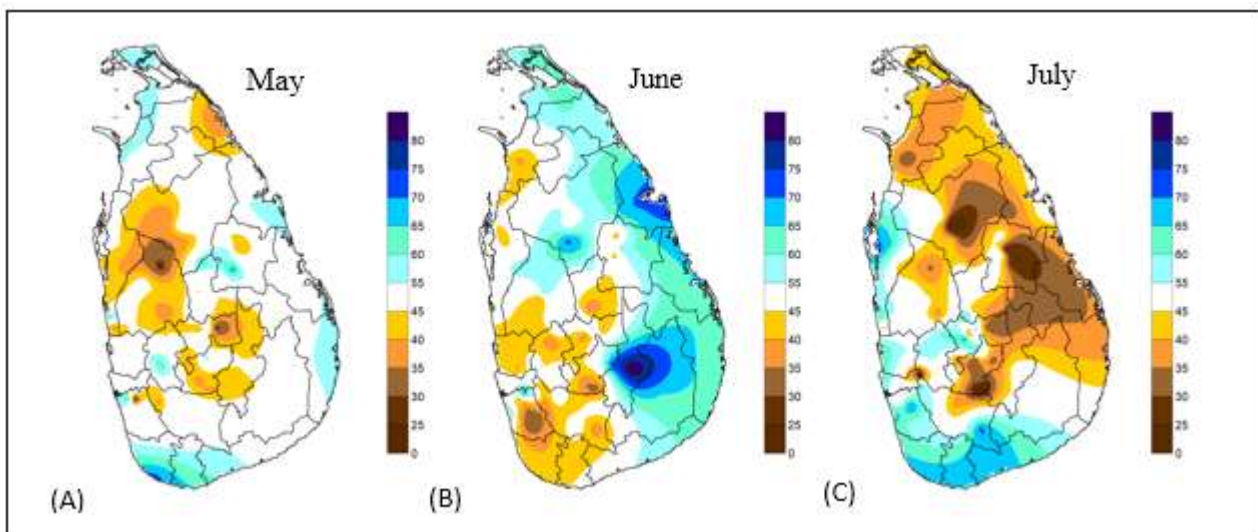


Fig 4b: Median Based Composite maps of Monthly Rainfall during May (A), June (B) and July (c) during positive IOD years (Hapuarachchi et al 2018)

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 North western and Central provinces and Anuradhapura and Mullativu districts. Near or slightly above normal rainfalls are likely over remaining areas during the month of May(Fig 4b(A)). During the month of June it is showing a higher probability of getting below normal rainfalls in some areas in Western, Southern, Uva and Central provinces and above or near normal rainfalls over remaining areas of the country (Fig 4b (B)) under the positive IOD condition. During the month of July below normal rainfalls are likely over most parts in Eastern, Northern, Central and Northcentral provinces and some areas in Kurunegala and Rathnapura districts. Above or near normal rainfalls are likely over elsewhere of the country under the positive IOD condition ( Fig 4b (C)) during the month of July.

## 2. Forecasts from different climate models from around the world

### 2.1 May to July (MJJ) 2024 season

Figure 5 shows the probabilistic multi model ensemble forecast which prepared by using dynamical models from 14 Global Producing Centers (GPC) for MJJ season. According to that above normal rainfall can be expected for MJJ 2024 season.

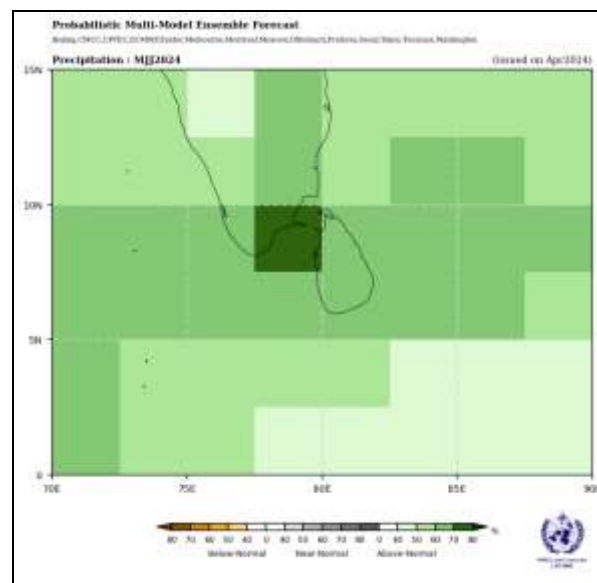


Fig 5: Probabilistic multi model ensemble forecast for MJJ using dynamical models from 14 WMO global producing centers (GPC).

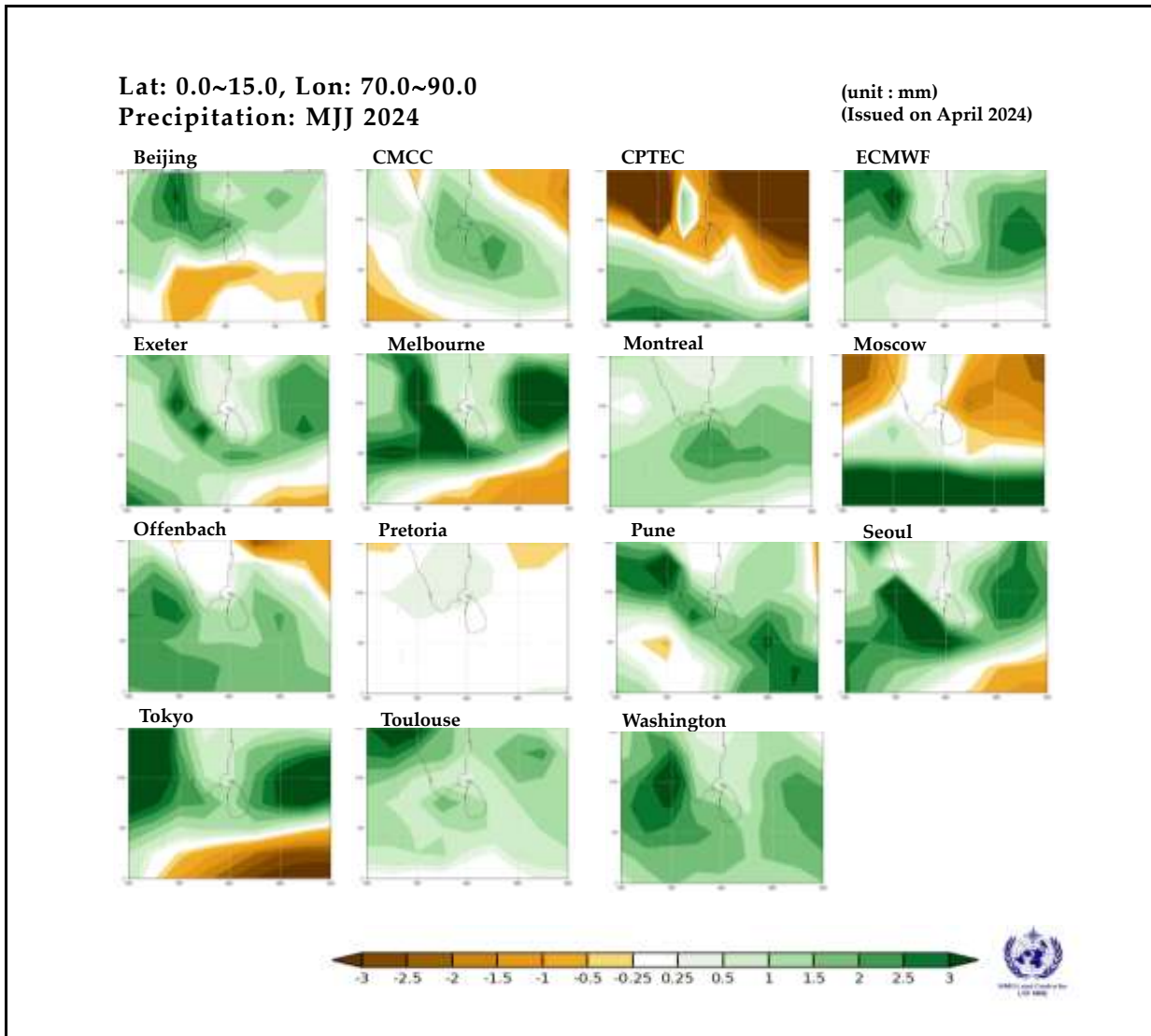


Fig 6: Individual forecasts for MJJ 2024 season by dynamical models from 15 WMO global producing centers (GPC).

Figure 6 depicts individual forecasts provided by same GPC centers for the MJJ season. Out of 15 GPC individual models, 11 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 MJJ 2024 season.

## 2.2 Monthly Forecast for May, June and July 2024

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 May, June and July 2024. According to that during the month of May it can be expected slightly above normal rainfall over some areas in Western, Southern, Sabaragamuwa and Uva provinces and in Kandy, Nuwaraeliya and Ampara districts. There is no clear signal indicated over remaining areas of the country. Accordingly below or about or above normal rainfalls can be expected over these areas during the period. During the months of June and July above normal rainfalls are likely over most

parts of the country.

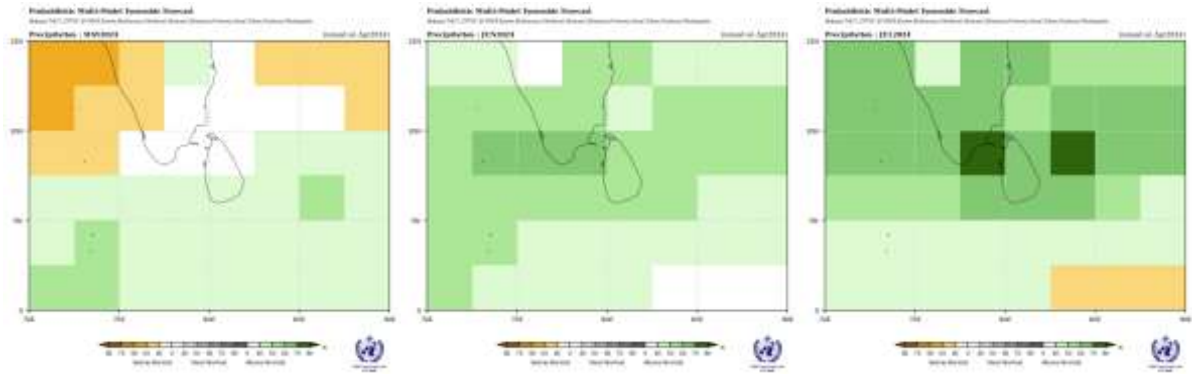


Fig 7: Probabilistic multi model ensemble forecast for May (left), June (middle) and July (right) 2024 using dynamical models from 14 WMO global producing centers (GPC).

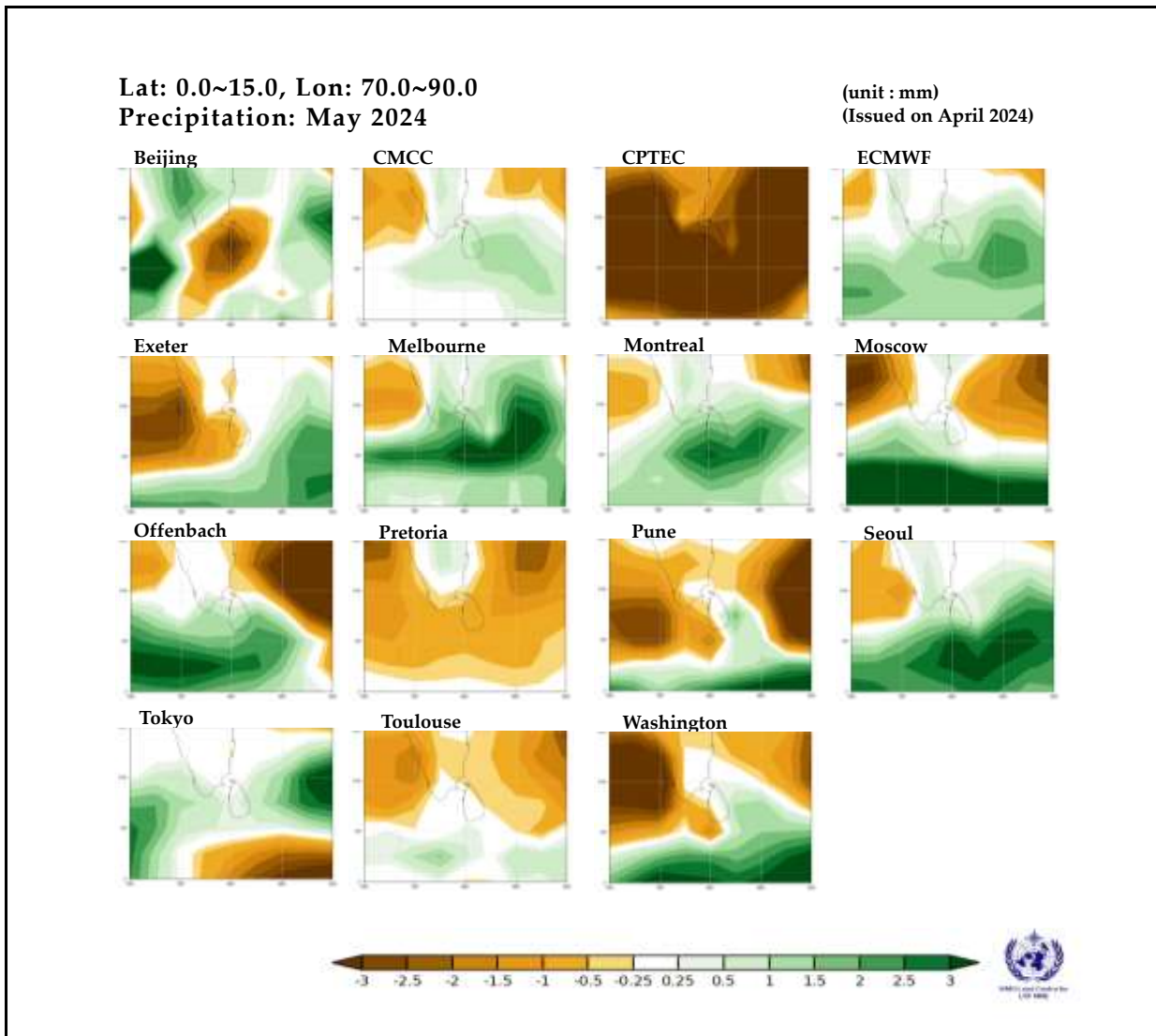


Fig 8: Individual forecast for May 2024 by dynamical models from 15 WMO global producing centers (GPC).



Figure 8 shows the 15 monthly forecasts from individual global producing centers (GPC) for May 2024. Out of 15 GPC forecasts, 4 GPC models predicted below normal rainfalls and 7 GPC forecasts predicted above normal rainfalls over the country. There is no clear signal indicated in 4 GPC models. Accordingly below or about or above normal rainfalls are possible over the country during the month of May 2024.

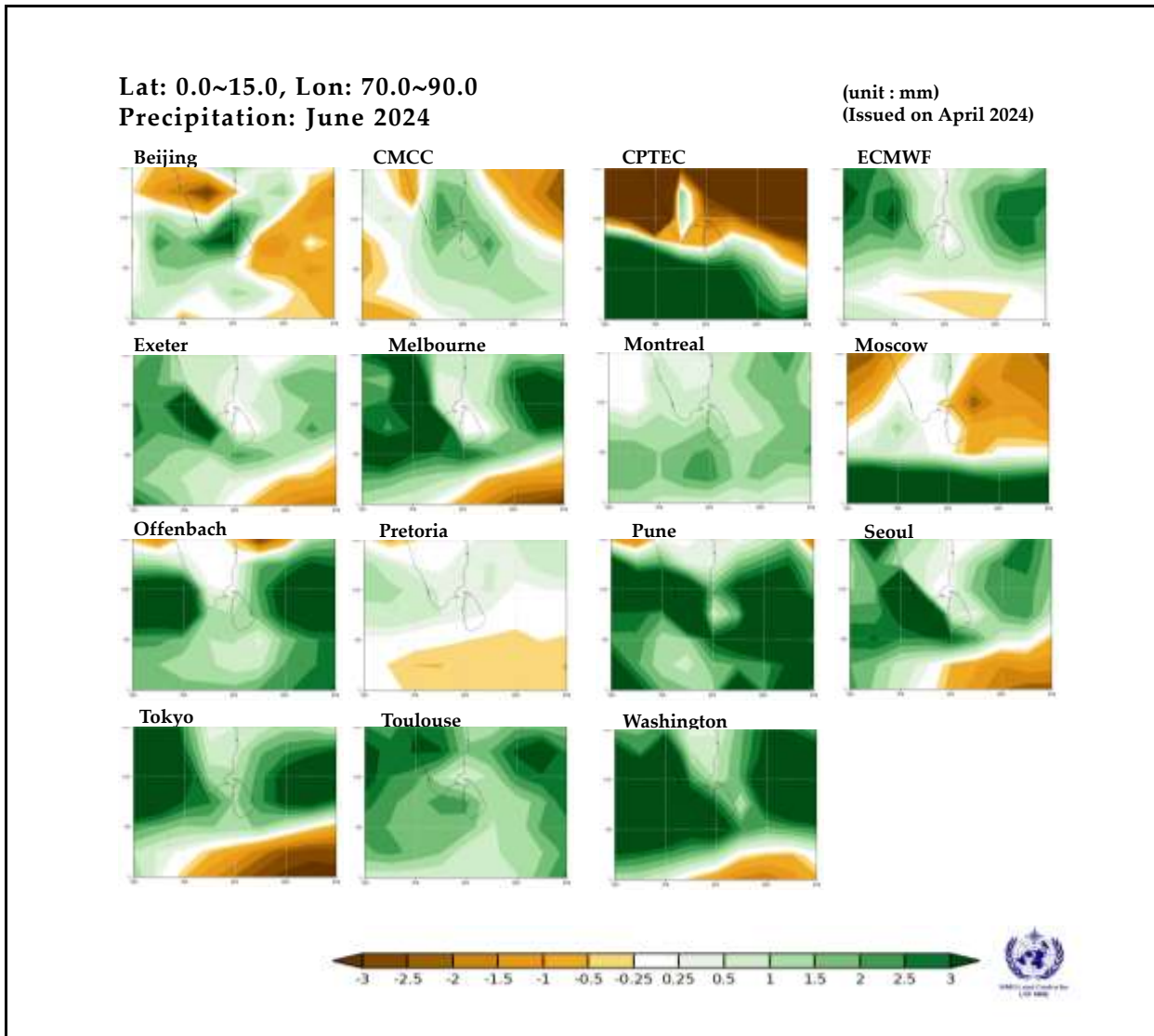


Fig 9: Individual forecast for June 2024 by dynamical models from 15 WMO global producing centers (GPC).

Figure 9 shows the monthly forecasts from individual global producing centers (GPC) for June 2024. Out of 15 GPC forecasts, 8 GPC models predicted above normal rainfall over the country. There is no clear signal indicated in 7 GPC models. Accordingly above normal rainfalls can be expected over the country during the month of June 2024.

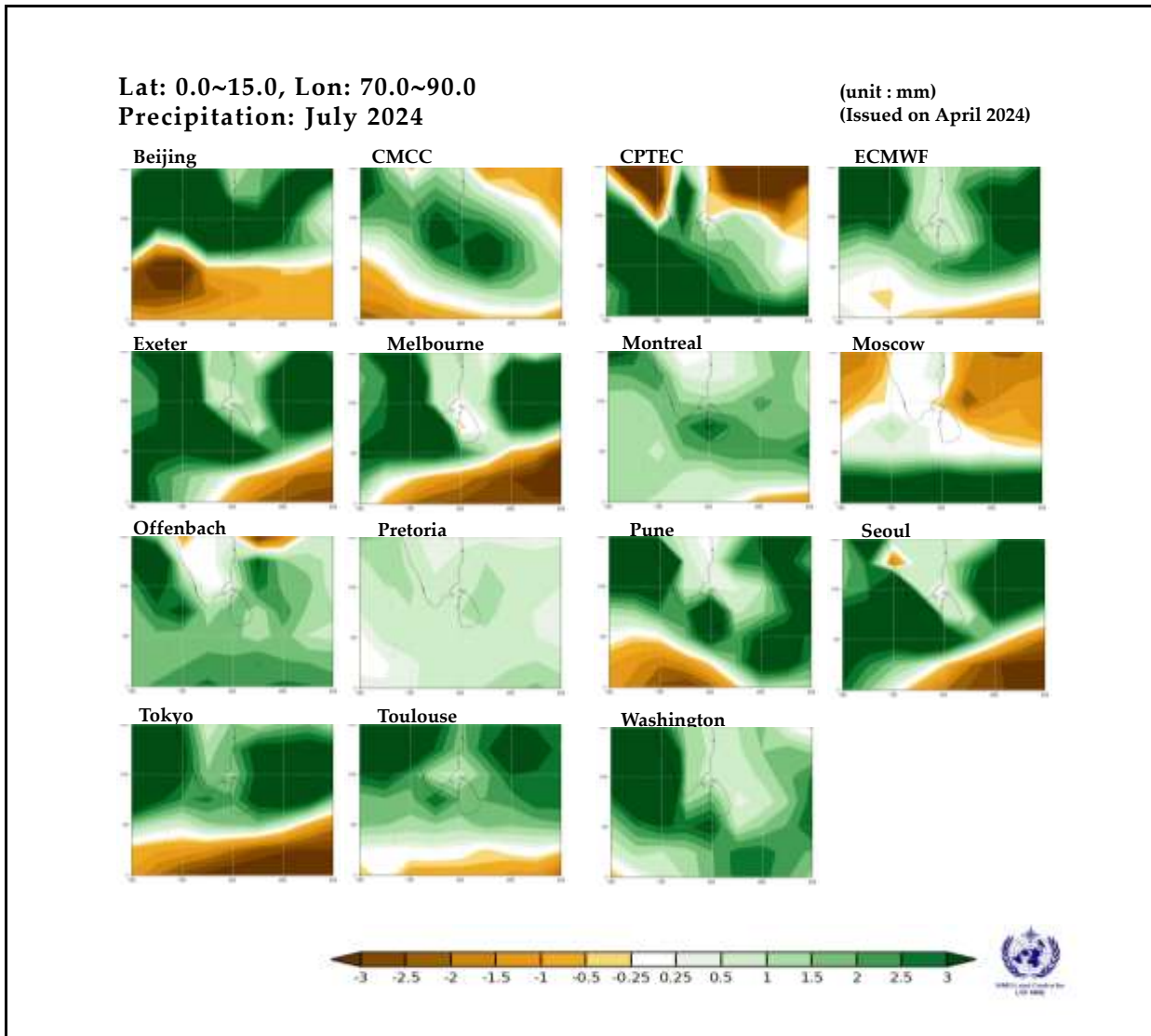


Fig 10: Individual forecast for July 2024 by dynamical models from 15 WMO global producing centers (GPC).

Figure 10 shows the monthly forecasts from 15 individual global producing centers (GPC) for July 2024. Out of 15 GPC forecasts, 13 GPC models indicate above normal rainfall and there is no clear signal indicated in 2 GPC models. Accordingly it can be expected above normal rainfall over most parts of the country during the month of July 2024.

### 3. Statistical downscaling of CFSv2 global forecast output

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

The following district wise probabilistic rainfall forecasts for the season of MJJ 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 MJJ 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) –MJJ (1981-2010)	Probability%		
		Below	Normal	Above
Colombo	756.3	45	30	25
Kalutara	1064.2	55	30	15
Galle	927.6	45	30	25
Matara	667.1	20	20	60
Hambantota	155.8	20	20	60
Ampara	114.9	20	20	60
Batticaloa	108.3	20	20	60
Trincomalee	126.0	20	20	60
Mullaithivu	104.5	20	20	60
Jaffna	86.1	20	20	60
Killinochchi	80.8	20	20	60
Mannar	80.2	20	20	60
Puttalam	181.5	25	25	50
Gampaha	609.2	40	30	30
Kegalle	991.6	35	30	35
Ratnapura	803.1	20	20	60
Monaragala	154.3	20	20	60
Badulla	204.4	20	20	60
Pollonnaruwa	110.5	20	20	60
Vavuniya	119.9	15	30	55
Anuradapura	119.5	20	20	60
Kurunegala	254.4	20	25	55
Matale	188.8	20	20	60
Kandy	451.8	20	20	60
Nuwaraeliya	791.7	20	20	60

**Table 1:** Probabilistic Rainfall Forecast for MJJ season 2024 using CPT

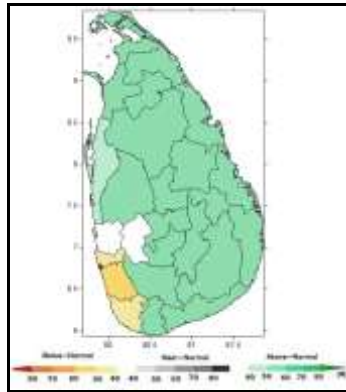


Fig 11: Probabilistic rainfall forecast for May –July 2024 using CPT

According to the CPT (Fig 11 and table 01), below normal rainfalls can be expected in Colombo, Kalutara and Galle districts. There is no clear signal indicated in Gampaha and Kegalle districts and above normal rainfalls are expected 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 MJJ Season 2024.

### **3.3 Probabilistic rainfall forecast for MJJ 2024 season using RIMES FOCUS System**

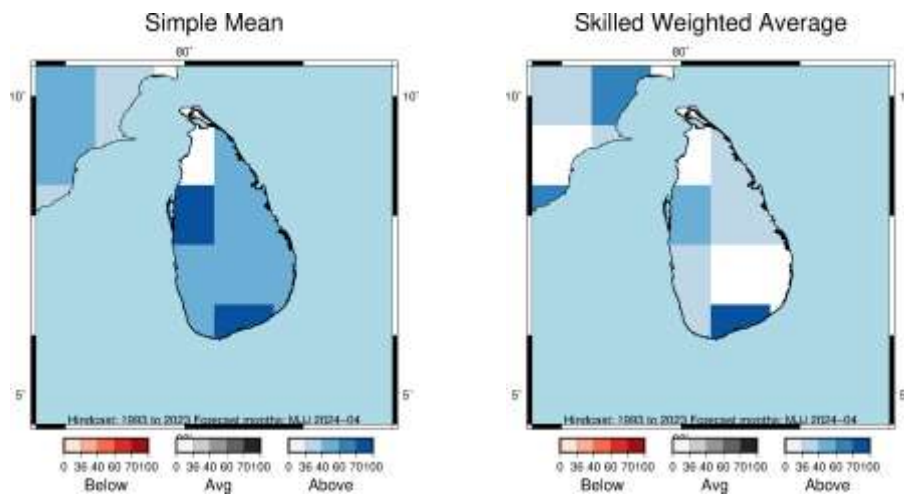


Fig 12. Probabilistic rainfall forecast for May-July 2024 using RIMES FOCUS System

Figure 12 depicts the Probabilistic rainfall forecast for MJJ 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 MJJ season 2024.

## 4. SUMMARY :

SUMMARY of MODEL FORECAST for MJJ 2024 season for SRI LANKA						
Season	WMO LC MME	WMO GPC	CPT	FOCUS	Impact of Global conditions	Final Rainfall Forecast
MJJ season 2024	AN	AN	BN- Colombo, Kalutara, Galle No Signal- Gampaha, Kegalle AN- Elsewhere	AN-Most parts		Above normal over most parts
May 2024	AN-Western, Uva, Sabaragamuwa, Southern provinces and Kandy, Nuwara Eliya, Ampara districts  No Signal - Elsewhere	No Signal				Above normal over SW part and near normal over remaining areas
June 2024	AN	AN				•Above normal over SW parts and near normal over remaining parts
July 2024	AN	AN				•Above normal over most parts

**Table 2:** Summary of Model Forecasts for MJJ season 2024

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

### 4.1 Summary of prevailing global climate conditions

A transition from El Niño to ENSO-neutral is likely by April-June 2024 (85% chance), with the odds of La Niña developing by June-August 2024 (60% chance).

IOD is currently in neutral and an atmospheric indicators in the east Indian ocean may be consistent with developing positive IOD.

## 5. Consensus Seasonal outlook for May, June and July 2024

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

### 5.1 Rainfall forecast for the three months period during May-June-July (MJJ) 2024

Above normal rainfalls are likely over Western, Southern Sabaragamuwa, Central and Uva provinces and near normal over remaining areas during May- July 2024 season (Fig. 13).

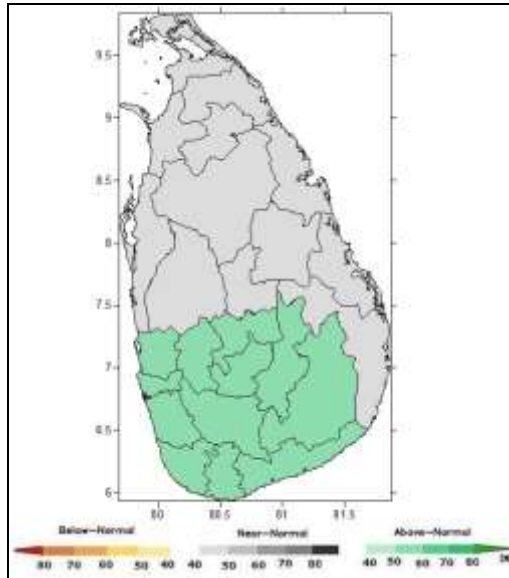


Fig 13. Consensus Probabilistic rainfall forecast for May–July 2024

### 5.2 Rainfall forecast for May 2024

There is a higher chance of having above normal rainfall over Western, Southern, Sabaragamuwa, Central and Uva provinces and near normal rainfalls over remaining areas of the country during the month of May 2024.

In addition to that, generally there is a possibility for developing atmospheric disturbances, low pressure systems and cyclones in the vicinity of Sri Lanka during the latter part of month of May.

### 5.3 Rainfall forecasts for June 2024

There is a higher chance of having above normal rainfalls over Southwestern parts and near normal rainfalls over elsewhere of the country during the month of June 2024.

### 5.4 Rainfall forecasts for July 2024

There is a chance of having above normal rainfalls over most parts of the country during the month of July 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 May to July 2024 (MJJ 2024)**

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

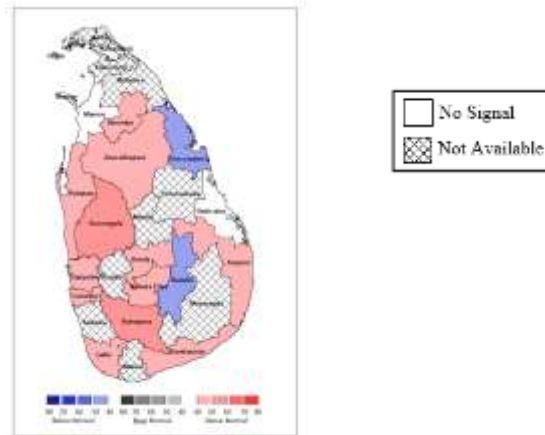


Fig 14: Probabilistic forecast for Maximum Temperatures for MJJ season 2024

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

There is a higher chance of experiencing slightly above the normal Maximum Temperatures in Vavuniya, Anuradapura, Puttalam, Kurunegala, Gampaha, Colombo, Galle, Hambantota, Rathnapura, Kandy, Nuwara Eliya and Ampara districts and below the normal maximum temperatures in Trincomalee and Badulla districts (Fig 14) for MJJ 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 (°C) – (MJJ) (1981-2010)	Probability %		
		Below	Normal	Above
Anuradhapura	32.9	30	30	40
Badulla	30.6	40	30	30
Batticaloa	33.5	35	35	30
Colombo	30.5	25	30	45
Galle	29.1	30	30	40
Hambantota	30.5	30	30	40
Katugastota	28.6	25	30	45
Katunayake	30.8	30	30	40
Mannar	31.3	35	30	35
MahaIlluppallama	32.7	30	30	40
NuwaraEliya	19.6	25	30	45
Pottuvil	31.7	30	30	40
Puttalam	31.7	30	30	40
Ratnapura	31.2	20	30	50
Ratmalana	30.3	25	30	45
Trincomalee	34.6	40	30	30
Vavuniya	33.8	30	30	40
Kurunegala	31.4	20	30	50
Bandarawela	26.0	40	30	30

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

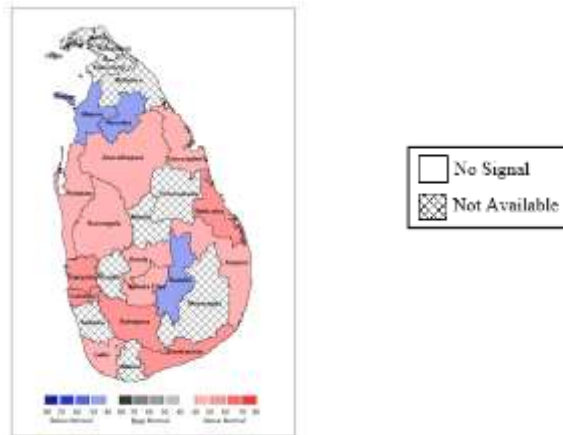


Fig 15: Probabilistic forecast for Minimum Temperatures for MJJ season 2024



District	Average Minimum Temperature (°C) – (MJJ) (1981-2010)	Probability %		
		Below	Normal	Above
Anuradhapura	24.7	30	30	40
Badulla	18.9	40	30	30
Batticaloa	25.5	20	30	50
Colombo	25.4	20	30	50
Galle	25.2	20	30	50
Hambantota	25.1	20	30	50
Katugastota	21.3	30	30	40
Katunayake	25	20	30	50
Mannar	27	40	30	30
MahaIlluppallama	24.5	30	30	40
NuwaraEliya	12.9	30	25	45
Pottuvil	23.4	30	30	40
Puttalam	25.7	30	30	40
Ratnapura	23.7	20	30	50
Ratmalana	25.1	30	30	40
Trincomalee	25.9	30	30	40
Vavuniya	24.5	40	30	30
Kurunegala	24.2	30	30	40
Bandarawela	16.8	40	30	30

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

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

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