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

**Consensus Seasonal Weather Outlook**  
**September, October and November(SON2024)**  
**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, and in the Indian Ocean. Near-to-below-average SSTs were evident in the east-central and eastern Pacific Ocean. Equatorial Atlantic SSTs were mostly near average. (source-CPC-NOAA)

### El Nino and La Nina update

ENSO-neutral conditions are present. Equatorial sea surface temperatures (SSTs) are above average in the western Pacific and near-to-below-average in the eastern Pacific Ocean. ENSO-neutral is expected to continue for the next several months, with La Niña favored to emerge during September-November (66% chance) and persist through the Northern Hemisphere winter 2024-25 (74% chance during November-January). (CPC-NOAA)

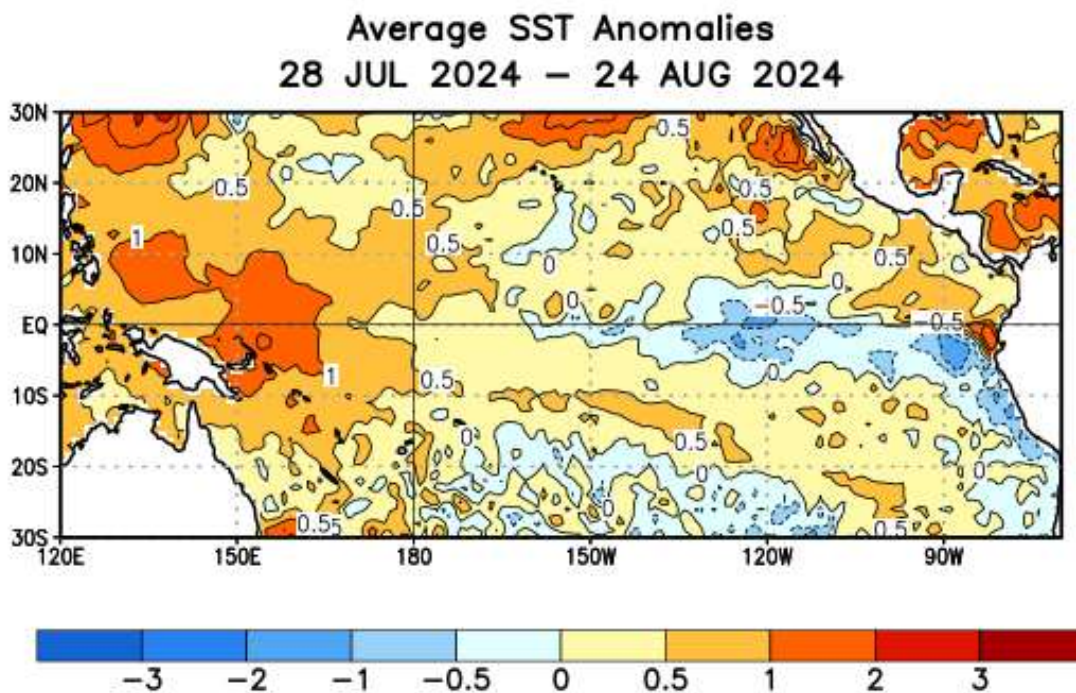


Fig 1: Observed Average sea surface temperature (SST) anomalies (°C)

## Weekly SST Anomalies (DEG C)

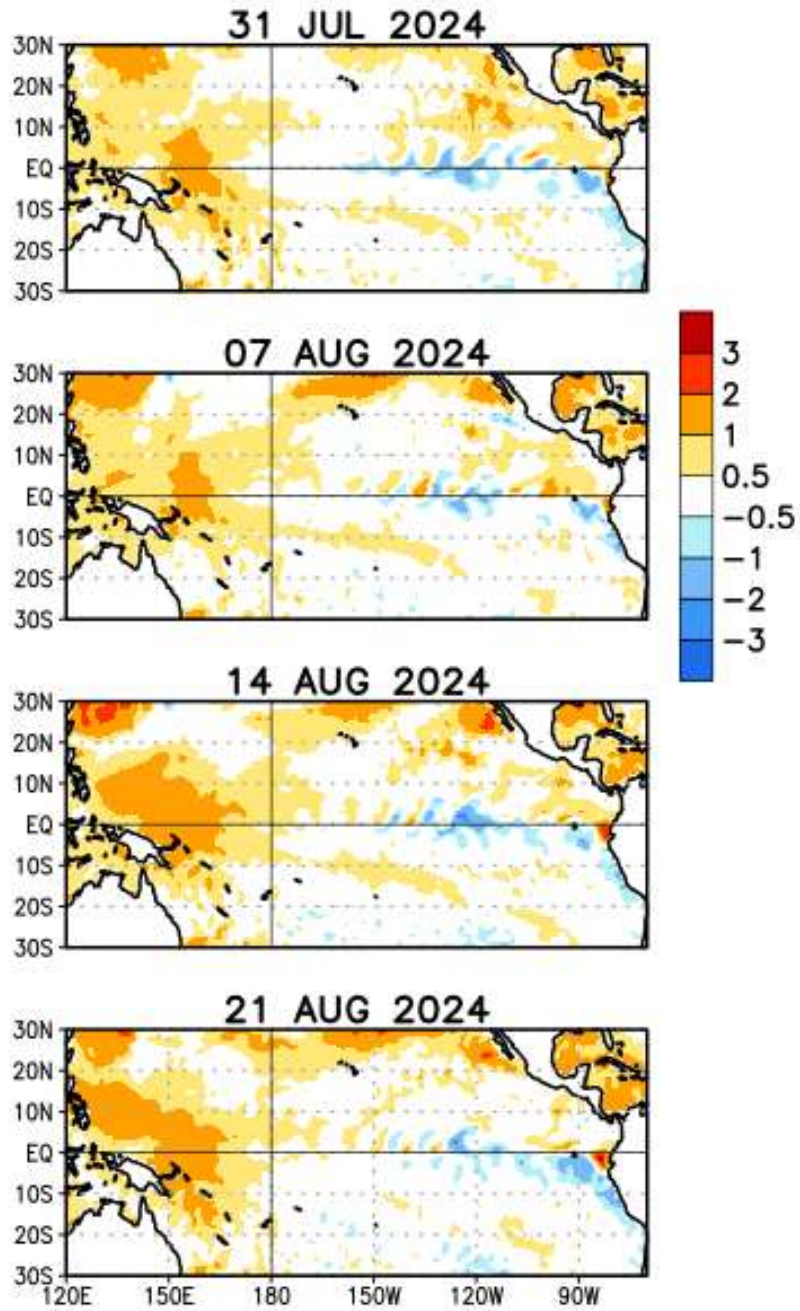


Fig 2: Weekly Observed Average sea surface temperature (SST) anomalies (°C)

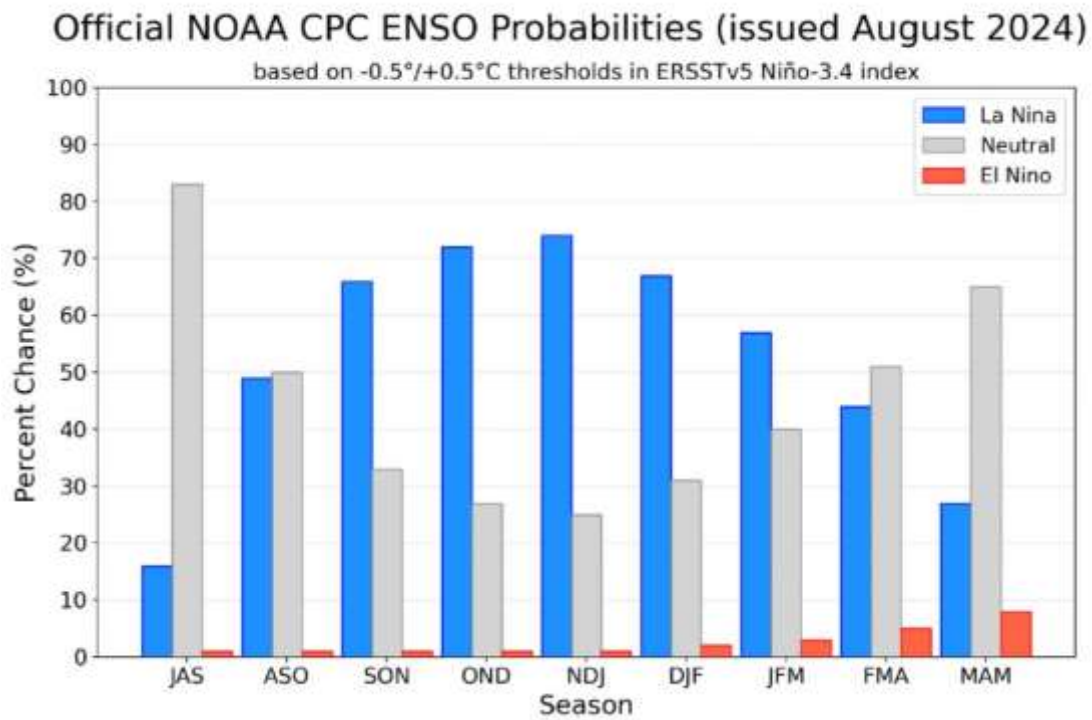


Fig 3a: ENSO forecast from Climate Prediction Center (CPC)/ IRI Forecast

### 1.1.1 Impacts of La nina on monthly rainfall anomaly during September, October and November

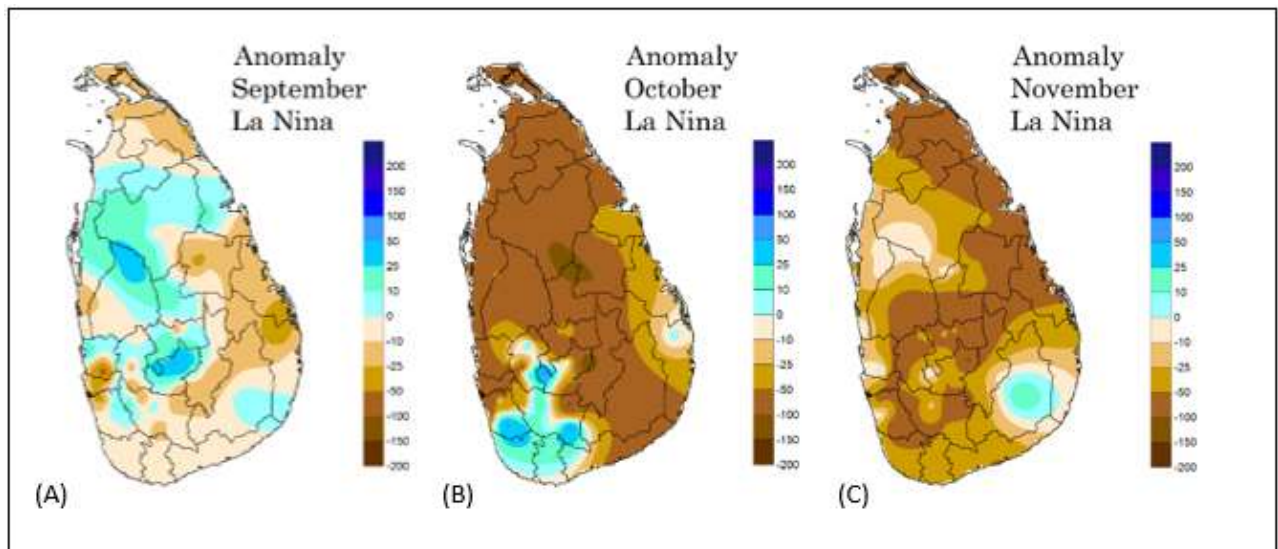


Fig 3b: Monthly Rainfall Anomaly maps of the months of September(A), October (B) and November (C) during La nina years (Hapuarachchi et al 2016)

A research conducted by the Department of Meteorology, it has been found that, below normal rainfalls are likely over some areas in the Western, Eastern, Uva and Northern provinces and near or slightly above normal rainfalls can be expected over remaining parts of the country during the month of September. During the month of October below normal rainfalls are possible over most parts of the country except some areas of Kaluthara, Galle, Mathara, Hambantota, Rathnapura,

Kegalle and Nuwara Eliya districts. During the month of November below normal rainfalls are likely over the country except Monaragala district, where above normal rainfalls are possible some areas, while the La nina conditions were prevailed. (Fig 3b).

## 1.2 The Indian Ocean Dipole (IOD) update

The Indian Ocean Dipole (IOD) is currently neutral and most global model forecasts is favoured for a neutral IOD for upcoming season(source- BOM,Australia).

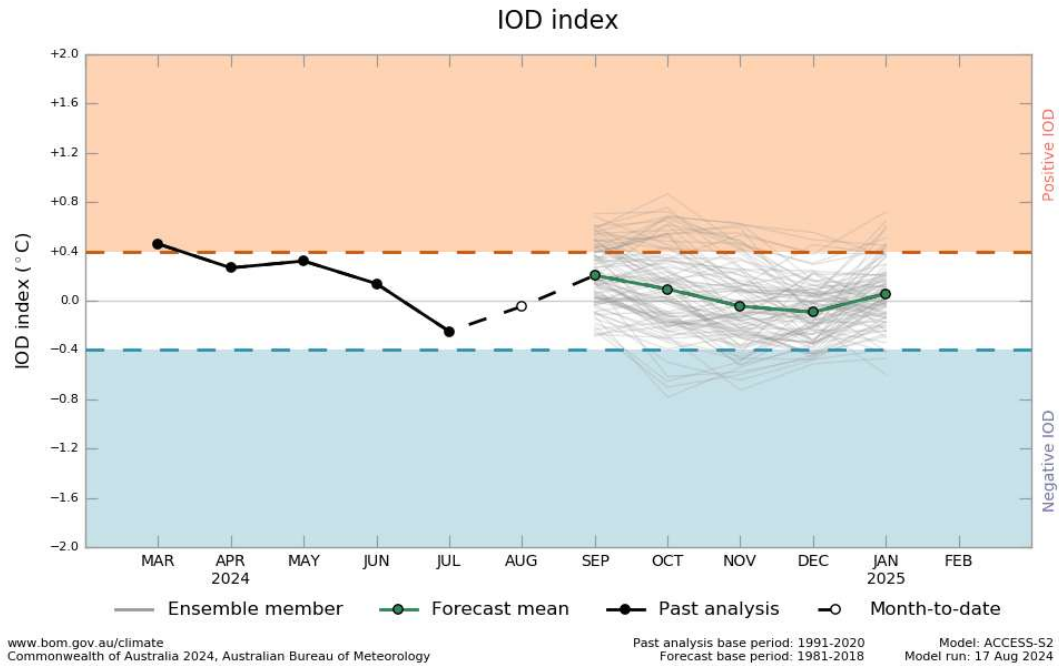


Figure 4a: IOD forecast from Australian Bureau of Meteorology

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

### 2.1 September to November (SON) 2024 season

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

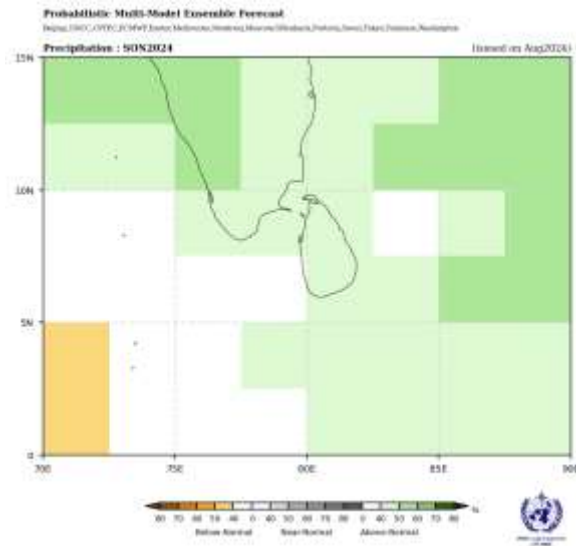


Fig 5: Probabilistic multi model ensemble forecast for SON using dynamical models from 14 WMO global producing centers (GPC).

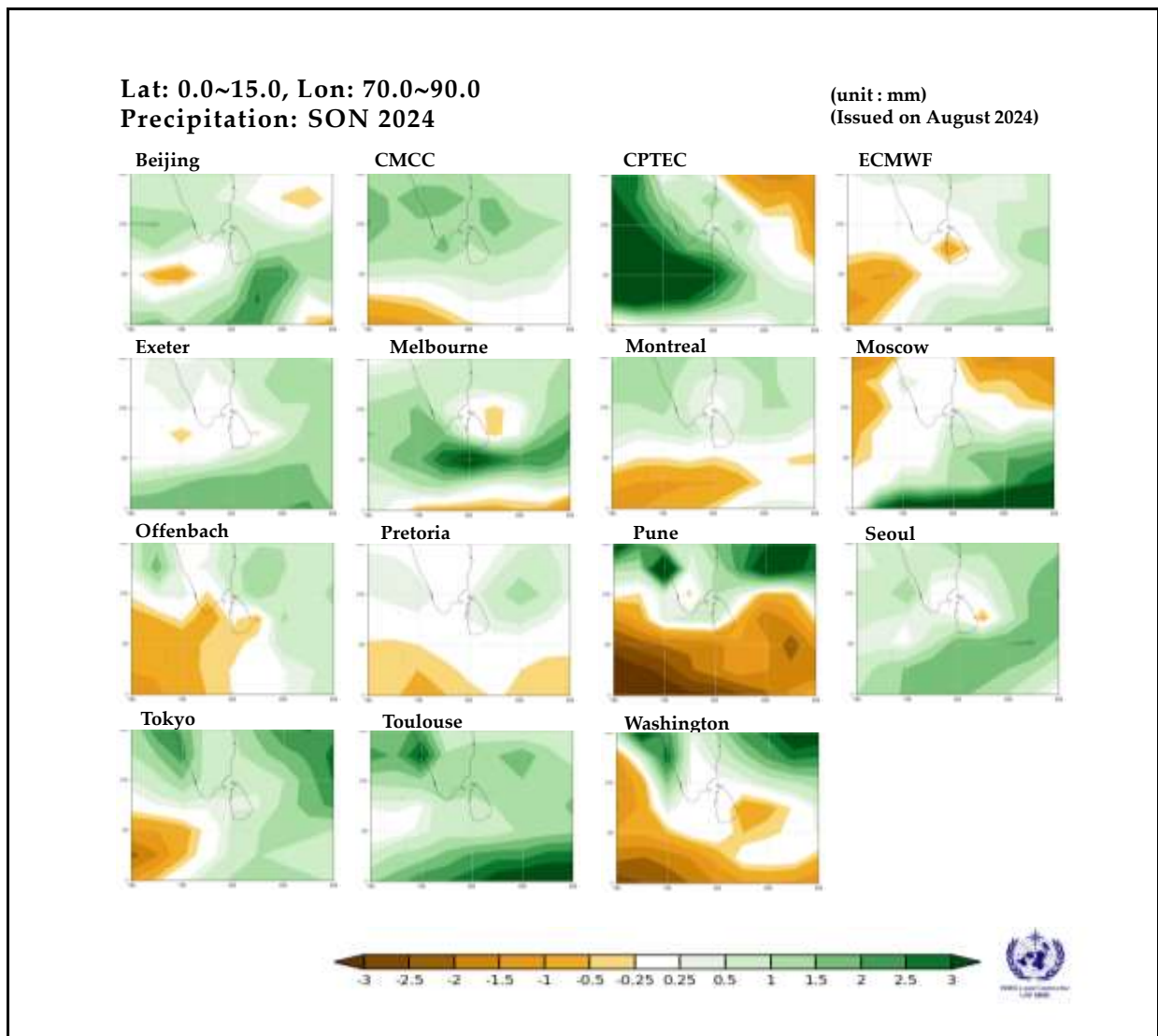


Fig 6: Individual forecasts for SON 2024 season by dynamical models from 15 WMO global producing centers (GPC).

Figure 6 depicts individual forecasts provided by same GPC centers for the SON season. Out of 15 GPC individual models, 6 GPC models predicted above normal rainfall and there is no clear signal indicated in 9 GPC models. Accordingly below or about or above normal rainfalls can be expected over the country during SON 2024 season.

## 2.2 Monthly Forecast for September, October and November 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 September, October and November 2024. According to that during the month of September above normal rainfalls are expected. During the month of October it can be expected above normal rainfall over Western, Southern, Sabaragamuwa, Central and Uva provinces and Ampara district. There is no clear signal indicated over remaining areas of the country. During the month of November there is no clear signal indicated over the country and equal chances exist of receiving below, about or above normal rainfall over no signal areas of the country during the period.

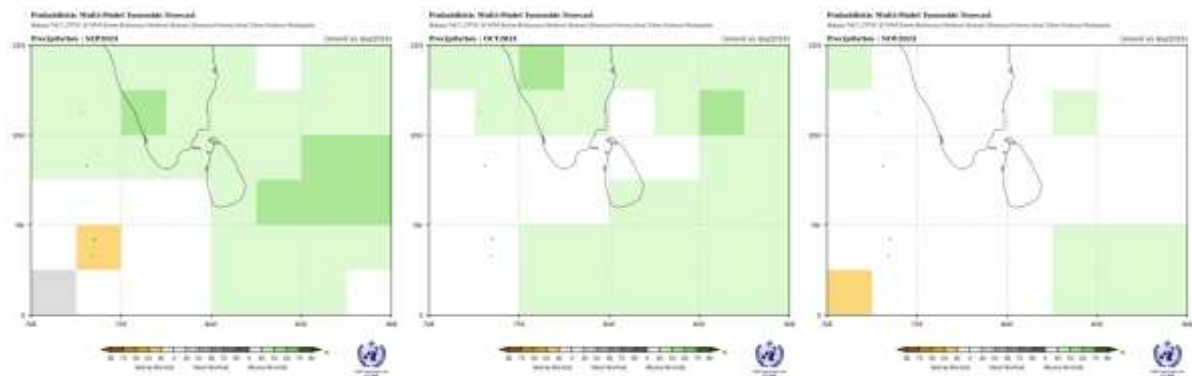


Fig 7: Probabilistic multi model ensemble forecast for September (left), October (middle) and November (right) 2024 using dynamical models from 14 WMO global producing centers (GPC).

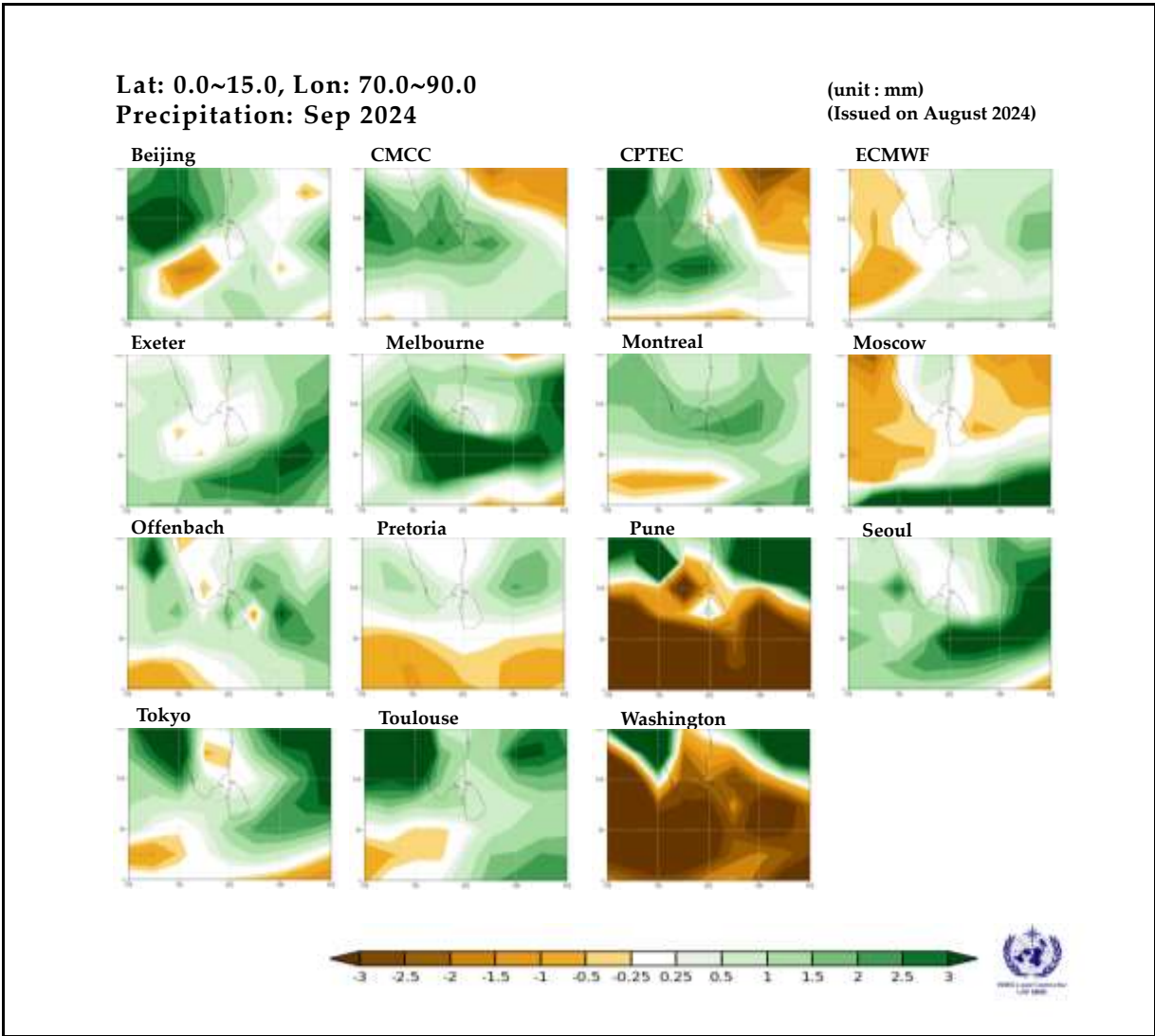


Fig 8: Individual forecast for September 2024 by dynamical models from 15 WMO global producing centers (GPC).

Figure 8 shows the 15 monthly forecasts from individual global producing centers (GPC) for September 2024. Out of 15 GPC forecasts, 9 GPC models predicted above normal rainfalls over southern most parts of the country( Western, Southern, Sabaragamuwa, Uva provinces and Nuwara Eliya and Ampara districts) and one GPC model predicted below normal rainfalls over the country. There is no clear signal indicated in 5 GPC models. Accordingly there is a possibility of having above normal rainfall over the Southern parts of the country during the month of September 2024.



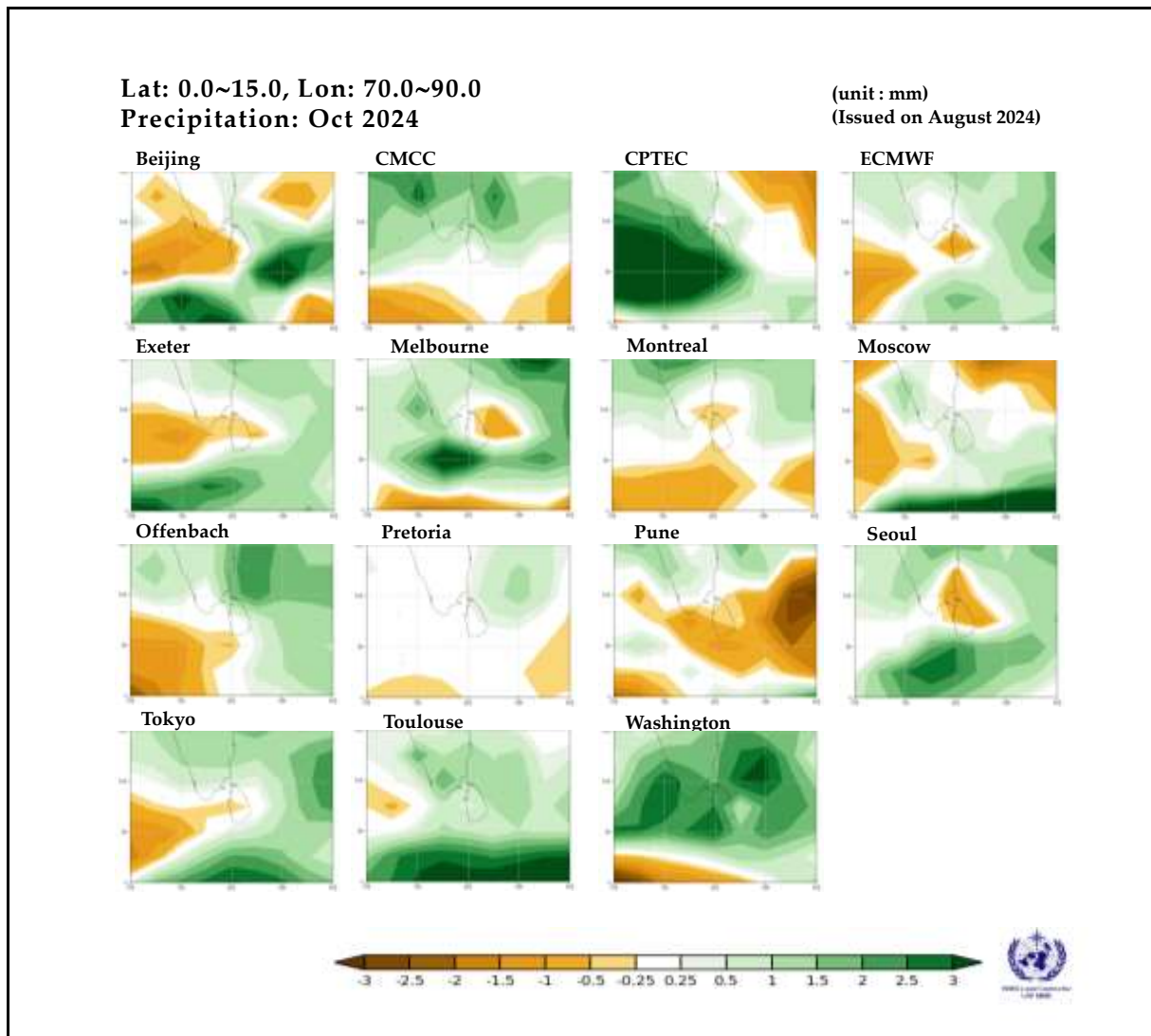


Fig 9: Individual forecast for October 2024 by dynamical models from 15 WMO global producing centers (GPC).

Figure 9 shows the monthly forecasts from individual global producing centers (GPC) for October 2024. Out of 15 GPC forecasts, 4 GPC models predicted above normal rainfall and 1 GPC model predicted below normal rainfall over the country. There is no clear signal indicated in 10 GPC models. Accordingly below or about or above normal rainfall can be expected over the country during the month of October 2024.

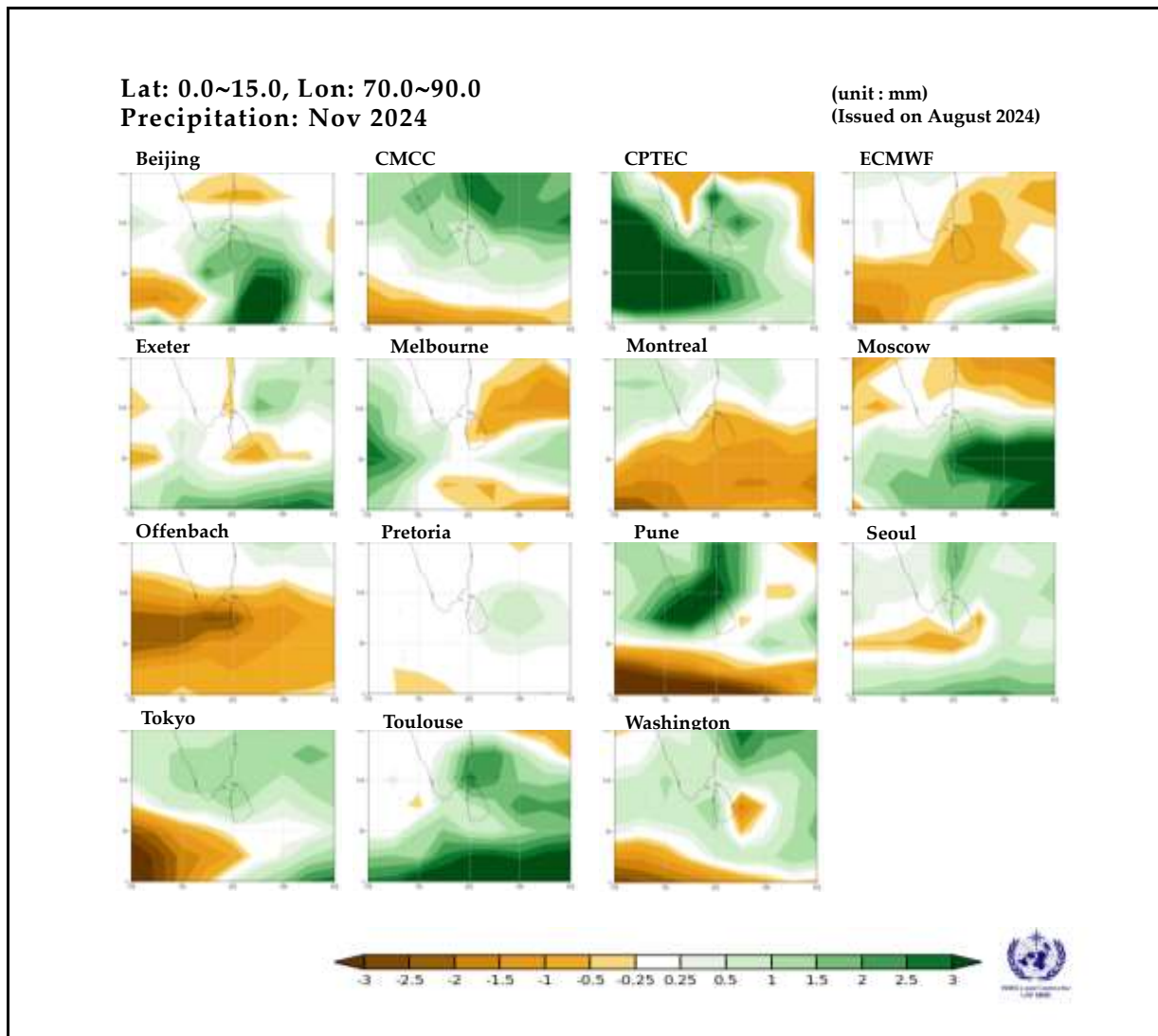


Fig 10: Individual forecast for November 2024 by dynamical models from 15 WMO global producing centers (GPC).

Figure 10 shows the monthly forecasts from 15 individual global producing centers (GPC) for November 2024. Out of 15 GPC forecasts, 6 GPC models indicate above normal rainfall over the country and another 3 GPC models predicted below normal rainfall over the country. There is no clear signal indicated in 6 GPC models. Accordingly it can be expected below or about or above normal rainfall over the country during the month of November 2024.

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

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

The following district wise probabilistic rainfall forecasts for the season of SON 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 SON 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) –SON (1981-2010)	Probability%		
		Below	Normal	Above
Colombo	1033.2	50	30	20
Kalutara	1201.2	50	30	20
Galle	1059.6	45	25	30
Matara	877.7	20	30	50
Hambantota	458.3	25	30	45
Ampara	519.5	40	30	30
Batticaloa	581.8	40	30	30
Trincomalee	613.5	45	30	25
Mullaithivu	577.9	40	30	30
Jaffna	608.9	40	30	30
Killinochchi	573.4	30	30	40
Mannar	469.3	30	30	40
Puttalam	511.4	30	30	40
Gampaha	898.4	45	30	25
Kegalle	1143.3	40	30	30
Ratnapura	990.5	20	30	50
Monaragala	587.0	30	30	40
Badulla	694.7	35	30	35
Pollonnaruwa	576.2	45	30	25
Vavuniya	545.8	40	30	30
Anuradapura	529.4	40	30	30
Kurunegala	643.9	40	30	30
Matale	667.0	45	30	25
Kandy	772.2	30	30	40
Nuwaraeliya	837.8	25	30	50

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

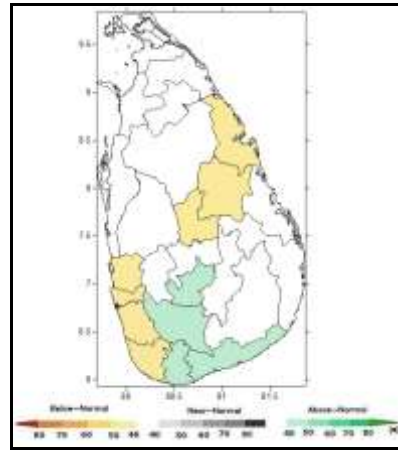


Fig 11: Probabilistic rainfall forecast for September –November 2024 using CPT

According to the CPT (Fig 11 and table 01), below normal rainfalls can be expected in Colombo, Gampaha, Kalutara, Galle, Mathale, Polonnaruwa and Trincomalee districts and above normal rainfalls are expected in Mathara, Hambantota, Rathnapura and Nuwara Eliya 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 SON Season 2024.

### **3.2 Multi-model ensemble mean forecast of NMME models**

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

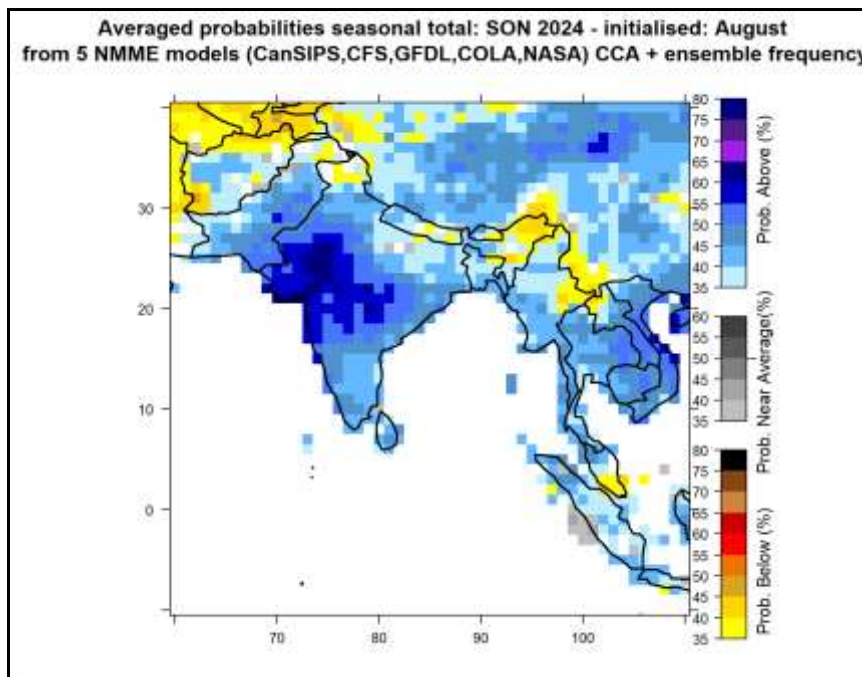


Fig 12. Average probability forecast of NMME models for SON 2024

According to the model above normal rainfall can be expected over most parts of the country except Northwestern province during the season. There is no clear signal indicated for Northwestern province and accordingly it can be expected below or about or above normal rainfall over the Northwestern province during the SON 2024 season.

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

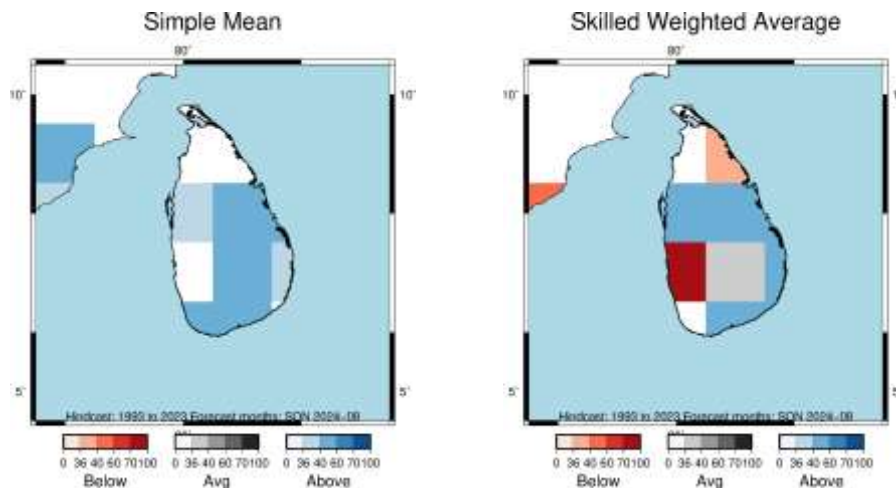


Fig 13. Probabilistic rainfall forecast for September-November 2024 using RIMES FOCUS System

Figure 13 depicts the Probabilistic rainfall forecast for SON 2024 season, which has been prepared by using RIMES FOCUS System. According to the model above normal rainfalls are likely over some areas in Northwestern, Northcentral, Eastern provinces and Southern parts of the country. There is a possibility of having near of slightly above normal rainfalls over Uva and Central provinces of the country during SON season 2024.

## 4. SUMMARY :

SUMMARY of MODEL FORECAST for SON 2024 season for SRI LANKA						
Season	WMO LC MME	WMO GPC	CPT	FOCUS	Impact of Global conditions	Final Rainfall Forecast
SON season 2024	AN	No Signal	AN-Nuwara Eliya, Rathnapura, Mathara and Hambantota BN- Colombo, Gampaha, Kalutara, Galle, Mathale, Polonnaruwa and Trincomalee No Signal- Elsewhere	AN-some areas in Northwestern, Northcentral, Eastern provinces and Southern parts of the country.  NN/AN – Uva, Central provinces		No signal
September 2024	AN-	AN- Western, Sabaragamuwa Southern,, Uva provinces and Nuwara Eliya and Ampara districts  No Signal - Elsewhere			ENSO neutral	Near normal over most parts
October 2024	AN- Western, Soouthern, Sabaragamuwa, Central and Uva provinces and Ampara district  No Signal- Elsewhere	No Signal			Possibility of Development of LaNina is 66%	Below normal over NW province and near normal over Northcentral,Uva,sabaragamuwa and Eastern Provinces and no signal elsewhere
November 2024	No Signal	No Signal			Possibility of Development of LaNina is 66%	No signal

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

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

### 4.1 Summary of prevailing global climate conditions

ENSO-neutral is expected to continue for the next several months, with La Niña favored to develop during September-November (66% chance) and persist into the Northern Hemisphere winter 2024-25 (74% chance during November-January).

The Indian Ocean Dipole (IOD) is currently neutral and most global model forecasts is favoured for a neutral IOD for upcoming season(source- BOM,Australia).

## 5. Consensus Seasonal outlook for September, October and November 2024

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

### 5.1 Rainfall forecast for the three months period during September-October-November (SON) 2024

There is no clear signal indicated for September- November 2024 and accordingly there is an equal probability for having below or near or above normal rainfalls over the country during September-November 2024 season (Fig. 14). **However if La Nina onset occurs in October or November 2024 (66% chance of La Nina onset during SON 2024) there is a possibility of below average rainfall over most parts of Sri Lanka during SON 2024. On the other hand development of the synoptic scale systems such as lows and depressions are also possible during the month. If so rainfall can increase.**

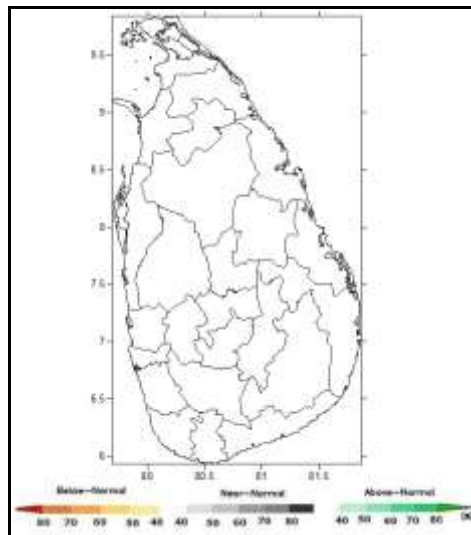


Fig 14. Consensus Probabilistic rainfall forecast for September–November 2024

### 5.2 Rainfall forecast for September 2024

There is a higher chance of having near normal rainfalls over most parts of the country during the month of September 2024. Generally there is a possibility for developing atmospheric disturbances during the month, particularly during latter part of the month.

### 5.3 Rainfall forecasts for October 2024

There is a probability of below normal over Northwestern province and near normal rainfalls over Northcentral, Uva, Sabragamuwa and Eastern provinces. There is no clear signal for other areas during the month of October 2024.

However there is a possibility for developing low pressure systems, depressions or cyclones during the month. If so rainfall will increase over most parts.

#### 5.4 Rainfall forecasts for November 2024

According to the available global model forecasts, there is no clear signal to issue a rainfall forecast for the month of November 2024. As such there is a equal probability for having below or near or above normal rainfalls over the country during the month of November 2024. **However if La Nina onset occurs in October or November 2024 (66% chance of LaNina onset during SON 2024) there is a higher possibility of below average rainfall over most parts of Sri Lanka during November 2024. On the other hand development of the synoptic scale systems such as lows and depressions are also possible during the month. If so rainfall can increase.**

\*\*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 September to November 2024 (SON 2024)

The probabilistic Temperature forecast for September, October and November 2024 (SON 2024) season for Sri Lanka as given below.

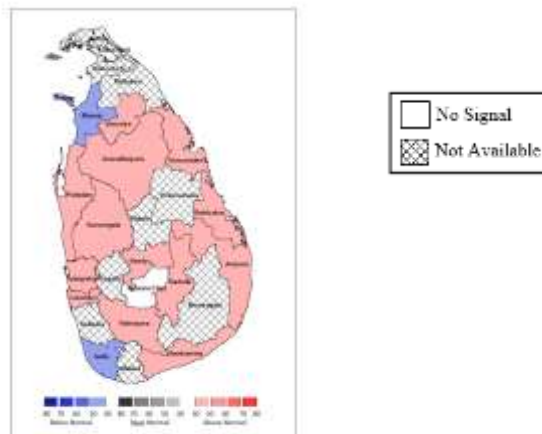


Fig 15: Probabilistic forecast for Maximum Temperatures for SON season 2024

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

There is a higher chance of experiencing slightly above the normal Maximum Temperatures in Vavuniya, Anuradapura, Kurunegala, Puttalam, Gampaha, Colombo, Hambantota, Rathnapura, Kandy, Badulla, Ampara, Batticaloa and Trincomalee districts and below the normal Maximum Temperatures in Mannar and Galle districts (Fig 15) for the SON 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) – (ASO) (1981-2010)	Probability %		
		Below	Normal	Above
Anuradhapura	32.4	30	30	40
Badulla	29.2	30	30	40
Batticaloa	31.2	25	35	40
Colombo	30.4	25	30	45
Galle	29.4	40	35	25
Hambantota	30.5	30	30	40
Katugastota	28.7	25	30	45
Katunayake	30.8	30	30	40
Mannar	30.6	40	30	30
MahaIlluppallama	31.8	30	30	40
NuwaraEliya	19.6	35	30	35
Pottuvil	32.3	30	30	40
Puttalam	31.3	30	30	40
Ratnapura	31.1	25	30	45
Ratmalana	31.0	25	30	45
Trincomalee	32.2	30	30	40
Vavuniya	32.5	30	30	40
Kurunegala	31.4	25	30	45
Bandarawela	24.9	25	30	45

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

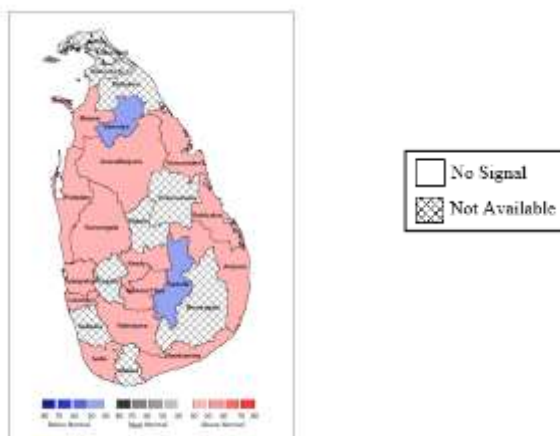


Fig 16: Probabilistic forecast for Minimum Temperatures for SON season 2024

District	Average Minimum Temperature (°C) – (SON) (1981-2010)	Probability %		
		Below	Normal	Above
Anuradhapura	23.8	30	30	40
Badulla	18.9	40	30	30
Batticaloa	24.5	30	30	40
Colombo	24.4	30	30	40
Galle	24.6	30	30	40
Hambantota	24.3	30	30	40
Katugastota	20.4	30	30	40
Katunayake	23.9	30	30	40
Mannar	25.4	40	30	30
MahaIlluppallama	23.3	30	30	40
NuwaraEliya	12.4	30	25	45
Pottuvil	24.0	30	30	40
Puttalam	24.4	30	30	40
Ratnapura	23.0	30	30	40
Ratmalana	24.4	30	30	40
Trincomalee	24.6	30	30	40
Vavuniya	23.3	25	30	45
Kurunegala	22.9	30	30	40
Bandarawela	16.8	40	30	30

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

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

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