

# Climate Out Look –Southwest Monsoon 2021



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## *Outline*

*1. Climatology*

*2. Observed rainfall during past seasons*

*3. Seasonal forecast for Southwest monsoon 2021*

*3. Summary and Conclusion*

# Rainfall Distribution in Four Seasons

M A M J J A S O N D J F

March-April

FIM

May-Sep

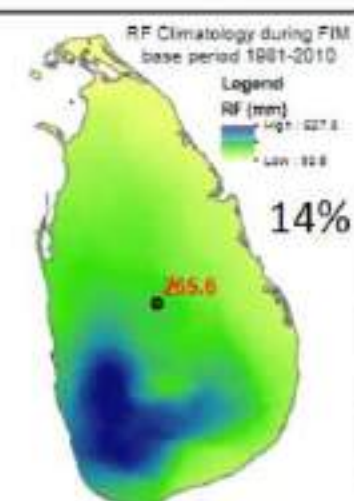
SW Monsoon

October-November

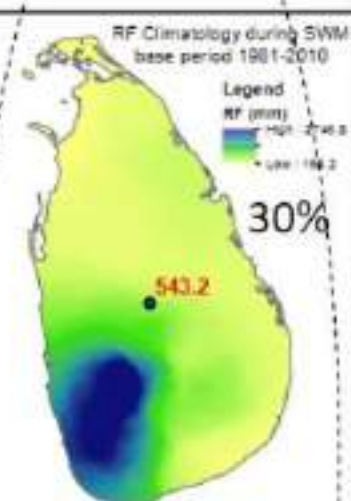
SIM

December-February

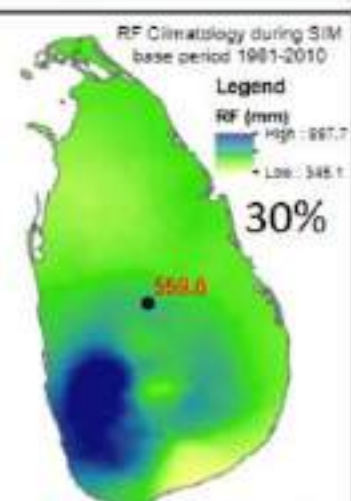
NE Monsoon



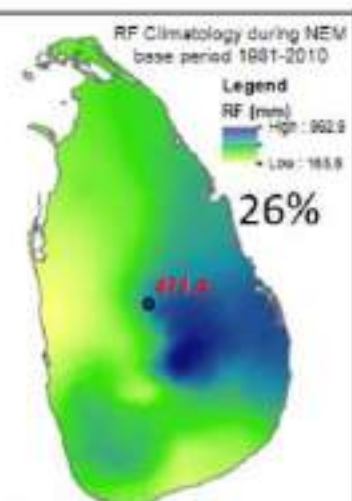
Spatially averaged rainfall-(Country wise)



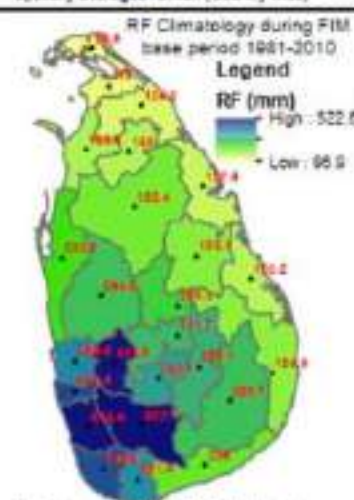
Spatially averaged rainfall-(Country wise)



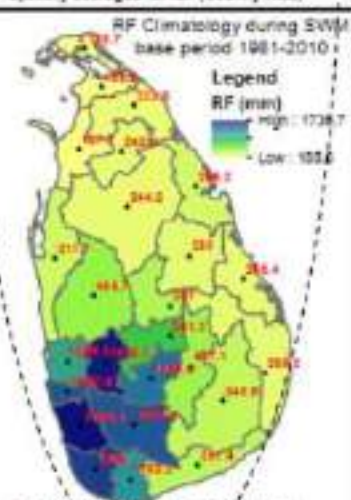
Spatially averaged rainfall-(Country wise)



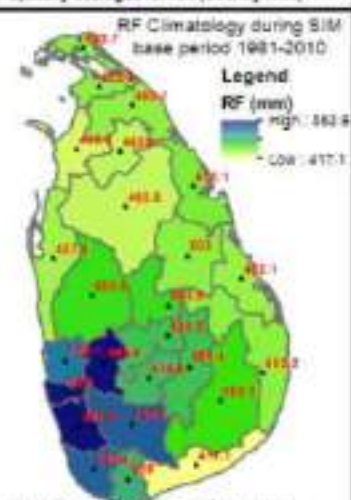
Spatially averaged rainfall-(Country wise)



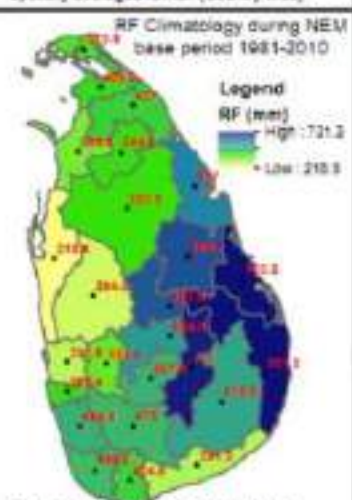
Spatially averaged rainfall-(District wise)



Spatially averaged rainfall-(District wise)



Spatially averaged rainfall-(District wise)



Spatially averaged rainfall-(District wise)

**First Inter Monsoon Season (FIM)**

*March-April*

**South West Monsoon Season (SWM)**

*May - September*

**Second Inter Monsoon Season (SIM)**

*October-November*

**North East Monsoon Season (NEM)**

*December - March*

# Observed Rainfall during 2<sup>nd</sup> Inter-monsoon (October-November) 2020

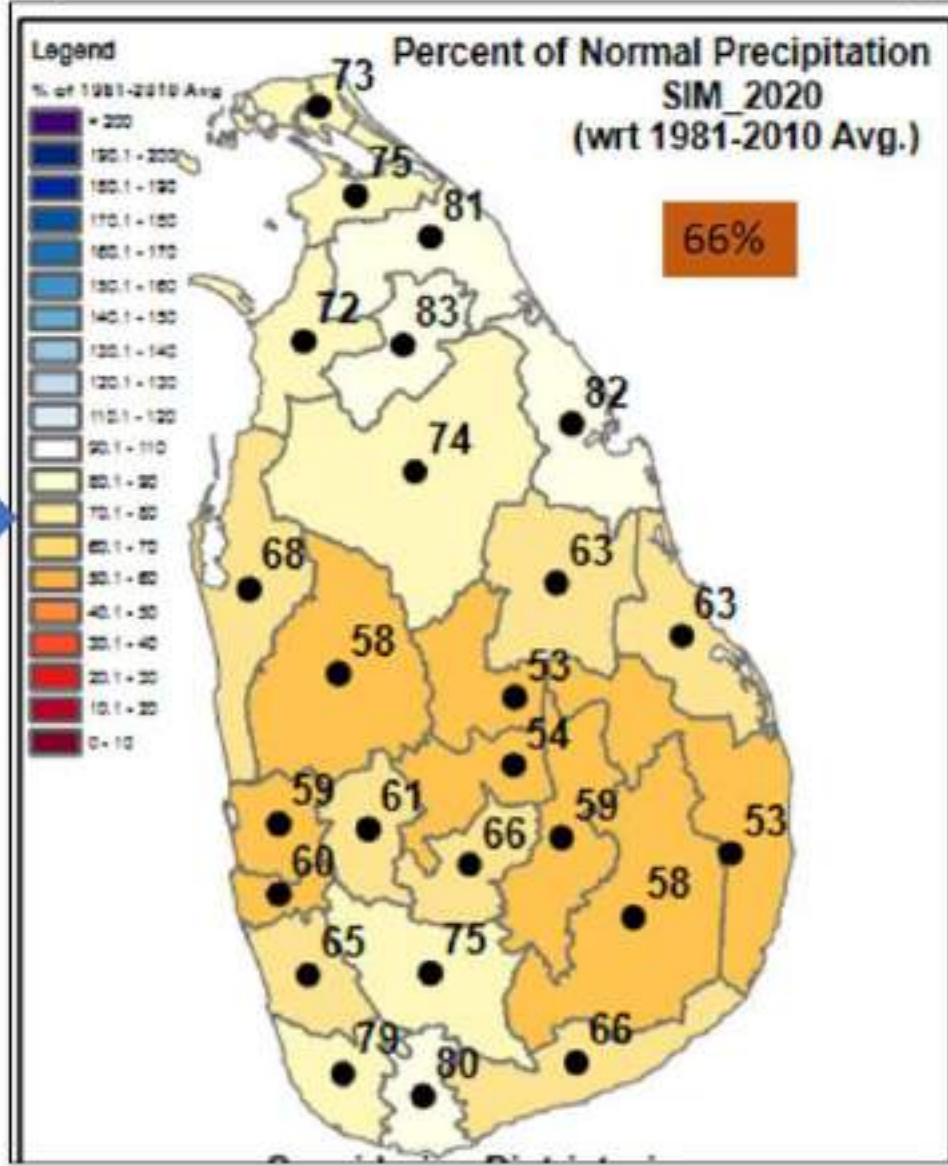
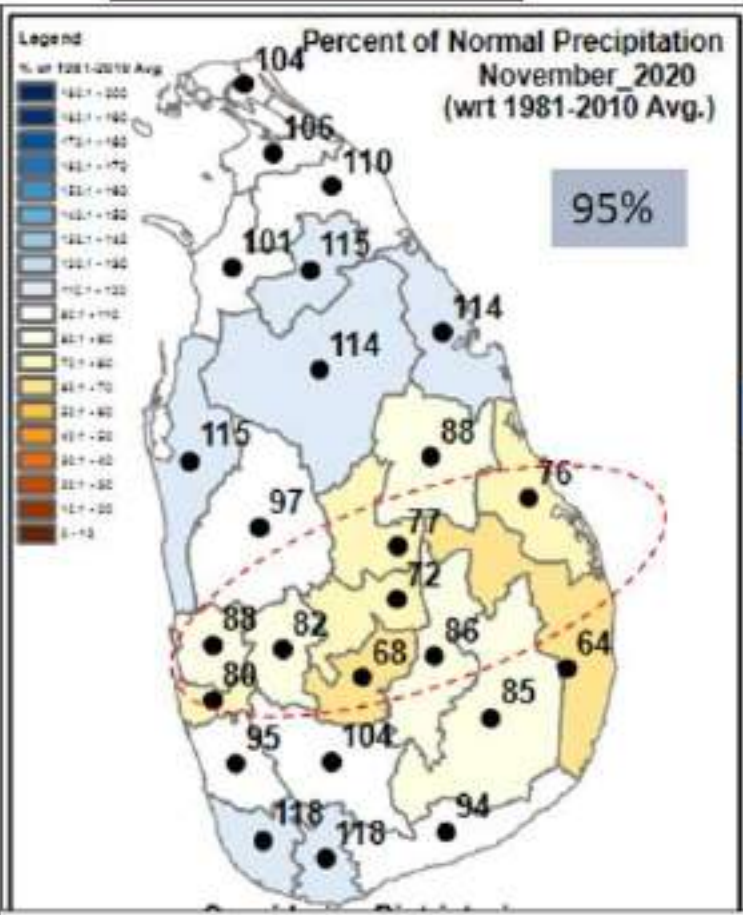
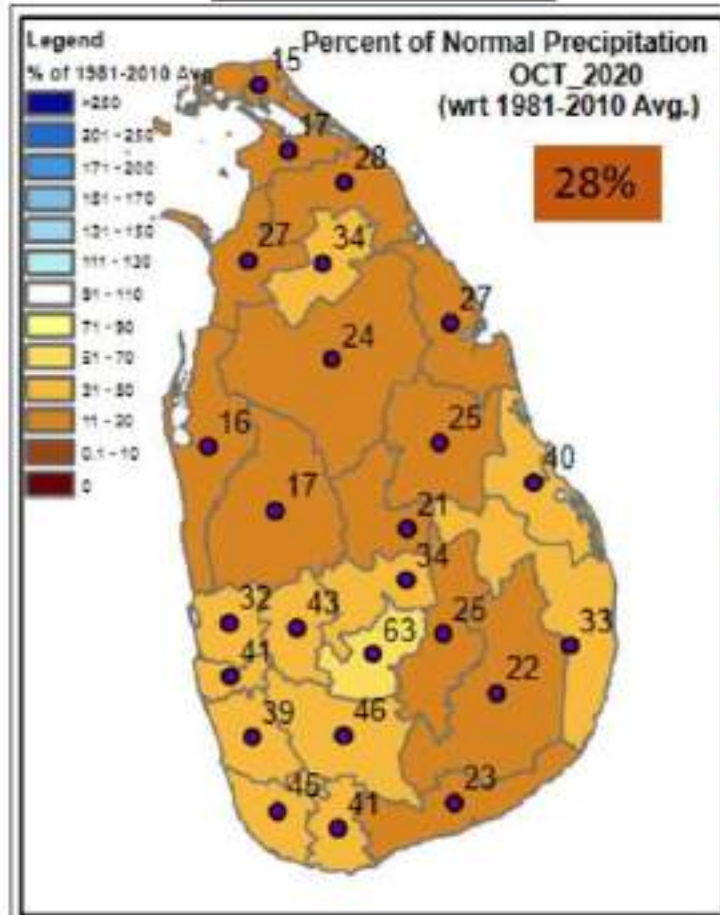
Observed Monthly rainfall as a percentage of Normal(1981-2010) rainfall

Total rainfall (%) during Octo-Nov 2020

October 2020

November 2020

Total rainfall (%) during Octo-Nov 2020

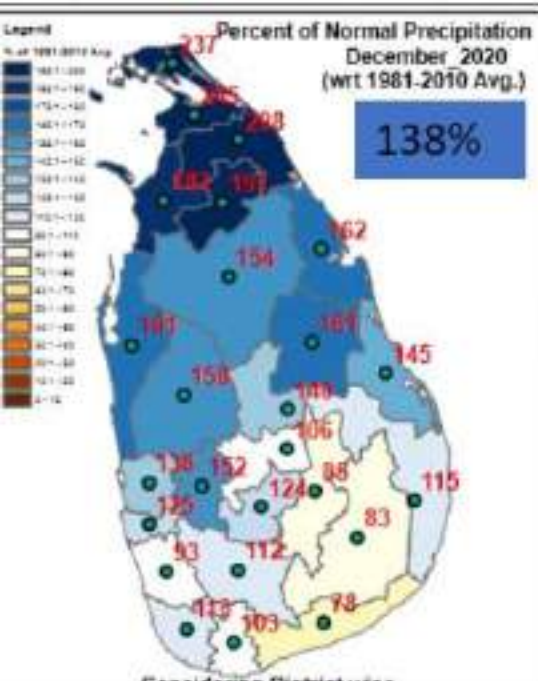


# Observed Rainfall during Northeast Monsoon 2020

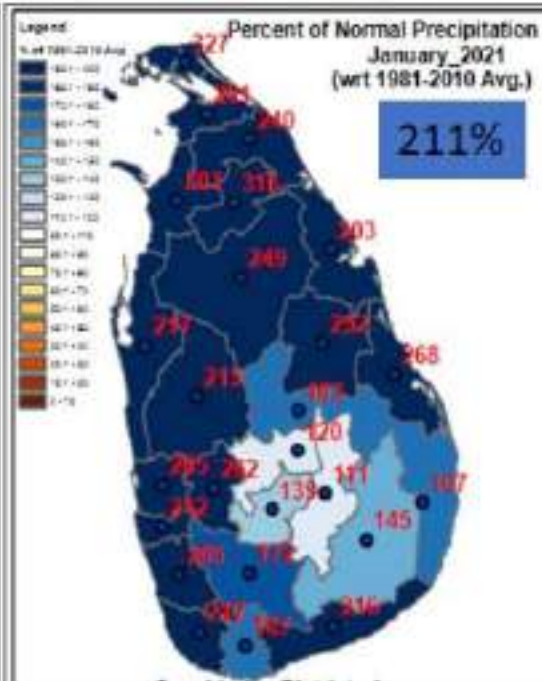
December 2020-January 2021-February 2021

Observed Monthly rainfall as a percentage of Normal(1981-2010) rainfall

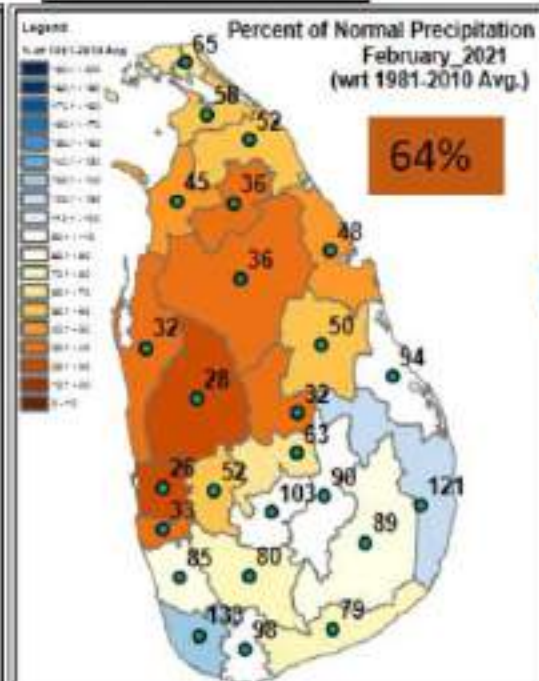
December 2020



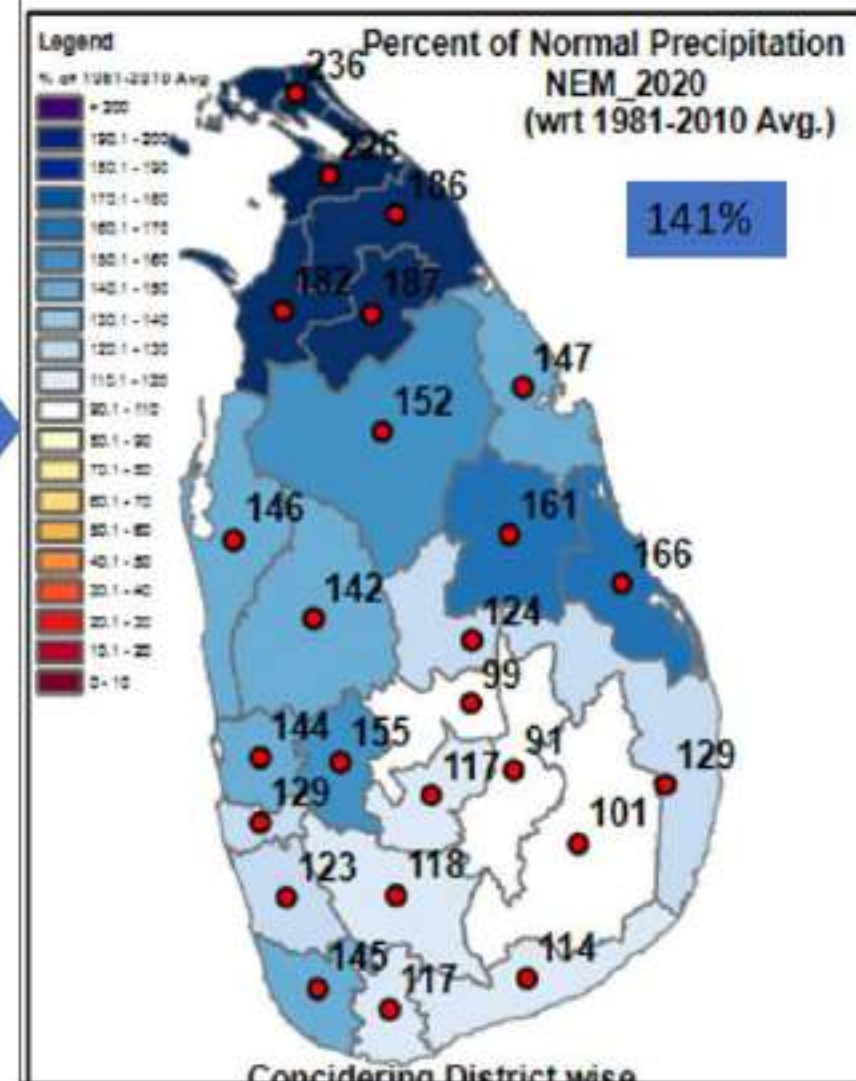
January 2021



February 2021



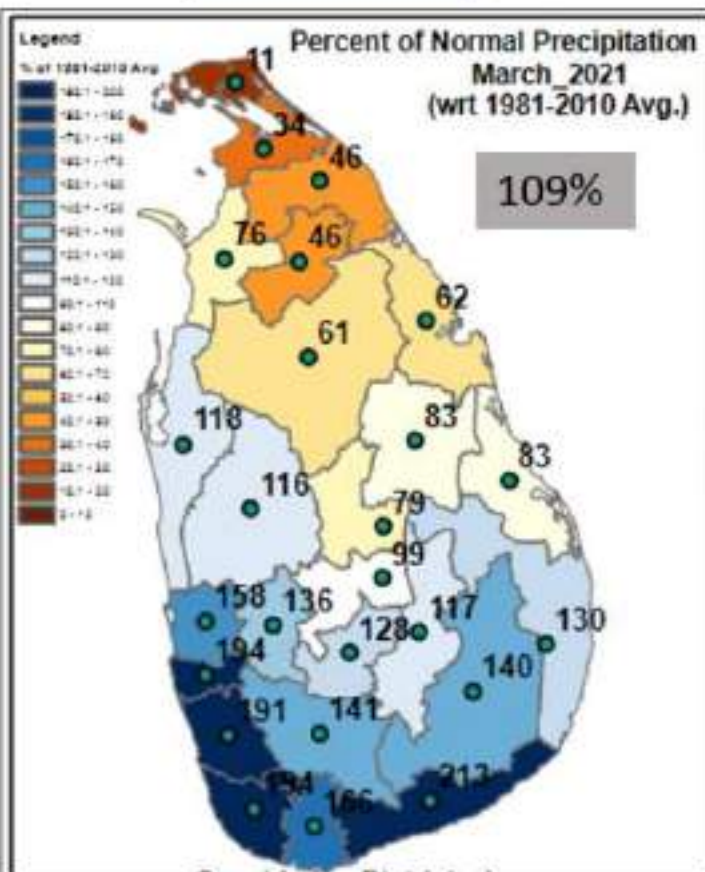
Total rainfall(%) during NE Monsoon 2020



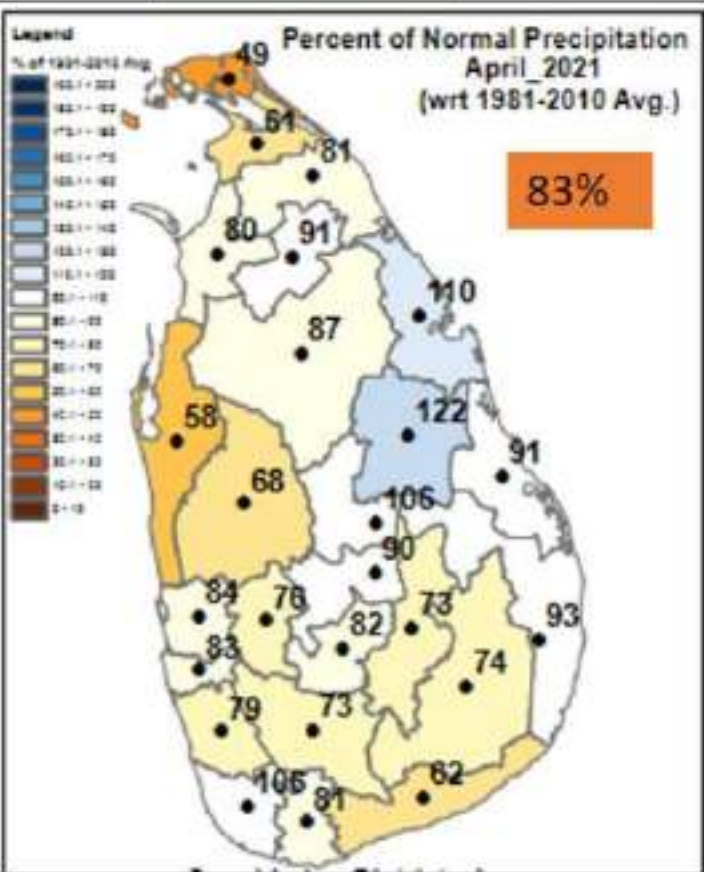
# Observed Rainfall during 1<sup>st</sup> Inter Monsoon March-April 2021

Observed Monthly rainfall as a percentage of Normal(1981-2010) rainfall

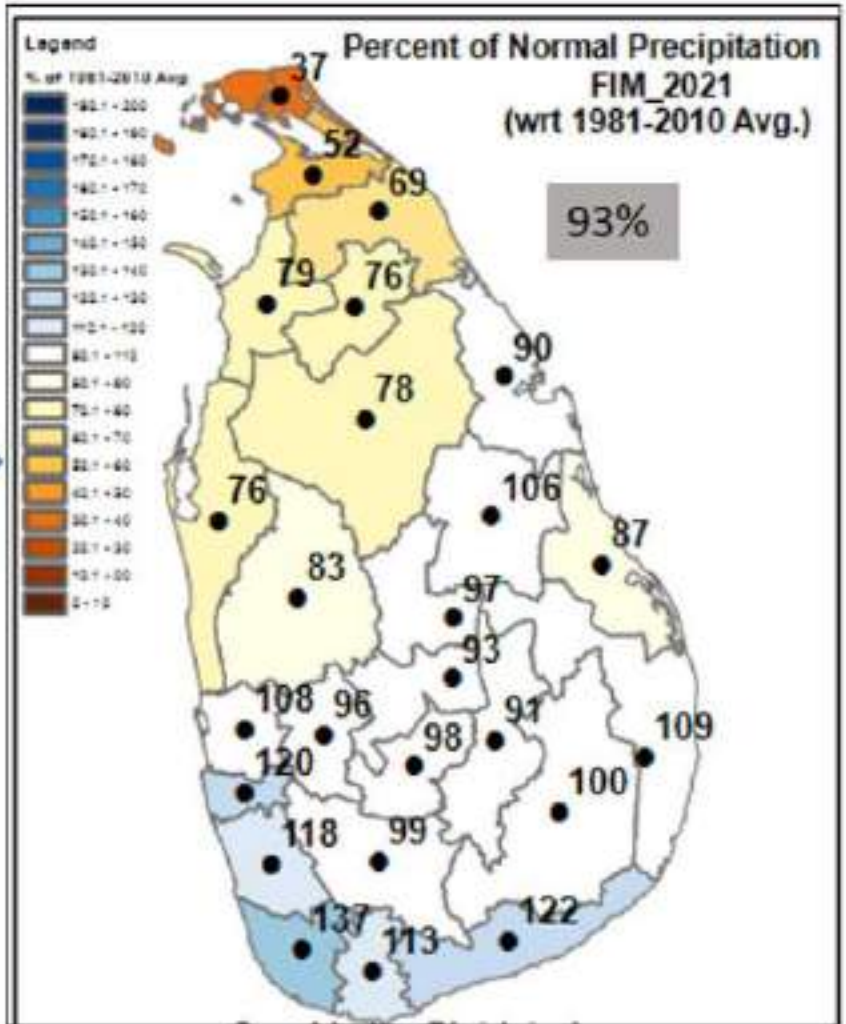
March 2021



April 2021



Total rainfall(%) during 1<sup>st</sup> Inter monsoon



# DoM Seasonal Prediction Process

We use WMO-Global  
Producing Centres  
global models  
Regional models

**PREDICTING  
SEASONAL WEATHER**

The prevailing global climate conditions.

Forecasts from different climate models around the world.

- Ensemble forecast from WMO GPC (10)
- 13 Individual Dynamical models from WMO
- Statistical downscaling of GCM output using CPT
- Probabilistic Forecast using RIMES FOCUS System
- probabilistic rainfall forecast using a regression model developed with guidance provided by Tokyo Climate Center (TCC)
- Dynamic ensemble forecast (CLICK)



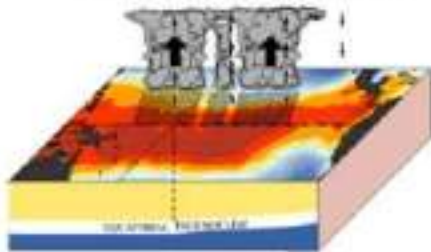
Seasonal forecast is prepared by using various climate model outputs together with the prevailing global climate conditions and research outcomes done by the DoM.



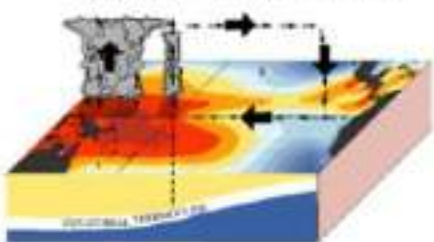
# Global Climate Drivers

## El Niño

December - February El Niño Conditions

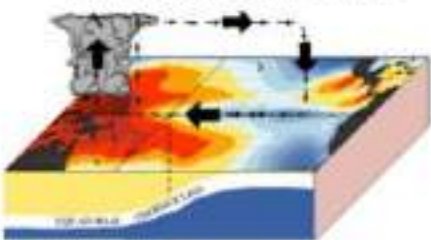


December - February Normal Conditions

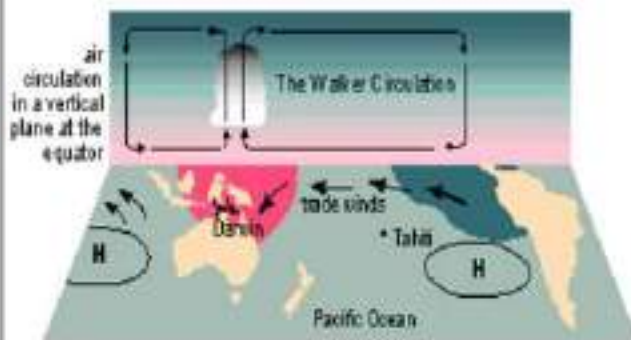


## La Niña

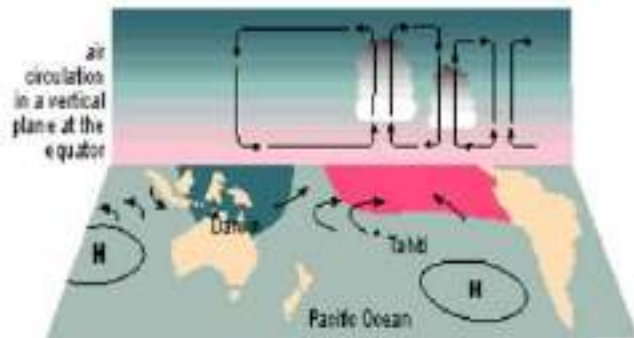
December - February La Niña Conditions



## Typical Walker circulation pattern



## Walker circulation during El Niño



■ warmer sea   
 ■ cooler sea   
 (H) typical summer positions of high pressure systems   
 ↖ surface winds

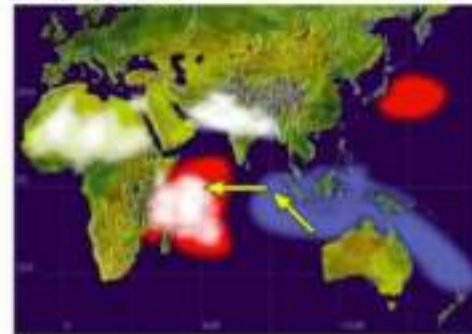
# ENSO - El Niño - Southern Oscillation (ENSO)

## IOD - Indian Ocean Dipole

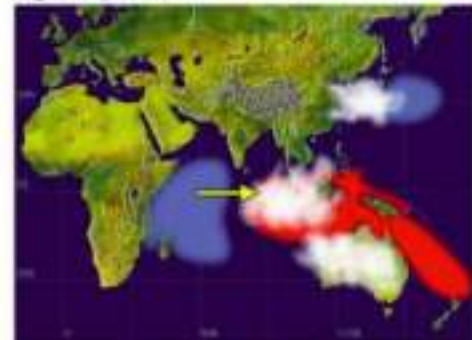
## MJO - Madden Julian Oscillation

## IOD

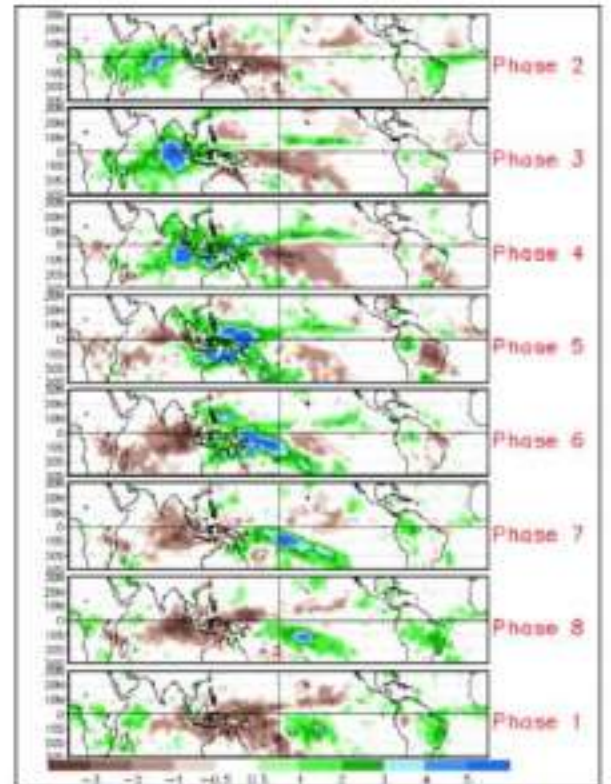
Positive Dipole Mode



Negative Dipole Mode



## MJO





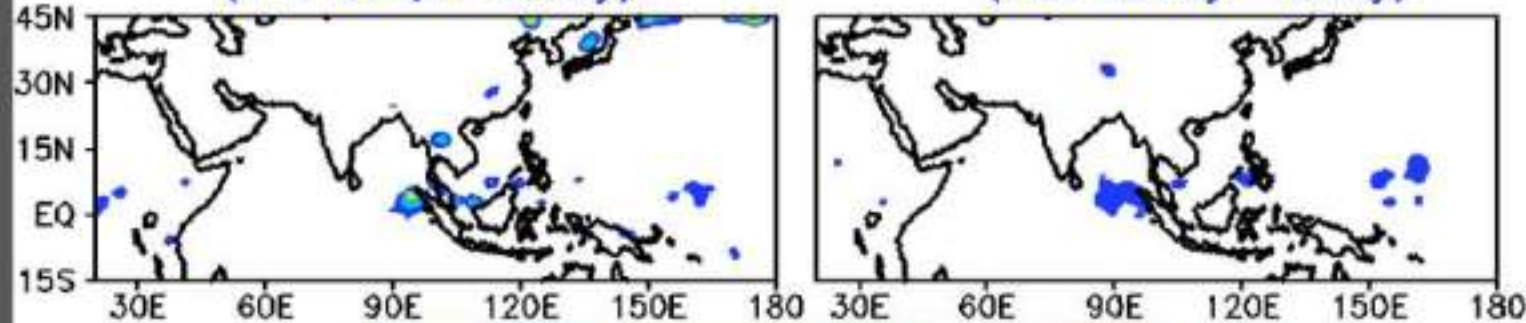
# CYCLOGENESIS POSSIBILITY DURING MONTH OF MAY 2021

Synoptic scale systems such as lows and depressions in Bay of Bengal to start the Southwest monsoon conditions

## Cyclogenesis & Evolution Probability (%) from MME

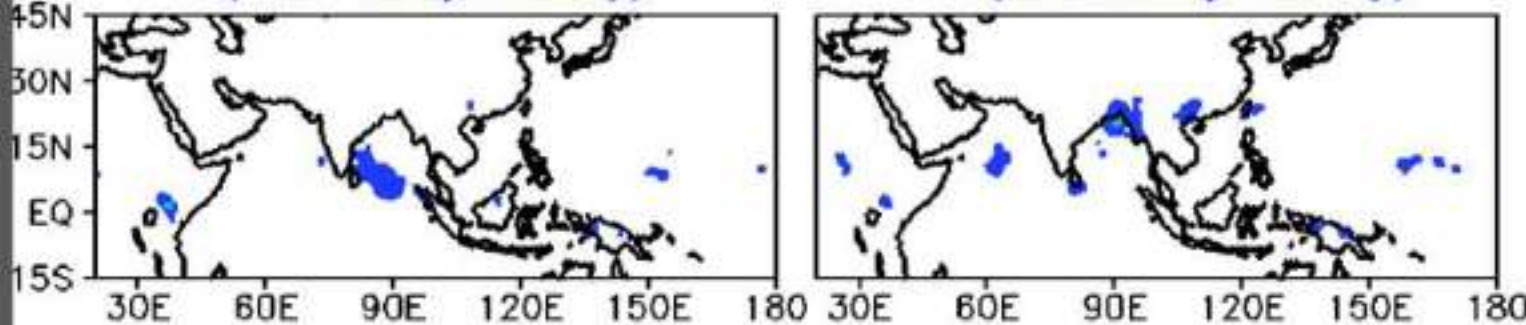
(W1: 29Apr-05May)

(W2: 06May-12May)

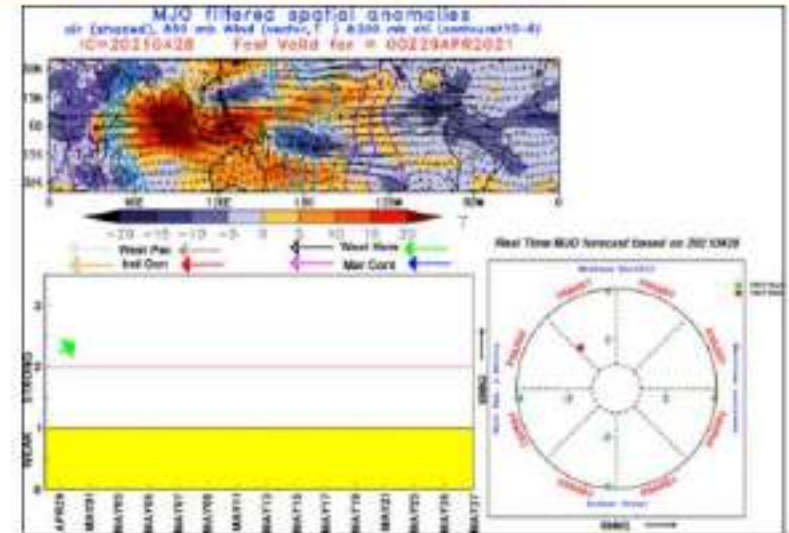


(W3: 13May-19May)

(W4: 20May-26May)



## MJO - Madden Julian Oscillation



# South Asian Climate Outlook Forum (SASCOF) OUTLOOK-JJAS 2021

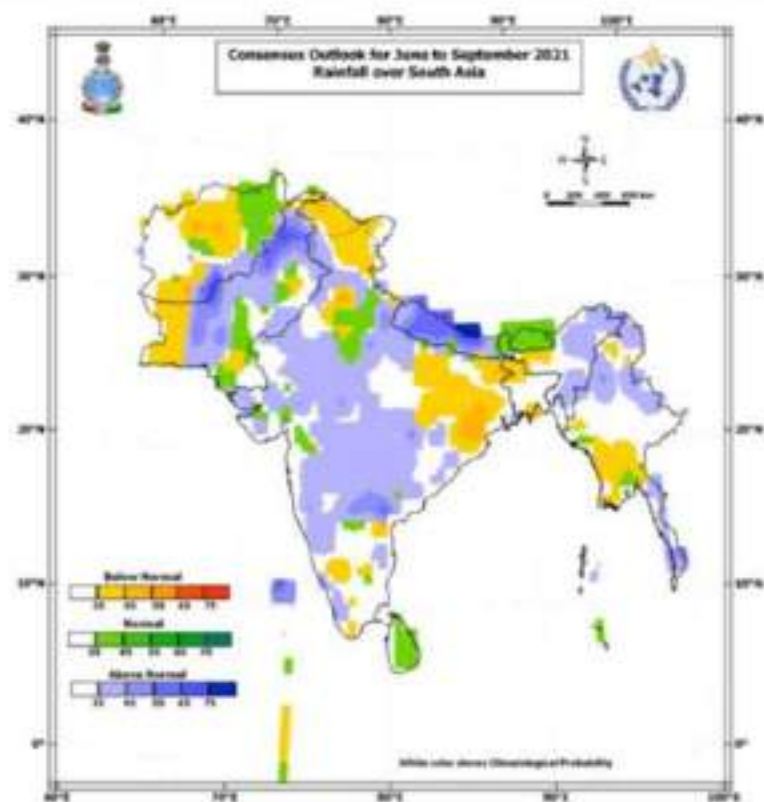


Fig.1a. Probability of the most likely tercile category for the 2021 southwest monsoon rainfall over South Asia. White areas within the land regions indicate tercile categories of equal climatological probabilities of 33.33% each.

India  
Pakistan  
Afghanistan  
Nepal  
Myanmar  
Sri Lanka  
Maldives  
Bangladesh  
Bhutan

WMO  
Uk met office  
ECMWF  
IRI  
JMA  
IMD  
KMA



DoM

# Rainfall Forecast-MJJAS 2021

Near Normal Rainfall during MJJAS 2021



# South Asian Climate Outlook Forum (SASCOF) OUTLOOK (JJAS)

## Maximum Temperature

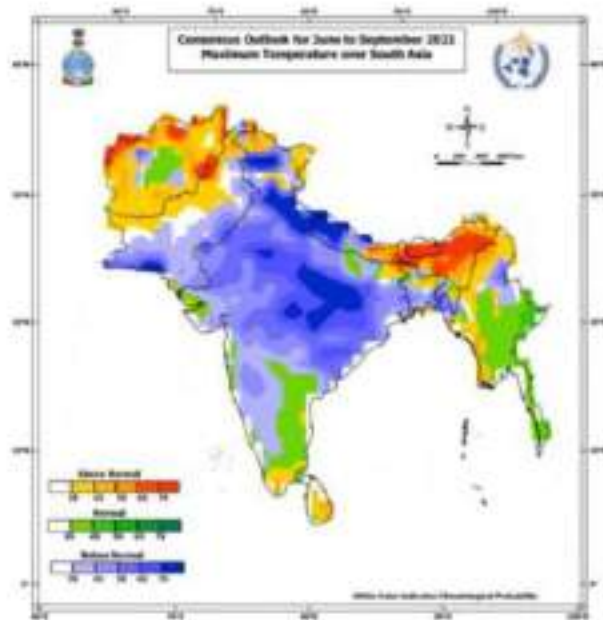


Fig.1c. Probability of the most likely tercile category for the 2021 southwest monsoon season (June to September 2021) Maximum Temperature and over South Asia. White areas within the land regions indicate tercile categories of equal climatological probabilities of 33.33% each.

## Minimum Temperature

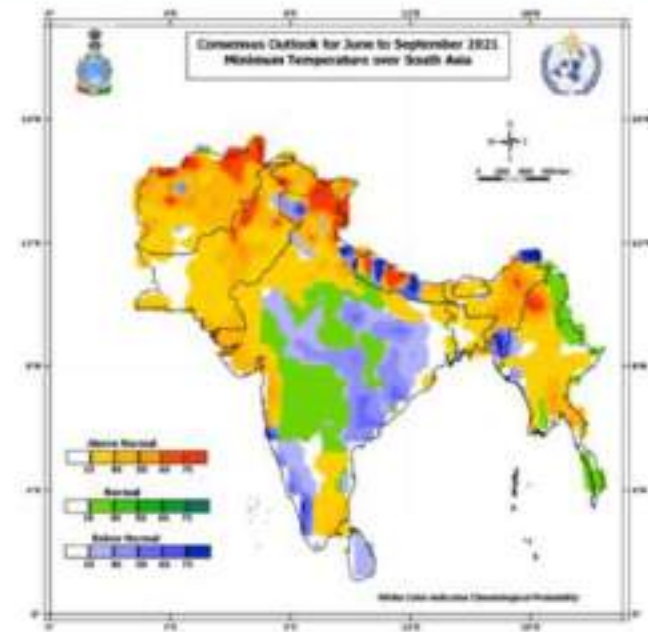


Fig.1b. Probability of the most likely tercile category for the 2021 southwest monsoon season (June to September 2021) Minimum Temperature and over South Asia. White areas within the land regions indicate tercile categories of equal climatological probabilities of 33.33% each.

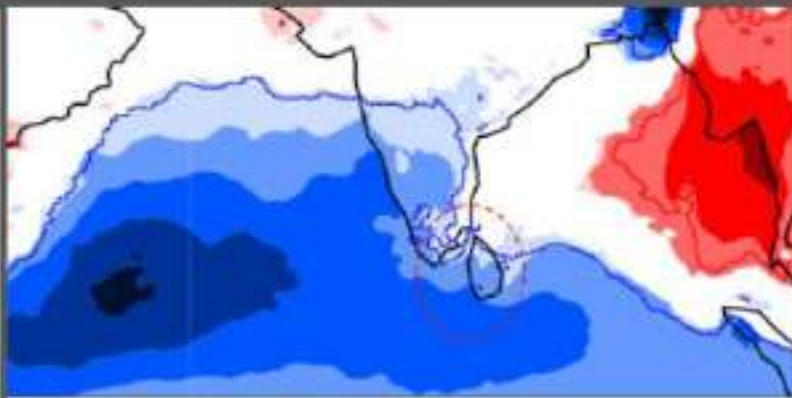
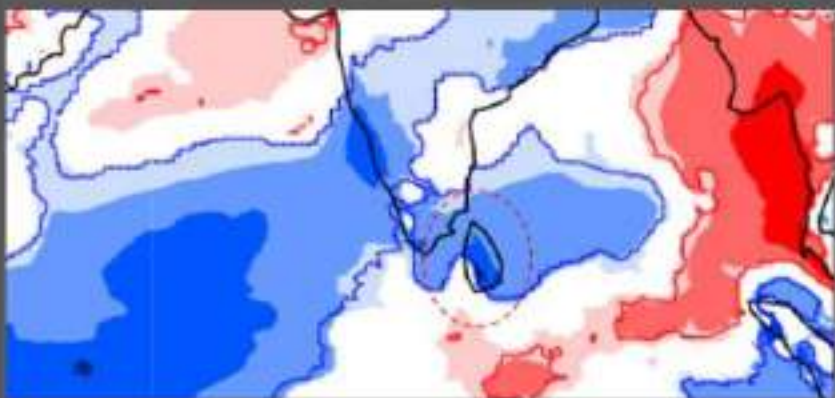
# Weather Forecasts for Next Four Weeks

## Onset of SW monsoon 2021?

Legend for precipitation anomalies (mm):  
-90mm, -90..-60, -60..-30, -30..-10, -10.. 0, 0.. 10, 10.. 30, 30.. 60, 60.. 90, > 90mm

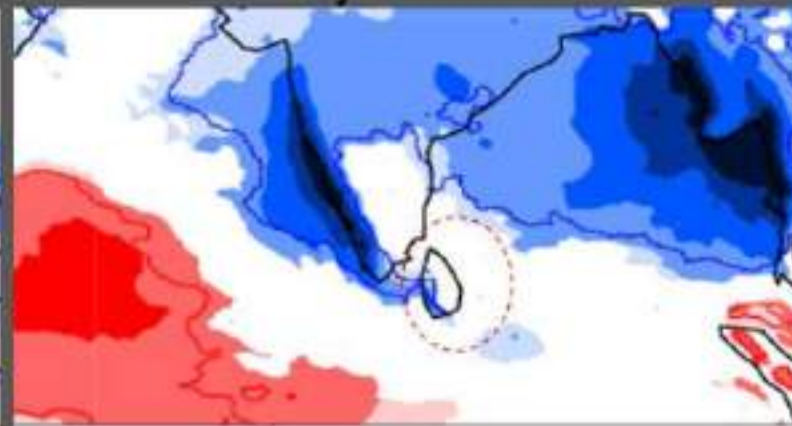
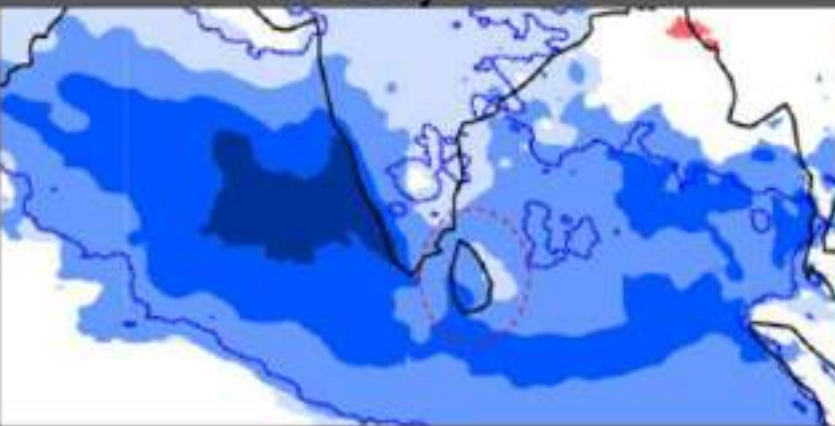
3-9 May 2021

10-16 May 2021



17-23 May 2021

24-30 May 2021



ECMWF EPS-Monthly Forecasting System

Precipitation anomaly

Forecast start reference is 29-04-2021  
ensemble size = 51 , climate size = 660

## Weekly Anomaly

### Forecast

Above normal rainfall is expected over the South Western parts of Sri Lanka from 10<sup>th</sup> May.

ECMWF EPS-Monthly Forecasting System

Precipitation anomaly

Forecast start reference is 03-05-2021  
ensemble size = 51 , climate size = 660

Heavy Rain



POSSIBLE DISASTERS DURING MONSOON SEASON- Even Near normal???

Low/Depressions/Cyclones



Floods



Strong winds



Landslides



Drought- in Northern half



Rough Seas





## ➤ Summery

- Near normal rainfall is likely during the 2021 May – September season.
- However ,in the month of May there is a possibility for development of low pressure systems over the Bay of Bengal which influence the rainy condition over Sri Lanka ,Particularly over Southwestern part of the country.
- Currently neutral El Niño/Southern Oscillation (ENSO) conditions are prevailing in the Pacific Ocean and Indian Ocean Dipole is also in the normal mode over the Indian Ocean.
- Normal to slightly above normal temperatures are likely, over most parts of the region.
- Seasonal predictability is limited due to synoptic scale systems such as lows and depressions etc. and intra-seasonal Oscillations such as Madden Julian Oscillations (MJO).

seasonal  
forecast

Monthly  
forecast

Weekly  
forecasts

Daily  
forecasts

Bad Wx  
Warnings

[www.meteo.lk](http://www.meteo.lk)

Thank you

# Seasonal Forecasts

## Seasonal Forecast

- It consists with rainfall and temperature forecasts for next 3 months along with individual monthly forecasts.

## Monthly Forecast

## Weekly forecast

- Weekly briefing for the requested parties( agriculture/water sectors) on each Monday

# Updates of National Forecasts



සමුදාය මත දැක්වෙමින්  
සාමාන්‍ය මාසික දිනපතර දැක්වීම  
DEPARTMENT OF METEOROLOGY  
දෙපාර්තමේන්තුව  
SRI LANKA

Consensus Seasonal Weather Outlook  
August, September and October (ASO)  
Seasonal Rainfall and Temperature for Sri Lanka

This forecast was prepared using

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



සමුදාය මත දැක්වෙමින්  
සාමාන්‍ය මාසික දිනපතර දැක්වීම  
DEPARTMENT OF METEOROLOGY  
දෙපාර්තමේන්තුව  
SRI LANKA

Monthly and weekly Rainfall Forecasts for September 2020  
Issued on 17<sup>th</sup> September 2020 by Forecast Issuance Division of the Department of Meteorology, Sri Lanka.

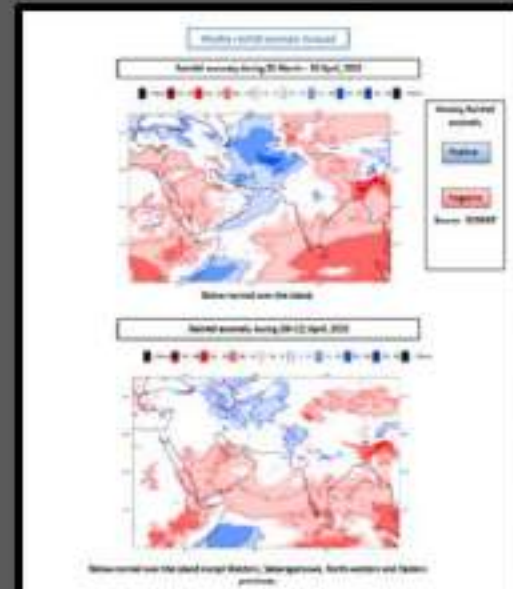
According to the global consensus model output and prevailing atmospheric conditions, following monthly and weekly rainfall forecast are prepared.

**Monthly Rainfall Forecast for September 2020**

Above normal rainfall is likely over most parts of the country during the month of September 2020 followed by heavy condition is expected during the first week of the month, particularly over southern part of the country.

Other meteorological news will be issued as and when it arises.

However, the probability is also limited due to strong day to day atmospheric variability caused.



Monthly forecast

Weekly forecasts

[www.meteo.lk](http://www.meteo.lk)