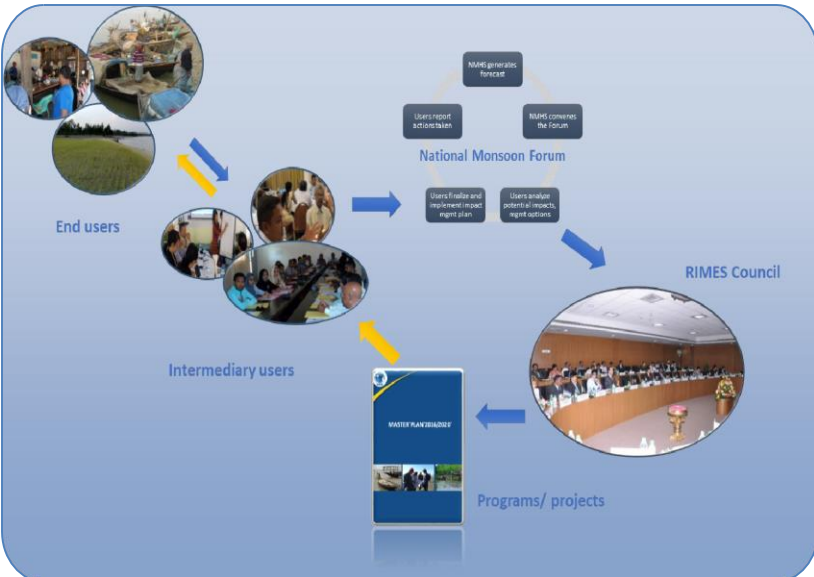


# Department of Meteorology Responsibilities And Tasks

Venue: Four Seasons Hall, Shanghai Expo Riverside Hotel-26th July ,2025



Climate Change CDAAS



Agriculture



**Athula Karunanayake**  
**Director General**  
**Department of Meteorology**

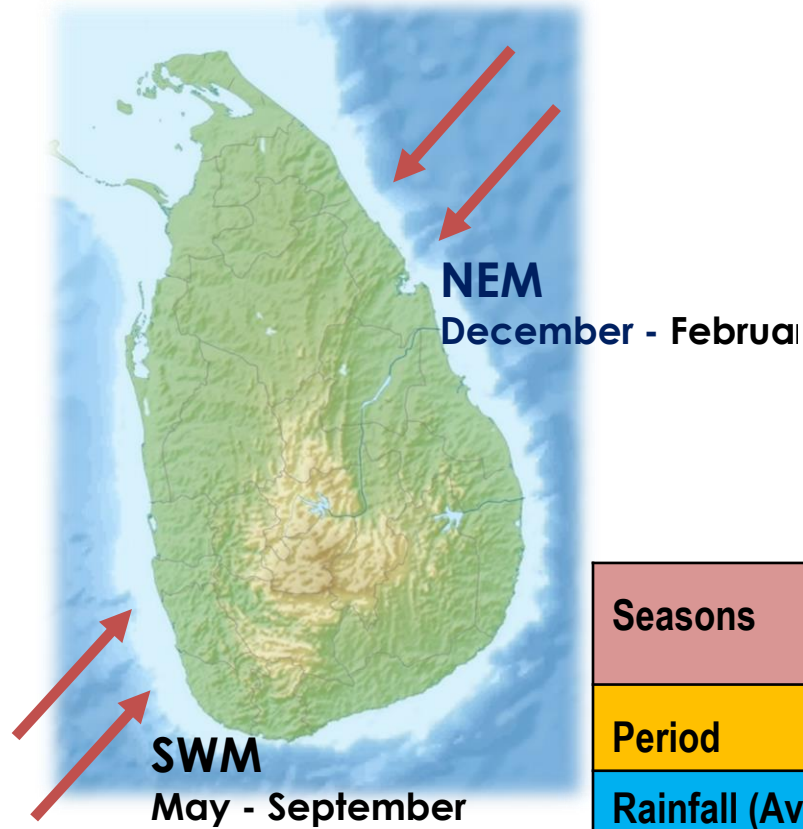
# Table Of Contents

- 1. Current Responsibilities of the Department of Meteorology**
- 2. Climate Over Sri Lanka**
- 3. Meteorological Observation Network of Sri Lanka**
- 4. Provider of meteorological data and products – Met Services**
- 5. Weather Forecasting and Early Warning System**
- 6. Climate Projection**
- 7. Indian Ocean Tsunami Warning and Mitigation Services (IOTMWS)**
- 8. Department of meteorology current projects**

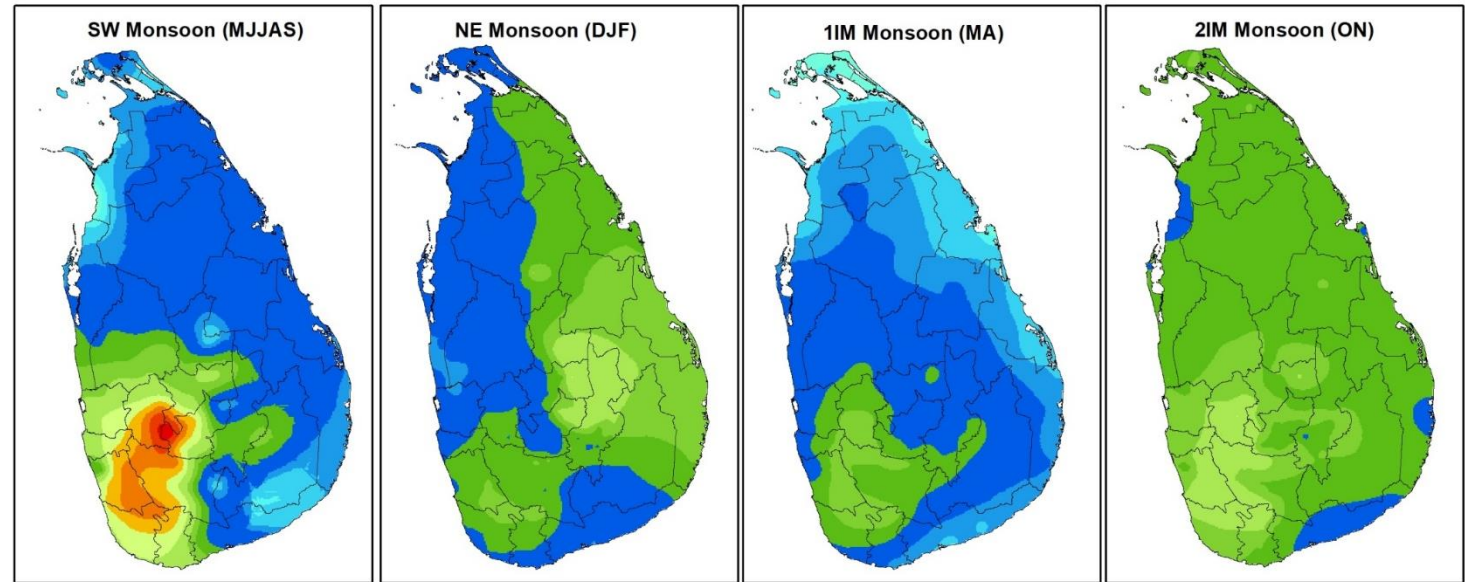
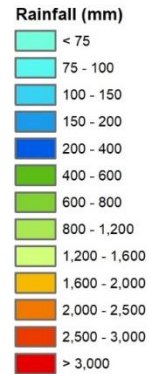
# Current Responsibilities of the Department of Meteorology

## Climate Over Sri Lanka

### Seasonal Weather Forecast



### 30 Year Climatological Average (1961-1990)



Seasons	Southwest Monsoon	Northeast Monsoon	First Inter-monsoon	Second Inter-monsoon
Period	May-Sep	Dec-Feb	Mar-Apr	Oct-Nov
Rainfall (Average)	556 mm	479 mm	268 mm	558 mm
% of Annual Average	30%	26%	14%	30%

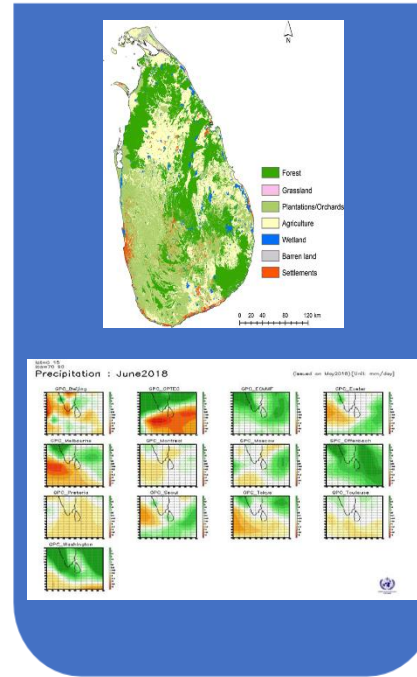
# Provider of meteorological data and products – Met Services



## Weather Observation



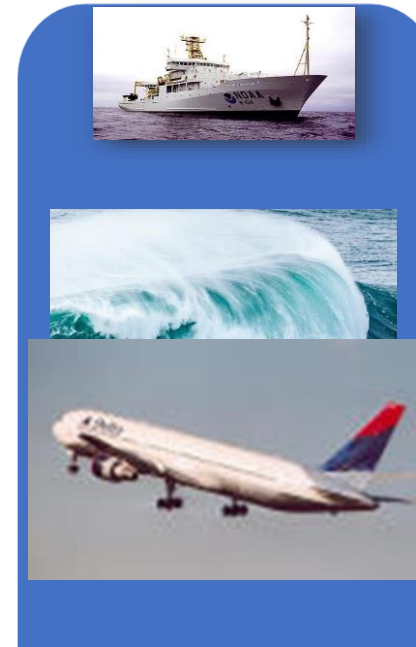
## Seasonal and Agricultural Weather Forecast/Alert



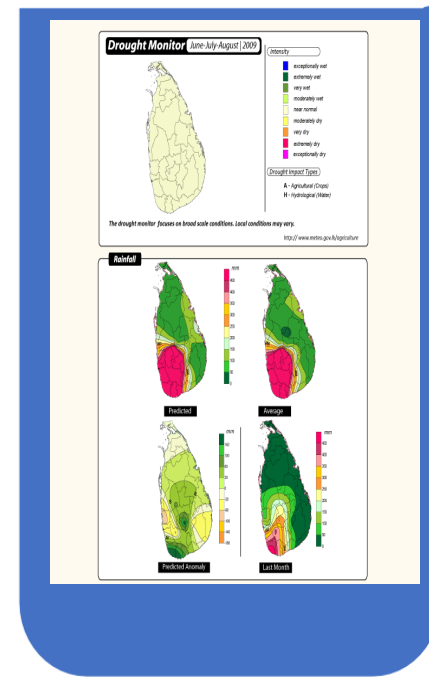
## Weather Forecast



## Aviation & Marine Forecast TSUNAMI WARNING



## Climate Projection



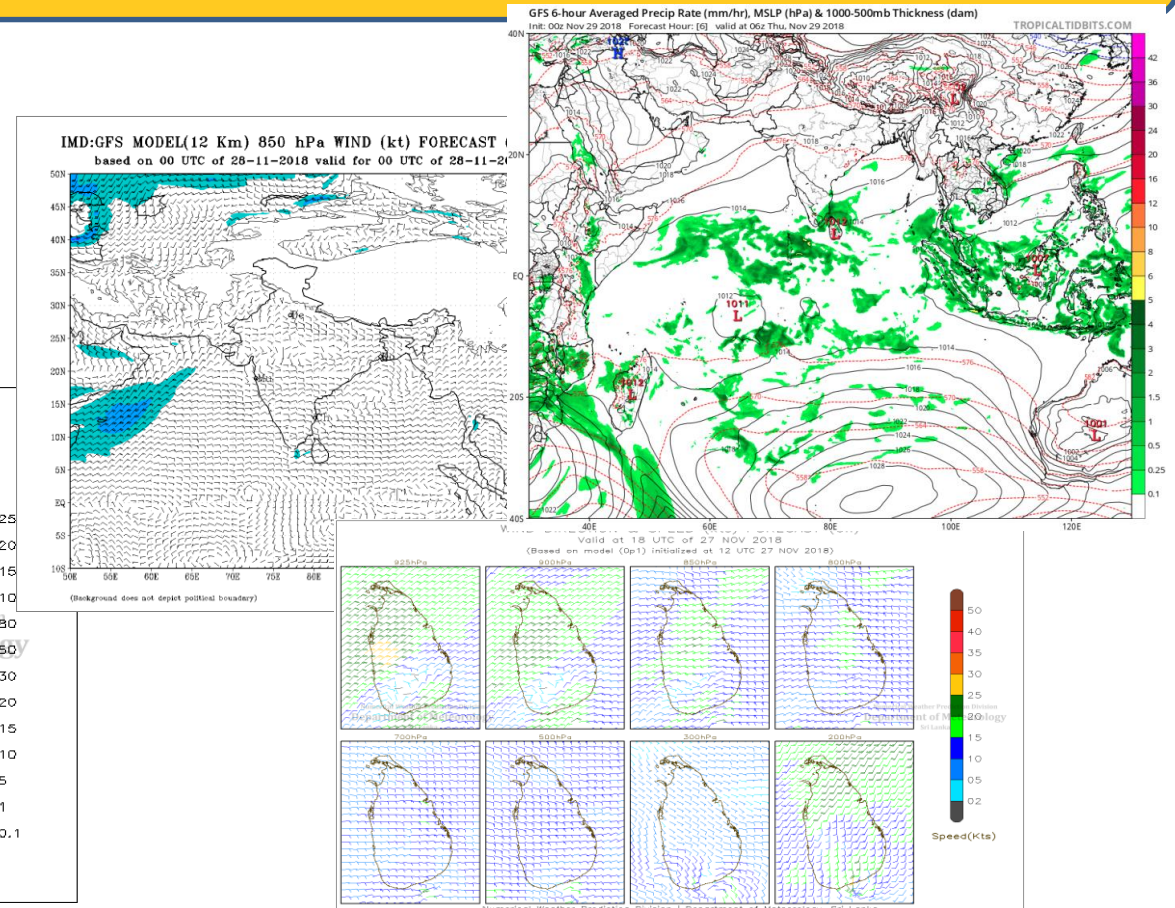
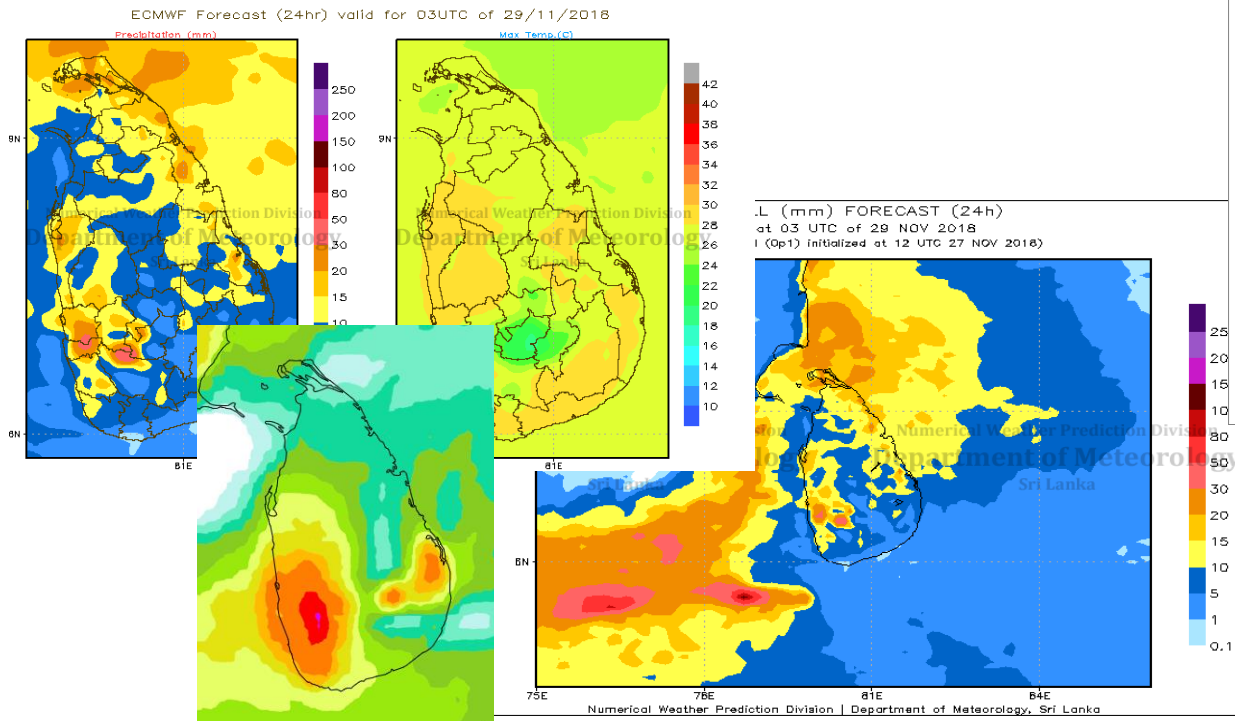
# Weather Forecasting and Early Warning System

NWP Product used as a guidance

Numerical weather prediction (NWP) uses mathematical models of the atmosphere and oceans to predict the weather based on current weather conditions.

ECMWF products 

- ▶ 0.1 degree model outputs
- ▶ 2 times a day (00Z, 12Z)

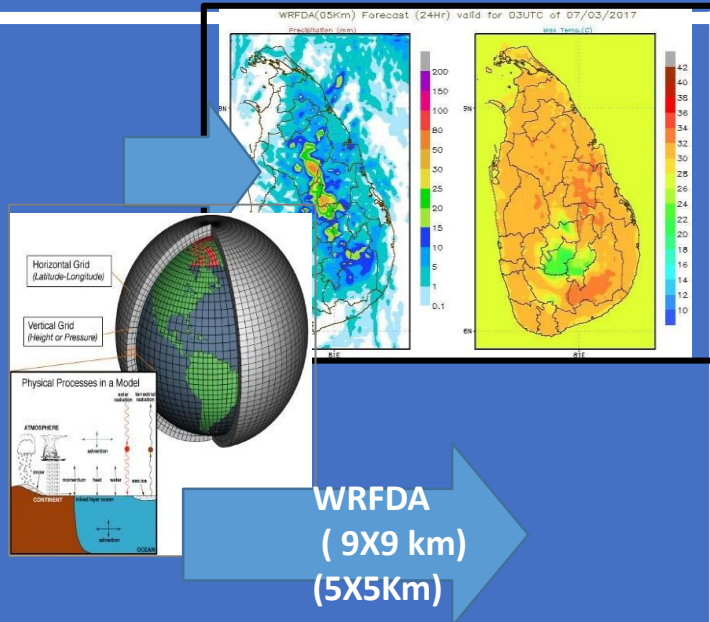


Non commercial agreement with ECMWF

IMD GFS/NCMRWF/NCEP/JMA products

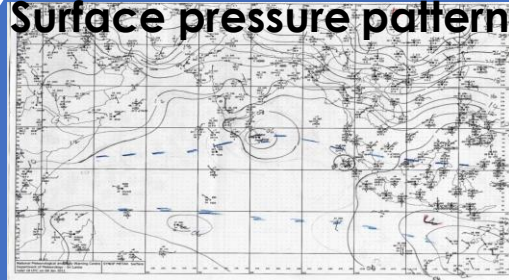
# Weather Forecasting

## NWP product

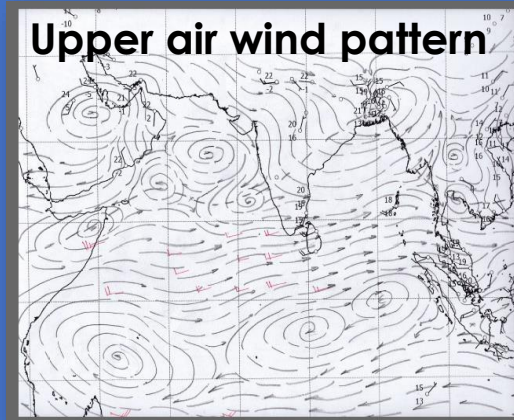


Numerical Weather Prediction(NWP) Activities in the Department of Meteorology

## Surface pressure pattern

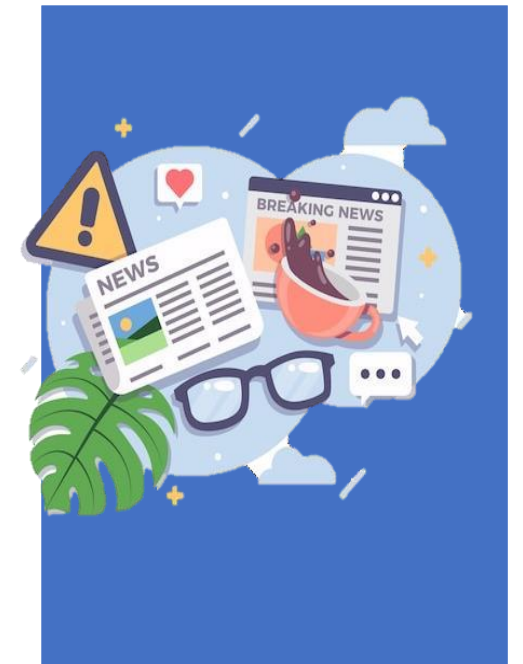
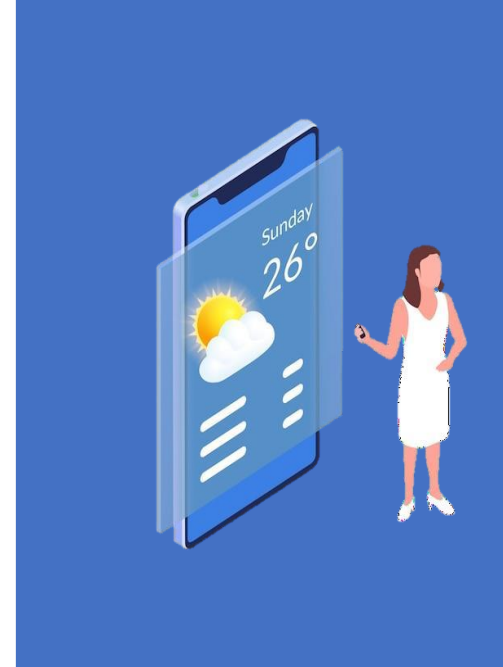


## Upper air wind pattern



Weather analysis

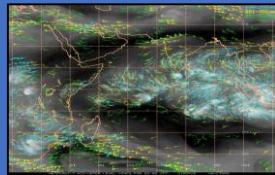
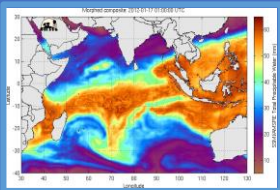
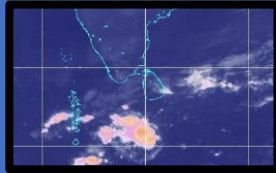
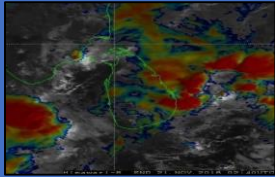
## Weather forecast



Information publish

# Weather forecast

Satellite Products are used in weather forecasting

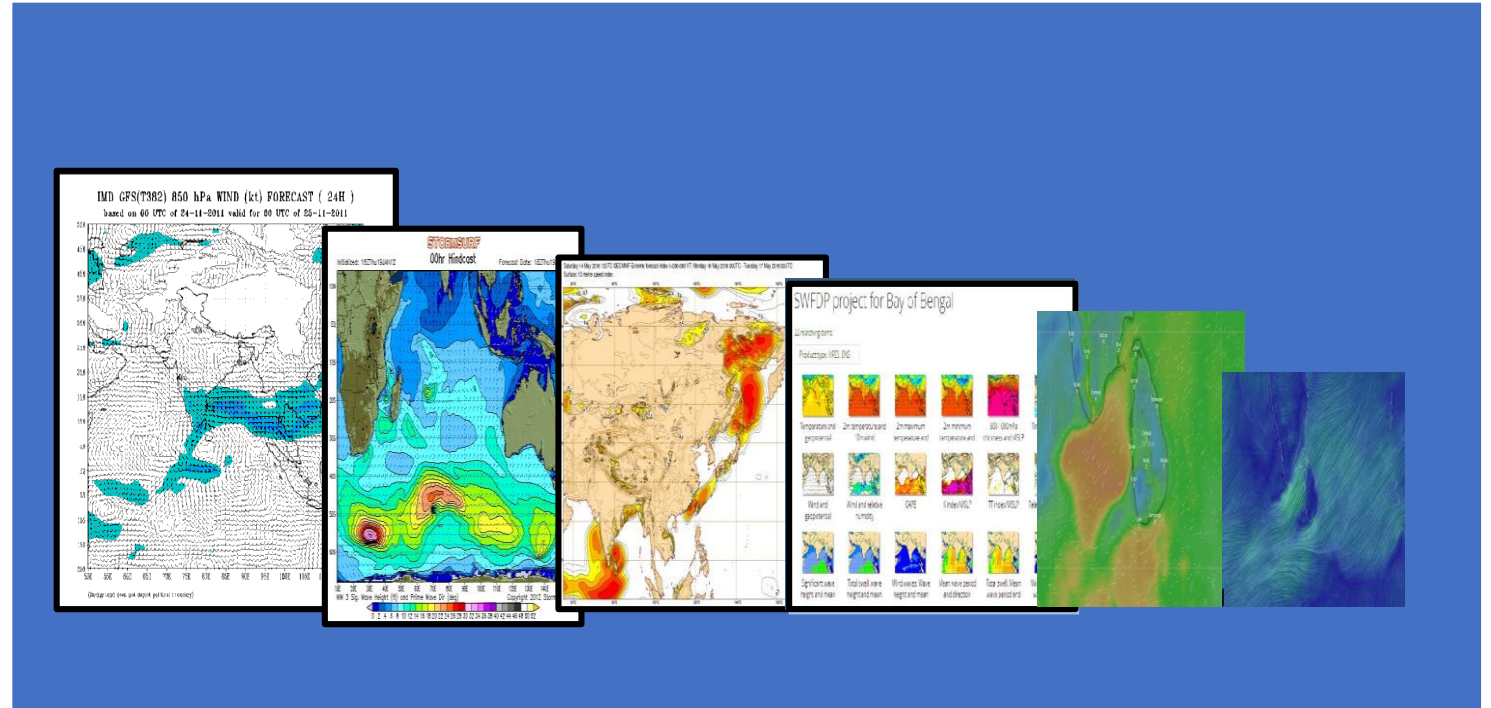


Himawari-Japanese

CMACAST-Chinese

INSAT-Indian

MIMIC-NOAA(USA)

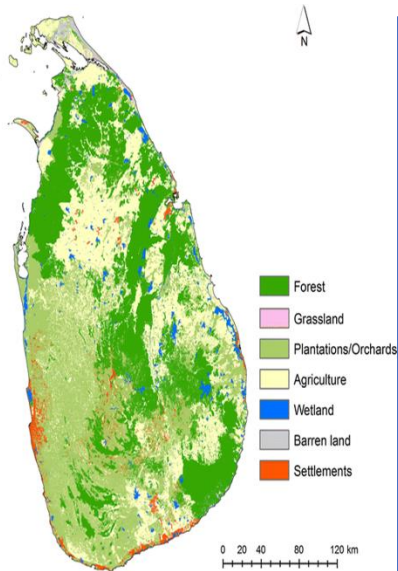


Global NWP Model out puts are used in weather forecasting/warning activities

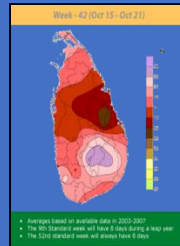
# Enhancing Weather and Climate services in Sri Lanka to Impact Based Forecasting



Development of Forecast of Different Timescales in Sri Lanka Based on Stakeholder Demands  
 Enhancements in spatial resolution were also introduced by Dom; forecast for specific sectors evolved



- ✓ Forecasting for Agricultural parameters - growth & development of Crop, yield, optimum sowing rate, etc..
- ✓ Application of climatological parameters
- ✓ Specialized Weather Forecasts for Agriculture
- ✓ Agricultural Weather Forecast/Alert



Agricultural Weather

## Monsoon Forum

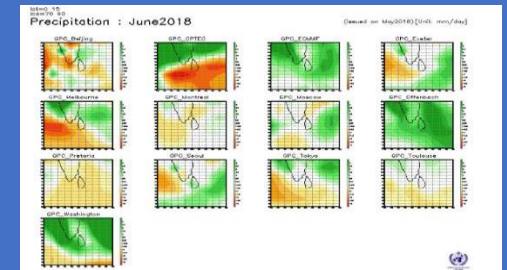
Summary : Consensus Seasonal Rainfall outlook for June, July, August (JJA) Season 2018

Table 2: SUMMARY of MODEL FORECAST for JJA season for SRI LANKA

SUMMARY of MODEL FORECAST for JJA season for SRI LANKA				
Season	WMO LC MME	WMO GPC	CPT	Final
JJA season 2018	N Northern and No signal elsewhere	No signal	No signal	No signal
June 2018	N Northern and No signal elsewhere	No signal	BN Eastern Coast NN central parts No signal elsewhere	BN Eastern Coast NN central parts No signal elsewhere
July 2018	BN	BN		BN
August 2018	No signal	No signal		No signal

BN: Below Normal N: Normal AN: Above Normal CP: Climatological Probability

Summary of Model Forecasts for Sri Lanka



Seasonal Forecast







# Agro Meteorological Forecasting System

## Agro-Meteorological Services

**NATIONAL AGROMETEOROLOGICAL ADVISORY BULLETIN**

08<sup>th</sup> December 2021 to 08<sup>th</sup> January 2022  
Issued on 08<sup>th</sup> January 2022




Department of Meteorology  
 Department of Agriculture  
 World Food Programme  
 2022.01.08

Sustainable Agriculture for Better Sri Lanka

Weekly Bulletin 28 FEB 2022



කාලගුණ විද්‍යා දෙපාර්තමේන්තුව  
සෘණිමත්ස්‍රයාගාරය  
Department of Meteorology

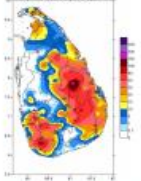
TP : 011 2694846  
Ext-804/805  
Fax : 011 2698311  
E-mail : agromet12@yahoo.com  
Web : www.mets.gov.lk  
https://www.facebook.com/SriMetDept/

**Agro meteorological Bulletin - කෘෂි කාලගුණ තොරතුරු ප්‍රකාශය**

Vol: 09-2022 09 වන සතිය 09<sup>th</sup> Week

පෙබරවාරි 19 සිට පෙබරවාරි 25 දක්වා සතිය තුළ පැවති කාලගුණ තත්වයේ සාරාංශය:

**TOTAL RF IN WEEK 06**



රූපය 01  
පෙබරවාරි 19 සිට පෙබරවාරි 25 දක්වා සතිය තුළ වාර්තා වූ මුළු වර්ෂාපතනය (මි.මී)

- පැය 24 ක් තුළ වාර්තා වූ වැඩිම වර්ෂාපතනය වන මි.මී 142.6 පොළොන්නරුව ප්‍රදේශයෙන් පෙබරවාරි 23 වන දින වාර්තා විය.
- උපරිම උෂ්ණත්වයේ සාමාන්‍යය අගයයට වඩා වැඩිවීම වැඩිම අගය සෙල්සියස් අංශක 3.3 ක් වූ අතර, එය පෙබරවාරි 23 දින සෙල්සියස් අංශක 33.6 ක් පමණ කටුකන්තොට ප්‍රදේශයෙන් වාර්තා විය.
- අවම උෂ්ණත්වයේ සාමාන්‍යය අගයයට වඩා අඩු වීමේ පහළම අගය සෙල්සියස් අංශක 2.7 ක් වූ අතර, එය පෙබරවාරි 22 වන දින සෙල්සියස් අංශක 7.1 ක් පමණ කුරුමිලිය ප්‍රදේශයෙන් වාර්තා විය.

**ඇතුළත:**  
සමුද්‍ර මට්ටම තුළ පැවති කාලගුණ තත්වය

**වර්ෂාපතනය**

පෞද්ගල වර්ෂාපතනය	8.02
වැඩිම වර්ෂාපතන අගයයන්	8.02
වර්ෂාපතනයේ වෙනස්වීම්	8.03
වර්ෂාපතනයේ වෙනස්වීමේ ප්‍රතිශතය	8.03
සමුද්‍ර මට්ටම වර්ෂාපතනයේ හැසිරීම	8.04

**උෂ්ණත්වය**

උපරිම උෂ්ණත්වයේ වැඩිවීම	8.07
උපරිම උෂ්ණත්වයේ අඩුවීම	8.07
අවම උෂ්ණත්වයේ වැඩිවීම	8.08
අවම උෂ්ණත්වයේ අඩුවීම	8.08
සමුද්‍ර මට්ටම තුළ උපරිම/අවම	8.09
උපරිම/අවම උෂ්ණත්ව සාමාන්‍යයන්	8.09

**ඉදිරි සතිය සඳහා කාලගුණ තත්වය**

සාමුද්‍ර උෂ්ණත්වය 8.10

කෘෂි කාලගුණ පරාමිතීන්හි සති සාමාන්‍යයන් 8.11

ඉදිරි සතිය සඳහා කාලගුණ අනාවැකිය 8.13

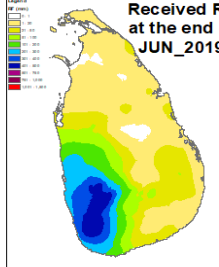
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කෘෂි කාලගුණ අංශය  
කාලගුණ විද්‍යා දෙපාර්තමේන්තුව  
383, බෞද්ධාලෝක මාවත  
කොළඹ 07

Agromet Division  
Department of Meteorology  
383, Baudhaloka Mawatha  
Colombo 07

**Drought Monitoring Through Standardized Precipitation Index (SPI) at the end of June\_2018**

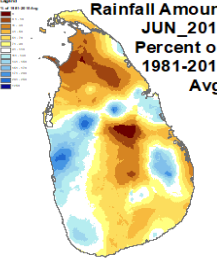
**Received RF at the end of JUN\_2019**

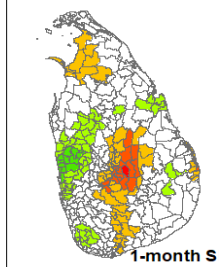


**Legend**  
**SPI Classification**

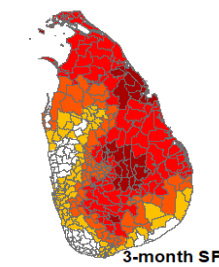
- -2.0 and below (Extremely dry)
- -1.5 - -1.99 (Severely dry)
- -1.0 - -1.49 (Moderately dry)
- -0.5 - -0.99 (Mildly dry)
- -0.49 - +0.49 (Normal)
- +0.5 - .99 (Mildly wet)
- +1.0 - +1.49 (Moderately wet)
- +1.5 - +1.99 (Severely wet)
- +2.0 and above (Extremely wet)

**Rainfall Amount JUN\_2019 Percent of 1981-2010 Avg.**

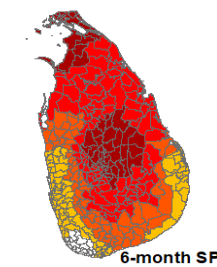




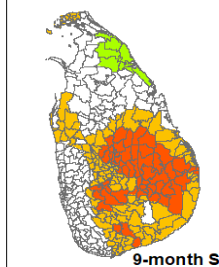
1-month SPI



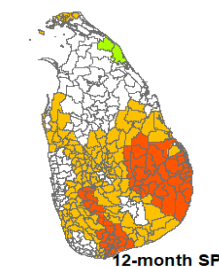
3-month SPI



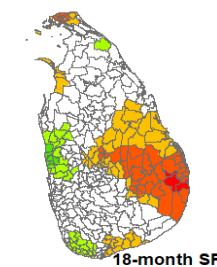
6-month SPI



9-month SPI



12-month SPI

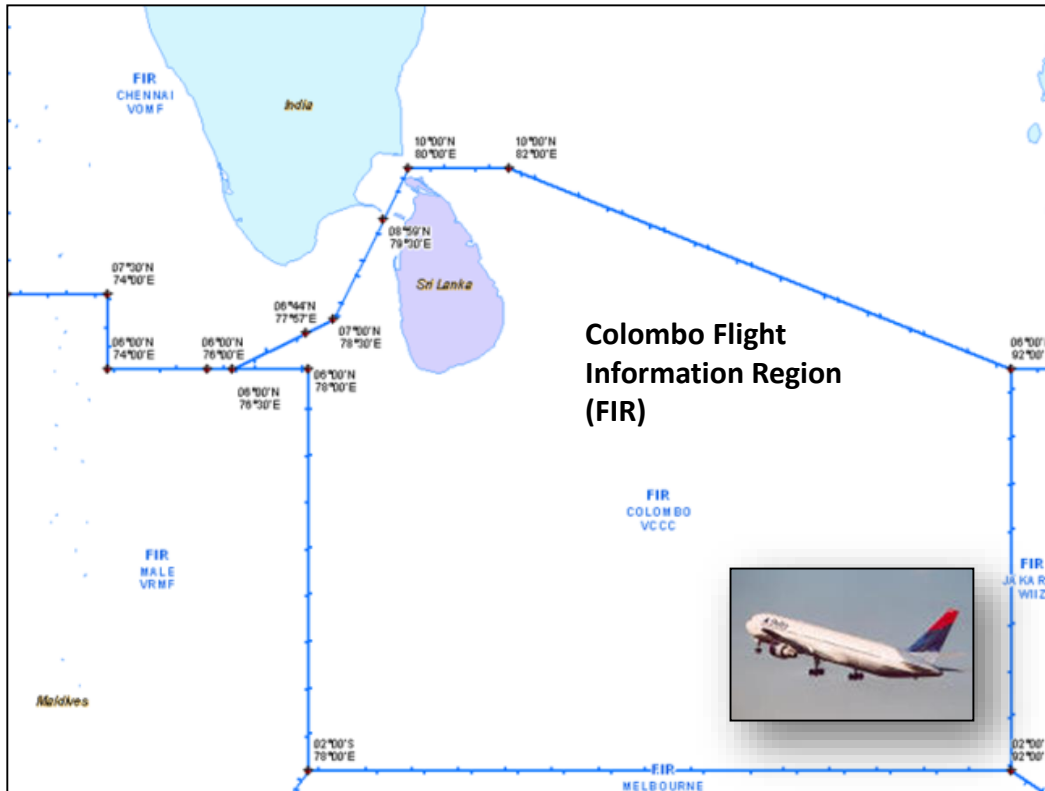


18-month SPI

- Weekly agro-met bulletin
- Monthly agro-met bulletin
- Drought monitoring bulletin

# Aviation Forecasting System

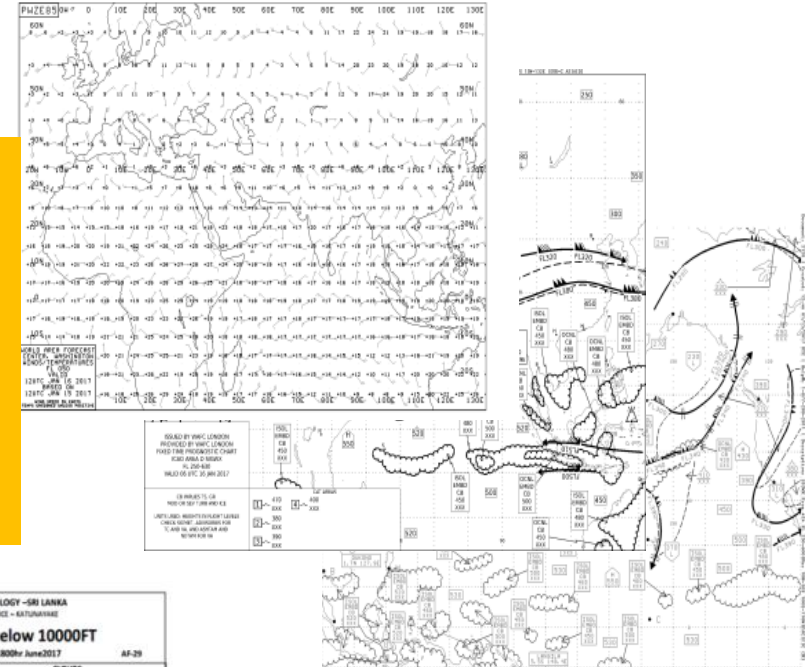
## Aviation Meteorological Services



Colombo Flight Information Region (FIR)

Services provided by accordance with the WMO and ICAO regulations and Standards

Aviation Met Office in BIA (Katunayke) & MRIA (Mattala) providing 24h services for safer air navigation



DEPARTMENT OF METEOROLOGY - SRI LANKA  
METEOROLOGICAL WATCH OFFICE - KATUNAYAKE  
**Forecast Weather below 10000FT**  
Valid 150600 - 151800hr June2017 AF-29

AREA	SURFACE WEATHER AND VISIBILITY	CLOUDS
A	WE: BKN BKNLS OF -9999 VIS: 1000 4000M/1000M TX -9999	CUY CU 1200/10000FT SCT/FRSNC AS 10000/15000FT A BISE OF 100L CR 1000/30000FT
B	WE: BKN 0100FT/1000FT VIS: 1000M	CUY CU 1200/10000FT RTRNC AS 10000/15000FT
C	WE: BKN 0100FT/1000FT VIS: 1000M	FRM/FRSNC 1000/10000FT
D	WE: -9999/-9999 AFTR 14000FT VIS: 1000M 6000M/1000M TX -9999	FRM /FRSNC 1000/10000FT A BISE OF 100L CR 1000/30000FT AFTR 13000M

below 35000FT  
1800hr June2017 AF-29

Altitude	Direction/Speed	Temperature
+30	10 270/10-15	+09
+28	15 100/05-10	+03
+26	20 050/10-20	+04
+24	25 040/10-20	+17
+17	30 100/30-40	+32
+12	35 090/50-60	+42
+31	10 270/10-15	+10
+29	15 100/05	+01
+25	20 070/10-15	+04
+23	25 040/10-20	+17
+14	30 080/25-35	+32
+11	35 090/50-55	+42
+32	10 250/10-15	+09
+28	15 110/05-10	+01
+24	20 050/10-15	+04
+23	25 040/10-15	+17
+14	30 090/30-40	+32
+12	35 040/50-60	+42

ISSUED AT 150000hr June2017  
Duty Meteorologist: GRWV  
Contact telephone: 011 22 32 721  
This forecast may be amended at any time.

- Areas are shown in the map.
- Altitudes are above MSL in thousands of feet.
- Wind speeds are in knots.
- Temperatures are in degrees Celsius.

ISFC	08/10-15	10	150/10-15	+10
01	230/05-15	+28	15 090/05-10	+01
02	230/10-15	+25	20 040/10-15	+04
03	250/10-15	+23	25 080/10-20	+17
05	240/10-15	+14	30 100/30-40	+31
07	240/10-15	+12	35 080/50-65	+42

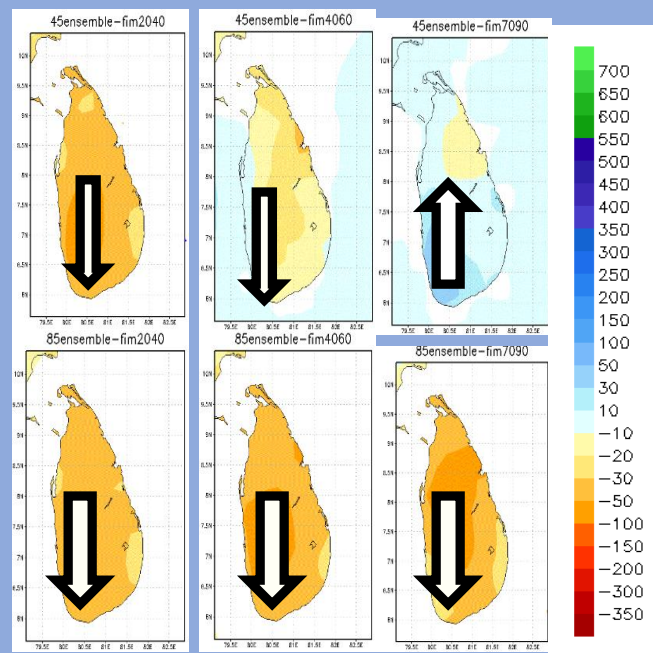
# Climate Projections

According to the IPCC guidelines

Statistical & Dynamic Downscaling of Climate Projections (CMIP5 & CMIP6) for Sri Lanka (1985-2100)

Multi-model Ensemble projection for FIM Rainfall

2020-2040    2040-2060    2070-2090



2020-2040    2040-2060    2070-2090

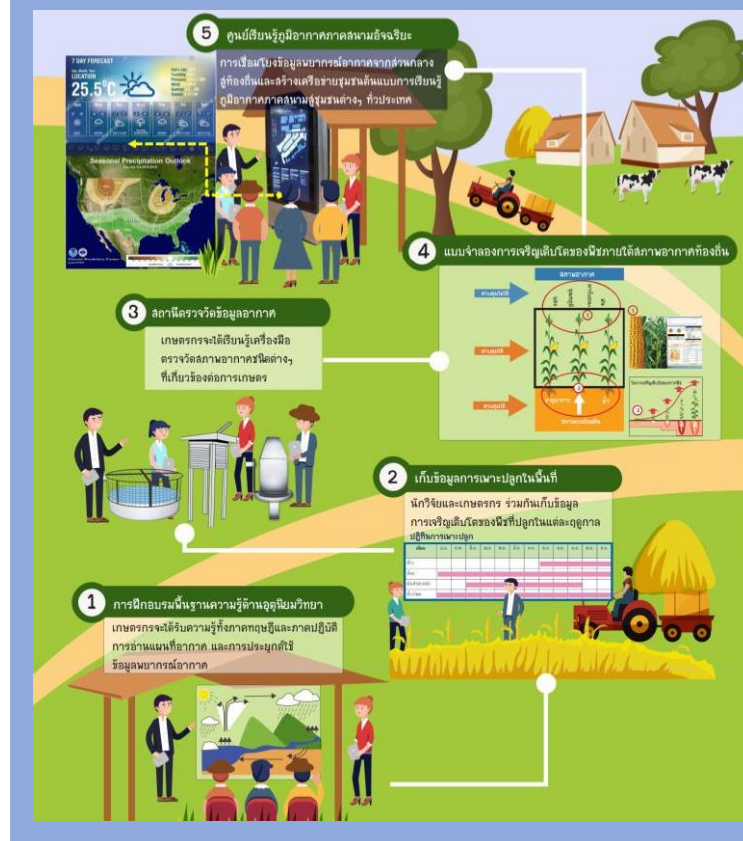
## Moderate Emission Scenario

Negative anomaly is evident in 2020-2040  
Slightly Negative anomaly is evident in 2040-2060  
Positive anomaly is evident in 2070-2090

## High Emission Scenario

Negative anomaly is evident in 2020-2040, 2040-2060 and 2070-2090

## Climate Field School: Future farming



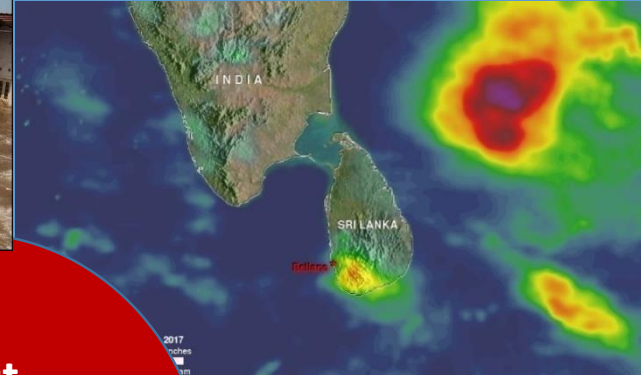
- ✓ El-Nino outlook
- ✓ Drought Monitor

- Offer guidance to the police on national activities
- Advise faímeís on agícuítuál weatheí.
- Reseaích agícuítuál weatheí in local aiea.

# Forecasting and Early Warning System

## Most Vulnerable Natural Hazards of Sri Lanka

Drought



Flood



Cyclone

Heavy Rain

Most Vulnerable Hazards of Sri Lanka

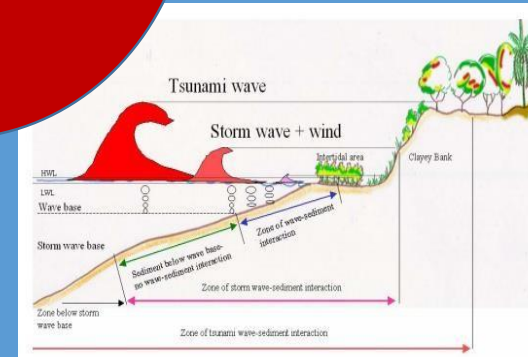
Lightning Strikes



Tsunami



Strong Winds



Landslides



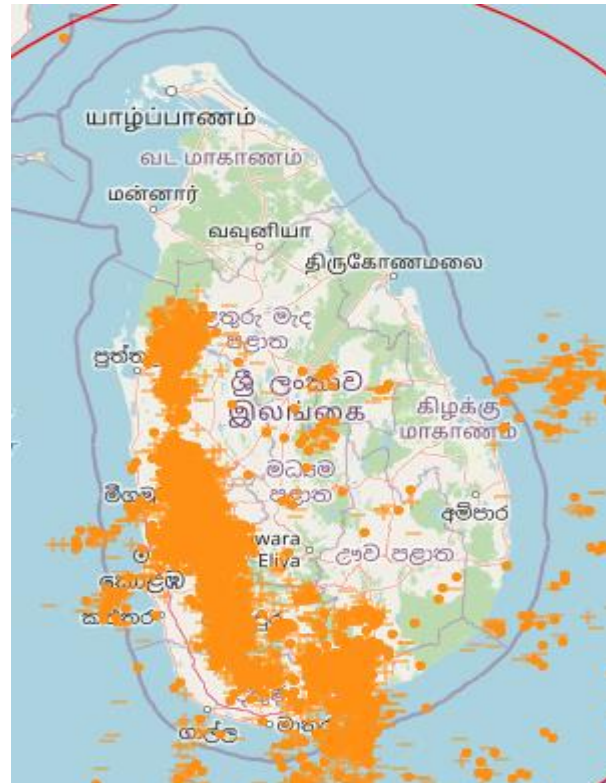
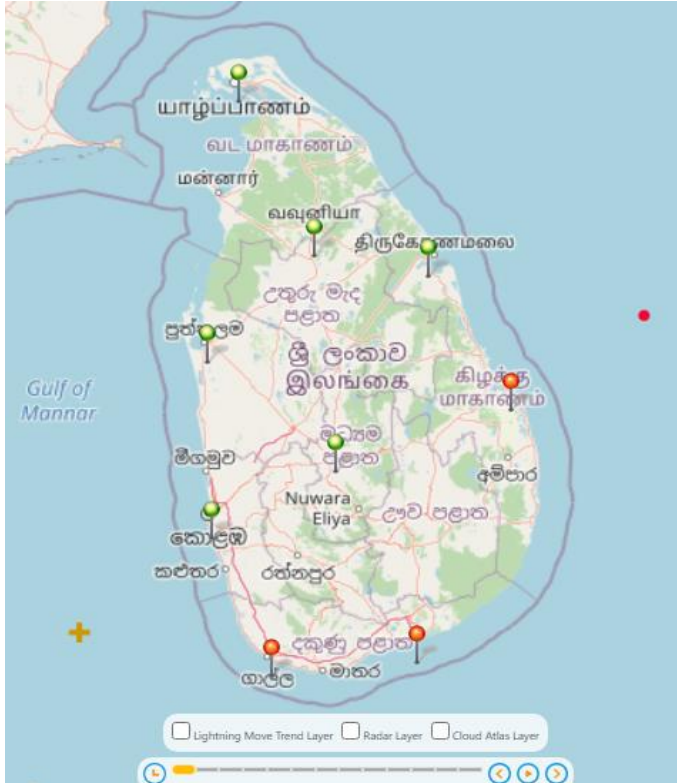
# Advisories and Warning Services

<b>Disaster</b>	<b>Responsible Agency for Early Warning</b>
<b>Cyclones and heavy rainfall/Strong wind (Land/Ocean) Thunderstorms and Lightning High wave alert/ Heat weather</b>	<b>Department of Meteorology</b>
<b>Floods(Hydro Meteorology)</b>	<b>Irrigation Department</b>
<b>Landslides</b>	<b>National Building Research Organization</b>
<b>Tsunami</b>	<b>Department of Meteorology (with the consultation of Geological Survey and Mines Bureau)</b>
<b>Earthquakes</b>	<b>Geological Survey and Mines Bureau</b>

# Bad Weather Advisories and Warning Services

## Thunderstorms and Lighting

Thunderstorm and lightning warning system in the DOM is mainly based on sensor based lightning detection system



### Bulletin No: 01

WW/T/22/03/12/01

COLOR: Amber

### Advisory for Severe Lightning

Issued by the natural hazards early warning center

Issued at 02.00 p.m. 12 March 2022 for the period until 11.00 p.m. 12 March 2022

### PLEASE BE AWARE:

Thundershowers accompanied by severe lightning are likely to occur at several places in Sabaragamuwa, Western, Southern, Central and Uva provinces and in Kaluthara district.

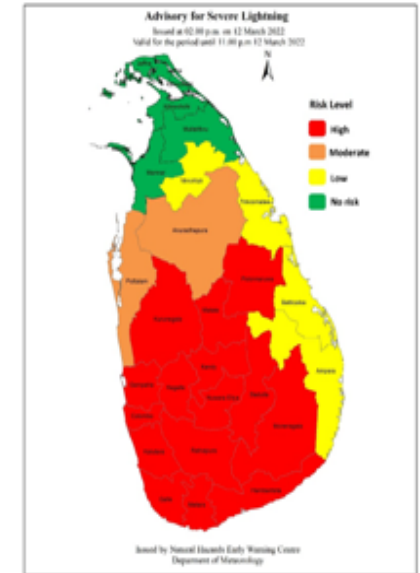
Heavy showers about 100 mm can be expected at some places in Central, Southern, Sabaragamuwa and Uva provinces. Fairly heavy showers above 50 mm can be expected at some places elsewhere.

There may be temporary localized strong winds during thundershowers. General public is kindly requested to take adequate precautions to minimize damages caused by lightning activity.

### ACTION REQUIRED:

The Department of Meteorology advises that people should:

- Seek shelter, preferably indoors and never under trees.
- Avoid open areas such as paddy fields, tea plantations and open water bodies during thunderstorms.
- Avoid using wired telephones and connected electric appliances during thunderstorms.
- Avoid using open vehicles, such as bicycles, tractors and boats etc.
- Beware of fallen trees and power lines.
- For emergency assistance contact the local disaster management authorities.



# Warning and Advisory for the Ocean

## Strong Winds (Ocean)

Sea waves due to strong winds are vulnerable to fishermen fishing near coast and coastal communities



### Sea

Wind speed	Wave Height	Alert Status	Color
Average Wind is > 30kmph Gusting > 60kmph	> 2m	Alert/ Advisory	Amber
Average Wind is > 70kmph Gusting > 100kmph	> 4m	Warning	Red
Squall line Wind Speed > 70kmph		Alert/ Advisory	Amber



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සංගීතයාලයේ මහල  
Department of Meteorology

TP : 011 2686686  
Fax : 011 2691443  
E-mail : metnmc@gmail.com  
Web : www.meteo.gov.lk

Bulletin No: 01  
COLOR: Amber

WW/O/20/05/20/01

**Advisory for Strong Wind and Rough seas**  
Issued by the Natural Hazards Early Warning Centre  
At 11.30 p.m. 20 May 2020 for the period until 11.30 p.m. 21 May 2020

For the deep and shallow sea areas to the North, South and South-east of Sri Lanka

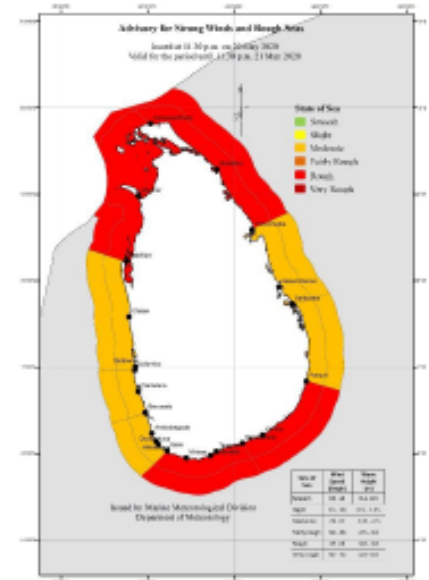
### PLEASE BE AWARE !

The deep and shallow sea area off the coast extending from Puttalam to Trincomalee via Mannar and Kankasanturai and Galle to Potuvil via Hambantota will be rough at times as the wind speed can increased up to (60-65) kmph at times.

Deep sea areas to the South and South-east of the island can be rough to very rough at times as the wind speed can increase up to (60-65) kmph at times.

Other sea areas around the island can be fairly rough at times as the wind speed can increase up to (40-50) kmph at times.

Naval and fishing communities are requested to be vigilant in this regard.



Color: -Red  
Warning (Take action)

Color: -Amber  
Advisory (Be prepared)

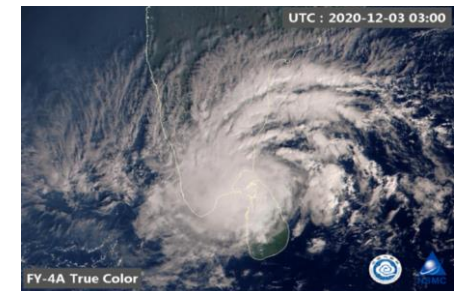
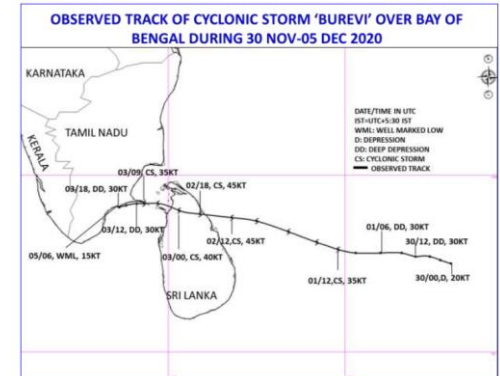
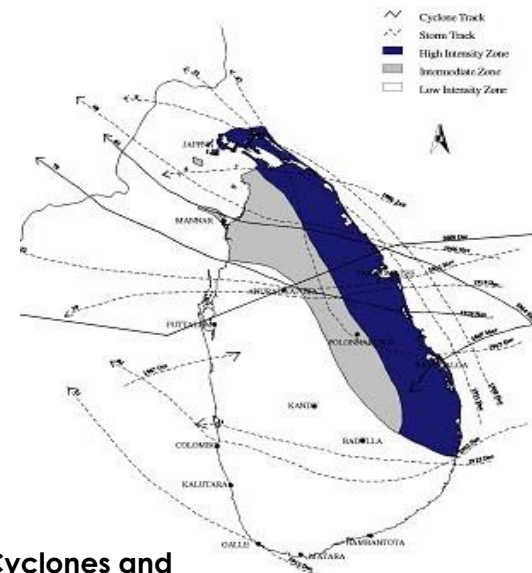
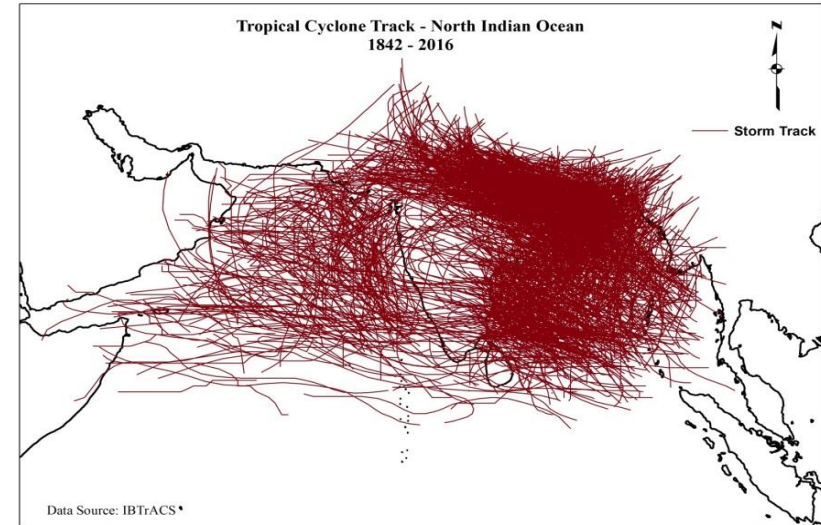
Color: -Green  
Threat is over

# Weather Forecasting and Early Warning System

## Advisories and Warning Services

### Tropical Cyclone

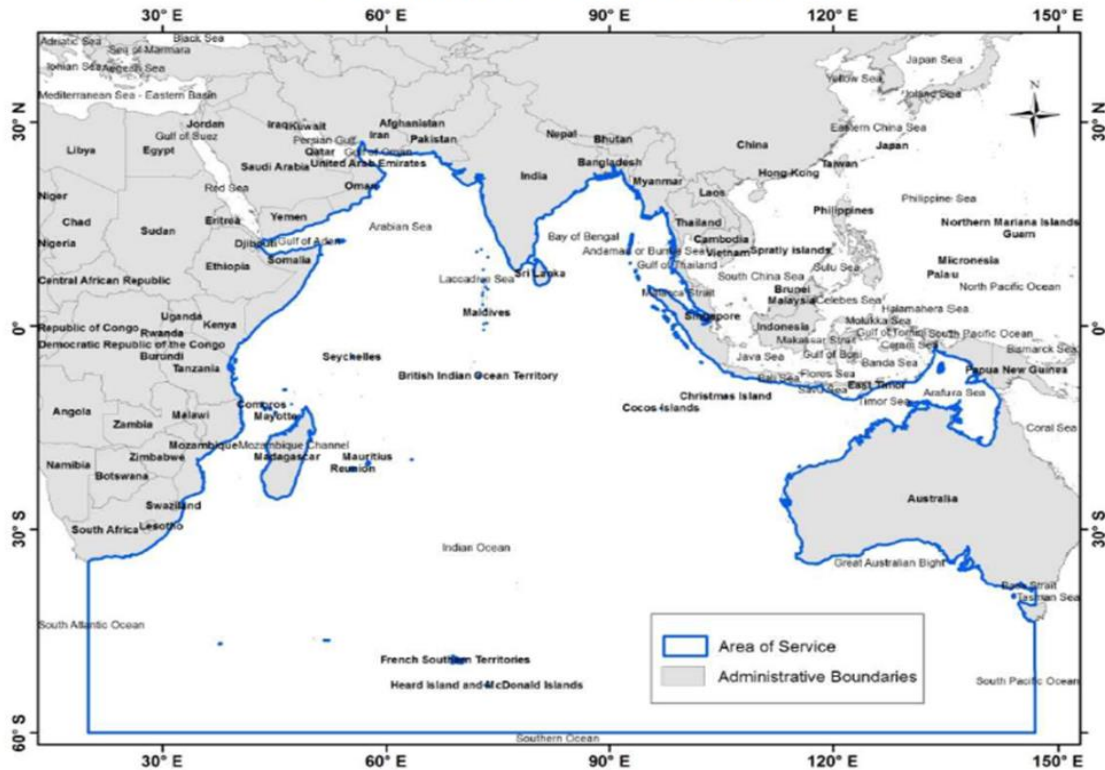
Signal No	Colors	Description	Action Required
1	white	Potential area of possibility to development of vortex /disturbance / Cyclone has formed	Information only, Vessels at sea to be vigilant and avoid the area, Listen to media
2	Yellow	Cyclone has formed in the vicinity, raining and windy, sea rough ( 30-40kts, 50-80kmph)	Stay away from beach/sea, vessels in danger/be inside building
3	Orange	Cyclone has formed in the vicinity, very heavy rain with very strong winds, very rough seas ( W > 40kts, 80kmph)	Be ready to leave weak buildings and low lying areas (flood prone areas), secure your home valuables
4	Red	Cyclone is expected to cross land, Very heavy rain/very strong winds (W>50kts,100kmph)	Evacuate to predesignated areas
5	Red	Severe cyclone is expected to cross Very severe weather expected	Evacuate to pre designated areas
6	green	Cyclone warning cancellation/withdrawal bulletin	



Tracks of Past Cyclones and Storms Crossed Sri Lanka

# Indian Ocean Tsunami Warning and Mitigation Services (IOTMWS)

IOTWMS Area of Service



Indian Ocean Tsunami Warning and Mitigation Services (IOTWMS), provided by:

❑ 3 Tsunami Service Providers (TSP)

- Australia (BOM)
- India (INCOIS)
- Indonesia (BMKG)

❑ 28 National Tsunami Warning Centers (including the 3 TSPs)

**National Tsunami Warning Center (NTWC) of Sri Lanka was established on year 2005 in the Department of Meteorology**

# NATIONAL TSUNAMI WARNING CENTER (NTWC) – SRI LANKA

Department of Meteorology

GTS/FAX/SMS/EMAIL/WEB



TSP  
AUSTRALIA (BOM)

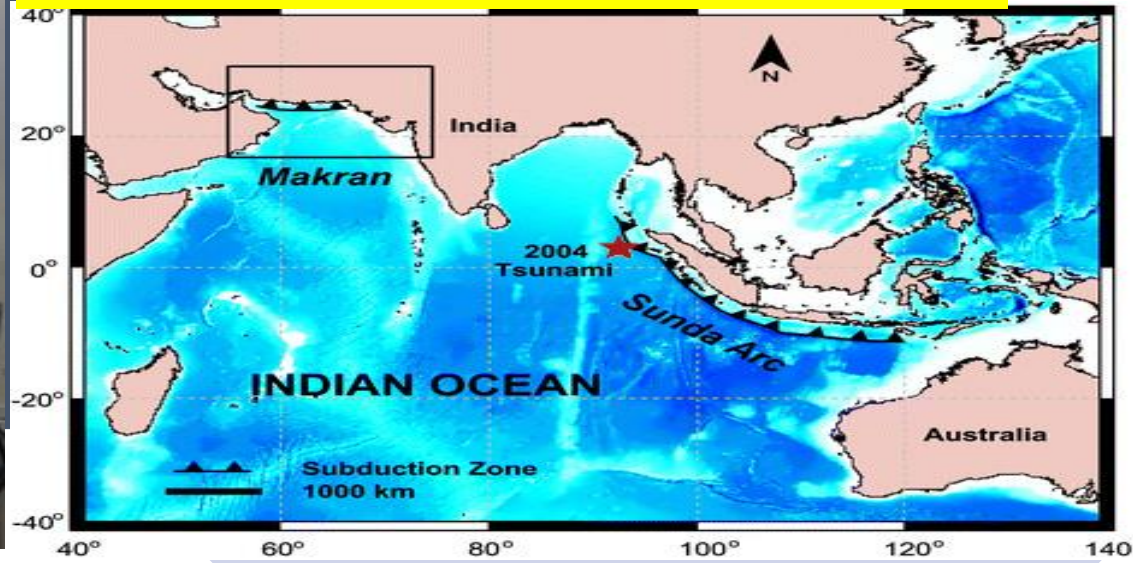
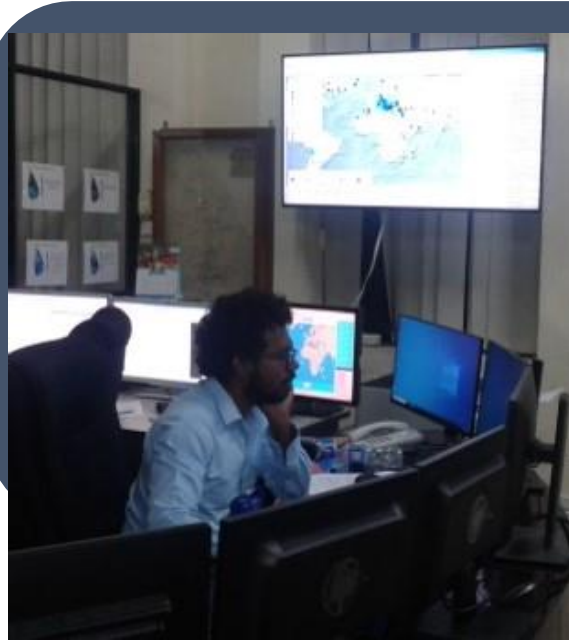
TSP  
INDIA (INCOIS)

TSP  
Indonesia (BMKG)

# NATIONAL TSUNAMI WARNING CENTER (NTWC) – SRI LANKA

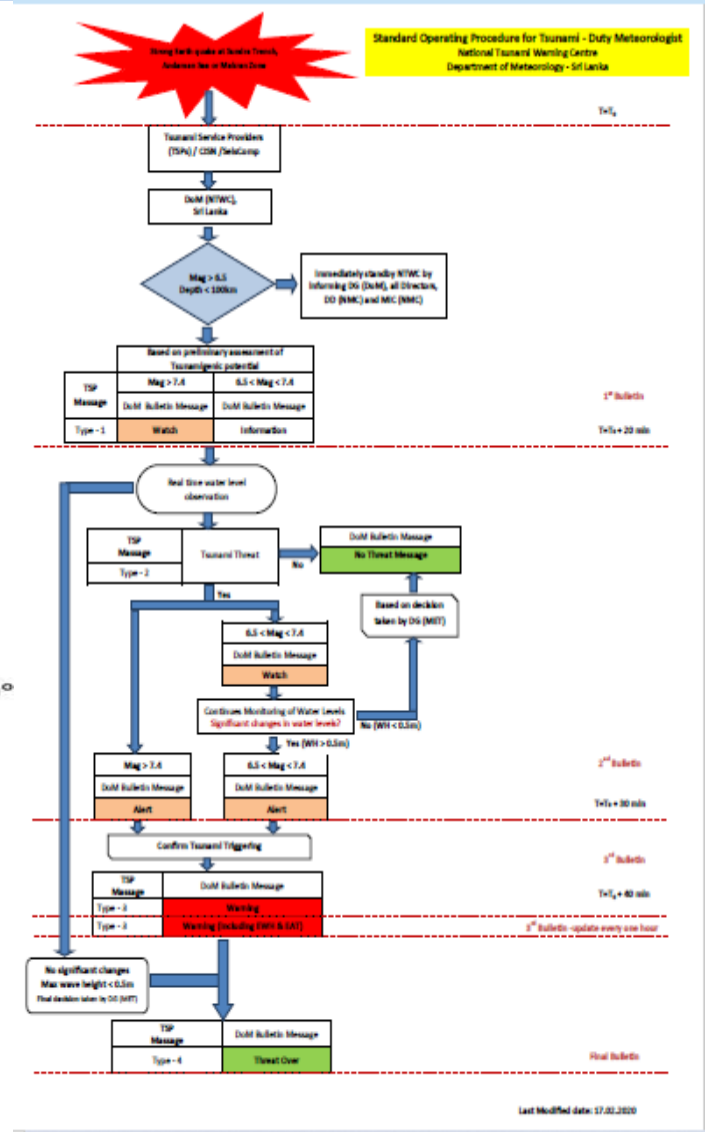
## DEPARTMENT OF METEOROLOGY

Sri Lanka is in the Island of between two tsunami sources in the Indian ocean



- Monitoring earthquake signals
- Received and analysis TSPs messages
- Estimate earthquake parameters (location, magnitude and depth etc..)
- Provide timely information to Disaster Management Center (DMC) and general public according to the SOP

### Basic Functions:

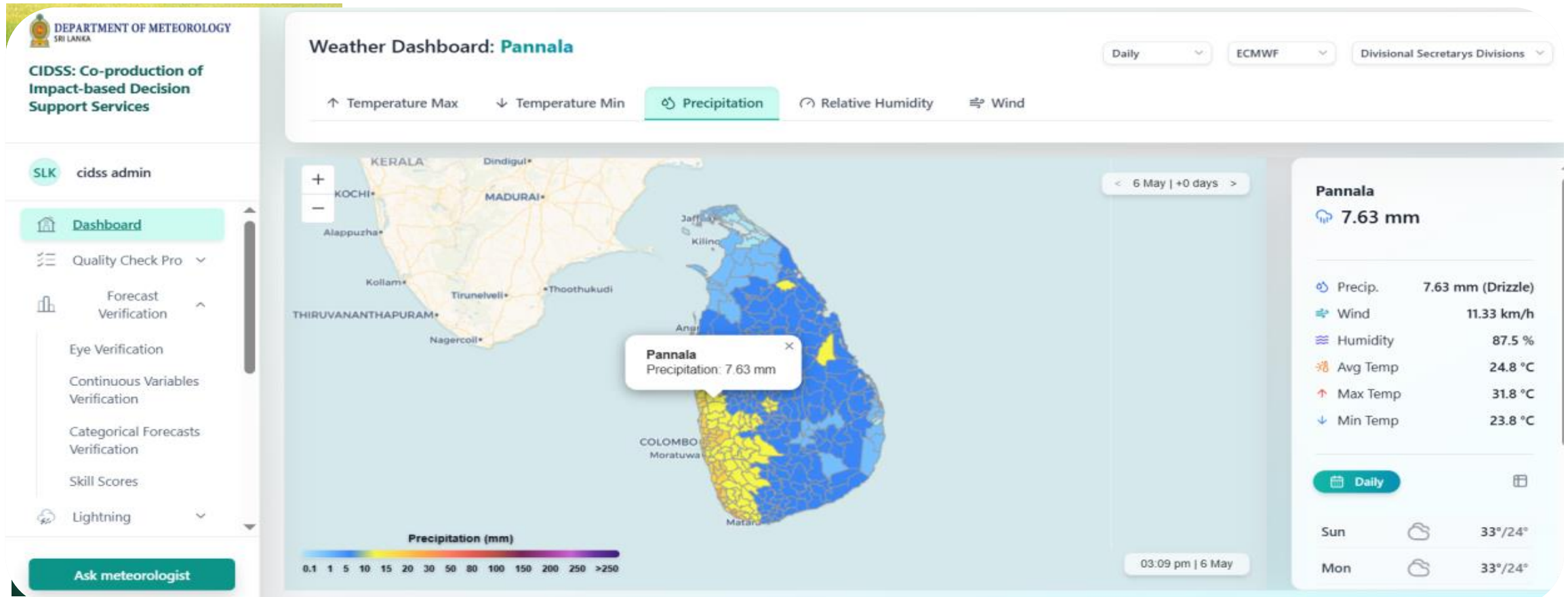


SOP for Tsunami Warning

# Department of meteorology current projects

1. DOM's forecast services to a co-production model for Impact-Based Decision Support Services (CDISS) with RIMES support."

## CIDSS - Dashboard Develop IT-Based Decision Support Systems



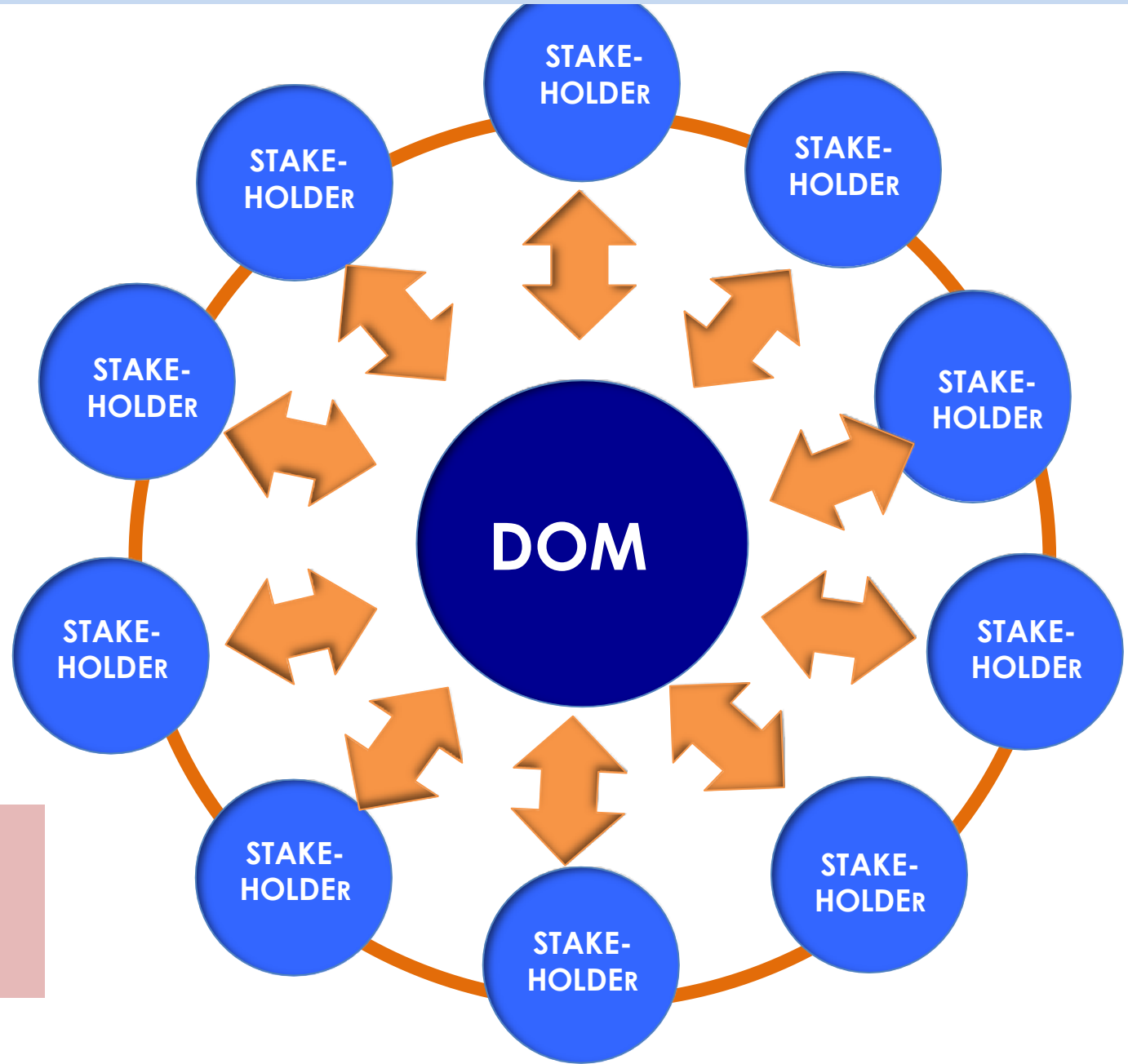
Linking the Department of Meteorology with stakeholders for an integrated early warning system

# Establish co-production forecast services for Impact-Based Decision Support (CDISS) with RIMES at the 2026 Northeast Monsoon Forum

**Department of Meteorology as the Focal Institution,**  
being the mandated national institution for weather, climate (and earthquake and tsunami) services in the countries

**Stakeholders**  
Are key institutions in the country mandated for productivity and risks management

- Both in the context of resources and risks management
- Multi-hazard
- Multi-timescales



## 2.The implementation of the DOM Modernization Project

(CResMPA) with the assistance of the World Bank

### Component of DoM Modernization activity

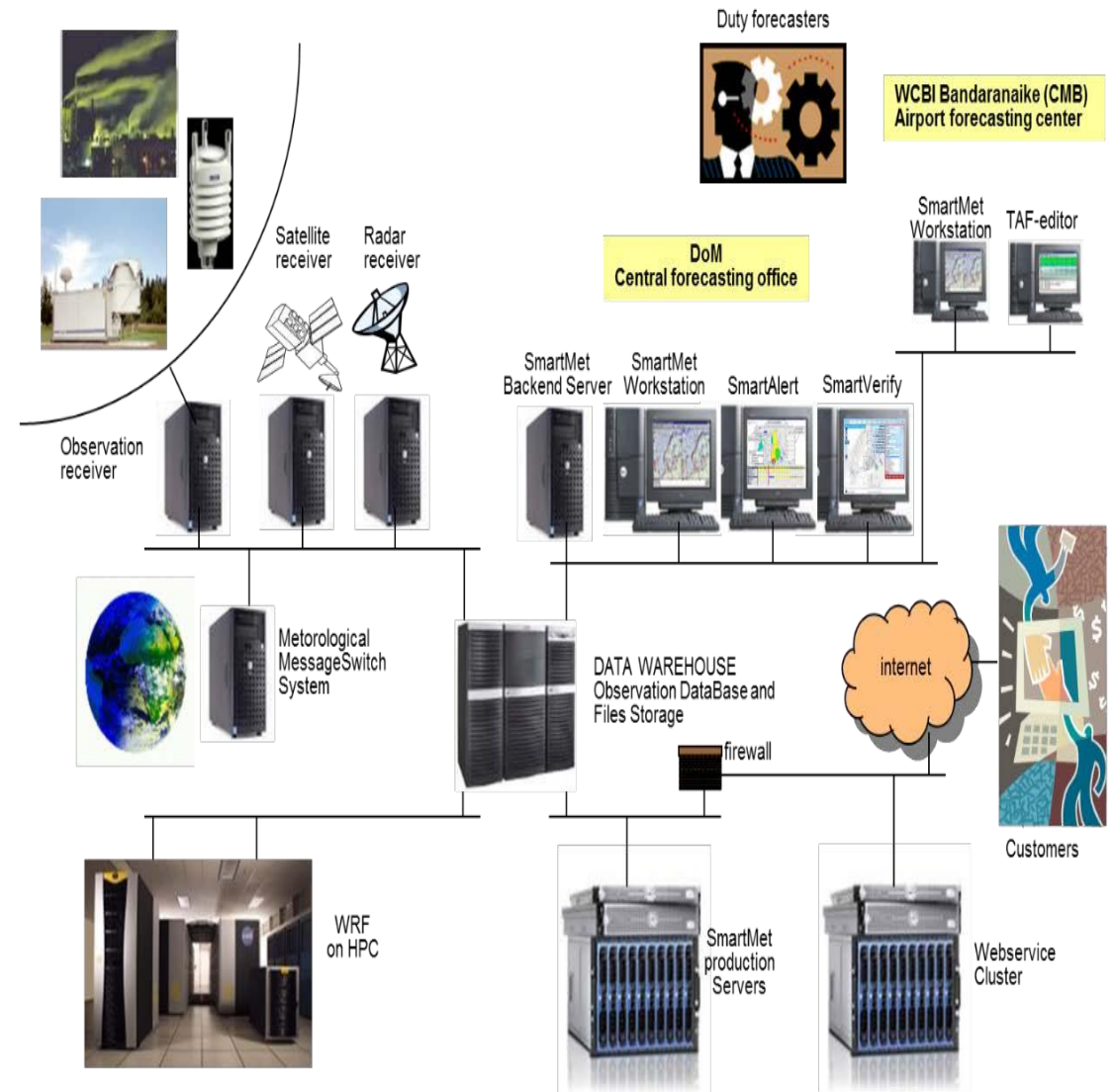
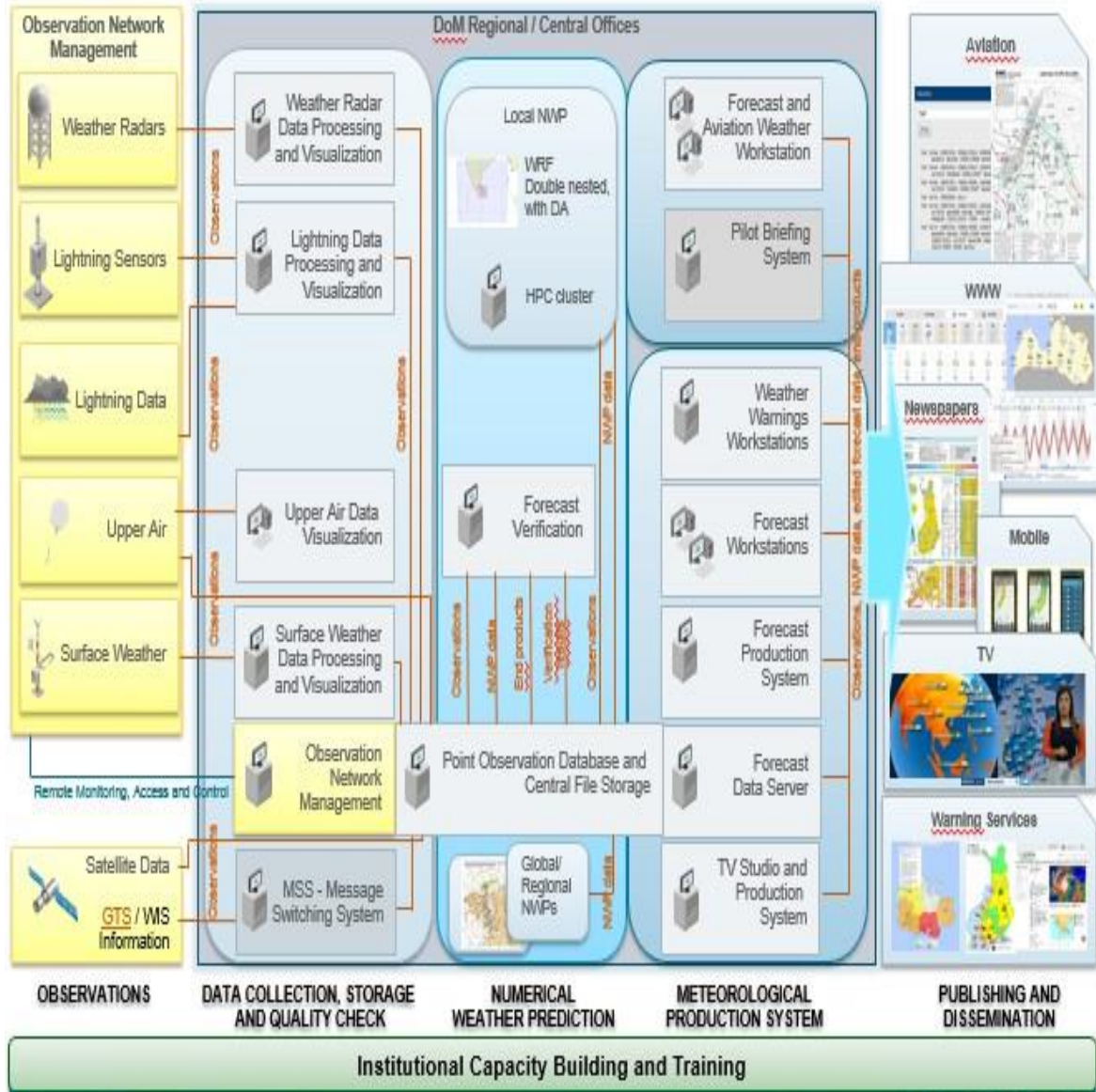
**New Weather  
Forecasting  
Building**

**Improve Observation  
and Communication  
system**

**Capacity Building**

**Improve forecasting  
capabilities/Numerical  
Weather Prediction**

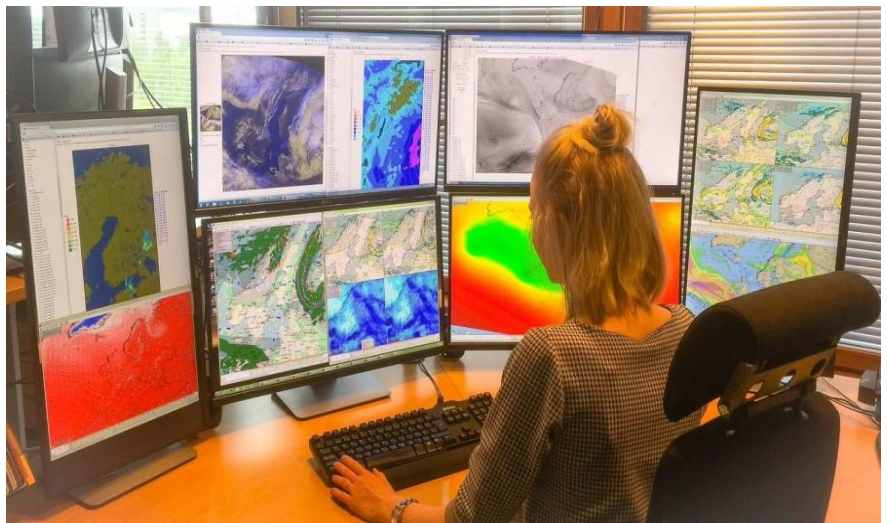
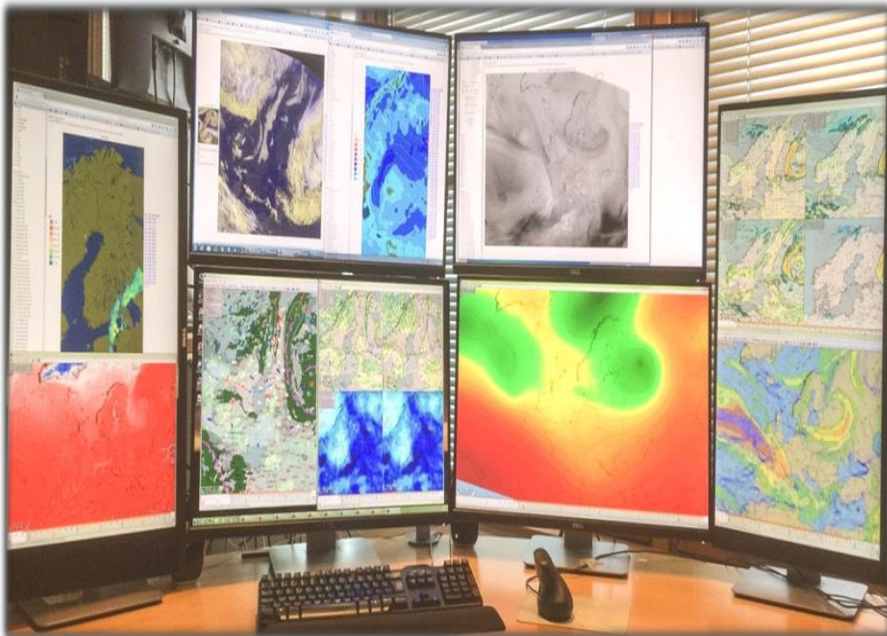
# Overview of DoM Meteorological Network Integration



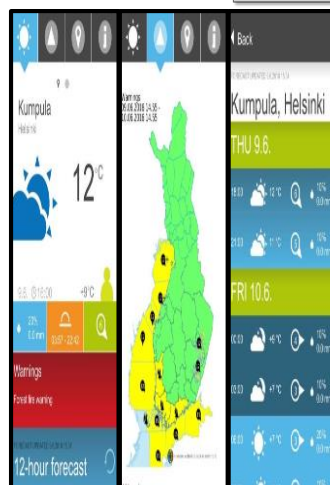
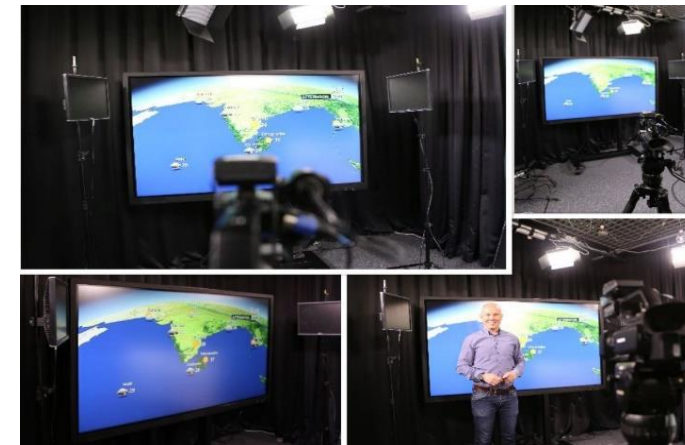
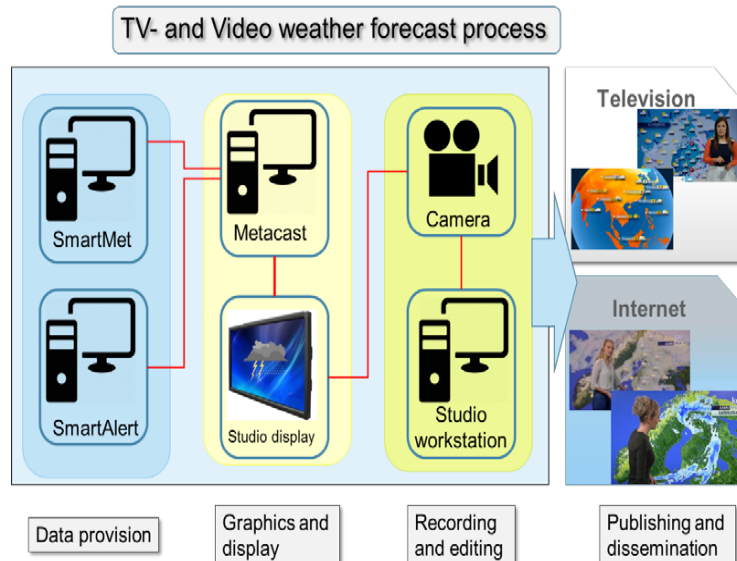
# Weather Information and Forecast Production System

Smart Met Workstation includes following features:

TV-Studio for weather presentations



## Flow chart of the weather forecast presentation process



mobile weather application, data produced with SmartMet and warning information with SmartAlert

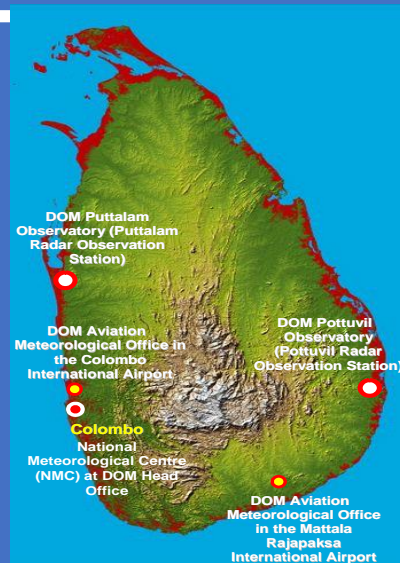
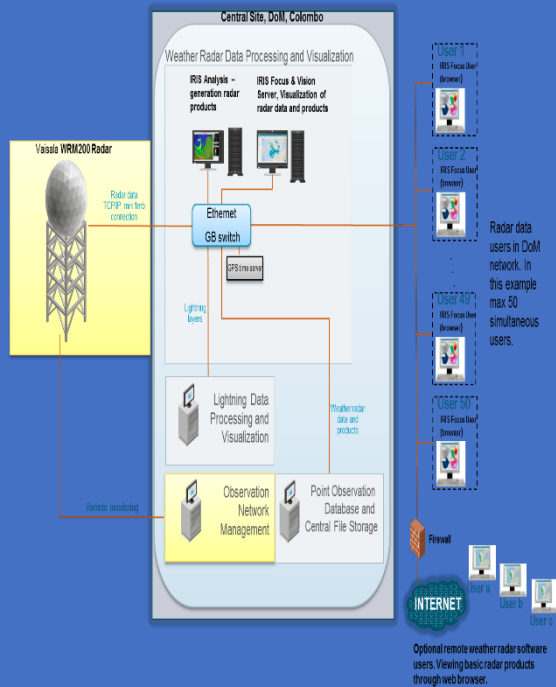
පුනරුත්ථාපන ප්‍රදේශයේ  
 ඩොප්ලර් රේඩාර්  
 ව්‍යාපෘතිය (JICA)

### 3. Doppler Radar Project(JICA) ( Grant Aid Project by Japanese Government)

New Technology Implement

Doppler Radar Project ( Grant  
 Aid Project by Japanese Govt)

Now we can apply it in Radar  
 nowcasting and aviation activities



Source  
 of  
 Finance

Government of Japan:  
 Two Billion six Hundred  
 sixty Three Million  
 Japanese Yen  
 (JPY 2,663,000,000)  
 Government of Sri  
 Lanka: 550,000,000  
 Rupee

Duration: JULY 31, 2027

## **Medium Term (3-10 Years)**

**Improvements in lead time and accuracy of weather and climate forecasting at all-time scales and early warning capability Making DOM a great place to work**

## **Long term (Over 10 Years)**

**“A Centre of Excellence in Weather, Climate  
and related Early Warning Service”**

**Thank You !**