WEATHER ANALYSIS AND FORECAST ENABLING SYSTEM

INDIA METEOROLOGICAL DEPARTMENT NEW DELHI

MINISTRY OF EARTH SCIENCES

Project : Multi Hazard Early Warning Decision Support System

Initiation of Project: Nov. 2022

Date of launch : 15/01/2024 (by Hon'ble Vice President)

Operationally working since: 15/08/2023

BACKGROUND AND OVERVIEW

Weather Forecast Service

Daily Weather forecast

- 36 Meteorological Subdivision
- 750 Districts
- 7000 Blocks
- All Stations (Panchayat Level)
- Mausamgram
  - Location Specific Forecast
  - Pincode
  - Panchayat
  - Latitude & Longitude
  - Click any Point

Validity Seven Days

Daily Severe Weather Warning

- Heatwave
- Coldwave
- Thunderstorm
- Heavy Rainfall
- Tropical Cyclone
- Gusty/Squally Wind
- Fog, etc.

Spatial scale at District, Station and Meteorological Subdivision

Validity Five Days

Specialised Forecast

- Aviation weather Forecast (Half an hour,3hr, daily 4 times)
- Marine Weather Forecast (Twice daily and 6 to 8 times during cyclone)
- Hydrometeorology bulletin (Quantitative Precipitation Forecast) to CWC
- Agriculture (Farmer's Weather Bulletin daily, Agromet Advisory Bulletin -twice a week valid for four weeks
- Transport
- Tourism
- Fishery
- Power
- Shipping

WEATHER FORECASTING AND MULTI-HAZARD EARLY WARNING PROCESS

Observational Network

- Surface
- Satellite
- AWS/ ARG
- RS-RW/Pi
- DWR
- Aviation weather
- Ship

INTEGRATION

Data collection

Data Processing

Data communication , Modeling & Forecasting Systems Climatological System

Dissemination

Generation of Forecast

End user production

Numerical Weather Prediction (NWP) Modeling with High Performance Computing System (HPCS)

Problem Identification for Formulation of Project

- Lack of Multi-Hazard Early Warning Decision Support System for forecasters and users anywhere at any time

FORECAST GAP

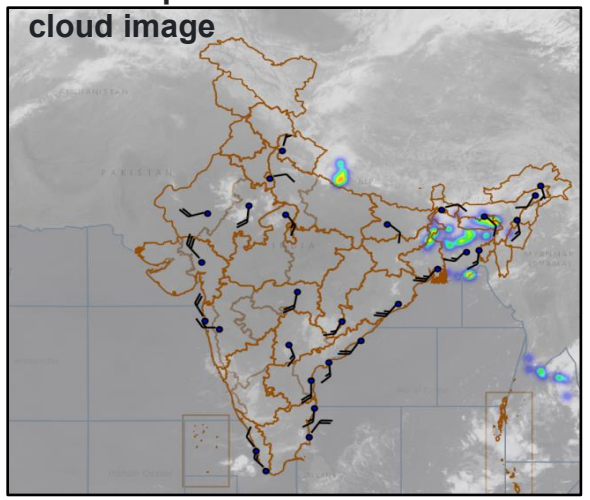
- **Fragmented System** (poor/ slow data communication and Less responsive system)
- **Observation issues** (No real time validation or error correction in meteorological observation)
- **Radar and satellite underutilisation** (No integration of large and upgraded datasets from satellites and radar though there is manifold increase in datasets with multiple satellites and more than 40 Radars)
- **Error prone manual processes** (Manual preparation of weather charts, analysis & products and **Manual forecast and warnings** generation & dissemination) leading to more time consumption, and less lead time for response and lack of confidence in forecast.
- **Customisation Lack** (No location specific customised foreast and warning)
- **Automation deficit** (Limited automation in preparation of Poor visualization and poor resolution of products through website as it could not be projected through native resolution in GIS).
- **Scalability** (Not scalable, Limited flexibility for India-specific needs) & No multi-hazard inter-operability
- **Technology dependency** (Vendor locking and reliance on foreign systems and hence poor maintenance)
- **Gap in Numerical weather prediction model** integration (though IMD runs 6 models daily twice and accesses 3-4 foreign models for weather forecasting.
- **Accessibility** (available to 12 out of 200 Forecasting Offices. Not web based)
- **Poor forecast accuracy**, no dynamic impact based forecast, risk based warning & public weather service

OBJECTIVE

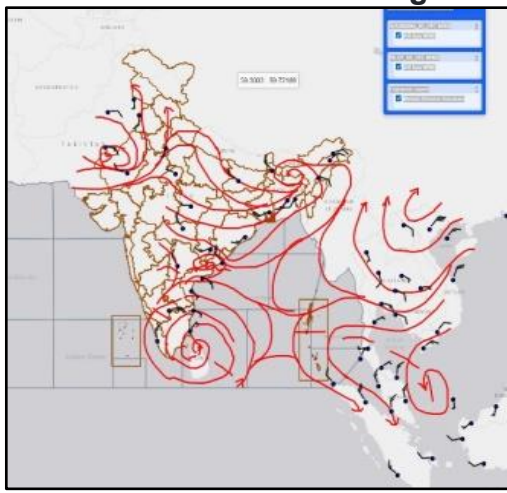
To Develop Indigenous Multi-Hazard Early Warning Decision Support System (DSS) aimed to ACTIONS:

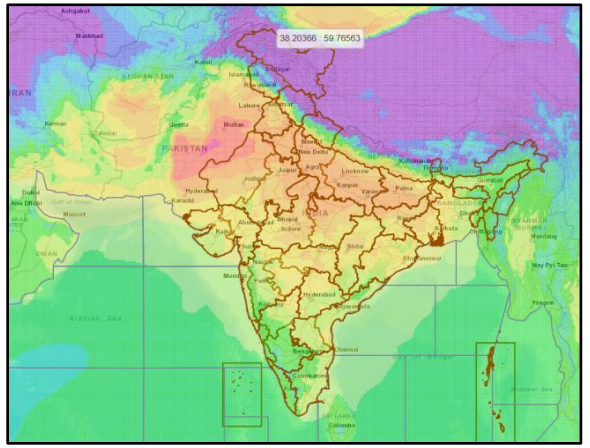
- **Address all the problem areas** listed in previous slide.
- **Compare, Comprehend and Analyze** all atmospheric and Oceanic Observations in Real Time through round the clock watch
- **Track and decide Current Status Of weather** System and their Genesis, Evolution, structure and other Characteristics
- **Integrate and evaluate all numerical Weather prediction models** (7 in number) guidance
- **Operate collaboratively to develop consensus forecast** on each and every weather conditions including severe weather
- **Notify likelihood of occurrence and severity of weather** conditions expected
- **Summarise & issue Impact Based Forecast & risk based warning** of Severe Weather at district and location

Wind observation at 1.5 km sumerimposed with satellite based cloud image

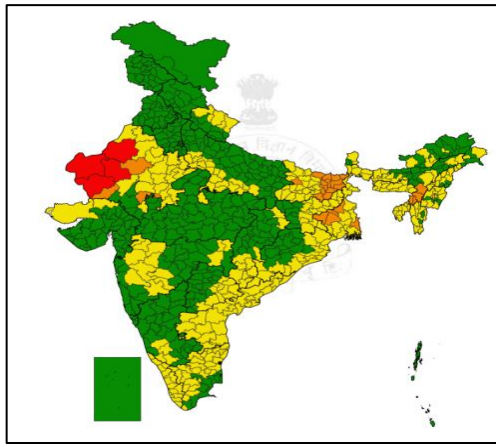


Streamline analysis of Wind observation at 1.5 km height





Mean Sea leval pressure analysis based on Numerical Weather Prediction Model Guidance



Multi-hazard impact based forecas and risk based warning graphics valid for next 24 hrs at district lev

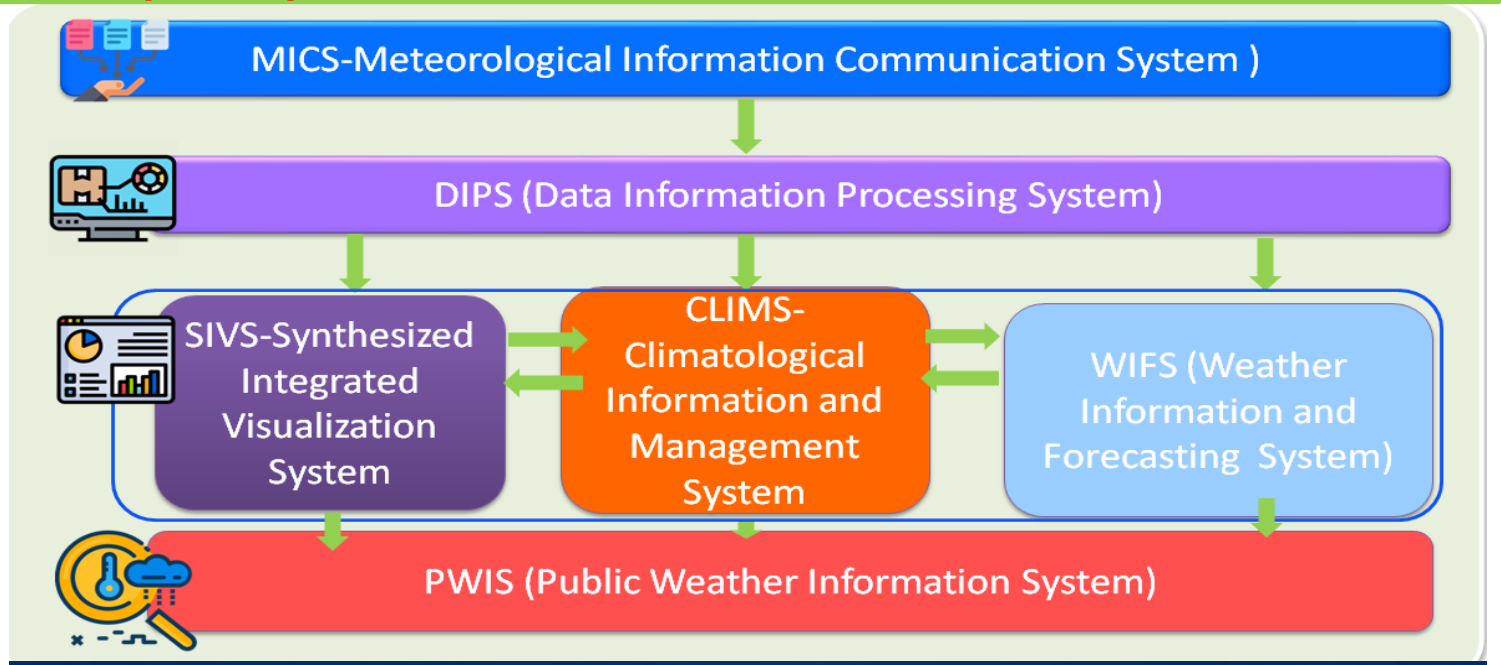
ΓMENT

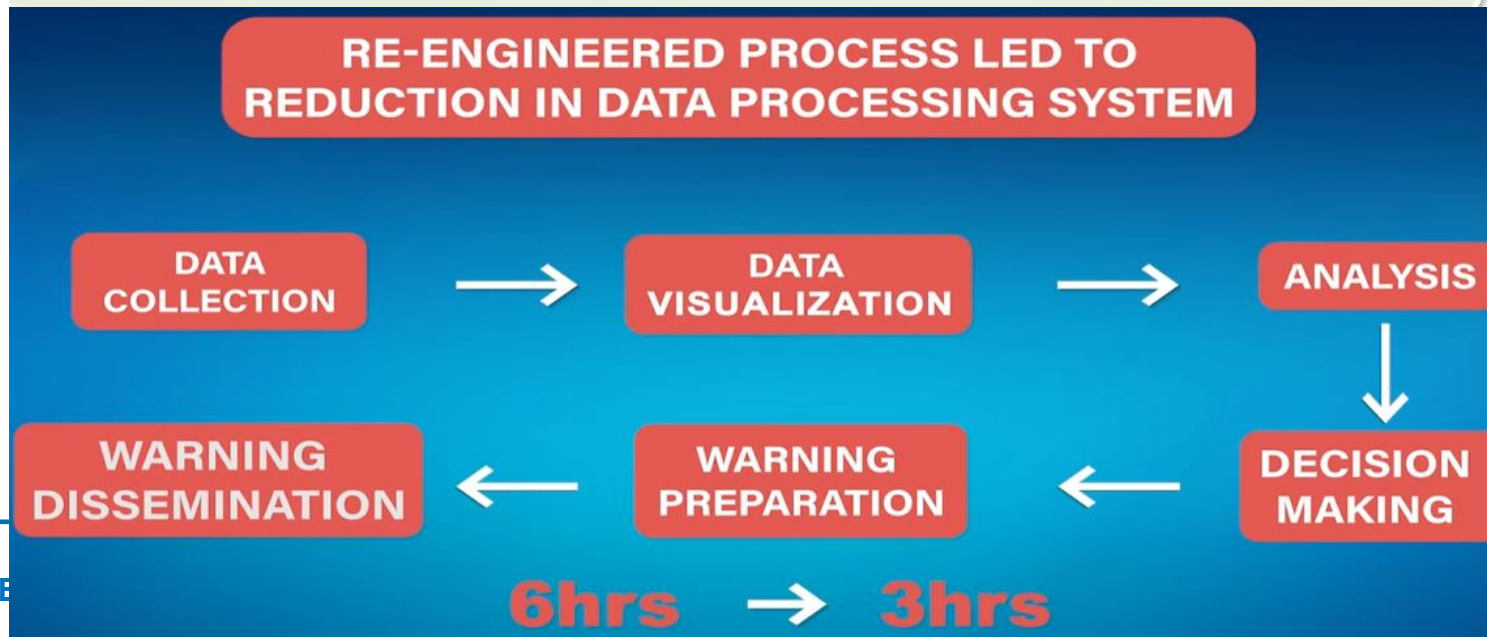
Years of Service to the Nation

WEATHER ANALYSIS AND FORECAST ENABLING SYSTEM (WAFES):DECISION SUPPORT SYSTEM (DSS): IMPLEMENTATION

Methodology Adopted

- Baseline study
- Problem identified
- Stakeholder consultation
- Design, development, testing, commissioning
- Capacity building and awareness
- Feedback mechanism





High level architecture for Decision support system

- Display all meteorological data
- Model outputs visualization
- Display satellite / radar imagery
- Plot and analyze observation and model data
- Product/ Bulletins Generation
- QC system for Forecaster
- Sectoral Applications

DSS Tools /Modules

Data Acquisition & Processing

Web services | Database | Flat Files | Geo -Spatial Layers

NWP Modeling (HPC server)

Decision Support System (DSS)

- Visualization
- Risk Analysis
- Climatology Services
- SOP
- GEOSPATIAL OGC compatible Services
- Regional Services
- Bulletins Generation
- Dissemination

- GTS
- CAP
- Social Media
- Website /APIs
- RSS feed
- Push notification
- Email
- SMS
- FAX

Back-End

Geospatial Database

PostgreSQL

Automating the entire process in python
- Manipulation and Integration of geospatial layers
- Converting to formatted CSV, geojson
- Maintaining the database

Library – Pandas, PSYCOPG2, Geopandas, GDAL, datetime etc.

GeoServer & OpenLayers

Mapping APIs

Matplotlib | GeoPandas | NumPy | GDAL | TensorFlow | python

Front-End

JS | HTML

Leaflet, PHP

KEY SYSTEM CHARACTERISTICS

Interoperable	• Separate modules are interoperable in a single platform also enable seamless data exchange across ministries, agencies, and sectors • Integrates diverse datasets, models, and platforms through open standards
Scalable	• Scalable in time, space, new data format and technology • Supports future expansion to additional hazards, sectors, and spatial resolutions without redesign
Replicable	• It can be replicated for any and sector country in the World • Standardized procedures, protocols and interoperability
Efficient	• Real time forecast, impact based warning, reduced forecast preparation time by 50% , enhanced accuracy by 30%
Responsive	• Dynamic and user driven • Multi-channel dissemination(SMS, API, Mobile apps,website)
Transparent	• Traceable data pipelines, standardized methodologies,open protocol and open source technologies. • Auditability and accountability
Sustainable	• Long term operational framework with institutional support and capacity building • Training, upgrades and knowledge sharing

PROCESS RE-ENGINEERING ACCOMPLISHED

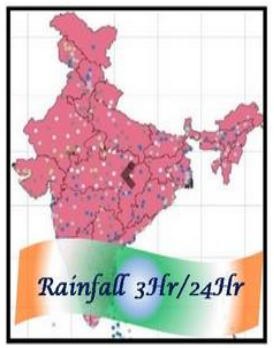
- **Over 90% of data collection, quality control, and real-time integration** has been automated for seamless ingestion from multiple sources to improve detection accuracy of weather systems and their impact.
- **Numerical weather modeling input** in decision making has **improved by over 95%,** enabling more accurate risk assessment for various hazards.
- **Forecast and warning generation has been fully (100%) re-engineered** to deliver real-time alerts for timely action. It led to
  - increase in **lead period from 5 to 7 days**,
  - **reduction in time to prepare the forecast by about 3 hrs** and
  - **increase in accuracy by about 15-20%**
- Dynamic GIS mapping, Decision Support System (DSS), and automated severe weather alerts have been implemented for the forecasters, common public, disaster managers and other stakeholders.
- Forecasting is now more accurate, efficient, and responsive to sector-specific needs across India.

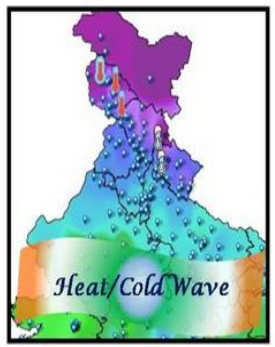
DSS-IBF Modules http://imdgeospatial.imd.gov.in/

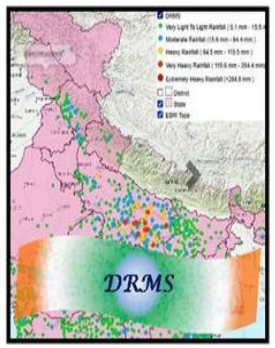
IMD has now introduced Web GIS based applications for all types of severe weather events like.

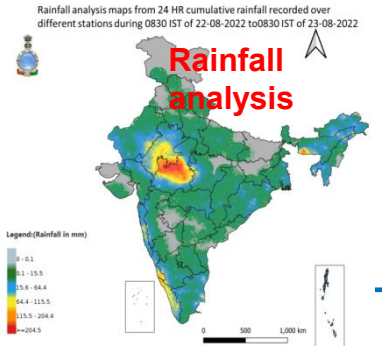
- Max/Min Temp, Hot day, Warm night
- Heat Wave Cold Wave, Heat Index
- Rainfall, 24hrs/3Hrs
- Heavy rainfall warning
- Cyclone Warning
- Marine weather Services
- Urban weather services
- Nowcast Services
- Agrometeorological Services
- Aviation weather serviceas
- Transport Services (RAIL/Highways)
- Mountain met and tourism
- Power sector Services

APPLICATIONS

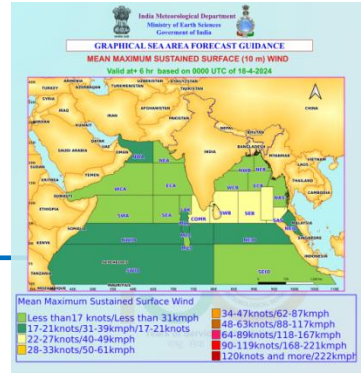








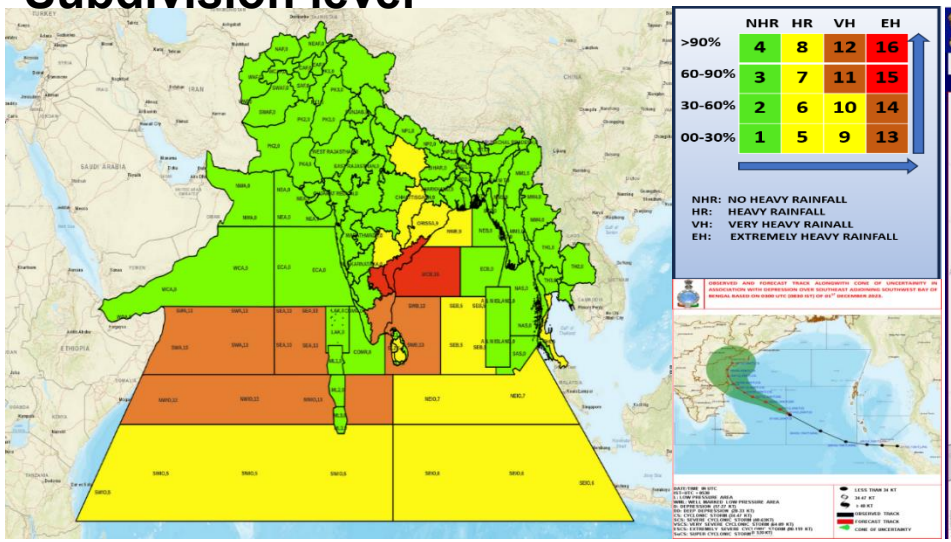
Sea area Bulletin graphics



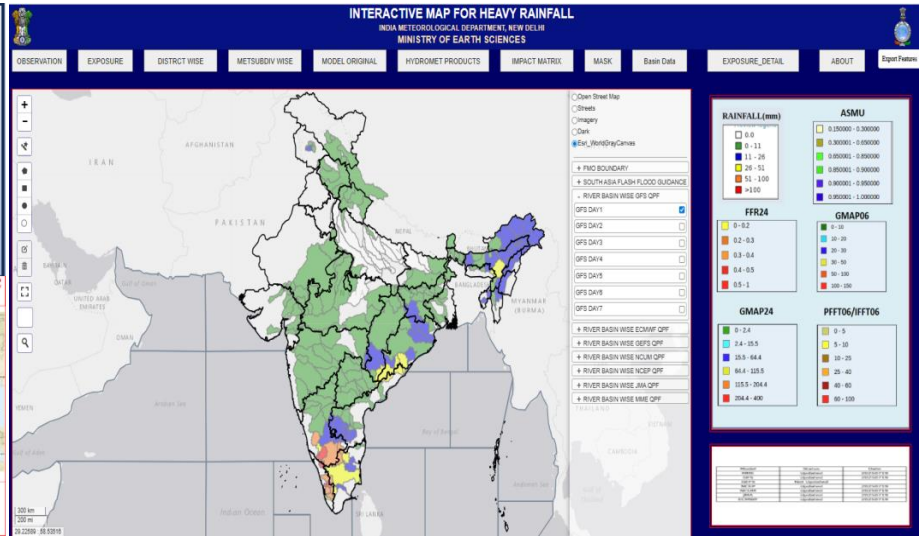
Multi-hazard interoperability : An example of Cyclone warning and Marine weather forecasting Services:

- South Asia Flash Flood Guidance (SA-FFG)
- Severe Weather Forecast Programme(SWFP)
- Quantitative Precipitation Estimate and Forecast (QPE & QPF)
- Storm Surge warning
- Heavy Rainfall warning
- Fisherman warning

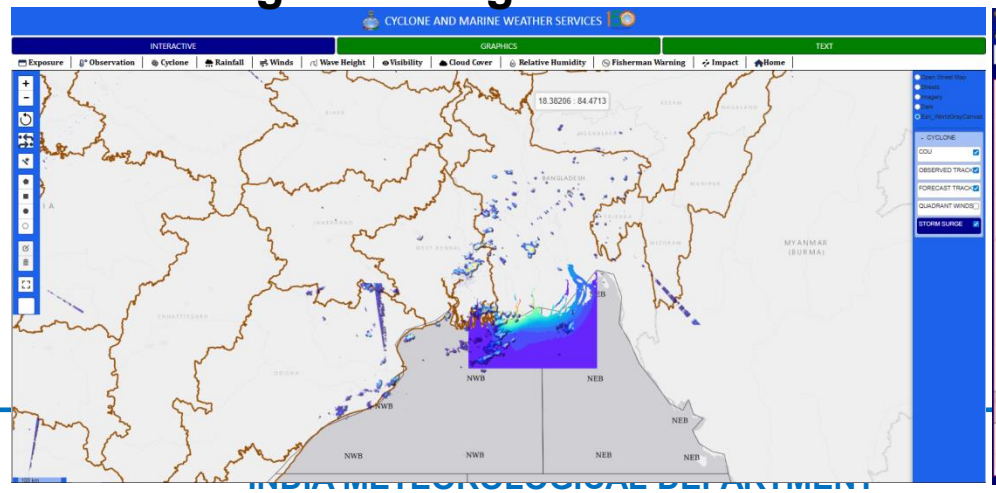
Heavy Rainfall warning at met. Subdivision level



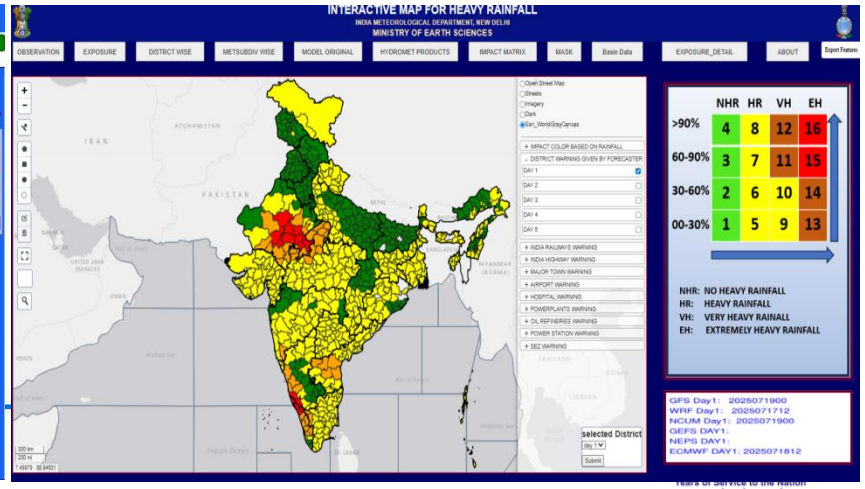
QPE/QPF for flood warning



Storm Surge Warning

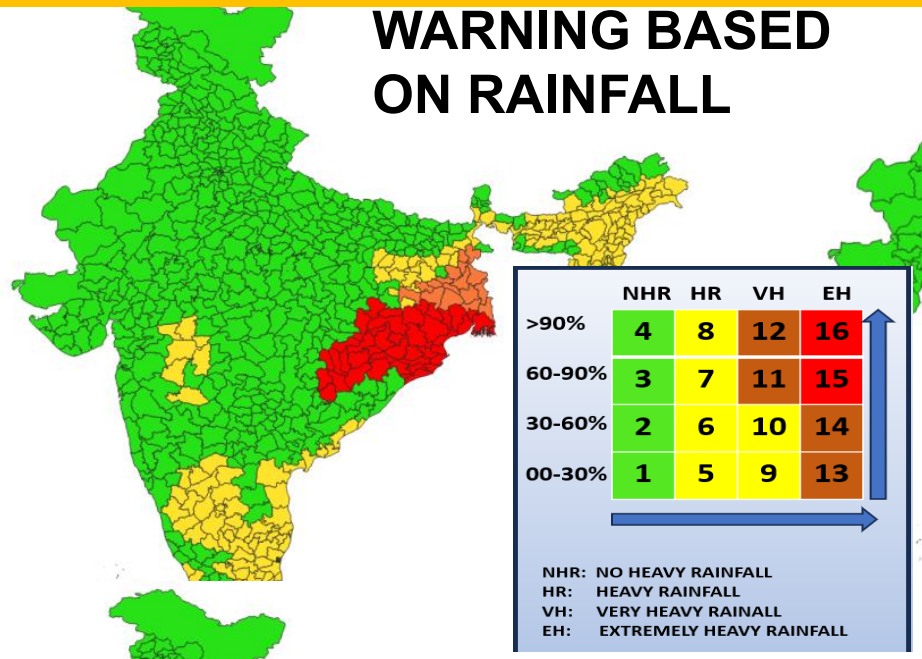


Heavy Rainfall warning at district level



Color Coded Warning For Cyclone Dana Based On 0830 IST of 23/10/2024 for 24/10/2024

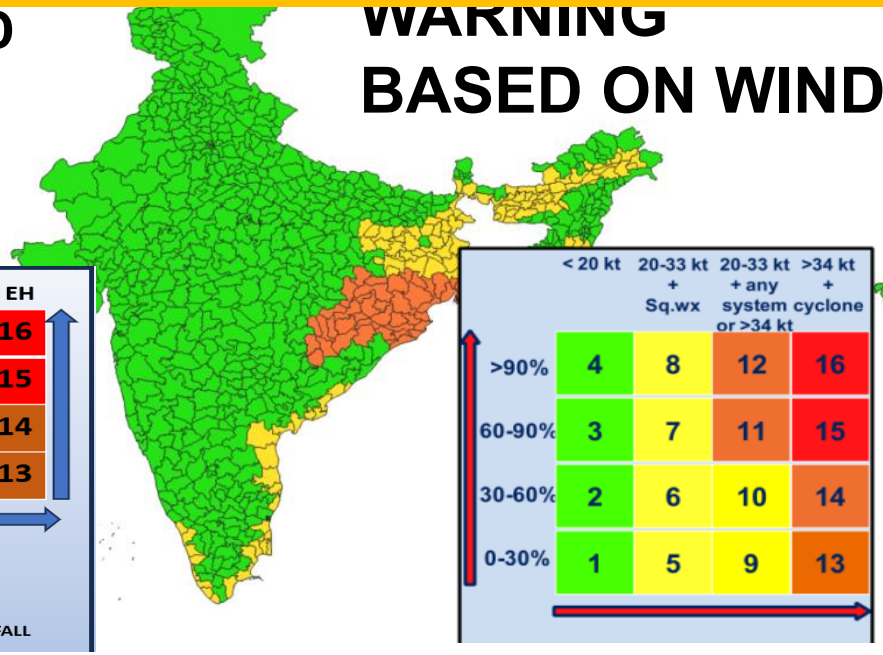
WARNING BASED ON RAINFALL



	NHR	HR	VH	EH
>90%	4	8	12	16
60-90%	3	7	11	15
30-60%	2	6	10	14
00-30%	1	5	9	13

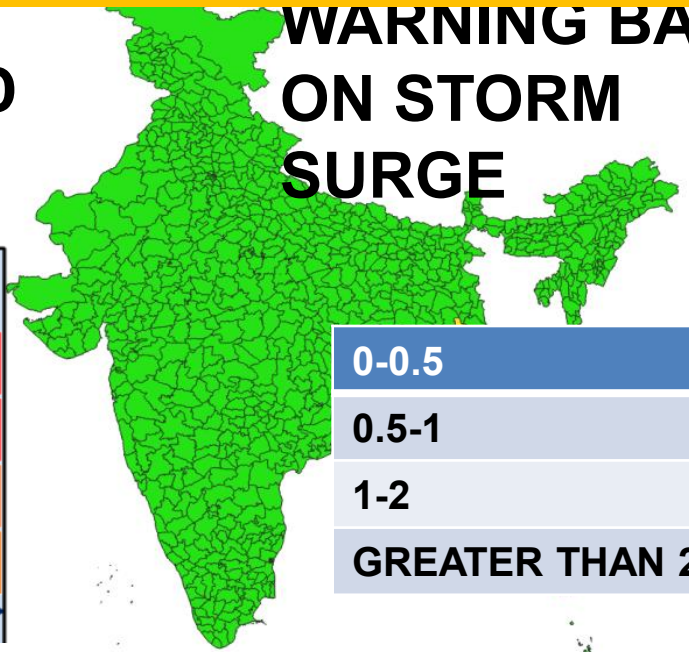
NHR: NO HEAVY RAINFALL
HR: HEAVY RAINFALL
VH: VERY HEAVY RAINALL
EH: EXTREMELY HEAVY RAINFALL

WARNING BASED ON WIND



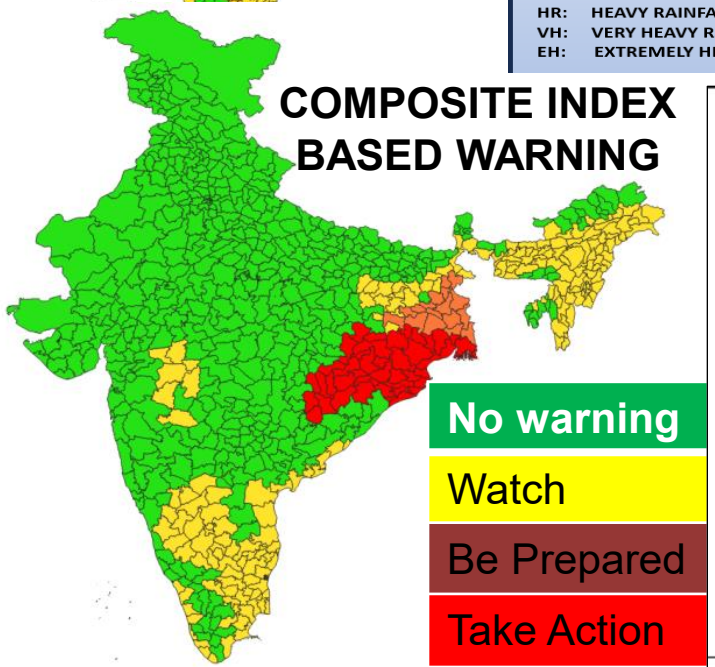
	< 20 kt	20-33 kt + Sq.wx	20-33 kt + any system or >34 kt	>34 kt + cyclone
>90%	4	8	12	16
60-90%	3	7	11	15
30-60%	2	6	10	14
0-30%	1	5	9	13

WARNING BASED ON STORM SURGE

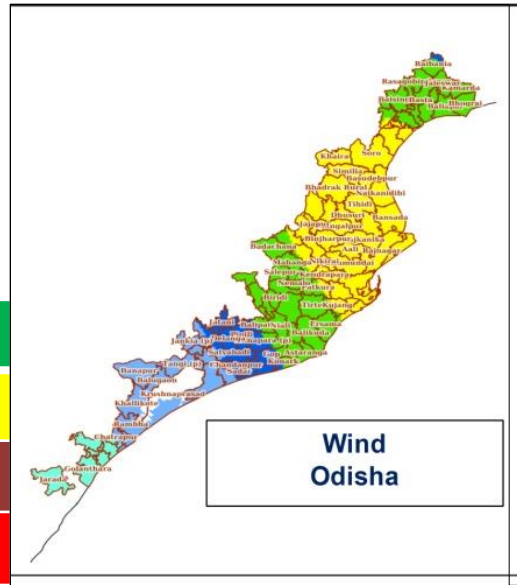


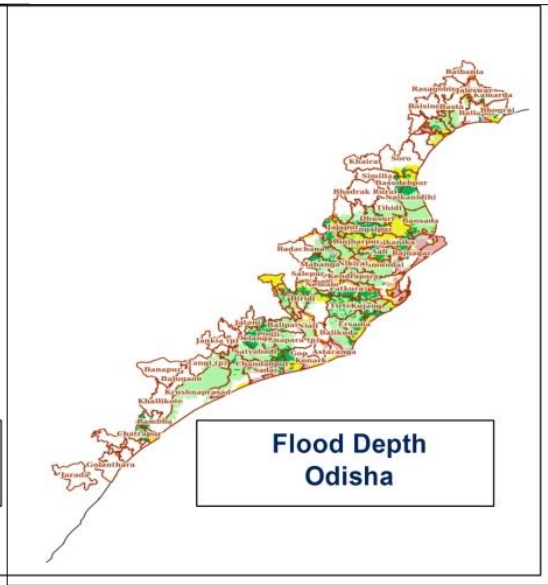
0-0.5
0.5-1
1-2
GREATER THAN 2

COMPOSITE INDEX BASED WARNING



- No warning
- Watch
- Be Prepared
- Take Action





State Boundary | District Boundary | Tehsil Boundary | Village Boundary

Wind Speed (Less than 31 Km/h) | Wind Speed (31 - 49 Km/h) | Wind Speed (49 - 61 Km/h)
Wind Speed (61 - 88 Km/h) | Wind Speed (88 - 117 Km/h) | Wind Speed (117- 166 Km/h)
Wind Speed (166 - 221 Km/h) | Wind Speed (Greater than 221 Km/h)

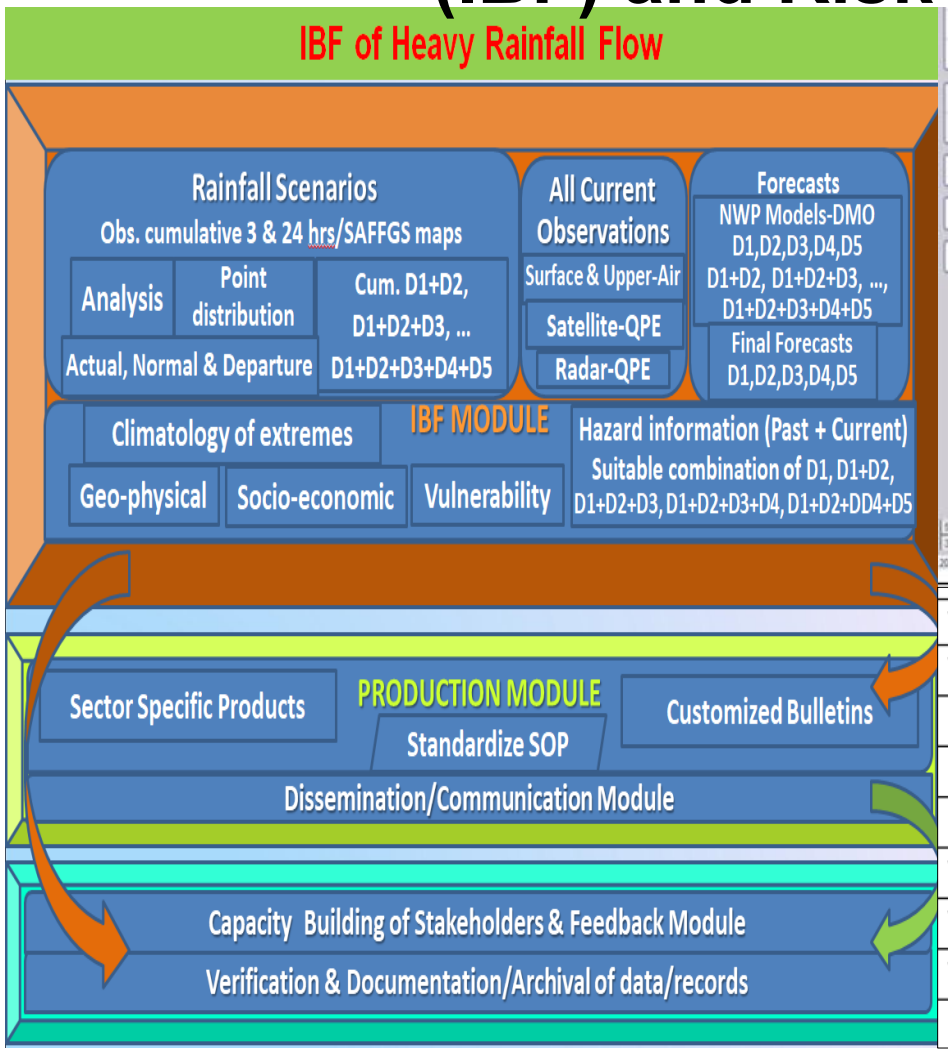
Wind

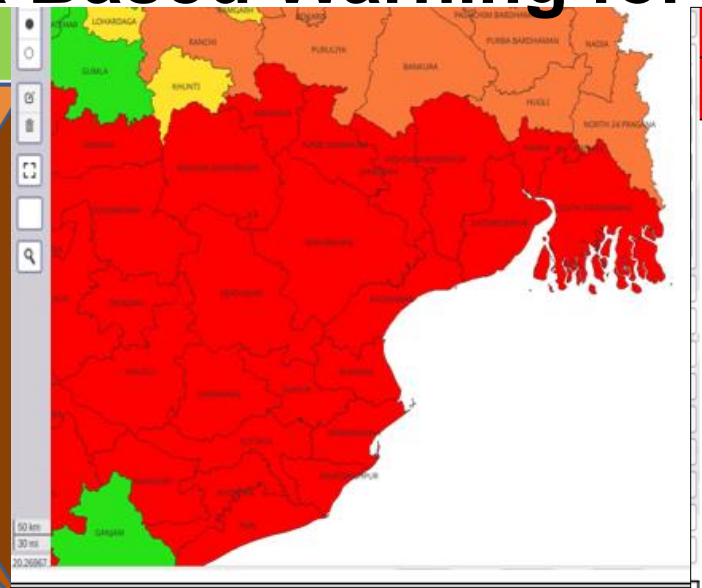
Very Low (Less than 0.25 m) | Low (0.25 to 0.50 m) | Moderate (0.50 to 1.0 m)
High (1.0 to 2.0 m) | Very High (2.0 to 3.0 m) | Extreme (Greater than 3.0 m)

Flood Depth

150 Years of Service to the Nation

Multi-hazard interoperability : An example of Impact Based Forecast (IBF) and Risk Based Warning for Heavy rainfall





Total Population Affected :155,000
Total No of Airport Affected :0
Railway Station affected: 4
Railway Network affected :East Coast Railway , South Eastern Railway
Hospitals affected: 4
Total No of SEZ affected: 1
Total No of Power Station affected:1
Total No of Power Plants affected:1
Major Towns affected:5

District: Bhadrak WARNING: RED (TAKE ACTION)

IMPACTS

- Flash flood/Water logging in low lying areas;
- Inundation of agriculture field;
- Possibility of some damage to informal/Kutcha road, wall collapsed of vulnerable kutcha houses;
- It may lead to significant rise in water level of rivers;
- Water logging in underpass road and occasional reduction of visibility causing traffic congestion in urban areas during intense spells of rain;
- Municipal services like electricity, water supply etc. will be affected to large extent;
- Supply and transportation will be affected at a few to many places for several days.

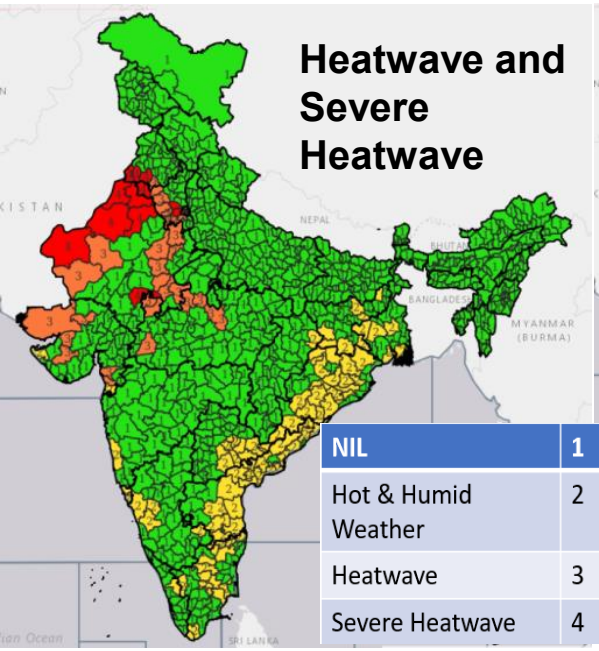
ACTION

- Keep arrangement for drainage of excess water from inundated agriculture fields;
- Avoid movement in urban areas specially during intense spells of rain; Postpone fertilizer/chemicals application in agriculture field;
- Keep livestock in safe place;
- Avoid movement in affected areas and move to safe place

Multi-hazard interoperability : An example of Heat Indices Prepared

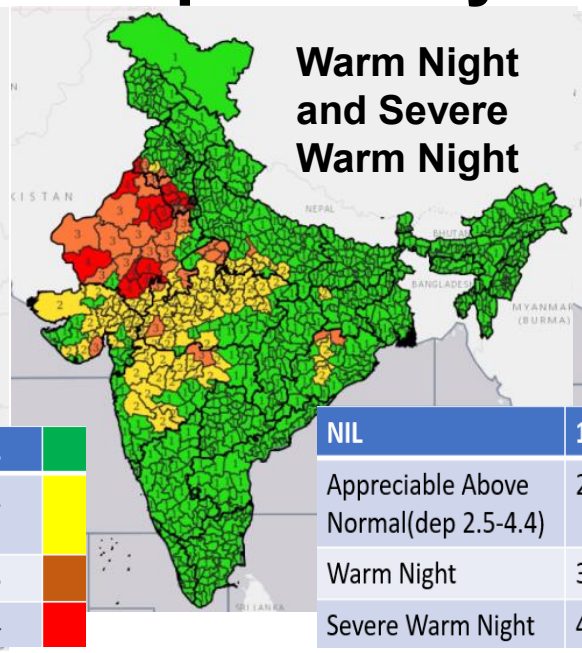
Daily

Heatwave and Severe Heatwave



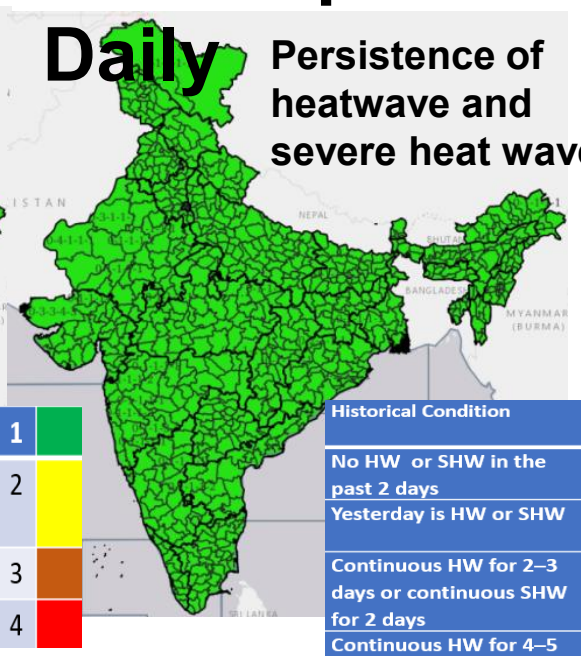
NIL	1	
Hot & Humid Weather	2	
Heatwave	3	
Severe Heatwave	4	

Warm Night and Severe Warm Night



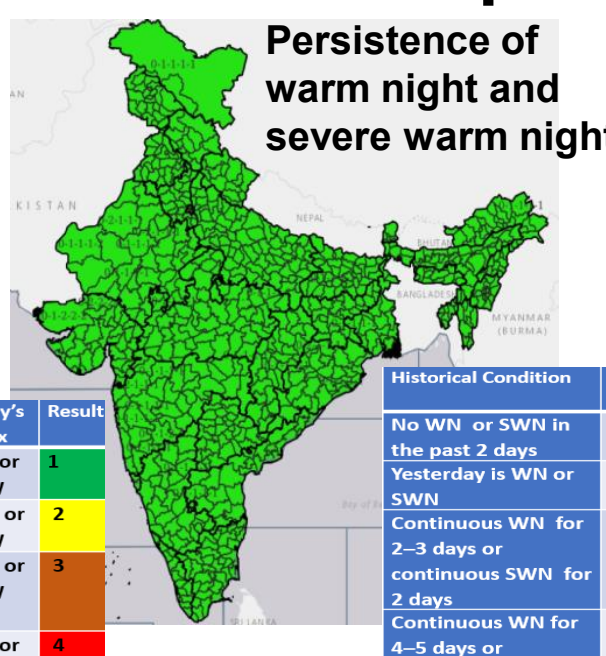
NIL	1	
Appreciable Above Normal(dep 2.5-4.4)	2	
Warm Night	3	
Severe Warm Night	4	

Persistence of heatwave and severe heat wave



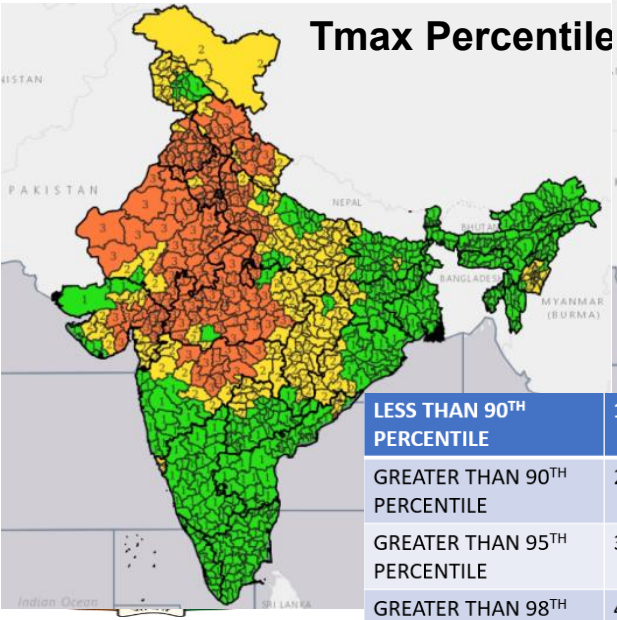
Historical Condition	Today's Index	Result
No HW or SHW in the past 2 days	HW or SHW	1
Yesterday is HW or SHW	HW or SHW	2
Continuous HW for 2–3 days or continuous SHW for 2 days	HW or SHW	3
Continuous HW for 4–5 days or continuous SHW for 3+ days	HW or SHW	4

Persistence of warm night and severe warm night



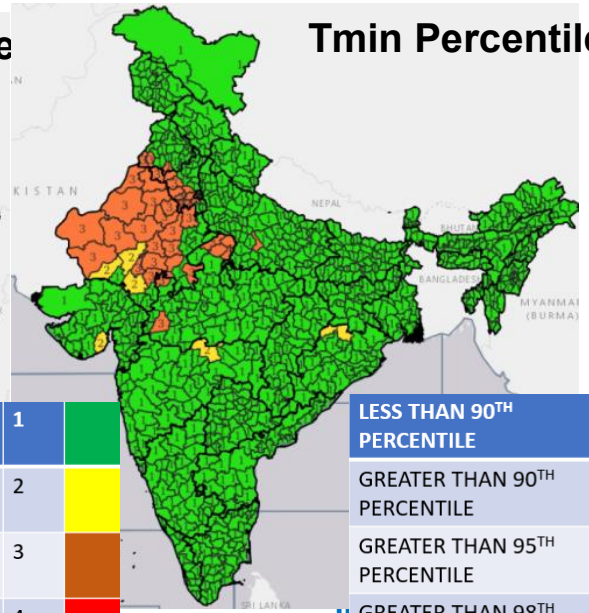
Historical Condition	Today's Index	Result
No WN or SWN in the past 2 days	WN or SWN	1
Yesterday is WN or SWN	WN or SWN	2
Continuous WN for 2–3 days or continuous SWN for 2 days	WN or SWN	3
Continuous WN for 4–5 days or continuous SWN for 3+ days	WN or SWN	4

Tmax Percentile



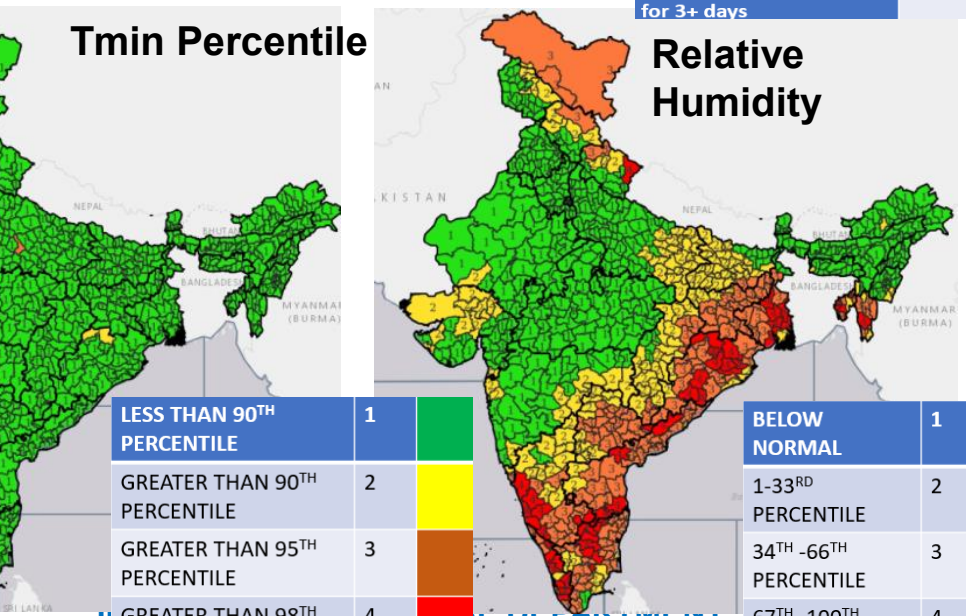
LESS THAN 90TH PERCENTILE	1	
GREATER THAN 90TH PERCENTILE	2	
GREATER THAN 95TH PERCENTILE	3	
GREATER THAN 98TH PERCENTILE	4	

Tmin Percentile



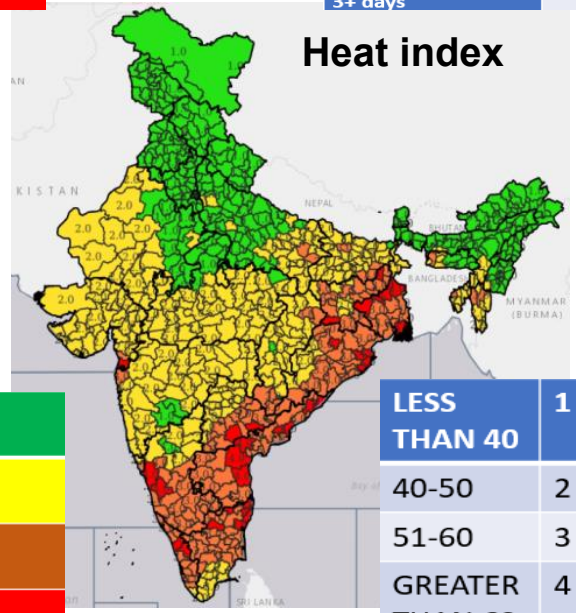
LESS THAN 90TH PERCENTILE	1	
GREATER THAN 90TH PERCENTILE	2	
GREATER THAN 95TH PERCENTILE	3	
GREATER THAN 98TH PERCENTILE	4	

Relative Humidity



BELOW NORMAL	1	
1-33RD PERCENTILE	2	
34TH -66TH PERCENTILE	3	
67TH -100TH PERCENTILE	4	

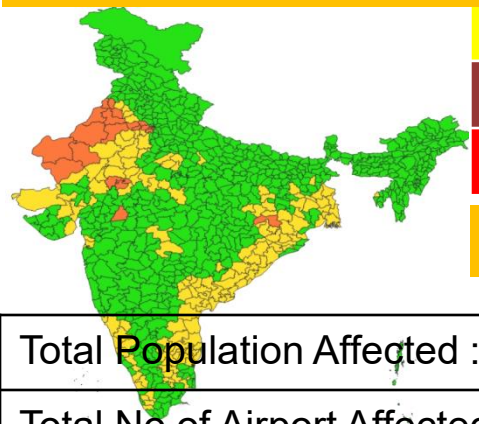
Heat index



LESS THAN 40	1	
40-50	2	
51-60	3	
GREATER THAN 60	4	

Multi-hazard interoperability : An example of Composite Index Based Heat Wave Watch & Warning

District:Jodhpur: ORANGE Warning (Be prepared)

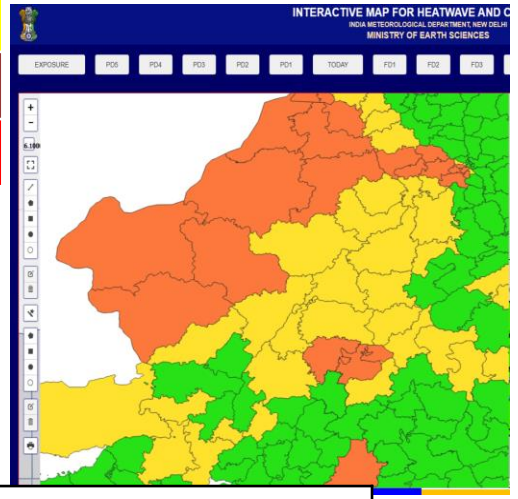


Heat wave Watch

Heat Wave Warning

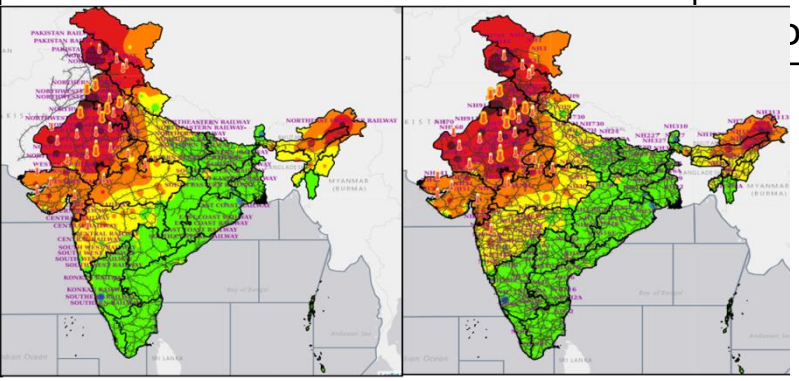
Severe Heat Wave Warning

District: Jodhpur



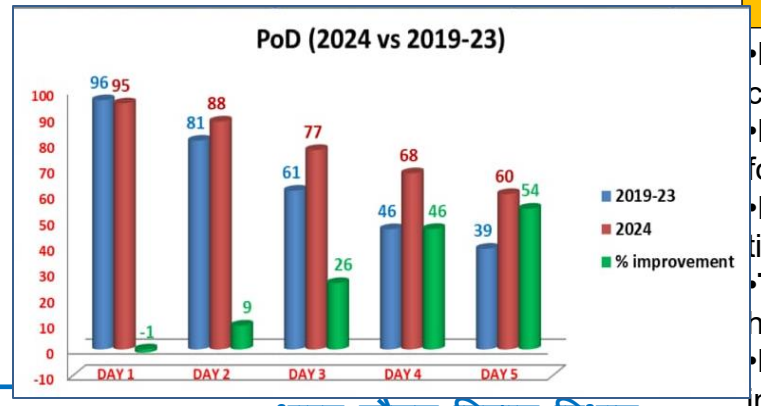
Total Population Affected :15.43 lakh
Total No of Airport Affected :1
Railway Station affected: 10
Railway affected :North Western Railway
Hospitals affected: 35

Total No of SEZ affected: 1
Total No of Power Station affected:6
Total No of Power Plants affected:4
or Towns affected:9



Maximum Temperature Departures with heat wave conditions overlaid with Indian Railway Network

Maximum Temperature Departures with heat wave conditions overlaid with Indian Road Network



भारत मौसम विज्ञान विभाग

INDIA METEOROLOGICAL DEPARTME

IMPACTS

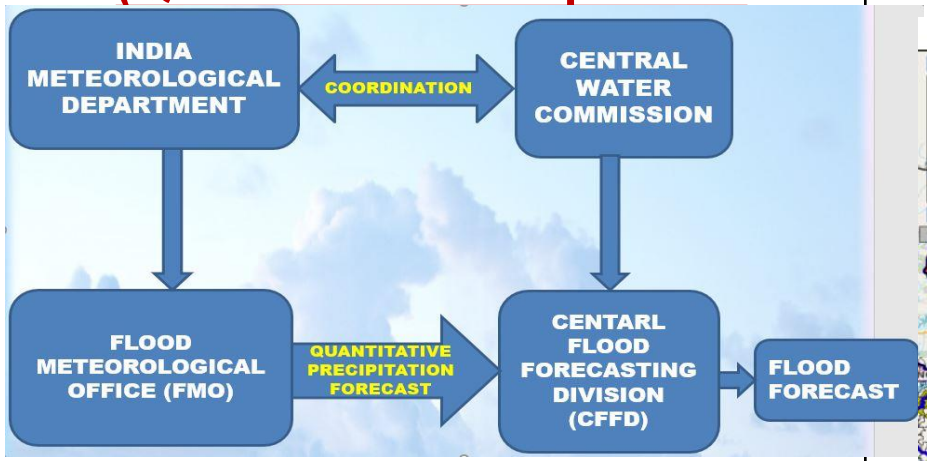
- **Human Health**: Increases risk of heatstroke, dehydration, and cardiovascular issues; vulnerable populations suffer most.
- **Agriculture**: Reduces crop yields, causes drought stress, disrupts planting/harvesting cycles.
- **Livestock**: Causes heat stress, reduced productivity, higher mortality.
- **Transport**: Damages roads/railways, causes delays and accidents, affects worker safety.
- **Economy**: Disrupts labor productivity, increases health and infrastructure costs.
- **Water Resources**: Increases evaporation, reduces freshwater availability, worsens droughts.

ACTION

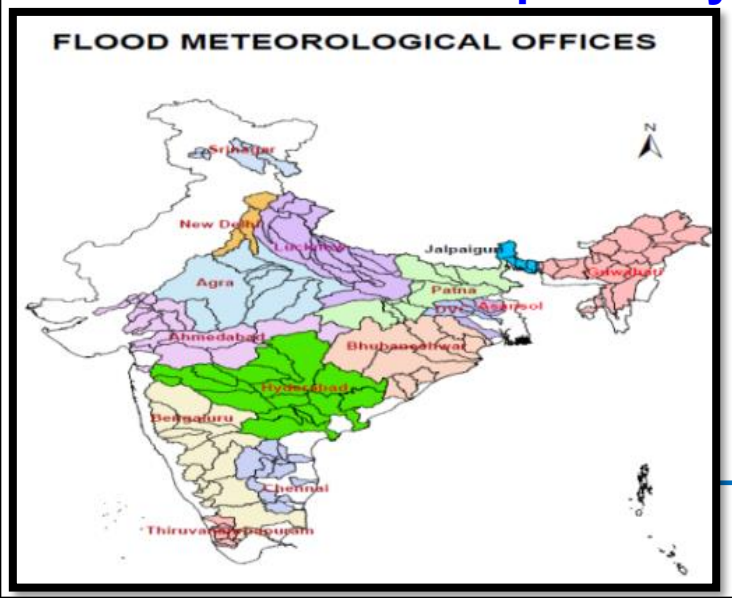
- **Human Health**: Improve heat warning systems, expand access to cooling centers, promote hydration and public awareness.
- **Energy**: Boost energy efficiency, diversify energy mix, upgrade grids for heat resilience.
- **Livestock**: Provide shade, ventilation, ample water; modify feeding times.
- **Transport**: Upgrade infrastructure for heat resilience, adjust work hours, enhance maintenance.
- **Economy**: Invest in heat-resilient jobs and technology, support heat-impacted sectors.
- **Water Resources**: Improve water conservation, build reservoirs, enhance drought planning.

Hydromet Services of IMD for Flood Forecasting

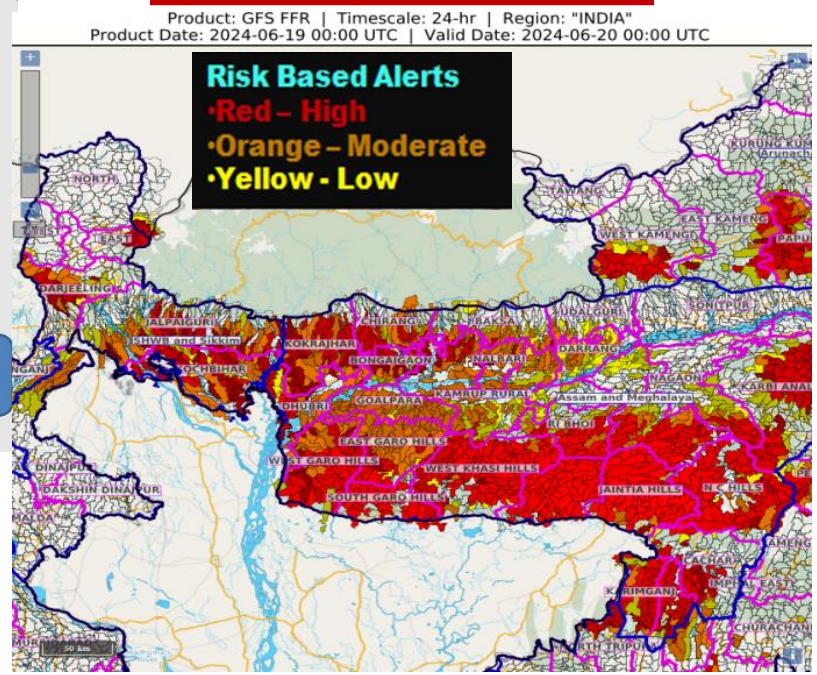
Riverine Flood Forecasting (Quantitative Precipitation



- 15 Flood Met. Offices provide rainfall forecast for 160 river sub basins valid upto 7 days

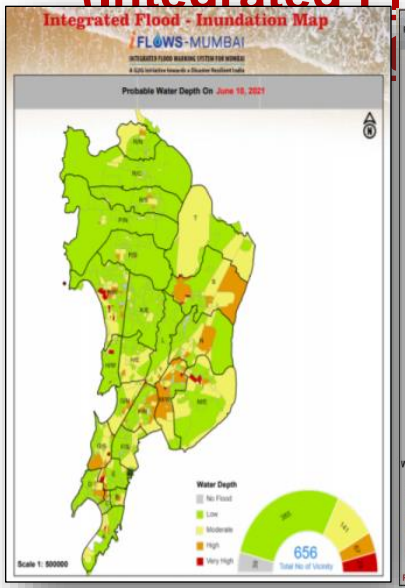


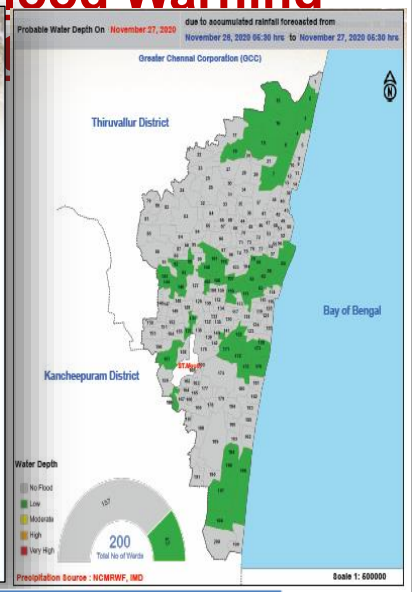
South Asia Flash Flood Guidance System (SAsiaFFGS)



- Guidance for Bangladesh, Bhutan, India, Nepal, Sri Lanka.
- High resolution (4X4 km) and 30000 watersheds over Indian region.
- Capable of issuing flash flood Threat and risk for next 6 and 24 hours respectively.

City Specific Flood Forecast (Integrated Flood Warning





Code	Water Depth (feet)
	No flood
	3-4
	4-5
	5-6
	>6

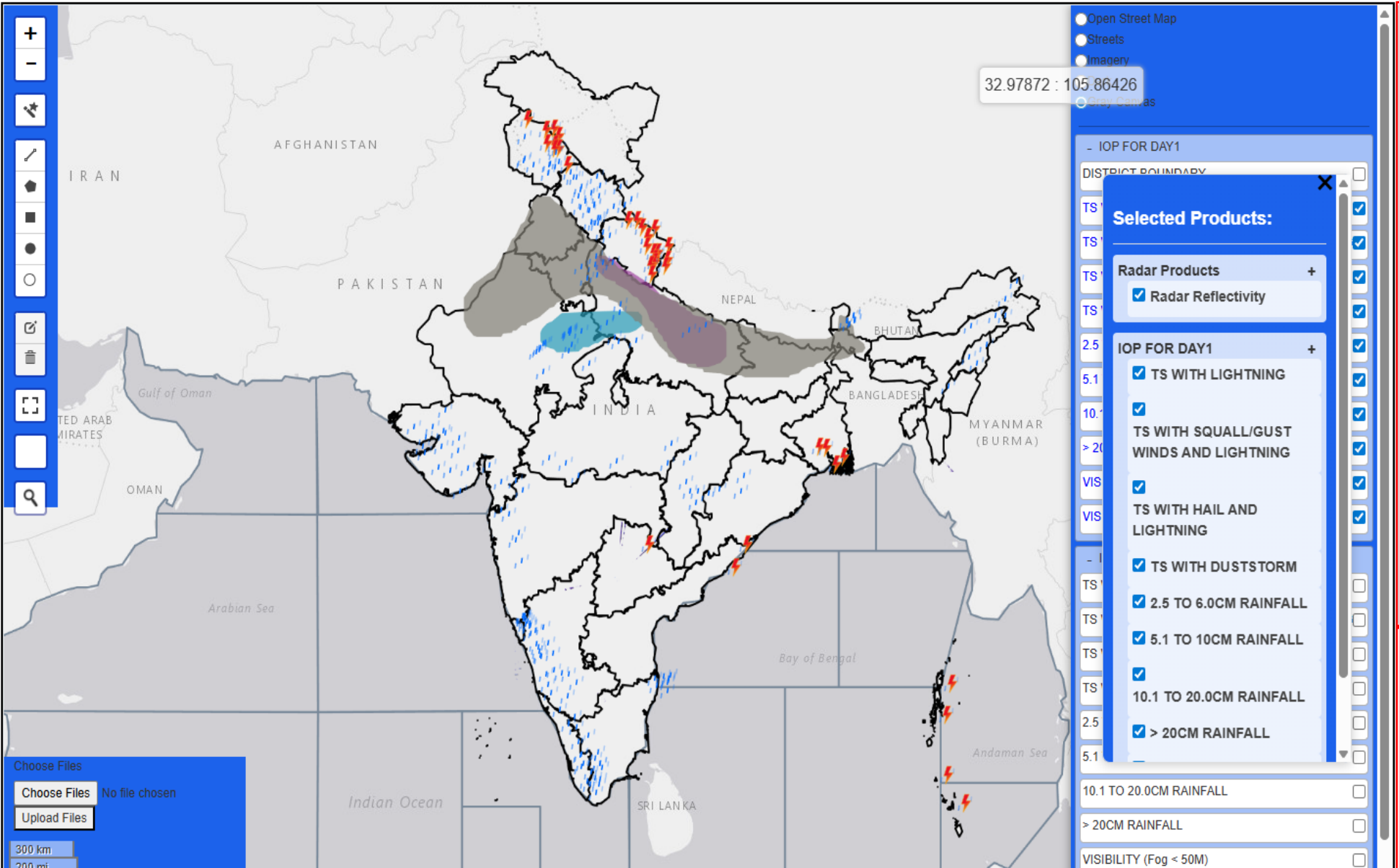
- Implemented at Mumbai, Chennai and Kolkata
- Ward-wise probable water depth/inundation.

THUNDERSTORM SERVICES

INTERACTIVE SYSTEM FOR NOWCAST SERVICES

Climatological Indices | Exposure | Metar | Synop | Model Output | Satellite | Mimic | Lightning | Radar | Sounding | MultiModal_Lightning | Home | Exposure Detail | Export Polygon

IOP View | IOP Edit | Generate IOP | Generate Bulletin | Generate PDF | Data Filter



Open Street Map
Streets
Imagery
Gray Canvas

IOP FOR DAY1

DISTRICT BOUNDARY

Selected Products:

Radar Products +
- Radar Reflectivity

IOP FOR DAY1 +
- TS WITH LIGHTNING
- TS WITH SQUALL/GUST WINDS AND LIGHTNING
- TS WITH HAIL AND LIGHTNING
- TS WITH DUSTSTORM
- 2.5 TO 6.0CM RAINFALL
- 5.1 TO 10CM RAINFALL
- 10.1 TO 20.0CM RAINFALL
- > 20CM RAINFALL

10.1 TO 20.0CM RAINFALL
> 20CM RAINFALL
VISIBILITY (Fog < 50M)

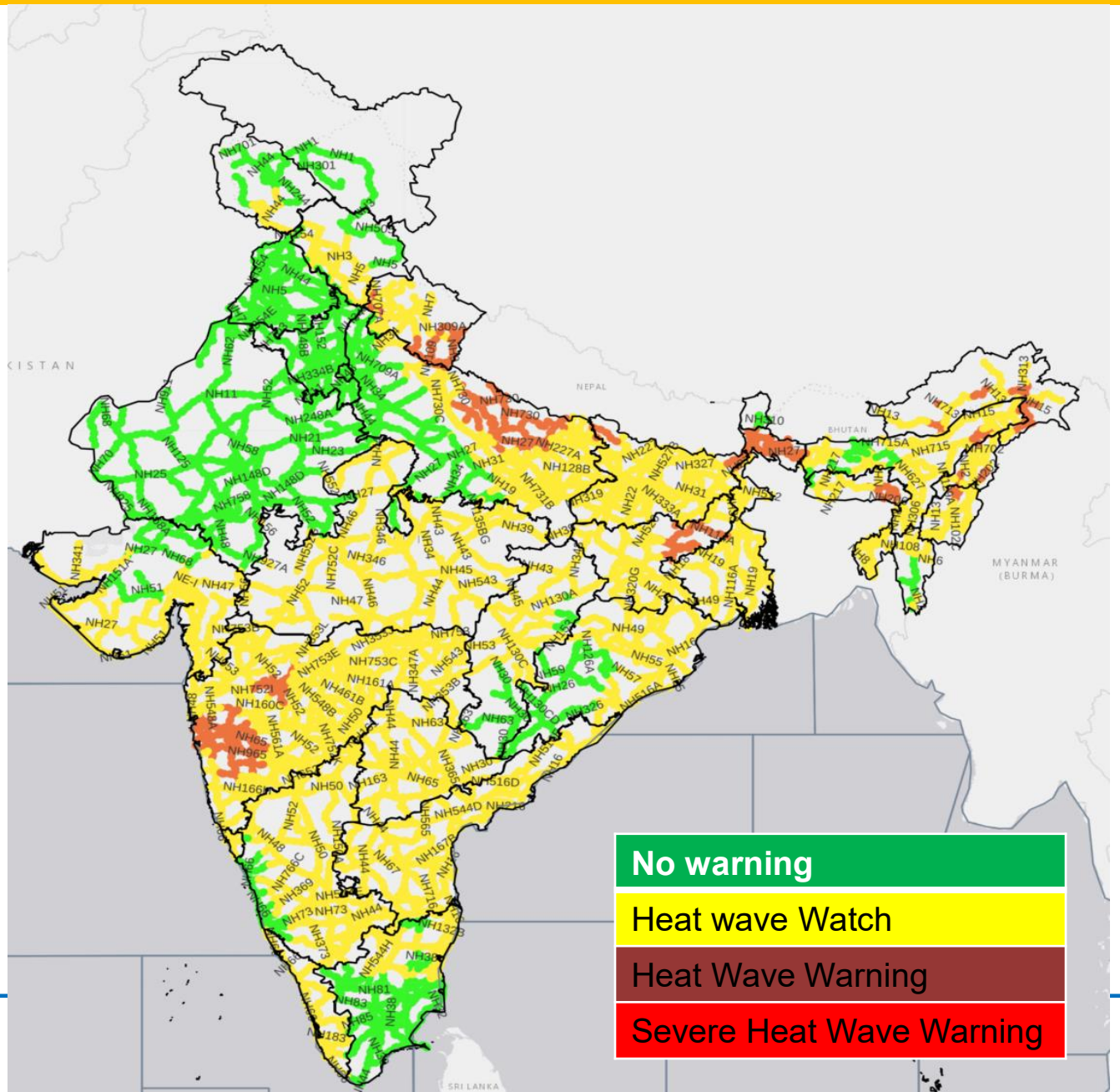
Choose Files
Choose Files No file chosen
Upload Files
300 km

Warning Type

TS With Lightning	A1 / B1
TS with Squall/Gusty winds and Lightning	A2 / B2
TS with Hail and Lightning	A3 / B3
TS with Duststorm	A4 / B4
2.5 to 5.0 cm Rainfall	A5 / B5
5.1 to 10.0 cm Rainfall	A6 / B6
10.1 to 20.0 cm Rainfall	A7 / B7
>20.0 cm Rainfall	A8 / B8
Visibility(Fog <50 m)	A9 / B9
Visibility(Fog <200 m)	A10 / B10

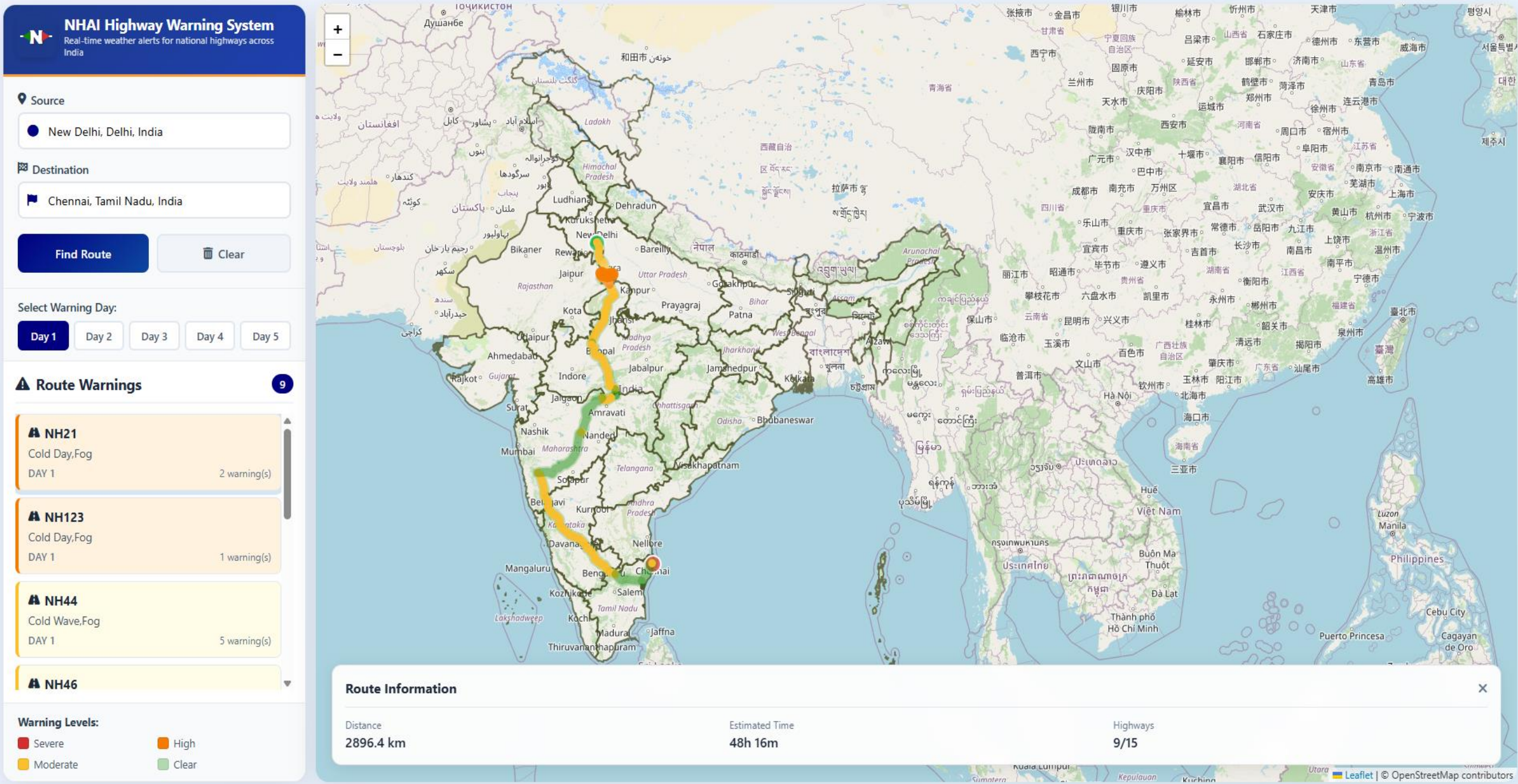
Day 1 : 20260118

MULTI HAZARD WARNING FOR NATIONAL HIGHWAY

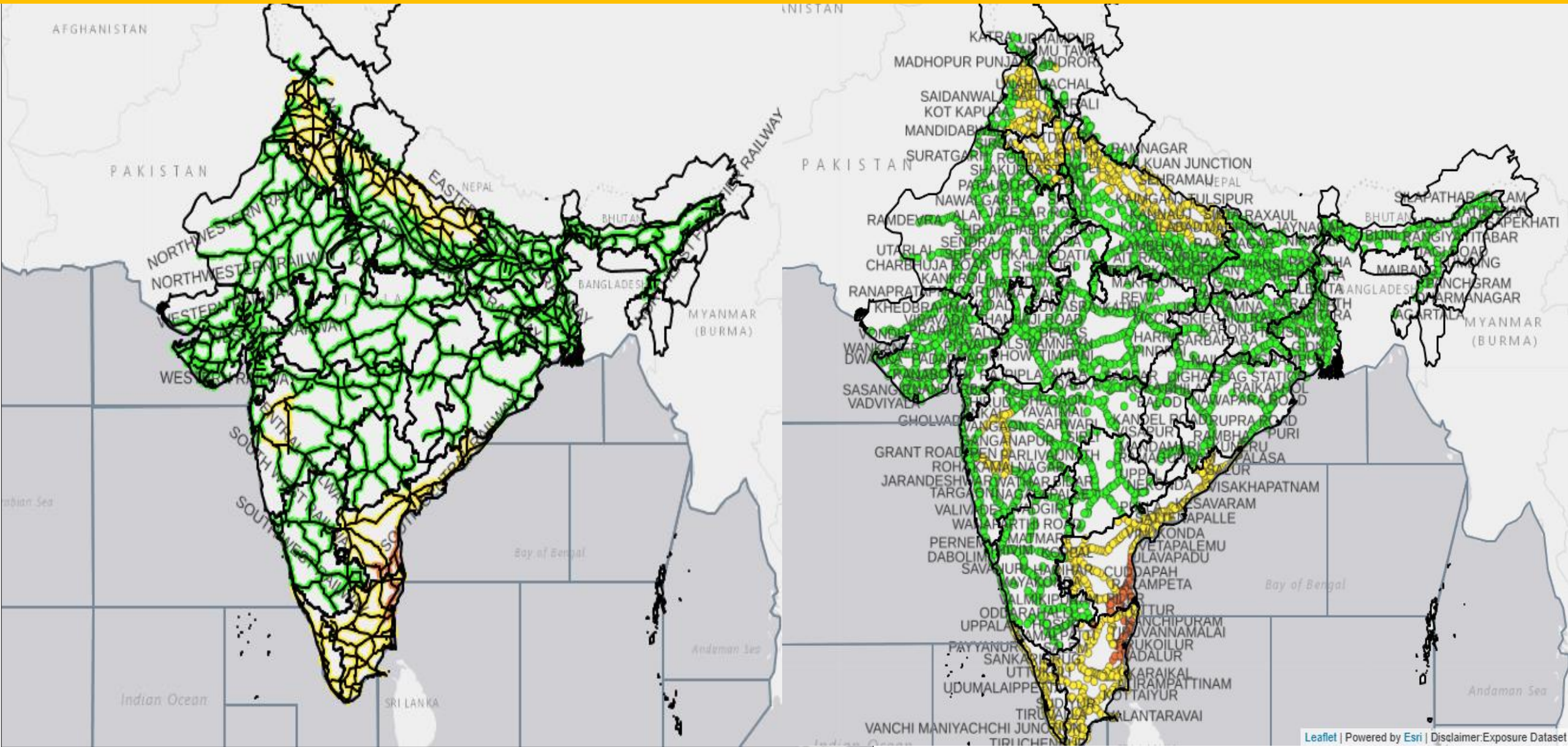


Years of Service to the Nation

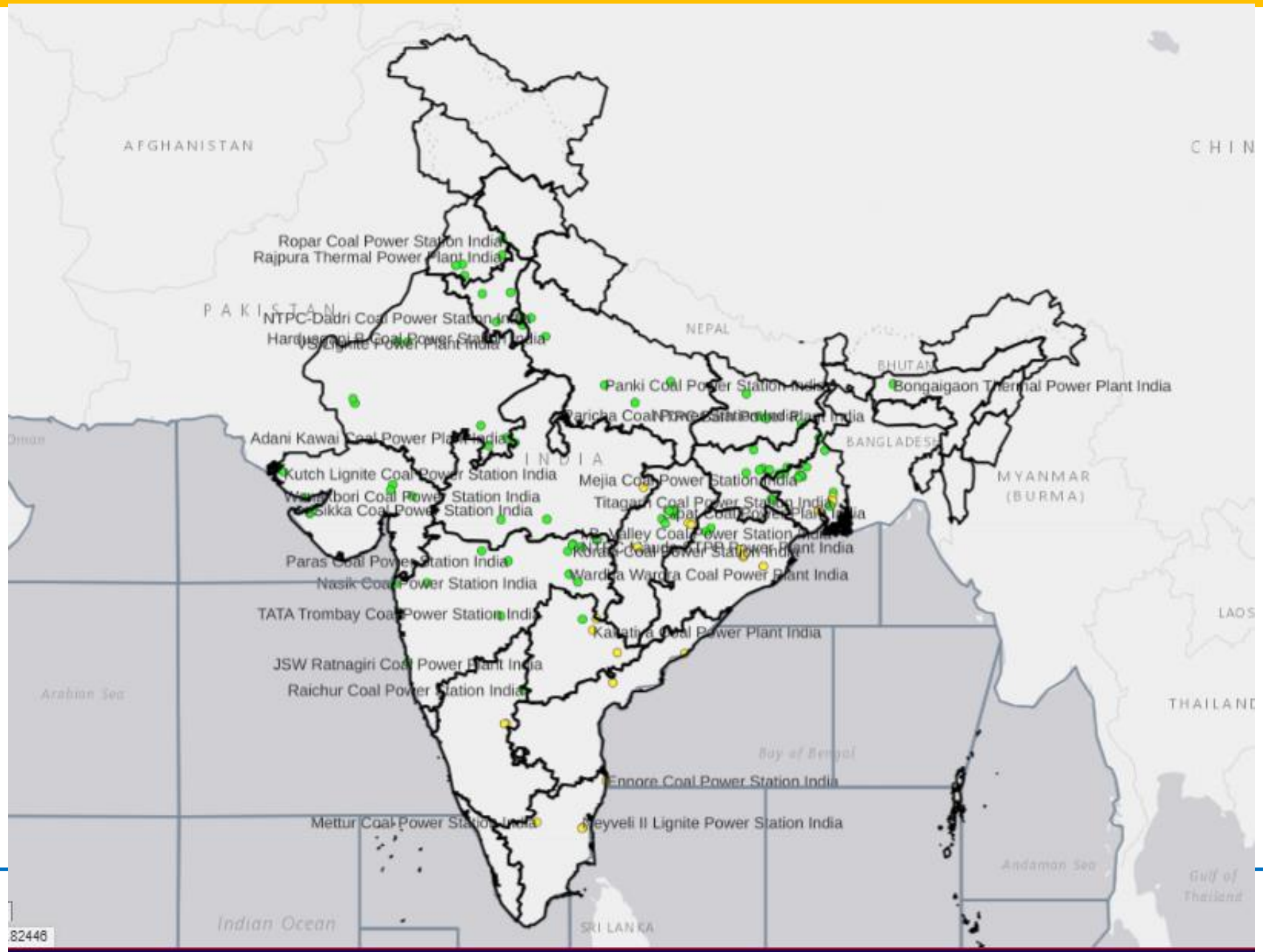
ROUTE FORECAST FOR NATIONAL HIGHWAYS



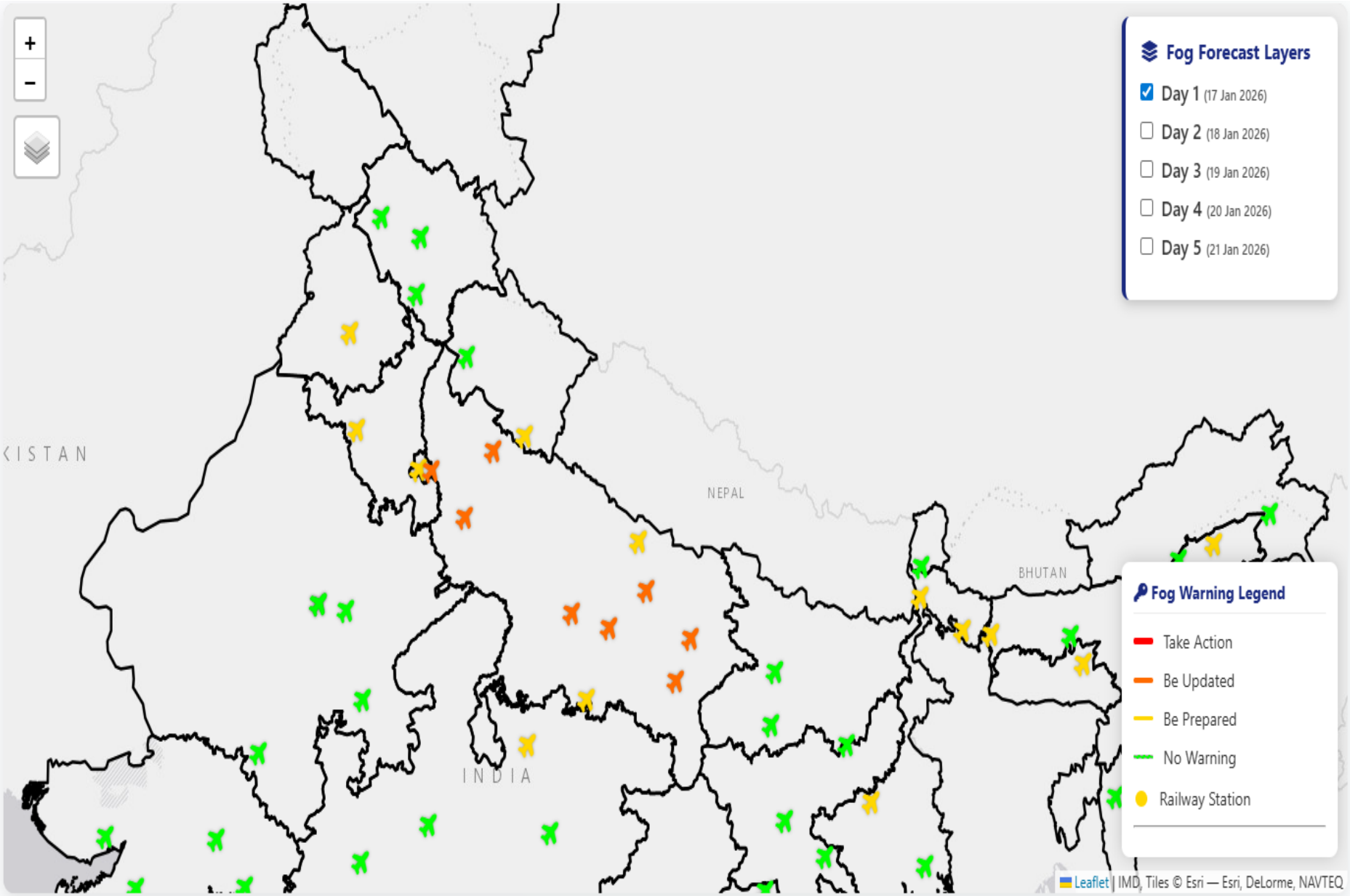
MULTI HAZARD WARNING FOR INDIAN RAILWAYS AND RAILWAY STATIONS



MULTI HAZARD WARNING FOR POWER SECTOR SERVCIES



FORECAST FOR AVIATION SECTOR



Fog Warnings

Aviation Warnings

IMD

Airport

Location: MORADABAD, UTTAR PRADESH

Type: Airport

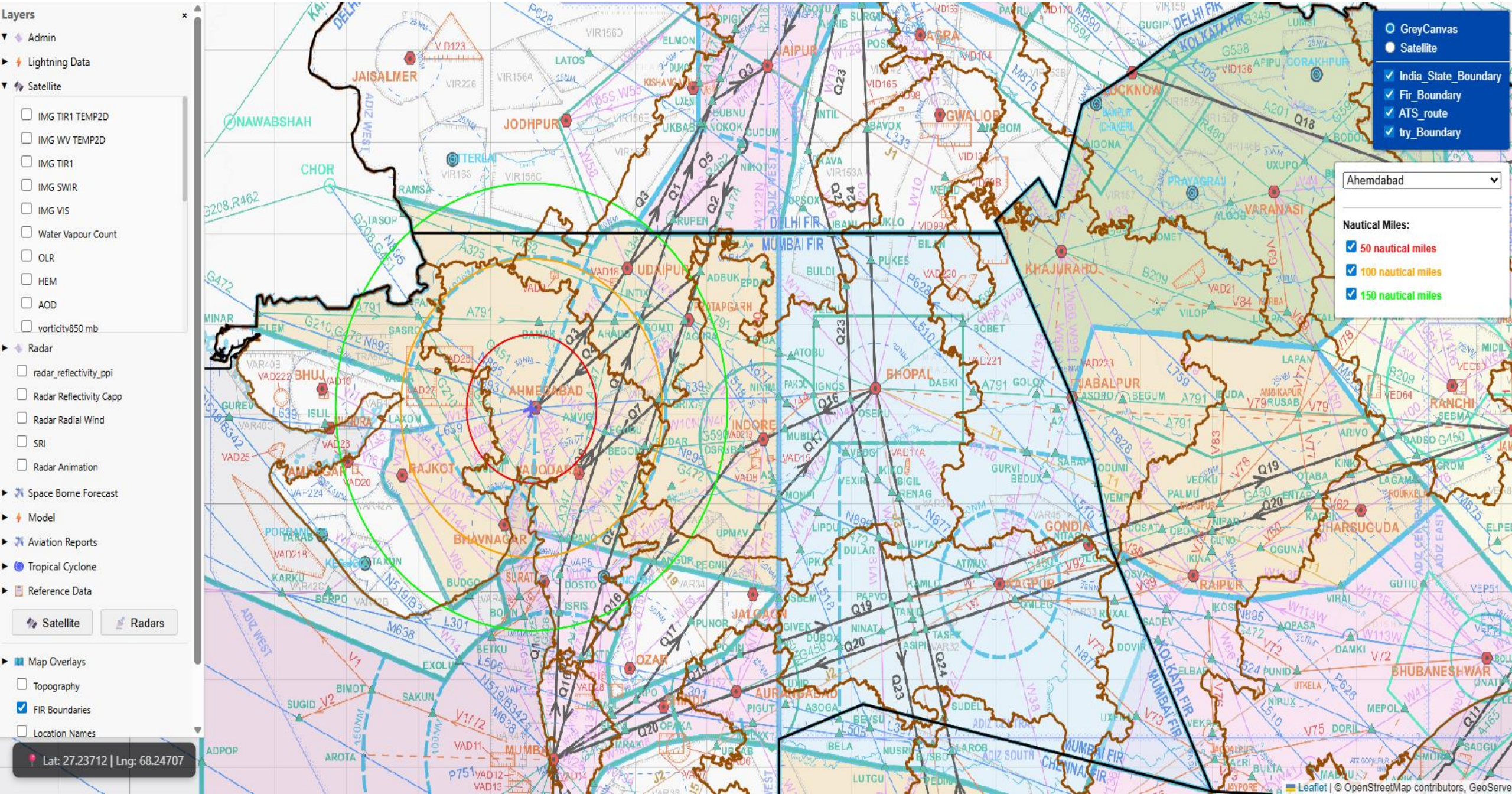
Forecast Day: Day 1

Warning Level: Orange (Be Updated)

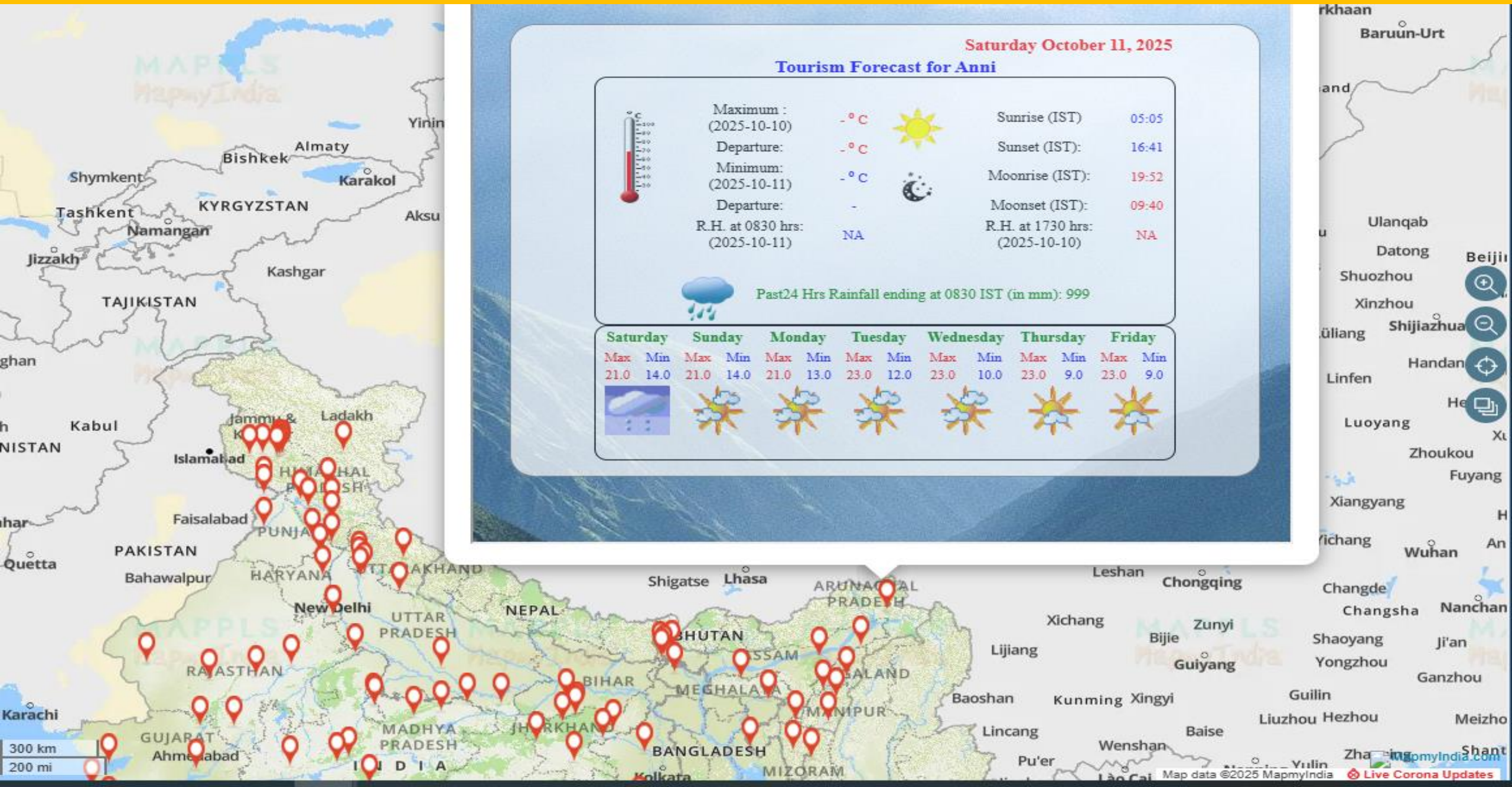
Last Updated: N/A

Day 1

MODULE FOR AVIATION SECTOR



TOURISM SECTOR SERVCIES

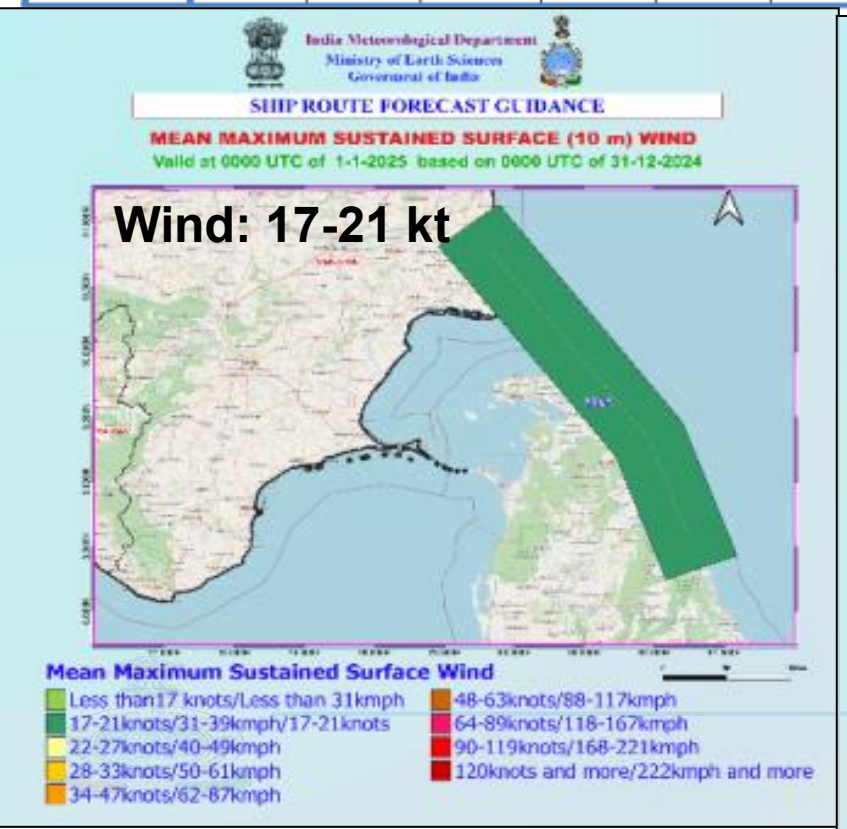


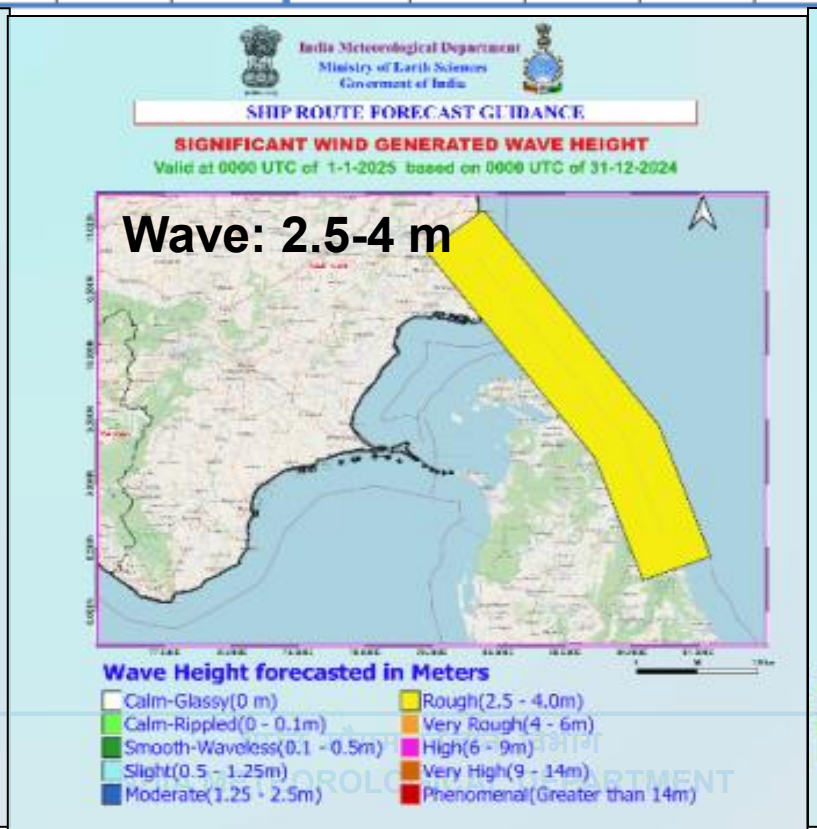
SHIP ROUTE FORECAST (3HRLY FORECAST UPTO NEXT 5 DAYS)

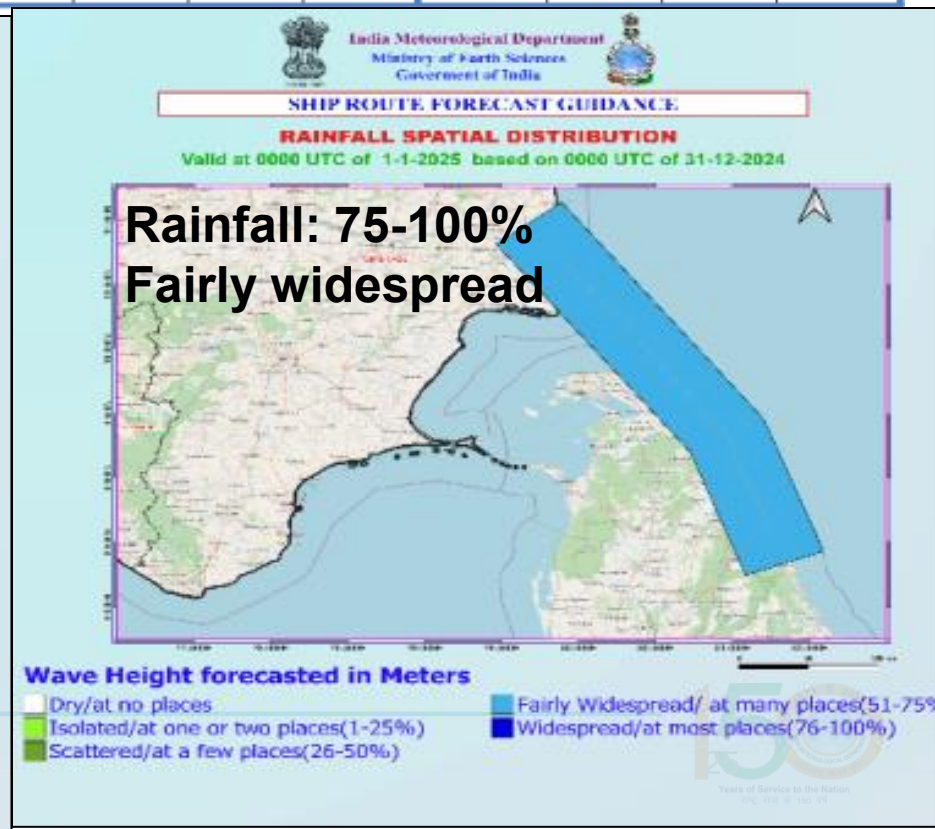
Parameters predicted: Wind, Wave, Weather and Visibility)

The weather forecast for the route between Nagapattinam Port to Kankesanthurai dated 31ST December 2024

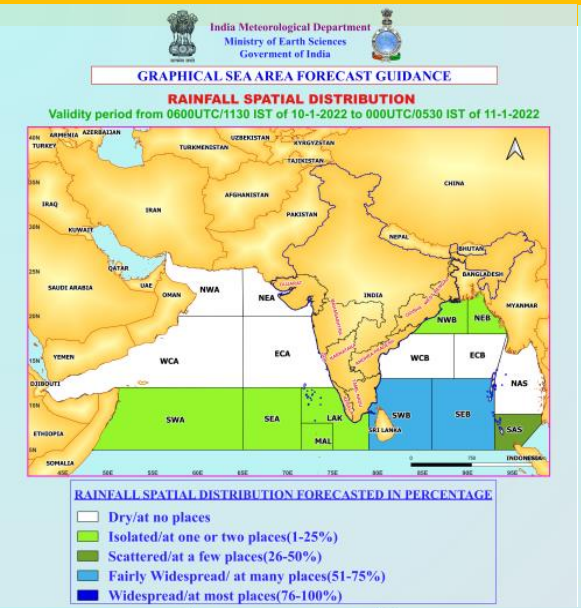
	Day 1: 31-December-2024								Day 2: 01-January-2025								Day 3: 02-January-2025			
	00 UTC	03 UTC	06 UTC	09 UTC	12 UTC	15 UTC	18 UTC	21 UTC	00 UTC	03 UTC	06 UTC	09 UTC	12 UTC	15 UTC	18 UTC	21 UTC	00 UTC	03 UTC	06 UTC	09 UTC
Wind (kt)	20.5	22.4	23.5	22	21.7	20.7	21.5	22.2	21	21.7	21.2	19.8	20.8	19.7	19.2	18.2	18.1	17.9	18	18.8
Wave (m)	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	3	3	3
Weather	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	WS	Fair	Fair	Fair	Fair
Visibility	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor

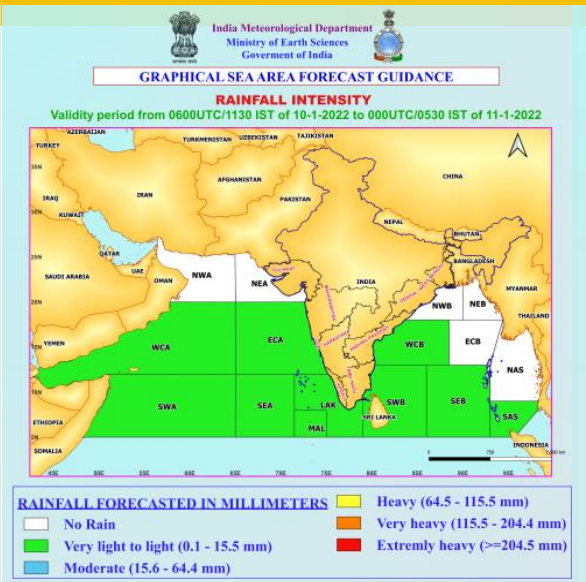


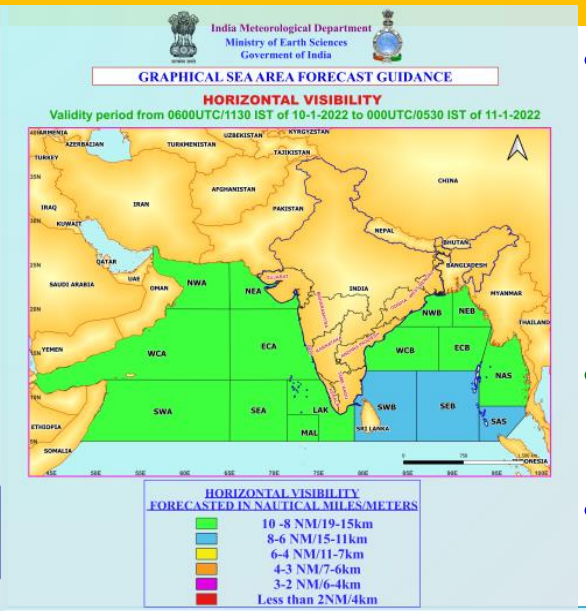


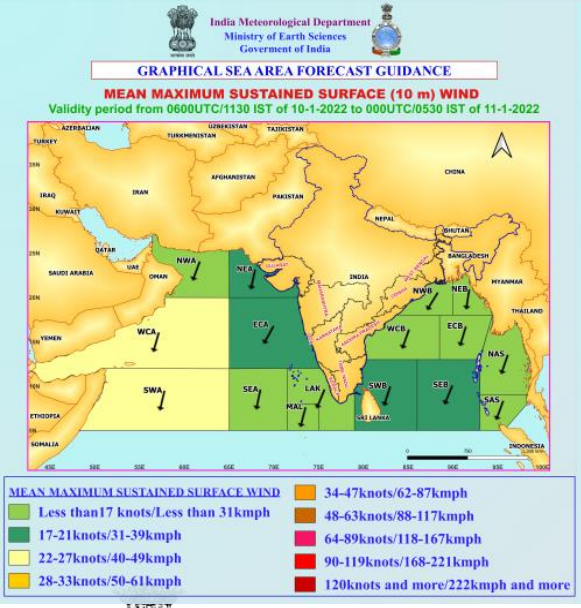


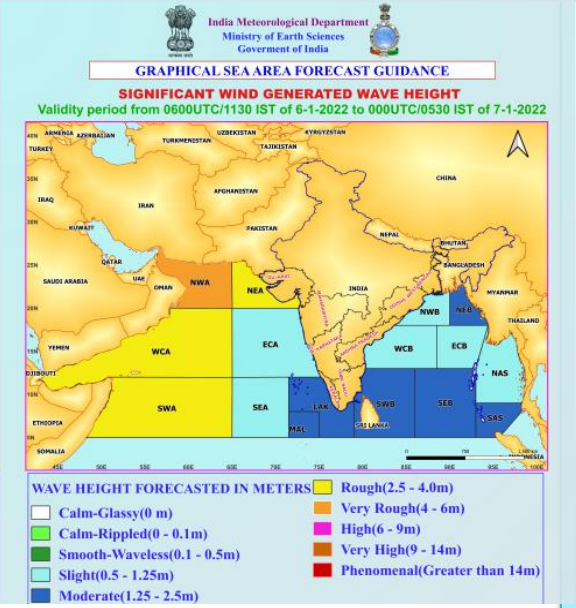
SEA AREA BULLETIN











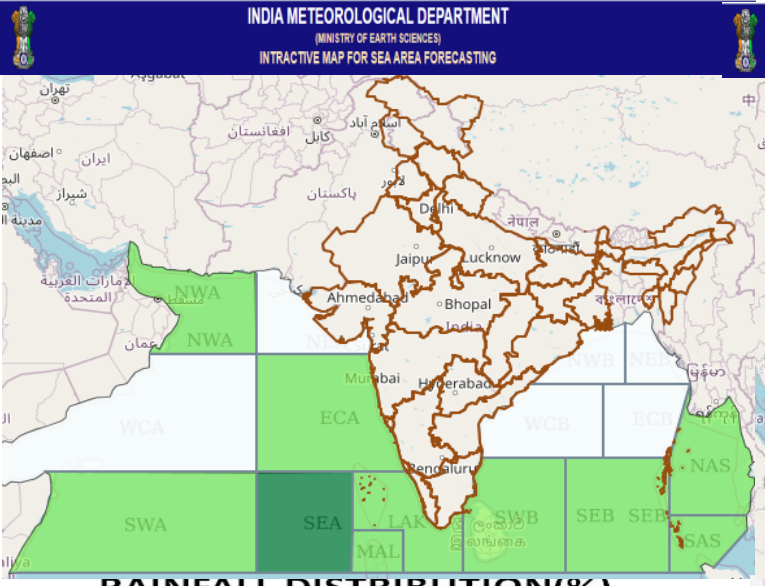
- Issued twice based on 0300 UTC & 1200 UTC (issued at +06 hrs) by IMD Kolkata for Bay of Bengal & IMD Mumbai for Arabian Sea.
- During Depression, additional bulletin at 1800 UTC.
- During cyclone, additionally at 0000, 0900 & 1500 UTC.

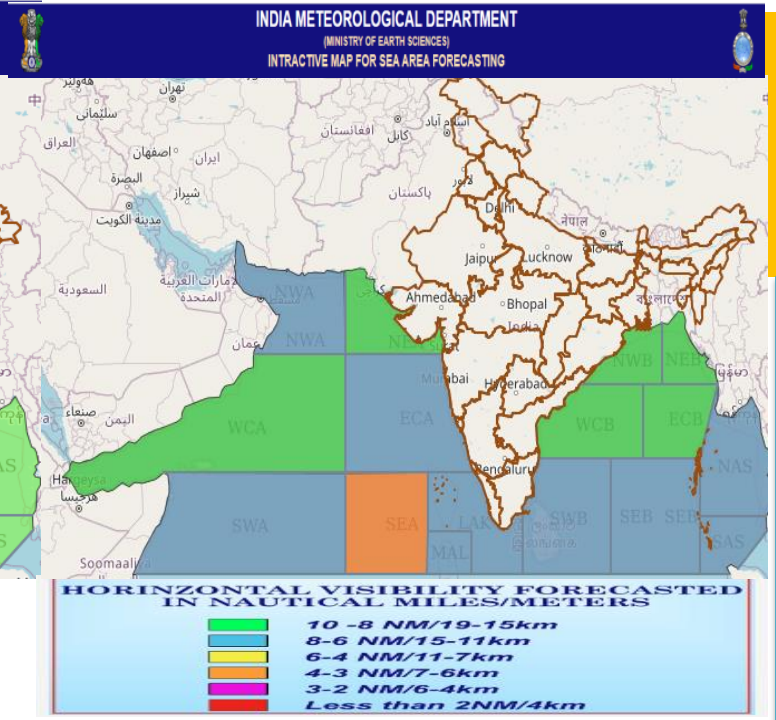
- ❖ **Part 1:** Information on weather system, location, speed of movement, extent of area affected, wind speed & direction in various sections of affected area
- ❖ **Part II :** Synoptic weather situation
- ❖ **Part III:** Forecast of (i)weather, (ii) wind and (iii) visibility.
- ❖ **Part IV:** Weather analysis.
- ❖ **Part V:** Observational data from ships in WMO codes.
- ❖ **Part VI:** Selected stations data & upper air reports.
- Broadcast by Navtex stations, put up on IMD websites

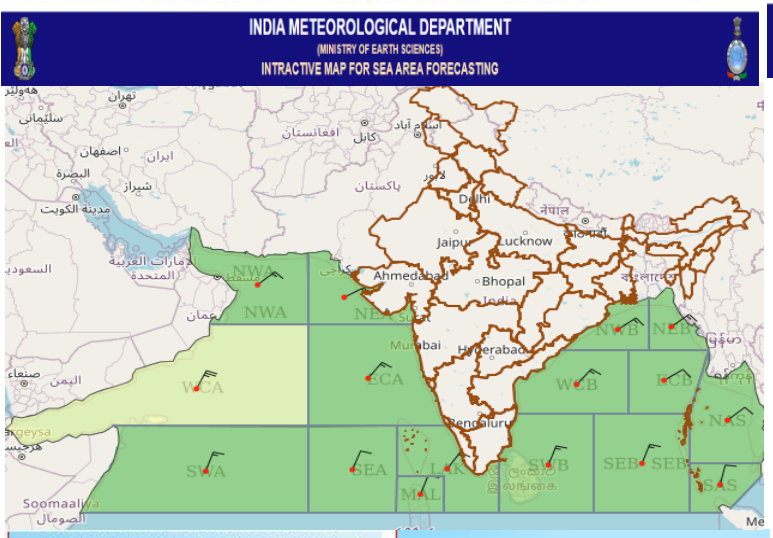
www.rsmcnewdelhi.imd.gov.in, www.mausam.imd.gov.in.

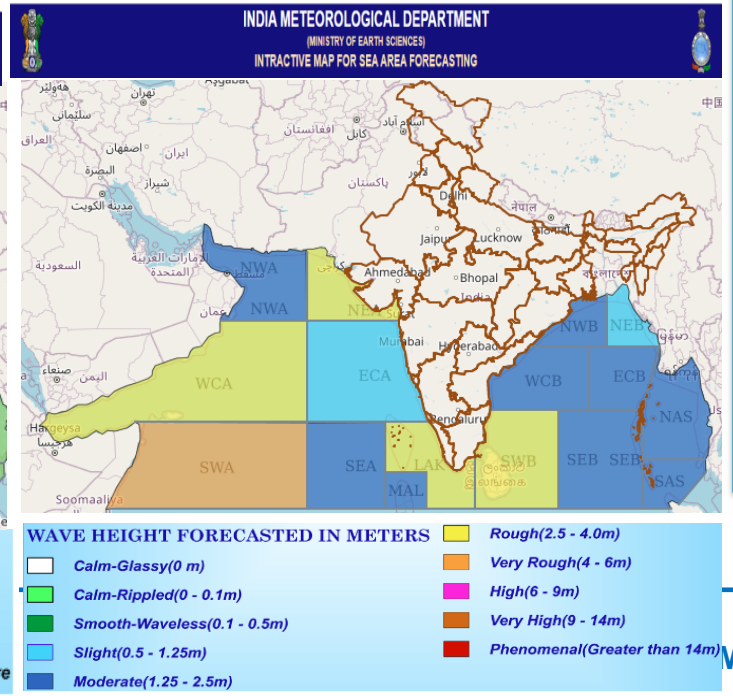
भारत
INDIA METEO

Global Maritime Distress Safety System (GMDSS) Bulletin









Value added Multi model based guidance for:

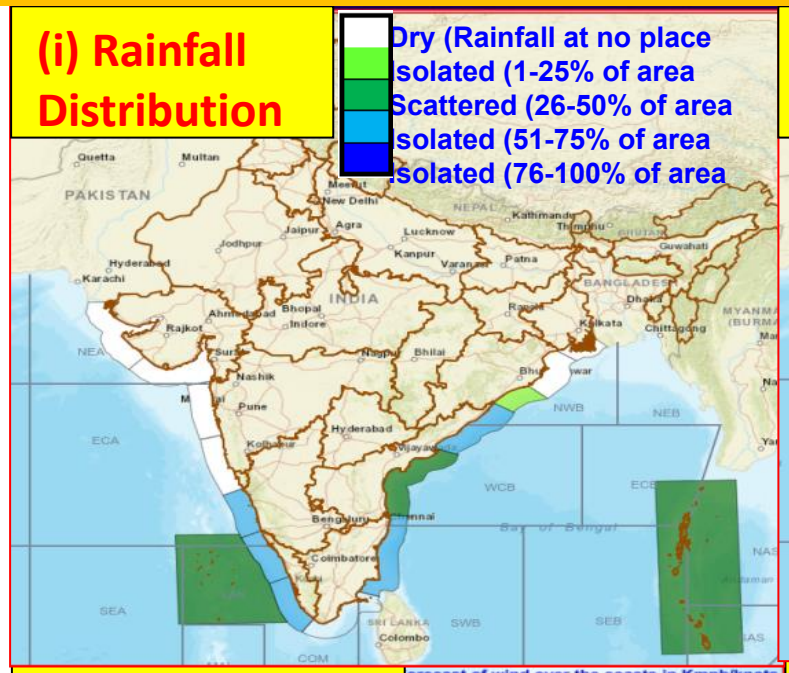
- mean maximum sustained wind (10m),
- rainfall (spatial & intensity)
- visibility
- significant wave height

Types of Bulletins:

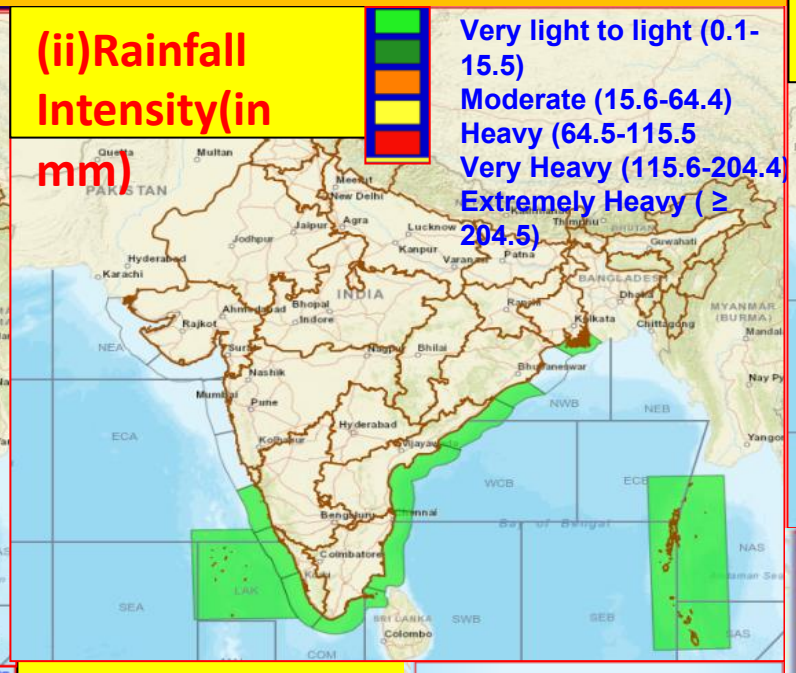
- Textual
- Graphical
- GIS for Met Area VIII(N)

Interactive maps for coastal weather

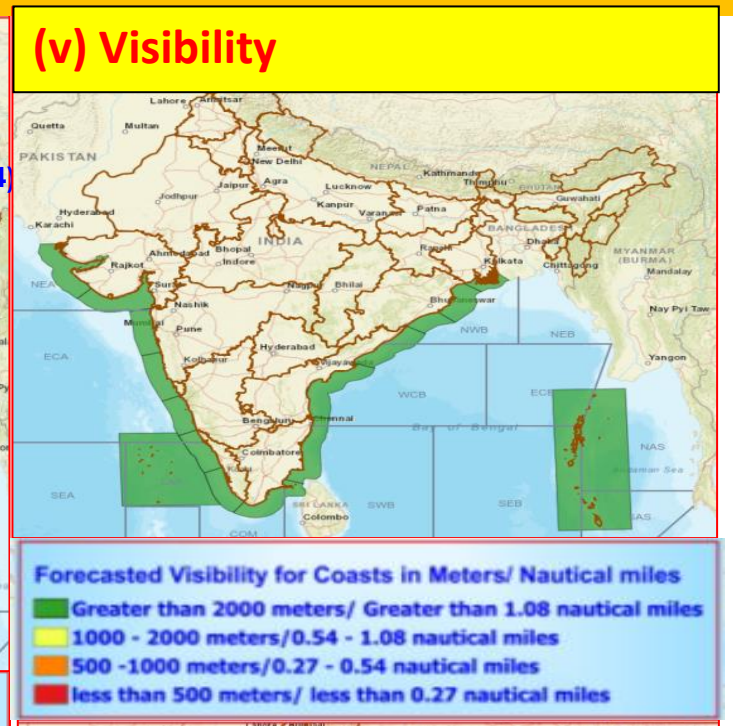
(i) Rainfall Distribution



(ii)Rainfall Intensity(in mm)

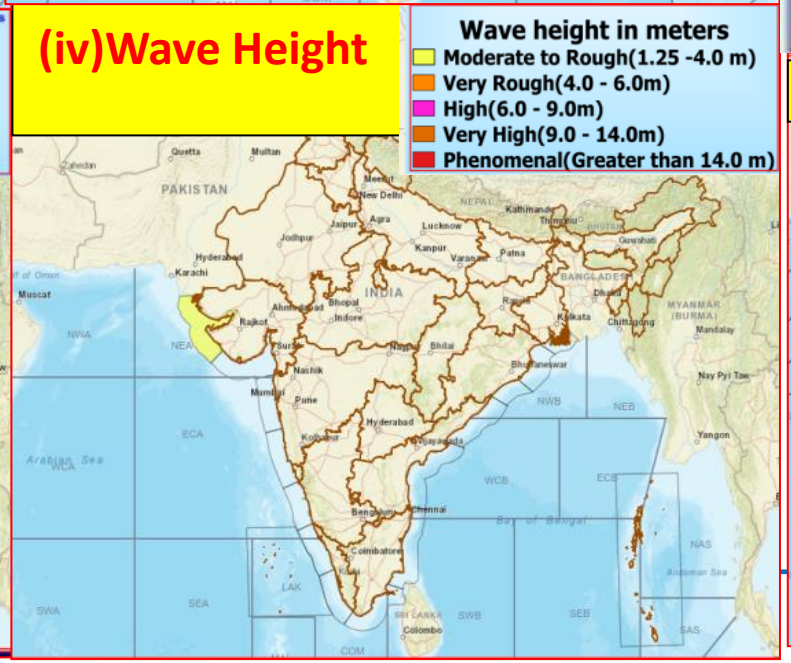


(v) Visibility

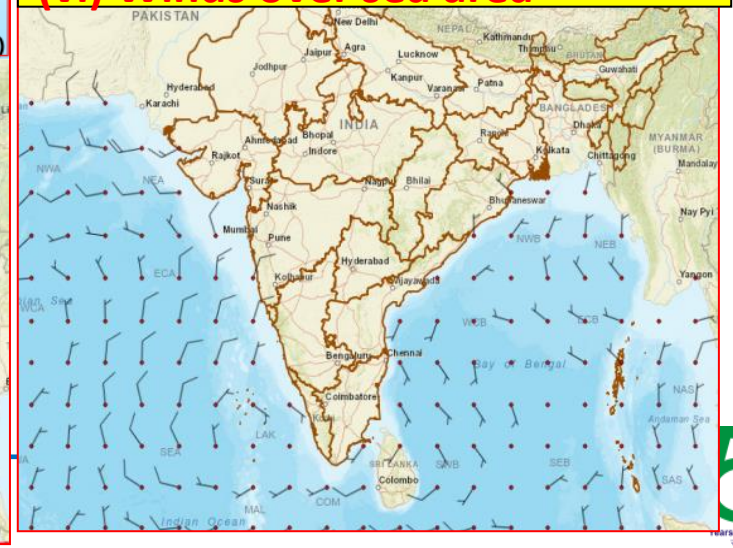


(iii) Winds over coastal water

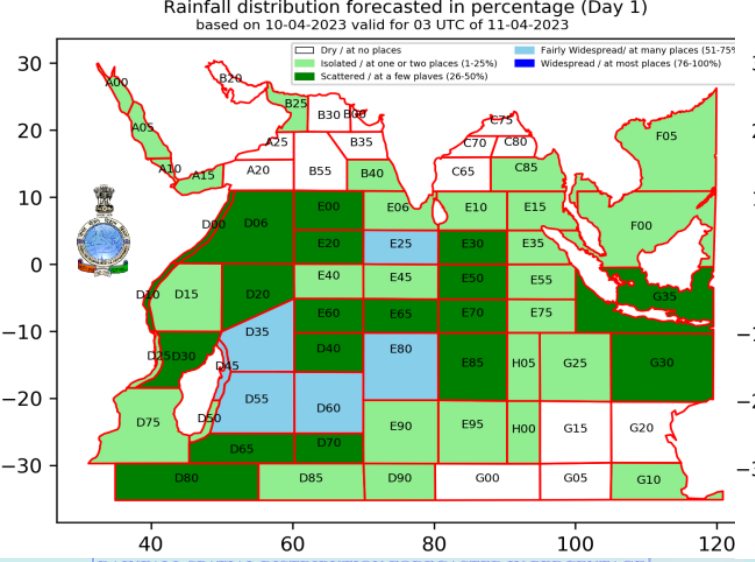
(iv)Wave Height

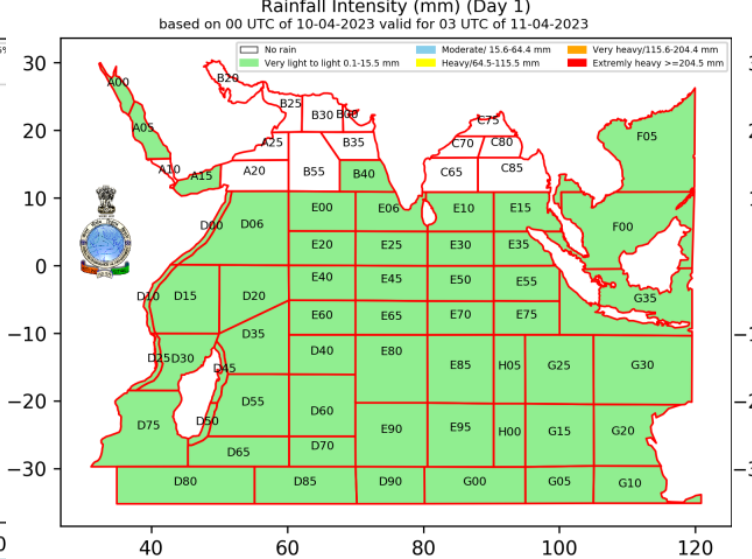


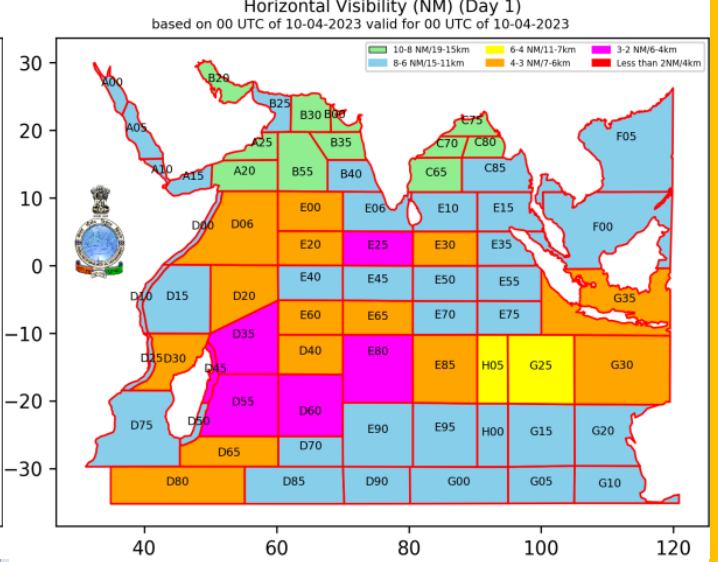
(vi) Winds over sea area



Fleet forecast graphics for Indian Navy Area is: 40-100E and 30S-30N







RAINFALL SPATIAL DISTRIBUTION FORECASTED IN PERCENTAGE

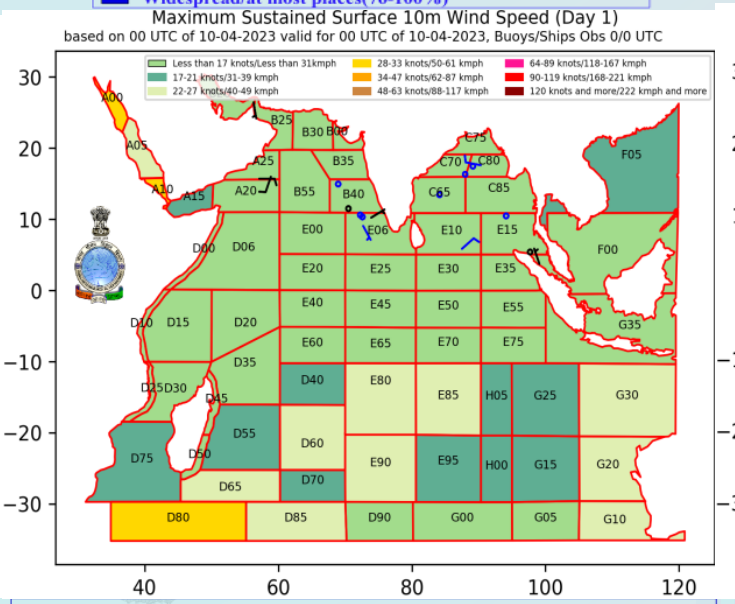
- Dry/at no places
- Isolated/at one or two places(1-25%)
- Scattered/at a few places(26-50%)
- Fairly Widespread/ at many places(51-75%)
- Widespread/at most places(76-100%)

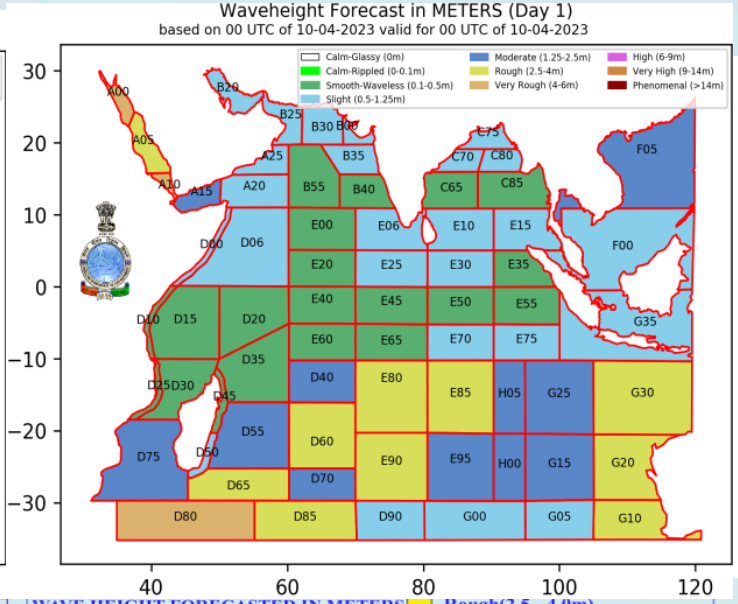
RAINFALL FORECASTED IN MILLIMETERS

- No Rain
- Very light to light (0.1 - 15.5 mm)
- Moderate (15.6 - 64.4 mm)
- Heavy (64.5 - 115.5 mm)
- Very heavy (115.5 - 204.4 mm)
- Extremly heavy (>=204.5 mm)

HORIZONTAL VISIBILITY FORECASTED IN NAUTICAL MILES/METERS

- 10 -8 NM/19-15km
- 8-6 NM/15-11km
- 6-4 NM/11-7km
- 4-3 NM/7-6km
- 3-2 NM/6-4km
- Less than 2NM/4km





MAXIMUM SUSTAINED SURFACE WIND

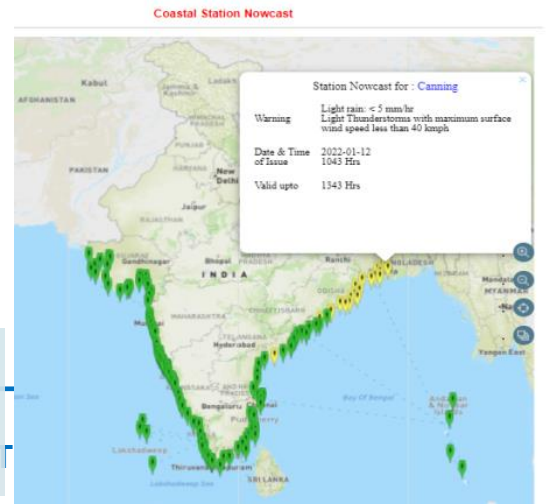
- Less than17 knots/Less than 31kmph
- 17-21knots/31-39kmph
- 22-27knots/40-49kmph
- 28-33knots/50-61kmph
- 34-47knots/62-87kmph
- 48-63knots/88-117kmph
- 64-89knots/118-167kmph
- 90-119knots/168-221kmph
- 120knots and more/222kmph and more

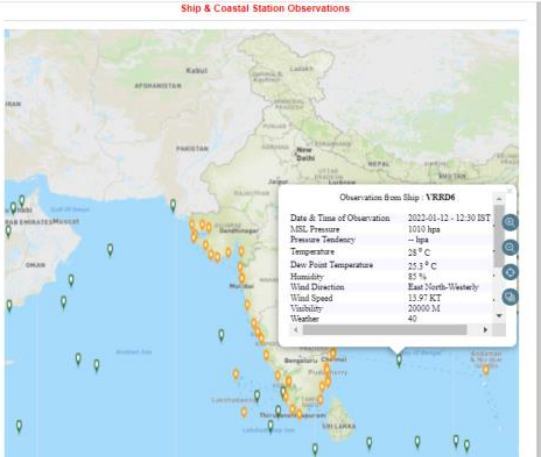
WAVE HEIGHT FORECASTED IN METERS

- Calm-Glassy(0 m)
- Calm-Rippled(0 - 0.1m)
- Smooth-Waveless(0.1 - 0.5m)
- Slight(0.5 - 1.25m)
- Moderate(1.25 - 2.5m)
- Rough(2.5 - 4.0m)
- Very Rough(4 - 6m)
- High(6 - 9m)
- Very High(9 - 14m)
- Phenomenal(Greater than 14m)

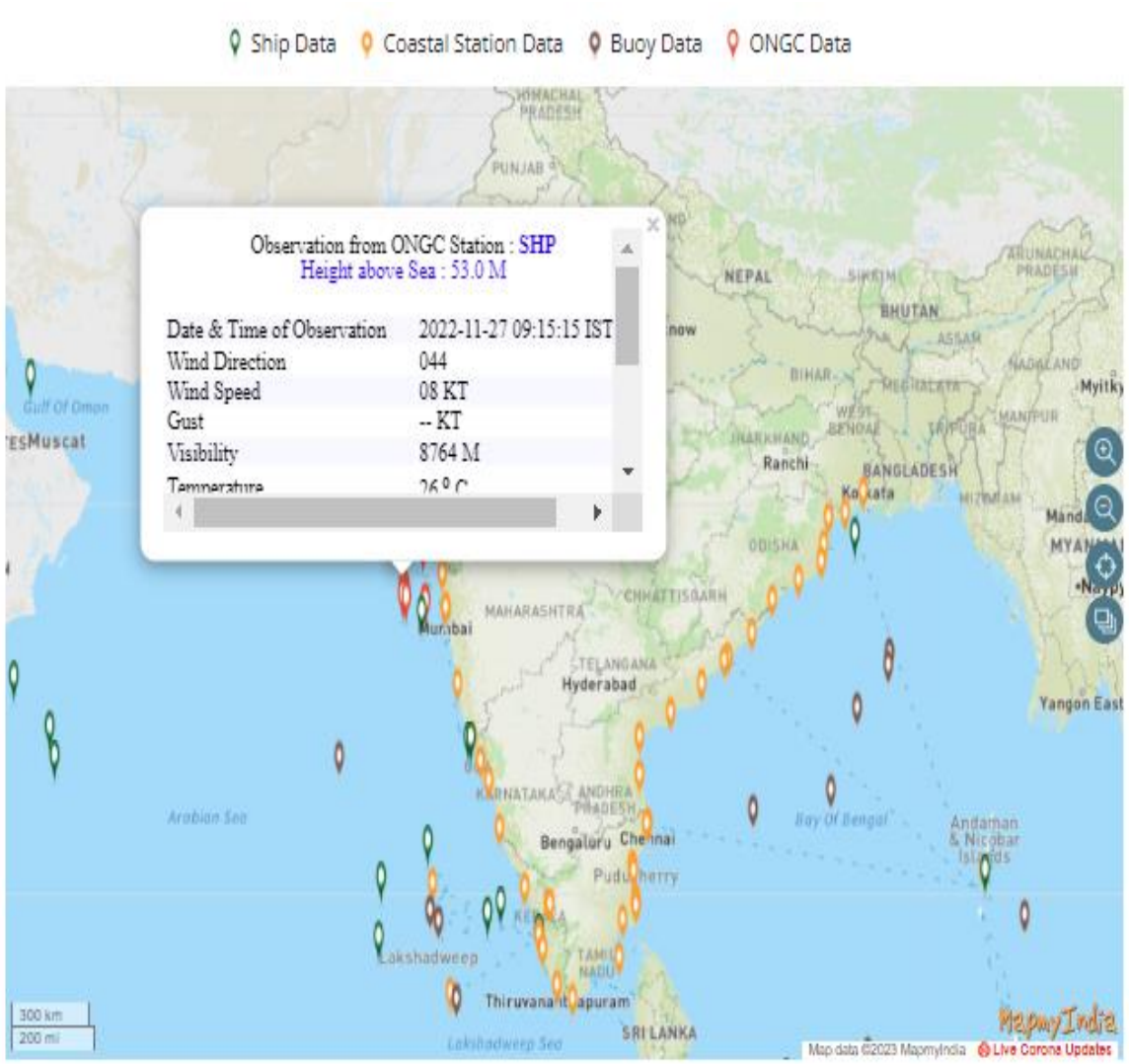
140 stations Nowcast Stations.

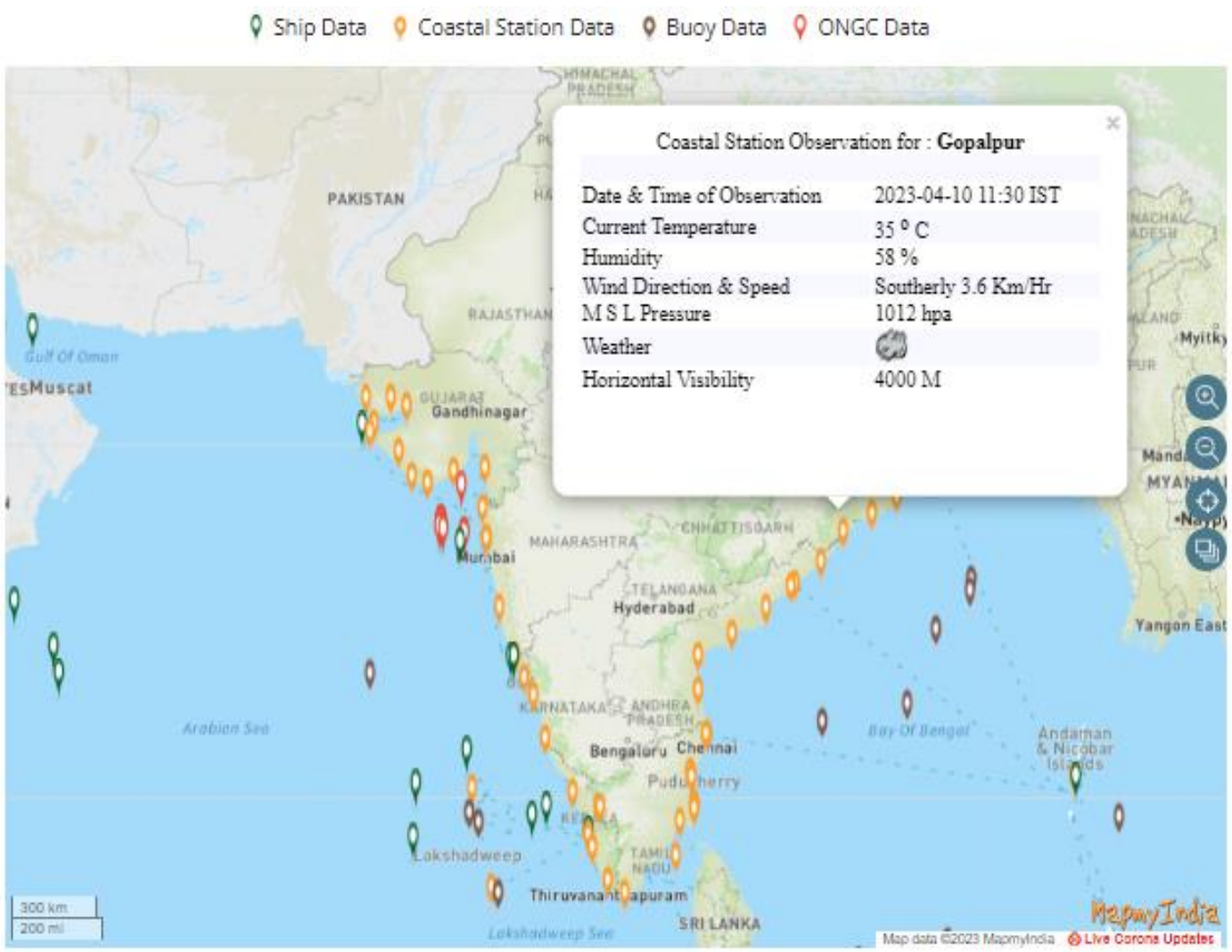
Real time display of Ship and Coastal Weather observations on website



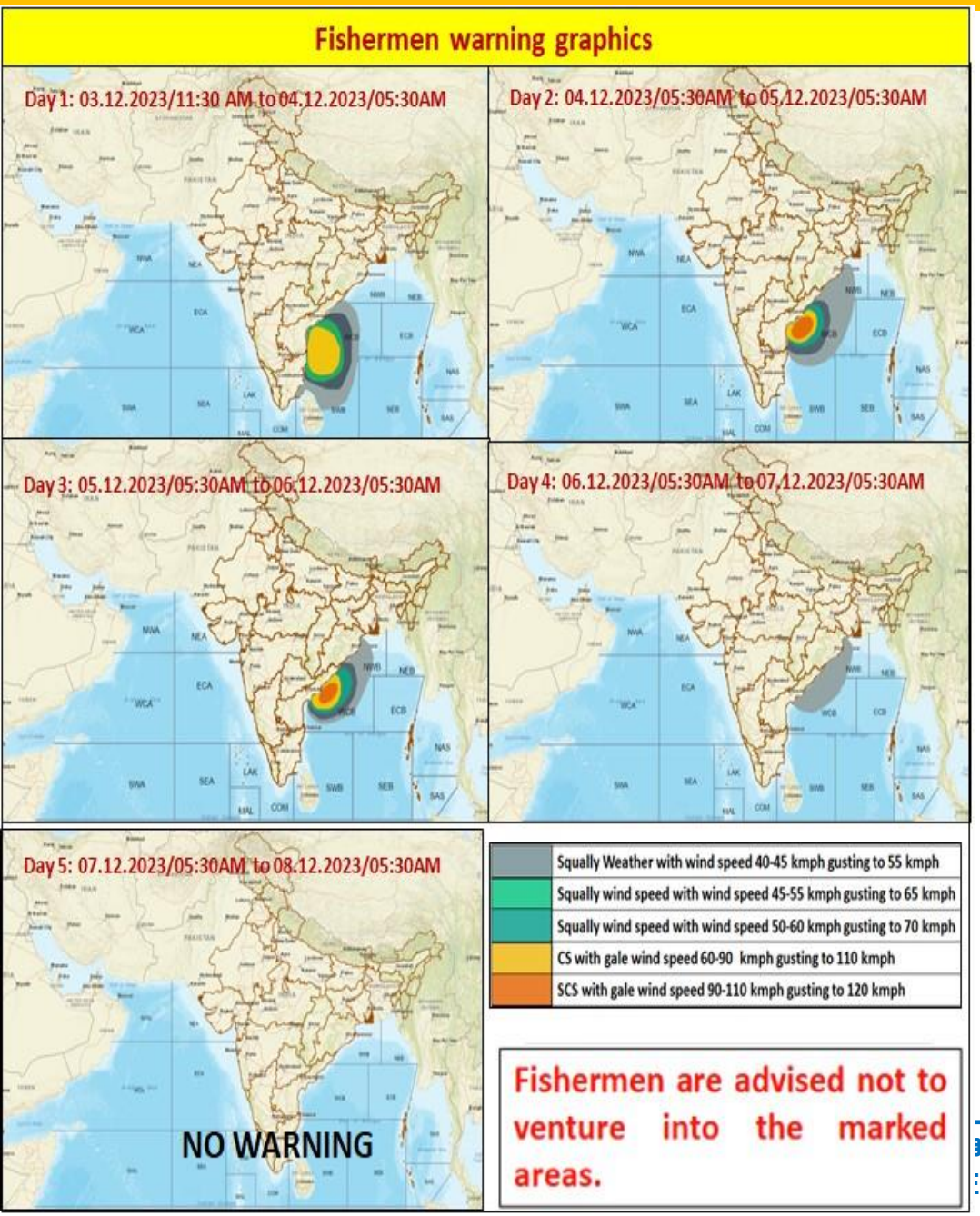


Realtime display of Actual Observations from coastal observatories, ships and buoys





Fishermen Warning Bulletins



- Issued whenever any one of the following is expected

(i) Wind speed expected to exceed 45 kmph

(ii) State of sea likely to be very rough or above,

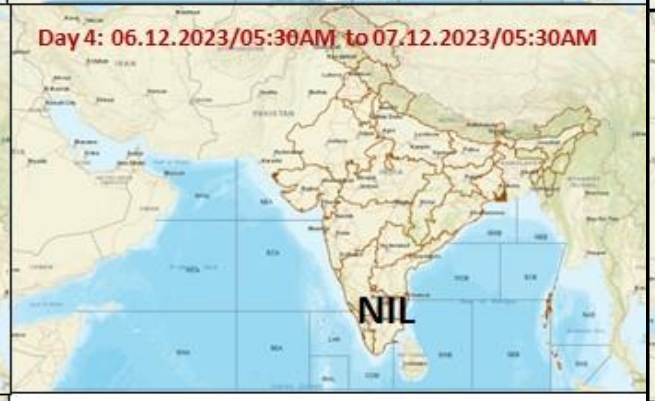
(iii) Swells are expected,

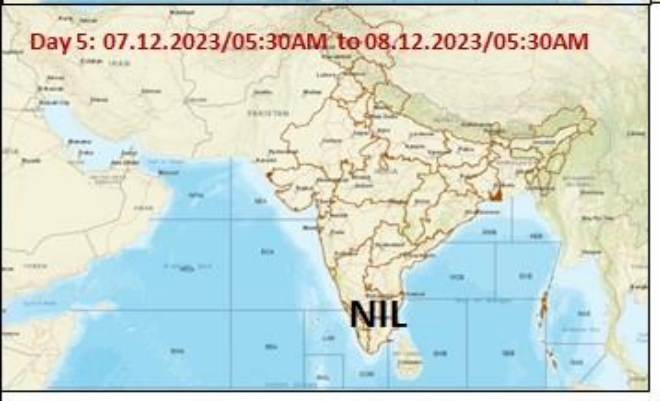
(iv)Squally weather (fairly widespread to widespread rainfall & maximum sustained wind speed of 20 knots or more).

- Warnings are transmitted by telephone/FAX/email to AIR/Doordarshan stations in the maritime states.
- Warnings are broadcast four times a day (morning, mid-day, evening and night) by AIR in local language.
- During cyclone, issued every 3 hour for frequent broadcast.
- Warnings are uploaded on website and appended with other warning bulletins.
- Transmitted to fishery officials and registered fishermen through SMS/WhatsApp/Mobile App

Probablistic of Exceedance of winds (a) 25 knots and (b) 35 knots

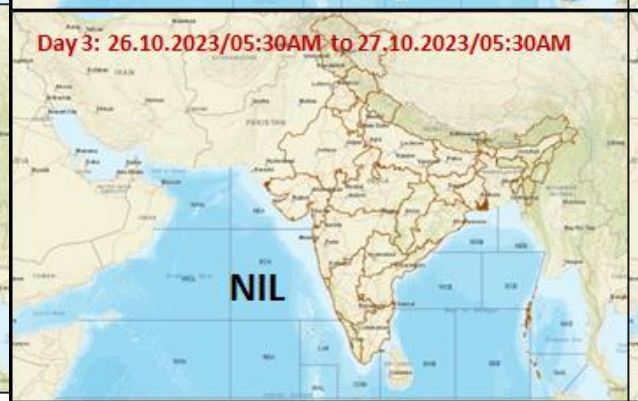
Probability of exceedance of maximum sustained winds ≥ 45 kmph

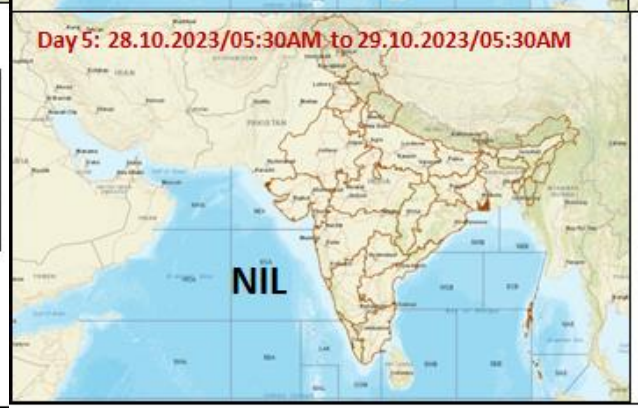




	Probabilty of exceedence
	Low (1-33%)
	Moderate (34-67%)
	High (68-100%)

Probability of exceedance of maximum sustained winds ≥ 62 kmph





	Probabilty of exceedence
	Low (1-33%)
	Moderate (34-67%)
	High (68-100%)

Krishi Advisory based on Location-specific weather Prediction

KALP

Pest & Disease Information

Brown Rust/Leaf Rust

Low Risk

Management

Current weather conditions are NOT favorable for Brown Rust/Leaf Rust development.

Mancozeb 75% WP @ 2.5 g/L or Propiconazole 25% EC of water

Black Rust

Low Risk

Management

Current weather conditions are NOT favorable for Black Rust development.

Mancozeb 75% WP @ 2.5 g/L or Propiconazole 25% EC of water

KALP:Krishi Advisory based on Location Specific Weather Prediction

English | Admin

Temp (Min/Max): 1.3°C / 11.2°C | RH (Min/Max): 22% / 58% | Precipitation (3 days): 0.0mm

Crop Information

Location detected successfully | Refresh

Manual Coordinates (Optional)

Latitude | Longitude

Use These Coordinates

Search by GP Code

State: Uttarakhand

District: Uttar Kashi

Block

Location Map

5-Day Weather Forecast *18/01/2026*

Day	Min Temp (°C)	Max Temp (°C)	Min RH (%)	Max RH (%)	Precip (mm)	Cloud Cover (octas)	Wind Speed	Wind Direction
Today	1.3	11.2	22	58	0.0	2	3.3	105°
Tomorrow	-0.4	9.9	21	53	0.0	1	3.5	92°
20/01/2026	0.2	9.9	21	51	0.0	2	3.9	87°

Agricultural Report

Current Crop Stage: Wheat

Advisory & Pest Info

Based on crop stage & weather conditions

Weather Advisory

Weather Alert: The following conditions exceed thresholds:

Low Temperature: Low minimum tempearture leads to Poor pollen viability and floret sterility

Threshold: 6.0

Recommendation: Immediate irrigation during frost nights will work as protective layer for crop against frost injury. Avoid the use of chemical sprays during cold spells.

Crop Stage: Flowering

Pest & Disease Information

Brown Rust/Leaf Rust

Low Risk

MAUSAM GRAM (HAR HAR MAUSAM HAR GHAR MAUSAM)

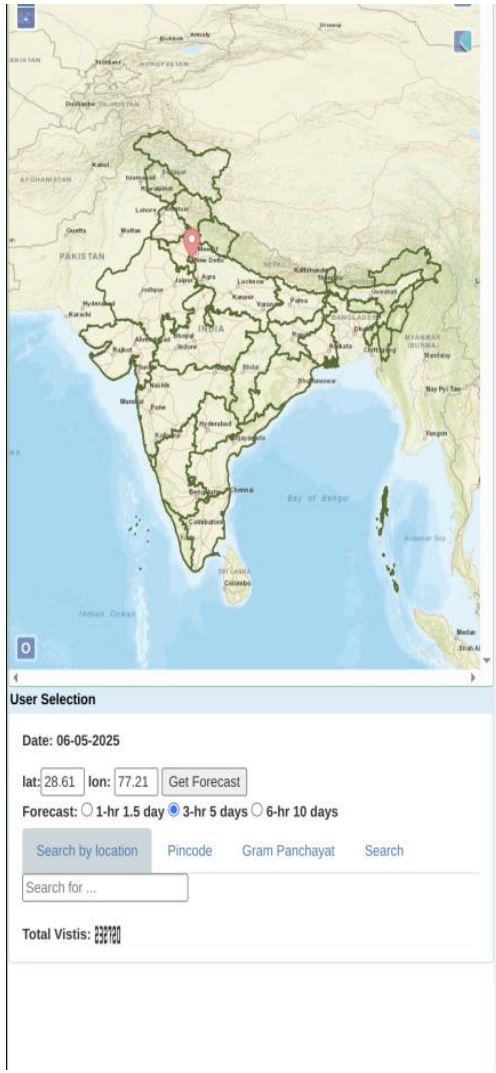
- Location Specific Forecast upto 10 days.

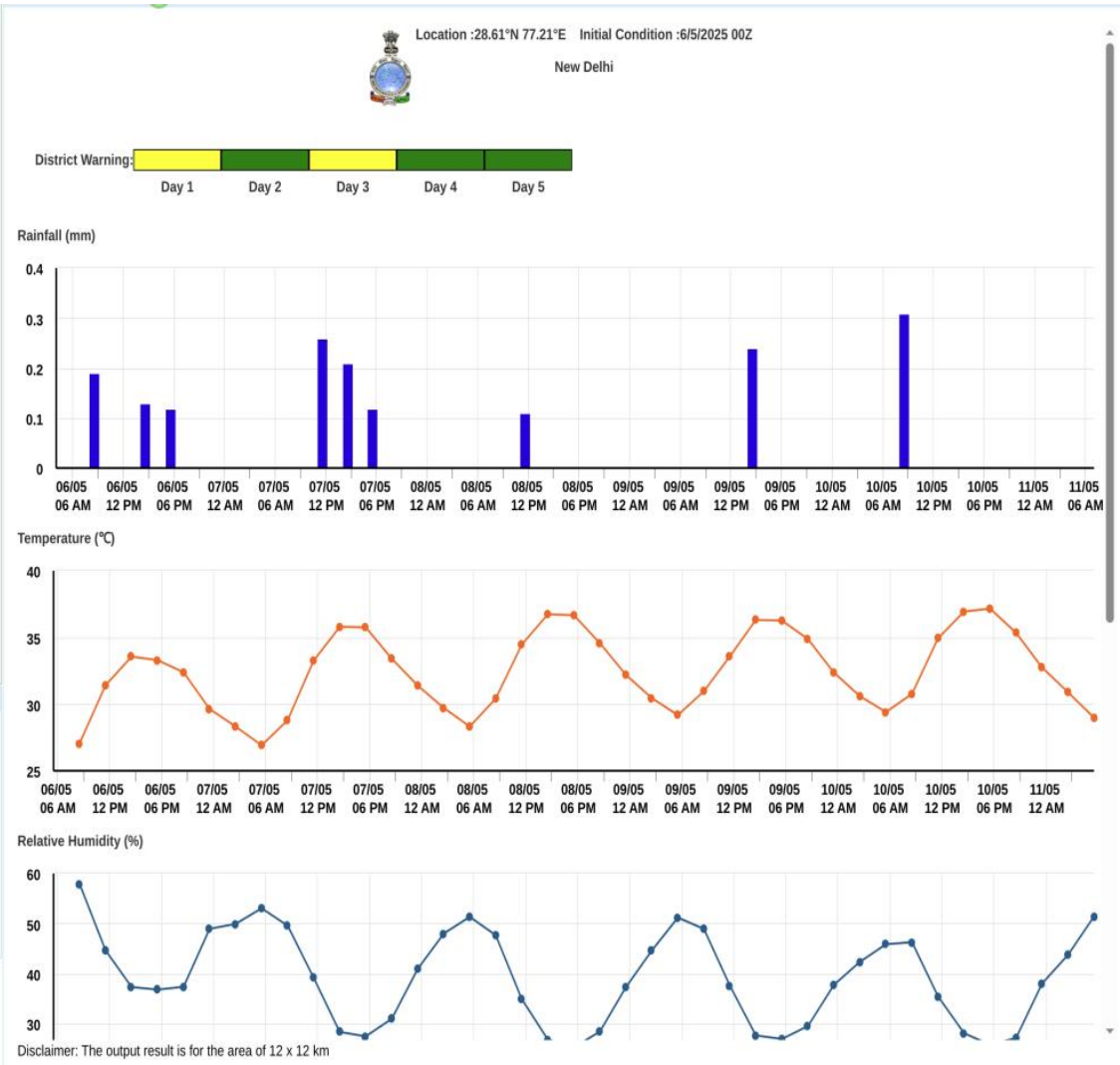
Forecast for

- 1.5 Lakhs pincodes locations,
- 5700 blocks,
- 624424 Villages and
- Any latitude & longitude or
- any location on the map based on single click

Available in

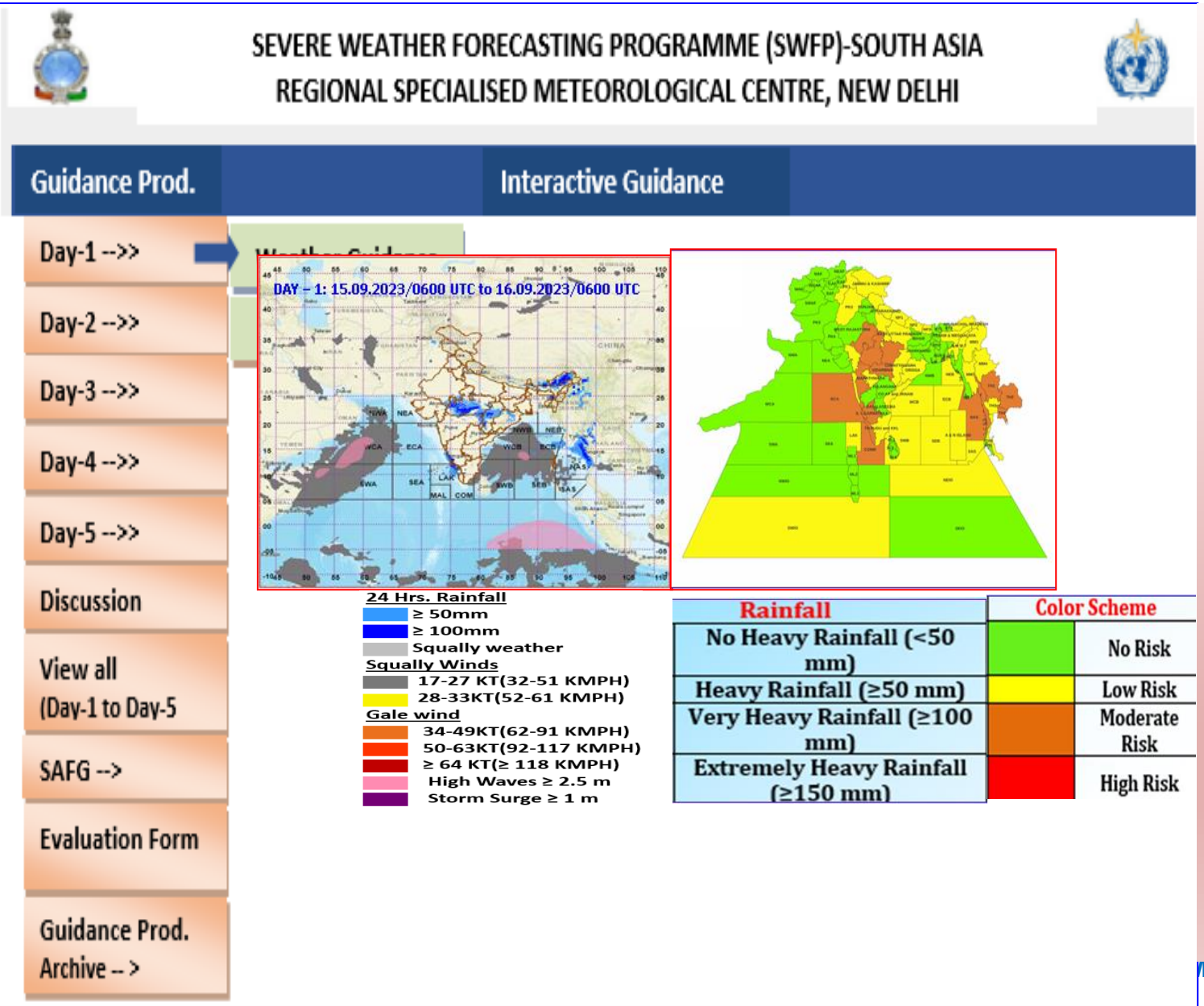
- IMD website : https://mausamgram.imd.gov.in
- Mobile App (Mausam)
- Sachet,
- E-Panchayat Seva
- APIs





- Forecast is available for every hour upto 36 hrs, every three hrs upto 5 days and every six hrs upto 10 days.

Impact based forecast under Severe Weather Forecast Programme (9 countries)

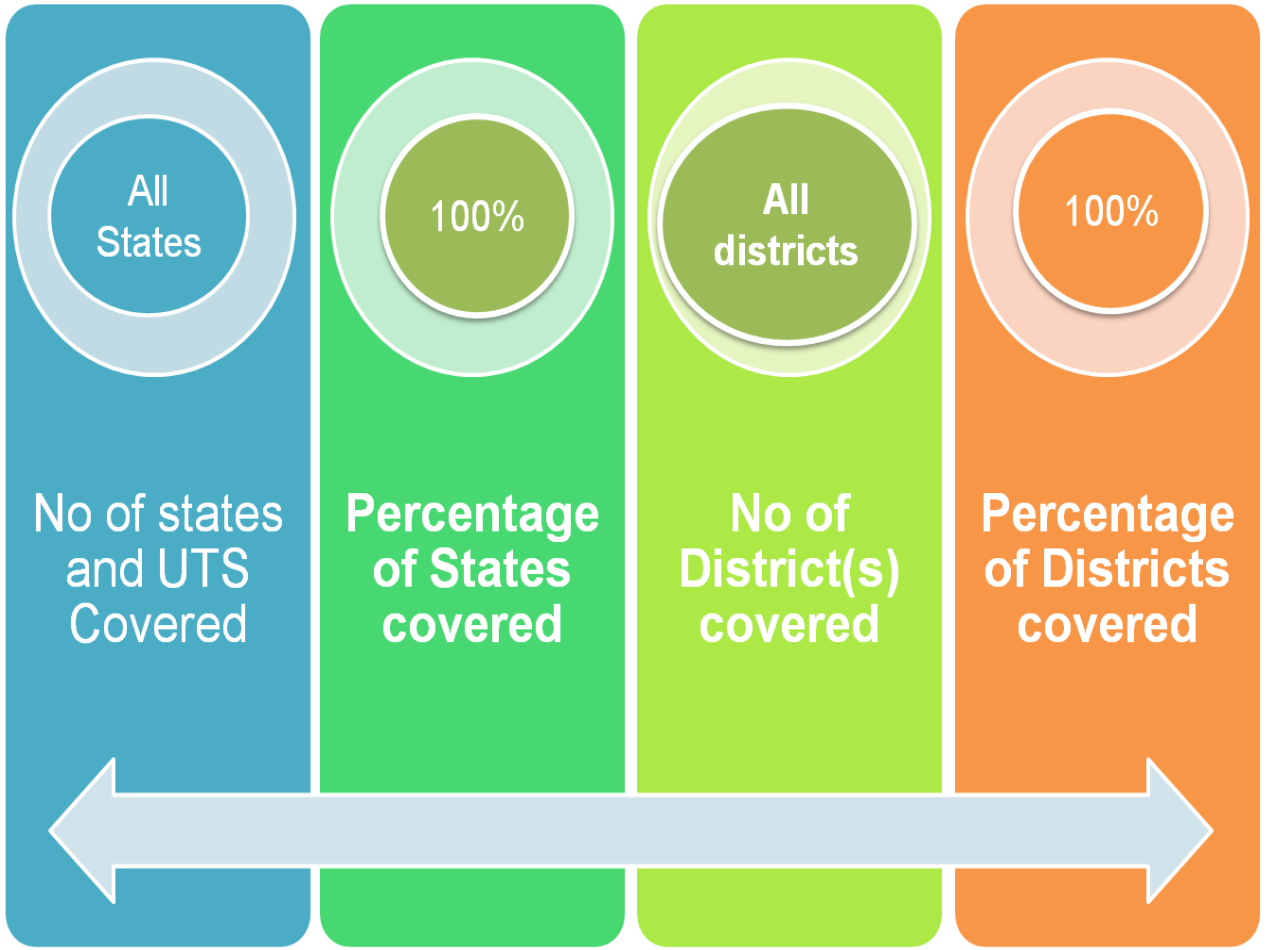


- Short Range (1-2 days)
- Medium Range (3-5 days)

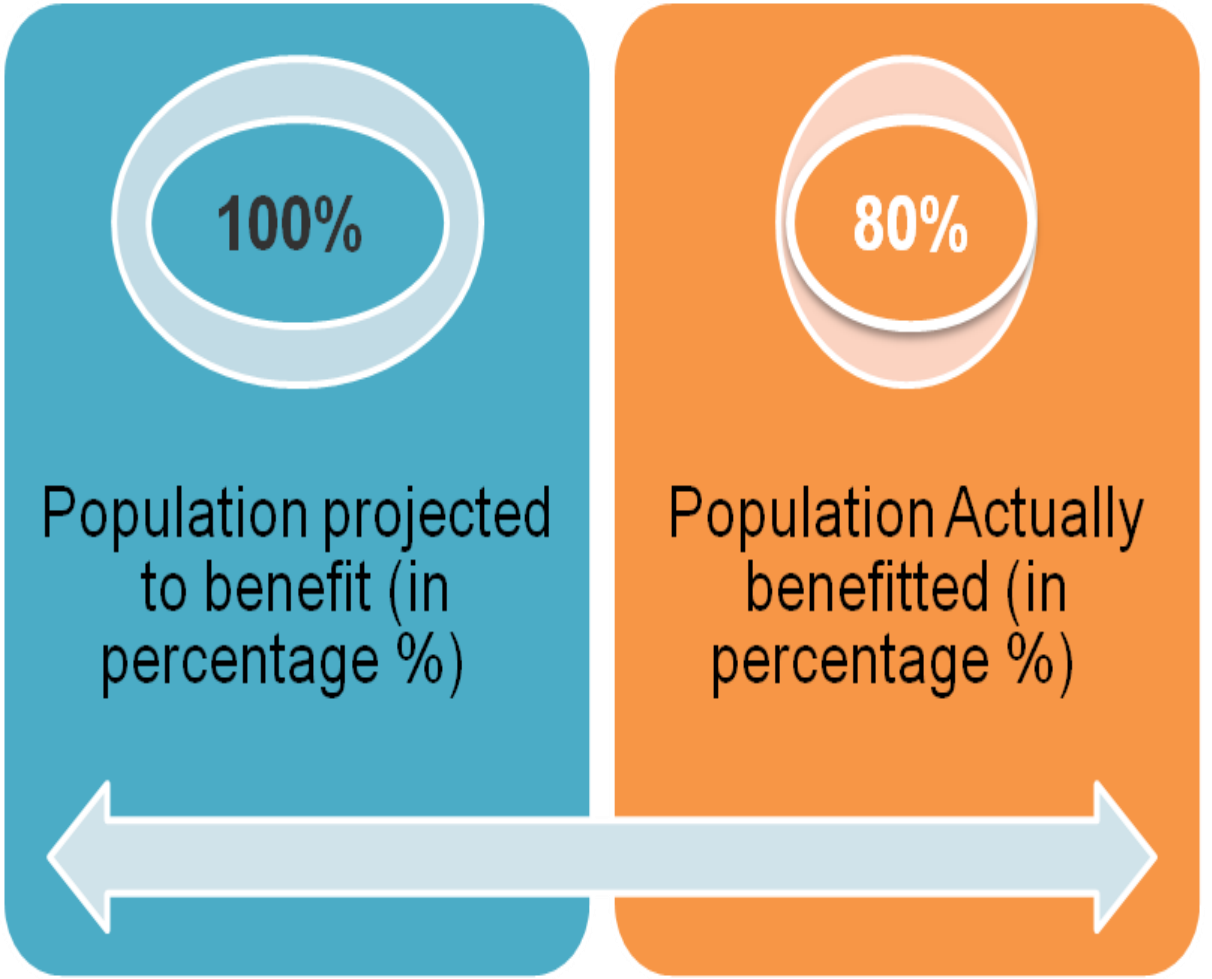
Guidance Products for next 5 days:

- Graphical WX forecast products
- Risk Guidance for precipitation & winds (graphical, tabular, GIS) for all 95 sub-divisions based on MME guidance from 5 global models (New)
- Discussion of main synoptic features, satellite features and forecast of heavy rainfall & strong winds
- Flash Flood Guidance

PROJECT COVERAGE-GEOGRAPHICAL SPREAD



PROJECT COVERAGE-POPULATION SPREAD



Services Rendered to various ministries of Government of India

APIs

More than 180 organizations are using IMD's API

- NITI Aayog, Meity
- BEL
- Adani Green Energy Ltd
- AP Government, Commissioner ate of Agriculture
- Assam State Disaster Management Authority
- Arunachal Pradesh Government
- National Institute of Hydrology
- MP Goverment, SDMA
- NHAI, Indian Railways, NHPC, C-DOT,
- NDMA / SDMA, Incredible India , eNAM
- National Rice Research Institute Cuttack,
- SDMAs/ Agriculture Dept: AP, Odisha, Karnataka, MP, Chandigarh, Kerala, A&N Islands, Uttarakhand, J&K, UP, TamilNadu
- Department of Space
- KRC Net Portal (MoES),
- Disaster Management Support Group ISRO,
- ICAR-NIASM, National Programme on Climate Change and Human Health,
- RIMES
- Media
- Apple.com, Delhivery, Ola Cabs, Wipro, Tomorrow.io, TATA, L&T Power, Adani Green, iDigiCloud and many others

Mobile Apps

as on 15 Jan 2026

Mausam App

Meghdoot App

Damini App

Download Mausam App

Android IOS

Common Alerting Protocol

- All IMD MCs and RMCs are integrated into NDMA CAP Platform and generating warnings

MET Centre	ALERT ISSUED	DISSEMINATED BY STATE	MET Centre	ALERT ISSUED	DISSEMINATED BY STATE	MET Centre	ALERT ISSUED	DISSEMINATED BY STATE
Agartala	2541	2402	Goa	563	76	New Delhi	394	169
Ahmedabad	1269	1045	Guwahati	1317	1005	Patna	1622	1493
Amravati	124	85	Hyderabad	1214	57	Raipur	1148	526
Bengaluru	4013	3937	Itanagar	291	248	Ranchi	3321	3161
Bhopal	5805	4683	Jaipur	1938	1859	Shillong	157	116
Bhubaneswar	201	52	Kolkata	4451	3912	Shimla	283	267
Chandigarh	2061	1530	Leh	16	8	Srinagar	61	53
Chennai	500	50	Lucknow	3467	2496	Thiruvananthapuram	1093	474
Dehradun	1342	1107	Mumbai	3685	257	Visakhapatnam	1153	869
Gangtok	981	535	Nagpur	780	128	TOTAL	45791	32600

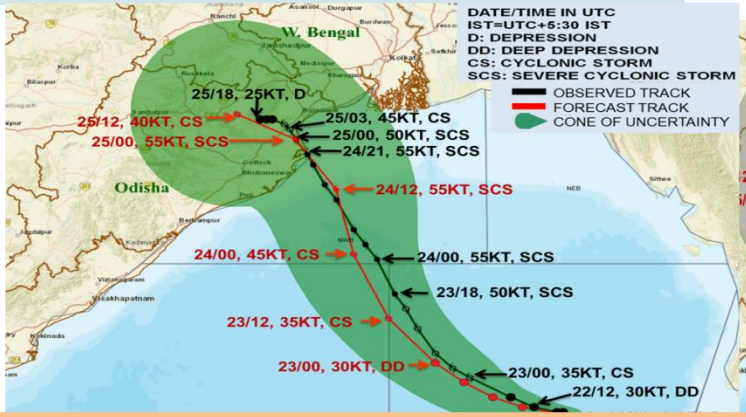
BENEFICIARIES OF THE PROJECT

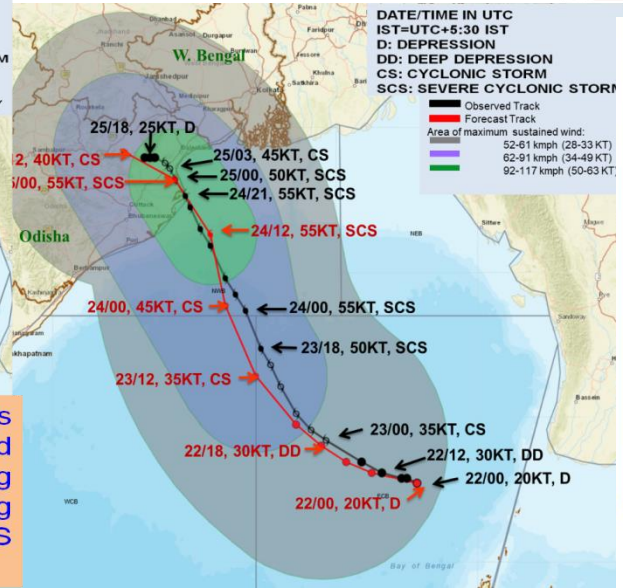
National

- All forecasters
- Disaster management authorities (NDMA, SDMA, NDRF etc.)
- Sectorial stakeholder(Urban, Power, Health, Energy, Agriculture, Aviation, Transport, Marine sector)
- General public

International

- Marine Weather Services over North Indian Ocean
  Aviation services in Asia Pacific
- WMO/ESCAP Panel for tropical Cyclone) member countries in North Indian Ocean
- Severe weather Forecasting program for 9 South Asian countries

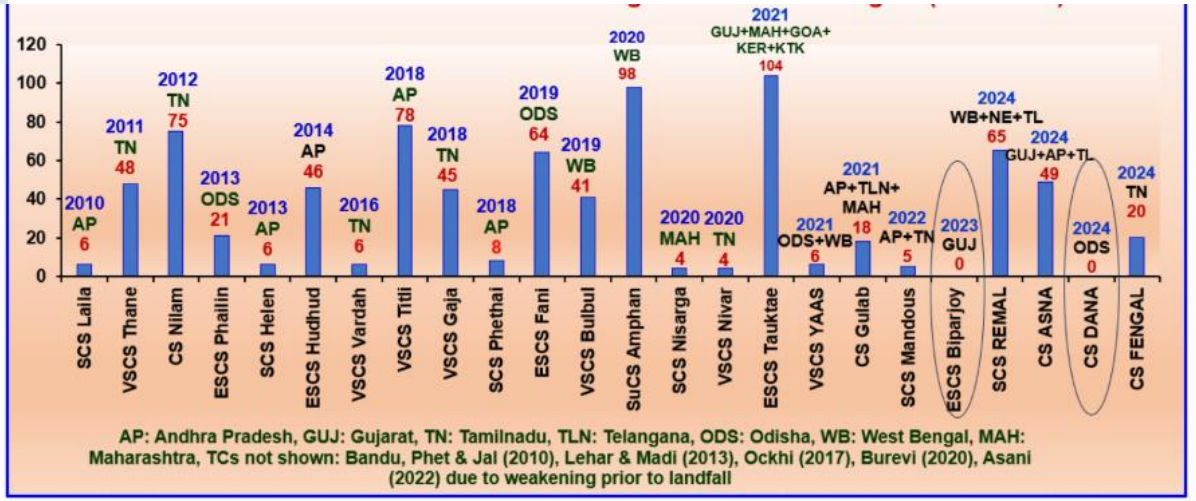




Cyclone and Marine Weather Services Module It is an interactive GIS enabled map showing track and intensity of a cyclonic disturbance. It is also being used for identification of low pressure system using model guidance for MSLP & 10m wind of GFS, GEFS NCUM, NEPS, WRF.

IMPACT IN TERMS OF TIME AND COST SAVING TO BENEFICIARIES

- Faster & More Accurate Weather Forecasts
- Reduced loss of life and property
- Cost savings of approximately **₹250 crores**
- DSS has successfully eliminated the procurement and dependance on foreign vendors, enhancing self-reliance and reducing operational expenses
- Accurate cyclone forecasts during Biparjoy (2023) and Dana (2024) resulted in zero deaths in Gujarat and Odisha.
- Evacuation costs reduced from ₹500 crores (1999) to ₹150 crores (2024).



AP: Andhra Pradesh, GUJ: Gujarat, TN: Tamilnadu, TLN: Telangana, ODS: Odisha, WB: West Bengal, MAH: Maharashtra, TCs not shown: Bandu, Phet & Jal (2010), Lehar & Madi (2013), Ockhi (2017), Burevi (2020), Asani (2022) due to weakening prior to landfall

CS: Cyclonic Storm, SCS: Severe Cyclonic Storm, VSCS: Very Severe Cyclonic Storm, ESCS: Extremely Severe Cyclonic Storm, SuCS: Super Cyclonic Storm

Area of Governance focussed under the given initiatives/innovation

Environment Conservation

- Weather chart plotting has been completely stopped in all IMD forecasting offices resulting in not only cost saving of approximately **Rs. 1.40 Cr.** per year but also environment conservation by saving of **2.57 tonnes** of **CO2** per year.

Water Conservation

- By introducing paperless work, **total water saved is 63 kilo liters** per year.

Energy Conservation

- Reduced IT infrastructure by automating all the process in one system. Resulting in the energy saving of approximately **211** MWhr per year, equivalent to **approximately 150** tons of **CO2** per year.

Education

- Capacity building through Digital literacy programmes on WebGIS-based forecasting, automated decision-making tools, and AI-based quality control systems to help users interpret WebGIS Visualizations.

Health

- Protecting public health by providing weather-based early warnings, climate information, and specialized services that hc help reduce disease risks and support health planning. Innovation has covered the health sector under "One-Health Mission" of Govt. of India by providing services to IMA.

Women and Child

- Alerts are regularly communicated to **Krishi Sakhis**, Pashu Sakhis, Sarpanch, Ward Members, and Panchayat Secretaries, ensuring last-mile preparedness and timely local act- Women and children benefit greatly from timely forecaasts during cyclones by helping authorities to safely shift them to nearby cyclone shelters (During Cyclone Biparjoy 1,206)

Area of Governance focussed under the given initiatives/innovation

Sustainable Farming

- Agromet Advisory Services and crop-specific advisories help in **preventing crop loss** (reduces **malnutrition), reducing water scarcity** or food insecurity. Adoption of weather advisories resulted in an additional income of **Rs. 12,500 annually per house hold** (in rain-fed areas. below the poverty line (BPL)) with overall **economic** benefit of **Rs. 13,331** crore per annum.

Reduces Malnutrition | Reduces Water Scarcity | Improves Food Security

Promoting Livelihoods

- Giving weather forecast and warnings to general public including rickshaw pullers, daily laborers etc.

Boosting Economy

- Total loss has been saved around **1700 crores** ; in comparison to **1998 "Kandla"** cyclone vs **"Biparjoy"** Cyclone 2023.
- **Reduction in** economic losses due to better preparedness in agriculture, transport, and infrastructure sectors.

Community Involvement in the form of Exhibitions, workshops, trainings, conferences, stakeholder meetings, social media campaigns, surveys

AWARDS AND RECOGNITION

National Award for e-governance 2025

Dr. Mrutyunjay Mohapatra received United Nations Sasakawa Award-2025 for Disaster Risk Reduction

6th Digital Transformation Award 2025

THANK YOU

- https://www.youtube.com/watch?v=-sdlVPojOg0
- https://youtu.be/ET68Nozu2fo?si=Y93oBSV8aSQl-qNN