

Heavy Rainfall for the Block, District & Location level :Decision Making - Early warning system



Dr. K NAGA RATNA
Scientist-E

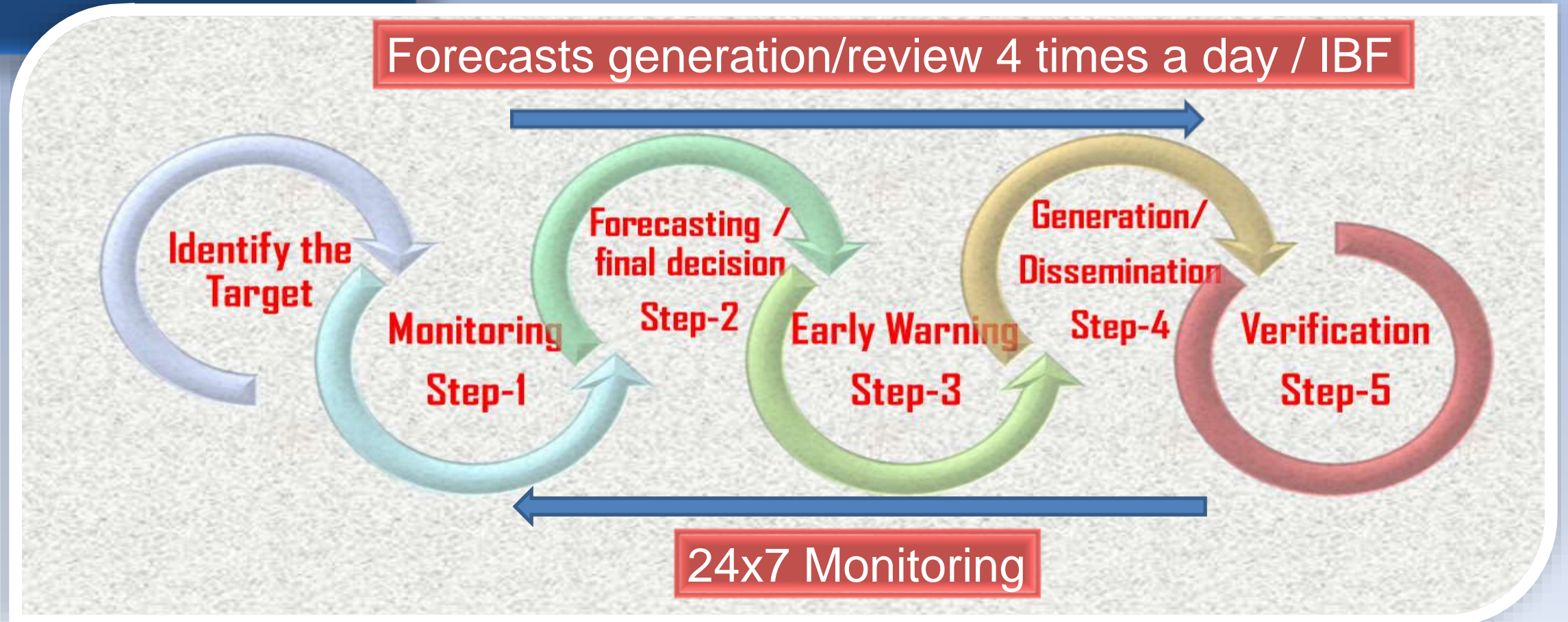
Meteorological Centre, Hyderabad



Targets/Decision making

Identify the target

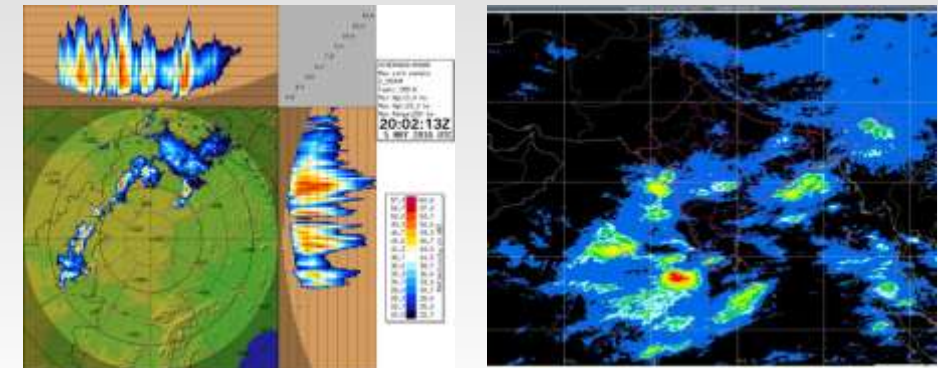
1. Monitoring
2. Forecast
3. Product Generation/Dissemination
4. Verification



Step1: Monitoring

Gathering the products/information, Identify the decision on forecast and weigh the evidence based on observations

- a. Monitoring the Current Observation's and Past 24 Hour Rainfall at 03UTC.
- b. Synoptic Features (Past 3 Days)
(Synoptic System Features (Low, Depression or Trough)
(Present 24 Change, Pressure Departure, Temperature 24 Change, Temp. Dep.)
(Upper Air Wind Analysis/RSRW)
- c. Model Forecast At Various Ranges (Nowcast, Short Range, Medium Range Forecast)
- d. Deterministic and Probabilistic Forecast Products on Heavy Rainfall Intensity and spatial Distribution to the District and Block Level.
- e. Satellite Products (Such as INSAT, HEM others)
- f. Radar Products (reflectivity, PPI, Vertical and horizontal winds, shear)

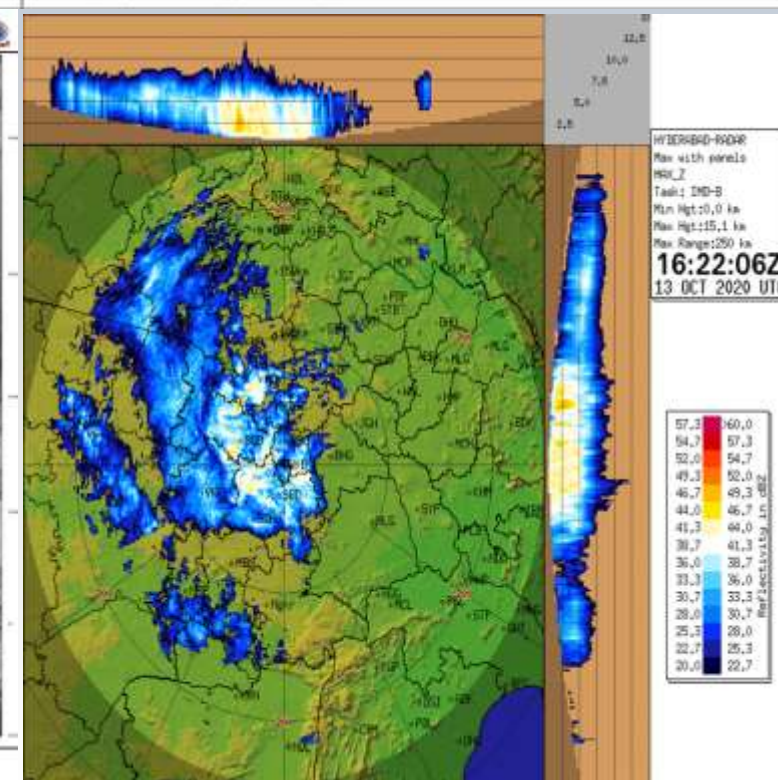
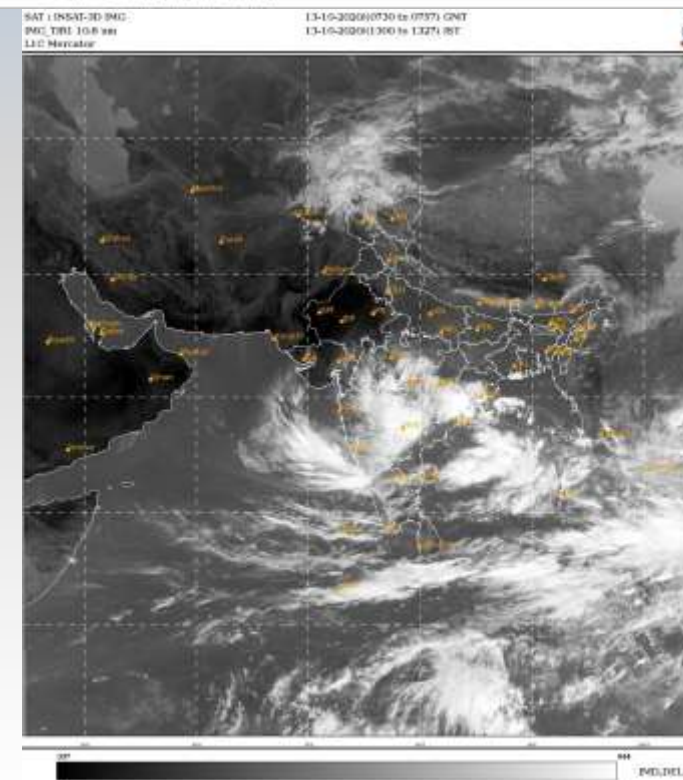
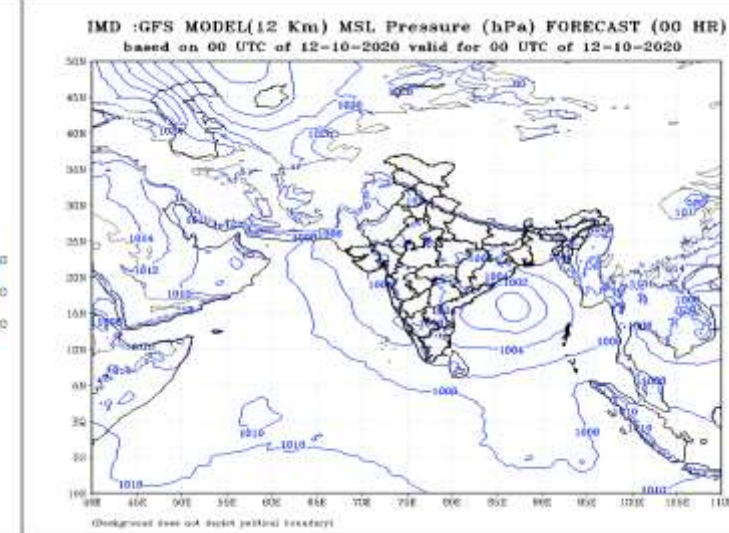
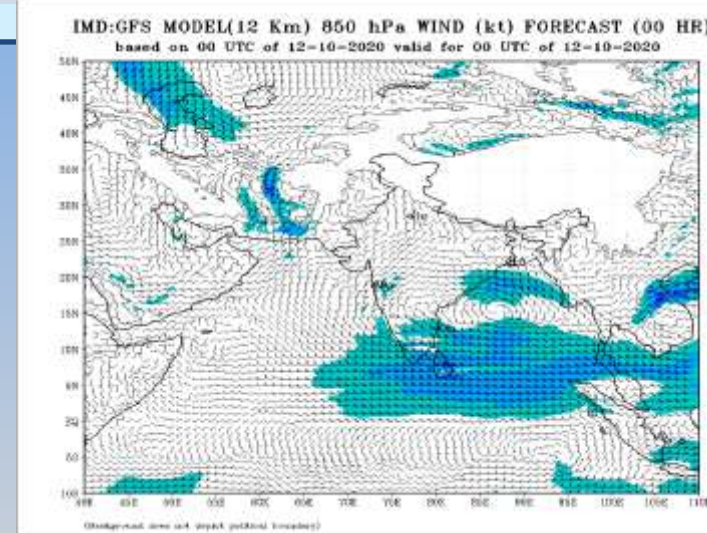


Step2: Forecasting

Step2: Forecasting

Choose among the products available /alternatives

- I) Detection of intensity of Rainfall occurrence.
- II) Detection of Specific Regions for probable zone of occurrence of Heavy Rainfall based on Deterministic and Probabilistic Model outputs Comparison of the climatology of the block and Station and the present situation to determine the future forecast for the next 3 Days.
- III) Finalization of the Forecast for the Potential zone of the Rainfall at the Block/ District Level.
- IV) Utilisation of South Asian Flash Flood Guidance



Step3: Early Warning

Step3: Early Warning

Take Action based on risk levels and issue IBF

Finalize the Early warning for the Heavy Rainfall of the next 3 Days

Green: No warning (Very Low Risk, NO Impact)

Yellow: Be Updated (Low Risk Level, Watch any Increase/Decrease in the WX Conditions)

Orange: Be Alert (Medium Risk Level, Be prepared for the Situation)

Red: Take Action (High risk Level, Ready to take Action)

Likelihood	High		2	7	10
	Medium		1	6	9
	Low			4	8
	Very Low			3	5
		Very Low	Low	Medium	High
		Impact			

Colour Codes	
Risk level	Response
Very Low	No Action
Low	Be updated
Medium	Be Prepared
High	Take Action



Step4(a): Product Generation

- ❖ After analysis and Finalization of the Forecast and Warnings Color codes for the Heavy Rainfall of the Block and District Level.
- ❖ Generate the Forecast and Warning Maps and Prepare the Impact Based alerts Using QGIS and Web GIS.
- ❖ Generate the Flash Flood Forecast for the Water Sheds level .

<p>భారతదేశం, భారతదేశం (భారతదేశం)</p> <p>భారతదేశం, భారతదేశం</p> <p>భారతదేశం -500 016.</p>	<p>భారతదేశం</p> <p>భారతదేశం</p> <p>భారతదేశం</p> <p>భారతదేశం</p> <p>భారతదేశం</p>	<p>Government of India</p> <p>India Meteorological Department</p> <p>Meteorological Centre, Begumpet</p> <p>Airport, Hyderabad-500 016.</p>
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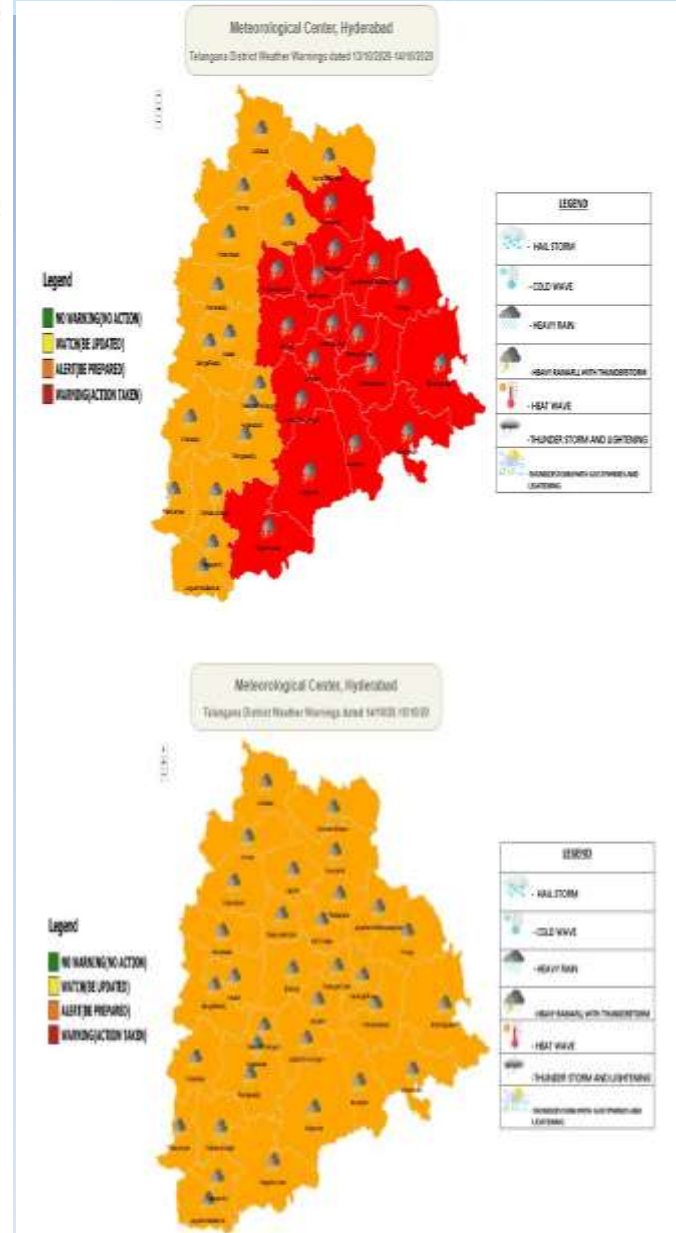
IMPACT BASED HEAVY RAINFALL WARNING FOR DISTRICTS OF TELANGANA/ Hyderabad city 3-hourly Warning-10 (RED)

DATE: 22-07-2021

TIME OF ISSUE: 1600 HRS IST

- To:
- 1) Chief Secretary, Telangana
 - 2) Relief Commissioner, SDMA, Telangana
 - 3) Concern District Collectors, Telangana
 - 4) GHMC Hyderabad
 - 5) All India Radio, Hyderabad
 - 6) Doordarshan, Hyderabad

Date	Warnings	Impact
Day 1: From: 1600hrs IST of 22/07/2021 To: 0830 hrs IST of 23/07/2021	<p>HEAVY TO VERY HEAVY WITH EXTREMELY HEAVY RAIN Very likely to occur at ISOLATED places in Adilabad, Kamaram Bheem Asifabad, Mancherial, Jagan, Nirmal, Nizamabad, Rajanna Sircilla, Ramireddy districts and</p> <p>HEAVY TO VERY HEAVY RAIN Very likely to occur at ISOLATED places in Karimnagar, Peddapalli, Jayashankar Bhupalapally, Khammam, Suryapet, Mahabubabad, Warangal (Rural), Jangaon, Siddipet, Vikarabad, Sangareddy, Medak districts and also</p> <p>HEAVY RAIN Very likely to occur at ISOLATED places in Mulugu, Bodradri Kothagudem, Nalgonda, Yadadri Bhuvanagiri, Rangareddy, Hyderabad, Medchal Malkajgiri, Mahabubnagar, Nagarkurnool, Wanaparthy districts of Telangana.</p> <p>Thunderstorm accompanied with Lightening and Gusty Winds (speed upto 30-40 KMPH) very likely to occur at ISOLATED places in all districts of Telangana</p> <p>Hyderabad City: Generally Cloudy sky, Moderate to Heavy Rain or Thundershowers very likely to occur in the parts of the city.</p>	<ol style="list-style-type: none"> 1. Moderate Flooding/inundation in low lying areas 2. Water pooling on roads and low lying areas in many locations. 3. Traffic regulation of Rail/road/air and congestion at many locations. 4. Wet and slippery roads. 5. Agriculture land submerge/crop damage 6. Social disruptions of water /electricity etc 7. Tree/branches/electric pole etc fall 8. Reservoirs water level increase/rise



Step4(b) : Dissemination

- ❖ Dissemination through various media to the Govt. officials , agriculture, State Disaster Management Authority, Urban centre, Police Dept. Fire dept. Airport Authority, Railways , Tourism, Public and other agencies.
- ❖ Dissemination Through Mail, FAX, Print /E-media, Social Media, Twitter, Facebook, whatsapp, YouTube.



Heavy Rainfall for the Block, District & Location level

Step 5: Verification

❖ Verifying the forecast and warnings with the Available station and State Govt. Rain Gauge Data.

1. Feed back/ground truth information from Public/Govt help us in better verification and improvement of forecasts.
2. Feed back/suggestions/ground truth information from Public/Govt are welcome.

Date of the Events	No. IBF Forecast Issued	% of Realized
14-07-2021 to 15-07-2021	21	90%
21-07-2021 to 23-07-2021	24	100%

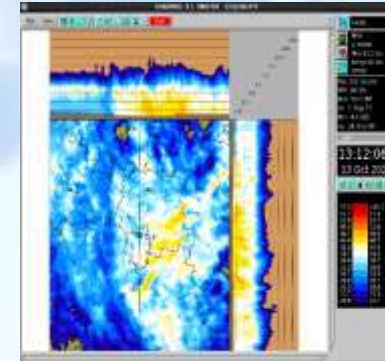
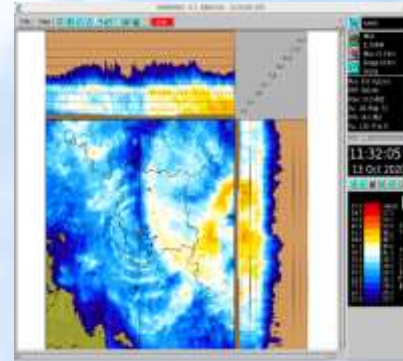
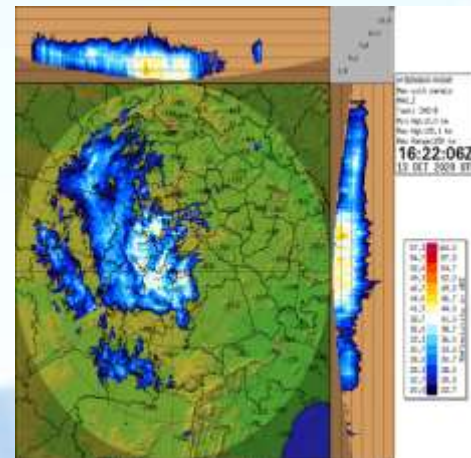
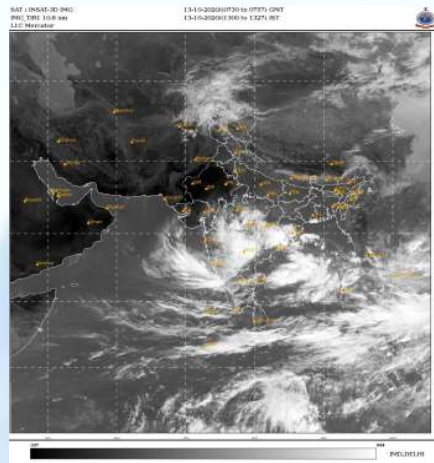
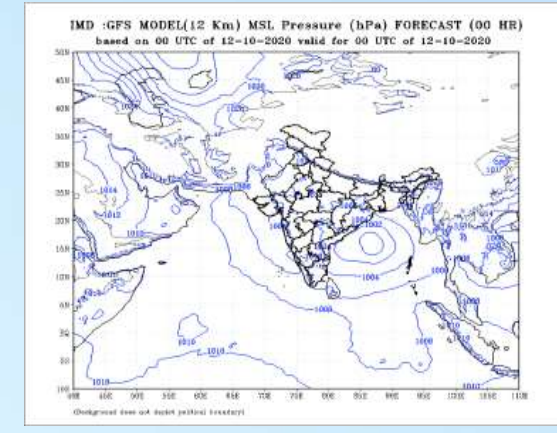
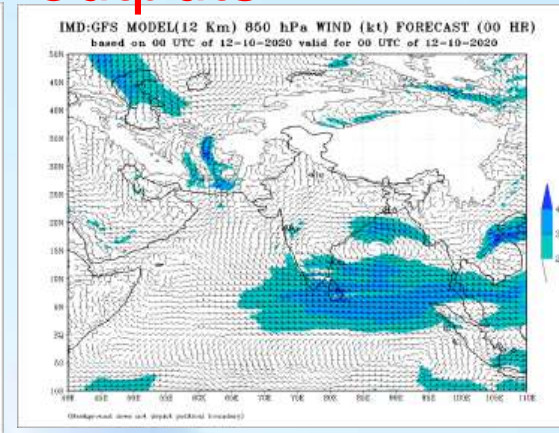
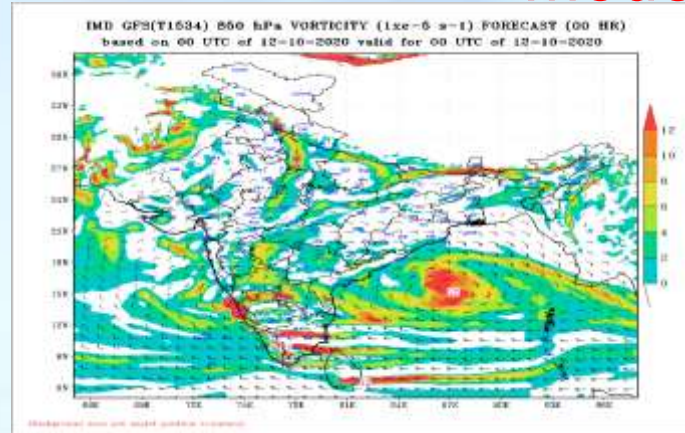
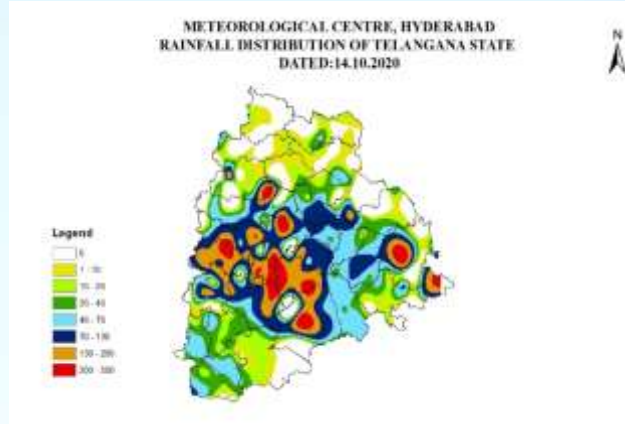
Date of the Events	No. IBF Forecast Issued	% of Realized
14-07-2021 to 15-07-2021	8	72%(HEAVY RAIN)



Case study 1: 14oct 2020

Flood occurred due to Extremely Heavy rainfall Hyderabad city and its surroundings(GHMC).

Model outputs

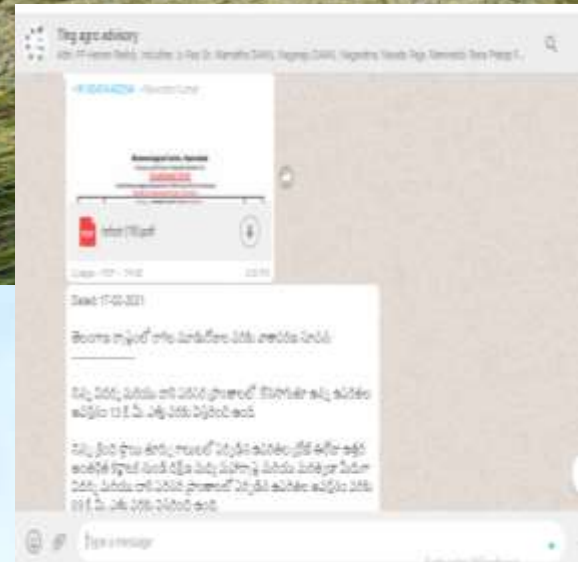


Radar and satellite



Agro Advisory bulletins

VALUE ADDED FORECAST FOR TELANGANA										
Dist. Name	Forecast Date	Wheat	Cotton	Soybean	Groundnut	Mustard	Chickpea	Moong	Urad	Other
ADILABAD	07-10-2023	8	59	23	77	49	4.3	338	7	
ADILABAD	08-10-2023	3	33	23	88	80	5.5	338	7	
ADILABAD	09-10-2023	3	33	21	88	80	3.5	42	8	
ADILABAD	10-10-2023	16	33	21	87	84	5.4	342	7	TS & lightning alongwith heavy rain likely to occur at isolated places
ADILABAD	11-10-2023	20	33	22	87	84	4	322	7	TS & lightning alongwith heavy rain likely to occur at isolated places
BHADRACHALAM	07-10-2023	14	36	21	85	82	4.4	294	8	TS with lightning likely at isolated places
BHADRACHALAM	08-10-2023	8	33	23	90	81	2.8	262	7	TS with lightning likely at isolated places
BHADRACHALAM	09-10-2023	13	33	21	90	84	3.8	335	7	TS & lightning alongwith heavy rain likely to occur at isolated places
BHADRACHALAM	10-10-2023	11	33	23	92	85	3.2	348	6	TS & lightning alongwith heavy rain likely to occur at isolated places
BHADRACHALAM	11-10-2023	18	33	23	95	88	3.4	355	7	TS & lightning alongwith heavy rain likely to occur at isolated places
HYDERABAD	07-10-2023	1	32	21	87	81	6.1	328	7	
HYDERABAD	08-10-2023	8	33	22	87	81	2.8	338	6	
HYDERABAD	09-10-2023	1	33	22	78	87	4.5	342	8	
HYDERABAD	10-10-2023	8	33.5	22	85	84	4.3	338	7	TS with lightning likely at isolated places
HYDERABAD	11-10-2023	6	33.5	22.5	79	87	8.2	335	7	TS with lightning likely at isolated places
JAGTIAL	07-10-2023	8	33	25	83	82	5.5	315	6	
JAGTIAL	08-10-2023	1	33	25	88	89	1	336	8	
JAGTIAL	09-10-2023	4	32	25	83	70	4	350	7	TS with lightning likely at isolated places
JAGTIAL	10-10-2023	18	32.5	25	90	87	6	348	7	TS & lightning alongwith heavy rain likely to occur at isolated places
JAGTIAL	11-10-2023	6	32.5	25	85	88	3.7	355	7	TS & lightning alongwith heavy rain likely to occur at isolated places
JANGON	07-10-2023	8	32	24	88	85	9.2	336	6	
JANGON	08-10-2023	8	32	24	103	70	6.5	336	5	
JANGON	09-10-2023	8	31	24	87	76	5.8	317	7	TS with lightning likely at isolated places
JANGON	10-10-2023	8	32	24	88	79	8	328	7	TS & lightning alongwith heavy rain likely to occur at isolated places
JANGON	11-10-2023	11	32	23	92	85	5.2	324	8	TS with lightning likely at isolated places
JAYASHANKAR-BHUPALPALLY	07-10-2023	8	33	25	88	84	5.6	328	8	
JAYASHANKAR-BHUPALPALLY	08-10-2023	8	32	24	99	87	3	313	5	TS with lightning likely at isolated places
JAYASHANKAR-BHUPALPALLY	09-10-2023	8	32	23	90	86	2.5	320	7	TS & lightning alongwith heavy rain likely to occur at isolated places
JAYASHANKAR-BHUPALPALLY	10-10-2023	8	31	23	86	84	3.8	314	7	TS with lightning likely at isolated places
JAYASHANKAR-BHUPALPALLY	11-10-2023	11	32	22	94	77	4	333	7	TS with lightning likely at isolated places

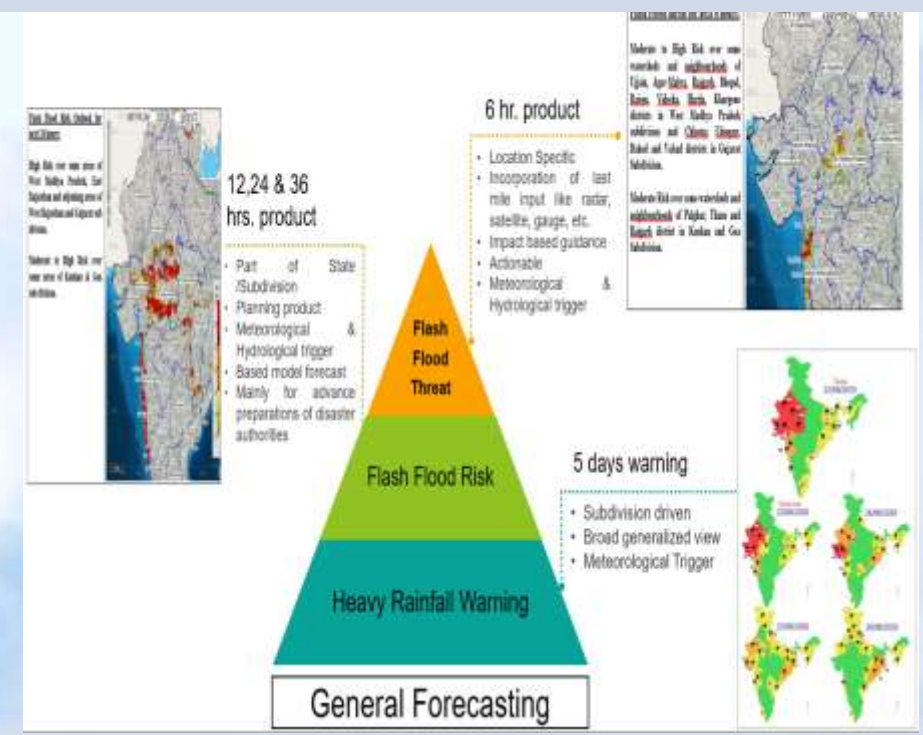


Peddapally, Vikarabad, Sangareddy, Medak, Kamareddy	cotton	Vegetative stage	Seedling rot, reducing optimum plant population and reduced number of squares per branch	<ul style="list-style-type: none"> Arrange proper drainage channels in black cotton soils
	Live stock	All stages		<p>In the view of thunderstorm accompanied with lightning and gusty winds</p> <p>Keep animals away from open water, pond or river.</p> <p>Keep animals away from tractors and other metal farm equipment.</p> <p>Avoid the tying of cattle to electrical poles, tree trunk and ensure that the cattle should be in the safe sheds or thatched shed.</p>
	Poultry			<p>Water & pipe lines may be covered with gunny bags to provide cool water.</p> <p>Ensure proper cross ventilation to avoid ammonia accumulation</p>

Issued by: SAMC_Hyderabad
 Contact no. 040 27908506, 040 27906172

Integration of Flash Flood Guidance with General Warnings for impact based forecast at local level

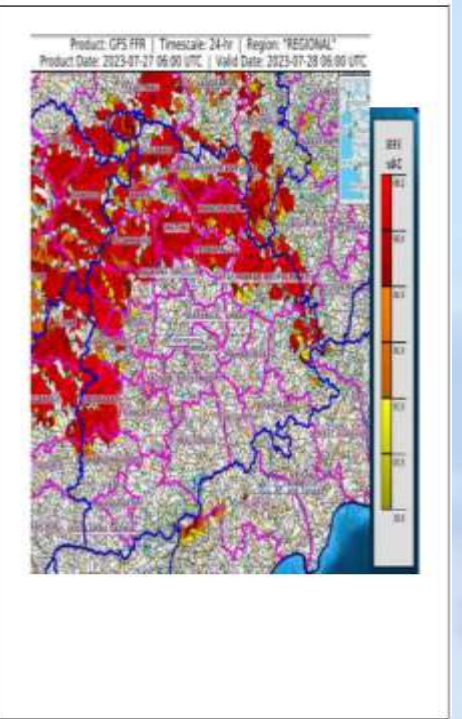
FMO Hyderabad office
Issues daily Hydromet Bulletin in Monsoon Season and also Cyclonic Storm events.
Hydromet Bulletin covering synoptic situation, realized rainfall in past 24 hours
and
Quantitative precipitation forecast for 7 Days & Heavy rainfall warnings for 7 days
to
Flood Forecasting Division of Central Water Commission
Of both Godavari and Krishna rivers, sub-basin wise
Flood Warning is issued by CWC



24 Hours Flash Flood RISK (FFR) till 1330 IST of 28.07.2023

Moderate Risk likely over few watersheds in the Peddapalle, JayashankarBhupalpalle, Mulugu, Vikarabad, Jagtial, Warngal(n), and Warngal, Siddipet, Jangaon, Mahabubabad, Sangareddy, Medak, Yadadri bhuvanagiri, Rangareddy, mahabubnagar, Rajanna Siricilla, Nizamabad, Kamareddy Districts in Telangana

Surface runoff/ Inundation may occur at some fully saturated soils & low-lying areas over AoC as depicted in map due to expected rainfall in next 24 hours.



Note: Next Bulletin will be issued based on 1930 IST of 27.07.2023.



Somesh Kumar, I.A.S.



CHIEF SECRETARY
GOVERNMENT OF TELANGANA

Hyderabad.
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+91-40-2345 5340
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Date: 22.12.2020

To

Dr. K. Naga Ratna
The Head
Meteorological Centre, Hyderabad,
Hyderabad-500016

I wish to express my appreciation to IMD Hyderabad that provided forecast and warnings in time, prompt and accurate way during recent monsoon season 2020 and Hyderabad floods 2020 during October 2020.

Telangana state disaster management authority (TS-SDMA) and IMD Hyderabad had very close collaboration and association in executing the timely forecasts in operational work like rescue, rehabilitation and reducing the disaster risk.

I would look forward for rendering IMD's support to the state organization in minimizing the disaster risks. Wishing for new collaborations in near future and development of weather forecasting services in realtime.

With best wishes

(SOMESH KUMAR)

14:09

Tweet



DGP TELANGANA POLICE
@TelanganaDGP

My heartfelt appreciations to you all dear officers,
The services you been rendering in rescue & relief operations of the flood affected, across Telangana, is exemplary & [#BeyondTheCallOfDuty](#).
Plz continue the same spirit, in partnership with other Depts, till normalcy restored.



Anjani Kumar, IPS, Stay Home Stay Safe, and 9 others

Tweet your reply

GREATER HYDERABAD MUNICIPAL CORPORATION

Directorate of
Enforcement, Vigilance &
Disaster Management,
Ground Floor, Head Office,
GHMC, Hyderabad.

No. /DIR/ EV&DM/GHMC/2020

Date: 12-10-2020

Sir/Madam,

Sub: - GHMC - DIR - EV&DM - Disaster Management - High Alert - Heavy Rainfall Predictions by IMD on 12th, 13th and 14th of October 2020 - Initiate necessary measures - Reg.

Adverting to the Heavy rainfall warnings issued by Indian Meteorological Department (IMD), Hyderabad during 12th, 13th and 14th of October 2020, it is imperative to act on High alert and take necessary steps viz.,

- > Alert Monsoon Emergency teams & station them at possible inundation locations
- > Identify Rehabilitation centres nearby to possible inundation areas and ensure availability of basic amenities.
- > Ensure the availability of necessary equipment & machinery to tackle flood emergency
- > Ensure the availability of transport facility to evacuate/shift the population from possible inundation areas

In this regard, the Zonal Commissioner's, GHMC are requested to initiate necessary measures to tackle the possible emergencies that may arise due to heavy rainfall.

THIS MAY BE TREATED AS MOST URGENT

**DIRECTOR
ENFORCEMENT, VIGILANCE &
DISASTER MANAGEMENT
GHMC, HYDERABAD**

To
All the Zonal Commissioner's GHMC

Copy submitted to
The Commissioner, GHMC

Copy to
All the Deputy Commissioner's GHMC



The depression over West central Bay of Bengal has moved West -North westwards and lay centred about 319 km South East of Visakhapatnam, 350 km East Southeast of Kakinada, AP and 380 km East South east of Narsapur, AP.

It is very likely to intensify further into a deep depression in Bay of Bengal during next 24 four hours it is very likely to move West- northwest wards and cross north Andhra Pradesh coast between Narsapur and Visakhapatnam, close to Kakinada during mid night today.

As per IMA, Hyderabad and Amaravathi, squally wind speed reaching 55-65 kmph gushing to 75 kmph is likely along and off coastal Andhra Pradesh and Tamam coast.

Dr. K. Nagaratna, Director, IMD, Hyderabad, While talking to AIR this morning said that there would be heavy rains and gusty winds

GOVERNMENT OF TELANGANA HYDERABAD METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD



O/o. The General Manager,
O&M Division XVII
HMWSSB.

PRESS RELEASE

Sub: HMWSSB-O&M Dn. XVII- Inflows to Himayathsagar Reservoir - Proposed Operation of Flood Gates - Request to alert public in Print & Electronic media - Reg.

With reference to the subject cited above, it is to submit that the FTL (full tank level) of Himayathsagar is 1763.50 fts with the capacity of 2.968 TMC. Due to recent rain falls in the catchment area the reservoir level reached to 1762.00 fts (2.603 TMC) recently. As per IMD forecast report, there may be expected heavy rain fall in Telangana state in the coming few days. To safeguard dam, the flood gates of Himayathsagar reservoir to be lifted at any time after reaching 1763.00 fts level depending upon inflows and further the inflows and outflows will be balanced accordingly.

In this regard, it is requested to alert in Print & Electronic media in the down stream of Himayathsagar reservoir and all along Musi river.

Your faithfully,

Date: 12/10/2020.
Place: Himayathsagar.

Sd/-
General Manager,
O&M Division XVII,
HMWSSB.

At 324 mm, Greater Hyd scores one-day maximum after 20 years

Preeti.Biswas@timesgroup.com

Hyderabad: October 13, 2020 went down as the rainiest day in the history of Greater Hyderabad, as the city received a month's rain on a single day, bringing life to a crippling halt. The city and its outskirts recorded 324 mm rainfall in just 24 hours, according to the Telangana State Development Planning Society (TSDPS). It was twenty years ago, on August 24, 2000, that the city had

recorded 241.5 mm of rainfall in 24 hours, triggering the Hyderabad floods.

Officials at the India Meteorological Department (IMD) said the core city area was last

Continued on P4

hed with 268 mm of rainfall from October 1-14 of which 191.8 mm on Tuesday alone.

"Since the deep depression was centered over Hyderabad, it led to the torrential rains.

But it was indeed unprecedented as our observatory has never witnessed such a high amount of rainfall in October," said Naga Ratna, in-charge director, the Indian Meteorological Department (IMD).

In October, 2017, Hyderabad received 248.3 mm of rainfall in a span of 15 days, and turning back the clock to October 1916, Hyderabad received 355.1 mm of rainfall in 31 days, which is an all-time record, the IMD said.





भारत मौसम विज्ञान विभाग
India Meteorological Department
Ministry of Earth Sciences
Government of India

Meteorological Centre
HYDERABAD
मौसम केंद्र हैदराबाद

मौसम की जानकारी / Weather Information



मौसम के अपडेट के लिए / For Weather updates
हमारा अनुसरण इस पर कीजिये / Follow us on
फेसबुक, ट्विटर, यूट्यूब और इंस्टाग्राम / Facebook, twitter, youtube and instagram



<https://www.instagram.com/meteorologicalcenter/>



<https://twitter.com/metcentrehyd>



<https://m.facebook.com/imd.hyd.3/>



<https://www.youtube.com/channel/UCgLcdtiKuvTFJpdnl2ZmoNA>

040-27908506/27906172

mausam.imd.gov.in/hyderabad

Mausam App for location specific forecast, Damini App for Lightening alerts,
Meghdoot App for Agriculture forecasts



Like it & share it



THANK YOU

भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

