



India Meteorological Department
(Ministry of Earth Sciences)

BULLETIN NO. 76 (ARB/01/2023)

TIME OF ISSUE: 2030 HOURS IST

DATED: 15.06.2023

FROM: INDIA METEOROLOGICAL DEPARTMENT (FAX NO. 24643965/24699216/24623220)

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Sub: Very Severe Cyclonic Storm "Biparjoy" (pronounced as "Biporjoy") over Northeast Arabian Sea: Cyclone Warning for Saurashtra & Kutch Coasts (Red Message)

The Very Severe Cyclonic Storm "Biparjoy" (pronounced as "Biporjoy") over Northeast Arabian Sea moved nearly eastward with a speed of 12 kmph during past 6-hours and lay centered at 1730 hours IST of today, the 15th June, 2023 over the same region near latitude 22.9°N and longitude 68.0°E, about 70 km west-southwest of Jakhau Port (Gujarat), 130 km west-northwest of Devbhumi Dwarka, 100 km west-southwest of Naliya and 240 km south-southeast of Karachi (Pakistan).

It is very likely to move northeastwards and cross Saurashtra & Kutch and adjoining Pakistan coasts between Mandvi (Gujarat) and Karachi (Pakistan) near Jakhau Port (Gujarat) during next few hours as a very severe cyclonic storm with maximum sustained wind speed of 115-125 kmph gusting to 140 kmph. The landfall process commenced around 1830 hours IST of today and would continue till midnight of today, the 15th June 2023.

Forecast track and intensity are given below:

Date/Time(IST)	Position (Lat. °N/ long. °E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
15.06.23/1730	22.9/68.0	115-125 Gusting To 140	Very Severe Cyclonic Storm
15.06.23/2330	23.4/68.7	105-115 Gusting To 125	Severe Cyclonic Storm
16.06.23/0530	23.9/69.5	80-90 Gusting To 100	Cyclonic Storm
16.06.23/1130	24.5/70.4	50-60 Gusting To 70	Deep Depression
16.06.23/1730	25.2/71.4	35-45 Gusting To 55	Depression

(i) Heavy Rainfall warning:

- Light to moderate rainfall at most places with heavy to very heavy rainfall at a few places and extremely heavy falls at isolated places very likely over Kachchh, Devbhumi Dwarka & Jamnagar and heavy to very heavy rainfall at a few places over Porbandar, Rajkot, Morbi & Junagarh districts of Gujarat and Isolated heavy to very heavy rainfall is very likely over remaining districts of Saurashtra and north Gujarat region on 15th June.
- Light to moderate rainfall at most places with heavy to extremely heavy rainfall at isolated places very likely over north Gujarat and adjoining south Rajasthan on 16th and southeast Rajasthan & adjoining North Gujarat region on 17th June.

(ii) Wind warning:

Northeast Arabian Sea: Gale wind speed reaching 115-125 kmph gusting to 140 kmph prevailing over the region likely to gradually decrease and becoming 105-115 kmph gusting 125 kmph by 15th evening. It would weaken gradually further more thereafter becoming squally wind speed reaching 50-60 kmph gusting to 70 kmph by 16th morning.

Eastcentral Arabian Sea: Gale wind speed reaching 50-60 kmph gusting to 70 kmph is prevailing and would become squally wind speed reaching 40-50 kmph gusting to 60 kmph from 15th evening for subsequent 12 hours.

Wind warning along & off Saurashtra & Kutch coasts (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts) including Gulf of Kutch:

- Gale wind speed reaching 115-125 kmph gusting to 135 kmph is prevailing along & off Kachchh, Devbhoomi Dwarka & Porbandar district coasts. It would gradually increase becoming gale wind speed reaching during 15th afternoon to night along & off Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts. Thereafter, it would decrease gradually becoming 70-80 kmph gusting to 90 kmph over Kachchh and adjoining districts of Saurashtra & Kutch by 16th early morning and squally wind speed reaching 45-55 kmph gusting to 65 kmph by 16th afternoon.
- Squally wind speed reaching 50-60 kmph gusting to 70 kmph very likely to prevail along & off remaining districts of Saurashtra coast on 15th June.

Wind Warning for South Rajasthan

- Squally wind speed reaching 40-50 kmph gusting to 60 kmph is likely over South Rajasthan during 16th noon to evening and 35-45 kmph gusting to 55 kmph till mid-night of 17th June.

(iii) Sea condition

Sea condition will be phenomenal over northeast Arabian Sea and rough to very rough over adjoining eastcentral Arabian Sea till 15th evening and would improve thereafter.

Along & off Saurashtra& Kutch coasts:

Sea condition is likely to be very high to phenomenal thereafter till 15th June night and would improve thereafter.

(iv) Storm Surge Warning (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar and Morbi districts)

Storm surge of about 2 -3 m above the astronomical tide is likely to inundate the low lying areas of above districts during the time of landfall. The astronomical tides along these districts could be upto 3-6 meters in different places.

(v) Damage expected over Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Morbi & Junagarh & Rajkot districts of Gujarat on 15th June:

- Total destruction of thatched houses/ extensive damage to kutcha houses. Some damage to Pucca houses.
- Potential threat from flying objects.
- Bending/ uprooting of power and communication poles.
- Major damage to Kutcha and Pucca roads. Flooding of escape routes. Disruption of railways, overhead power lines and signalling systems.
- Widespread damage to standing crops, plantations, orchards, falling of green coconuts and tearing of palm fronds. Blowing down of bushy trees like mango.
- Small boats, country crafts may get detached from moorings.
- Visibility severely affected due to salt spray.

(vi) Fishermen Warning & Action Suggested (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts) and for Offshore & Onshore Industries (Graphics Attached):

- Total suspension of fishing operations over northeast and adjoining eastcentral Arabian Sea till 15th June.
- Those out at sea are advised to return to coast.
- Judicious regulation of offshore and onshore activities.
- Ports along the west coast of India may take necessary precautions.
- Naval base operations may maintain necessary precautions.
- Movement in motor boats and small ships all & off these coasts to be avoided.
- Mobilize evacuation from coastal areas of Saurashtra and Kutch (Kachchh, Devbhumi Dwarka, Porbandar, Jamnagar, Rajkot, Junagarh and Morbi districts).
- Judicious regulation of rail and road traffic.
- People in affected areas to remain indoors.
- Tourism activities may be restricted over these areas.
- Preparatory actions before the cyclones.

Post Landfall Outlook for interior districts of Saurashtra and north Gujarat region (Districts apart from those mentioned under warning above):

After the landfall the system is very likely to move northeastwards, across north Gujarat and weaken gradually. It is likely to maintain the intensity of Cyclonic Storm till the morning of 16th June and thereafter it will weaken gradually into a Depression over south Rajasthan by evening of the same day.

Light to moderate rainfall at most places with heavy to extremely heavy rainfall at isolated places very likely over Banaskantha and Patan; heavy to very heavy at isolated places over Kachchh, Morbi, Mehsana and Sabarkantha of north Gujarat and isolated heavy rainfall over remaining districts on 16th June.

Light to moderate rainfall at most places with heavy to very heavy rainfall at isolated places likely over Banaskantha and Sabarkantha on 17th June.

Damage expected over interior districts of Saurashtra and north Gujarat region (Districts apart from those mentioned under warning):

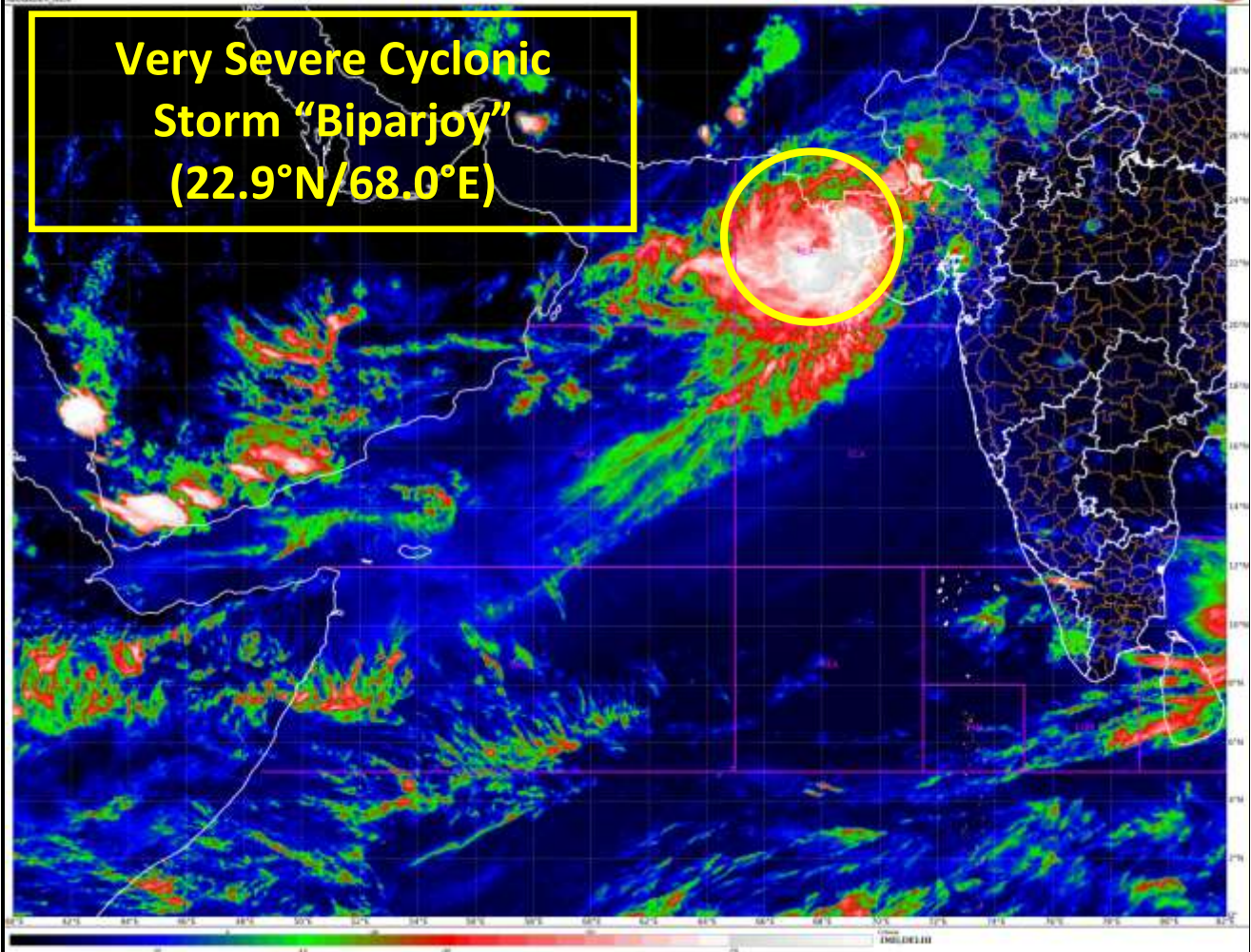
(i) Major damage to Kutcha and minor damage to Pucca roads. (ii) Breaking of tree branches, uprooting of small trees. Damage to orchards. People in affected areas to remain indoors.

The system is under continuous surveillance and the next message will be issued at 2330 hours IST of 15th June, 2023.

(Ananda Kumar Das)
Scientist F, Cyclone Warning Division, New Delhi

Copy to: ACWC Kolkata/ ACWC Chennai/ CWC Bhubaneswar/CWC Visakhapatnam/CWC Ahmedabad/ MO Port Blair/MC Raipur/MC Bhopal/MC Hyderabad/RMC Nagpur
LEGEND: Heavy Rainfall: 64.5 to 115.5mm, **Very Heavy Rainfall:** 115.6 to 204.4mm **Most Places:** more than 76% of total stations, **Isolated Places:** Less than 25% of total

**Very Severe Cyclonic
Storm "Biparjoy"
(22.9°N/68.0°E)**



Radar Imagery of Doppler Weather Radar at Bhuj

bhuj_weather_2023_06_15_14_21_34_hsfimd-b-bel.dwr

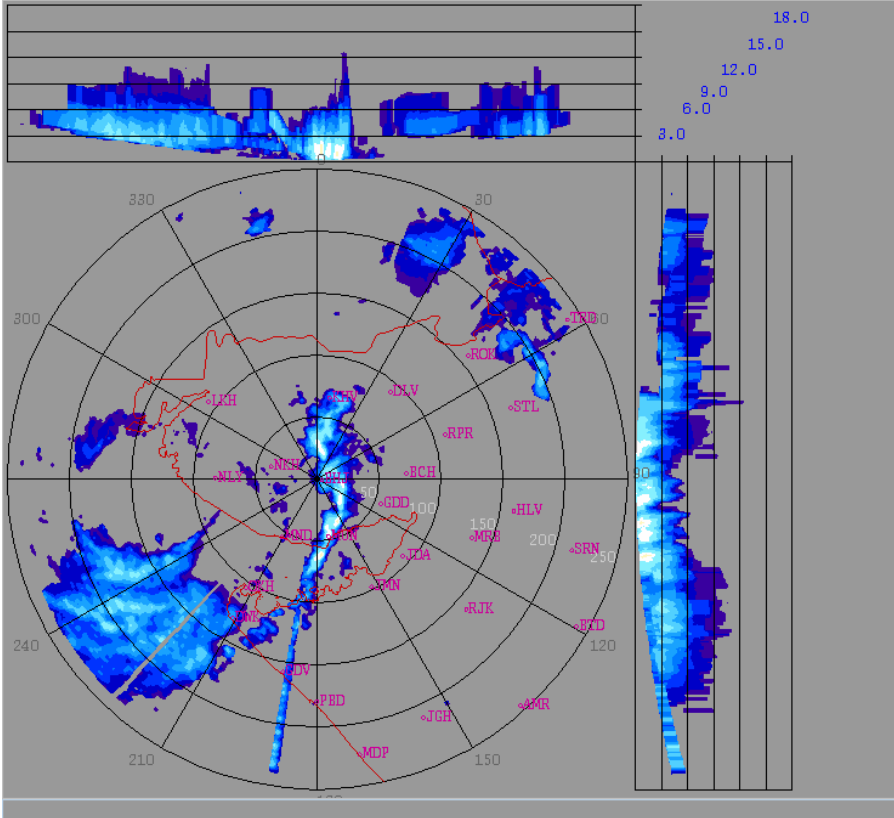
2023/06/15

14:21:34 (UTC)

MAX(Z)

DWR BHUJ

(23.2416N , 69.6458E , 100.00 mts)

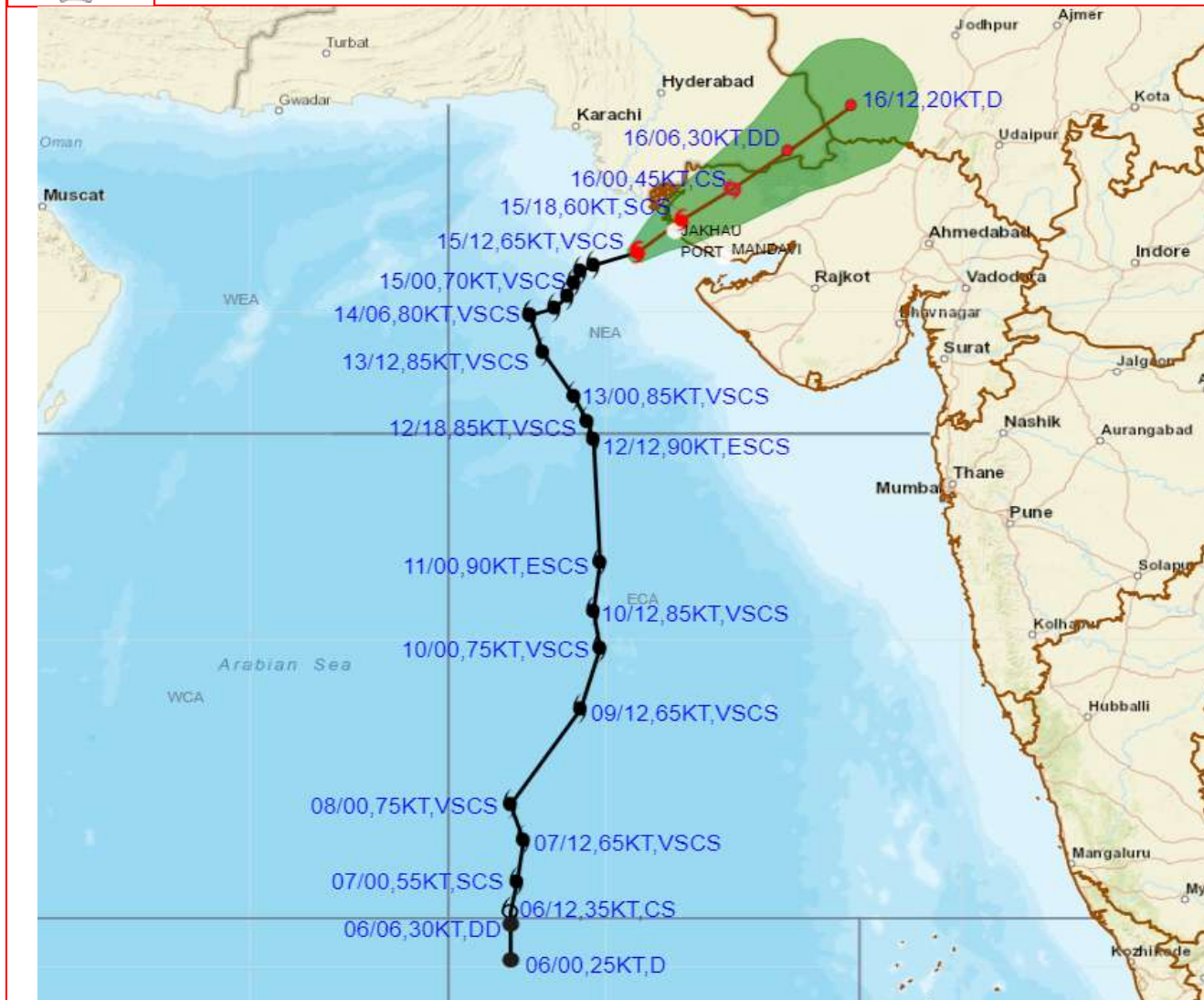


Height	: 18.0 Km
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Grid size	: 1 Km
Display Range	: 250 Km
Display Res	: 1.0 Km/Pix
DDR Enable	: Yes
Scan Elev (Lo, Hi)	: 0.2, 21.0 Deg
PRF (Lo, Hi)	: 450, 600 Hz
Scan Res	: 150 mts
Scan RPM	: 2.0
Log Threshold	: 4 dB
DTP	: 42
Pulse Width	: 1.0
Notch Width	: 54.0 Hz
SQI	: 0.25
CSR	: 20
Scan Range	: 240 Km
Preprocessings	: NONE

dBZ	
No Data	
61.3: > 65.0	
57.7: 61.3	
54.0: 57.7	
50.3: 54.0	
46.7: 50.3	
43.0: 46.7	
39.3: 43.0	
35.7: 39.3	
32.0: 35.7	
28.3: 32.0	
24.7: 28.3	
21.0: 24.7	
17.3: 21.0	
13.7: 17.3	
10.0: 13.7	



OBSERVED AND FORECAST TRACK ALONGWITH CONE OF UNCERTAINTY OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST ARABIAN SEA BASED ON 1200 UTC (1730 IST) OF 15TH JUNE 2023.



DATE/TIME IN UTC

IST=UTC + 0530

L: LOW PRESSURE AREA

WML: WELL MARKED LOW PRESSURE AREA

D: DEPRESSION (17-27 KT)

DD: DEEP DEPRESSION (28-33 KT)

CS: CYCLONIC STORM (34-47 KT)

SCS: SEVERE CYCLONIC STORM (48-63KT)

VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)

ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)

SuCS: SUPER CYCLONIC STORM (\geq 120 KT)

● LESS THAN 34 KT

○ 34-47 KT

○ \geq 48 KT

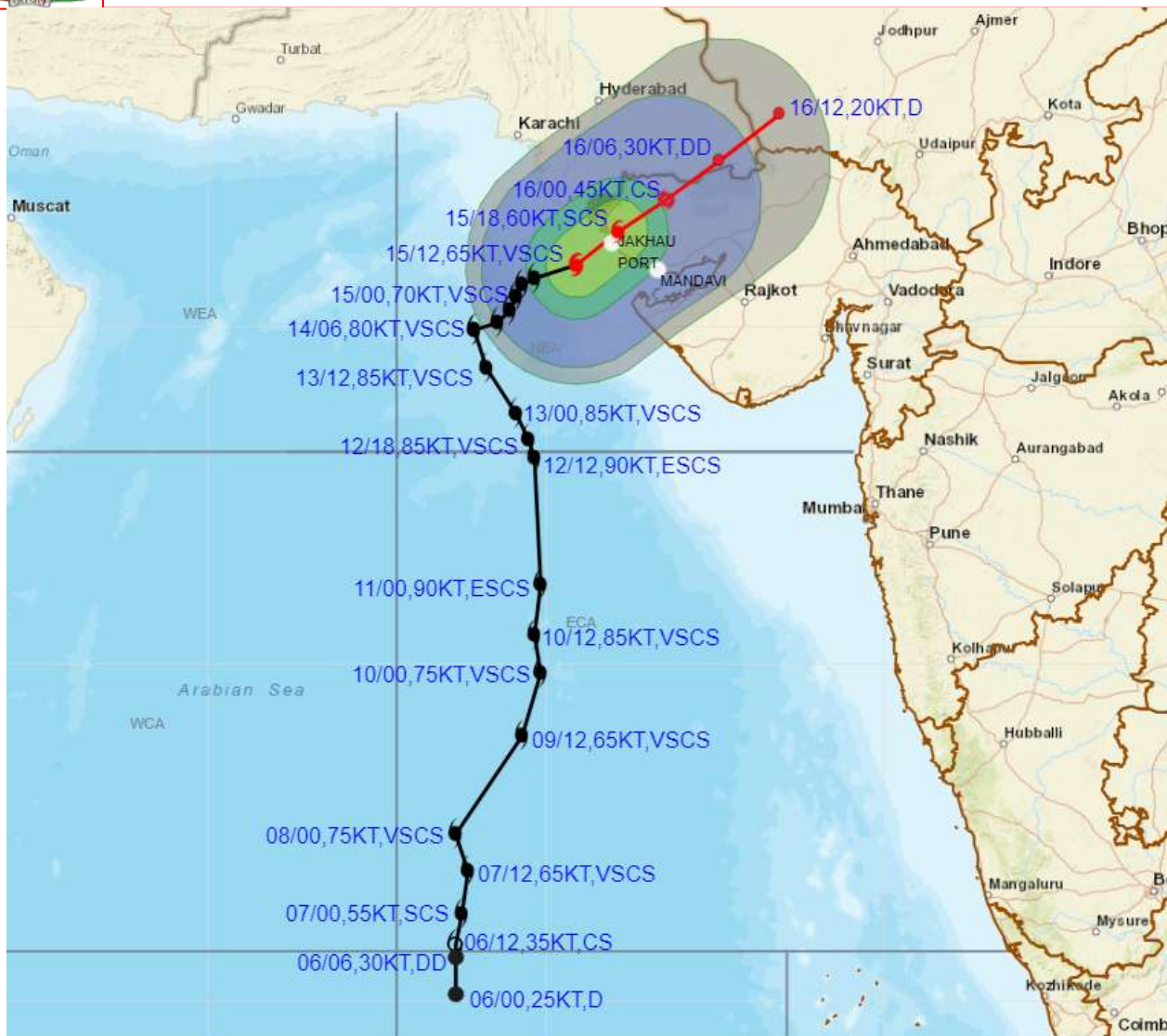
— OBSERVED TRACK

— FORECAST TRACK

▲ CONE OF UNCERTAINTY



OBSERVED AND FORECAST TRACK ALONGWITH QUADRANT WIND DISTRIBUTION OF VERY SEVERE CYCLONIC STORM "BIPARJOY" OVER NORTHEAST ARABIAN SEA BASED ON 1200 UTC (1730 IST) OF 15TH JUNE 2023.



DATE/TIME IN UTC

IST=UTC + 0530

L: LOW PRESSURE AREA

WML: WELL MARKED LOW PRESSURE AREA

D: DEPRESSION (17-27 KT)

DD: DEEP DEPRESSION (28-33 KT)

CS: CYCLONIC STORM (34-47 KT)

SCS: SEVERE CYCLONIC STORM (48-63KT)

VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)

ESCS: EXTREMELY SEVERE CYCLONIC STORM (90-119 KT)

SuCS: SUPER CYCLONIC STORM (≥ 120 KT)

● LESS THAN 34 KT

○ 34-47 KT

● ≥ 48 KT

— OBSERVED TRACK

— FORECAST TRACK

▲ CONE OF UNCERTAINTY

AREA OF MAXIMUM SUSTAINED WIND SPEED:

■ 28-33 KT (52-61 KMPH)

■ 34-49 KT (62-91 KMPH)

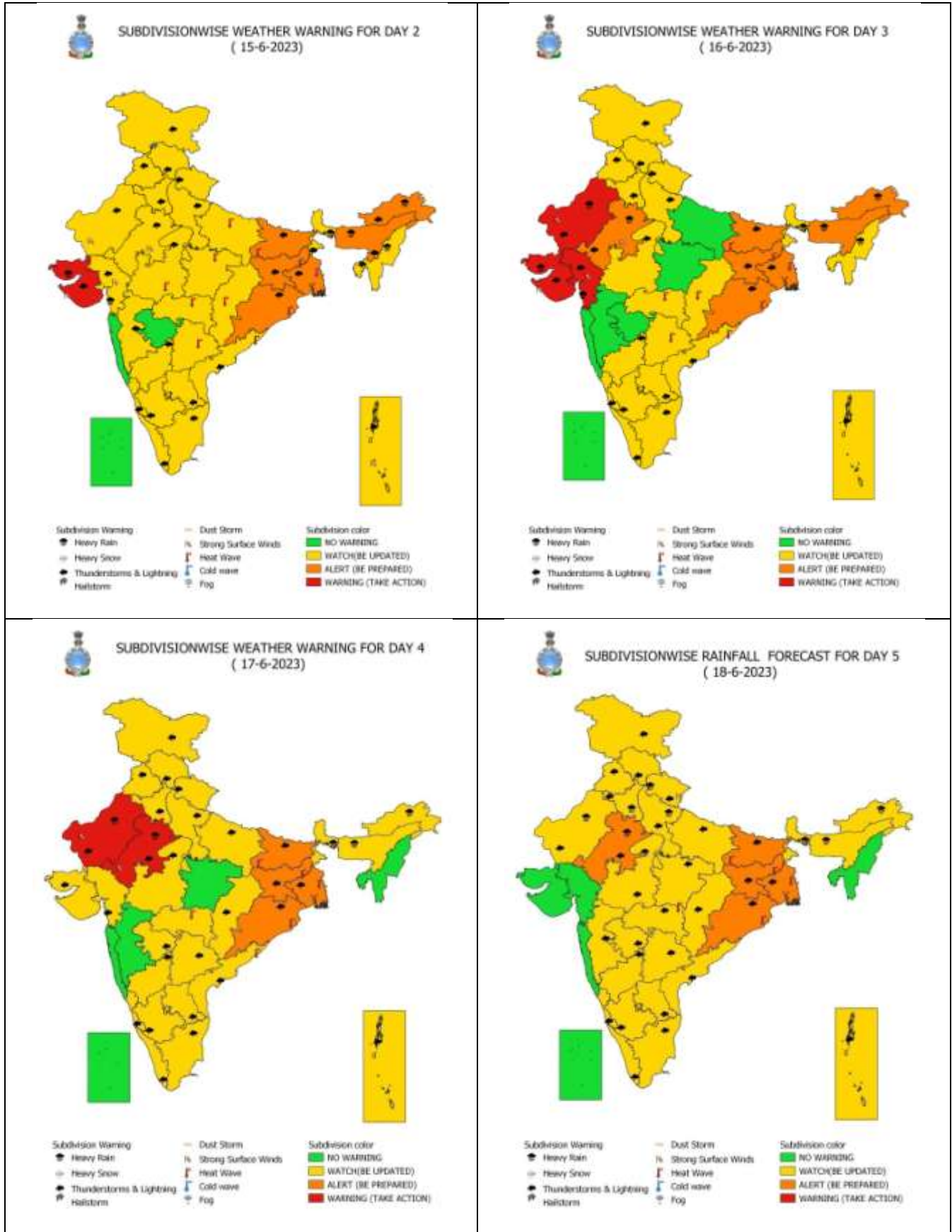
■ 50-63 KT (92-117 KMPH)

■ ≥ 64 KT (≥118 KMPH)

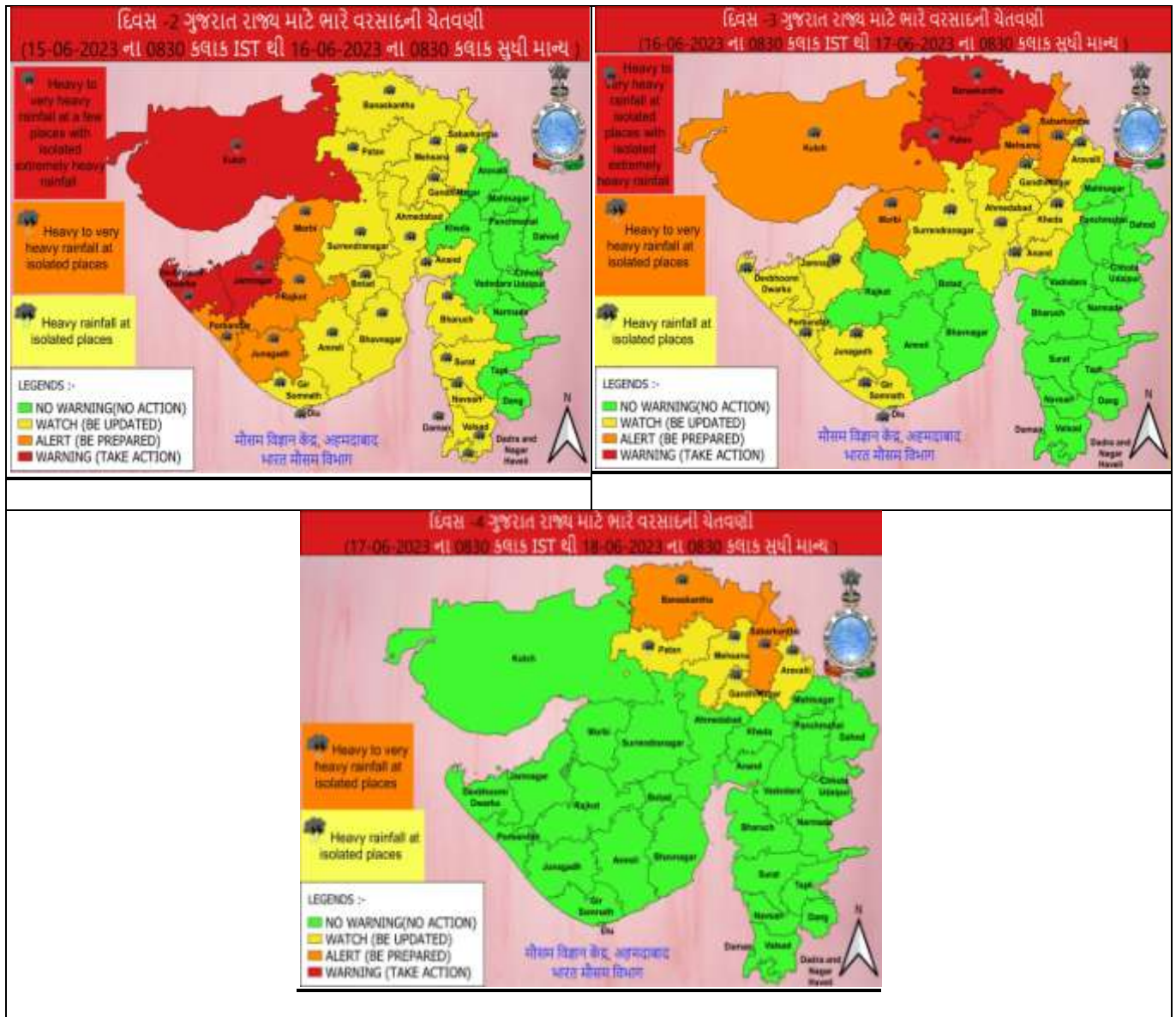
IMPACT OVER THE SEA

MSW (knot/kmph)	Impact	Action
28-33 (52-61)	Very rough seas	Total suspension of fishing operations
34-49 (62-91)	High to very high seas	Total suspension of fishing operations
50-63 (92-117)	Very high seas	Total suspension of fishing operations
≥ 64 (≥118)	Phenomenal	Total suspension of fishing operations

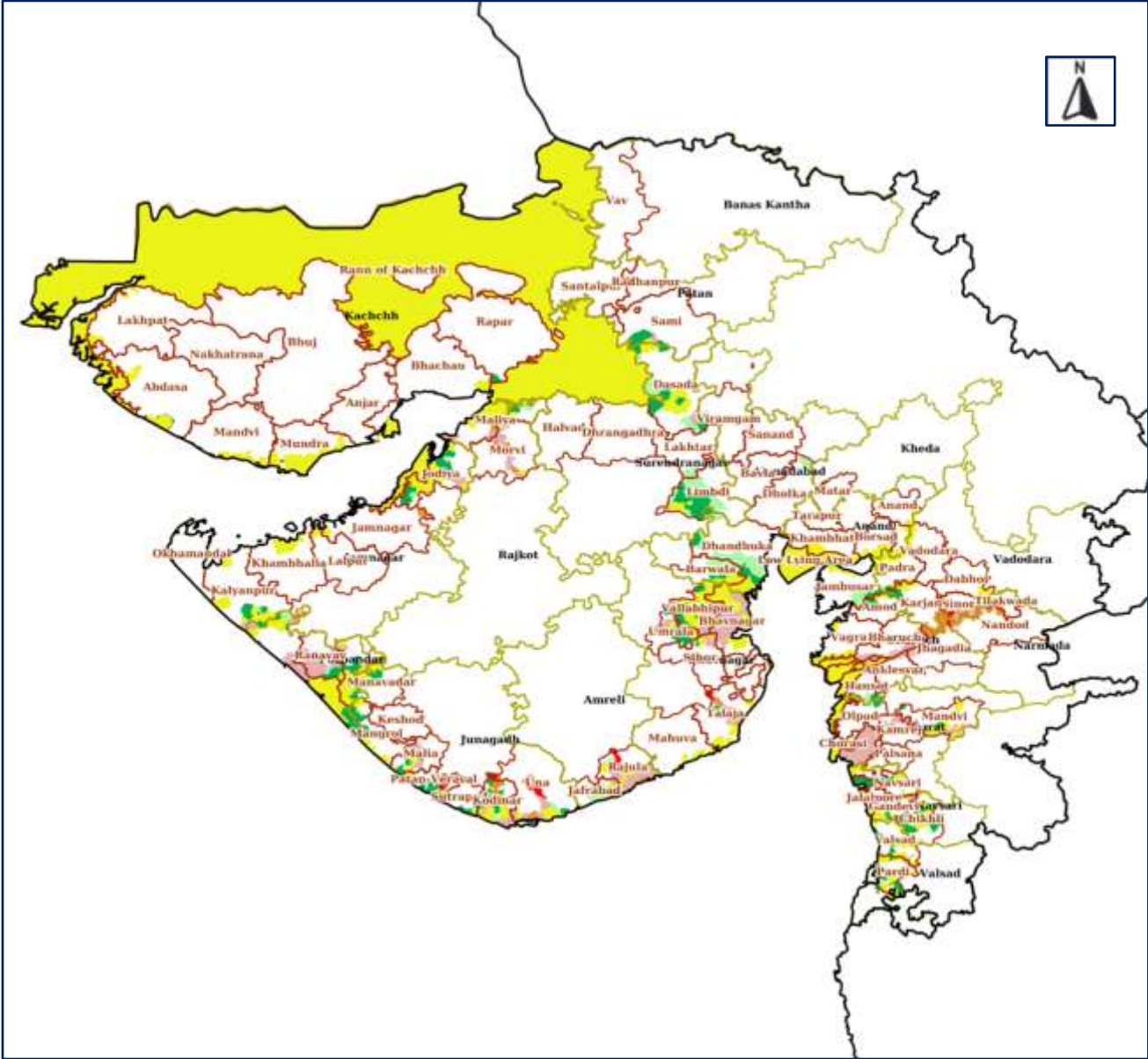
All India Heavy Rainfall Warning for 15th to 18th June 2023



District-wise Heavy Rainfall Warning Maps for 15th to 17th June



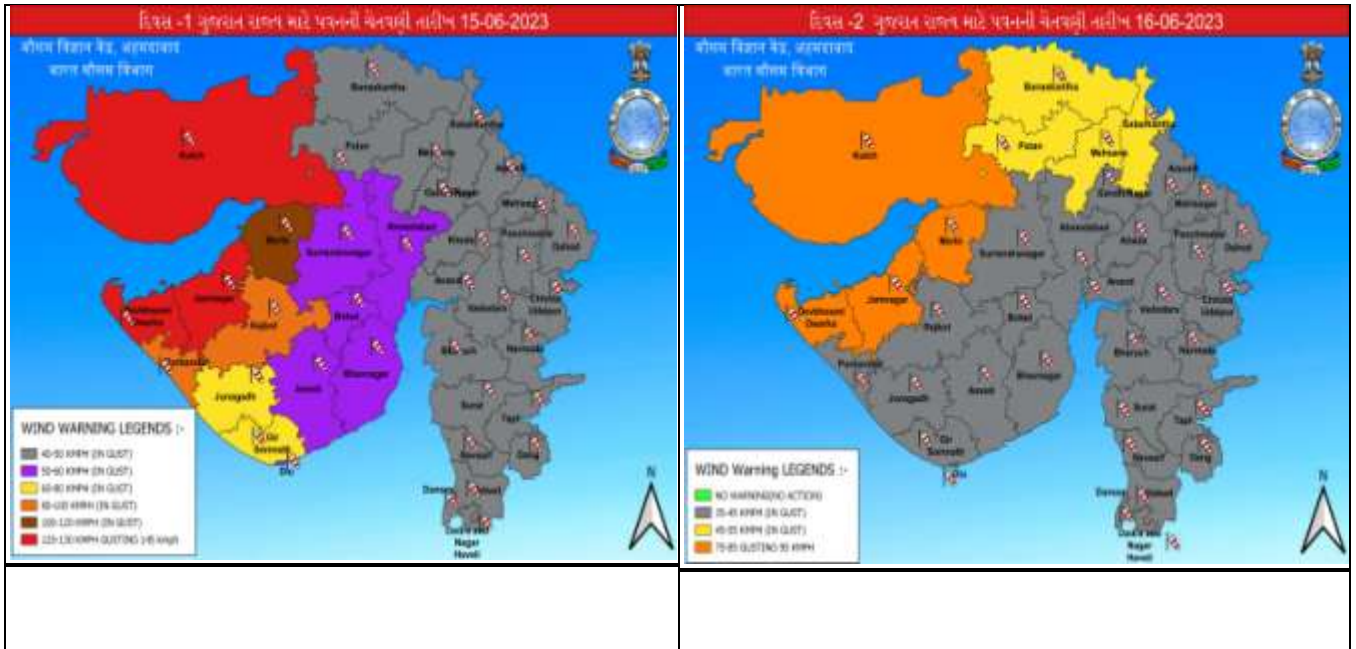
Cyclone Biparjoy Flood Hazard Map (Tehsil-wise) on 15th June – Flood Depth



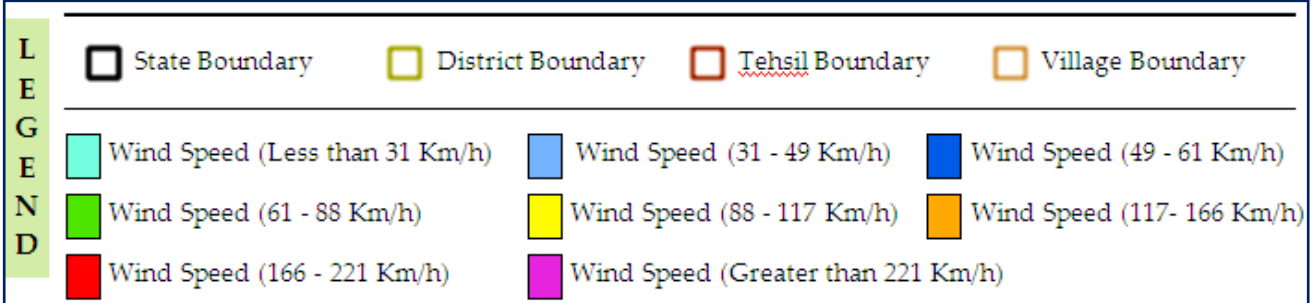
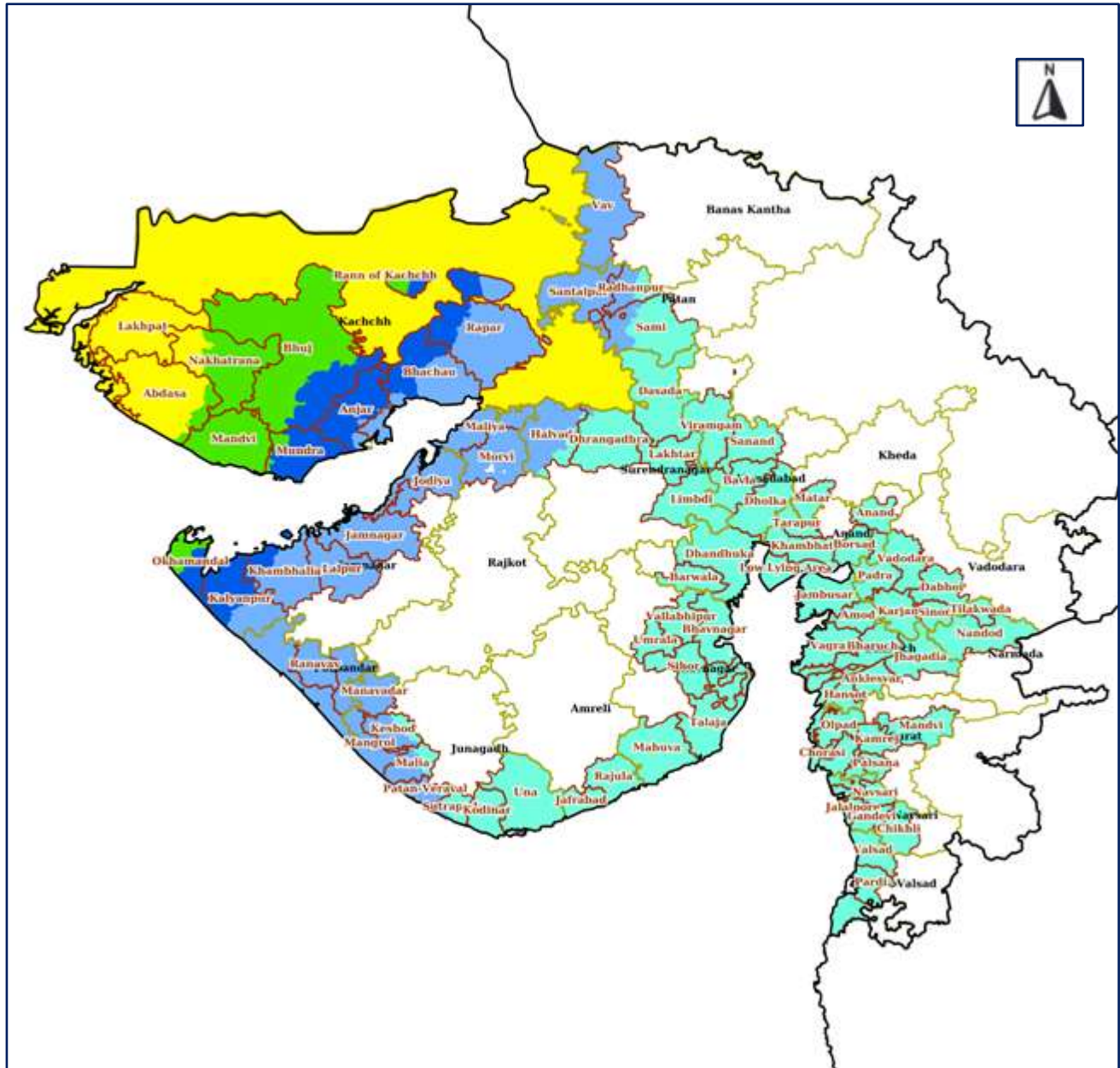
L E G E N D	State Boundary	District Boundary	Tehsil Boundary	Village Boundary
	Very Low (Less than 0.25 m)	Low (0.25 to 0.50 m)	Moderate (0.50 to 1.0 m)	
	High (1.0 to 2.0 m)	Very High (2.0 to 3.0 m)	Extreme (Greater than 3.0 m)	

For State Government Agencies: The list of affected villages with corresponding estimated wind speed, flood level and surge height can be seen in the Web-DCRA & DSS Application (<https://webdcra.ncrmp.gov.in/>). The concerned States/UTs can generate and download the list of affected villages through the distinct Tab named 'Affected Villages' under MOST AFFECTED DISTRICTS panel at right bottom provided in Real Time Cyclone Impact Forecasting dashboard of the Web-DCRA & DSS Application.

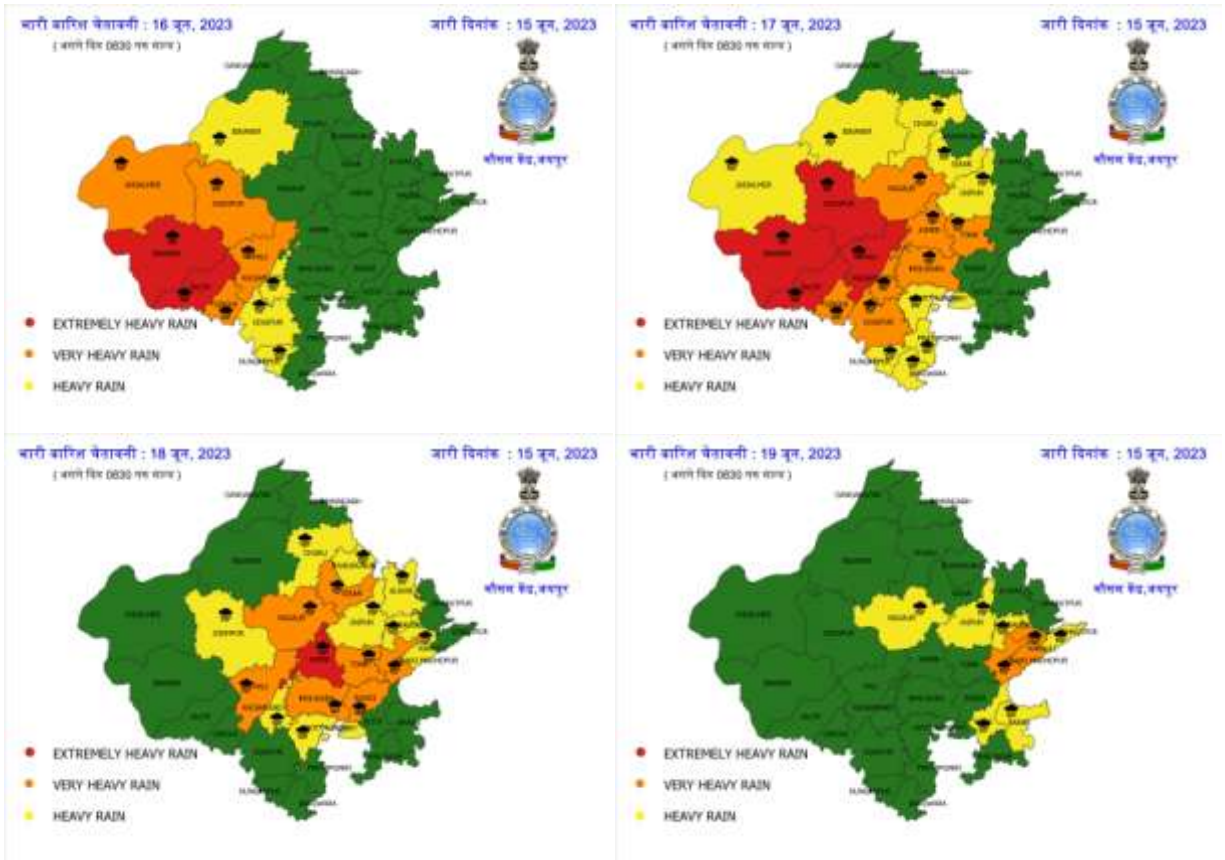
District-wise Wind Warning Maps for 15th to 16th June



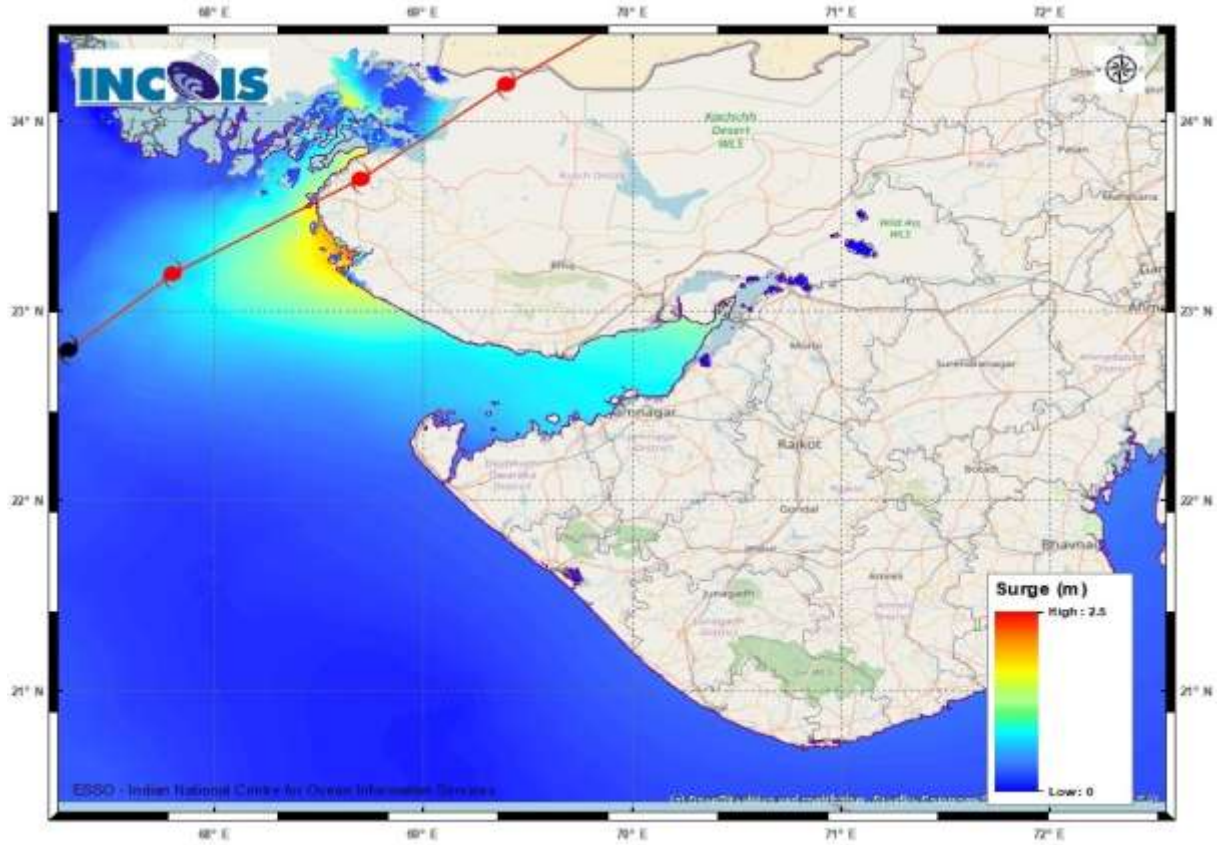
Cyclone Biparjoy Wind Hazard Map (Tehsil-wise) on 15th June - Wind Speeds



District-wise Heavy Rainfall Warning Maps for 16th, 17th and 18th June for Rajasthan



Storm Surge Warning Map based on Forecast Track



Astronomical Tide on 15th June 2023

Station	Time (IST)	Height (m)
Porbandar	09:37	2.61
Navlakhi	13:38	7.54
OKHA	11:36	3.74
DEENDAYAL PORT (KANDLA)	13:02	6.79

Fishermen warning graphics

