



India Meteorological Department  
(Ministry of Earth Sciences)

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

The Very Severe Cyclonic Storm "Biparjoy" (pronounced as "Biporjoy") over Northeast Arabian Sea moved nearly east-northeastwards with a speed of 13 kmph during past 6-hours and lay centered at 2030 hours IST of today, the 15<sup>th</sup> June, 2023 over northeast Arabian Sea close to Saurashtra & Kutch coasts near latitude 23.1°N and longitude 68.3°E, about 30 km west-southwest of Jakhau Port (Gujarat), 60 km west-southwest of Naliya, 110 km northwest of Devbhumi Dwarka and 230 km south-southeast of Karachi (Pakistan).

It is very likely to move nearly 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 15<sup>th</sup> June 2023.

**Forecast track and intensity are given below:**

| <b>Date/Time(IST)</b> | <b>Position<br/>(Lat. °N/ long. °E)</b> | <b>Maximum sustained surface<br/>wind speed (Kmph)</b> | <b>Category of cyclonic<br/>disturbance</b> |
|-----------------------|---|--|---|
| 15.06.23/2030         | 23.1/68.3                               | 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 15<sup>th</sup> 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 16<sup>th</sup> and southeast Rajasthan & adjoining North Gujarat region on 17<sup>th</sup> 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 15<sup>th</sup> night. It would weaken gradually further more thereafter becoming squally wind speed reaching 50-60 kmph gusting to 70 kmph by 16<sup>th</sup> 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 15<sup>th</sup> 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 15<sup>th</sup> 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 16<sup>th</sup> early morning and squally wind speed reaching 45-55 kmph gusting to 65 kmph by 16<sup>th</sup> afternoon.
- Squally wind speed reaching 50-60 kmph gusting to 70 kmph very likely to prevail along & off remaining districts of Saurashtra coast till 16<sup>th</sup> June morning.

**Wind Warning for South Rajasthan**

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

**(iii) Sea condition**

Sea condition will be phenomenal over northeast Arabian Sea and rough to very rough over adjoining eastcentral Arabian Sea till 15<sup>th</sup> night and would improve thereafter.

**Along & off Saurashtra& Kutch coasts:**

Sea condition is likely to be very high to phenomenal thereafter till 15<sup>th</sup> 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 15<sup>th</sup> 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 15<sup>th</sup> 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) Damage to Kutcha and minor damage to Pucca roads. (ii) Water logging and flooding in low lying areas  
(iii) Breaking of tree branches, uprooting of small tree and damage to orchards.

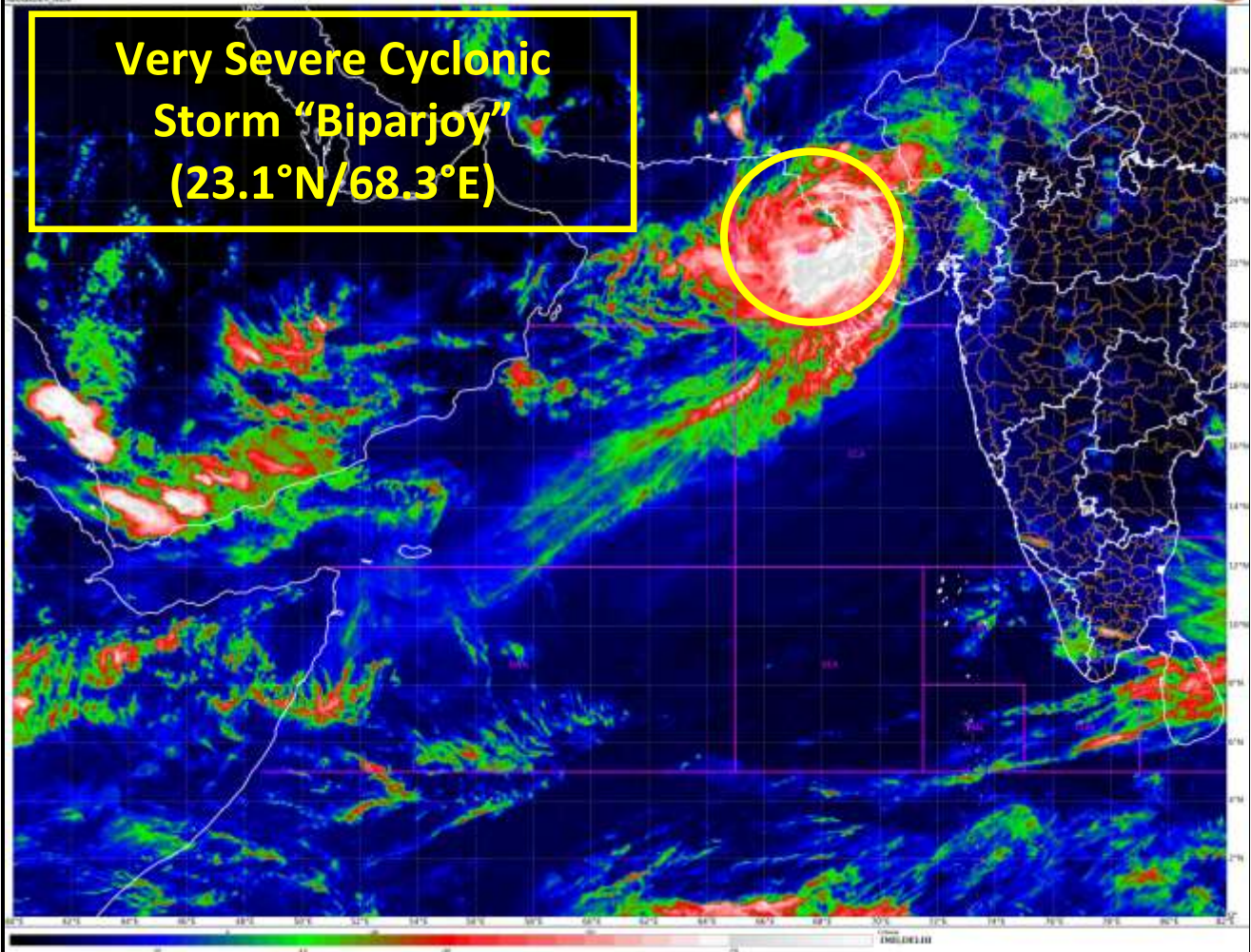
People in affected areas are advised to remain indoors.

**The system is under continuous surveillance and the next message will be issued at 0230 hours IST of tomorrow, the 16<sup>th</sup> 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"  
(23.1°N/68.3°E)**



# Radar Imagery of Doppler Weather Radar at Bhuj

bhuj\_weather\_2023\_06\_15\_15\_51\_33\_hsfimd-b-bel.dwr

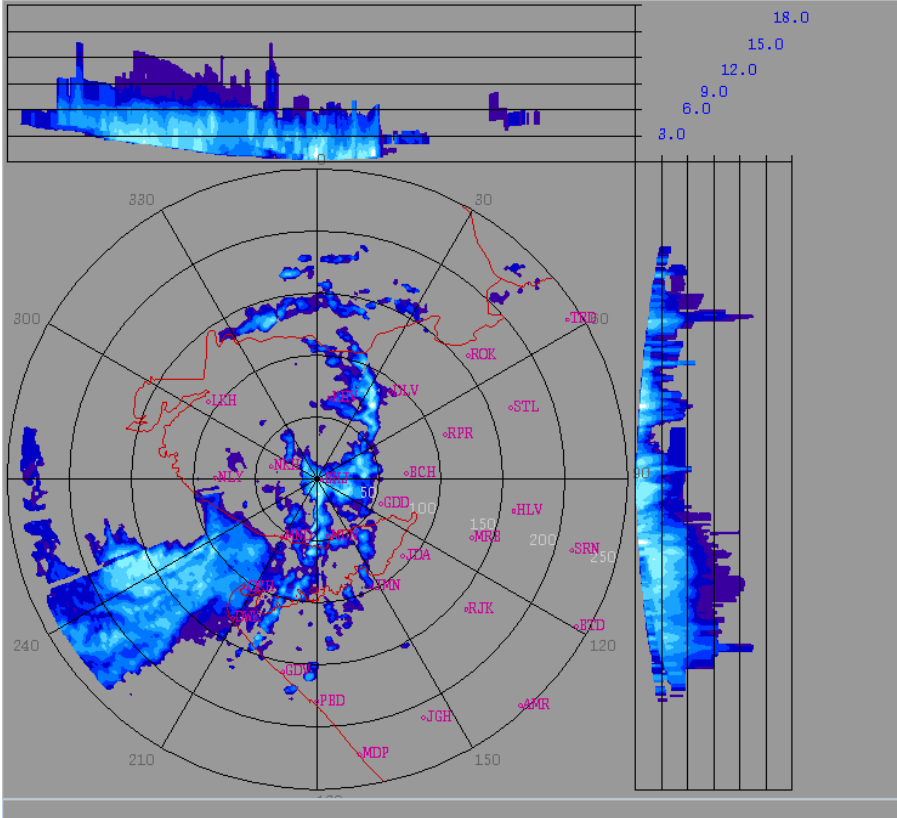
2023/06/15

15:51:33 (UTC)

MAX(Z)

DWR BHUJ

( 23.2416N , 69.6458E , 100.00 mts )

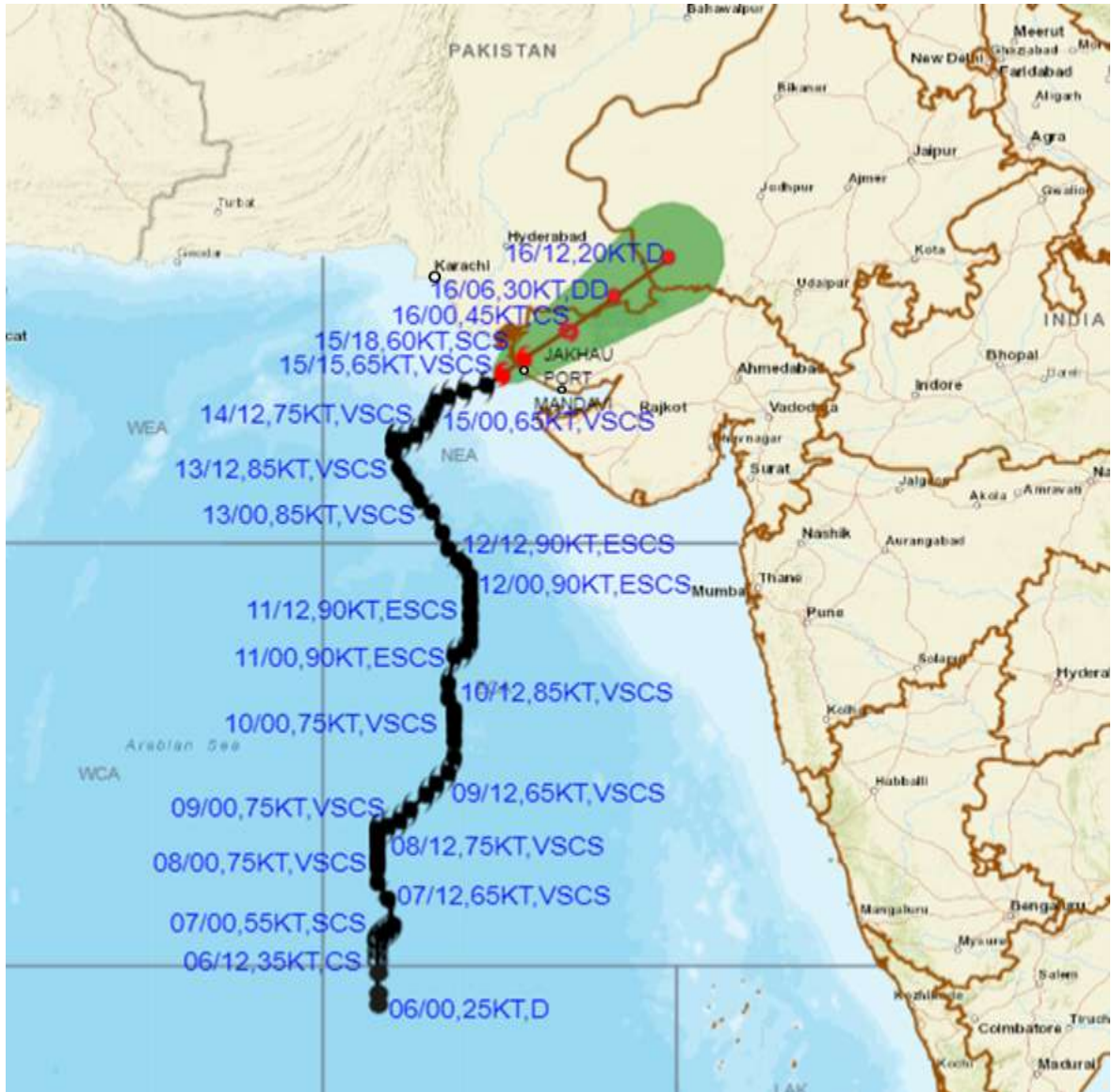


|                    |                   |
|--------------------|-------------------|
| Height             | : 18.0 Km         |
| Layer Spacing      | : 0.100 Km        |
| Z (Lo, Hi)         | : -32.0, 95.0 dBZ |
| Grid size          | : 1 Km            |
| Display Range      | : 250 Km          |
| 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 CLOSE TO SAURASHTRA-KUTCH COAST BASED ON 1500 UTC (2030 IST) OF 15<sup>TH</sup> JUNE 2023.**

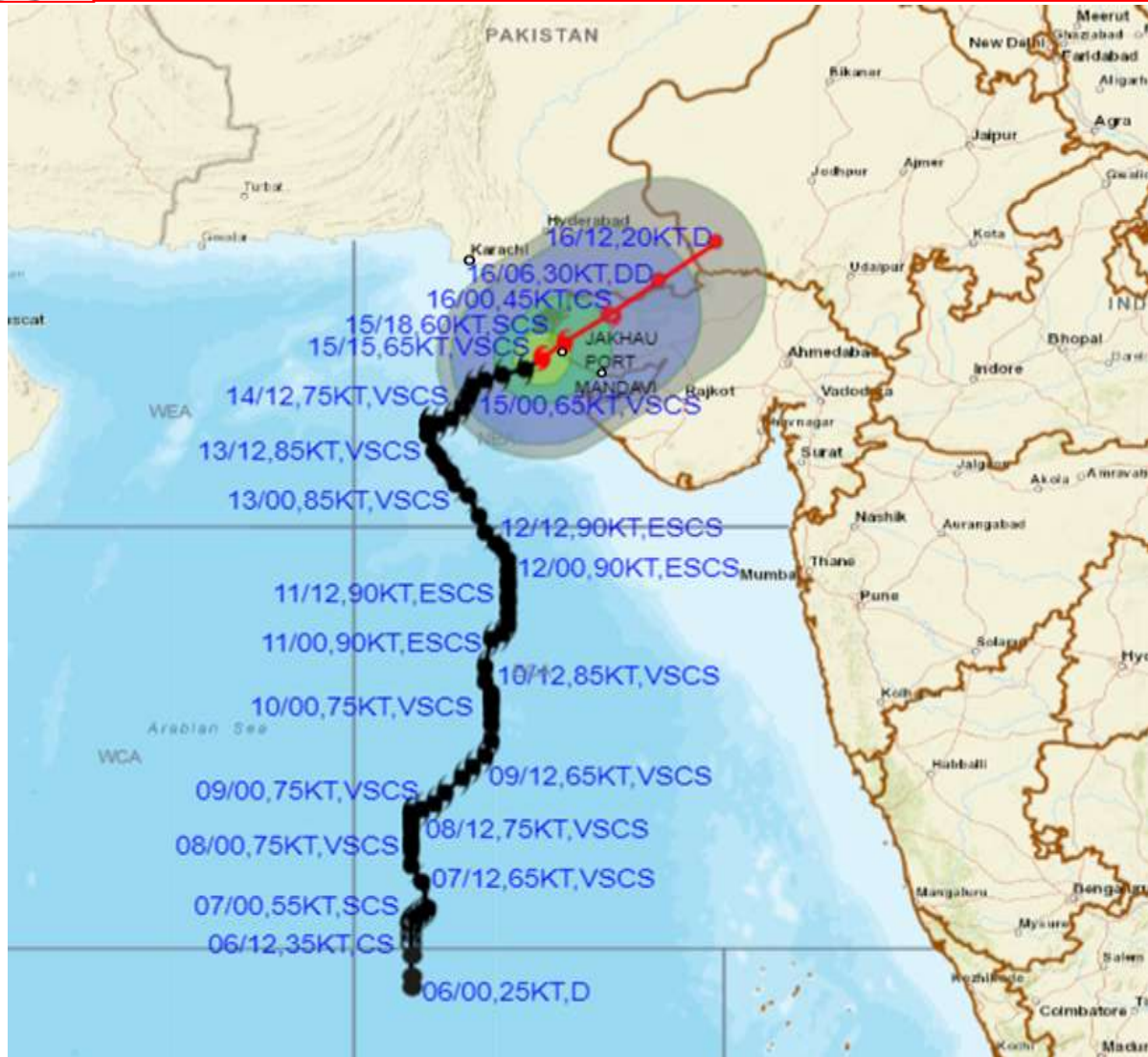


DATE/TIME IN UTC  
 IST=UTC + 0530  
 L: LOW PRESSURE AREA  
 WML: WELL MARKED LOW PRESSURE AREA  
 D: DEPRESSION (17-27 KT)  
 DD: DEEP DEPRESSION (28-33 KT)  
 CS: CYCLONIC STORM (34-47 KT)  
 SCS: SEVERE CYCLONIC STORM (48-63KT)  
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)  
 ESCS: EXTREMELY SEVERE 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 CLOSE TO SAURASHTRA-KUTCH COAST BASED ON 1500 UTC (2030 IST) OF 15<sup>TH</sup> JUNE 2023.**



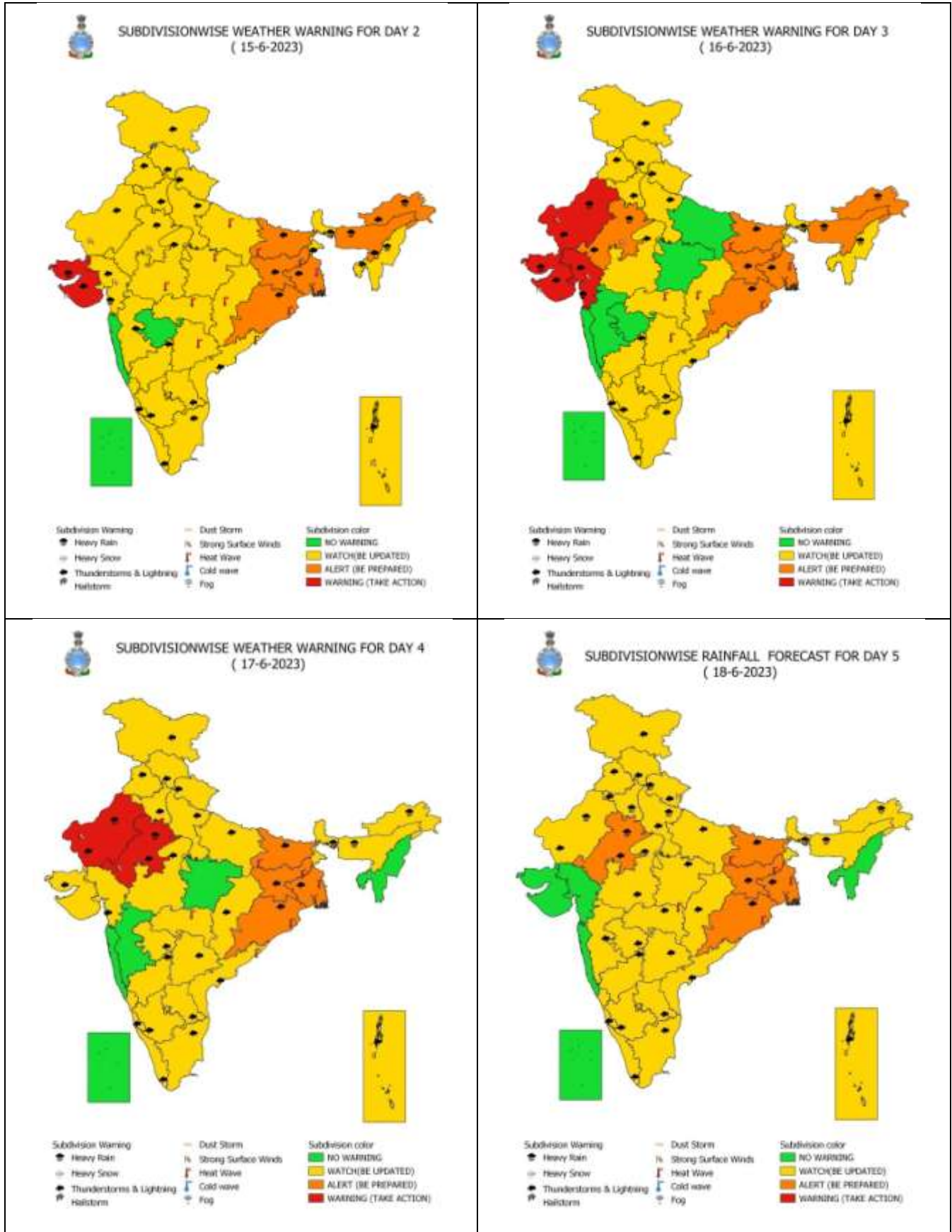
DATE/TIME IN UTC  
 IST=UTC + 0530  
 L: LOW PRESSURE AREA  
 WML: WELL MARKED LOW PRESSURE AREA  
 D: DEPRESSION (17-27 KT)  
 DD: DEEP DEPRESSION (28-33 KT)  
 CS: CYCLONIC STORM (34-47 KT)  
 SCS: SEVERE CYCLONIC STORM (48-63KT)  
 VSCS: VERY SEVERE CYCLONIC STORM (64-89 KT)  
 ESCS: EXTREMELY SEVERE 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**

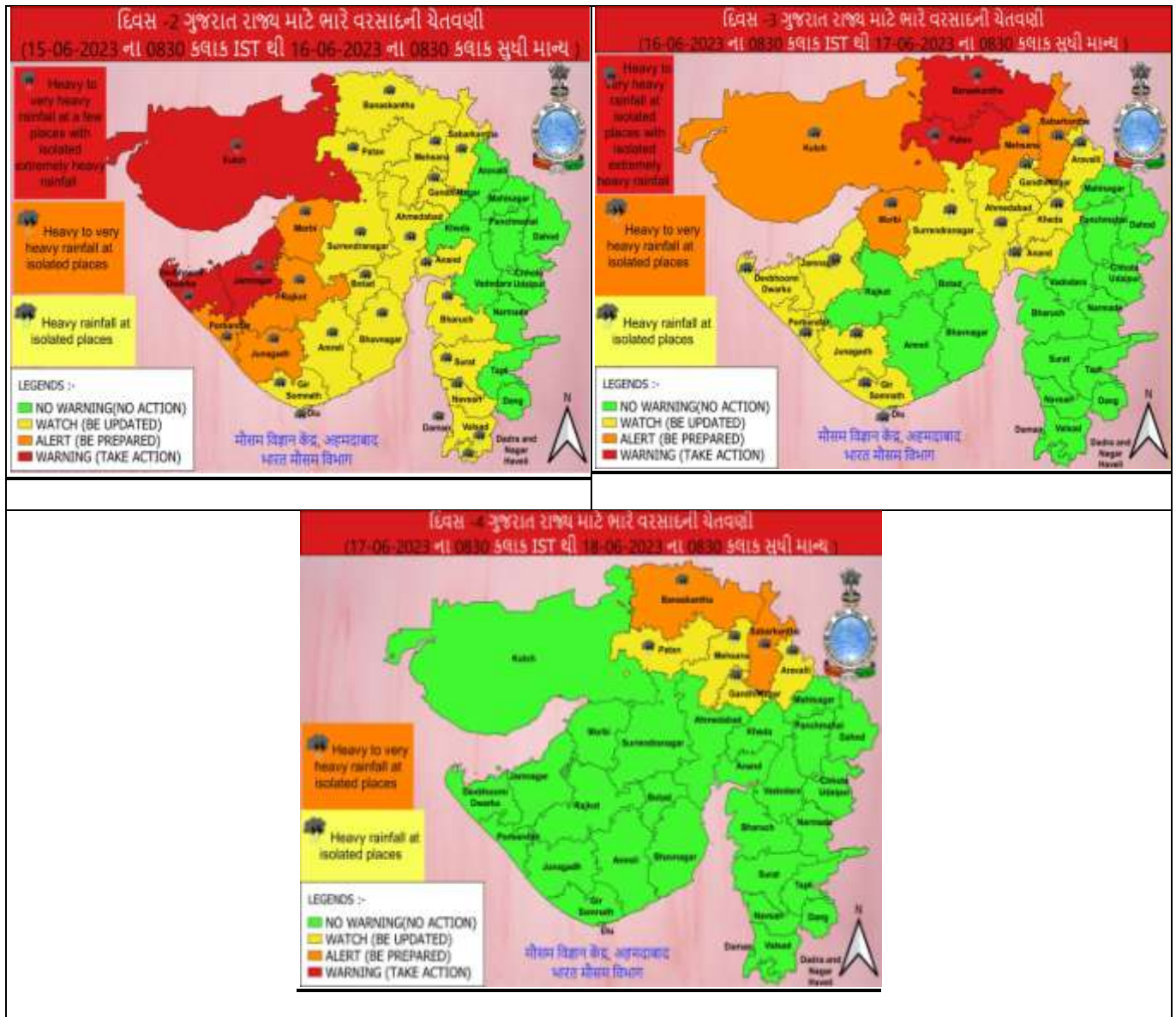
| MSW (knot/kmph) | Impact                 | Action                                 |
|-----------------|------------------------|--|
| 28-33 (52-61)   | Very rough seas        | Total suspension of fishing operations |
| 34-49 (62-91)   | High to very high seas | Total suspension of fishing operations |
| 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 15<sup>th</sup> to 18<sup>th</sup> June 2023

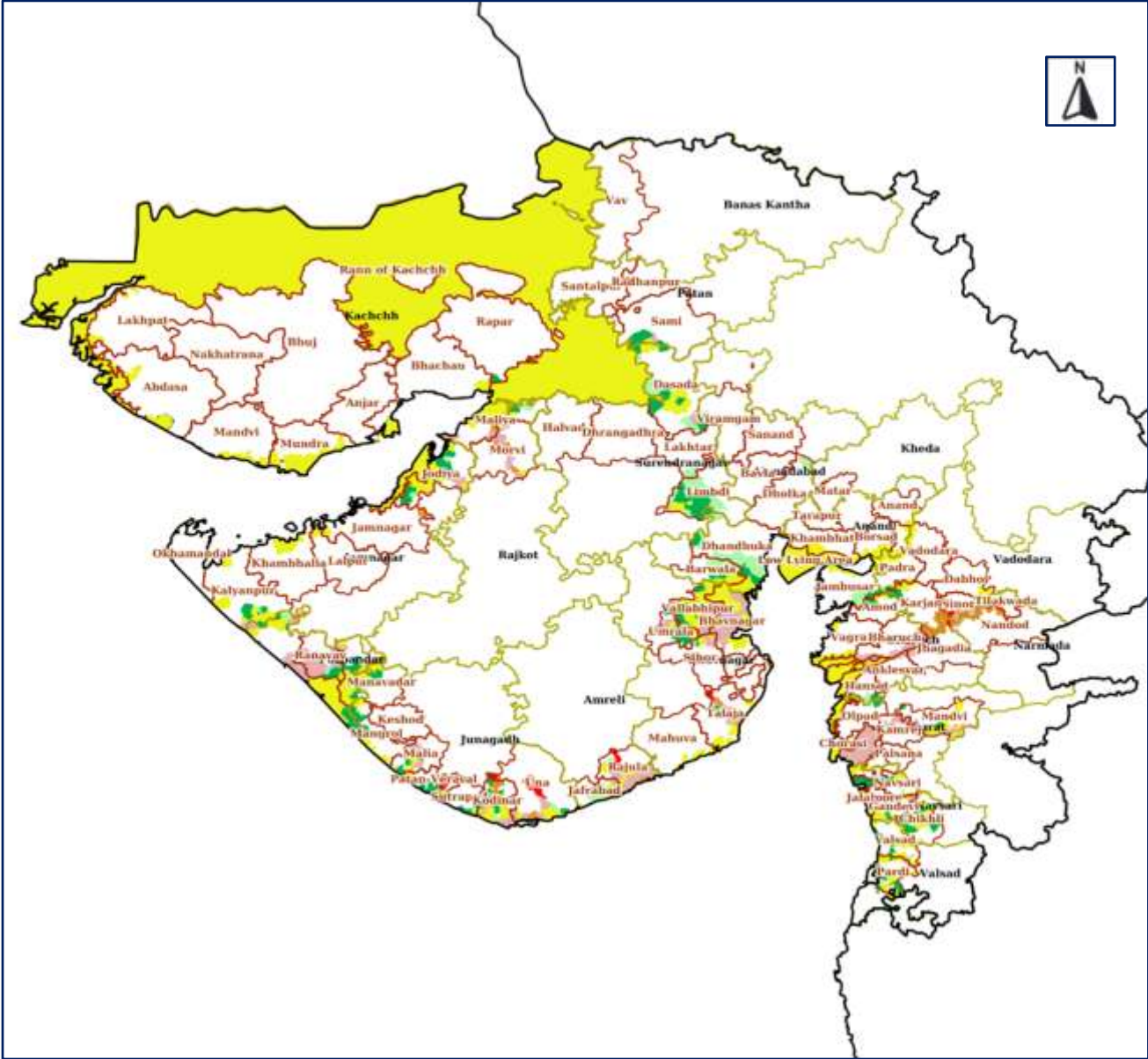




## District-wise Heavy Rainfall Warning Maps for 15<sup>th</sup> to 17<sup>th</sup> June



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

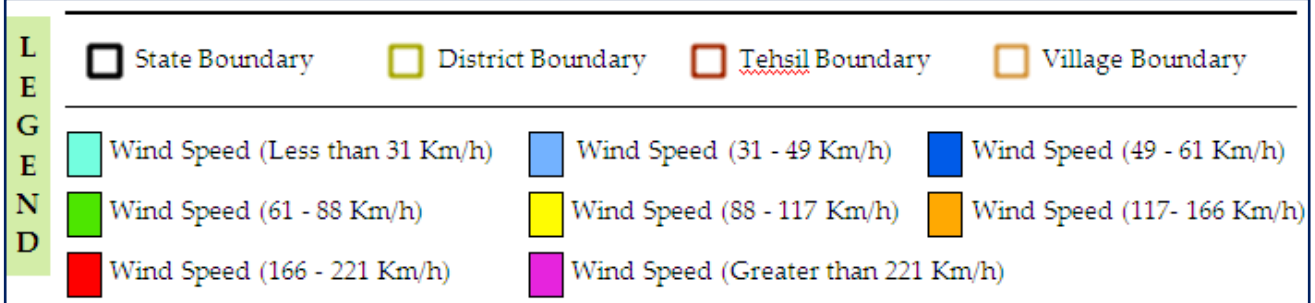
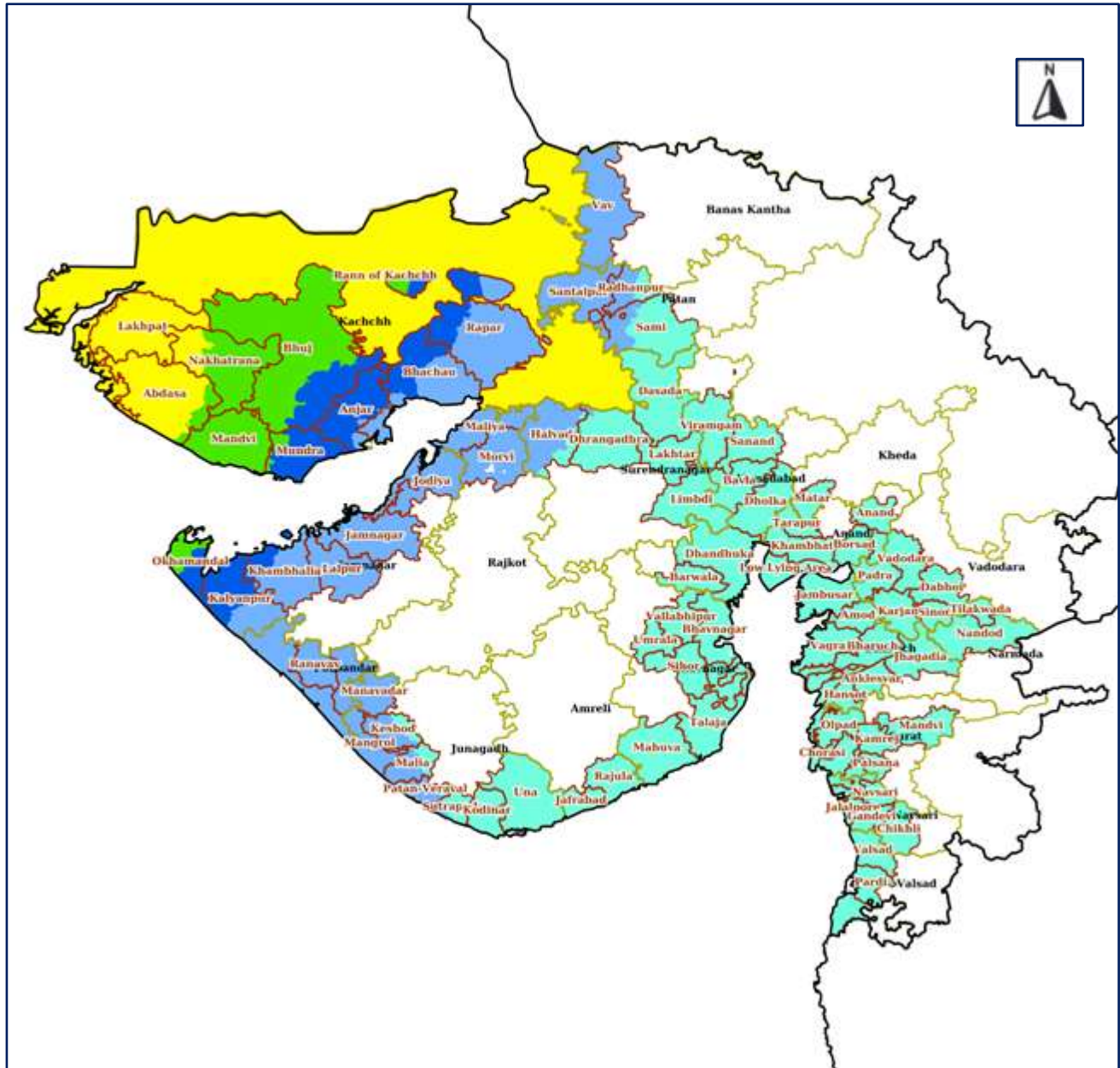


|                            |                             |                          |                              |                  |
|----------------------------|-----------------------------|--------------------------|------------------------------|------------------|
| L<br>E<br>G<br>E<br>N<br>D | 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.

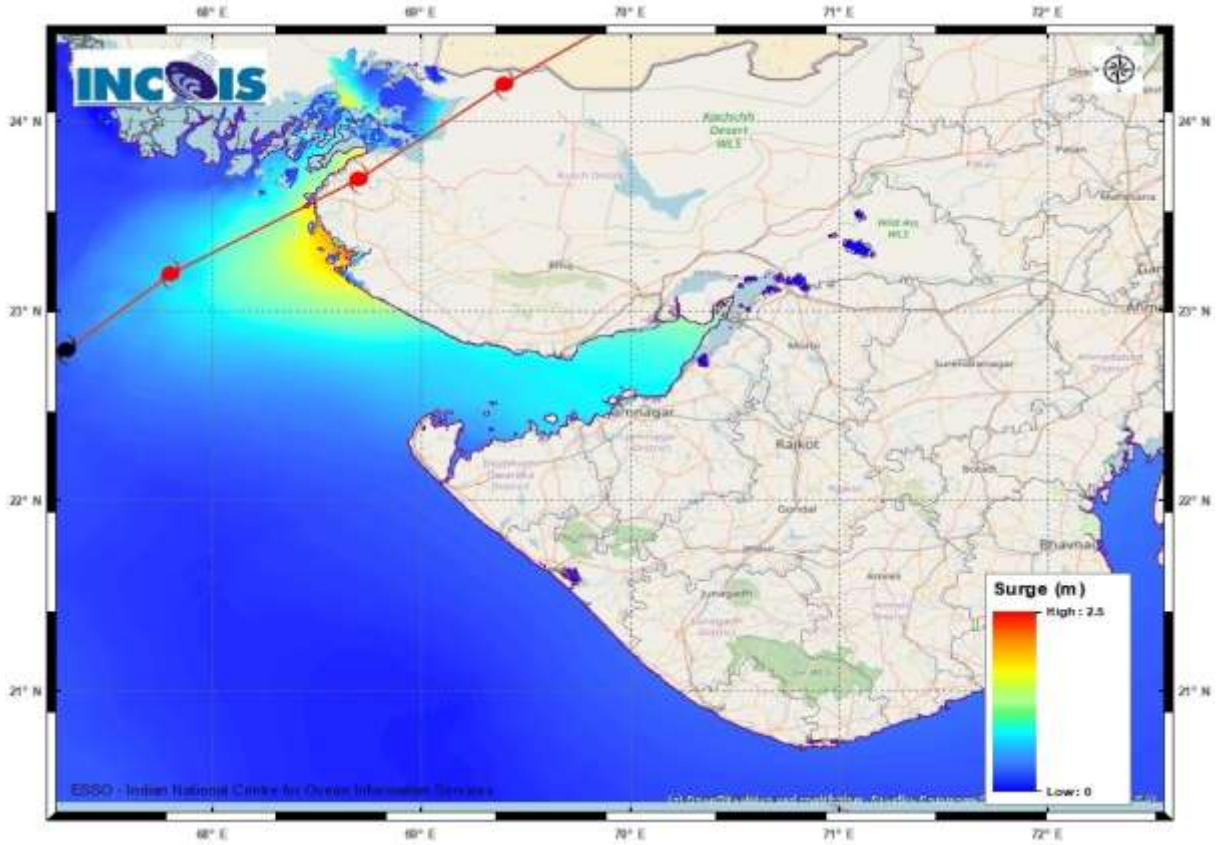


# Cyclone Biparjoy Wind Hazard Map (Tehsil-wise) on 15<sup>th</sup> June - Wind Speeds





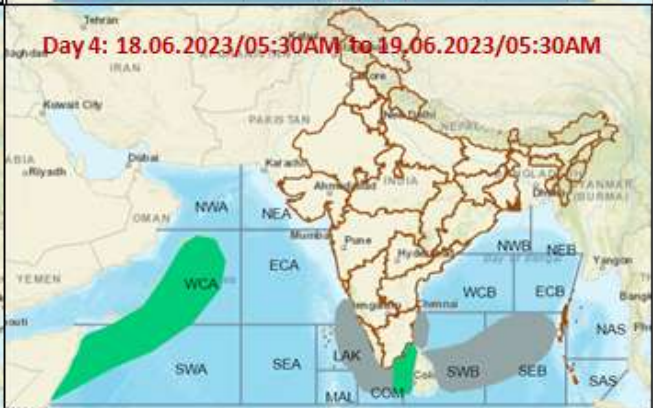
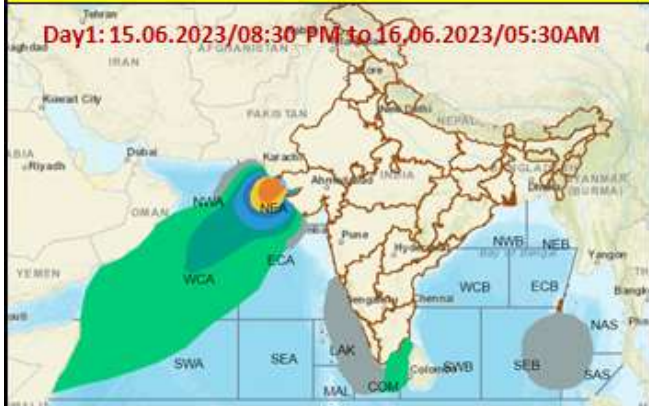
## Storm Surge Warning Map based on Forecast Track



### Astronomical Tide on 15<sup>th</sup> 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



|  |  |
|--|--|
|  | Squally Weather with wind speed 40-45 kmph gusting to 55 kmph    |
|  | Squally wind speed with wind speed 45-55 kmph gusting to 65 kmph |
|  | Squally wind speed with wind speed 50-60 kmph gusting to 70 kmph |
|  | Gale wind speed with wind speed 60-70 kmph gusting to 80 kmph    |
|  | Gale wind speed with wind speed 70-80 kmph gusting to 90 kmph    |
|  | Gale wind speed with wind speed 80-90 kmph gusting to 100 kmph   |
|  | Gale wind speed with wind speed 90-100 kmph gusting to 120 kmph  |
|  | Gale wind speed with wind speed 100-120 kmph gusting to 135 kmph |
|  | Gale wind speed with wind speed 120-140 kmph gusting to 155 kmph |
|  | Gale wind speed with wind speed 140-160 kmph gusting to 175 kmph |
|  | Gale wind speed with wind speed 160-180 kmph gusting to 200 kmph |

**Fishermen are advised not to venture into the marked areas**