



Earth



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Cyclone Risk In India

Tropical Cyclone (TC), also known as 'Cyclone', is the term used globally to cover tropical weather systems in which winds equal or exceed the minimum of 34 knot (62 kmph). The cyclones that occur between Tropics of Cancer and Capricorn are known as Tropical Cyclones. Cyclones are one of the natural hazards that affect India almost every year causing large loss of lives and properties.

Hazard associated with cyclones are long duration rotatory high velocity winds, very heavy rain and storm tide- combined effect of storm-surge and astronomical tide.

India has a coastline of about 7,516 km of which 5,400 km is along the mainland. The entire coast is affected by cyclones with varying frequency and intensity. 8.5 % of total area is prone to cyclone. Eastern coast of India is more prone to cyclones compared to the Western coast.

Historic Cyclones in India

Historic data reflects that among around 400 cyclones affected India since 1891, the East coast has received cyclones more than 6 times than the West Coast.

Fourteen coastal states and Union Territories (UTs) in the country are exposed to cyclones. On East coast, all four states viz. West Bengal, Orissa, Andhra Pradesh, and Tamil Nadu, have witnessed almost same number of events. While on the west coast, Gujarat has witnessed the maximum events followed by Maharashtra.

Despite having low frequency of events, the West Coast states might experiences more economic and insured losses due to higher exposure values compared to the East Coast states.

93 districts of India are prone to cyclone. Degree of proneness varies from P1 (Very High), P2 (High), P3 (Moderate), and P4 (Low). Table in appendix shows state wise cyclone prone districts.

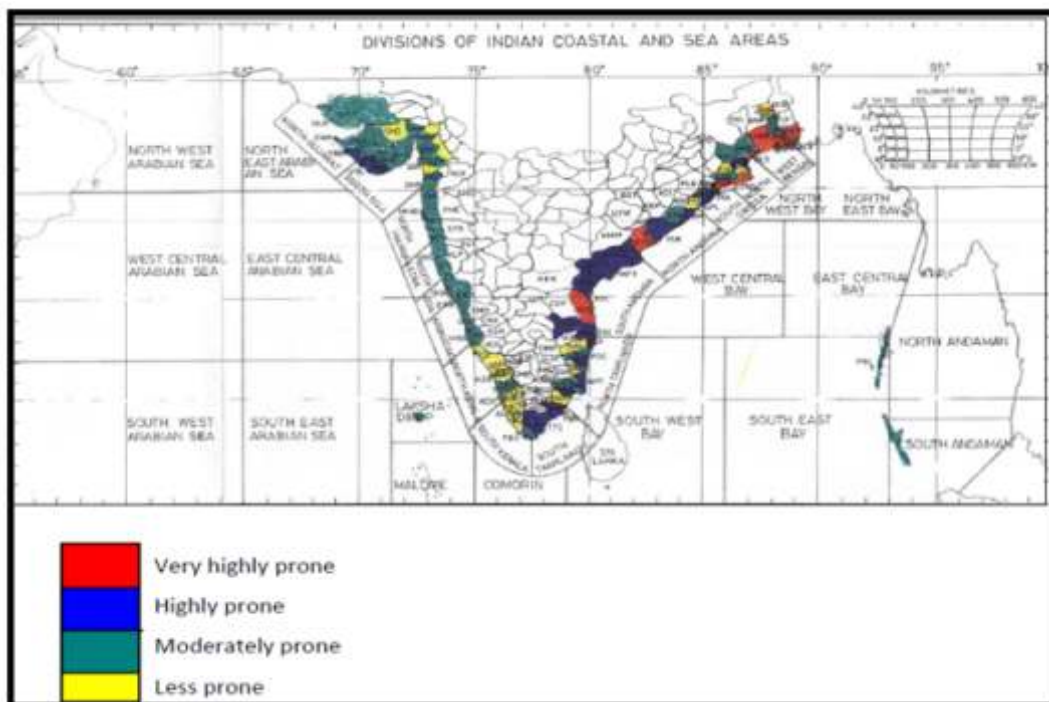


Figure 1: Cyclone hazard prone districts of India are based on frequency of total cyclone, total severe cyclones, actual/estimated maximum wind, and Probable Maximum Storm Surge (PMSS) associated with the cyclones| Source: NDMA

Classifications of Cyclones

The Indian Meteorological Department (IMD) classify Cyclonic disturbances depending upon the wind speed around the circulation centre. Satellite cloud imageries are used along with other meteorological features to estimate the intensities and the wind speed associated with these intense systems. The satellite cloud configurations, expressed by 'T' numbers, have unique relationship with wind field of a cyclonic disturbance. The wind speed, condition of sea and wave height associated with 'T' numbers of various categories of cyclonic disturbances.

Type of Disturbances	Associated Wind Speed in the Circulation	Satellite 'T' No.	Condition of Sea	Wave Height (m)
Depression	17 to 27 knots (31 to 49 kmph)	1.5	Moderate to Rough	1.25-2.5 2.5-4.0
Deep Depression	28 to 33 knots (50 to 61 kmph)	2.0	Rough	4.0-6.0
Cyclonic Storm	34 to 47 knots (62 to 88 kmph)	2.5-3.0	High	6.0-9.0
Severe Cyclonic Storm	48 to 63 knots (89 to 118 kmph)	3.5	Very High	9.0-14.0
Very Severe Cyclonic Storm	64 to 119 knots (119 to 221 kmph)	4.0-4.5	Phenomenal	Over 14.0
Extremely Severe Cyclonic Storm	119 knots and above (221 kmph and above)	5.0-6.0	Phenomenal	Over 14.0
Super Cyclonic Storm	120 knots or more (222 kmph or more)	6.5 or more	Phenomenal	Over 14.0

Source: *IMD*

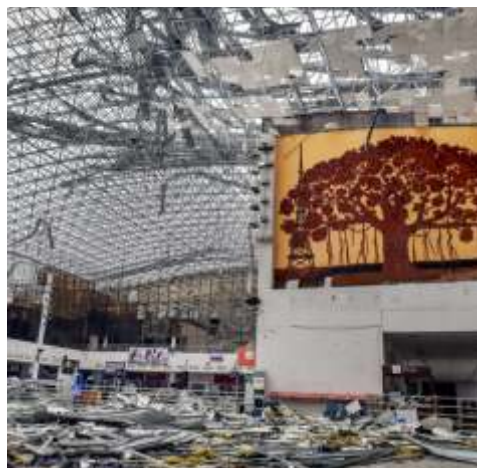
Insured Loss Due To Recent Cyclones

Date	Name of Event	Regions Impacted	Economic Loss (USD)	Insured Loss (USD) & Source
12 December, 2016	Vardah	Tamil Nadu	Around 1 billion (ASSOCHAM)	
12 October, 2014	Hudhud	Andhra Pradesh, Orissa, Chhatisgarh, Madhya Pradesh, Uttar Pradesh	7 billion	632 million (Swiss Re)
11 October, 2013	Phailin	Orissa, Andhra Pradesh,	4.5 billion	100 million (Swiss Re)
28 October, 1999		Orissa	4.5 billion	100 million (GIC)
28 May, 1998		Gujarat	590 million	NA



Damage caused by cyclone hudhud in visakhapatnam

Source: *Deccan Chronicle*



Damaged Vizag Airport during cyclone Hudhud

Source: *Deccan Chronicle*



Trees uprooted during cyclone Phailin

Source: *Deccan Chronicle*

Appendix - Cyclone prone districts in India

Source: NDMA

Sr. No	State / UTs	District Name	Category of Proneness
1	Andhra Pradesh	Nellore	P1
2	Andhra Pradesh	East Godavari	P1
3	Orissa	Balasore	P1
4	Orissa	Kendrapara	P1
5	Orissa	Jagatsinghpur	P1
6	West Bengal	South 24-Paragna	P1
7	West Bengal	Medinipur	P1
8	West Bengal	North 24-Pargana	P1
9	West Bengal	Howrah	P1
10	West Bengal	Kolkata	P1
11	Andhra Pradesh	Srikakulam	P2
12	Andhra Pradesh	Guntur	P2
13	Andhra Pradesh	Visakhapatnam	P2
14	Andhra Pradesh	Krishna	P2
15	Andhra Pradesh	West Godavari	P2
16	Andhra Pradesh	Prakasm	P2
17	Andhra Pradesh	Chittor	P2
18	Daman & Diu	Diu	P2
19	Gujarat	Junagadh	P2
20	Gujarat	Porbandar	P2
21	Orissa	Bhadrak	P2
22	Orissa	Ganjam	P2
23	Orissa	Puri	P2
24	Tamil Nadu	Pudukkottai	P2
25	Tamil Nadu	Cuddalore	P2
26	Tamil Nadu	Kanchipuram	P2
27	Tamil Nadu	Tiruvarur	P2
28	Tamil Nadu	Nagapattinam	P2
29	Tamil Nadu	Chennai	P2
30	Tamil Nadu	Ramanathapuram	P2
31	Tamil Nadu	Tuticorin	P2
32	Tamil Nadu	Tirunelveli	P2
33	Andhra Pradesh	Vizianagaram	P3
34	A & N Islands	A & N Islands	P3
35	Gujarat	Ahmedabad	P3
36	Goa	North Goa	P3
37	Goa	South Goa	P3
38	Gujarat	Kachchh	P3
39	Gujarat	Bhavnagar	P3
40	Gujarat	Amreli	P3
41	Gujarat	Jamnagar	P3
42	Gujarat	Anand	P3
43	Gujarat	Navsari	P3
44	Gujarat	Valsad	P3
45	Gujarat	Bharuch	P3
46	Daman & Diu	Daman	P3
47	Karnataka	Udupi	P3
48	Karnataka	Uttar Kannada	P3

Sr. No	State / Uts	District Name	Category of Proneness
49	Karnataka	Dakshin Kannada	P3
50	Kerala	Kozhikode	P3
51	Kerala	Malappuram	P3
52	Kerala	Thrissur	P3
53	Lakshadweep	Lakshadweep	P3
54	Maharashtra	Thane	P3
55	Maharashtra	Mumbai Suburban	P3
56	Maharashtra	Ratnagiri	P3
57	Maharashtra	Raigarh	P3
58	Maharashtra	Sindhudurg	P3
59	Orissa	Khordha	P3
60	Puducherry	Karaikal	P3
61	Tamil Nadu	Viluppuram	P3
62	Tamil Nadu	Thanjavur	P3
63	Tamil Nadu	Tiruvallur	P3
64	Tamil Nadu	Kanyakumari	P3
65	Orissa	Mayurbhanj	P3
66	Orissa	Cuttack	P3
67	Orissa	Nayagarh	P3
68	Orissa	Keonjhar	P3
69	West Bengal	Hoogli	P3
70	Gujarat	Rajkot	P3
71	Dadra & Nagar Haveli	Dadra & Nagar Haveli	P4
72	Gujarat	Surat	P4
73	Kerala	Kasargod	P4
74	Kerala	Kannur	P4
75	Kerala	Ernakulam	P4
76	Kerala	Alappuzha	P4
77	Kerala	Kollam	P4
78	Kerala	Thiruvananthapuram	P4
79	Orissa	Jajpur	P4
80	Orissa	Dhenkanal	P4
81	Orissa	Gajapati	P4
82	Tamil Nadu	Tiruvannamalai	P4
83	Tamil Nadu	Ariyalur	P4
84	Tamil Nadu	Sivaganga	P4
85	West Bengal	Bardhaman	P4
86	Gujarat	Surendra Nagar	P4
87	Gujarat	Kheda	P4
88	Gujarat	Vadodara	P4
89	Kerala	Wayanad	P4
90	Kerala	Palakkad	P4
91	Kerala	Kottayam	P4
92	Kerala	Idukki	P4
93	Kerala	Pathanamthita	P4

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