Overview of GIDM

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GUJARAT INSTITUTE OF DISASTER MANAGEMENT

BUILDING RESILIENCE

GIDM

Piyush Ramteke, RSPM

Understanding Disaster Risk

HAZARDS

- Floods
- Cyclone
- Tsunami
- Earthquake
- Fires
- Heatwave
- Virus

Hazard is a process, phenomenon or human activity that ***may cause*** loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

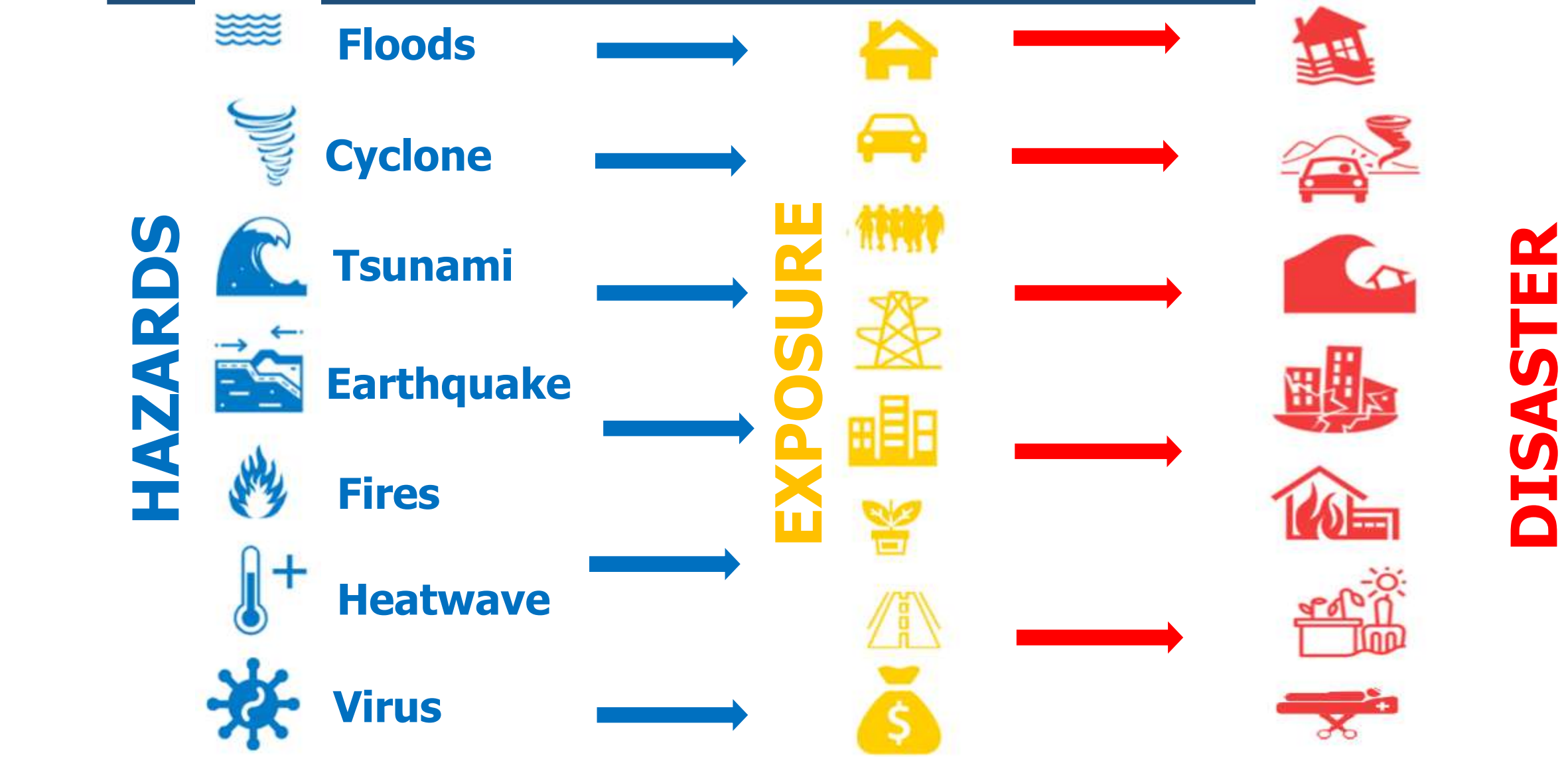
Fires

Viral Fever

Rains

HAZARDS ≠ DISASTER

Understanding Disaster Risk



Understanding Disaster Risk

VULNERABILITY

Vulnerability is the conditions determined by **physical**, **social**, **economic** and **environmental** factors or processes which **increase the susceptibility** of an individual, a community, assets or systems to the impacts of hazards.

Understanding Disaster Risk

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Capacity includes infrastructure, institutions, human knowledge and skills, and collective attributes such as social relationships, leadership, management and resources available within a society to ***manage disaster risks***.

COPING CAPACITY

Disaster Risk & Reduction

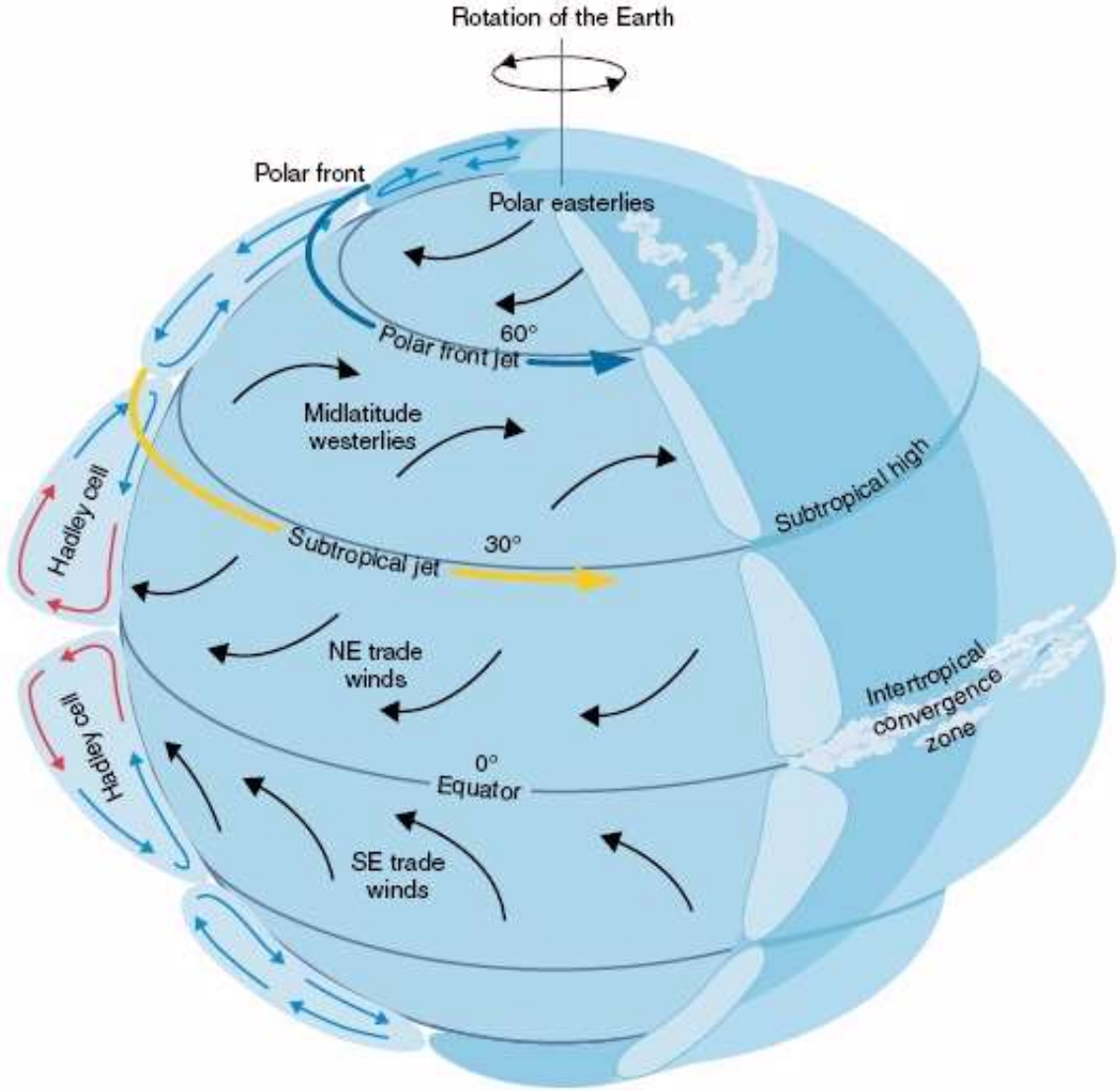
$$\text{Disaster Risk} \propto \frac{\text{Hazard X Exposure X Vulnerability}}{\text{Coping Capacity}}$$

$$\frac{\text{Reduce Hazard X Reduce Exposure X Reduce Vulnerability}}{\text{Increase Coping Capacity}}$$

Cyclone

- A weather system consisting of an area of low pressure, in which winds circulate at speeds exceeding 61 km/hr, also known as ‘Cyclone’ or Tropical Storm

Weather System: Movement of warm and cold air across the globe



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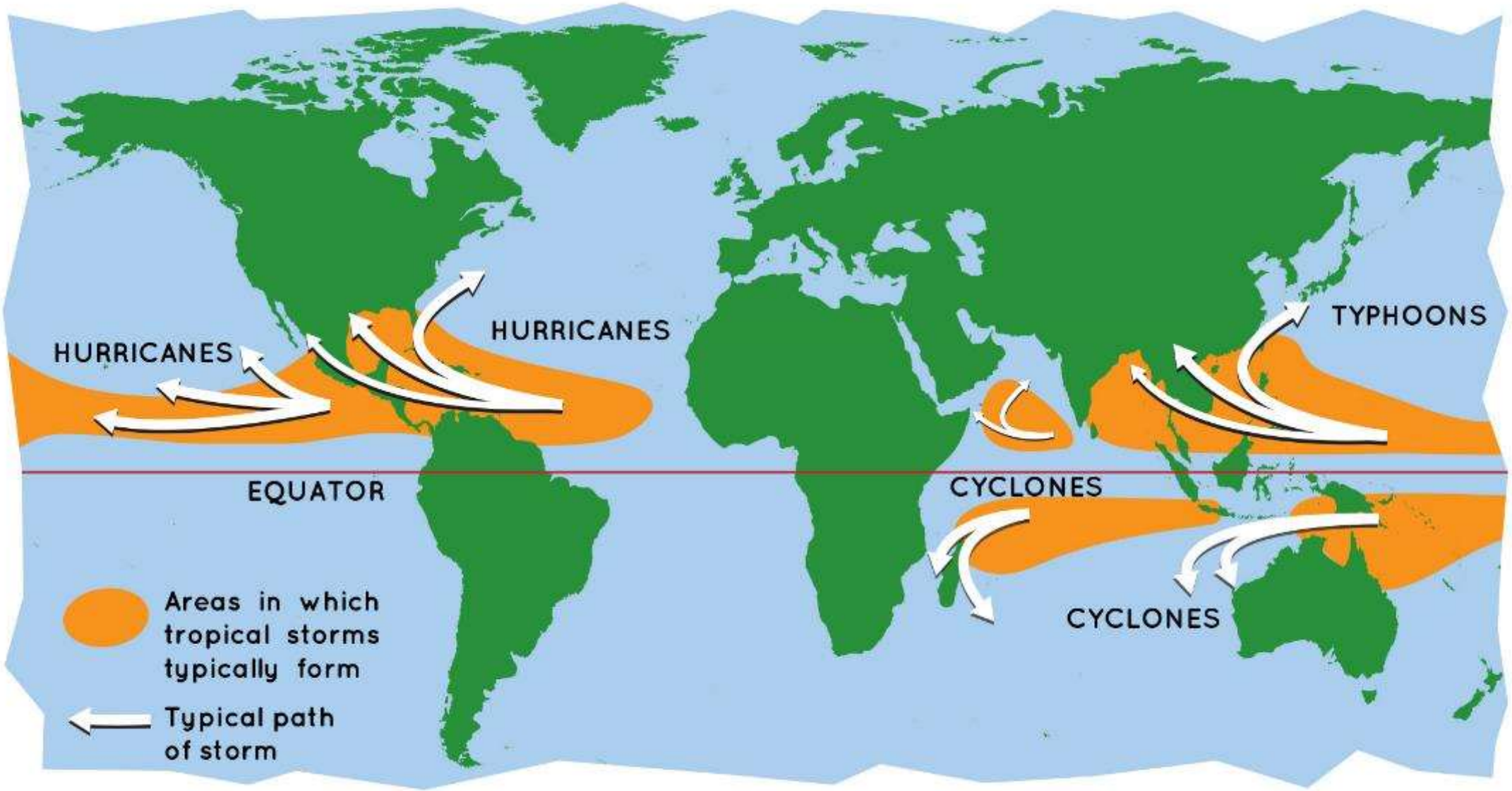
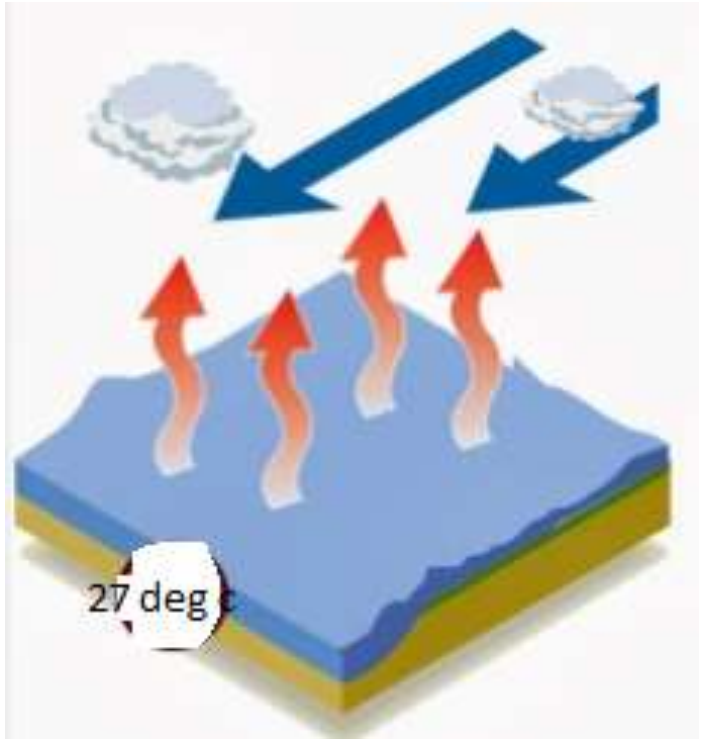
Why cyclones are called hurricane, typhoons and tropical cyclones ?

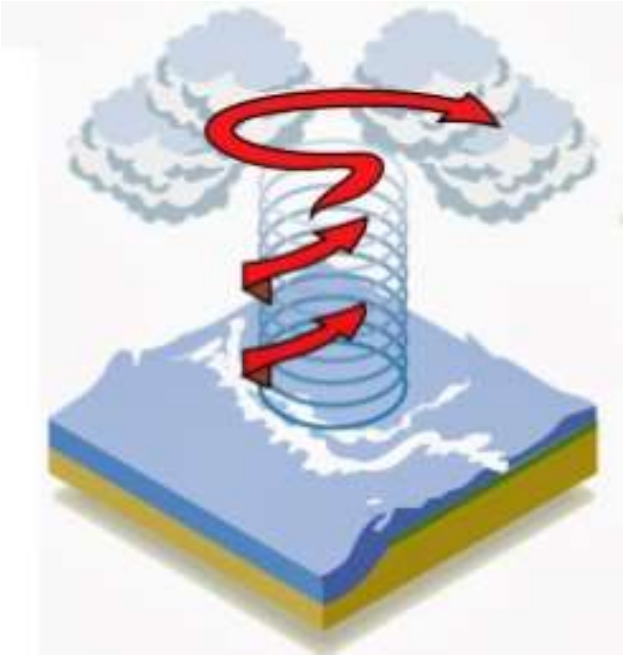
Areas of formation of cyclones



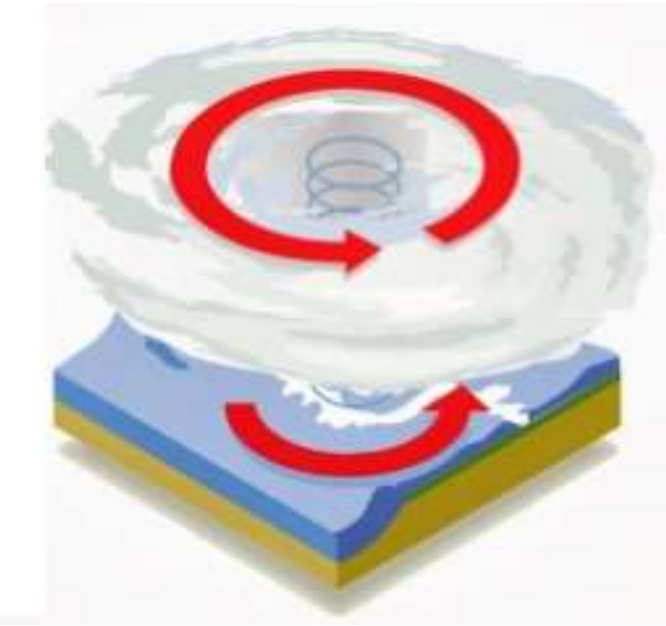
How cyclones are formed ?



- Warm sea surface with temperature in excess of 27°C or more
- High relative humidity



- Atmospheric instability caused due to condensation of rising moist air



- Low vertical wind shear between lower and higher levels of atmosphere
- Presence of cyclonic vorticity (rate of rotation of air)

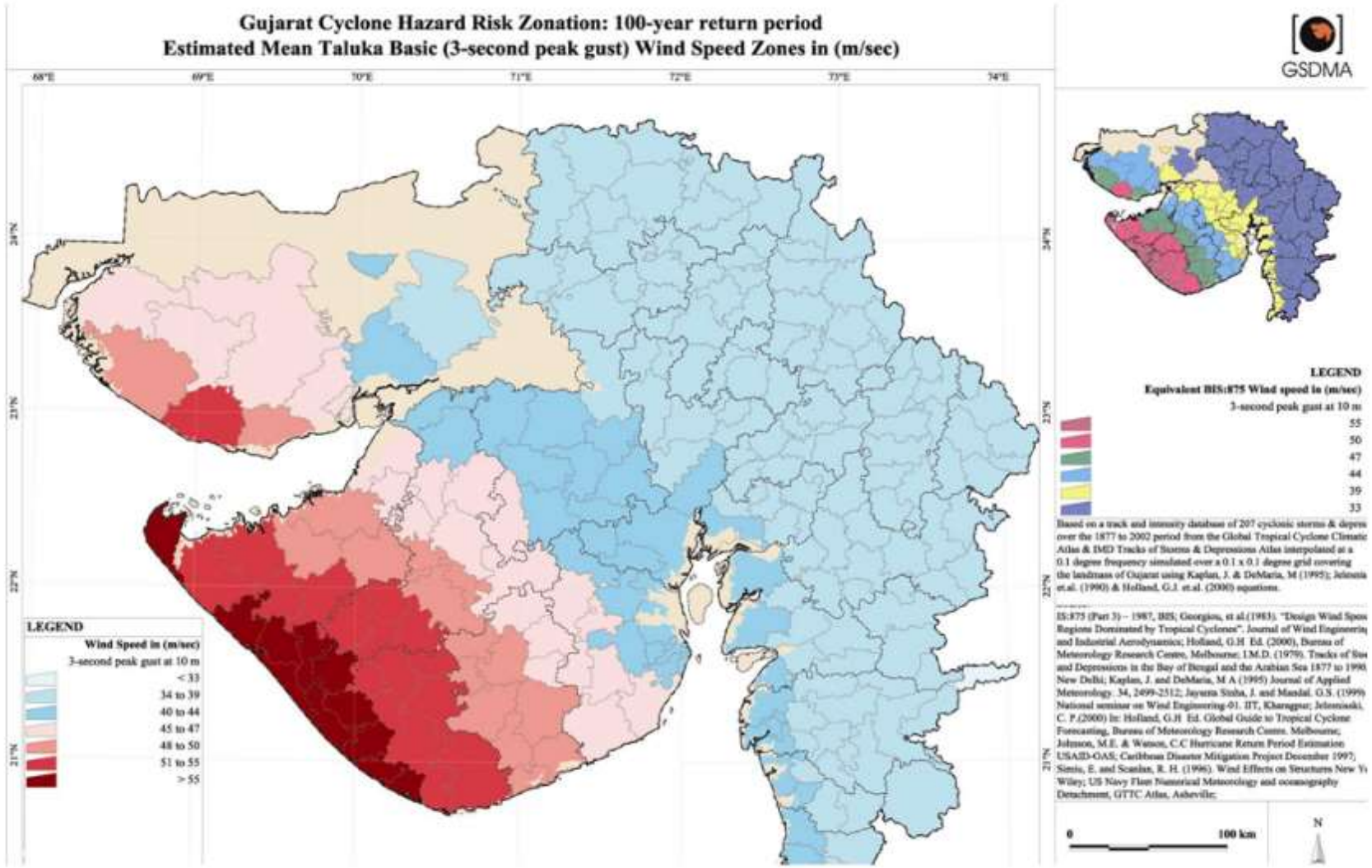
Important facts

- Out of 7516km of long coastline in India, 1600km falls in Gujarat i.e. 21.28%
- 13 coastal states encompassing 84 coastal districts are affected by tropical cyclone
- 8% of the area in the country is prone to cyclone related disasters
- It is estimated that 32 crore people, which accounts for almost a third of country's population are vulnerable to cyclone-related hazards.

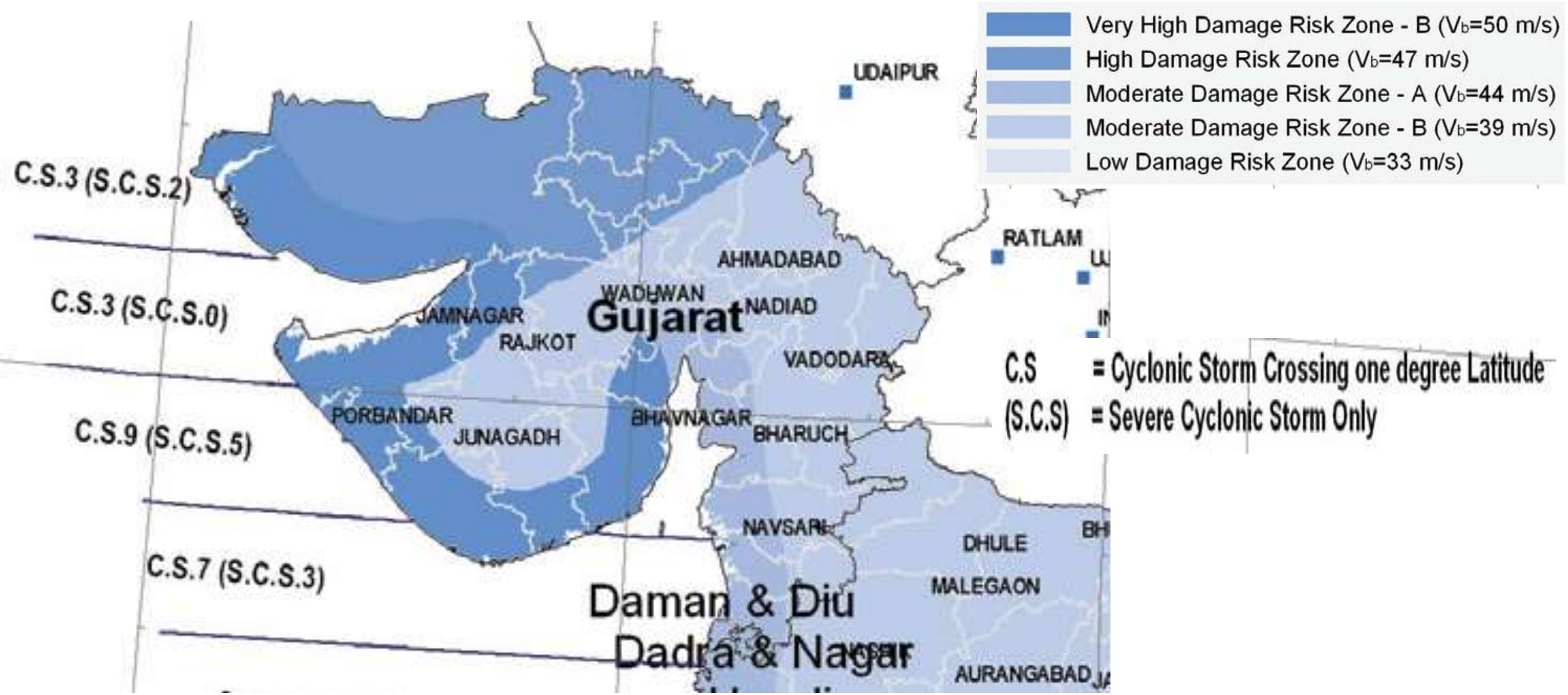
Vulnerability of cyclones in Gujarat

- About **10 million people** (about 25 per cent of the State population) live in coastal talukas of Gujarat and this includes **75 coastal towns** and **41 ports** (1 major, 11 intermediate and 29 minor)
- According to CRED (2002) report, the annual loss of life in Gujarat due to various disasters is 2000. It is estimated that **33%** out of it is due to cyclone and surges.
- The Gujarat Hazard Risk and Vulnerability Atlas (GSDMA/TARU, 2005) indicates that out of **675,000 residential buildings** in the region vulnerable to cyclonic wind damage, about **248,000 residential buildings** can be damaged due to a 100-year return period cyclone

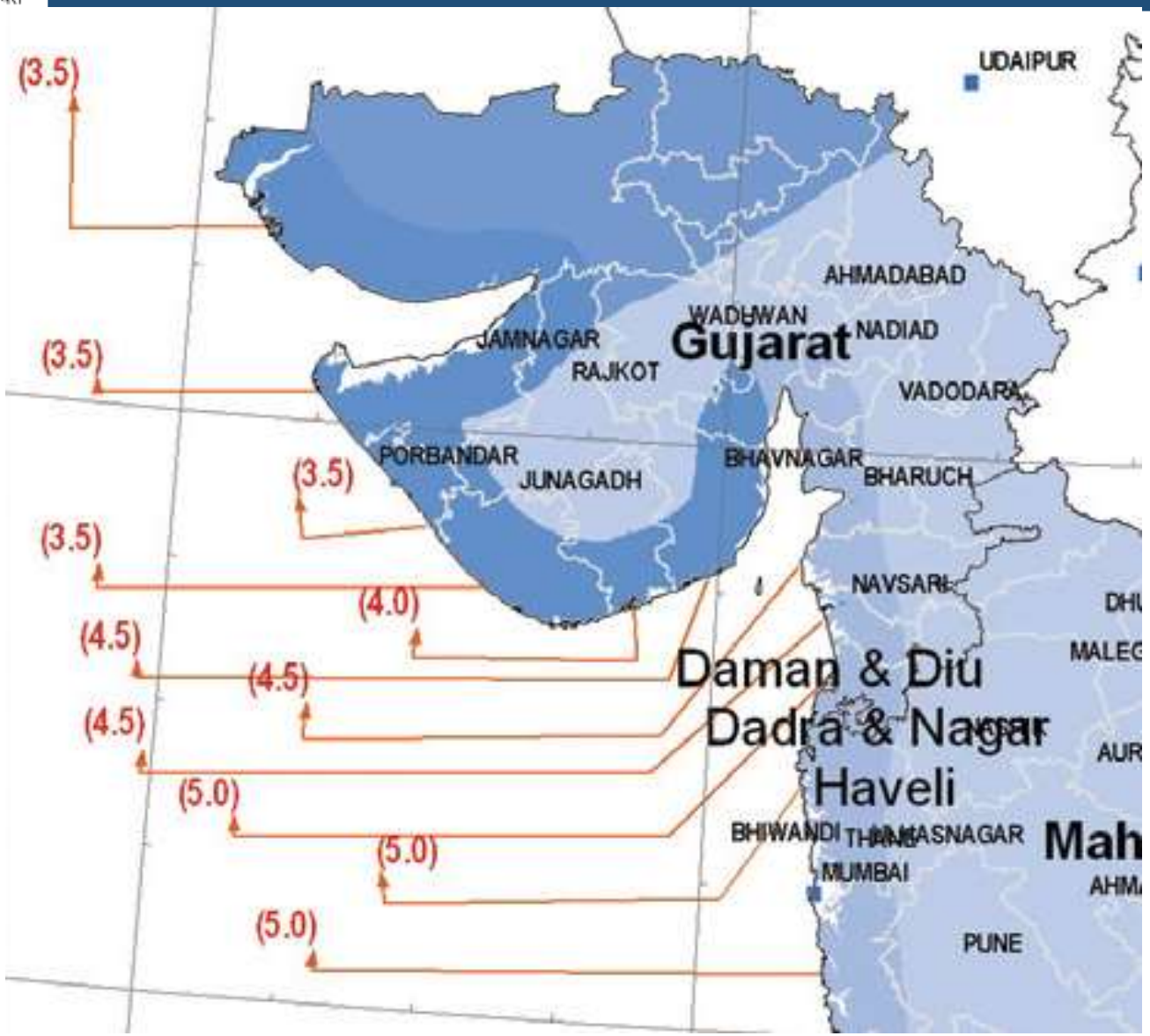
Cyclone prone areas in Gujarat



Cyclone Frequency and Wind hazard Map



Probable Maximum Storm Surge (PMSS)

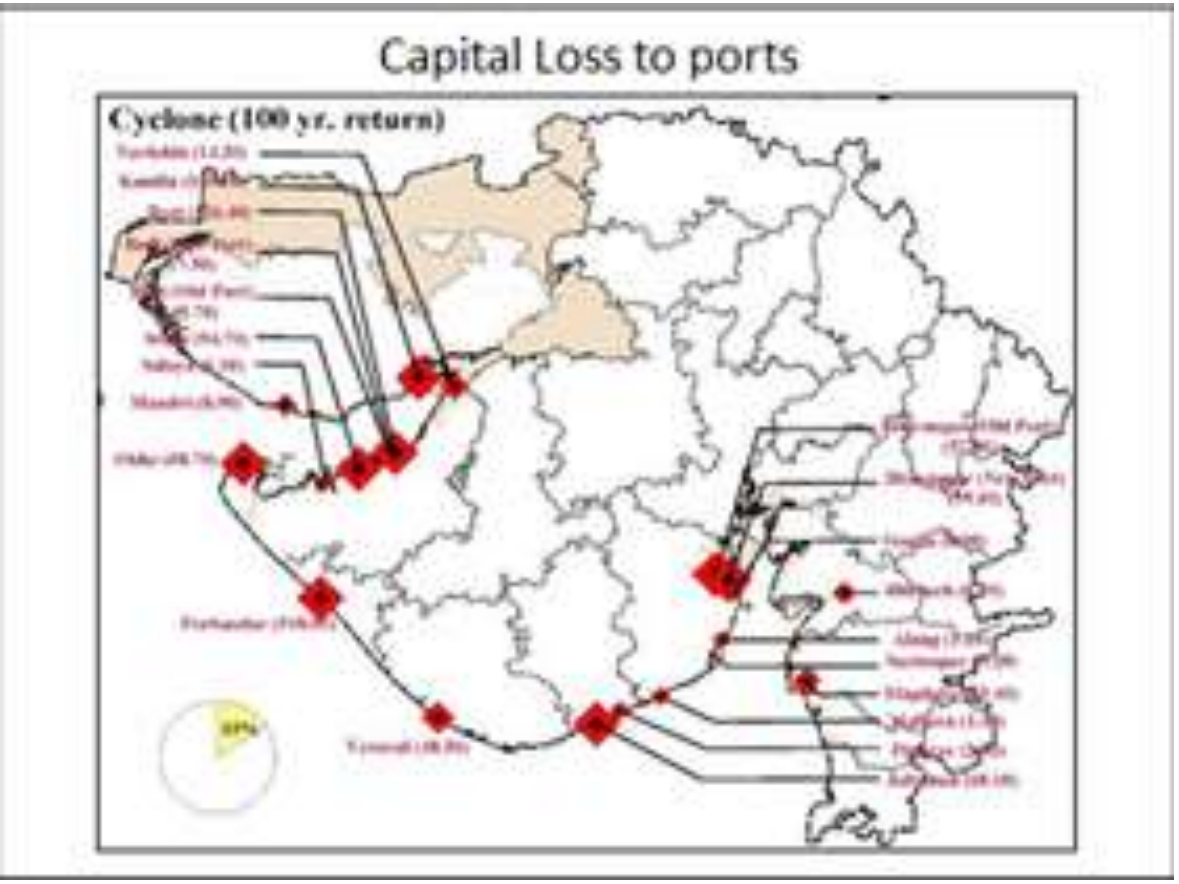


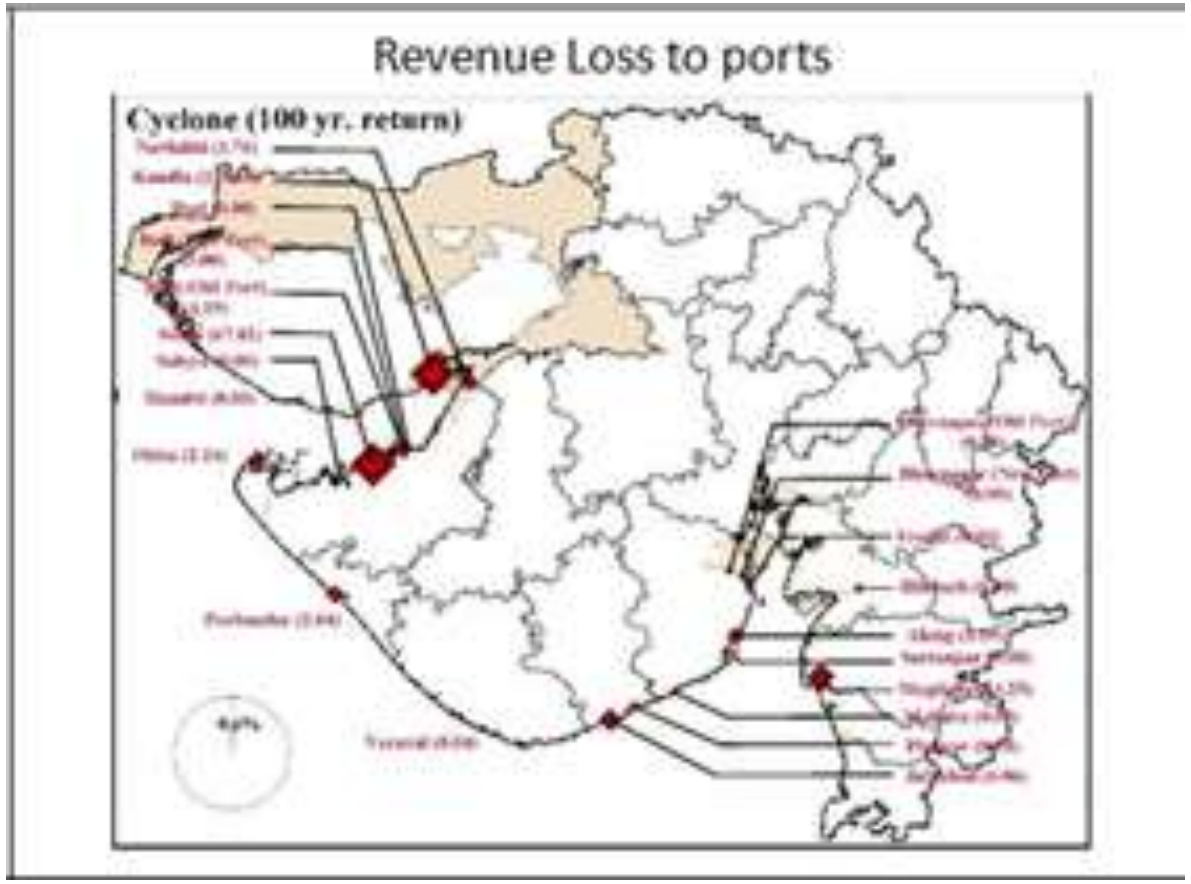
Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides

- Very High Damage Risk Zone - B (V_b=50 m/s)
- High Damage Risk Zone (V_b=47 m/s)
- Moderate Damage Risk Zone - A (V_b=44 m/s)
- Moderate Damage Risk Zone - B (V_b=39 m/s)
- Low Damage Risk Zone (V_b=33 m/s)
- ( ) Probable Maximum Storm Surge (PMSS) Height (m)

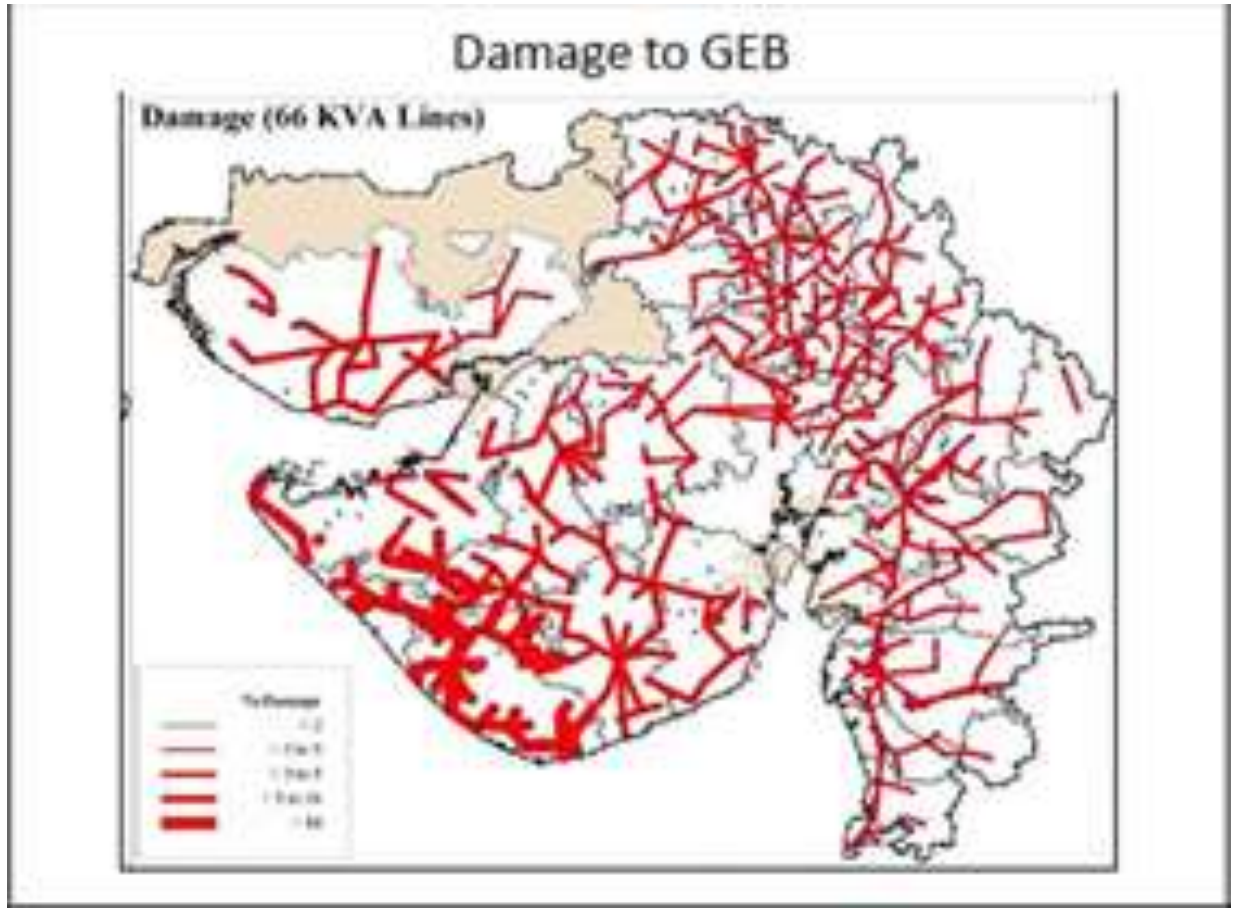
PMSS is the expected abnormal rise of water generated by a storm, over and above the predicted astronomical tides

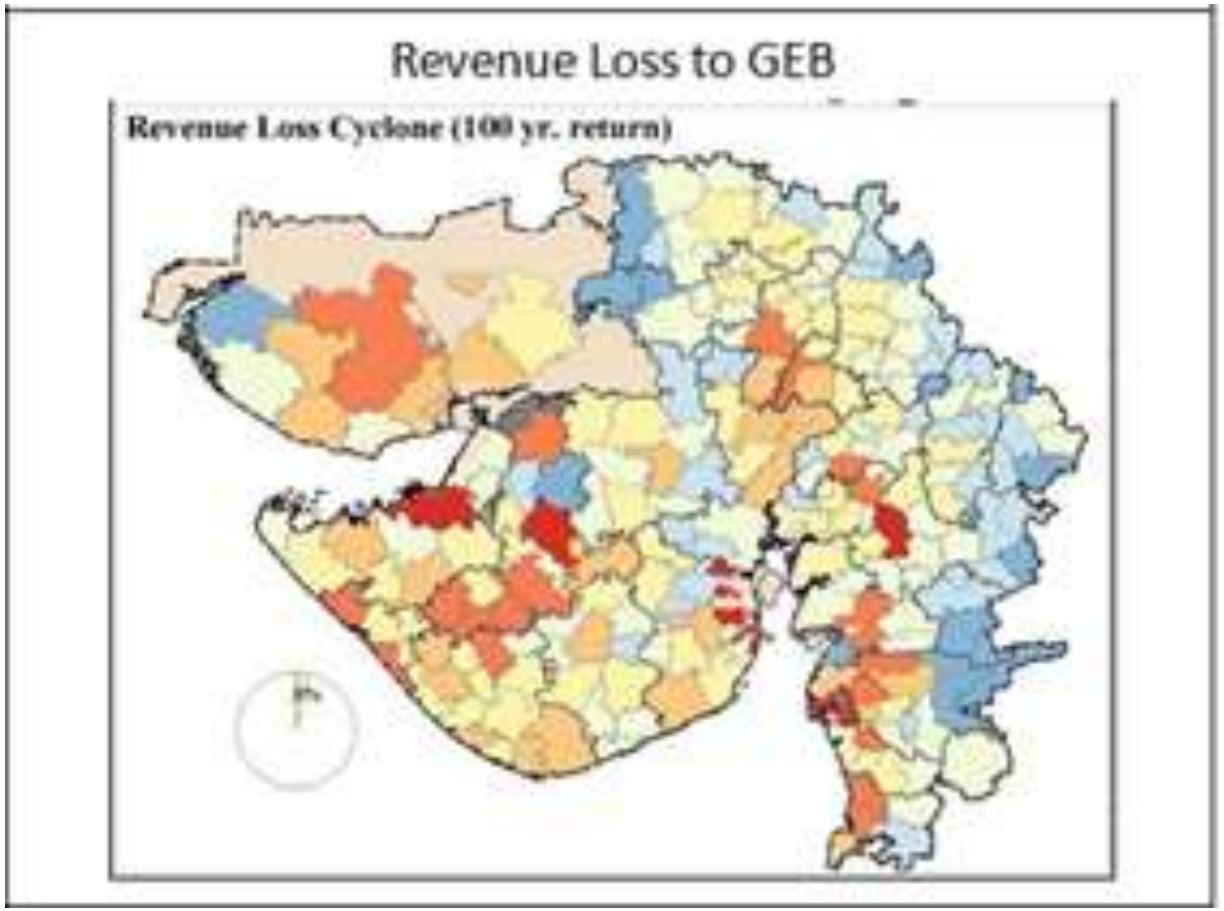
Cyclone Risk





Cyclone Risk

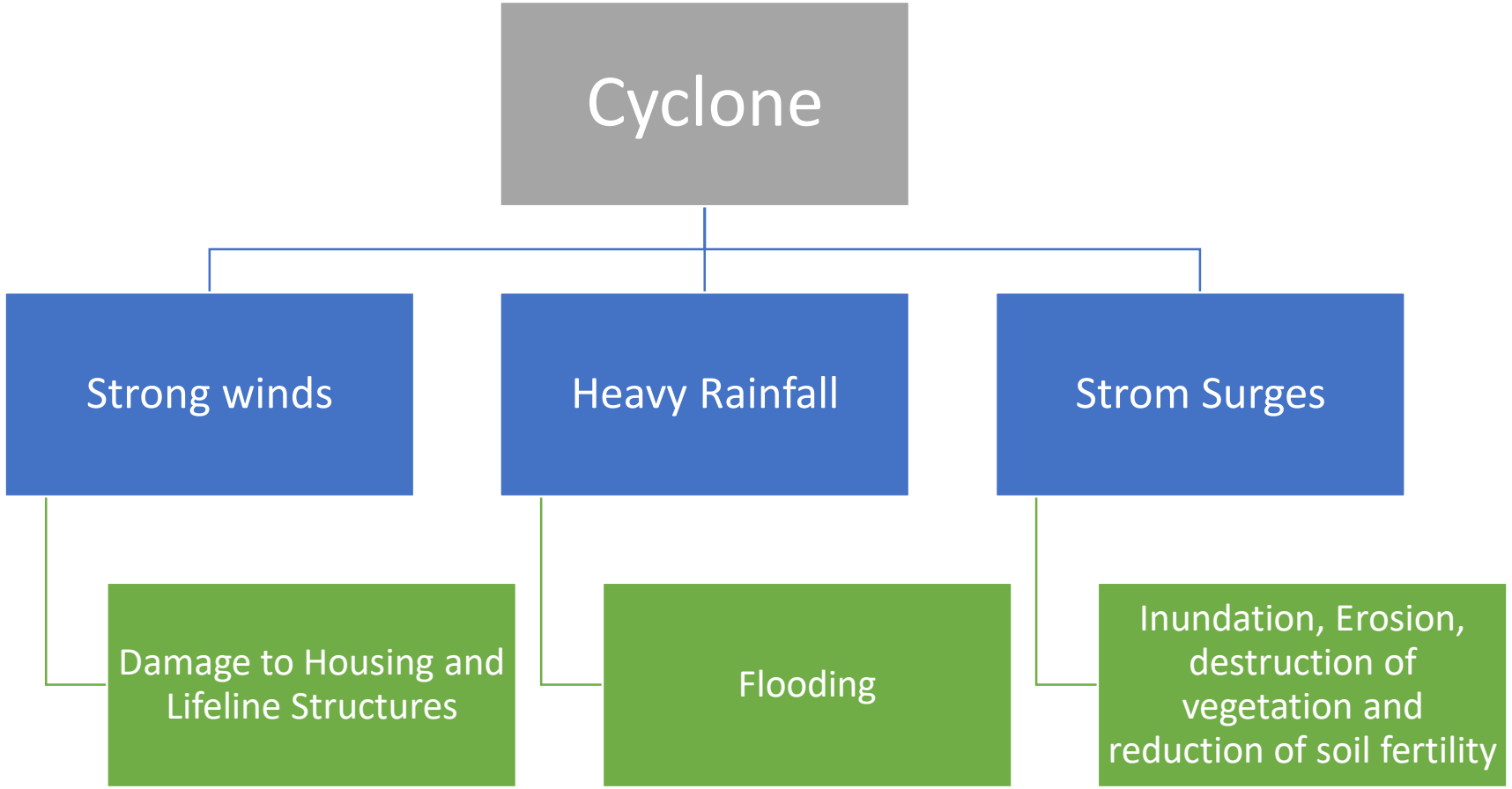




Classification of Cyclonic disturbances in NIO

S.No.	Type	Wind speed in kmph
1	Depression (D)	31 – 50 Kmph
2	Deep Depression (DD)	51 – 62 Kmph
3	Cyclonic Storm (CS)	63 – 88 Kmph
4	Severe Cyclonic Storm (SCS)	89 – 117 Kmph
5	Very Severe Cyclonic Storm (VSCS)	118 – 165 Kmph
6	Extremely Severe Cyclonic Storm (ESCS)	166 – 220 Kmph
7	Super Cyclone (SC)	>=221 Kmph

Characteristics of a cyclone



Effects of Strong Wind

Damage to housing

Damage to Power

Effects of Strong Wind

Damage to communication tower

Damage to hospitals

Effects of Strong Wind

Damage to food storage facility

Damage to roads

Effects of Strong Wind

Damage to bridges

Damage to culverts

Effects of Strong Wind

Damage to Crops

Heavy Rainfall

Flooding

Effect of Storm surge

Erosion of embankments

Erosion of beaches

Effect of Storm surge

Destruction of vegetation

Reduction in soil fertility

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Disaster Risk Reduction $\propto$ $\frac{\text{Reduce Hazard} \times \text{Reduce Exposure} \times \text{Reduce Vulnerability}}{\text{Increase Coping Capacity}}$

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How cyclones affect the buildings?

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Thank You

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