# Basics of Disaster Risk Management

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# Range & Balance

- System “ Regularly Interacting and Interdependent group of items forming a unified whole”

- Each and Every System has a range of perceiving, desimination, function and feedback and auto-correction measures that follows the wholesomeness of the system

- “systems are usually in a stable equilibrium or homeostasis, which is to say that a small change (the size of a particular population, for example) will be corrected by some negative feedback that will bring the parameter back to its original "point of balance" with the rest of the system”

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# What is 'disaster risk'?

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- "Probable occurrence of extreme event and expected exposure in certain area, situation or extent that may cause a massive disruption in societal function may be a disaster risk"

- The words that we need to know and understand are:
  - **Hazard**
  - **Vulnerability**
  - **Exposure**
  - **Coping capacity**

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# What is a 'hazard'?

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"Extreme events that originate in the lithosphere, hydrosphere, atmosphere and biosphere are hazard" that may exhibits in the form of Eathquake, Flood, Drought, Heat Wave, Tsunami etc.

Flood

Earthquake

Tsunami

# What is a 'hazard'?



So anything, which can be a process or a substance (e.g. nuclear fuel) or an establishment (e.g. petroleum refinery, power plants etc.) can be a hazard.

- To put it in simple words, if there is anything which can cause harm to life, property or both, is what hazard really is!
- Hazards can be natural or man-made (anthropogenic).
- For example, natural hazards are Earthquake, Flood, etc., while, man-made hazards are all those events which takes place due to human causes or in fact, negligence, like explosions or oil-spills.
- Hazards have however been classified into different 'scientific categories' depending on how they occur.

- Let us go through some of such classifications in the following slides.

# Classification of Hazards

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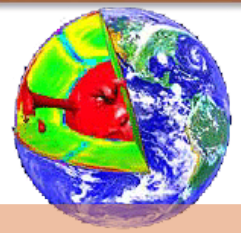
## Geophysical



Earthquake
Tsunami

Mass Movement triggered by geophysical events
Landslide
Avalanche
Rock fall
Mud flow
Debris flow
Subsidence

## Hydrological

Floods
Wave Action
Coastal Erosion
Shoreline Change

Mass Movement triggered by Hydrological events
Landslide
Avalanche
Rock fall
Mud flow
Debris flow
Subsidence

## Meteorological

Storm, Rain, Wind, Hail, Snow, Ice, Blizzard, Lightning, Sand, Dust, Tornado

Extreme Temperature, Cold Wave, Heat wave, Frost, Freeze

Fog

Tropical Cyclone, Cyclonic Wind, Rain, Surge

## Climatological

Drought

Glacial lake Outburst (GLOF)

Wildfire

# Classification of Hazards

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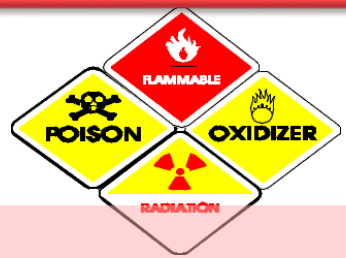
## Environment Degradation

- Erosion
- Deforestation
- Salinization
- Sea Level Rise
- Desertification
- Asian Dust Cloud
- Wetland Loss/Degradation
- Glacier Retreat/Melting

## Biological

- Epidemics
- Pandemics
- Epizootics
- Pest
- Insect infestation,
- Animal Incidents
- Pollution

## Technological




- Industrial Disaster
- Structural Collapse
- Power Outage
- Fire
- Explosion
- Mine Disaster
- Chemical Spill
- Oil Spill
- Radiation Contamination/ Nuclear Incident
- Aviation Accident
- Rail Accident
- Road Accident
- Navigation Accident
- Space Accident

# Cascading hazards

- One often finds that one hazard triggers another.
- For example, a tsunami (which is a natural hazard) may trigger a power-plant located on the sea-coast to malfunction leading to greater danger.
- Such scenarios have been categorised as Natural Hazards Triggering Technological Disasters (NATECH).
  - You may want to go through this to learn more about NATECH.
  - https://ec.europa.eu/jrc/sites/jrcsh/files/natech-leaflet.pdf

**Food for thought: Do you live in an area which is prone to NATECH?**

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# What is ‘exposure’?

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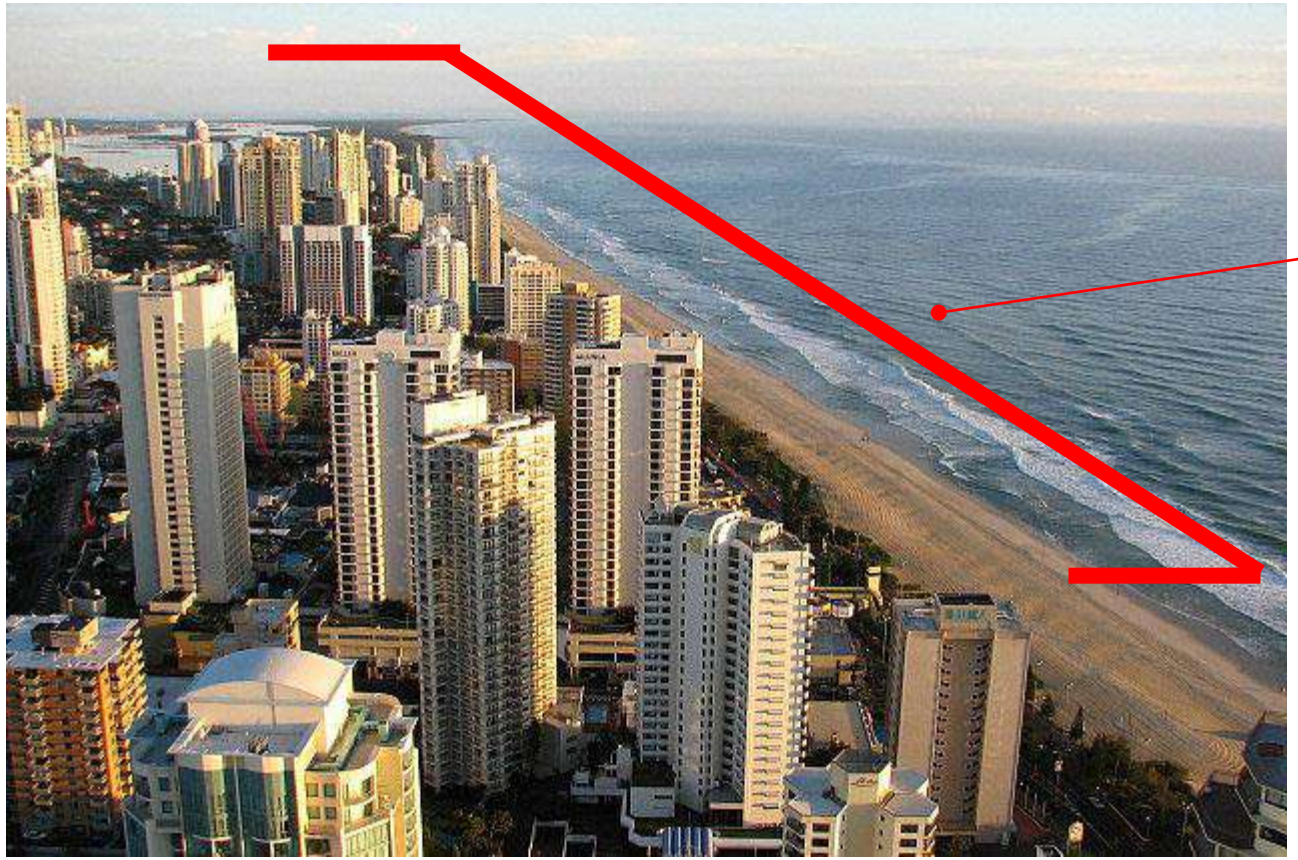
A state of being in which a person or a group of people, Infrastructure, Property, Environment remain in an imminent risk of danger



# What is ‘exposure’?

- *Measures of exposure can include the **number of people** or **types of assets** in an area.*
- *Let’s say that there is an imminent danger of a forest fire, in that case the exposure would be of the forest area and the flora and fauna of the area!*

# What is 'Vulnerability'?

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**

"lack of ability to resist some superfluous agent "

Vulnerability is a characteristic of those 'assets' which are exposed!

-If you build your house in an area which is prone to flood or earthquake, you are **vulnerable**.

-if you have not taken any measure to deal with it.

# What is ‘disaster risk’?

- Hazard: it is a probability of occurrence.
- Given this probability of occurrence of a hazard, there will be ‘something’ which will be exposed to the impending effects.
- This exposed assets will have vulnerabilities to different extents.
- Some may be highly vulnerable, while, some will be very less vulnerable.

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

# What is 'disaster risk'?

Case 1: We often hear about avalanches in the upper reaches of Himalayas, but we never call it a disaster. Why? Because, there is an imminent hazard but nothing is exposed so no any countable damage takes place So it is Just **Hazard**.

Case 2: Let's assume another scenario. We build a EQ resistant house in an earthquake prone area and there is an earthquake. Nothing happens to the building or the people living inside it. In this case, there is a hazard and the building is exposed, but, the building has very less or no vulnerability at all.

Case 3: In the same scenario, let's say that although the building is strong but the people inside are not aware of what to do in an earthquake. So, all the 200 people inside the building start running out. This creates a stampede and when they come out, other building outside, which are not so strong, collapses causing injury and death. In this case, the vulnerability of the people due to the lack of knowledge raises the disaster risk.

# So what is a 'Disaster' then?



When the 'disaster risk' exceeds the 'coping capacity' of the 'exposed' assets, the incident of a hazard turns into a 'disaster'.

**So, what is Coping Capacity?**

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# What is ‘coping capacity’?

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The **ability** of people, organizations and systems, using available skills and resources, **to manage adverse conditions, risk or disasters**.

- The capacity to cope requires continuing **awareness, resources and good management**, both in normal times as well as during disasters or adverse conditions.

- Coping capacities contribute to the reduction of disaster risks.

**Resilience: Bounce back to its normalcy without taking the add from other system**

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# What is a ‘disaster’?

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- There will always be a disaster risk owing to the hazards we are surrounded by, the vulnerabilities of the exposed assets.

- But, if we have the capacity to deal with it, there will be no disaster. It will merely be a ‘hazardous’ event which would require immediate attention!

# Definition of a Disaster: Legal Connotation

- This has been taken from the **Disaster Management Act of India, 2005**

"**Disaster** means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area."

# Definition of a Disaster: Legal Connotation

This has been taken from the **Gujarat Disaster Management Act of 2003**.

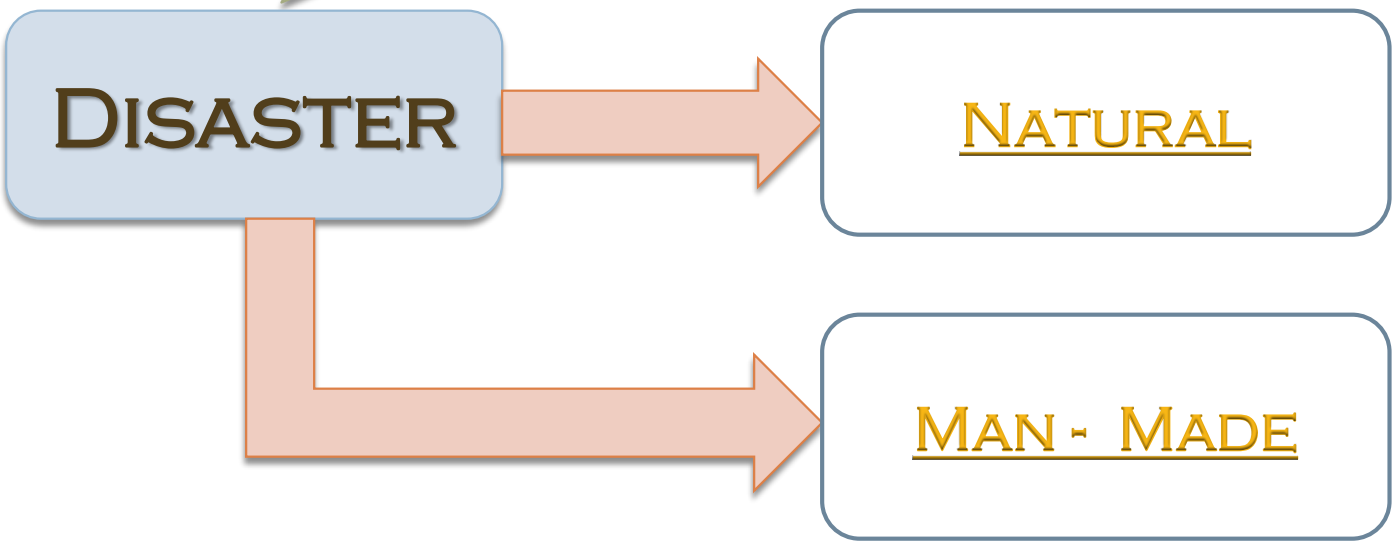
An actual or imminent event, whether natural or otherwise occurring in any part of the State which causes, or threatens to cause all or any of the following:

1. Widespread loss or damage to property, both immovable and movable; or
2. Widespread loss of human life or injury or illness to human beings; or
3. Damage or degradation of environment

And any of the effects specified in sub-clauses (1) to (3) is such as to be **beyond the capacity of the affected community to cope up with using its own resources** and which disrupts the normal functioning of the community.

# Types of Disaster

Disasters have been categorised into:
(click on the different categories to learn more)



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# Why do we need to worry? Occurrences (1998-2017)

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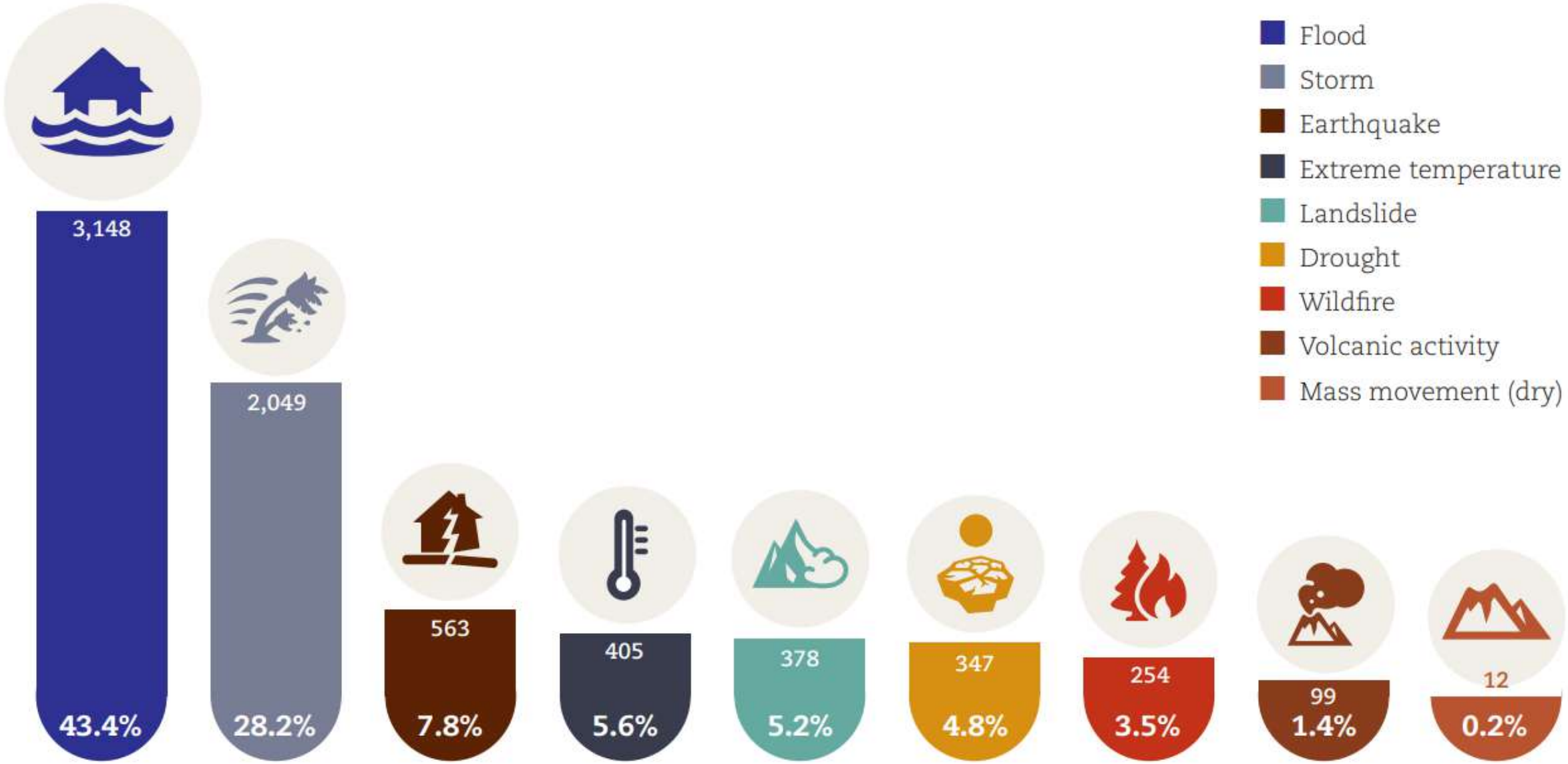

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# Disaster Trend

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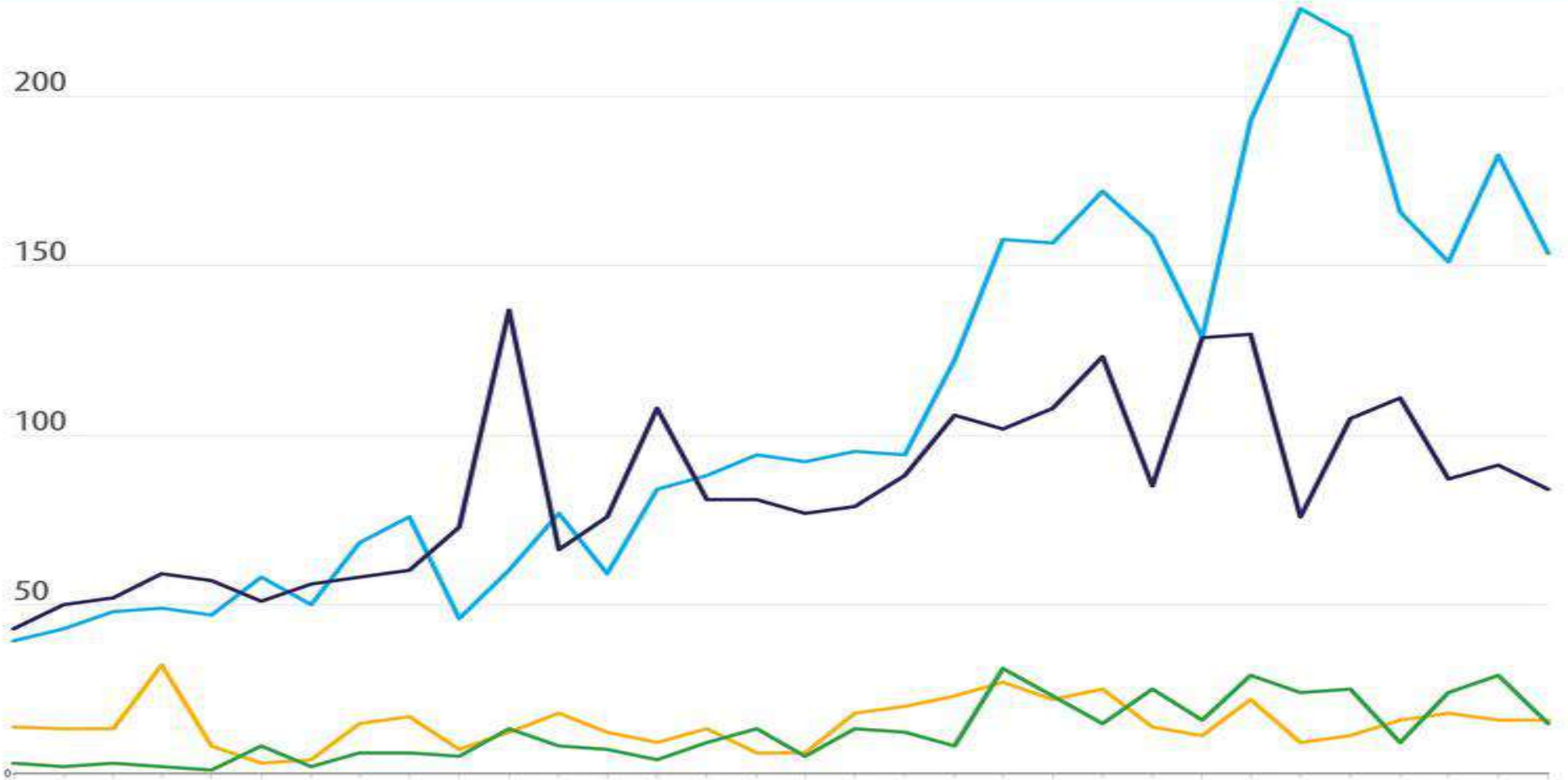
## Number of Climate-related Disasters Around the World (1980-2011)

**3455 FLOODS**

**2689 STORMS**

**470 DROUGHTS**

**395 EXTREME TEMPS**




UNISDR
The United Nations Office for Disaster Risk Reduction
http://www.unisdr.org

Version: 13 June 2012

DATA SOURCES

EM-DAT - http://www.emdat.be/ - The OFDA/CRED International Disaster Database; Data version: 13 June 2012 - v12.07

Humanitarian Symbol Set (2008): http://www.ungiwg.org/map/guideline.php

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FLOOD | 39 | 43 | 48 | 49 | 47 | 58 | 50 | 68 | 76 | 46 | 60 | 77 | 59 | 84 | 88 | 94 | 92 | 95 | 94 | 122 | 158 | 157 | 172 | 159 | 129 | 193 | 226 | 218 | 166 | 151 | 183 | 154 |
| STORM | 43 | 50 | 52 | 59 | 57 | 51 | 56 | 58 | 60 | 73 | 137 | 66 | 76 | 108 | 81 | 81 | 77 | 79 | 88 | 106 | 102 | 108 | 123 | 85 | 129 | 130 | 76 | 105 | 111 | 87 | 91 | 84 |
| DROUGHT | 14 | 13 | 13 | 32 | 8 | 3 | 4 | 15 | 17 | 7 | 12 | 18 | 12 | 9 | 13 | 6 | 6 | 18 | 20 | 23 | 27 | 22 | 25 | 14 | 11 | 22 | 9 | 11 | 16 | 18 | 16 | 16 |
| EXTREME TEMPERATURE | 3 | 2 | 3 | 2 | 1 | 8 | 2 | 6 | 6 | 5 | 13 | 8 | 7 | 4 | 9 | 13 | 5 | 13 | 12 | 8 | 31 | 23 | 15 | 25 | 16 | 29 | 24 | 25 | 9 | 24 | 29 | 15 |

# Why do we need to worry? Effect of Disaster (1998 – 2017)

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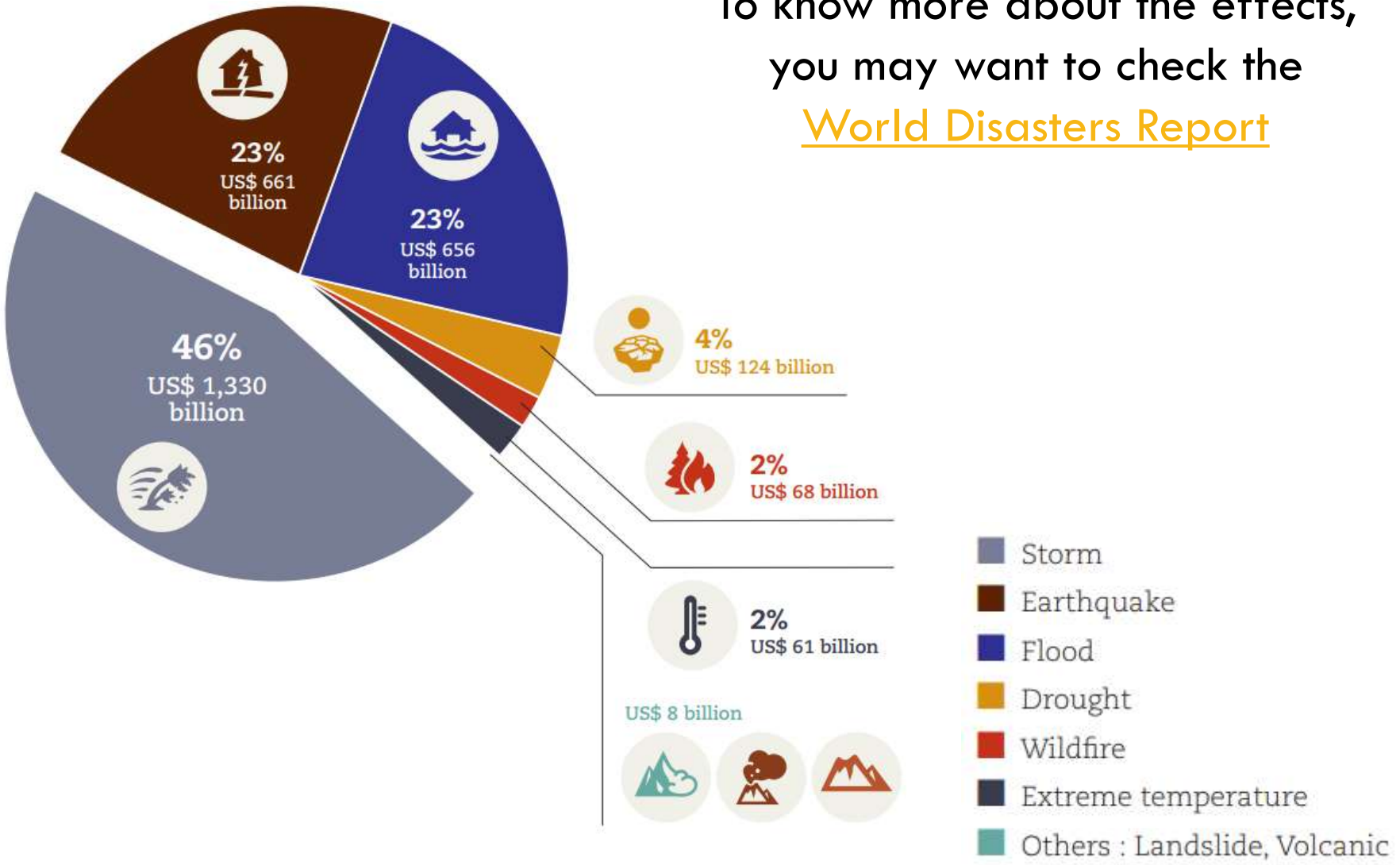
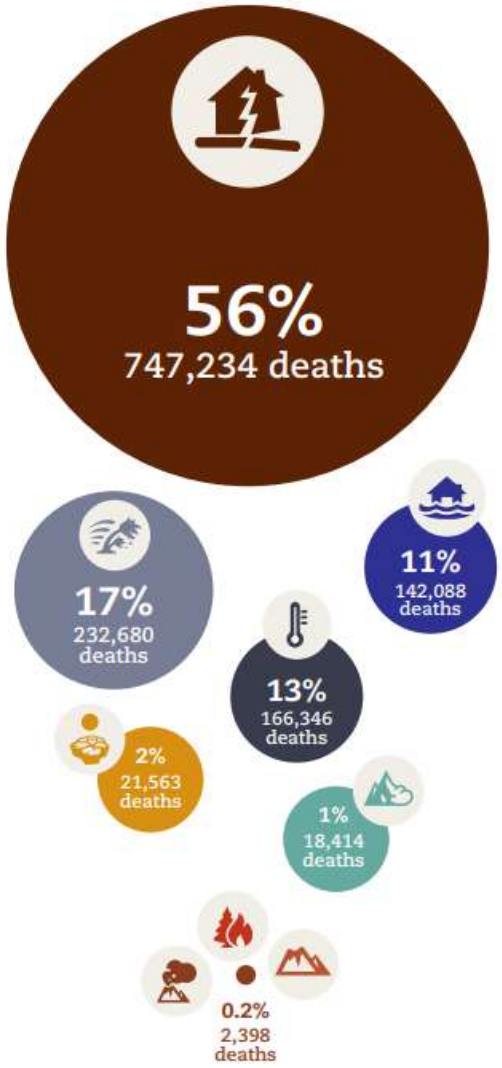
## Economic Losses




To know more about the effects, you may want to check the World Disasters Report

## Deaths



# Why do we need to worry? Effect of disaster in India(1998 – 2017)

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13 lakh Killed

440 crore Injured, Homeless, Displaced

US$ 2908 Bn. Direct Economic Loss

# Effects of the Gujarat Earthquake 2001

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## Damage & Loss Assessment

### Direct

- Human lives (13805)
- Livestock, other animals
- Private property
- Municipal infrastructure
- Power/ telecommunications infrastructure
- Health/ education assets

- Estimate: Rs. 9900 crore

### Indirect

- Export/ import
- Agricultural output
- Industry/services output
- Remittance income
- Fall in earning potential due to disability, trauma
- Unemployment
- Health hazard

- Estimate: Rs. 3000 crore

### Tertiary

- Long-term development
- Overall investment climate
- Fund reallocation
- Community migration/ relocation

- Estimate: Rs. 10100 crore

# We need to manage disasters, but how?



Now that we have a clear idea of how bad disasters can be, we obviously need to manage it. This is how disaster management came into being.

The following definition of Disaster Management has been taken from the Disaster Management Act (DM Act), 2003.

**Disaster Management means a <u>continuous</u> and <u>integrated</u> process of planning and implementation of measures with a view to:**

1. **Mitigating or reducing the risk of reducing the risk of disasters;**
2. **Mitigating the severity or consequence of disasters;**
3. **Capacity - building;**
4. **Emergency preparedness;**
5. **Assessing the effects of disasters;**
6. **Providing emergency relief and rescue; and**
7. **Post-disaster rehabilitation and reconstruction**

# Managing disasters: Disaster Management Cycle

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**Prevention**

Measures the object of which is to avoid the occurrence of a disaster

**Mitigation**

Measure aimed at reducing the impact or effect of disaster

**Preparedness**

State of readiness which enables stakeholders to mobilize, organize and provide relief to deal with an impending or actual disaster or the effect of a disaster

**Response**

Measures taken during or immediate after a declaration of disaster to diminish, or alleviate any suffering, pain, injury or distress or hardship caused on account of the disaster

**Recovery**

The actions taken by the community and all the government and the non-government agencies to reset the condition after disaster and minimise the vulnerability of the same kind of disaster in future

*DM Act 2003*

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# What is 'Prevention & Mitigation'?

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- Prevention expresses the concept and intention to completely avoid potential adverse impacts of hazardous events.
- In case, disaster risks cannot be eliminated, prevention aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed.
- Examples
  - Dams Or Embankments
  - Land - Use Regulations
  - Seismic Engineering Designs
  - Immunization

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# What is 'Preparedness'?

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- Aim is to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery
- Examples
  - Preparation of DM Plans
  - Plan Testing or Exercising
  - Establishment of inter-agency agreements
  - Development of systems for public warning and distribution of information
  - Emergency Communication
  - Emergency Response Personnel Training
  - Securing Adequate Resources
  - Public education

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# What is 'Response'?

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- Focused on immediate and short-term needs
- Examples
  - Public Warning & Evacuation
  - Search & Rescue
  - First Aid
  - Arrangements for Shelter
  - Fatality Management
  - Sanitation
  - Law & Order
  - Resumption of Critical Infrastructure
  - Media Management
  - VIP Visits
  - Donation Management

# What is 'Reconstruction & Rehabilitation'?

- Restoring or Improving Economic, Physical, Social, Cultural And Environmental assets, systems and activities, of a disaster affected community or society, aligning with the principles of Sustainable Development and "Build Back Better", to avoid or reduce future disaster risk.
- Examples

- Primary Requirements (Water, Food, Shelters)
- Waste disposal
- Debris clearance
- Decontamination
- Environment clearance
- Damage assessment
- Reconstruction (Houses, Roads and Bridges, Industrial, Commercial and Residential buildings, drainage system etc.)
- Restore Resources (Electricity, water, gas)
- Restore Communication
- Restore all emergency services
- Restart the Education centres( Schools, colleges)
- Employment opportunity
- Political stability
- Cultural recovery
- Treatment for Post Traumatic Stress Disorder
- Relocate community

# From Disaster Management to Disaster Risk Management

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- Don't you think disaster management is more of a reactive measure? You are right!
- Taking cognisance of this and powered by the researches that are going on around the world, we are slowly shifting towards disaster risk management.
- **Disaster Risk Management (DRM) is primarily the management of disaster risks in a way such that those risks never become a disaster!**
- You may have heard of a term, Disaster Risk Reduction. What is disaster risk reduction?
- **Disaster Risk Reduction (DRR) is all that we do to ensure that we have managed the risks that we know about and be prepared to deal with the ones that we do not know about.**

# From disaster management to disaster risk management

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- Disaster Risk Reduction is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of Sustainable Development.
- To sum it up,

**Disaster Risk Management (DRM) =**

**Disaster Risk Reduction (DRR) + Disaster Management (DM)**

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# Disaster Risk Management in India

# What are the major hazards in India & Gujarat?

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# Earthquake: India

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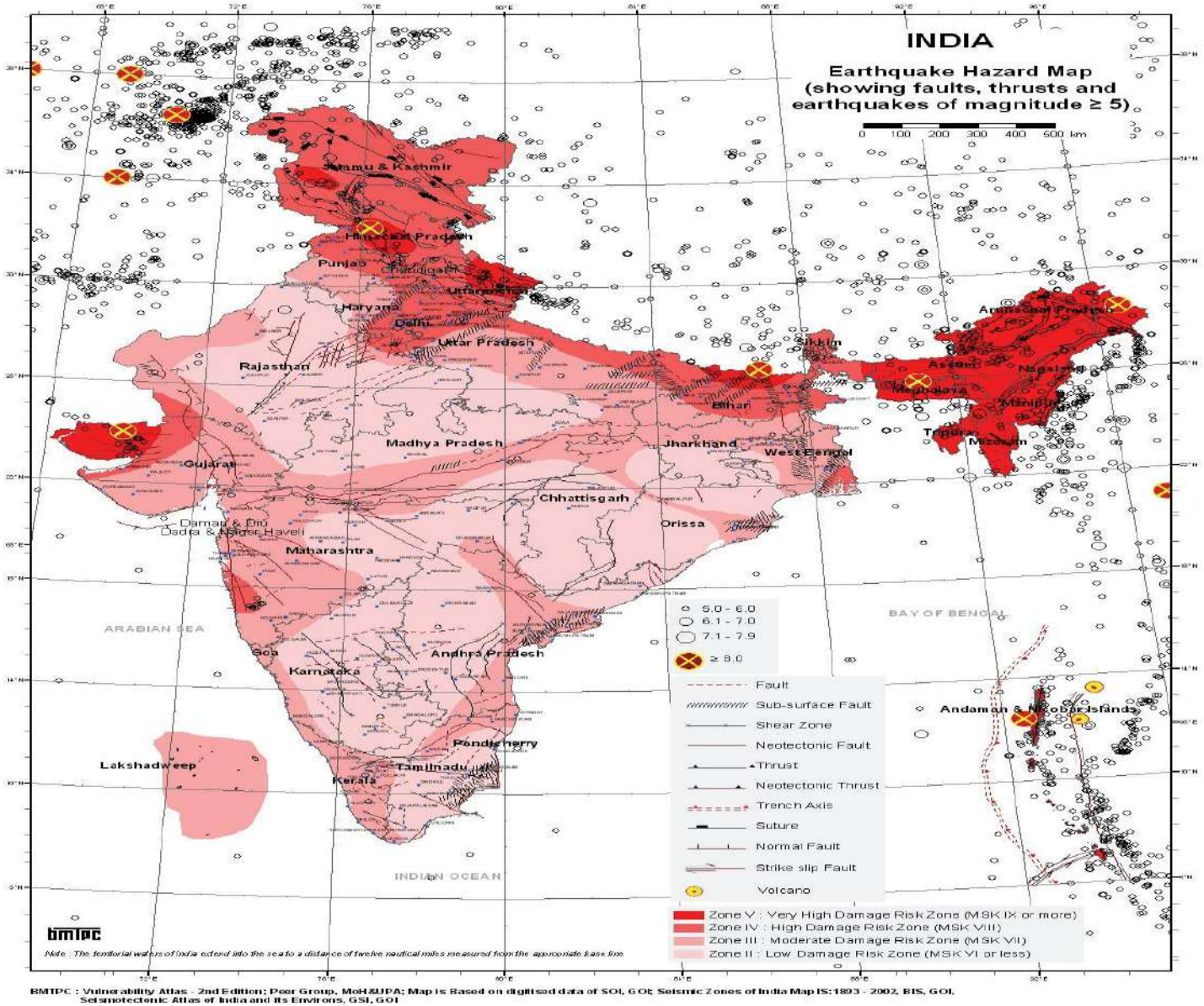
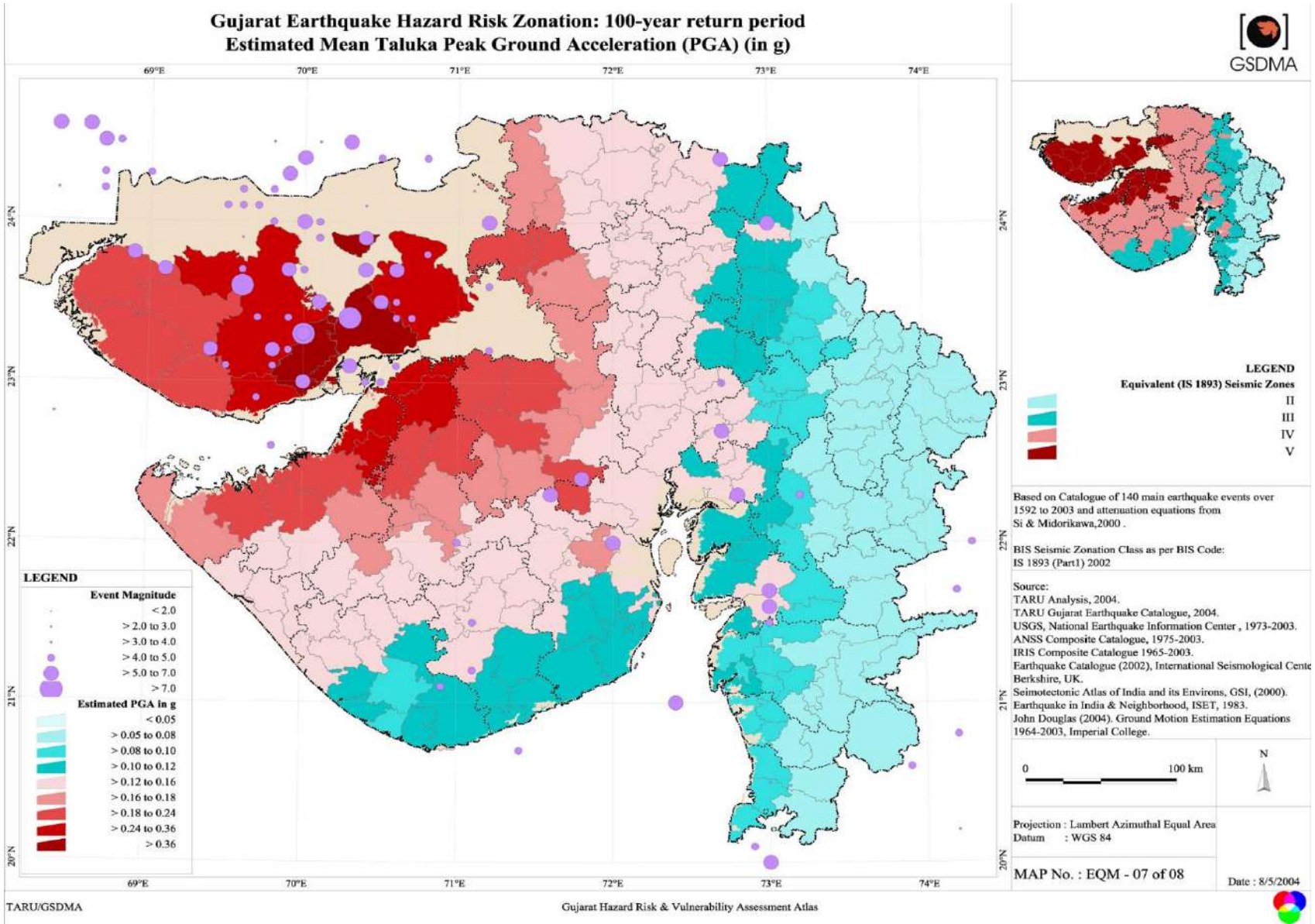
## How it occurs ?

Earthquake occurs due to tectonic plate movements. This sudden release of energy, due to the movements, cause **seismic** waves that shakes the ground.

To know more, see this!



# Earthquake: Gujarat




Bhuj earthquake: Just to get a context, one may be interested in reports on the earthquake of 2001.

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# Earthquake – Do's and Don'ts

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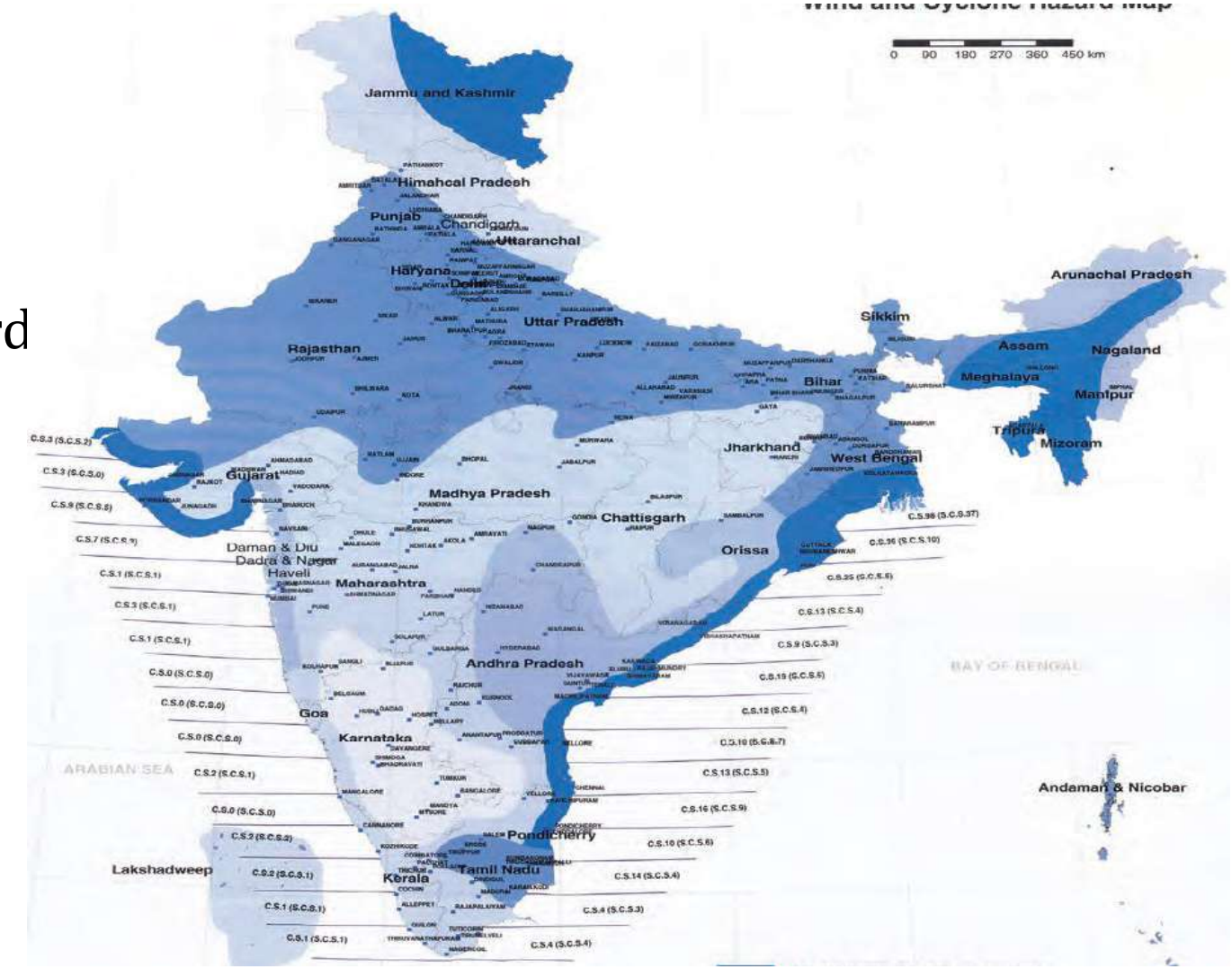
- Do not panic
- If already inside, than stay indoors! Get under a heavy desk or table and hang on to it.
- If fire breaks out, drop on the floor and crawl towards the exist
- If you are out doors during the quake, keep away from buildings, trees and electricity lines. Walk towards open places, in a calm and composed manner.
- If you are driving, quickly but carefully move your car as far out of traffic as possible and stop. Do not stop on or under a bridge or overpass or under trees, light posts, power lines, or signs. Stay inside the car until shaking stops
- Do not enter into the unsafe or risky houses or buildings after an earthquake
- Do not keep telephone lines busy unnecessarily

# Cyclone: India

- Out of about 8000 km Coastline - close to 5,700 km is prone to cyclones.
- Given alongside, is the cyclone hazard map of India!
- To better understand how cyclones are formed, see this!



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# Cyclone: Gujarat

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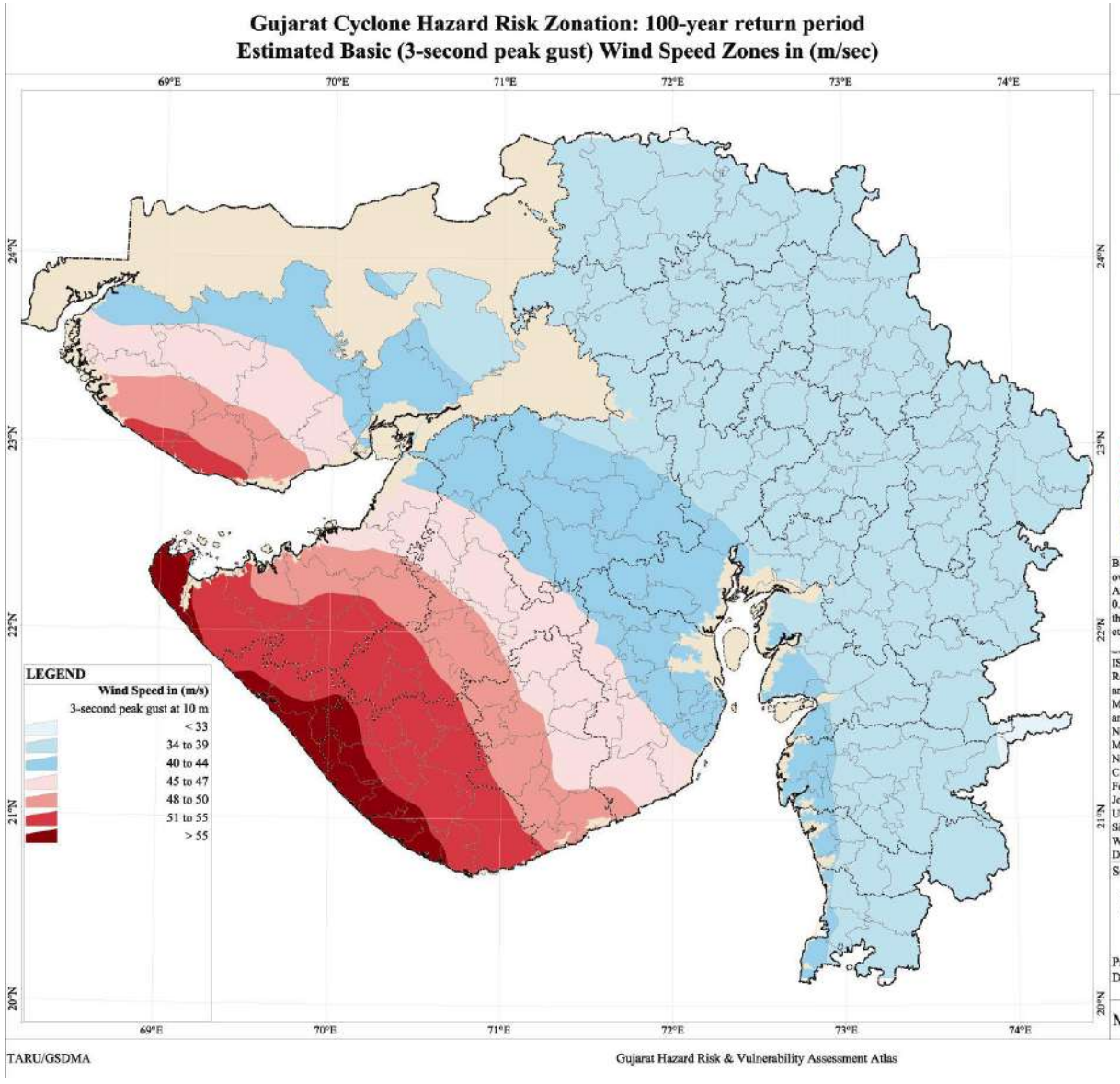


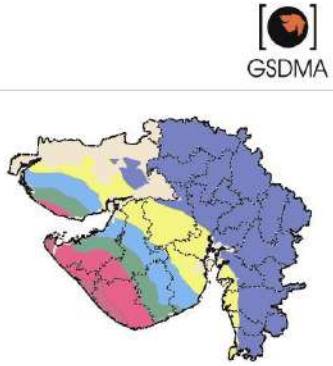


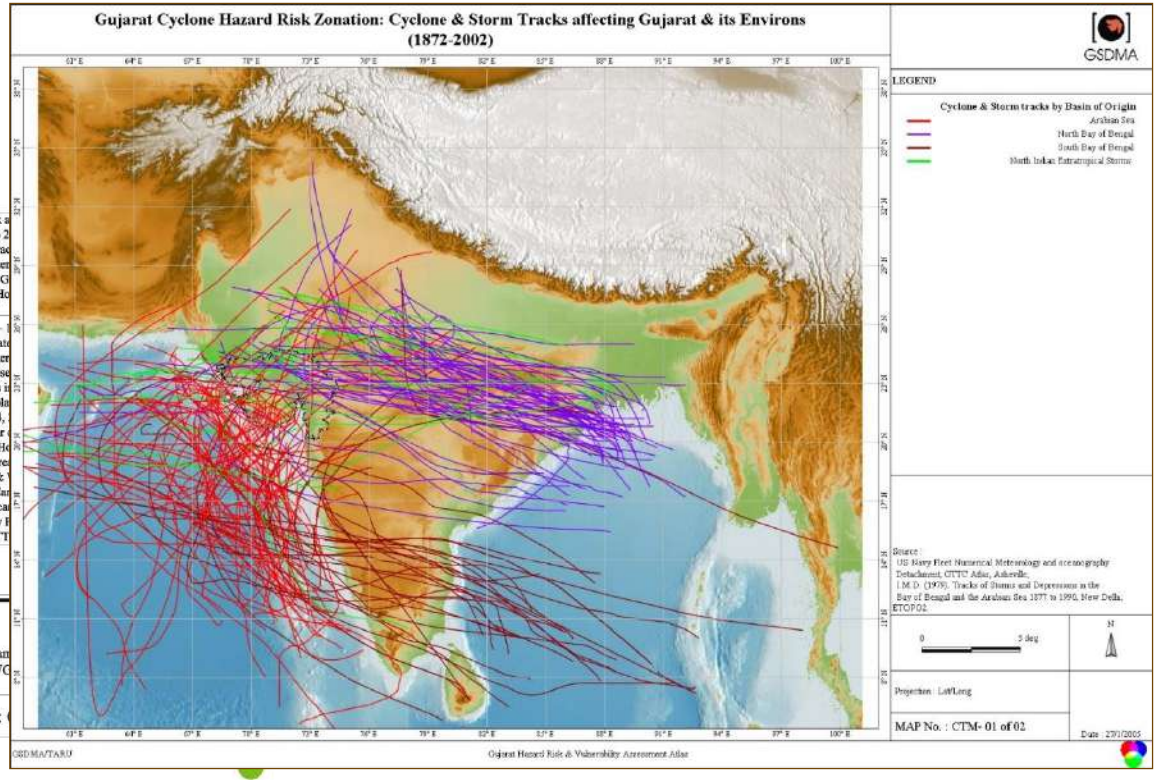

# Cyclone – Do's and Don'ts



- During the storm do not venture out unless advised to evacuate.
- If you have a vehicle and wish to move out of your house, leave early before the onset of a cyclone. It is often best to stay at home.
- Avoid remaining on the top floor of dwellings. Stay close to the ground.
- Avoid taking shelters near old and damaged buildings or near trees.
- Do not touch power lines. One may get electrocuted.
- Listen to the advice of local officials and emergency workers.
- Be sure that the storm has subsided before venturing out.
- Remain Calm

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# Floods: India

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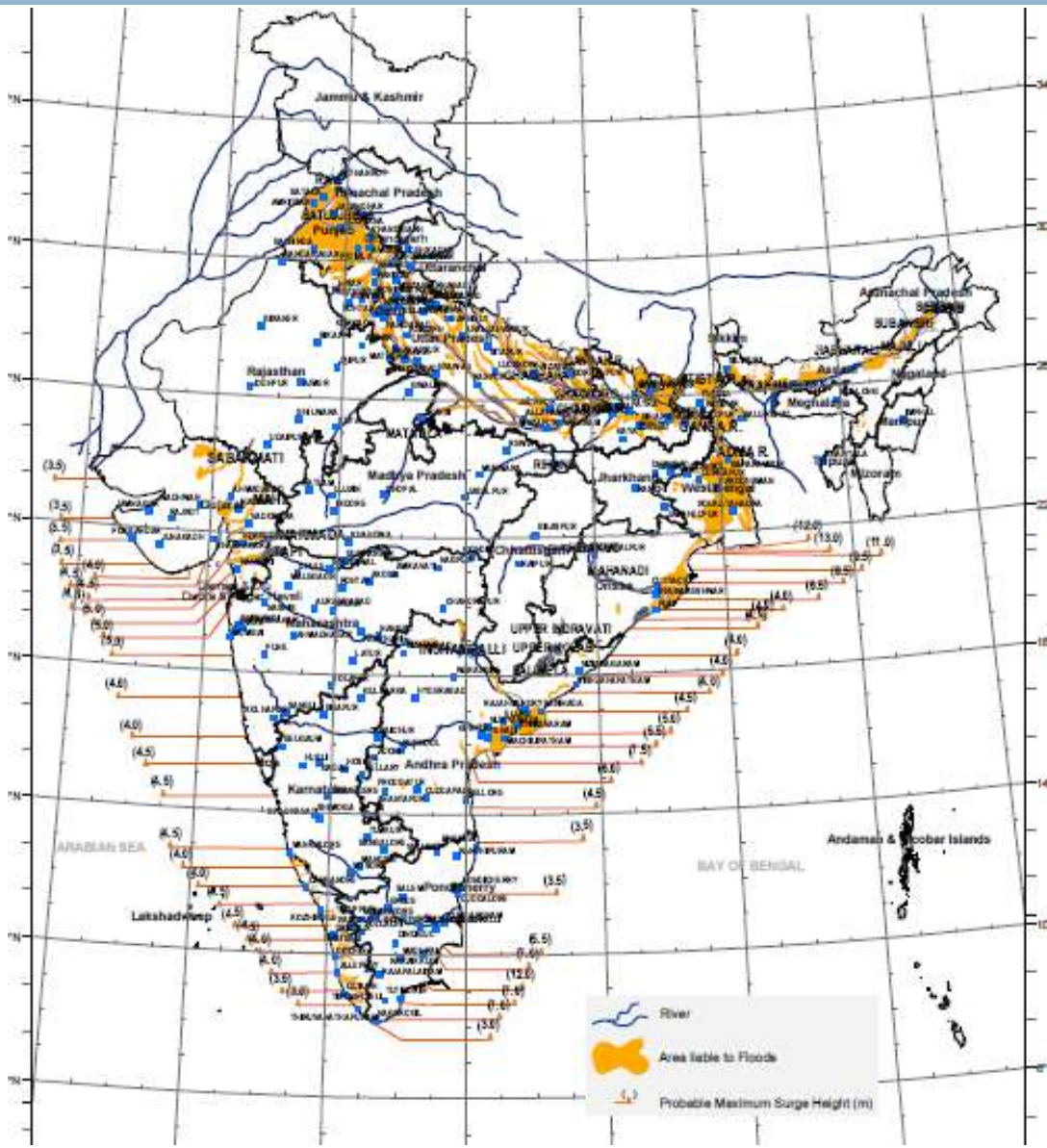
- Riverine Flood
- Urban Flood
- Coastal Flood
- Flash Flood
- Ponding Flood



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# Floods: Gujarat

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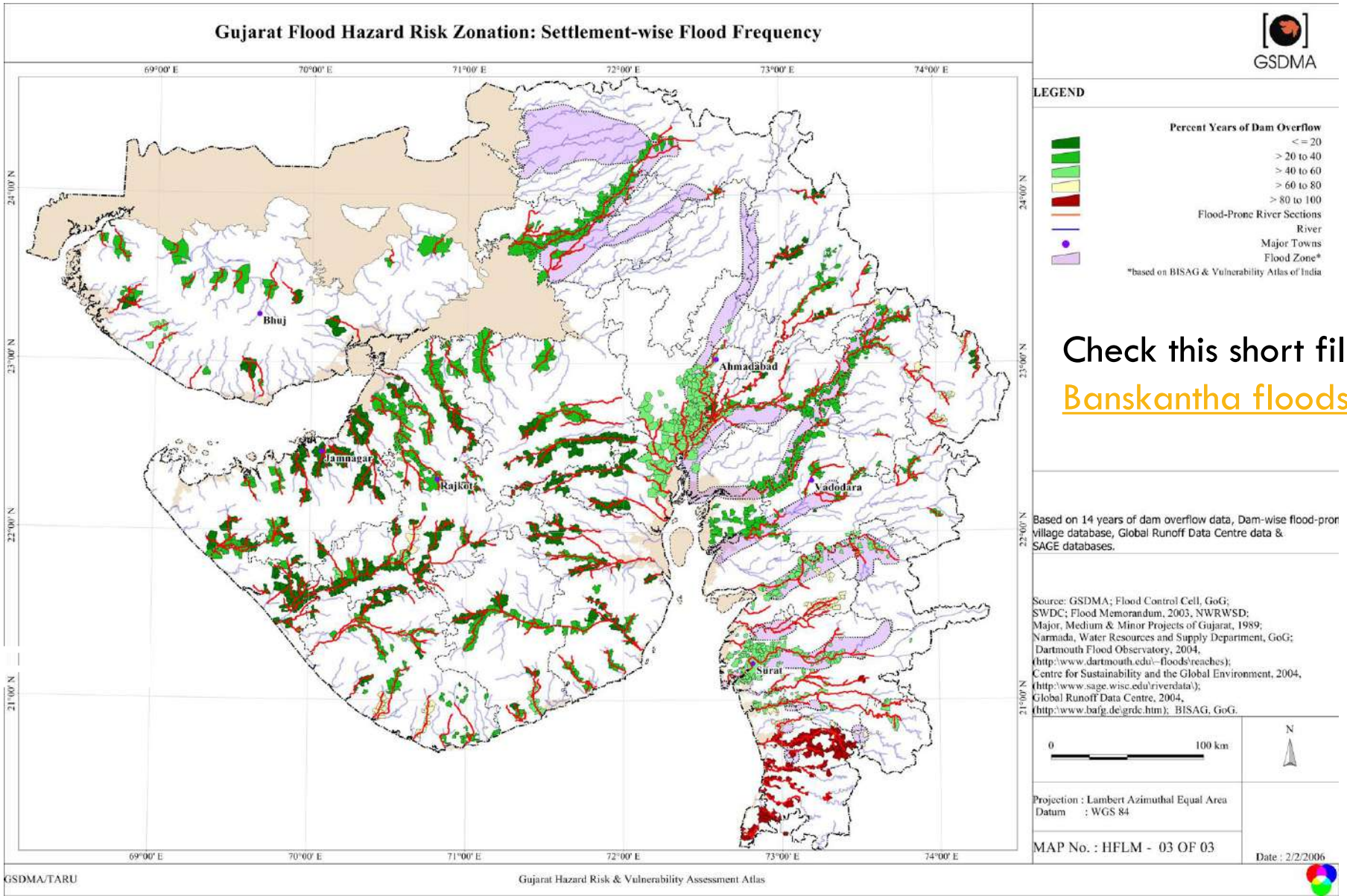


Check this short film on the Banskantha floods of 2017.

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# Floods – Do's & Don'ts

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- Keep listening to weather forecast on radio and television. Move to your residence only when instructed by the competent authority.
- Do not enter deep, unknown waters.
- Destroy the food commodities that have been affected by floodwater.
- Check properly all the electric circuits, floor level furnace, boilers, gas cylinders, or electric equipments like motor pump etc.
- Switch off the main electric supply, if any damage is noticed to the electric equipments.
- Boil drinking water before usage and drink chlorinated water.
- Eat safe food.

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# Tsunami: India

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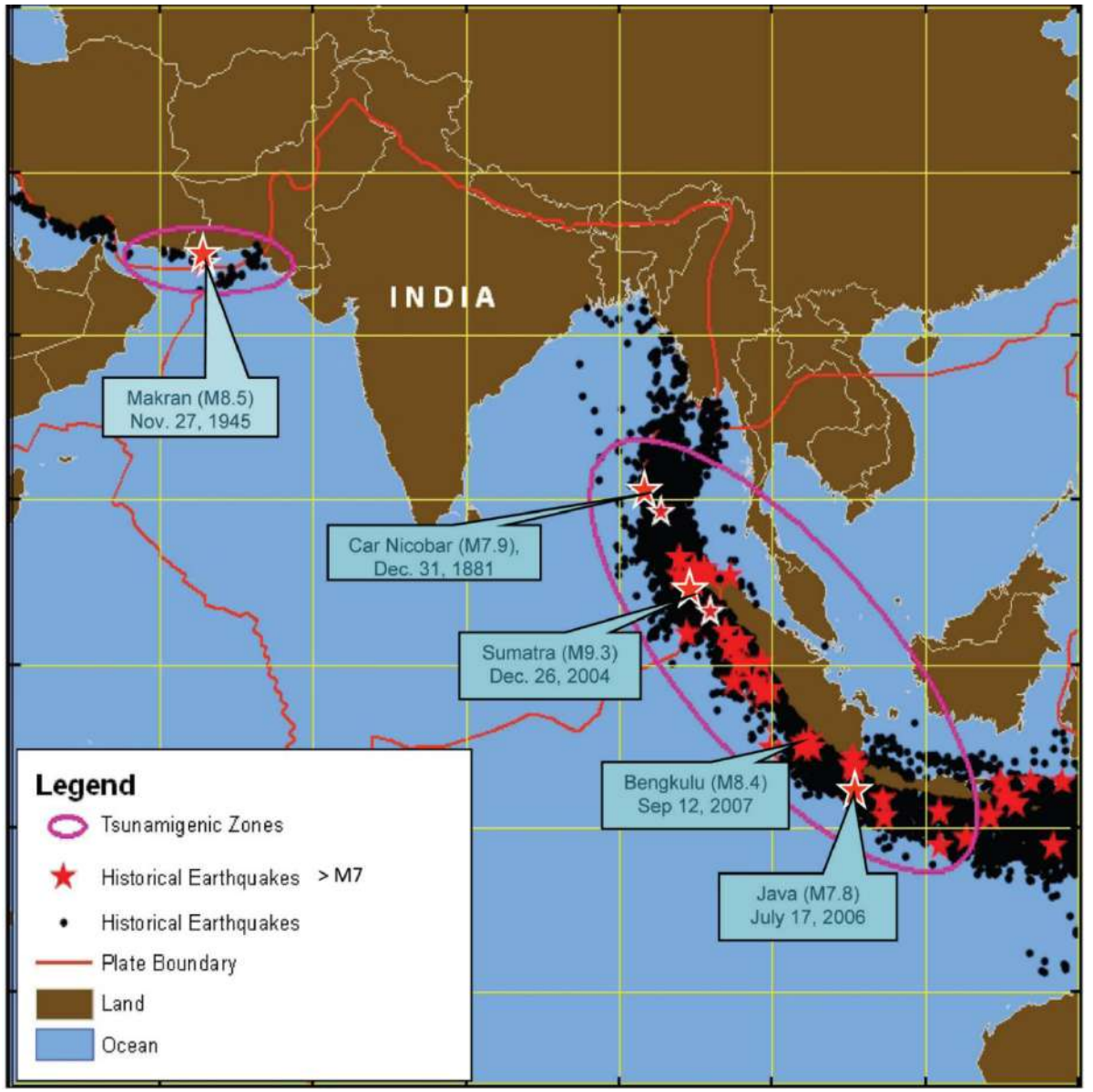
To know more about Tsunamis, click here!



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# Tsunami: Gujarat

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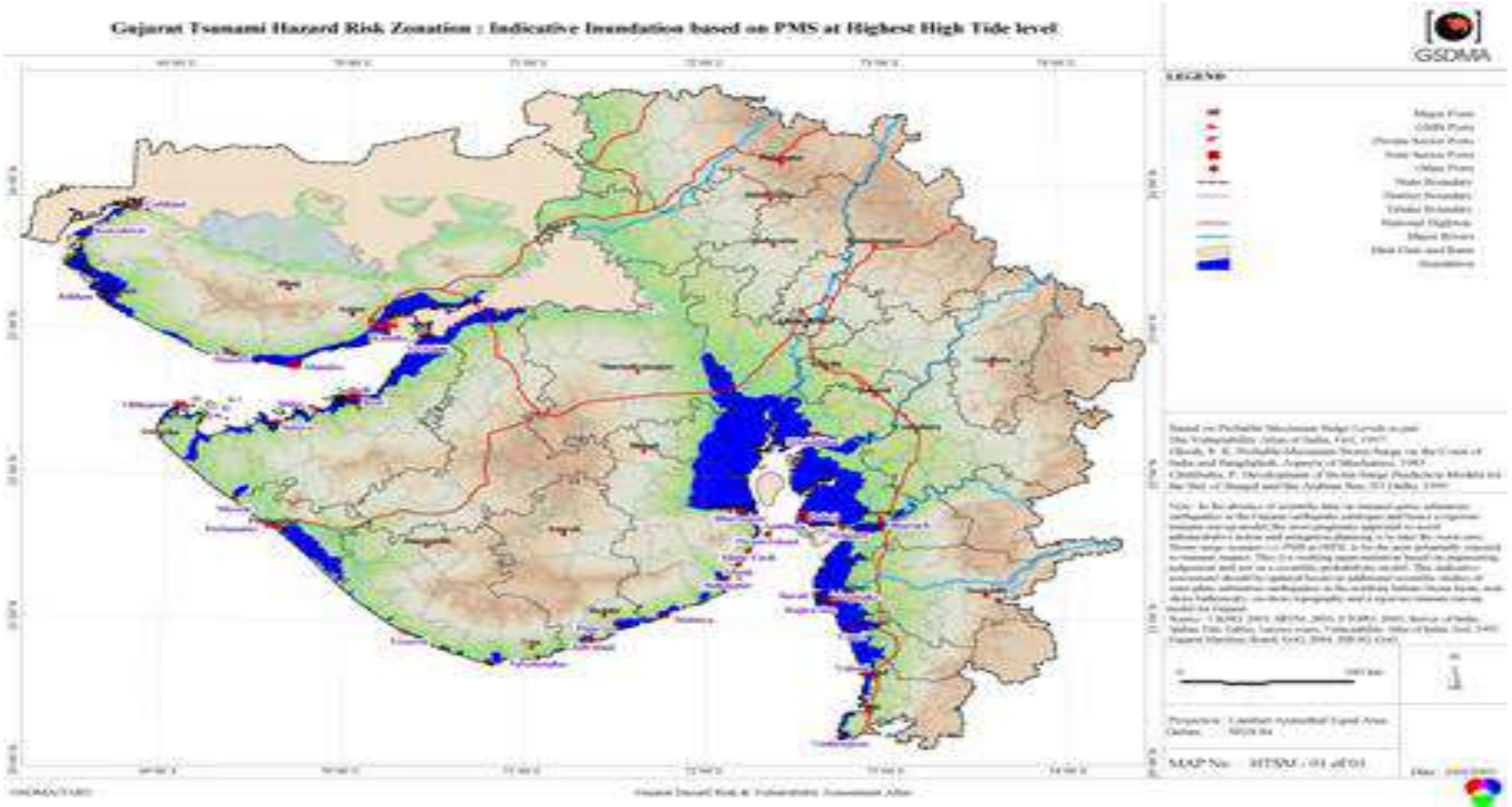

# Tsunami – Do's & Don'ts



- Listen to a radio or television to get the latest emergency information, and be ready to evacuate if asked to do so.
- If you hear a tsunami warning, move at once to higher ground and stay there until local authorities say it is safe to return home.
- Move in an orderly, calm and safe manner to the evacuation site
- Stay away from the beach. Never go down to the beach to watch a tsunami come in.
- Return home only after authorities advise it is safe to do so.

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# Drought Risk

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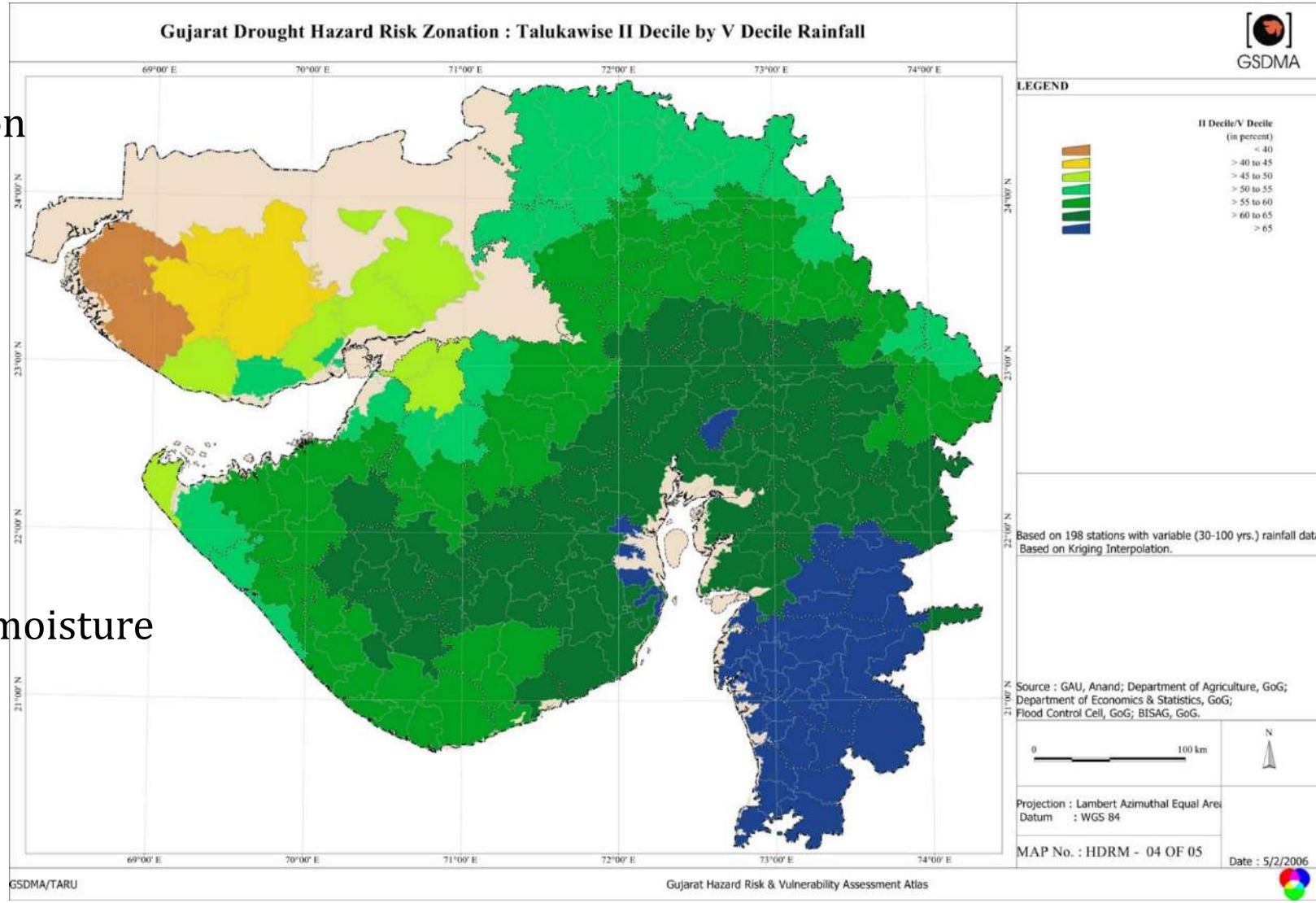
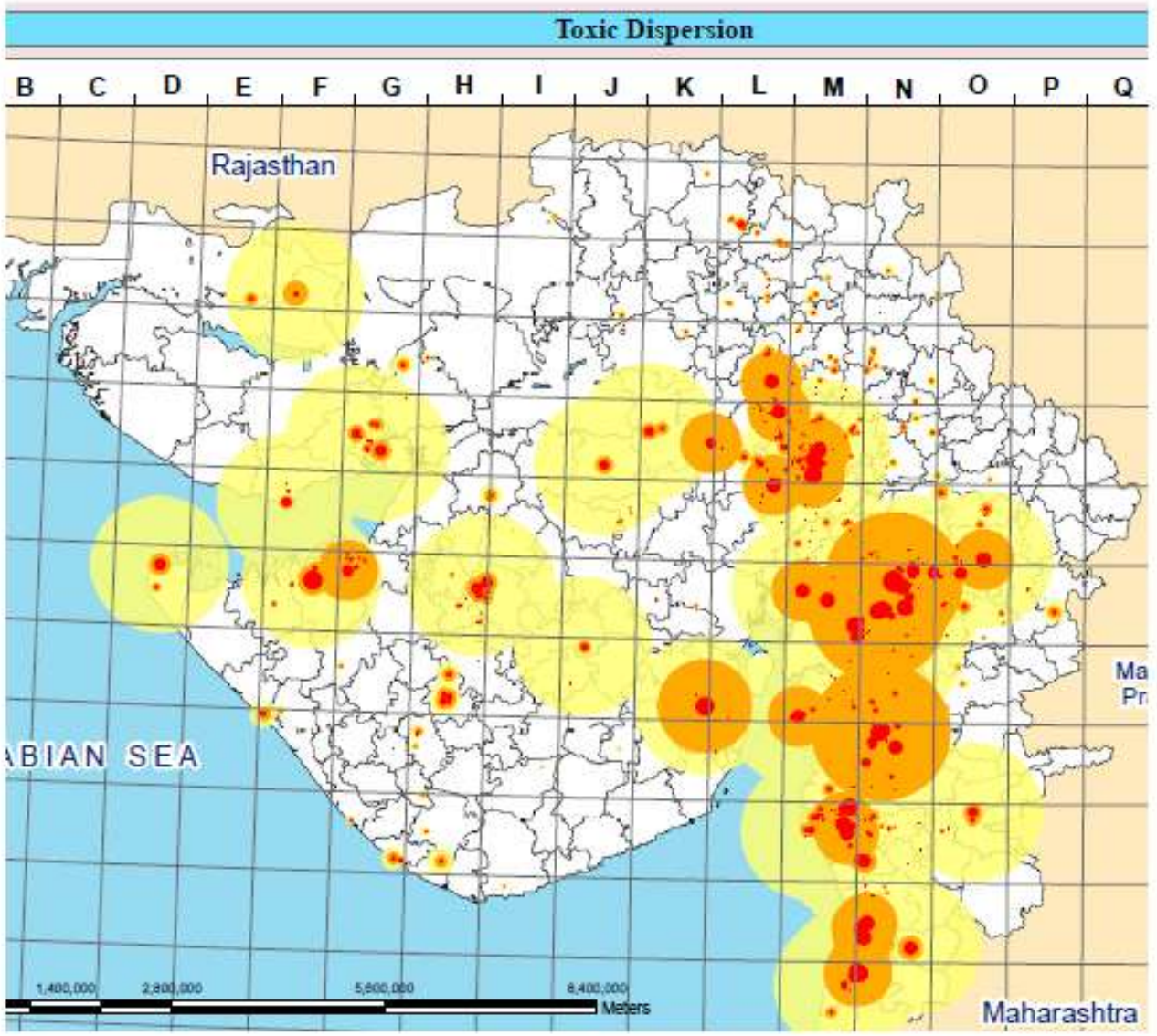
- **Meteorological Drought**
  - Lower than expected precipitation
  - Misdistribution over the season
- **Hydrological Drought**
  - Surface Water scarcity
  - Ground water scarcity
- **Agricultural Drought**
  - Crop losses due to low available moisture
- **Socio-economic Drought**
  - Food scarcity
  - Famines



# Technological hazards in Gujarat

- Registered Factories: 42065
- Major Accident Hazard (MAH) Factories: 402
- To understand how bad it can be, check this out!



Now that we have understood how destructive hazards and disasters can be, the question is what is being done?

Let’s understand the activities on the international level first.

# Evolution of Disaster Risk Management



- It started with the United Nations observing the 1990s as the International Decade for Natural Disaster Reduction (IDNDR).
  - Aim was to decrease the loss of life, property destruction and social and economic disruption caused by Natural Disasters. (Designation of the International Day for Natural Disaster Reduction, promotion of DRR measures)

# Evolution of Disaster Risk Management

- 1st World Conference on Natural Disaster, (May 1994, Yokohama, Japan)
- Adopted the Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation and its Plan of Action.
- It was the main outcome of the mid-term review of the International Decade of Natural Disaster Reduction (IDNDR) and established 10 principles for its strategy, a plan of action and a follow-up. After 5 Years
- In Dec. 1999 United Nations International Strategy for Disaster Reduction (UNISDR) was created - successor to the secretariat of the IDNDR

# Evolution of Disaster Risk Management

- 2nd World Conference on Disaster Reduction (January 2005, Kobe)
- The Hyogo Framework for Action (HFA) (2005 – 2015): Building the Resilience of Nations and Communities to Disasters
- Priorities for Action
  - Ensure that Disaster Risk Reduction is a National and a Local priority with a strong institutional basis for implementation.
  - Identify, Assess and Monitor Disaster Risks and enhance Early Warning.
  - Use knowledge, Innovation and Education to build a culture of Safety and Resilience at all levels.
  - Reduce the Underlying Risk Factors.
  - Strengthen Disaster Preparedness for effective Response at all levels.

2005 - 2015
- **2nd World Conference on Disaster Reduction**
- **Hyogo Framework for Action**

2006-2007 **Global Platform for Disaster Risk Reduction**

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# Sendai Framework for Disaster Risk Reduction: Latest Framework of DRM

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- 3rd World Conference on Disaster Risk Reduction (March 2015, Sendai)
- Adopted the Sendai Framework for Disaster Risk Reduction (SFDRR) (2015 – 2030)

## 1 OUTCOME

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

## 1 GOAL

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

## 4 PRIORITIES

- Understanding disaster risk
- Strengthening disaster risk governance to manage disaster risk
- Investing in disaster risk reduction for resilience
- Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction

## 7 TARGETS

- DISASTER MORTALIY BY 2030
- NUMBER OF AFFECTED PEOPLE BY 2030
- ECONOMIC LOSS BY 2030
- INFRASTRUCTURE DAMAGE BY 2030
- DRR NATIONAL/LOCAL STRATEGIES BY 2020
- INTERNATIONAL COOPERATION BY 2030
- EWS AND DR INFORMATION BY 2030

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# Sendai Framework for Disaster Risk Reduction

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- Expected Outcome and Goal
- Guiding Principles
- Priority of Actions
  - Suggest steps to achieve it -
    - Global and Regional Level
    - National and Local Level
- Role of Stakeholders
- International Cooperation and Global Partnership

# Materialising DRR through Sendai Framework

- Remember we were talking about Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR)?
- Well, it was through the Sendai Framework (SFDRR) that these actually started getting materialised.
- The concepts of understanding disaster risks, managing and reducing them came out of the academics bounds of recommendations and reports.
- All the signatory countries of SFDRR, have started imbibing the principles of risk management and risk reduction in its national and local strategies and policies.
- **India's National Disaster Management Plan is in fact inspired from SFDRR**.

# Mainstreaming DRM into Development Planning



Disaster and development are the two faces of the same coin. Do you agree?

Development, uncontrolled and sporadic, exposes us to new hazards, rendering us vulnerable, leading to disasters.

On the other hand, disasters give us an opportunity to learn from our mistakes and develop in a much more better way!

# Mainstreaming DRM into Development Planning



But we can not avoid development? Can we? **Perhaps no!**

So what do we do?

We need to develop in a **sustainable** manner.

Based on this simple principle the United Nations adopted the **Sustainable Development Goals**!

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# Sustainable Development Goals (SDG)

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# Linkages between targets of SFDRR and SDGs

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Sendai Framework
for Disaster Risk Reduction
2015-2030

SUSTAINABLE DEVELOPMENT GOALS

| | | |
|---|---|---|
| A | Number of deaths, missing persons and persons affected by disaster per 100,000 people | Goal 1. Target 1.5 |
| B | | |
| C | Direct disaster economic loss in relation to global gross domestic product (GDP) | Goal 11. Target 11.5 |
| D | Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services | |
| E | Number of countries with national and local disaster risk reduction strategies | Goal 11. Target 11.b |
| F | Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 | Goal 13. Target 13.1 |
| G | | |

# Mainstreaming DRM into Development Planning

In addition to the Sendai Framework and the Sustainable Development Goals, there are many other different agreements and treaties that have been ratified by India and all of these have an over-arching effect on disaster risks.

- Sustainable Development Goals (2015-2030)
- Paris Agreement 2015 (COP 21): Convention on Climate Change
- New Urban Agenda: Quito Declaration on Sustainable Cities and Human Settlements for All
- Addis Ababa Action Agenda: Financing for Development

# Evolution of Disaster Management Laws in India



- Famine codes developed in the 19th century.
- Relief manuals of States before and after independence.
- The Environment (Protection) Act, 1986 and various rules under the Act.
- The Public liability Insurance Act, 1991
- The High Power Committee (HPC) set up by Government of India in its report submitted in 2003 and during its deliberations even prior to that suggested a "National Calamity Management Act" for the country also prepared a "Model State Disaster Management Act" for adoption by States.
- **The Gujarat State Disaster Management Act, 2003; the Bihar Disaster Management Act, 2004; the Uttar Pradesh Disaster Management Act, 2005 and the Uttaranchal Disaster Management and Prevention Act, 2005.**

# Organisational and operational structure of disaster management in India

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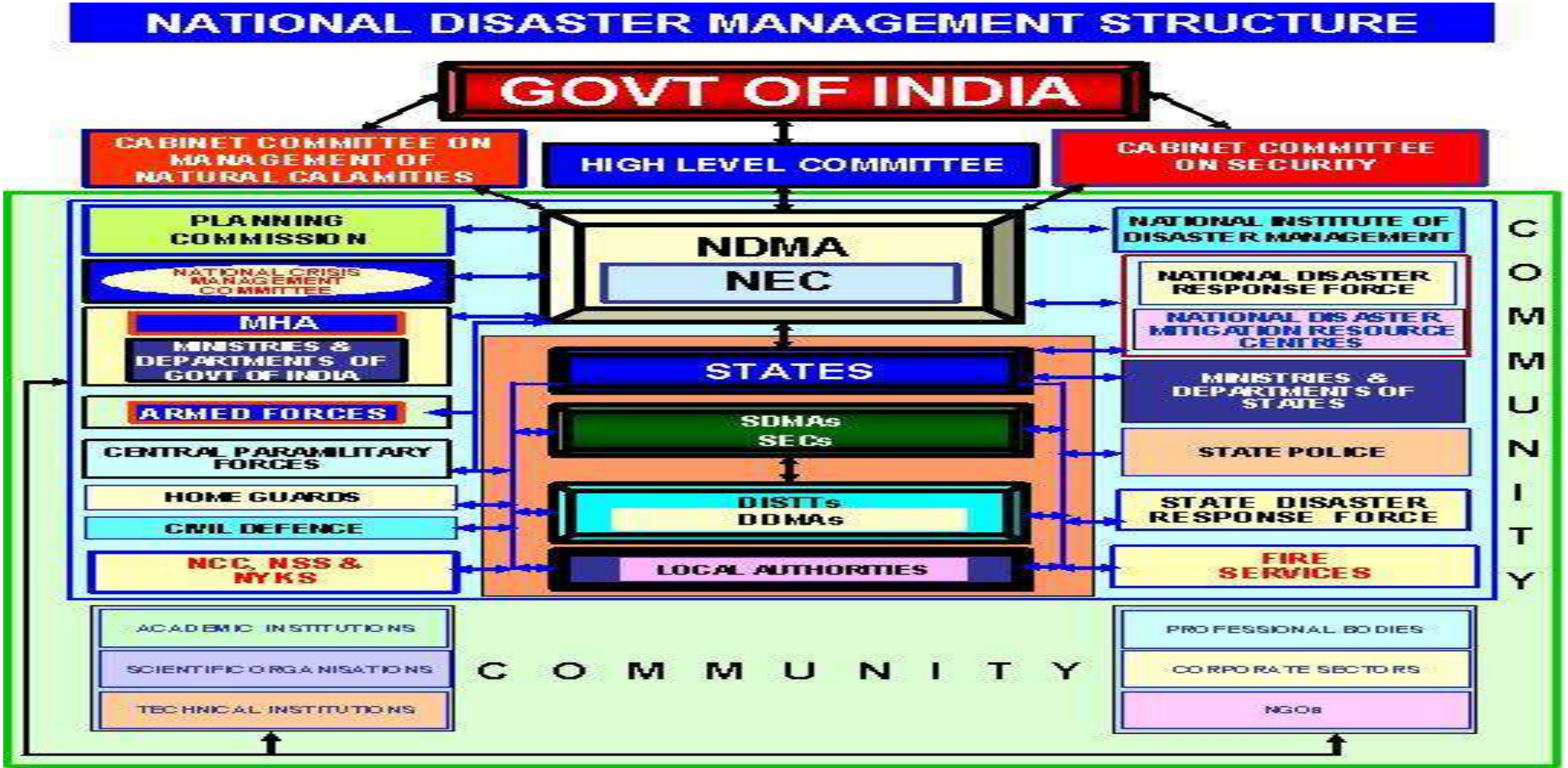

# National Disaster Management Plan of India, 2016

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## Types of hazards as per the Plan

- Geophysical
  - Earthquake (Mass movement of earth material)
  - Volcano
  - Tsunami
- Hydrological
  - Flood
  - Landslides
  - Wave action
- Meteorological
  - Cyclone, storm surge, Tornado
  - Extreme temperatures: Frost, Heat wave
- Climatological
  - Drought
  - Forest / Wildlife fires
- Biological

| | Disaster | Nodal Ministry/ Department |
|---|---|---|
| 1 | Biological | Min. of Health and Family Welfare (MoHFW) |
| 2 | Chemical and Industrial | Min. of Environment, Forest sand Climate Change (MoEFCC) |
| 3 | Civil Aviation Accidents | Min. of Civil Aviation (MoCA) |
| 4 | Cyclone/Tornado | Min. of Earth Sciences (MoES) |
| 5 | Tsunami | Min. of Earth Sciences (MoES) |
| 6 | Drought/Hailstorm/Cold Wave and Frost/Pest Attack | Min. of Agriculture and Farmers Welfare (MoAFW) |
| 7 | Earthquake | Min. of Earth Sciences (MoES) |
| 8 | Flood | Min. of Water Resources (MoWR) |
| 9 | Forest Fire | Min. of Environment, Forests, and Climate Change (MoEFCC) |
| 10 | Landslides | Min. of Mines (MoM) |
| 11 | Avalanche | Min. of Defence (MoD) |
| 12 | Nuclear and Radiological Emergencies | Dept. of Atomic Energy (DAE) |
| 13 | Rail Accidents | Min. of Railways (MoR) |
| 14 | Road Accidents | Min. of Road Transport and Highways (MoRTH) |
| 15 | Urban Floods | Min. of Urban Development (MoUD) |

# National Disaster Management Plan



## Key points to remember about the National Plan

- Levels of disasters:
  - L1: Can be managed at district level.
  - L2: Can be managed at state level; deployment of state level resources and agencies.
  - L3: Catastrophic event.
- Institutional framework:
  - MHA – deals with the overall coordination.
  - Cabinet Committee on Security and National Crisis Management Centre – top level decision making.
  - "State governments will be carrying out disaster management with the central government playing a supporting role"
  - "The central agencies will participate only on the request from the state government."

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# National Disaster Response Force (NDRF)

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- The general superintendence, direction and control of the National Disaster Response Force (NDRF) shall be vested and exercised by the National Disaster Management Authority.
- The National Disaster Response Force (NDRF) will position its battalions at different locations as required for effective response.
- National Disaster Response Force (NDRF) units will maintain close liaison with the designated State Governments and will be available to them in the event of any serious threatening disaster situation.
- The National Disaster Response Force (NDRF) units will also impart basic training to all the stakeholders identified by the State Governments in their respective locations.

# Organisational and operational structure in Gujarat

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GSDMA

- Coordinate and Monitor Disaster Prevention and Mitigation Activities
- Act as Central Planning, Coordinating and Monitoring Body for Post-Disaster Reconstruction and Rehabilitation
- Promote Awareness and Preparedness and Advice and Train the Community and Stakeholders with view to Increase Capacity

COR

- Coordinate and Monitor Disaster Response & Relief

GIDM

- Human Resource Development, Capacity Building, Training, Academic Programs, Research and Documentation in the field of Disaster Management

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# Further Reading

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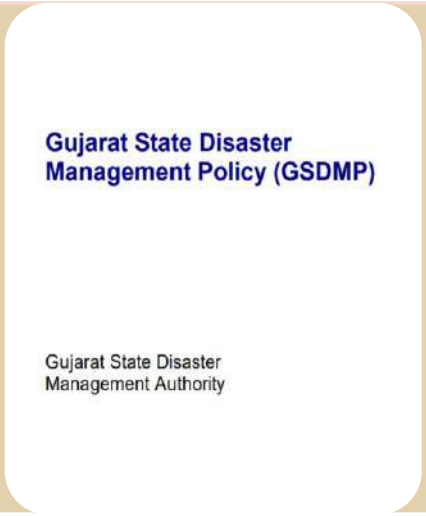
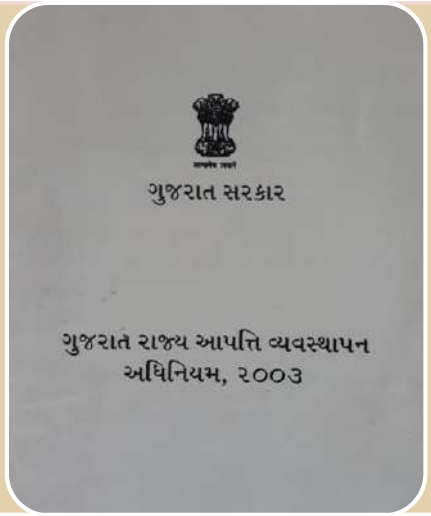



[State Disaster Management Policy, 2002]




[State Disaster Management Act, 2003]

[State Disaster Management Plan]

# Resilience to disaster: Way forward



- **Resilience** is the ability of a system, community or society exposed to hazards to
  - resist,
  - absorb,
  - accommodate to and
  - recover from

  the effects of the hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions

- How do we become resilient? It is a complex net of many elements.
  - It is multi-disciplinary, trans-disciplinary.
    - Technical science, social science, medical science, environmentalists etc., everyone is involved, directly or indirectly. (**Can you think of how you fit in here?)**

- Just to get an idea of how this will work:
  - Hazard -> Early warning -> Information dissemination -> Impact -> Rescue & Relief -> Reconstruction & Rehabilitation -> Building back better (All this is according to DM Cycle and SFDRR) **(Can you relate?)**

# Emergency Response Coordination Centre (ERCC) – ECHO Daily Map | 06/10/2016
# Haiti, Dominican Republic, Cuba, USA – Tropical Cyclone MATTHEW

**HURRICANE WARNING**
*in effect as of 6 Oct, 9.00 UTC*
***(NOAA)***

- Central Bahamas: Long Island, Exuma, Rum Cay, San Salvador, Cat Island
- North-western Bahamas: Abacos, Andros Island, Berry Islands, Bimini, Eleuthera, Grand Bahama Island, New Providence
- North Golden beach
- Lake Okeechobee

**Impact in Haiti, Dominican Republic, Cuba and the Bahamas**

- 9 people dead
- > 1 million people evacuated
- 10 people injured
- >5 200 houses damaged
- 230 schools damaged

**Intensity**
- Hurricane
- Tropical Storm
- Tropical Depression

**Wind Buffer**
- > 120 km/h
- 93-120 km/h
- 64-92 km/h
- Area of track uncertainty

**GDACS Alert**
- Moderate Event
- Potential local disaster
- Potential severe disaster

**Storm Surge JRC calculations**
- < 1 m
- 1 – 3 m

**Legend**
- People dead
- People evacuated
- People injured
- People missing
- Houses damaged
- Houses destroyed
- Heavy rain
- Landslide
- Damaged school

**Pop. Density** *(pop/km²)*
- 501 - 2 500
- 2 501 - 5 000
- 5 001 - 130 000
- Affected Departments

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# Resilience to disaster: Way forward

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- Let us understand the importance of resilience through a simple example; the benefits of being prepared!
- Cyclone Mathew hits Cuba and Haiti in October, 2016. (Refer to the next slide)
- The effects of the same cyclone is so different on the two countries! **(Can you find out why?)**

**Cuba**

Deaths: 0

Evacuated: 70,000

Population of most affected municipalities: 300,000

**Haiti**

Deaths: 548 (+128 missing)

Evacuated (displaced): 175,000

Population of most affected municipalities: 1,000,000

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# Food for thought

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- The level of preparedness of Japan is usually understood to be very good. This can be attributed to the fact that it witnesses earthquake and typhoon almost every other day. **To attain that level of preparedness, does India need to suffer the same frequency of recurring hazards?**

- **Again,** it is inherent to a human to think that disaster will not happen to me and thereby he or she lacks in preparedness**. So, should one suffer a disaster to be prepared?**

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# Thank You