Cyclone as a Disaster

- Where do Cyclones Originate?
- How do Cyclones Originate? (Geography)
- Vulnerability of India
- Impact of cyclones
- Management

Implications

- ↳ loss of life → more than 40,000 deaths
- ↳ loss of property.
- ↳ Social and Economic backwardness.
- ↳ Agriculture
- ↳ Environmental damage.

⊕

→ Global warming & Climate Change

→ frequency and intensity of cyclones are increasing.

Management

"What the weather will be"

$\downarrow$

'What the weather will do"

(V) **Mangrove plantation**

(I) Early warning system

(II) Building Resilience - ⟹ Underground Cables.
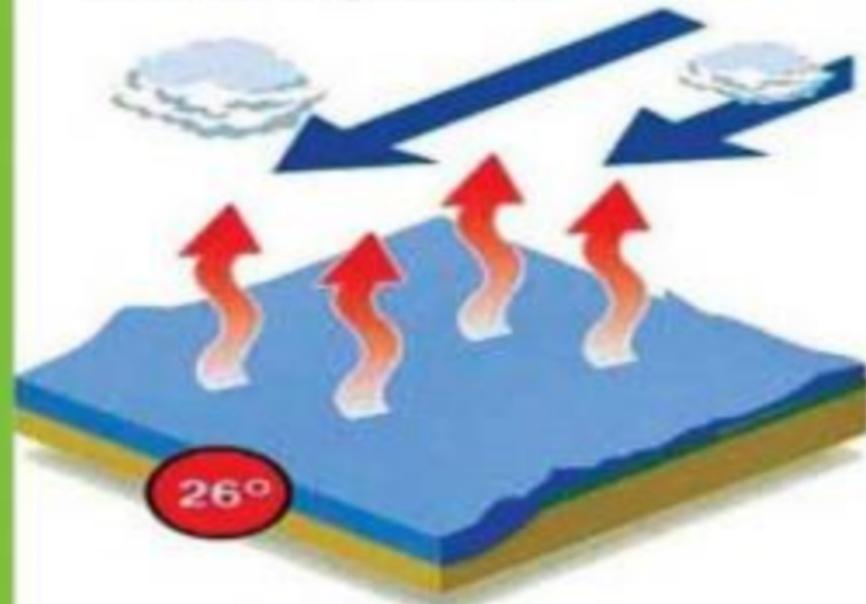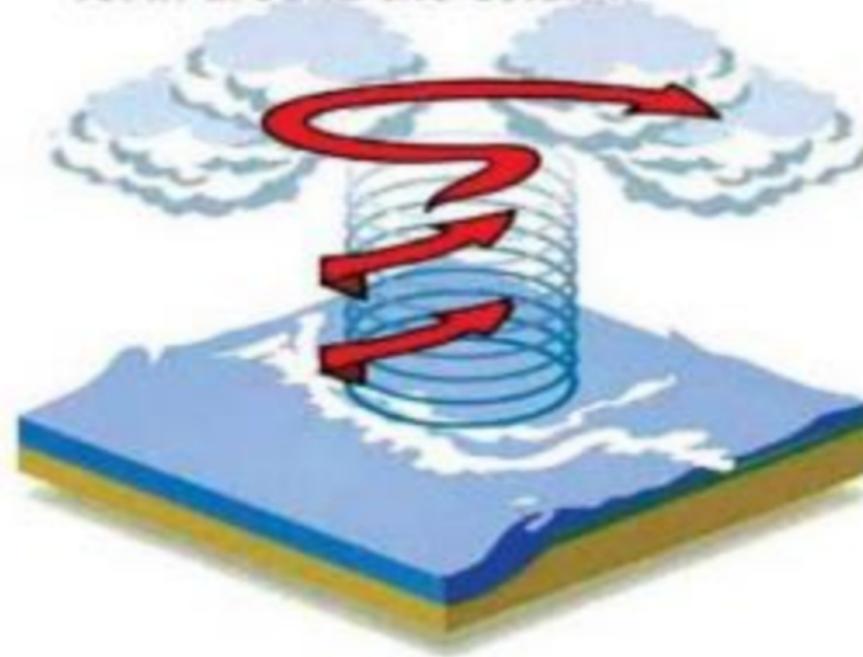
(III) Capacity development

(IV) Institutions

HOW TROPICAL STORMS ARE FORMED

High humidity and ocean temperatures of over 26°C are major contributing factors
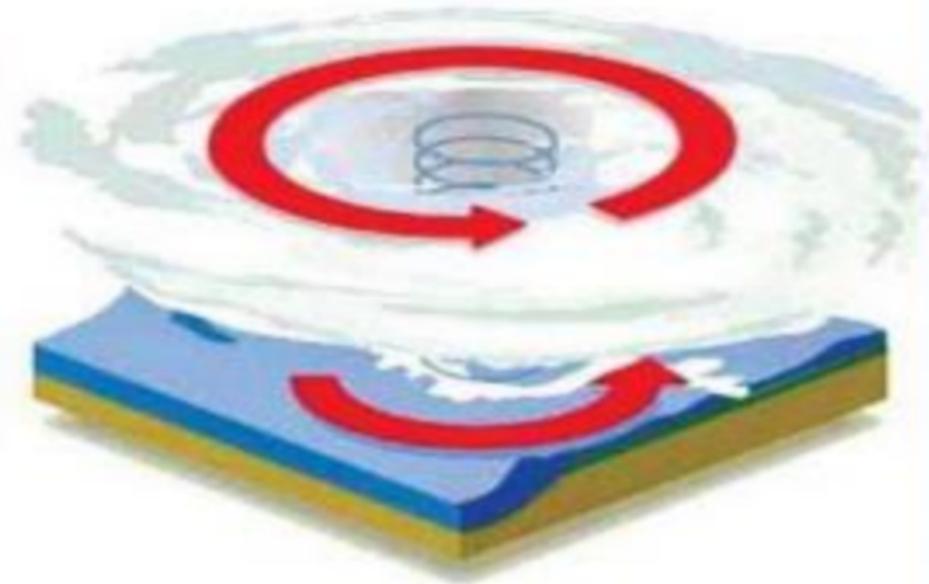
Water evaporates from the ocean surface and comes into contact with a **mass of cold air**, forming **clouds**

A column of low pressure develops at the centre. Winds form around the column

As pressure in the central column (the eye) weakens, the **speed of the wind around it increases**

26°

Saffir-Simpson hurricane wind scale

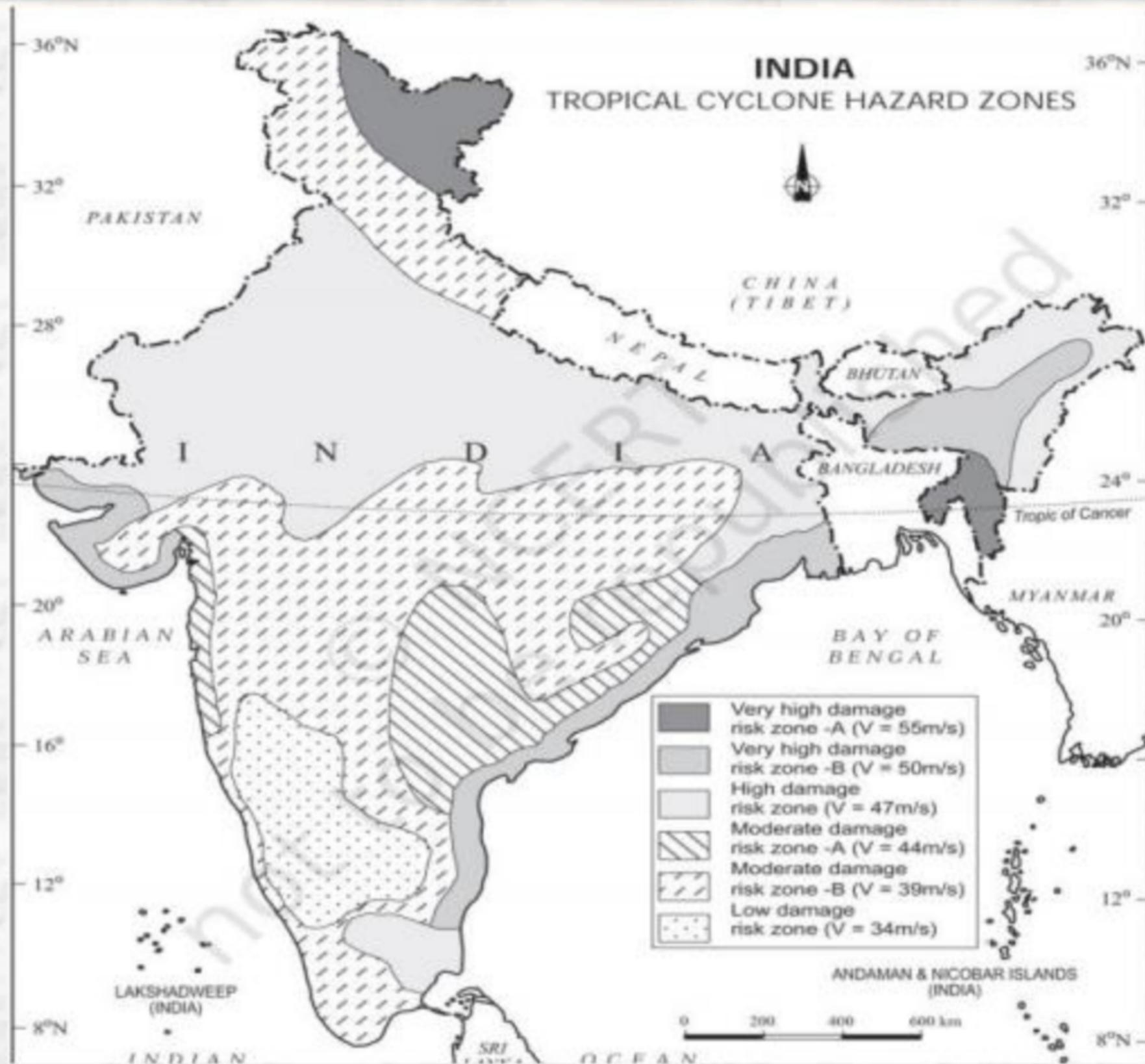| CATEGORY 1	CATEGORY 2	CATEGORY 3	CATEGORY 4	CATEGORY 5
Minimal damage	Moderate damage	Extensive damage	Extreme damage	Catastrophic
Winds 119-153 kph	Winds 154-177 kph	Winds 178-208 kph	Winds 209-251 kph	Winds 252 kph and more

Source: NHC

IMD Classification

- **Depression:** Winds up to 51 kmph.

- **Deep Depression:** Winds between 52 and 61 kmph.

- **Cyclonic Storm:** Winds between 62 and 88 kmph.

- **Severe Cyclonic Storm:** Winds between 89 and 117 kmph.

- **Very Severe Cyclonic Storm:** Winds between 118 and 166 kmph.

- **Extremely Severe Cyclonic Storm:** Winds between 167 and 221 kmph.

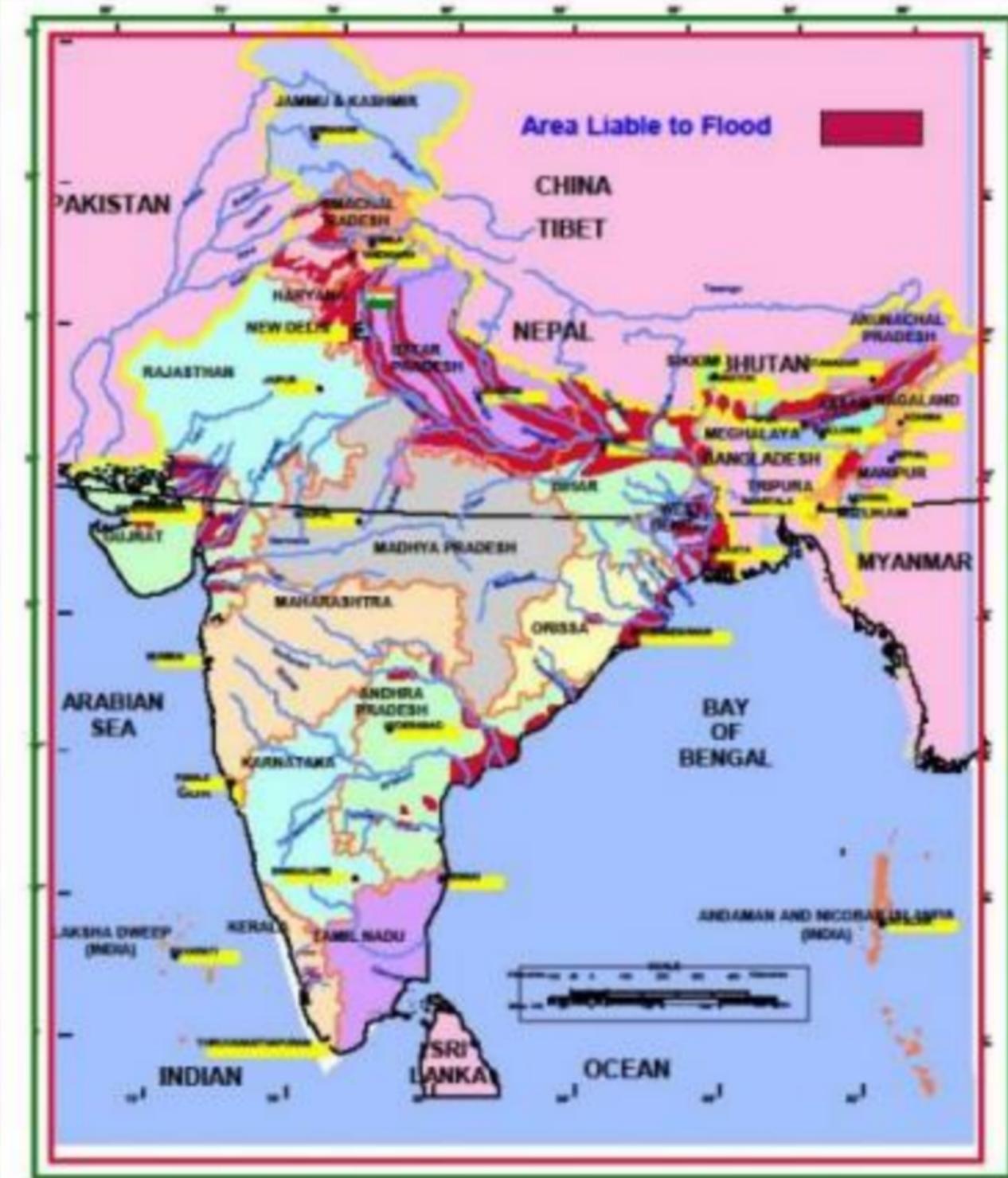- **Super Cyclonic Storm**: Winds exceeding 221 kmph.

Vulnerability

- About 5,700 km of the India's coastline encompassing 84 Coastal districts **(roughly 8% of the geographical area) in 13 Coastal States and Union Territories (UTs) are affected by severe tropical cyclones year after year**.

- Approximately **40% of India's population is living within 100 km of the coastline.**

INDIA
TROPICAL CYCLONE HAZARD ZONES

Legend:
- Very high damage risk zone -A (V = 55m/s)
- Very high damage risk zone -B (V = 50m/s)
- High damage risk zone (V = 47m/s)
- Moderate damage risk zone -A (V = 44m/s)
- Moderate damage risk zone -B (V = 39m/s)
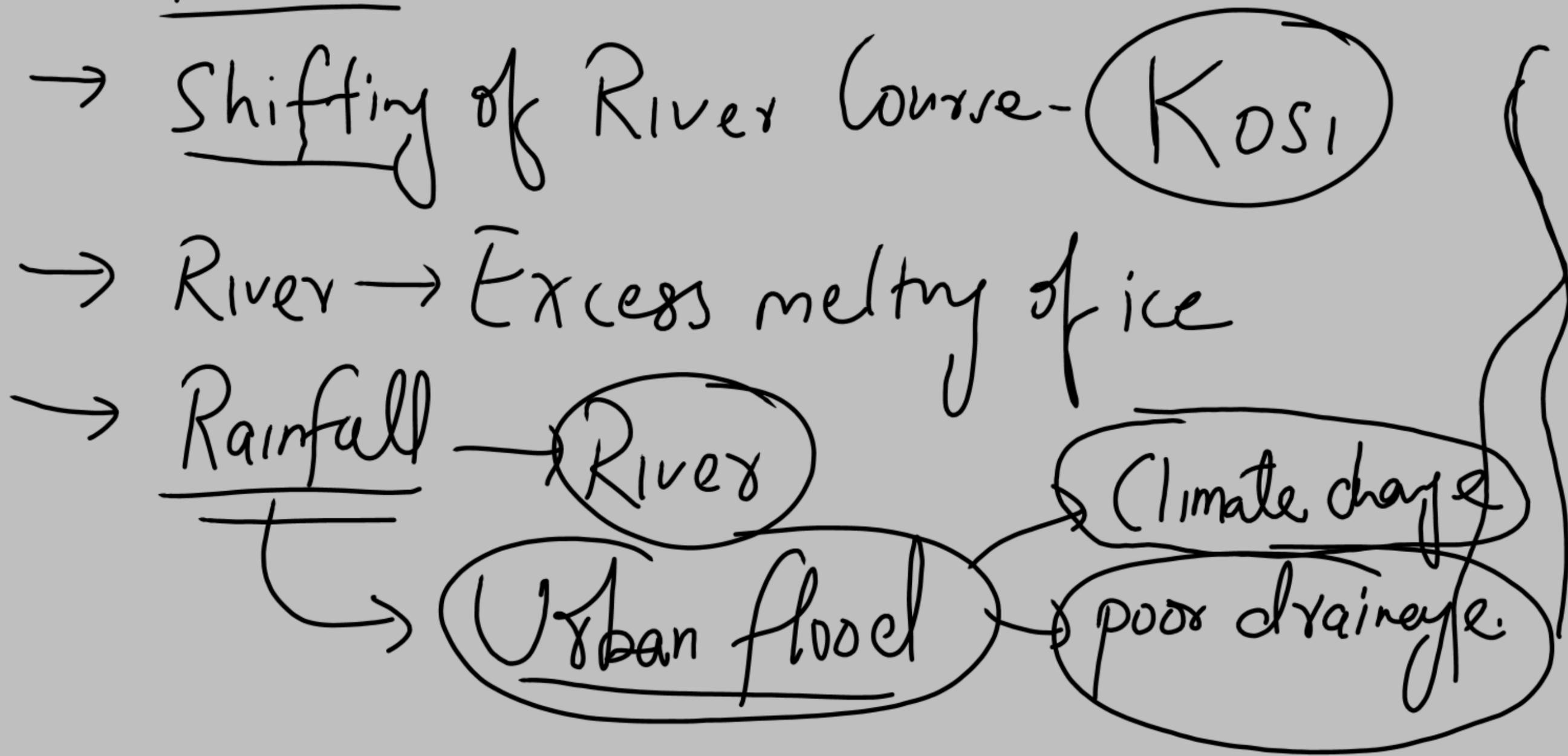- Low damage risk zone (V = 34m/s)

Vulnerability

- 1977 Cyclone – 10,000 death Andhra Pradesh
- 1990 Super Cyclone - 967 people in Andhra Pradesh
- 1996 Very Severe Cyclonic Storm with a fatality of 1,057 people in Andhra Pradesh
- **1999 Super Cyclone** - Odisha with a fatality of about 10,000 people, destroying 275,000 homes and leading to 1.67 million homeless.
- **October 12 2013, Cyclone Phailin** hit the states of Odisha and Andhra Pradesh with maximum sustained wind gusting up to 220 km per hour, heavy rains measuring up to 25 cm and storm surge over 3 m; the sea pushed in as much as 40 m along parts of the coast.
- Affecting about 13.2 million people in 171 blocks in 18 Districts of the state, and resulting in 44 human casualties.
- It was the strongest cyclone to hit the Indian coast, similar to the Super Cyclone of 1999 which hit Odisha.
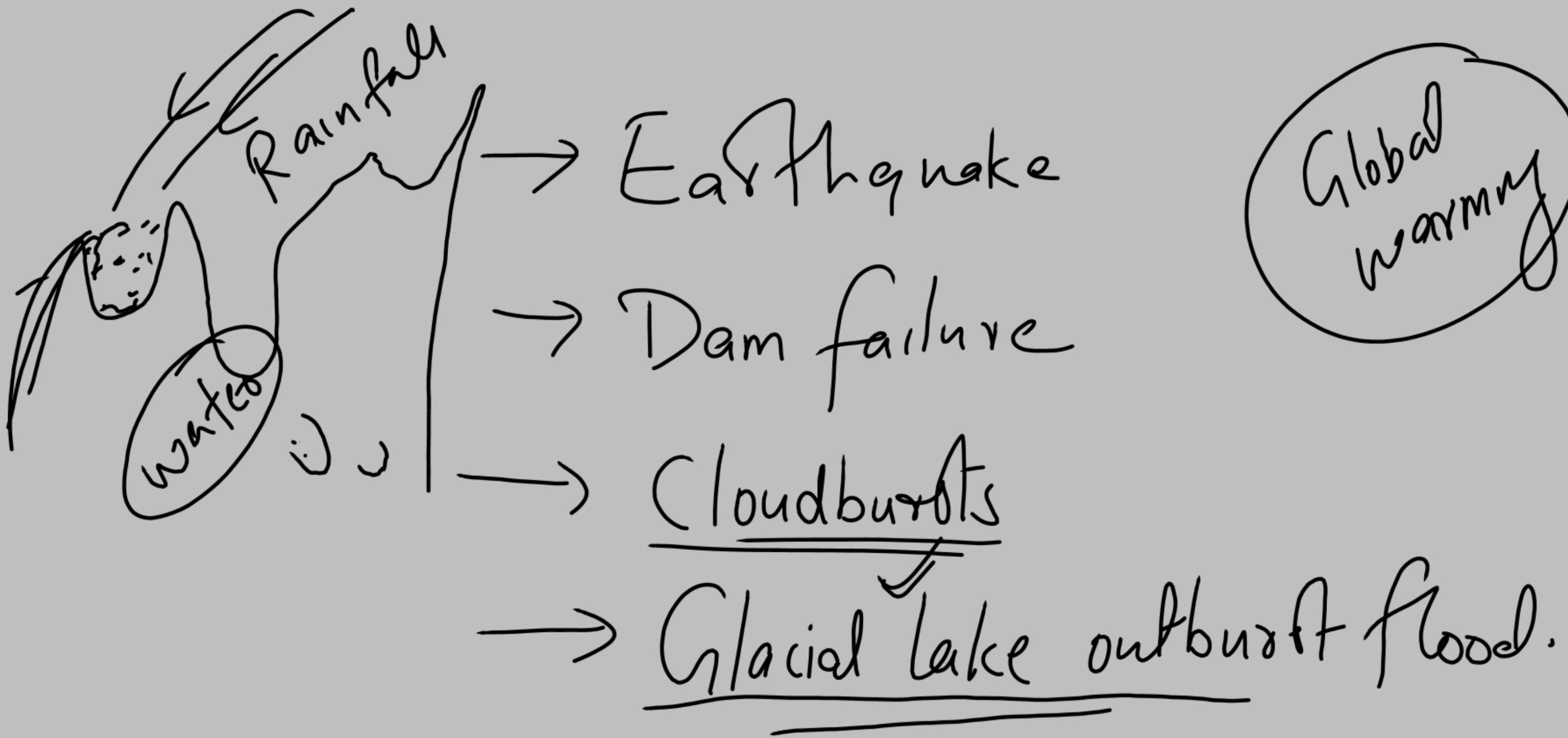
Flood Vulnerability

Floods

Factors

→ Shifting of River Course - (Kosi)

→ River → Excess melting of ice

→ Rainfall — (River)

(Urban flood) — (Climate change)

(poor drainage)

Rainfall

water

$\rightarrow$ Earthquake

$\rightarrow$ Dam failure

$\rightarrow$ Cloudbursts

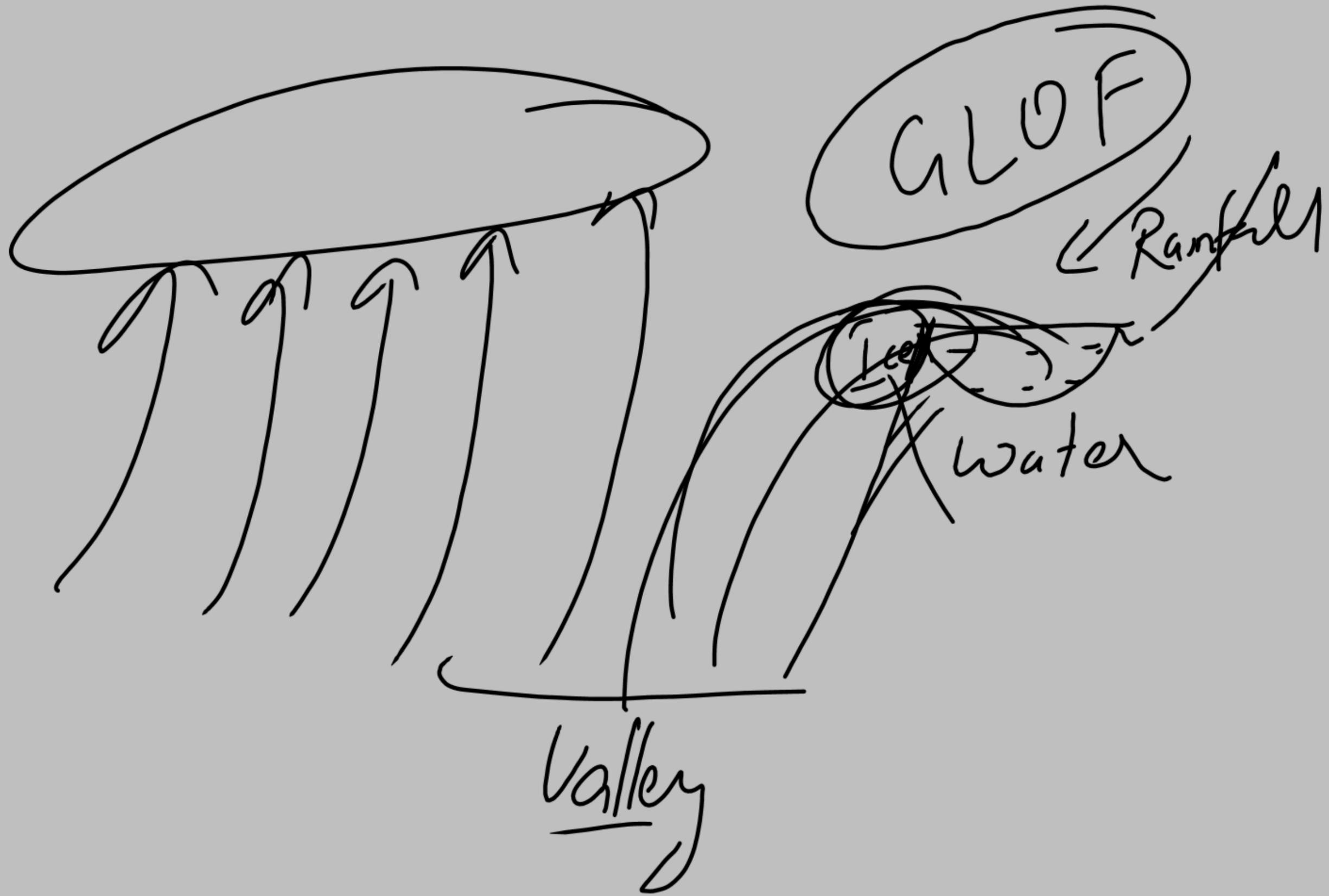$\rightarrow$ Glacial lake outburst flood.

Global warming

GLOF

Rainfall

Ice

water

Valley

Flood Vulnerability

- India is highly vulnerable to floods. Out of the total geographical area of 329 million hectares (mha), more than 40 mha is flood prone.
- Floods are a recurrent phenomenon, which cause huge loss of lives and damage to livelihood systems, property, infrastructure and public utilities.
- India is the world's worst flood-affected country after Bangladesh, accounting for one fifth of global death count due to floods.
- Between 1953 and 2011, floods in India caused the deaths of 1,653 people on average each year.
- In 2023, floods have caused extensive damage to several landmarks in Delhi, such as the Red Fort and the Supreme Court.
- In 2010, 965 people died from floods, the highest number of deaths due to floods across the country over the last decade. In 2021, 656 people died from floods

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