

# Natural disaster reduction and a proposed management framework



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Center on Integrated Rural Development for Asia and Pacific

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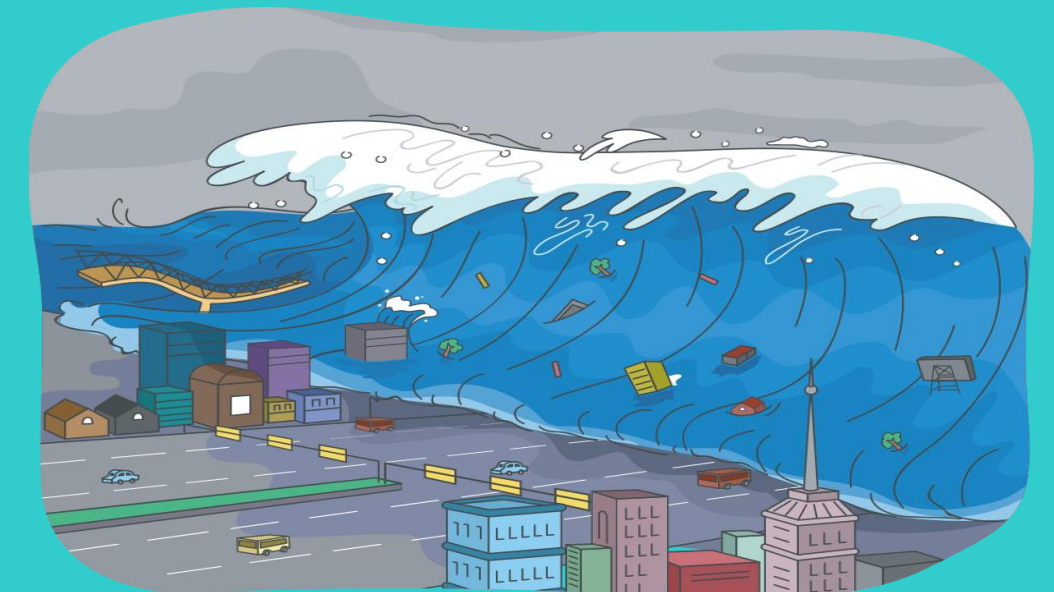
- What is a natural disaster?
- World disaster statistics of 2023
- Disaster management processes
- National disaster prevention and mitigation plans of Thailand
- A proposed flood risk management framework



# What is a natural disaster?

An event caused by a natural hazard, which refers to a natural process or phenomenon that can result in loss of life, property damage, and environmental impacts, such as earthquake, storm, flood, and tsunami.

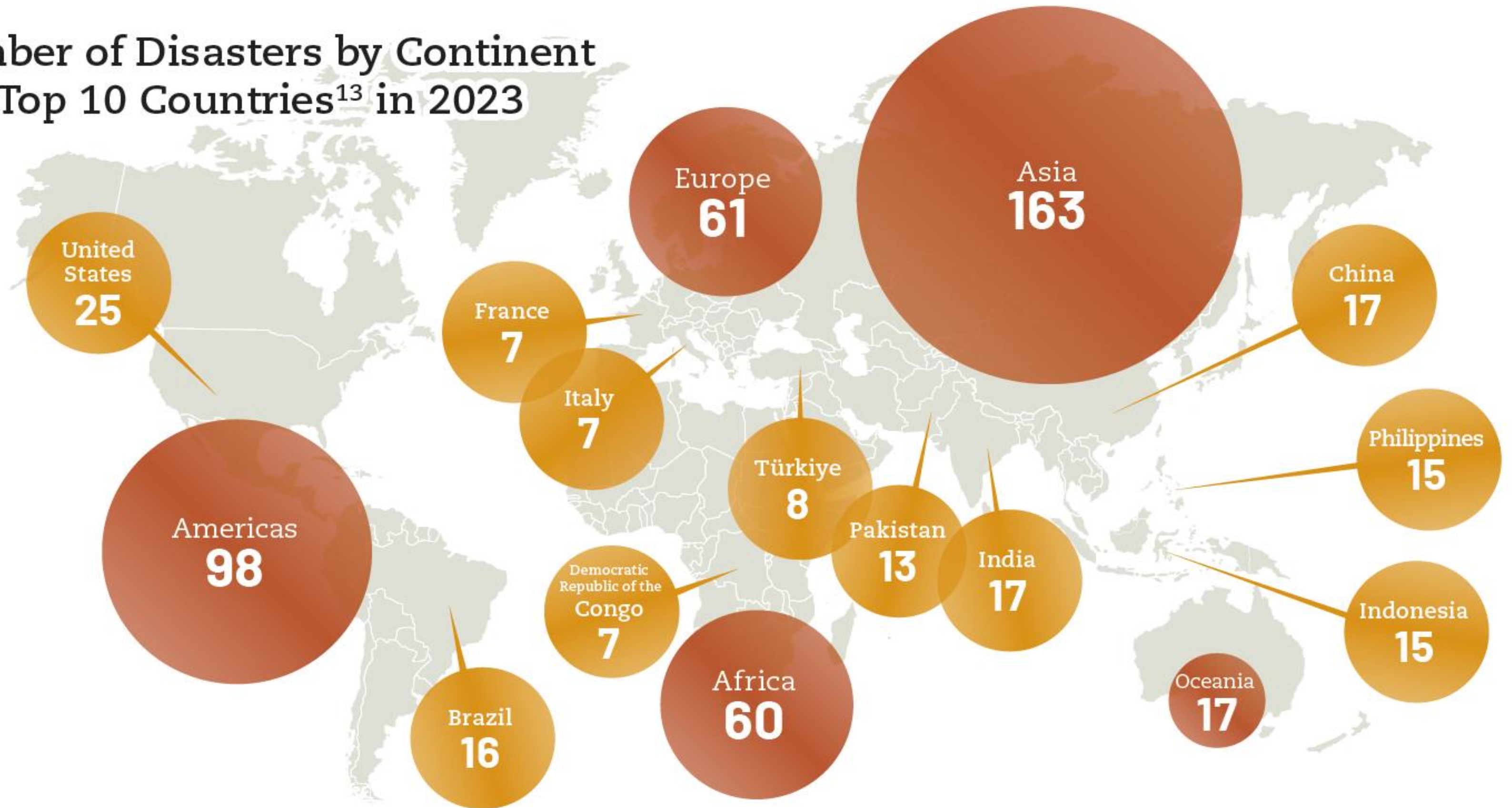
(AI definition based on: International Encyclopedia of Public Health, 2<sup>nd</sup> edition 2017)



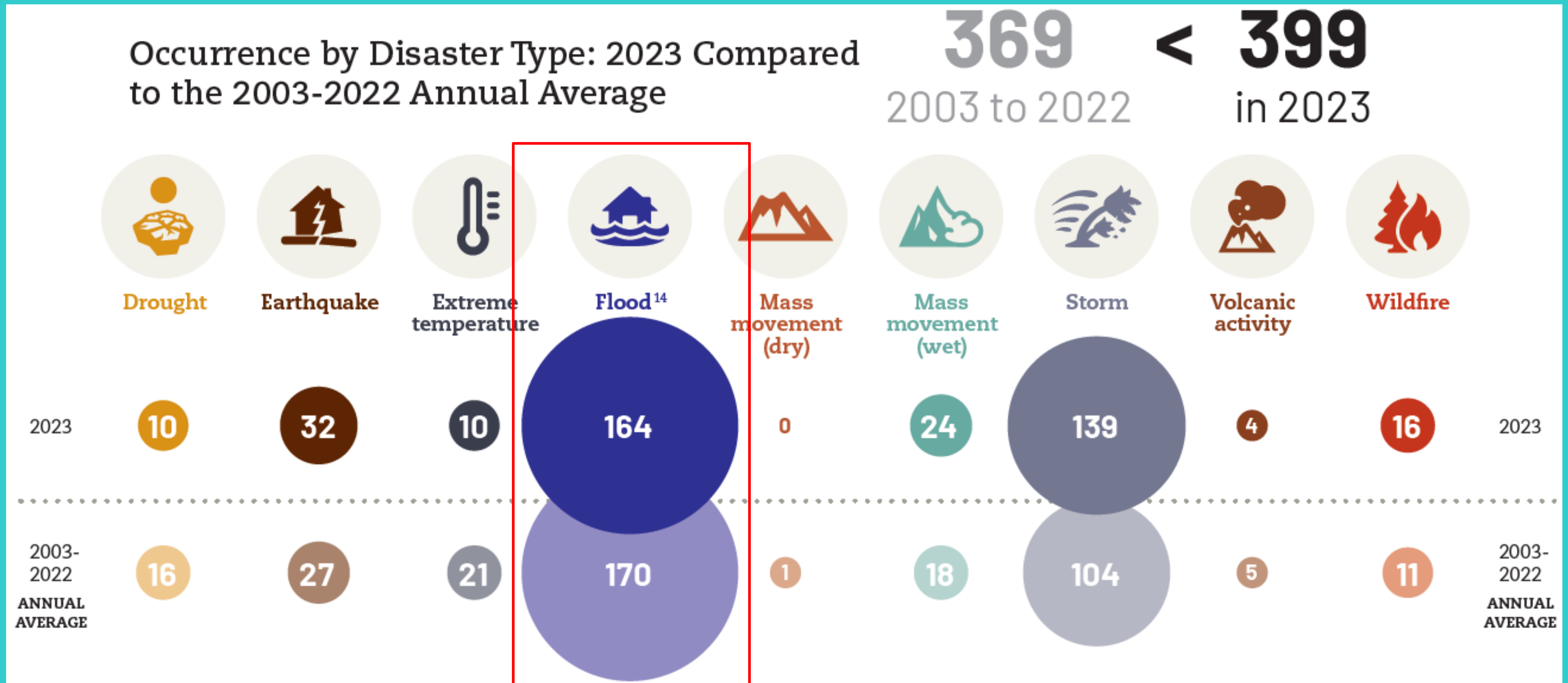


# World disaster statistics of 2023

Number of Disasters by Continent  
and Top 10 Countries<sup>13</sup> in 2023

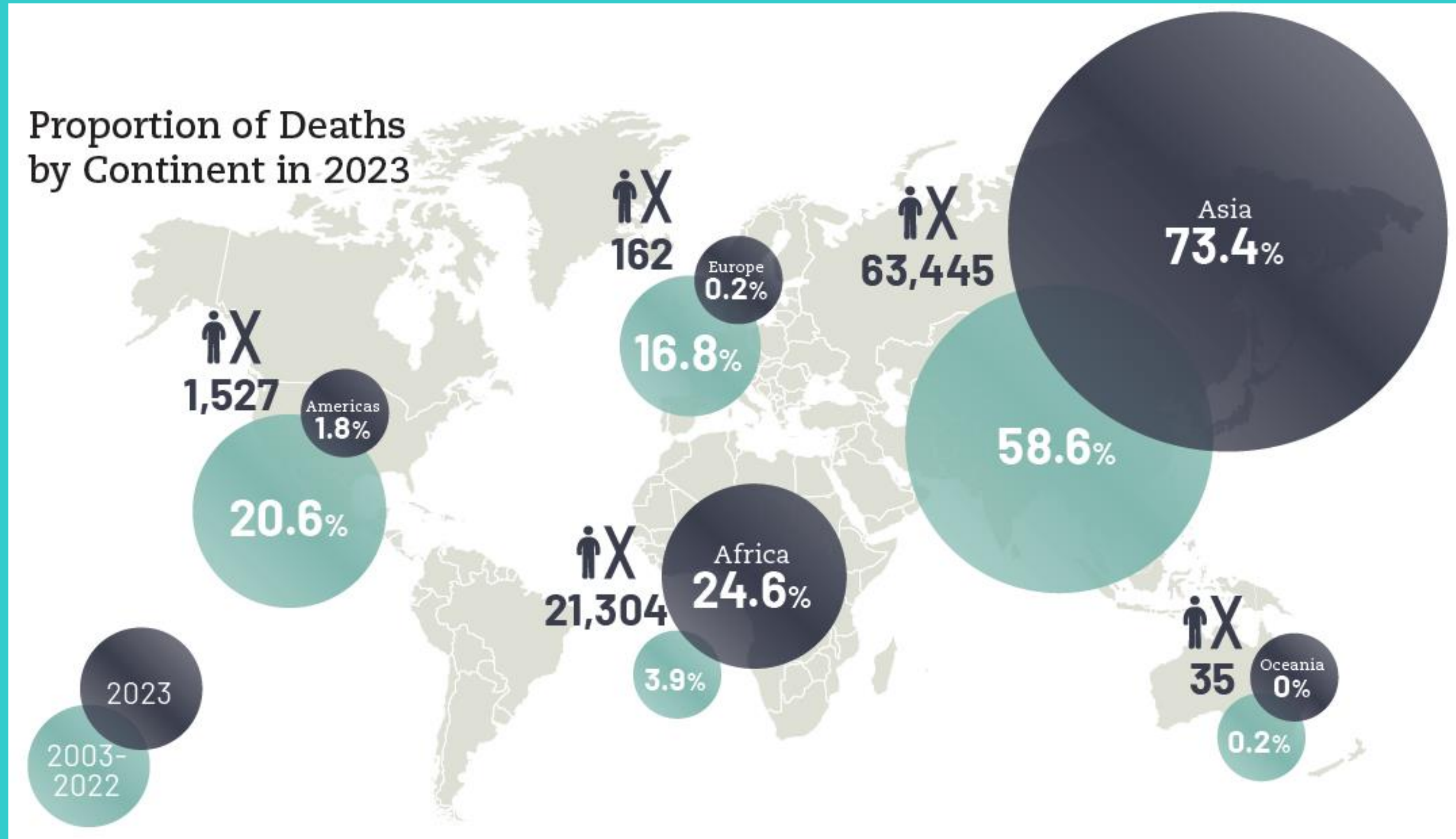


# World disaster statistics of 2023



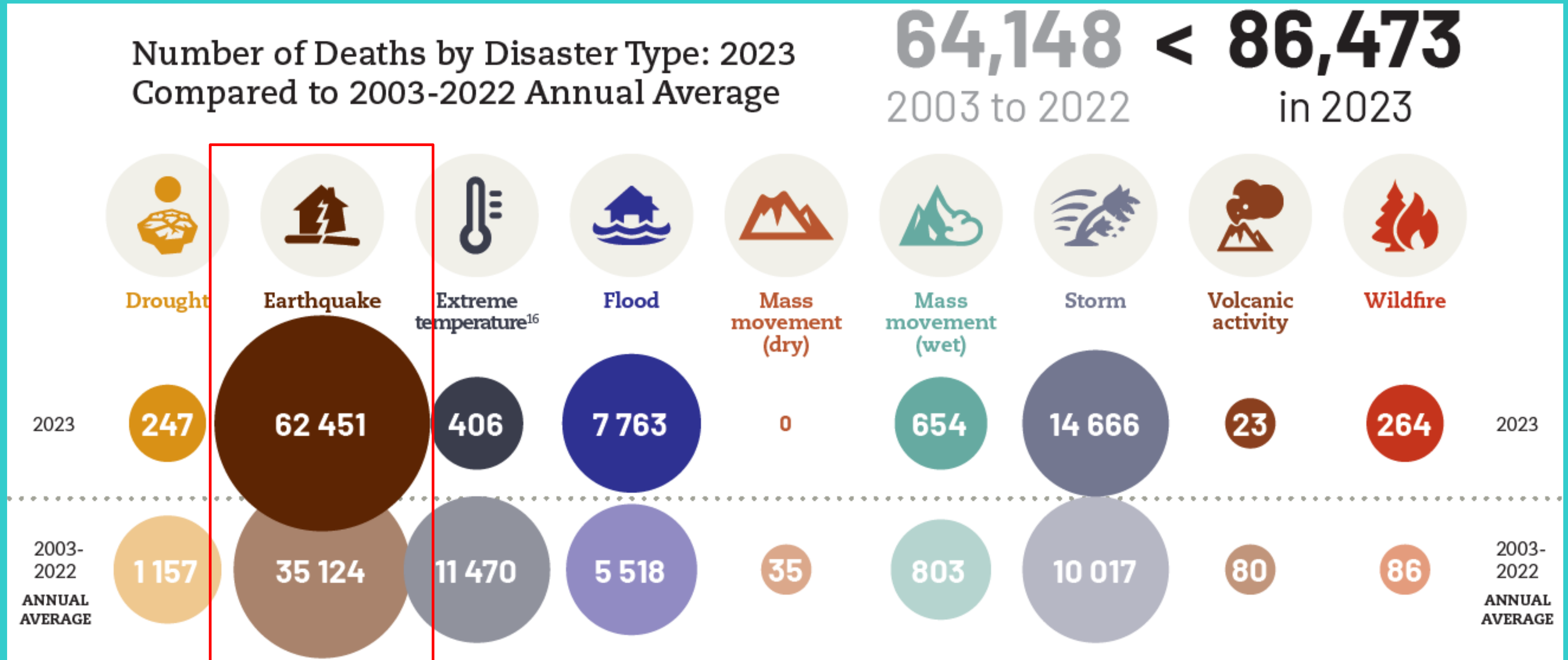


# World disaster statistics of 2023



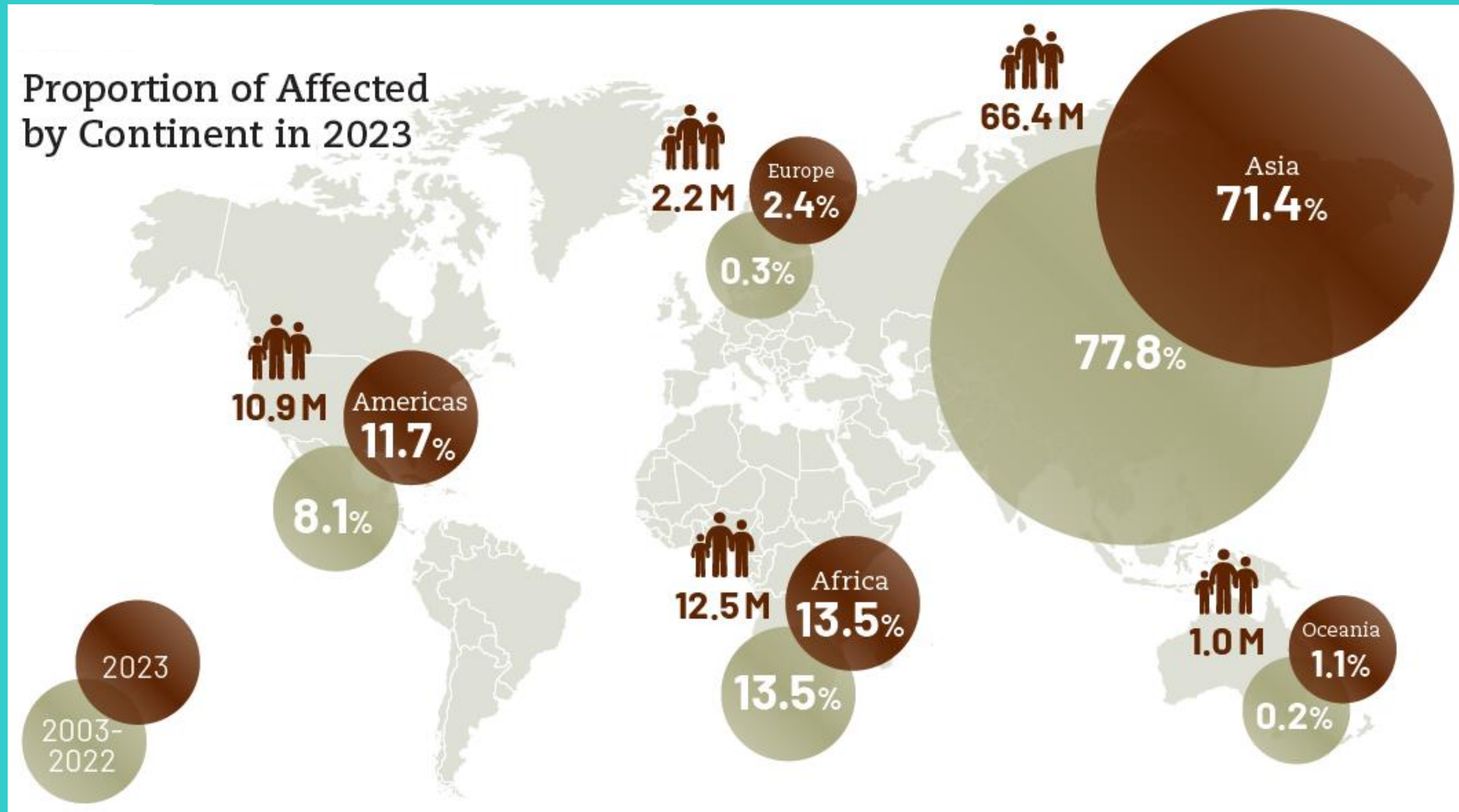
Centre for Research on the Epidemiology of Disaster (CRED 2024)

# World disaster statistics of 2023





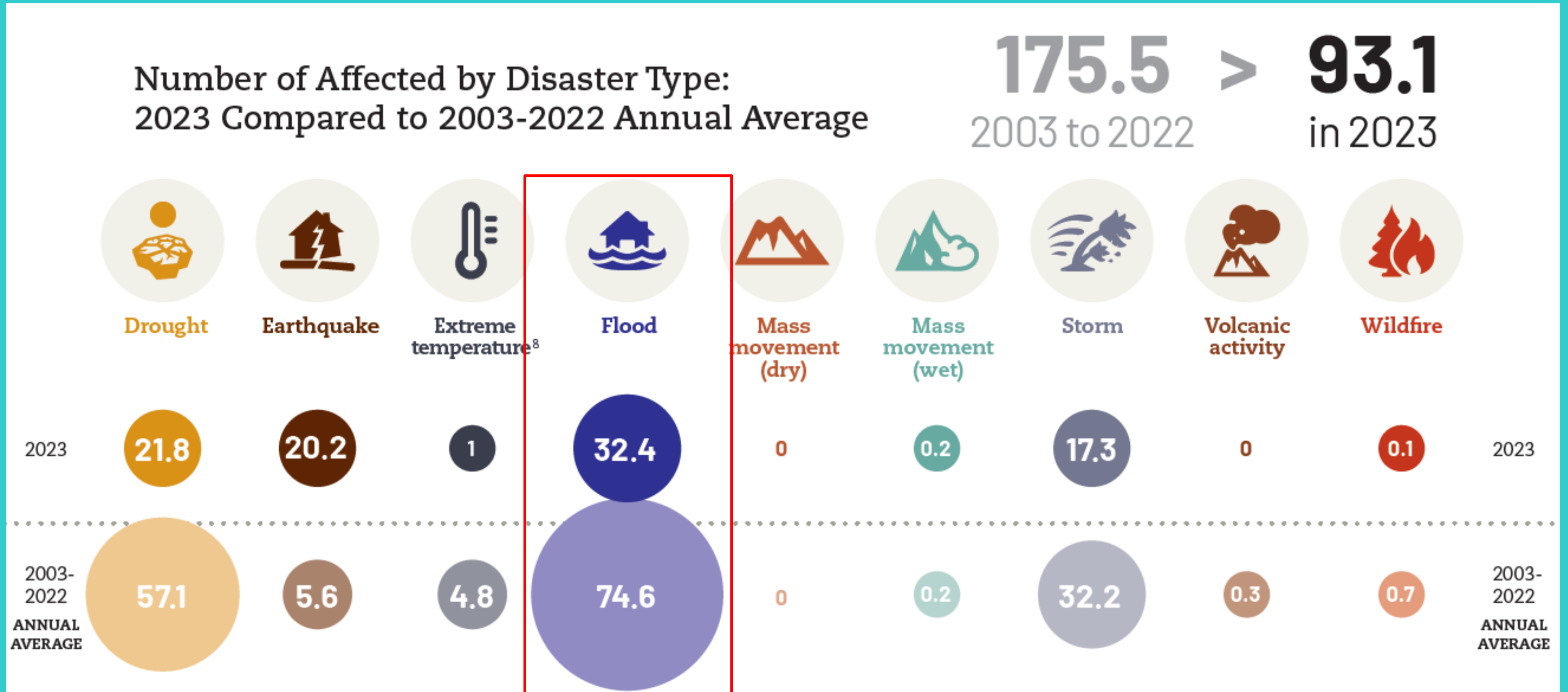
# World disaster statistics of 2023



Centre for Research on the Epidemiology of Disaster (CRED 2024)



# World disaster statistics of 2023

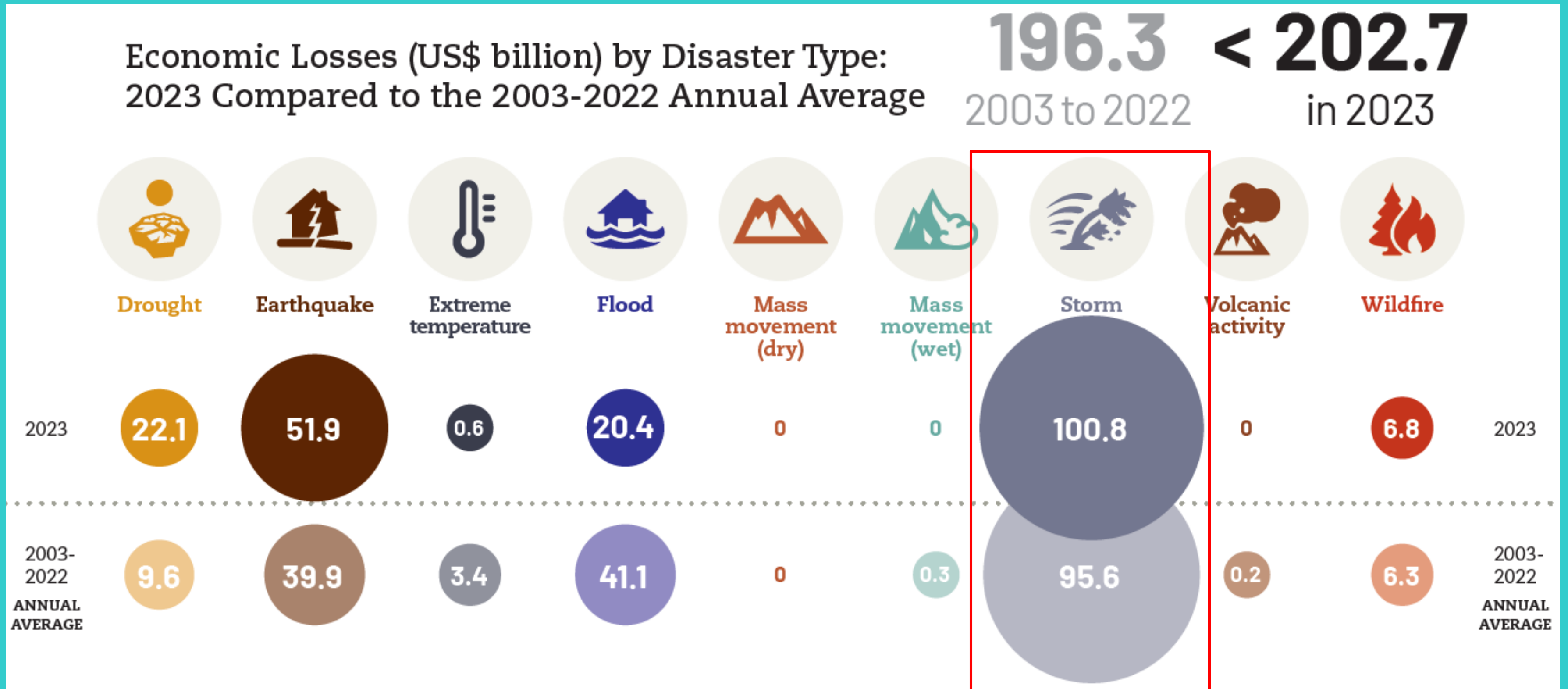


# World disaster statistics of 2023



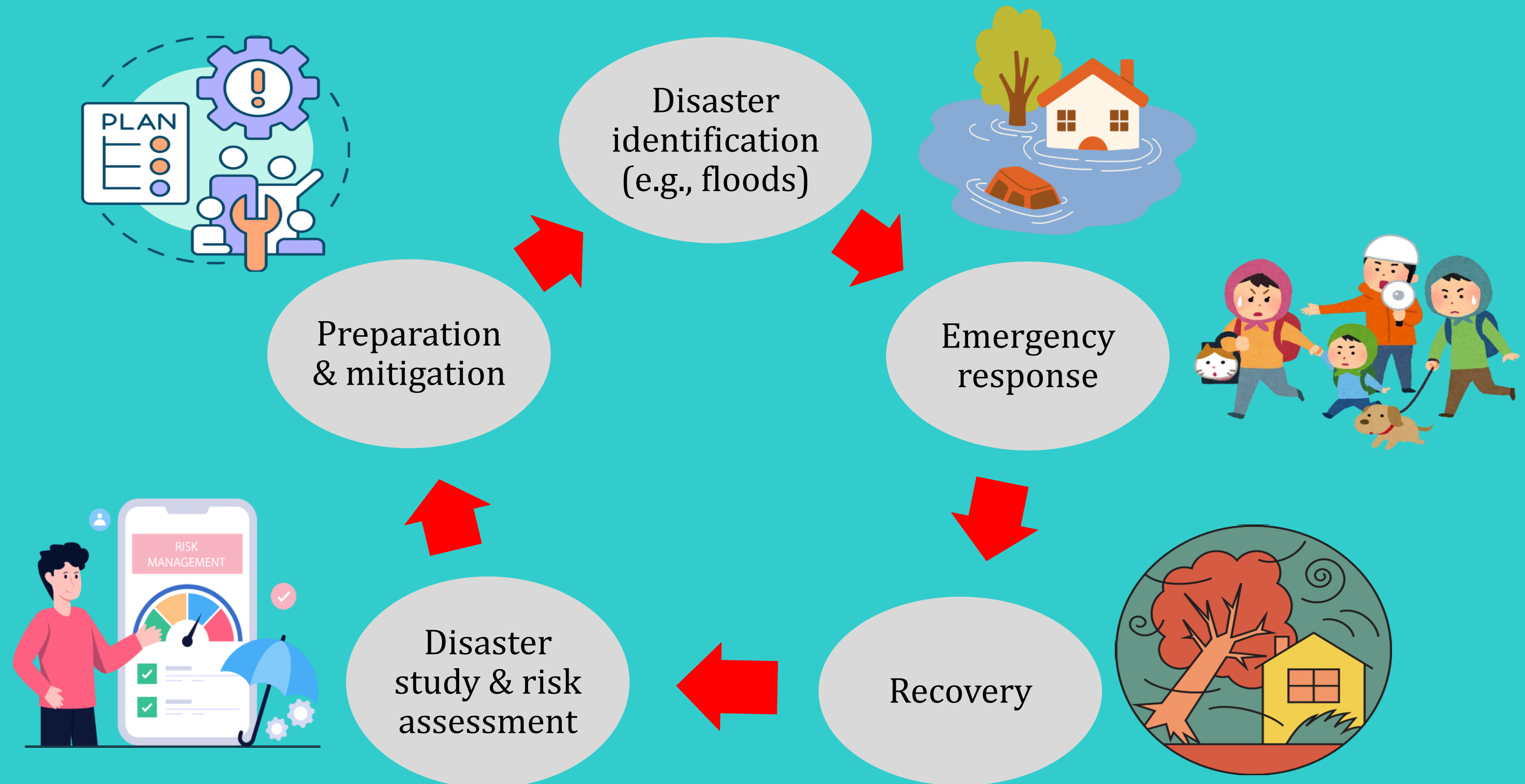
Centre for Research on the Epidemiology of Disaster (CRED 2024)

# World disaster statistics of 2023





# Disaster management processes





# Disaster management process: Emergency response



- Evacuating people, pets, animals, properties, etc. from the inundated areas.





# Disaster management process: Emergency response



- Providing the flood victims safe shelters for temporary stays.





# Disaster management process: Emergency response



- Providing food, clothes, medicine, physicians, & necessary things.





# Disaster management process: Recovery



- Infrastructures, factories, buildings, houses, agricultural areas, etc.
- Environment.
- Mental health of affected people/pets.



# Disaster management process: Risk study & assessment

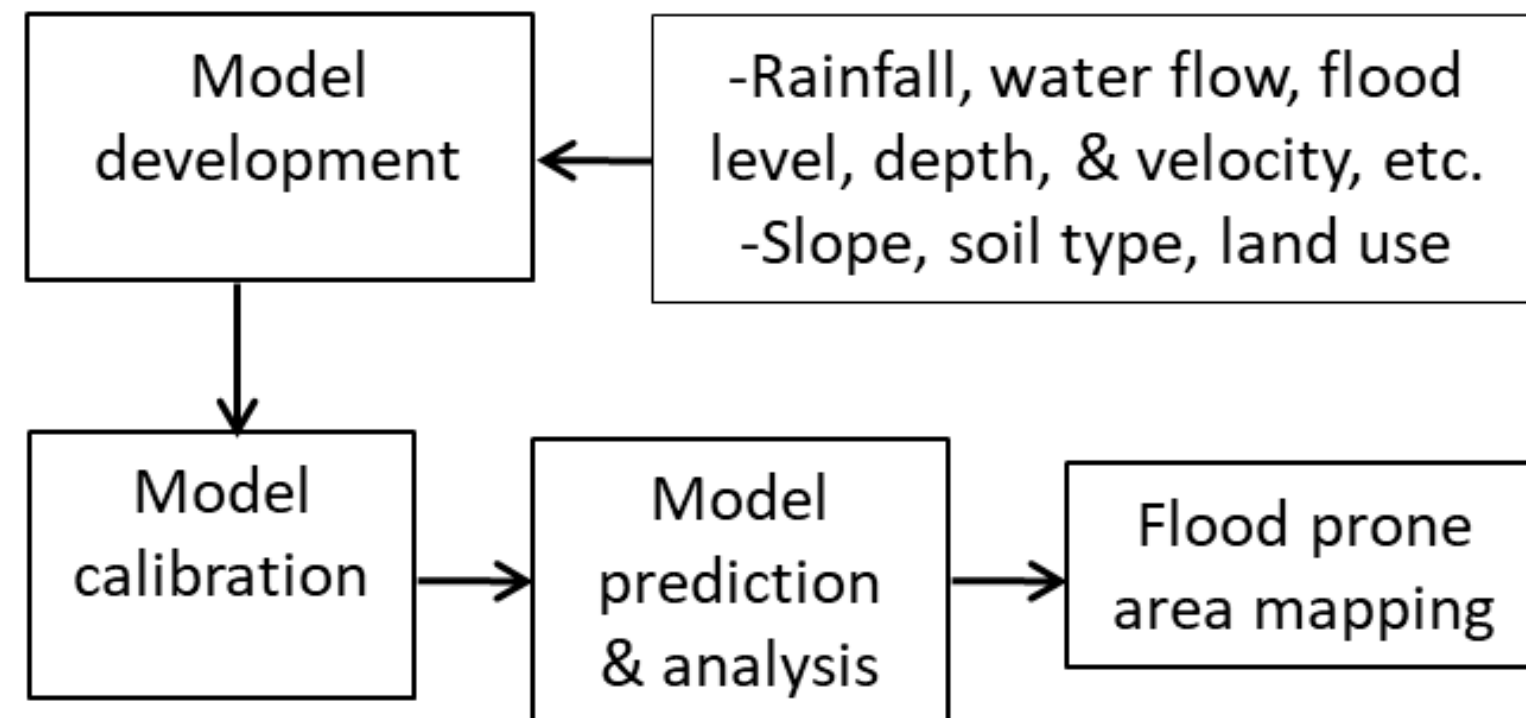
- Flood study

- Define nature and extent of flood problem
- Identify areas at risk (mapping)
- Categorize flood hazard

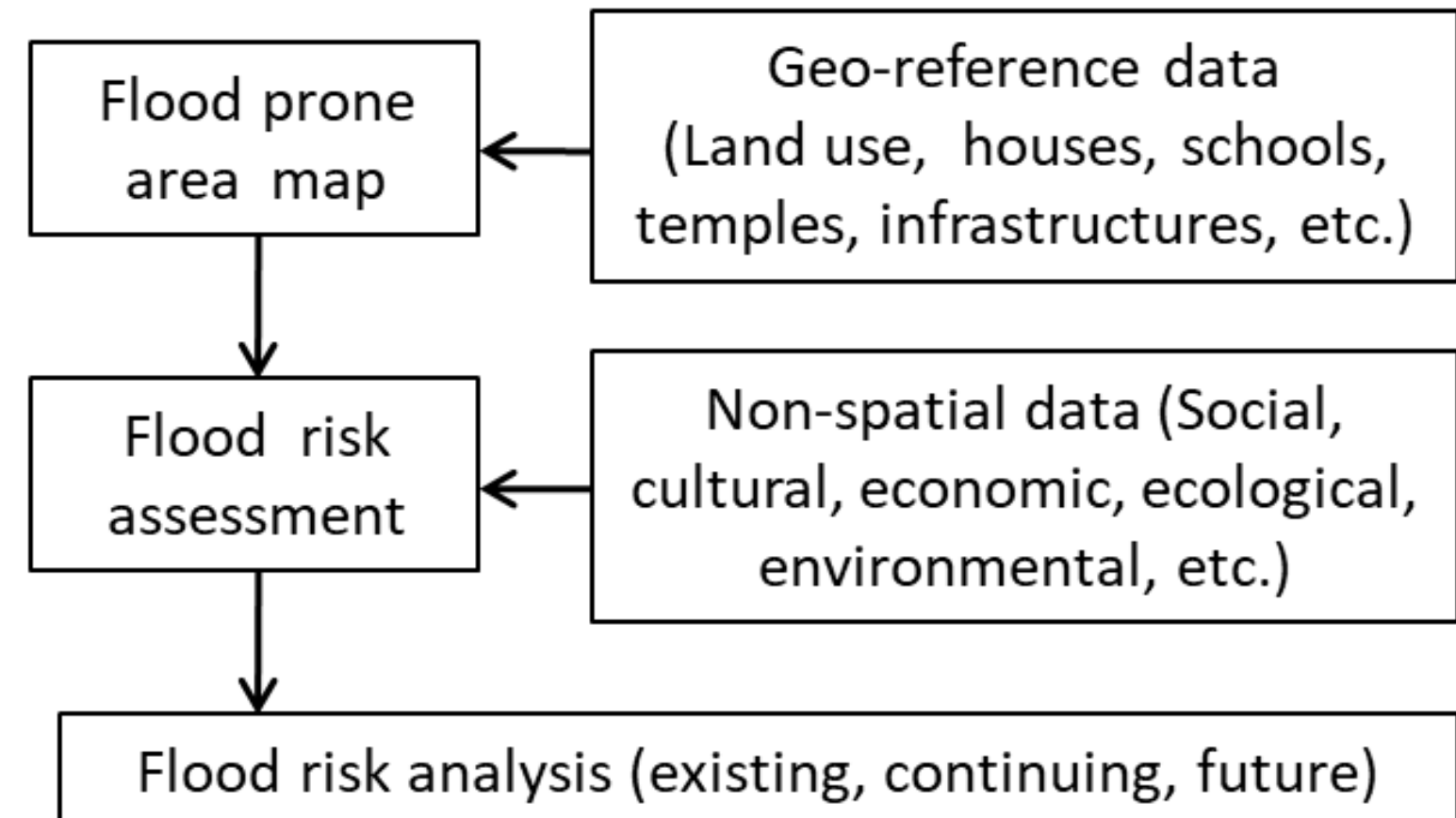
- Flood risk assessment

= Probability of occurrence of a flood hazard × consequences to individuals, community, and the environment

## Flood studies (e.g., flood prone area modeling)



## Floodplain management studies





# Disaster management process: Preparation & mitigation

- Floodplain management plans (existing, continuing, and future plans)
- Early flood warning system
- Local flood-watch network
- Local flood contingency plan and rehearsal
- Education and communication in flood risk, etc.

## Floodplain management plans

- Existing, continuing, future flood risks
- Methods for reducing flood loss & damages
- Local flood contingency plan and rehearsal

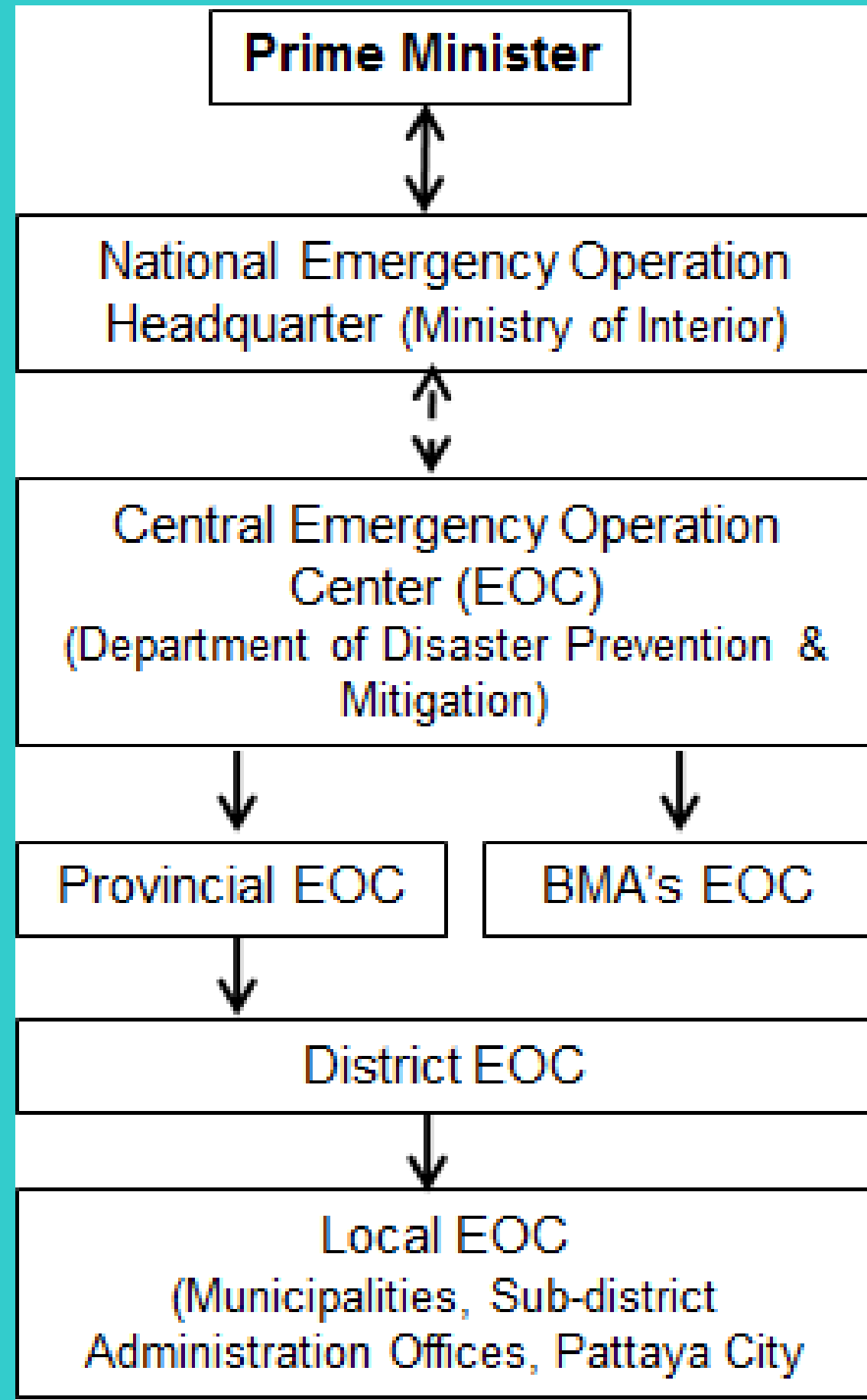


## Plan implementations

- Contingency plan rehearsal, warning system
- Local flood-watch network
- Education & communication in flood risks



# National disaster prevention and mitigation plans of Thailand



## The NDPMP's structure & functions

- The top-down policy management plan through the line government agencies.
- Managing all kinds of disasters in Thailand under the National Disaster Prevention & Mitigation Act that was established in 2007 following by some relevant plans and measures.

# National disaster prevention and mitigation plans of Thailand

Plans/framework	Time period	Response		Communication		Measures		Community participation	Type of flood risk considered		
		Passive	Progres sive	One- way	Two- way	Structural	Non- structural		Existing	Future	Continuing
<b>Existing</b>											
• National Disaster Prevention and Mitigation Plan (NDPMP)	Past-present	√	O	√	O	√	O	O	√	O	O
• Strategic National Action Plan on Disaster Risk Reduction 2010 – 2019	2010-2011	√	O	√	O	√	O	O	√	O	O
• Comprehensive flood management plan for the Chao Phraya River Basin	2013	√	O	√	O	√	O	O	√	O	O
• Strategic plan for flood management 2015 – 2026	2015-present	√	O	√	O	√	O	O	√	O	O

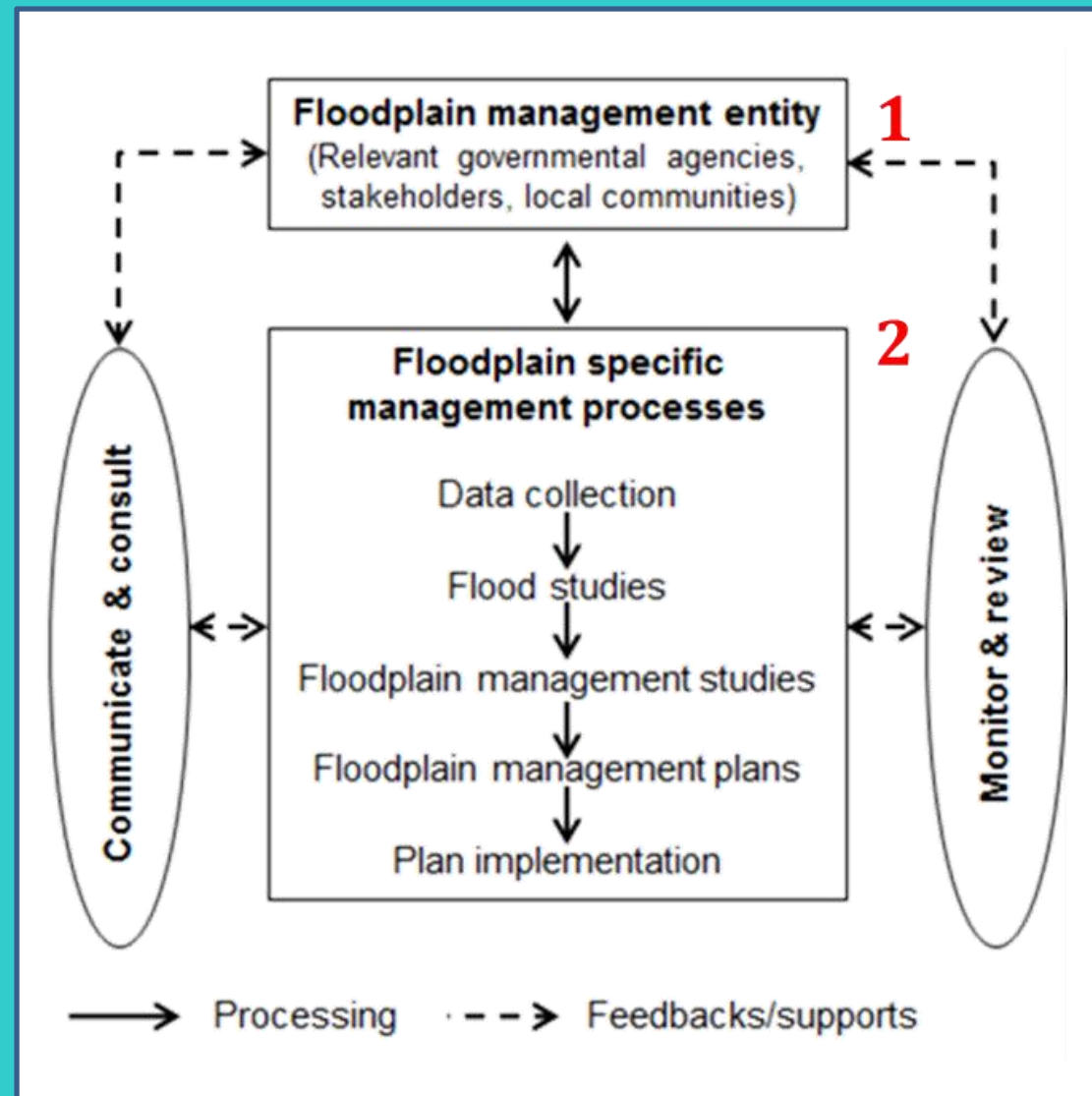
√ = available or emphasize, O = not available or not emphasize

## Serious drawbacks

- Lacking stakeholder participations (lead to ineffective collaborations).
- Inefficient (i.e., 1-way) communication in flood risks.
- Relying too much on structural measures, weak/no non-structural measures.
- Allowing new developments in areas with a high flood risk.
- Emphasizing measures (e.g., emergency responses) on ONLY existing flood events.



# A proposed flood risk management framework



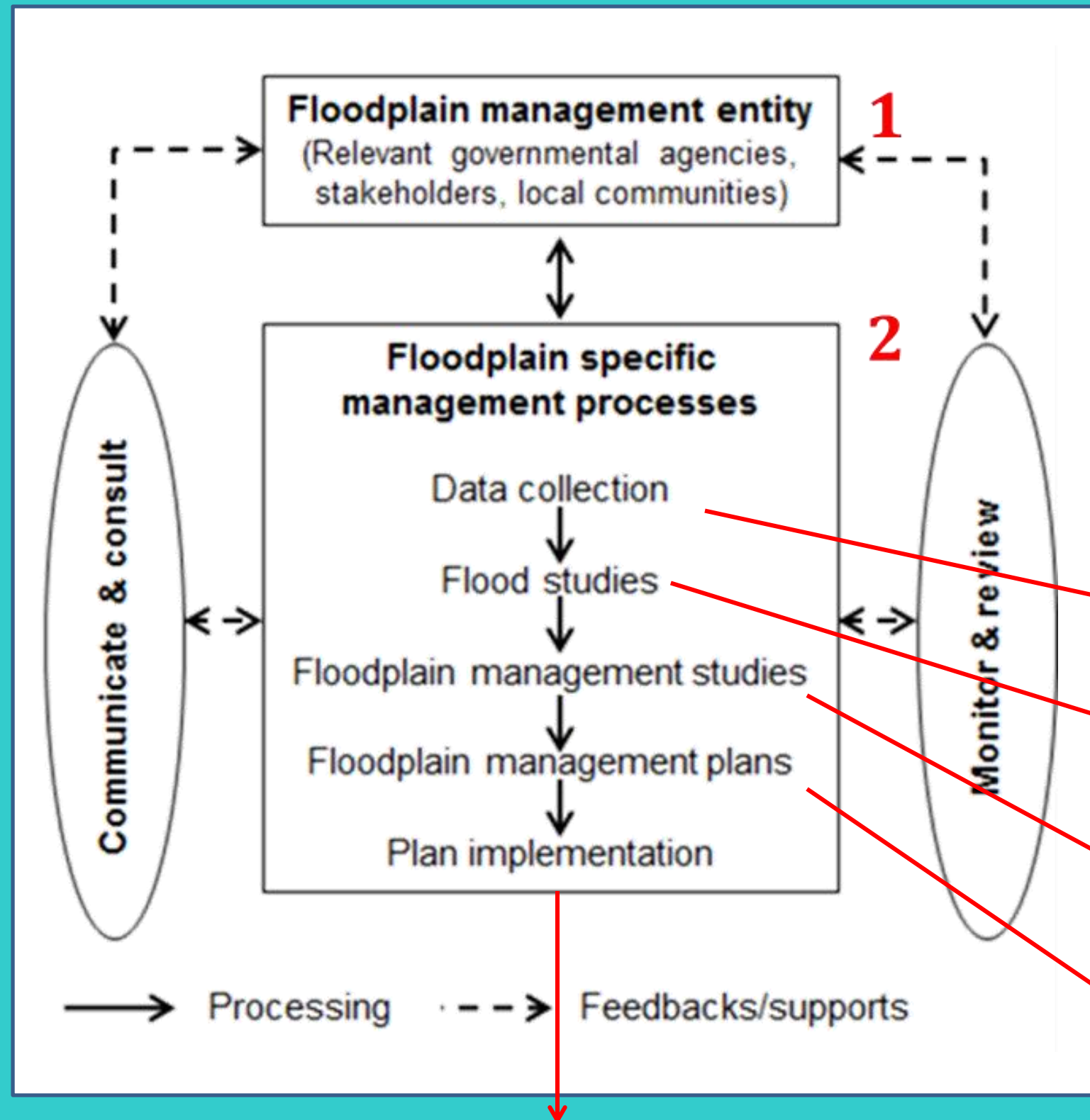
To efficiently manage a massive flood event, the traditional measures should be changed to a floodplain management framework that

- both line government agencies and stakeholders work together in the same level under the floodplain management entity (FME; 1).

- a majority is given to local participation.
- progressive measures and two-way communication are emphasized.

Plans/framework	Time period	Response		Communication		Measures		Community participation	Type of flood risk considered		
		Passive	Progressive	One-way	Two-way	Structural	Non-structural		Existing	Future	Continuing
<b>Proposed</b>											
• Flood risk management framework	Future	√	√	0	√	√	√	√	√	√	√

# A proposed flood risk management framework



- All floodplain specific management processes (2, i.e., data collection, flood studies, floodplain management studies, floodplain management plans, and plan implementation) should be monitored, reviewed, and commented back and forth by the FME and outside stakeholders.

central flooding database (e.g., historic flood levels, rainfall, topography, land use, plans, etc.

e.g., flood risk assessment, risk mapping in relation to land use/climate changes.

e.g., floodplain management plans/measures, land use planning/zoning.

plans that are relevant to existing, future, & continuing flood risks.

reviewed & improved by stakeholders, & implemented by local government agencies.

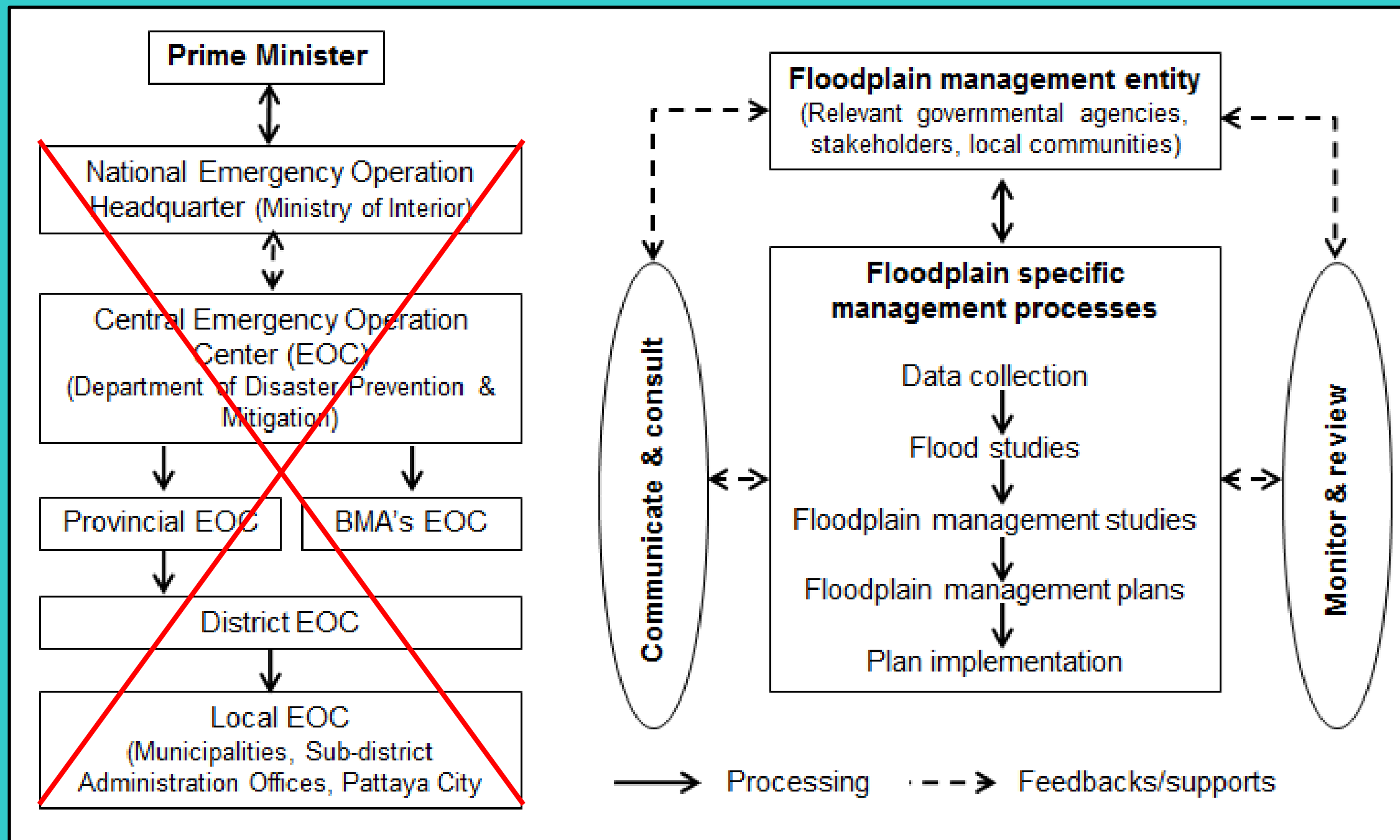
# A proposed flood risk management framework

Floodplain management plans should be prepared for all kinds of flood risks.

Existing flood risk	Future flood risk	Continuing flood risk
Associated with current development in the floodplain.	Associated with future development in the floodplain	Remains in both existing & future development areas.
<b>Current measures (in Thailand)</b> Structural measures (e.g., dams, dikes, flood protection walls).	<b>Current measures (in Thailand)</b> None: People live in a floodplain with high flood risk.	<b>Current measures (in Thailand)</b> <b>None:</b> People faced flooding in the same areas almost every year.
<b>Suggested measures (e.g.)</b> <ul style="list-style-type: none"><li>• Non-structural measures should be integrated, e.g.,<ul style="list-style-type: none"><li>- local emergency responses,</li><li>- relocation of development,</li><li>- rezoning of property,</li><li>- flood insurance promotion,</li><li>- community participation.</li></ul></li></ul>	<b>Suggested measures (e.g.)</b> <ul style="list-style-type: none"><li>• Flood insurance subsidization for an agricultural sector.</li><li>• Land use planning, e.g.,<ul style="list-style-type: none"><li>- exclude high flood risk areas from all future development zones,</li><li>- discourage a development that increases flood risk.</li></ul></li></ul>	<b>Suggested measures (e.g.)</b> <ul style="list-style-type: none"><li>• Trade-offs between the benefits earned and the loss from living there.</li><li>• Mitigation measures, e.g.<ul style="list-style-type: none"><li>- early warning systems installation,</li><li>- up-to-date recovery plans,</li><li>- community awareness/readiness on flooding.</li></ul></li></ul>



# A proposed flood risk management framework



- Community participation is the first priority for making plans effective at a local level.
- Two-way communication is an effective way to facilitate community participation.
- The results should be exhibited publicly, discussed at community meetings, commented on by outside agencies, and further improved by incorporating the reviews and feedback of stakeholders.
- All relevant plans should be implemented by local government agencies.