GIZ GIDRM & CC insight session:
Flood Management for Risk Informed Urban Development (RIUD)

From risk to resilience: lessons from flood-prone urban regions in Central Viet Nam and the 2021 floods in Western Europe

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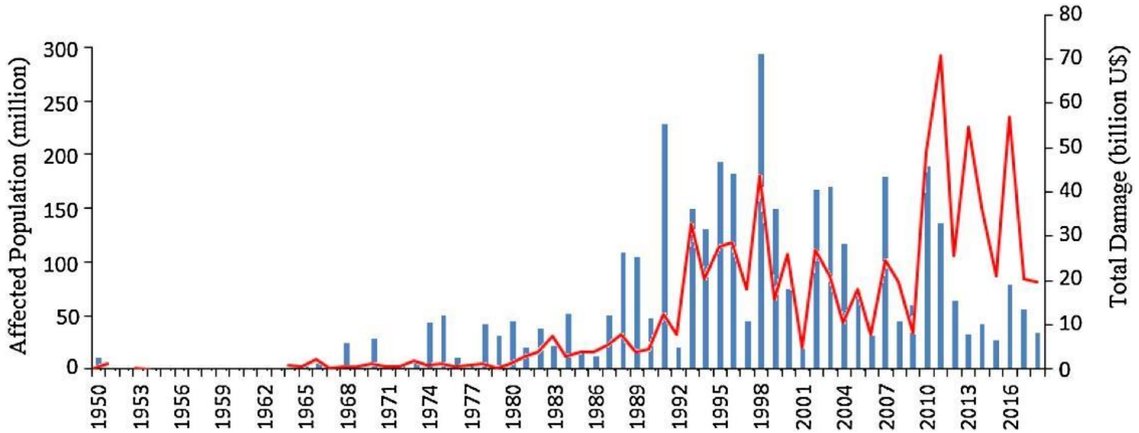
Adverse flood impacts exacerbate

- Mid- to long term trends suggest **increase** in:
  - People affected
  - Economic losses
  - Infrastructure damage
  - Environmental damage
- Cascading impacts on **wellbeing** observed:
  - Mental health issues (e.g. anxiety, depression, stress disorder)
  - Education
  - Food security
  - WASH
  - Livelihoods



Global population and economic impacts due to floods during 1950-2018 [Pour et al. 2020]

"we find that~12% of the people that experienced **food insecurity** from 2009 to 2020 had their food security status affected by flooding" Reed et al. 2022

"Flooding was found to aggravate **poverty** levels and negatively impact **educational status** and community development." Lawanson et al. 2022

"floods create **homelessness** and harm **workers** (either by disrupting commercial activities or causing unemployment)" Da Silva et al. 2020

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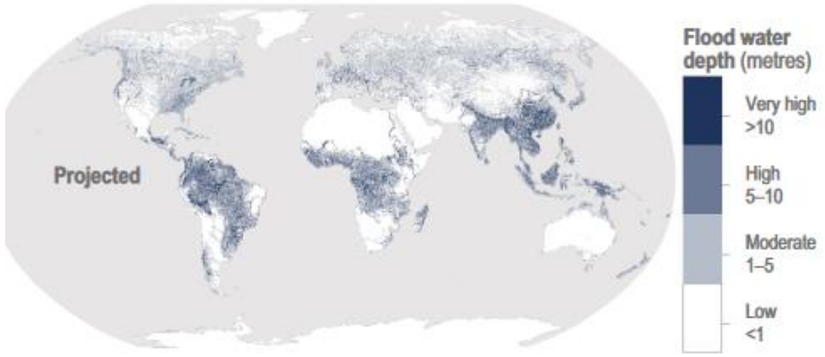
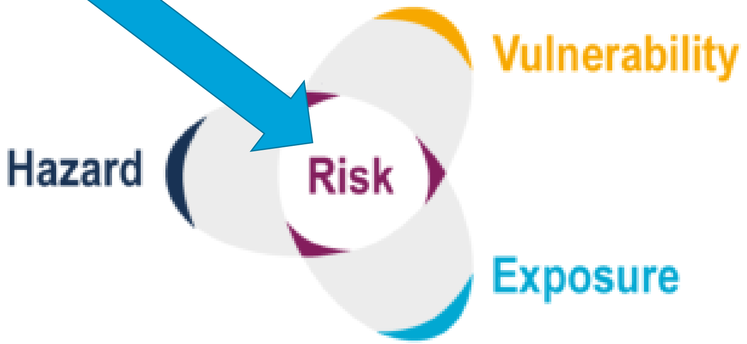
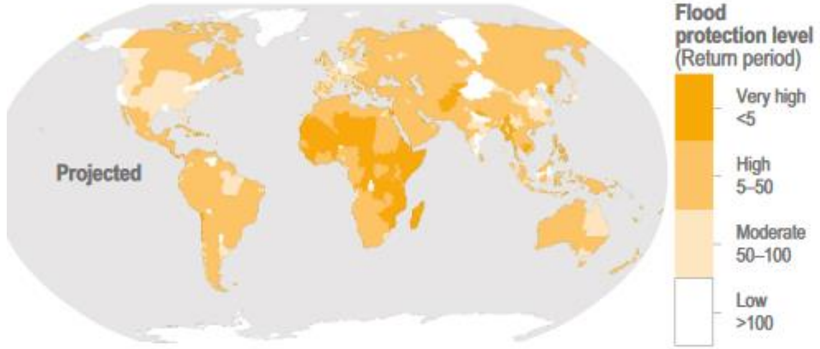
Increasing flood risks exacerbate impacts and are exacerbated by root causes

Key flood risks root causes (UNU-EHS 2020 & 2021)

- Human-induced climate change
- Unequal livelihood opportunities
- Undervaluation of environmental values & costs
- Insufficient risk governance

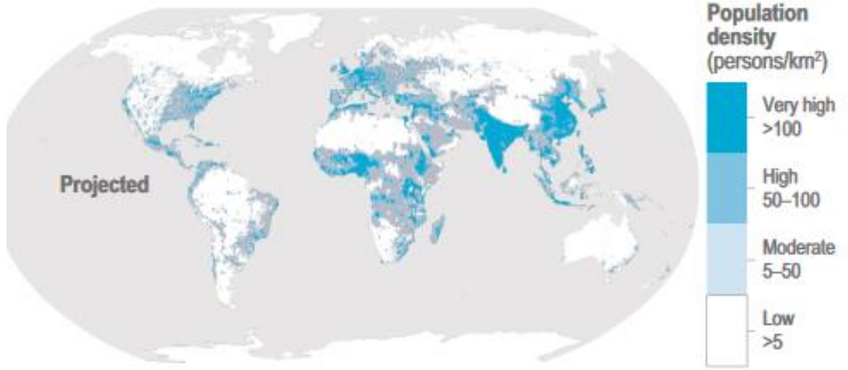






Increased inequalities and dependencies, lacking coping capacities, reduced environmental health, lacking risk awareness and adaptation appraisal

Increased frequency and magnitude of flood events (precipitation, tropical & extratropical storms, storm surge, sea level rise)



Increased number of people, livelihoods, services, assets, and values in flood-prone areas

IPCC 2022

Current flood risks management efforts are insufficient

Lack of:

- High quality **data & information**
- Effective, context-specific **programs**
- Well-arranged **institutions** and cooperation
- Adequate **finance**

- Often leads to adaptation **gaps** and even **maladaptation** (Eriksen et al. 2021)

Building blocks [Bowen et al. 2020]

Urgent need for upscaled action

"our world needs climate action on all fronts"
UN Secretary-General António Guterres (2023)

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Lessons from Viet Nam and Western Europe

Lessons from flood-prone urban regions in Central Viet Nam:

FloodAdaptVN project insights

Link to project website

Photo source: Ơi Huế (2020)

Lessons from the 2021 floods in Western Europe:

UNU **Climate Resilience Initiative** insights

United Nations University
Climate Resilience Initiative

Link to project website

Photo source: Sem van der Wal / ANP / AFP (2021)

FloodAdaptVN

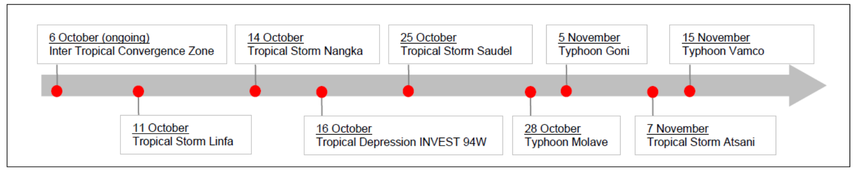
Integrating Ecosystem-based Approaches into Flood Risk Management for Adaptive and Sustainable Urban Development in Central Viet Nam

Floods in 2022. Pictures provided by Linh Nguyen

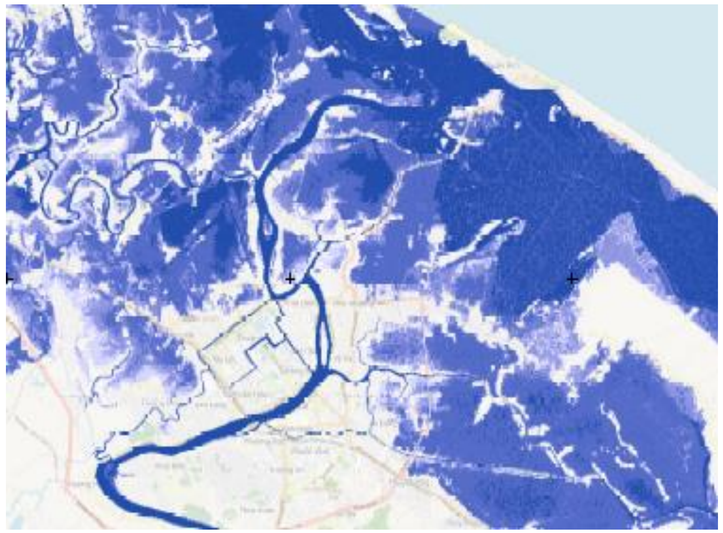
Increasing flood risks in (Huế, Central) Viet Nam

Key flood risk root causes for Central Vietnam (UNU-EHS 2020)

- Human-induced climate change
- Undervaluation of environmental values & costs
- Insufficient risk governance



“the amount of precipitation associated with a TC was projected to increase by 27–53 %”
[Redmond et al. 2015]



Oct. 2020 flood inundation [Geomer 2022]

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Current flood risks management and adaptation in Viet Nam

- **Data & information**:
  - Lacking data quality and sharing, particularly related to indirect impacts and downscaled climate and socio-economic projections
- **Programs**:
  - Non-risk informed urban planning
  - Existing solutions focus mostly on structural approaches (dams, drainage systems)
- **Institutions**:
  - Lacking human and technical resources in flood management
- **Finance**:
  - Strained government resources and budget constraints

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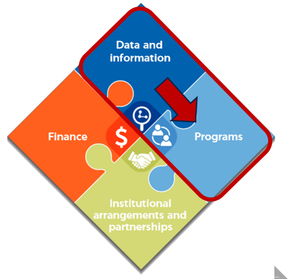
FloodAdaptVN approach: risk informed adaptation co-creation



1: Risk assessment → 2: Option identification → 3: Evaluation → 4: Implementation

Impact chains

Qualitative assessment of impacts, risks, and root causes

<u>what</u> adaptation action is required?

Spatial risk index

Quantitative risk hotspot assessment and modelling

<u>where</u> is adaptation required most urgently?

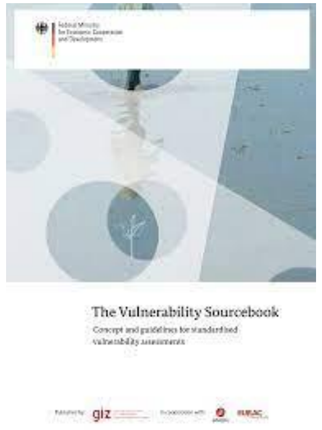
List of potential adaptation options

Evaluation

Implementation

FloodAdaptVN impact chain concept

Based on methodology developed by GIZ, Adelphi, Eurac & UNU-EHS



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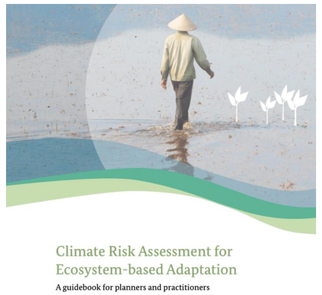

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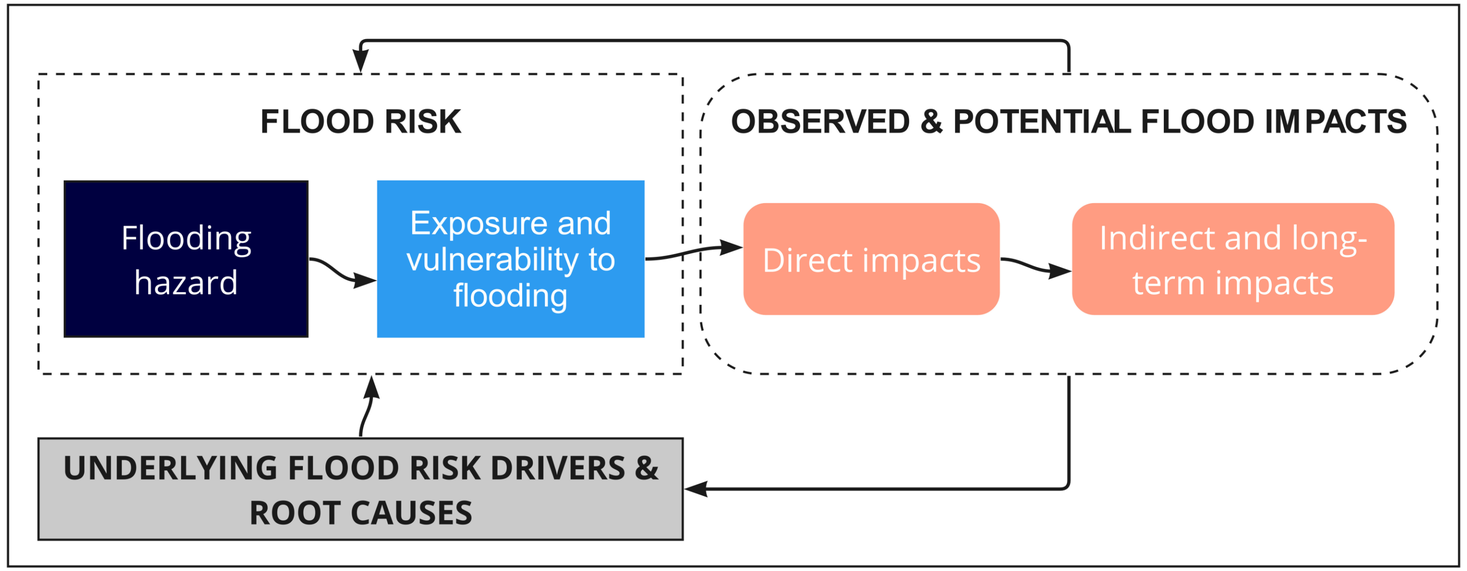

FloodAdaptVN impact chain concept

Based on methodology developed by GIZ, Adelphi, Eurac & UNU-EHS

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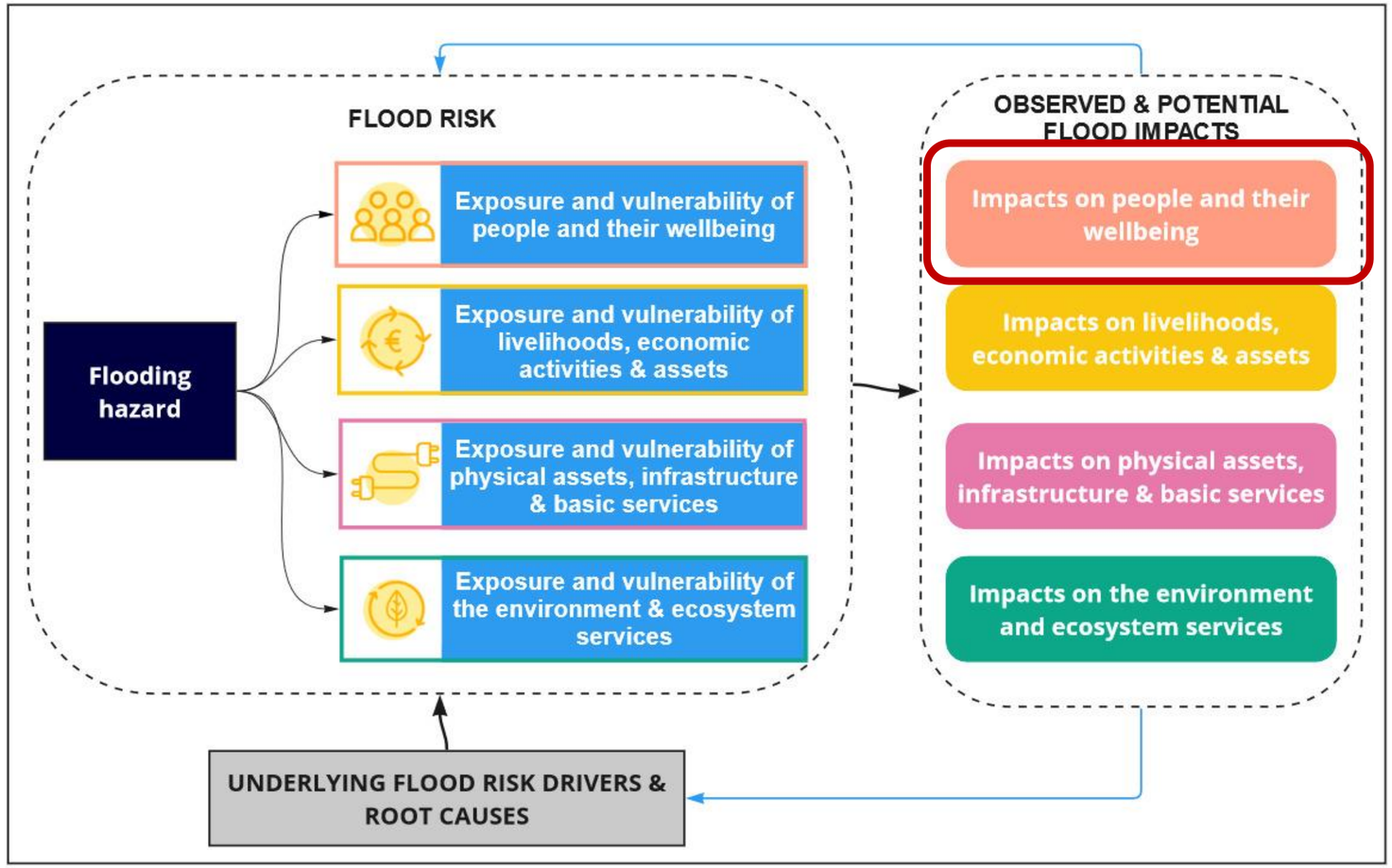
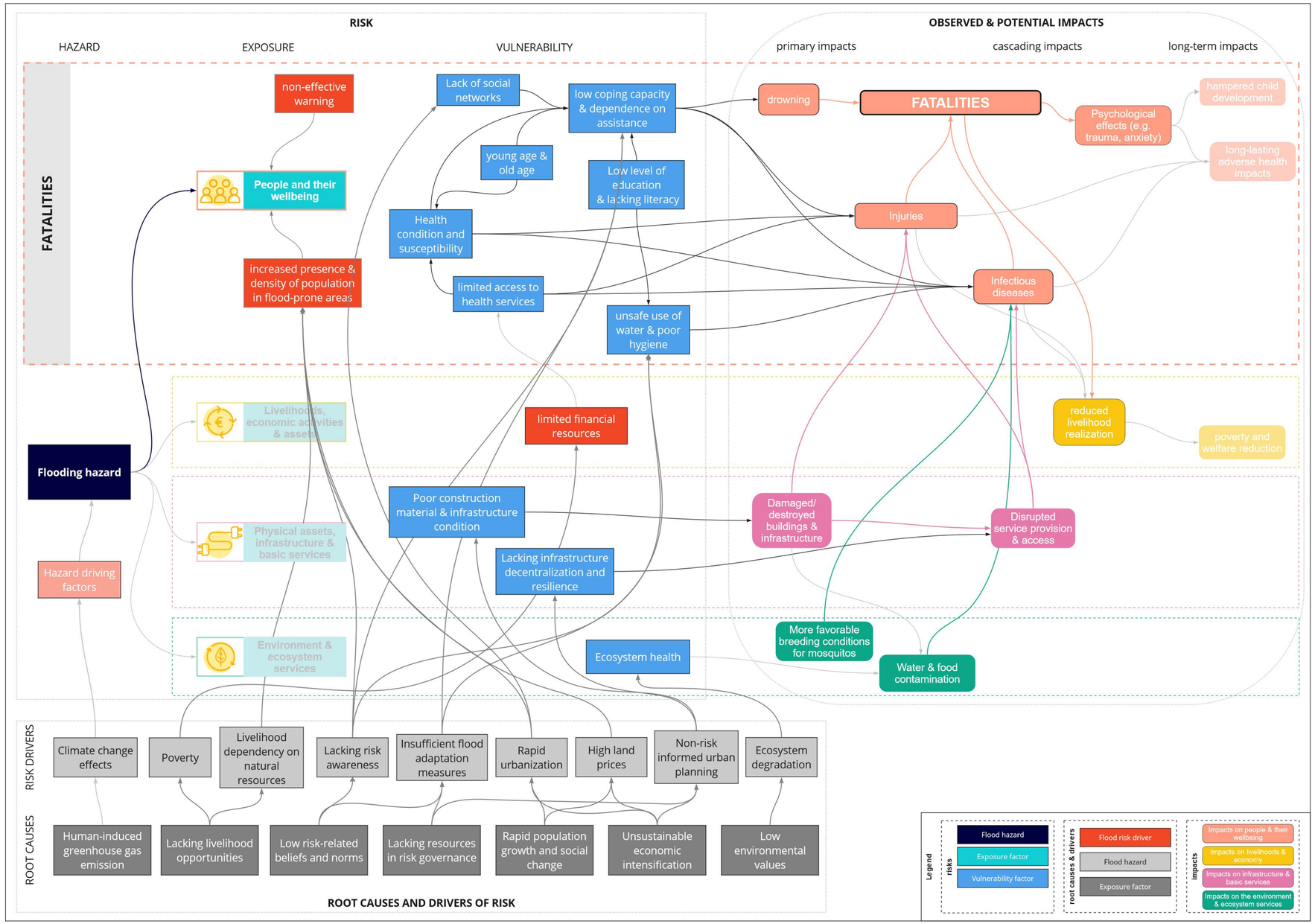
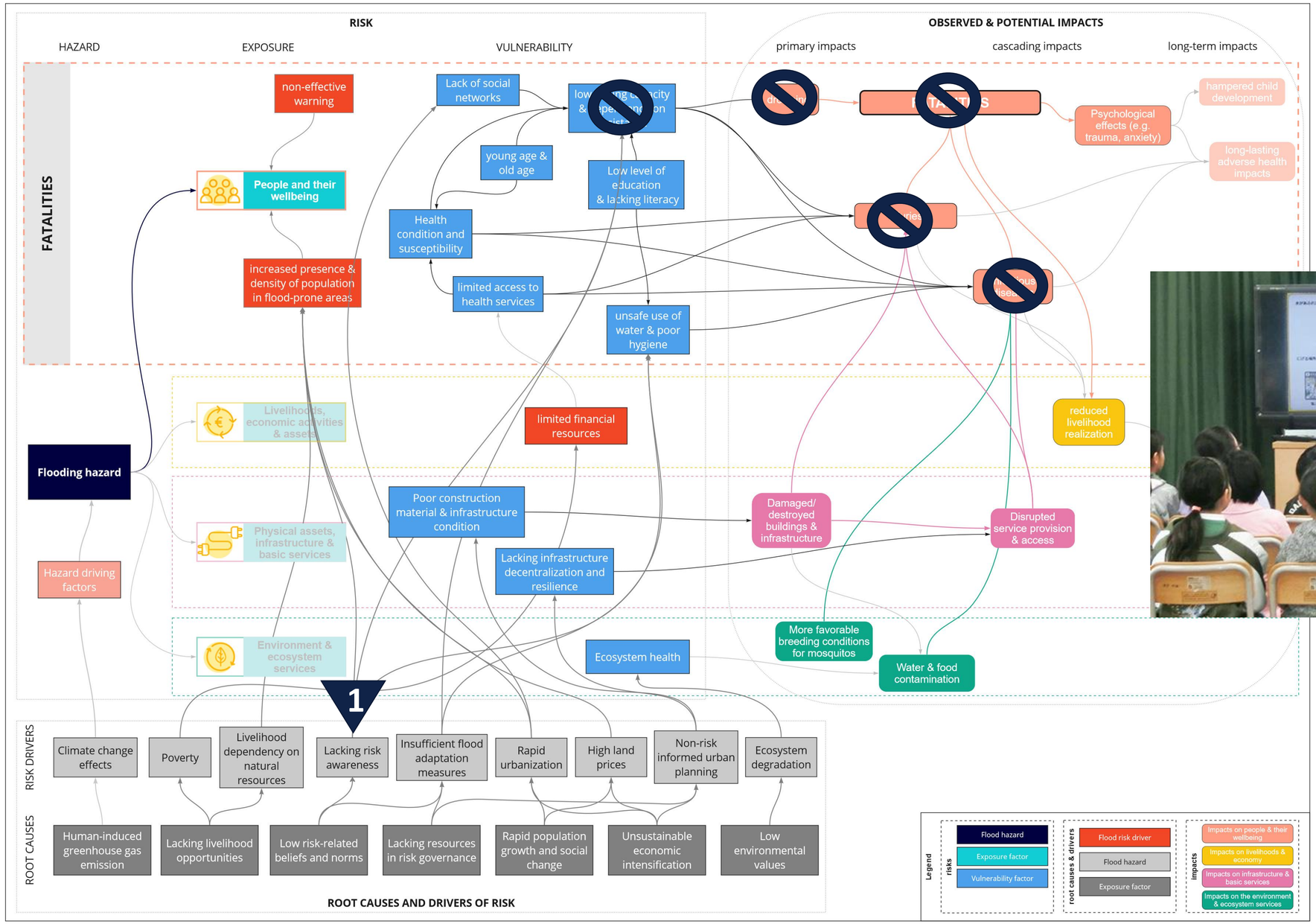


FloodAdaptVN impact chain for fatalities

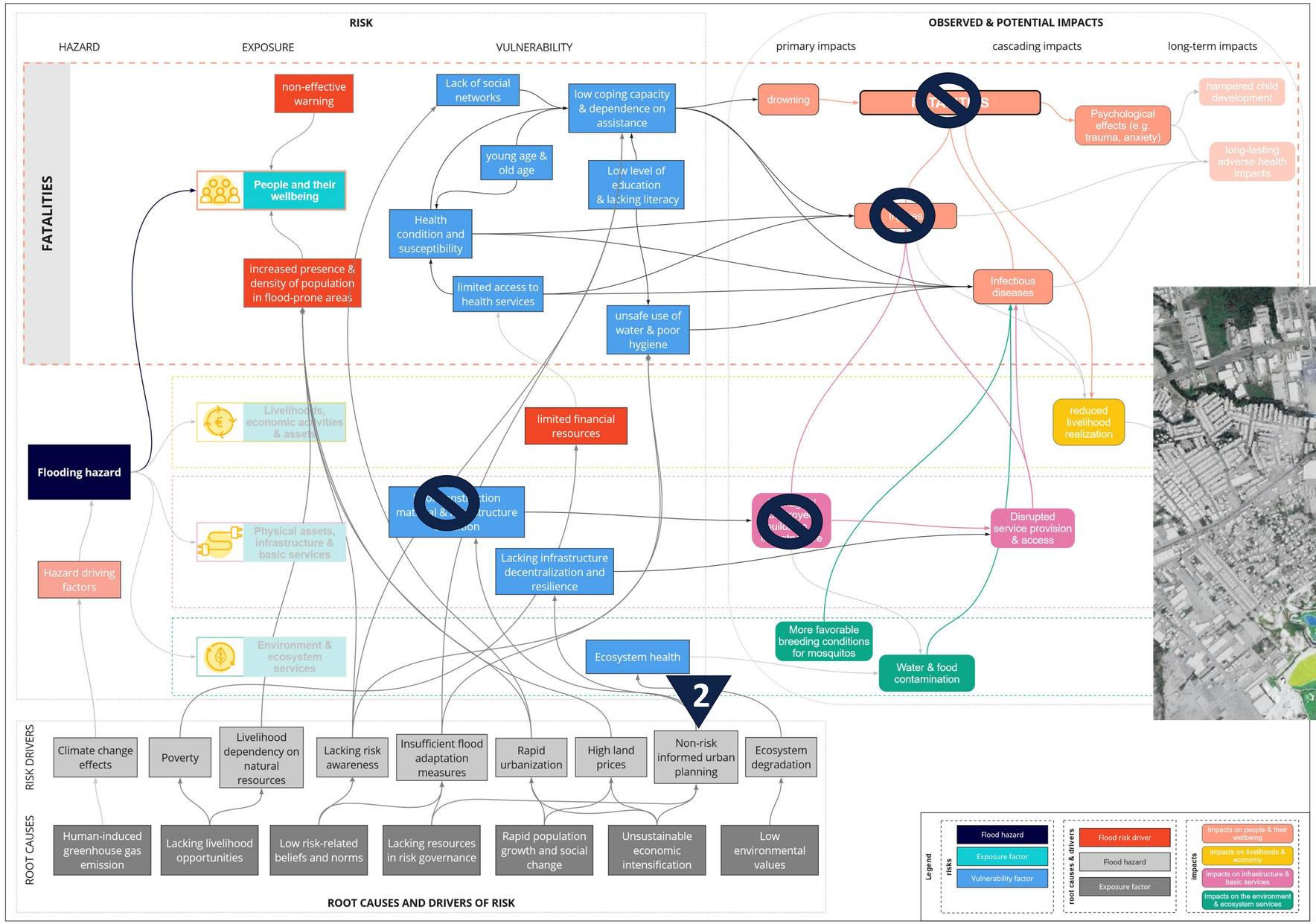


Impact chain informed adaptation options: 1



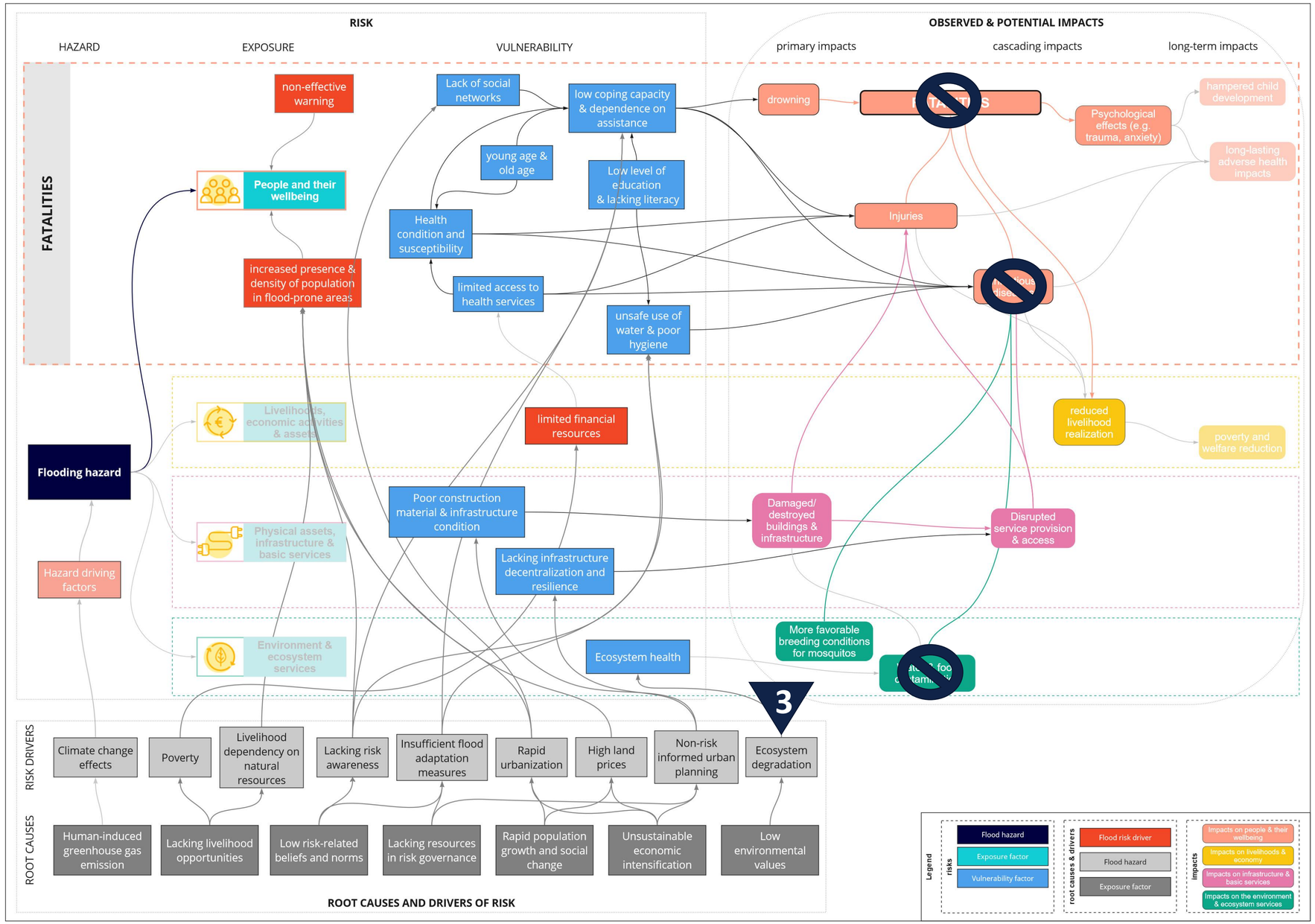
1 Disaster education and preparedness

Impact chain informed adaptation options: 2



2 Urban disaster plans incl. flood zoning

Impact chain informed adaptation options: 3



3 Ecosystem restauration and protection

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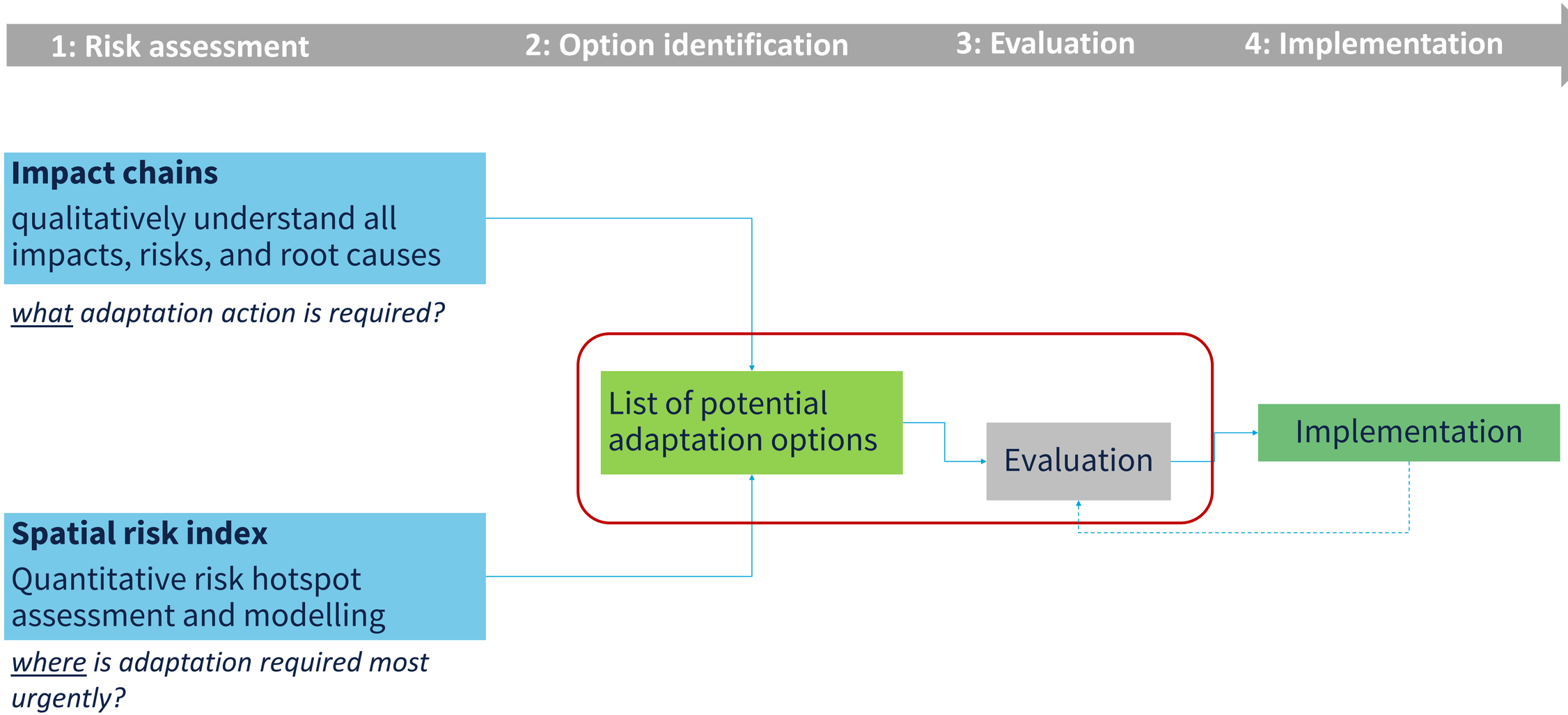
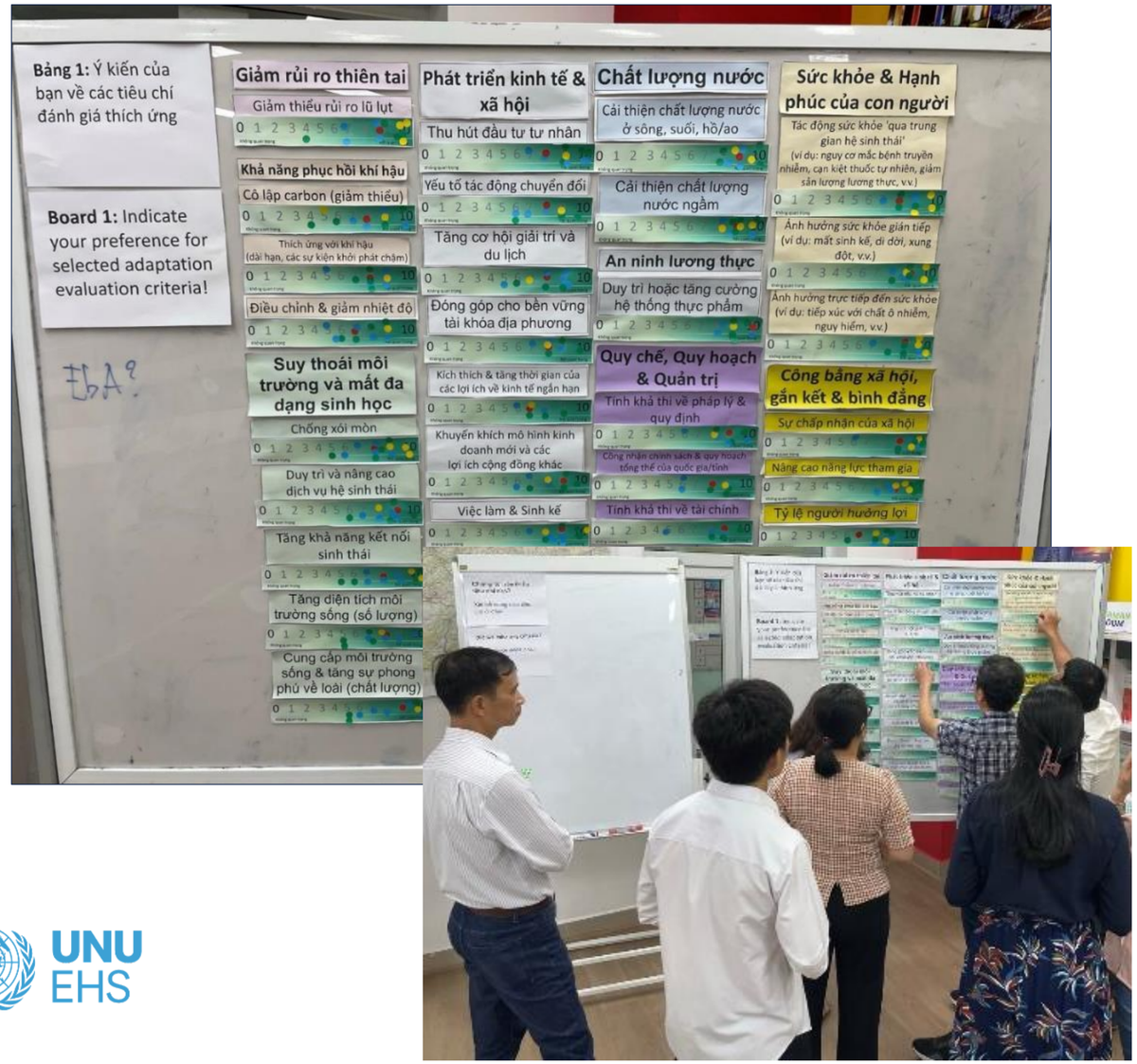
FloodAdaptVN approach: risk informed adaptation co-creation



Next steps: option evaluation

1: Criteria identification → **2: Criteria application**



Multi-Criteria Analysis Decision

Measures	Cost-Effectiveness	No-Regret Options	Social Acceptance	Nature-based Solutions (NbS)	Potential of Mal-adaptation	Institutional Support	Up-scaling Potential	Co-Benefits (for SDGs)	Total Score
	17.5	15.1	13.9	11.	10.	10.	10.	10.	100%
18 Green Spaces (Urban Forestry)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	**1**
12 Retention reservoirs	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	**0.94645**
15 Constructed wetlands	1.0	1.0	1.0	1.0	1.0	0.5	1.0	1.0	**0.94645**
13 Detention swales along roads	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	**0.89485**
27 Improved soild waste management	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	**0.8889**

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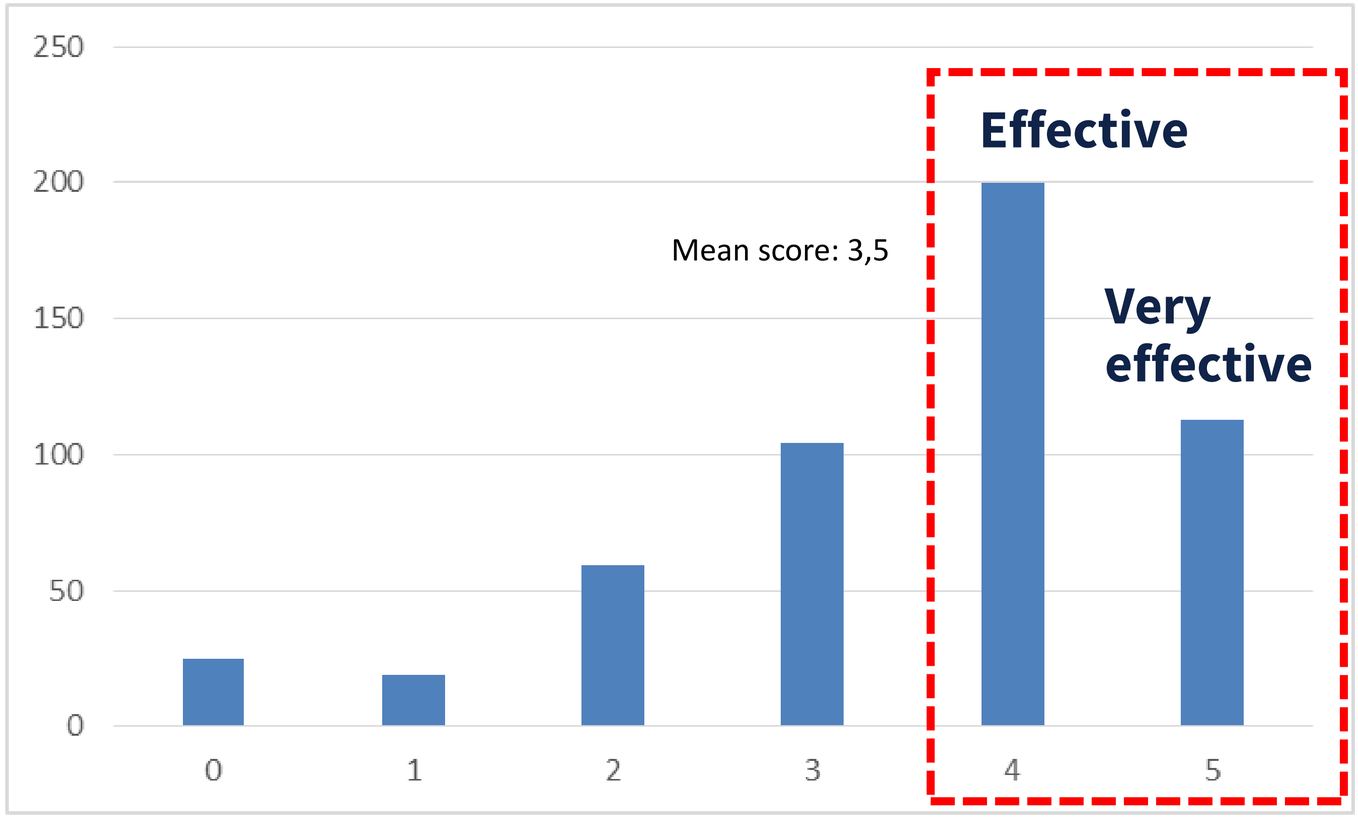
Preliminary results: EbA acceptance

Q89: In your opinion, **how effective are natural elements** like trees, mangroves, or green spaces in the city **to reduce flood impacts?**

Please rate from 0 (not effective at all) to 5 (very effective)

Picture source: Bao Chau, 2023



Outlook: EbA for increased flood protection and wellbeing

Forest protection and restoration in Son Tho, Viet Nam, as an example of EbA measures.
Source: Panorama Solutions, 2018

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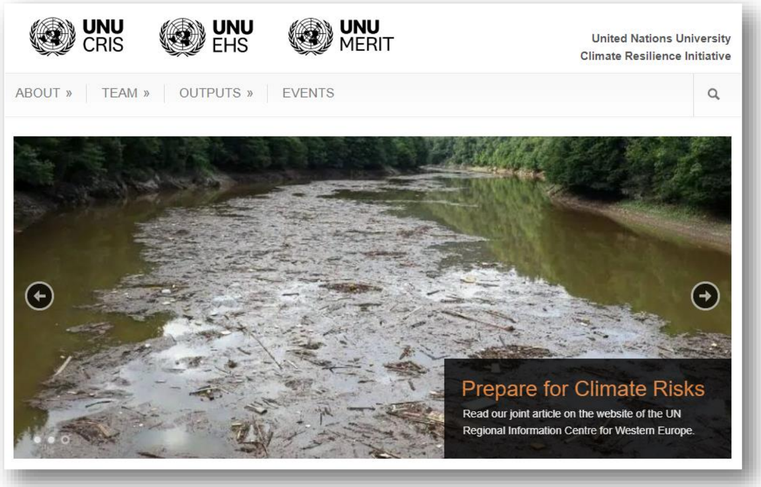
UNU Climate Resilience Initiative (CRI)

United Nations University
Climate Resilience Initiative

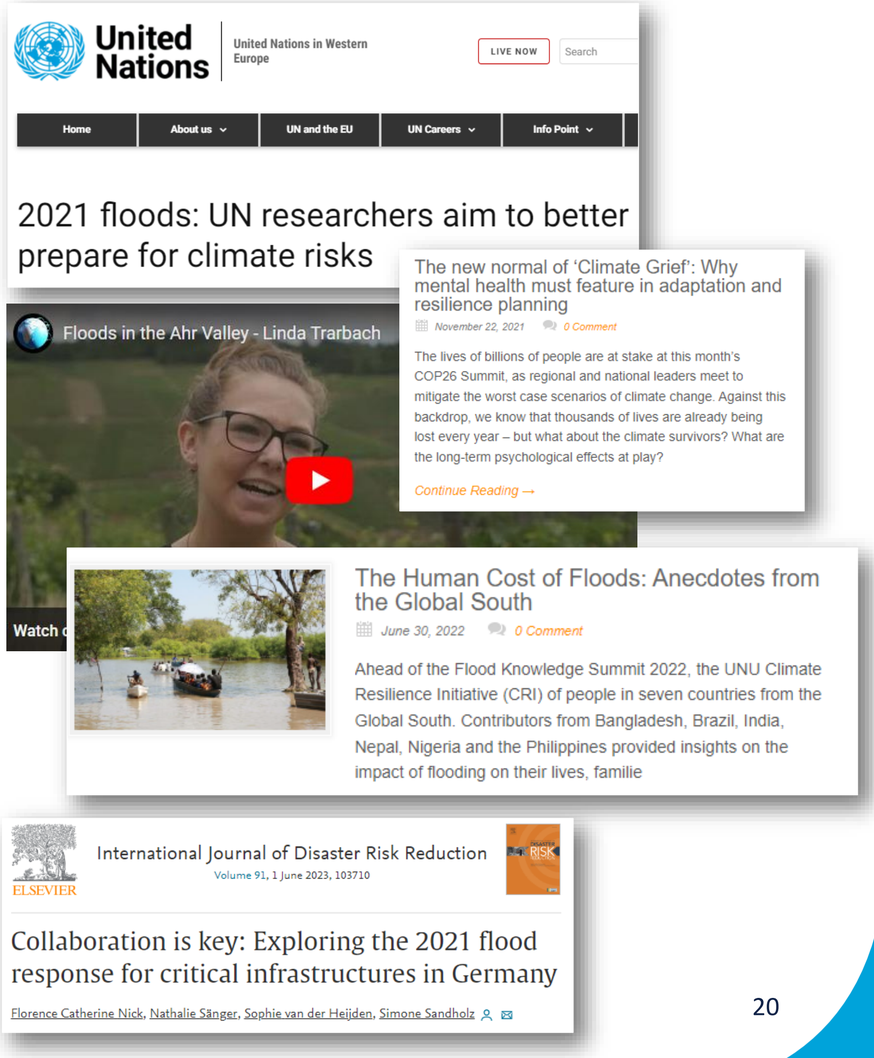
- **Launched in 2021** in recognition of the increasing impacts of climate change
- The initiative aims to **share knowledge, shape policy** & **drive action** for facilitating proactive **adaptation, innovation and transformation** towards climate resilience

UNU CRI Website



Flood Knowledge Summit 2022:
From Risks to Resilience

Blog/news articles, scientific papers & human stories



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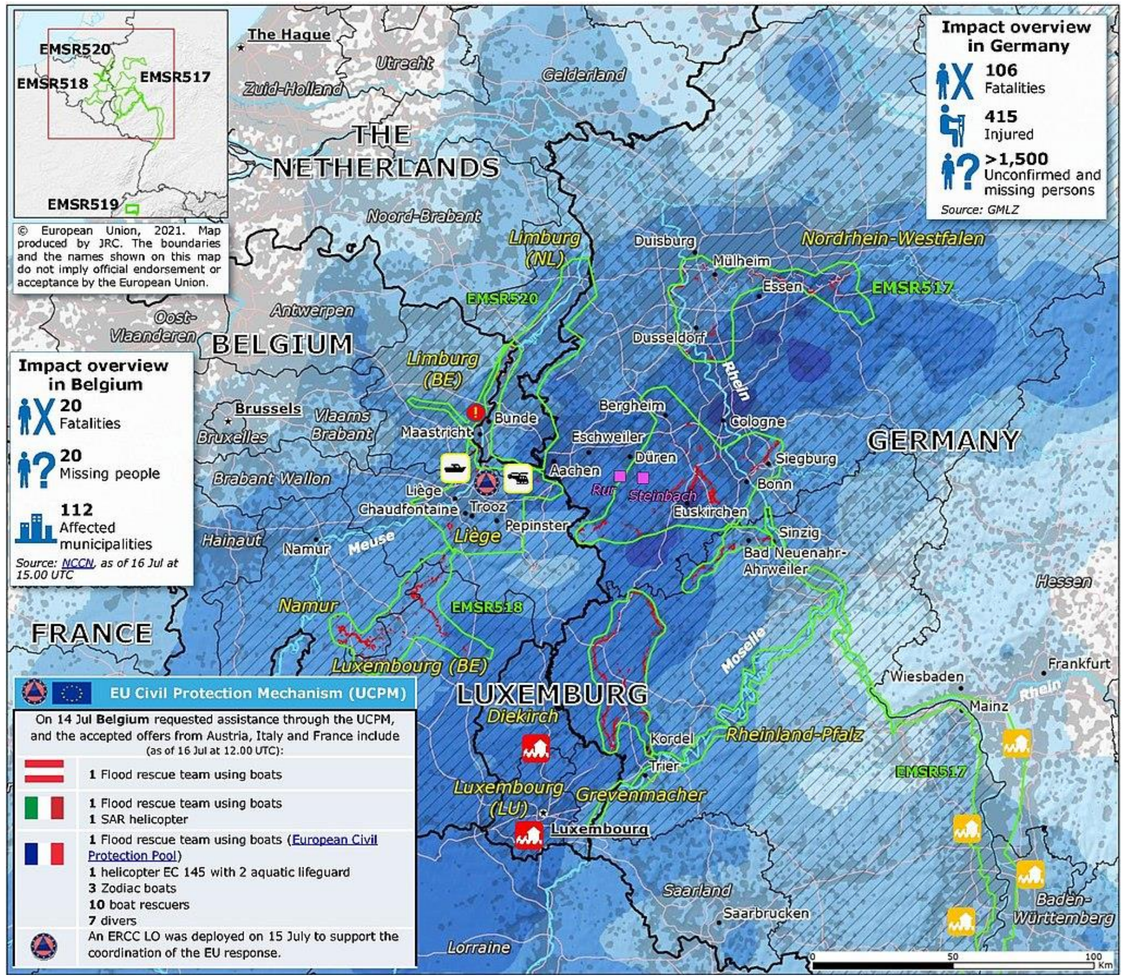
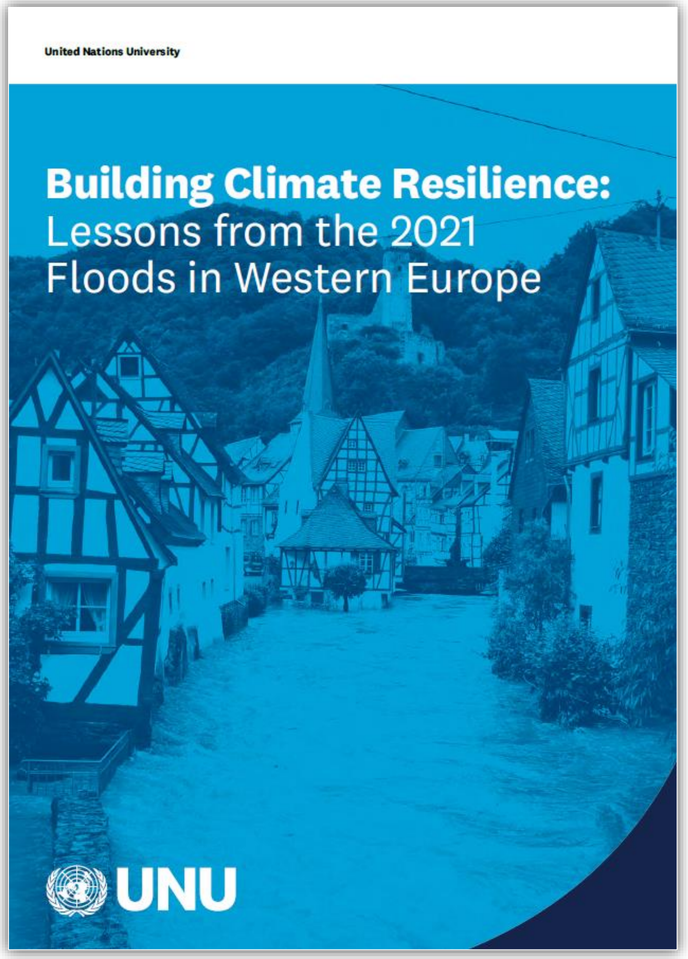
UNU CRI: Lessons from the 2021 floods in Western Europe



- Major flood event affecting **Germany, Belgium & the Netherlands** in **July 2021**
- **> 240 deaths**
- Ca. **54 billion USD economic losses**

UNU CRI: Lessons from the 2021 floods in Western Europe



UNU-EHS, UNU-CRIS & UNU-MERIT (2023);
http://collections.unu.edu/view/UNU:9123

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UNU CRI: Understanding current & future risks

We need to **understand risks to identify who & what needs protection** and to effectively **design risk management & adaptation strategies**

Germany
July 2021

LOSS OF LIVE

INFRASTRUCTURE DAMAGE

IMPACTS ON ECOSYSTEMS

AGRICULTURAL LOSSES

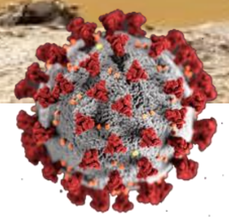
ECONOMIC LOSSES

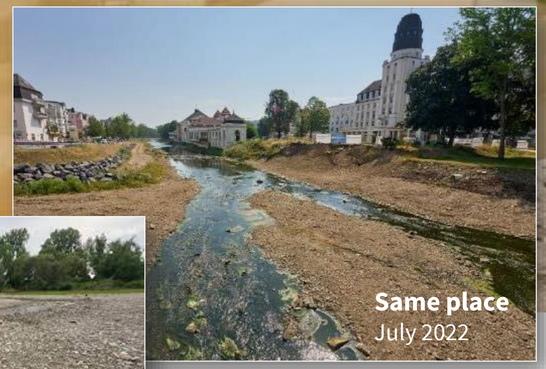
HEALTH & WELL-BEING

FLOOD HAZARD
- Heavy precipitation
- Saturated soils & sealed surfaces
- Topography
- Debris & clogging of bridges

EXPOSURE
- People & assets in the flood plain

VULNERABILITY
- Early warning
- Access to information
- Risk awareness
- Behavior
- Dependency/immobility
- Late evacuation
- …





Same place
July 2022

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UNU CRI: Understanding current & future risks

→ Develop **integrated approaches** that consider **all hazards** and their possible **compounding & cascading effects** with regularly updated hazard information and **future scenarios** of climate risks.

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UNU CRI: Emergency response & coordination

- **Mechanisms for EW exist** at EU, national and local levels → data from online surveys shows that **29% of HHs did not receive warning** & of those warned **85%** did **not expect severe flooding** & **46%** did **not know what to do**
- **Equipment + mechanism at EU level for emergency response** (vehicles, mobile medical care, shelter, etc.) **exists** → but not in sufficient numbers and lack of coordination across borders
- Role of **citizens as first responders** is crucial (often the first to warn, to respond & present on the ground)
  → **coordination** with formal response remains a challenge

UNU CRI: Emergency response & coordination

→ Improve the **understanding and dissemination** of early **warning messages** and the availability of **technical instruments for emergency response** (e.g. emergency vehicles and recovery equipment), as well as **cross-border** and **cross-sectoral cooperation / coordination**.

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UNU CRI: Climate risk insurance

- In the period 2000-2019, disasters led to approximately **$2.97 trillion in economic losses worldwide**, including close to **$651 billion** (22%) **due to floods** (CRED & UNDRR, 2021)
- **2021 floods** in Western Europe caused **$54 billion loss** (costliest disaster in recent European history & costliest flood event globally (Munich Re, n.d.) → **only 22% insured**
- German federal and regional governments allocated €30 billion as a **special flood relief fund** → important, but creates a **trade-off between solidarity & individual responsibility**
- Insurance only **effective** if **combined with preventive measures** (e.g. prohibiting buildings in high-risk zones, promoting insurance awareness) & when **facilitating "building back better"**

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UNU CRI: Climate risk insurance

→ Ensure **integration of insurance into a larger climate strategy** at an early stage by **involving all relevant stakeholders** and **improving insurance literacy** among societies to increase individual insurance uptake.

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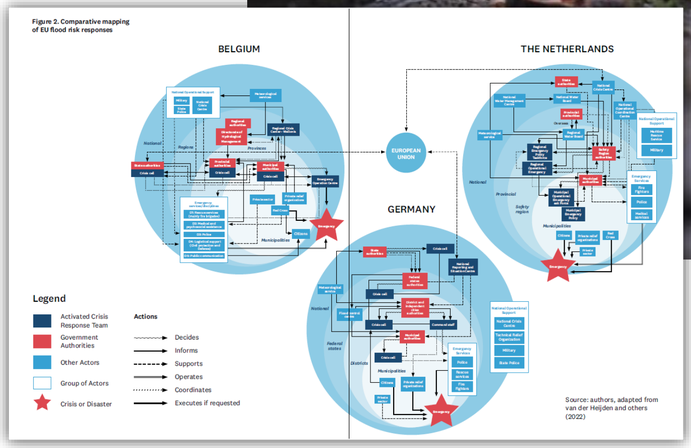
UNU CRI: Risk governance

- **Functioning relationships** among **relevant stakeholders** as part of a comprehensive risk governance scheme are decisive to support in a disaster situation & risk prevention → 2021 floods have revealed gaps & opportunities
- Different countries have different systems → we can learn from their strengths and weaknesses (dialogue, exchange important)
  - e.g. in Germany and Belgium, the federal level plays an essential role in coordinating emergency preparedness planning and response → decentralized approach enables fast coordination at the local level but also presents challenges for communication and joint efforts across federal states + borders



UNU CRI: Risk governance

Enhancing **regional coordination** for disaster risk governance, including flood risk governance.

Multi-level risk governance should be implemented in **national & cross-border basins** to coordinate competencies and mandates, as well as building stakeholder capacities from supranational to local levels.

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UNU CRI: Recovery from extreme events

- As extreme events become increasingly common, **communities will more frequently have to recover** from disasters → **how to organize recovery** (build back fast and desire to have previous life back vs learn, reorganize)?
- Instances of **“building back better”** are emerging (e.g. development of sustainable communal heating), but still scarce
- **Enablers & barriers** towards “transformative recovery”
  - **Enablers:** trust & cooperation in new alliances between government & citizens; long-term vision for change; empowerment & training; …
  - **Barriers:** psychological factors & insecurity; mistrust and polarization; time needed to see results; regulations discouraging change (e.g. insurance)

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UNU CRI: Sustainable recovery (pathways) for all

Facilitate transformative recovery pathways by understanding the **enablers** and conflicting **barriers** while **considering pre-existing vulnerabilities and socioeconomic differences** for *"building back better"*.

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UNU CRI: Conclusions

- More **research needed** to close persisting knowledge gaps
- Great **potential for learning** from other parts of the world (incl. Global South)
- **(How to) Change the discourse** *“from fear to hope”* ?!

Summary:
5 Considerations for adapting to flood risks in urban regions

1) Flood impacts are felt **across systems,** with implications for adaptation
2) Adaptation should go **beyond hazard control** and also **target exposure, vulnerability** and **underlying risk factors**
3) N**ature-based Solutions** can play a **vital role** in adaptation to rising flood risks
4) A **comprehensive evaluation of potential impacts of adaptation measures** is crucial **before their implementation**
5) Urban flood resilience requires **addressing adaptation barriers and enablers**

Read more here

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Questions to ponder …

- What do we value? What do we want to protect? What are critical societal functions/services? Are they at risk, if yes, how/why?
- Do we understand how our sectors and systems (e.g. ecosystems) are interconnected?
- Do we know what drives risks of communities, sectors and systems?
- Have we started to identify & address possible compounding & cascading effects of hazards/climate extremes, disasters & our responses to them?
- How agile are our planning systems, frameworks & polices to uncertainty?
- What are options for “cascading solutions” that address multiple (future) risks?

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Thank you.

FLOOD ADAPT VN

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