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Extreme Weather Events and Urban Floods: Risk and Opportunities in the SAARC Region

Training Workshop on Building Resilient Cities: Strategies for Effective Food Management

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SAARC Disaster Management Centre (IU)

Gandhinagar, India

SAARC

ESCAP Disaster Report for South and South West Asia 2024

#5 Messages: Riskscape

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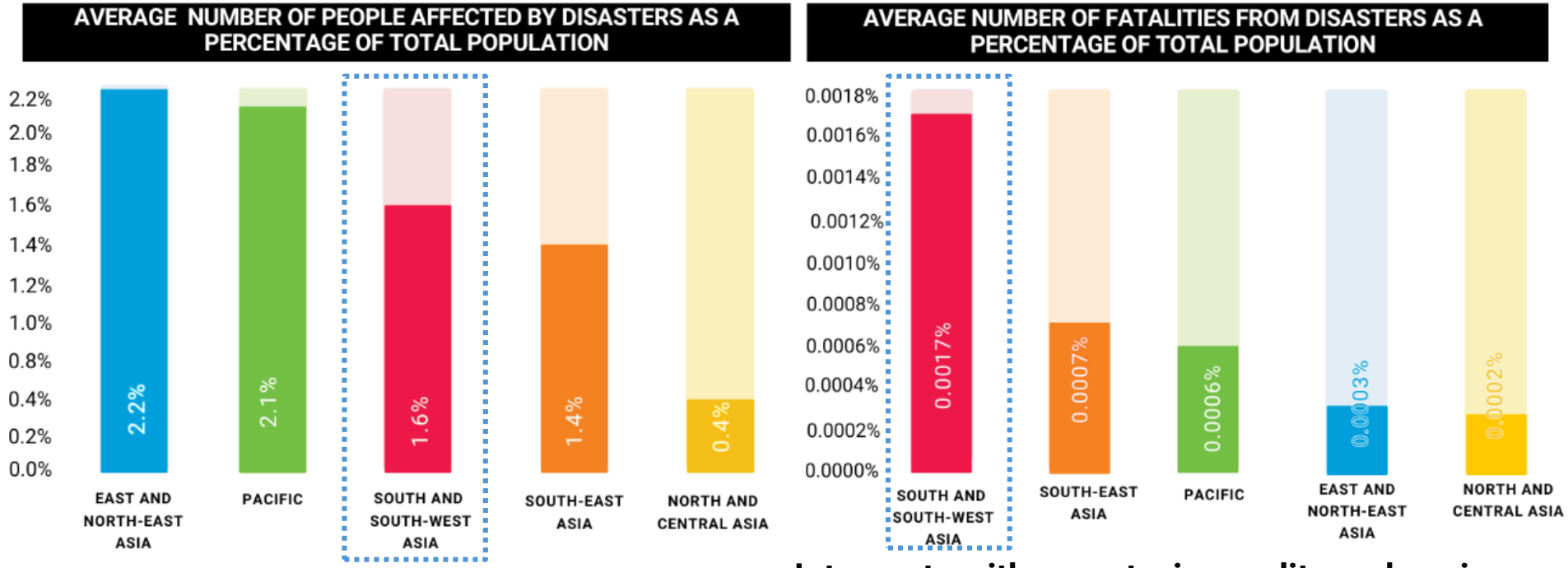
#1. Most disaster impacted subregion of Asia-Pacific

The Human Cost – Fatalities and Impacts

Over the past five decades, disasters in South and South-West Asia have affected over **3 billion people** and resulted in over **1 million fatalities.**



Intersects with poverty, inequality and environmental degradation

Source: ESCAP calculations based on EM-DAT, accessed on 1 July, 2024.

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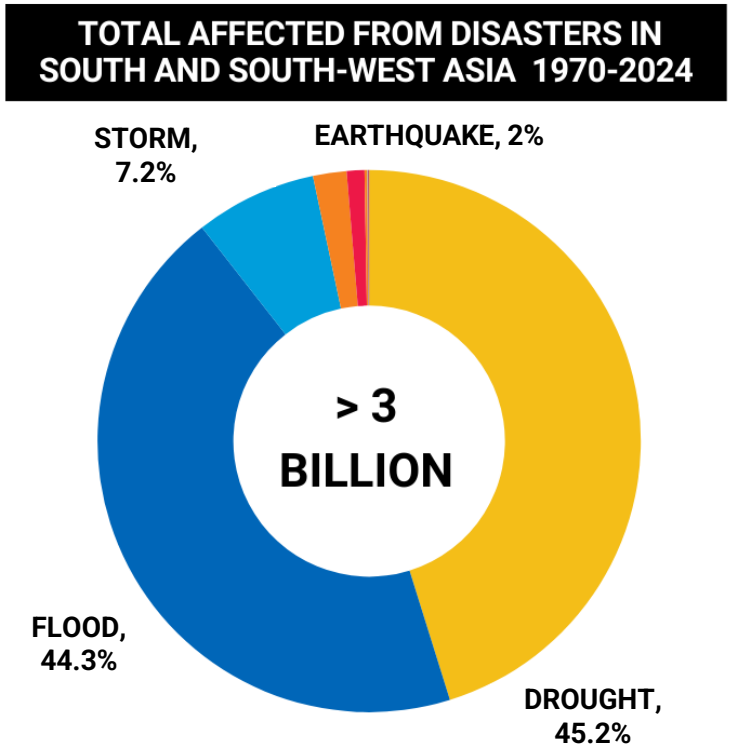
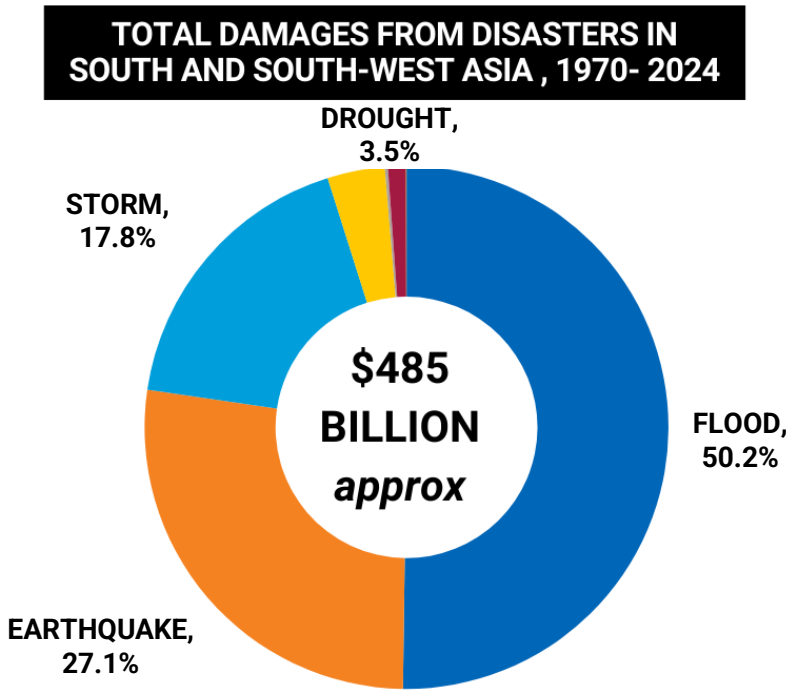
Note:

1. The percentage of disaster-related fatalities and people affected was calculated by dividing the total number of deaths/affected from 1970 to 2024 by the number of years (1970-2024) to obtain the average annual deaths, which was then divided by the 2024 total population.

2. EM-DAT does not have data available for Singapore and Nauru

#2. The Killer Disasters, Economic Costs





Deadliest disasters: Cyclones, Floods and Earthquakes

These disasters have caused **around $485 billion i**n damages which is close to 17% of the total disaster damages in the Asia Pacific region

Droughts had the greatest impact, affecting **over one billion** people, mainly in India.

Storms affected over **225 million**, and earthquake impacted **over 60 million**, particularly in India and Türkiye.

Source: ESCAP calculations based on EM-DAT, accessed on 1 July, 2024
Note: 1. EMDAT has no data on Singapore.
2. No data is collected in EM-DAT on Heatwaves.

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People at risk
Climate emergency
impacts people differently

Where the people @ risk are:
Geography of risk, transboundary multi-hazard risk hotspots

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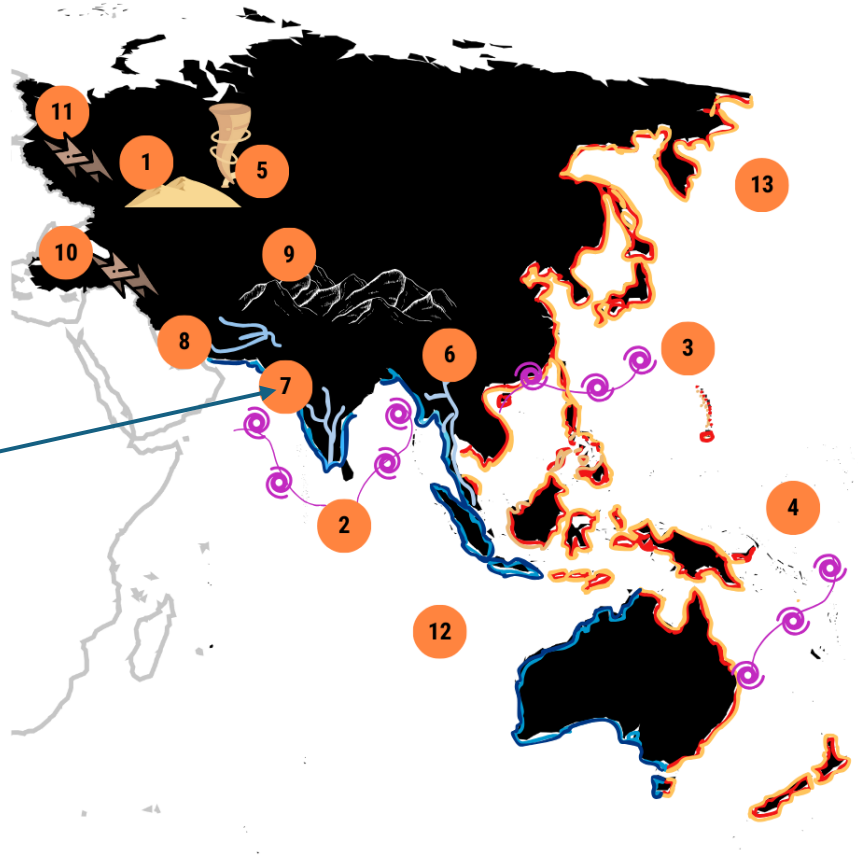


Bihar,
Eastern UP
Assam,
West Bengal
Jharkhand ..

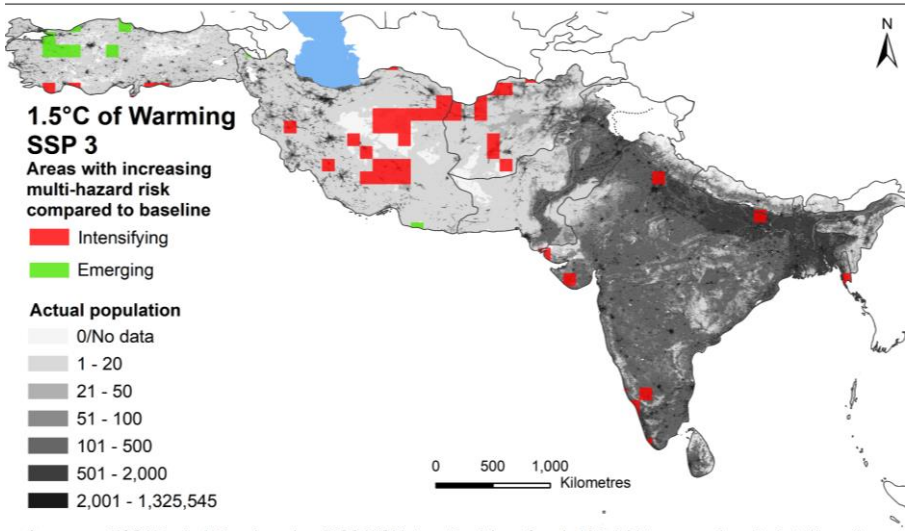
1. Desiccation of Aral Sea
2. Bay of Bengal and Arabian Sea Storm
3. North Pacific Ocean to South China Sea Storm
4. South Pacific and South East Indian Ocean
5. Central Asia Sand and Dust Storm
6. Mekong River Basin Flood and Drought
7. Ganges Brahmaputra Meghna River Flood & Drought
8. Indus River Flood and Drought
9. Hindu-Kusha Himalayan GLOF
10. South and Southwest Asia Earthquakes
11. Central Asia Earthquakes
12. Indian Ocean Tsunami
13. Pacific Ring of Fire

#3. Warming amplifies and expands multi-hazard risk hotspots

Escalating population risks under 1.5°C and 2°C warming scenarios in densely populated areas

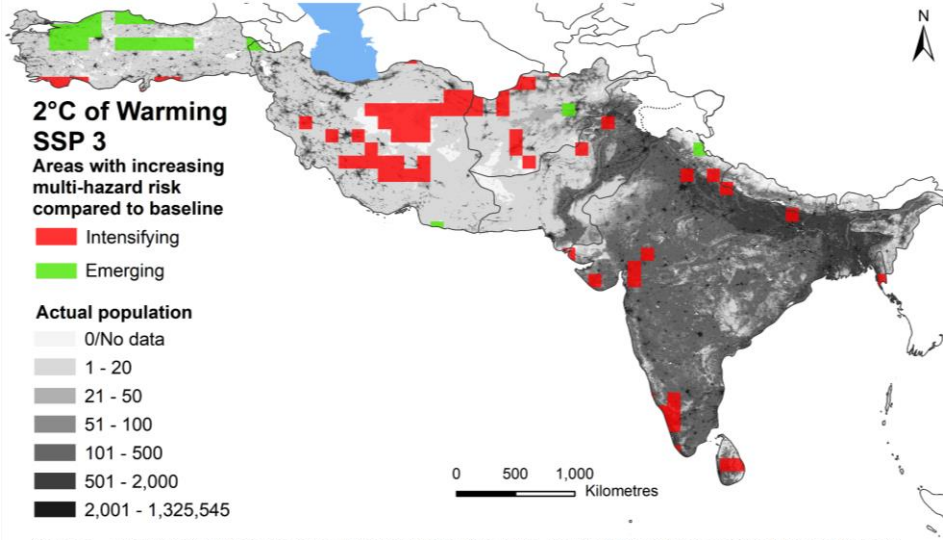
Hotspots of emerging and intensifying multi-hazard risk hotspots of population under 1.5- and 2-degree warming SSP3 scenarios

1.5-degree warming (SSP3)



Sources : ESCAP calculations based on IPCC WGI Interactive Atlas - Coupled Model Intercomparison Project Phase 6 (CMIP6) 2021, WorldPop 2020 Population Estimates, and UN Geospatial.
Note : The baseline period is from 1995-2014.
Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

2-degree warming (SSP3)



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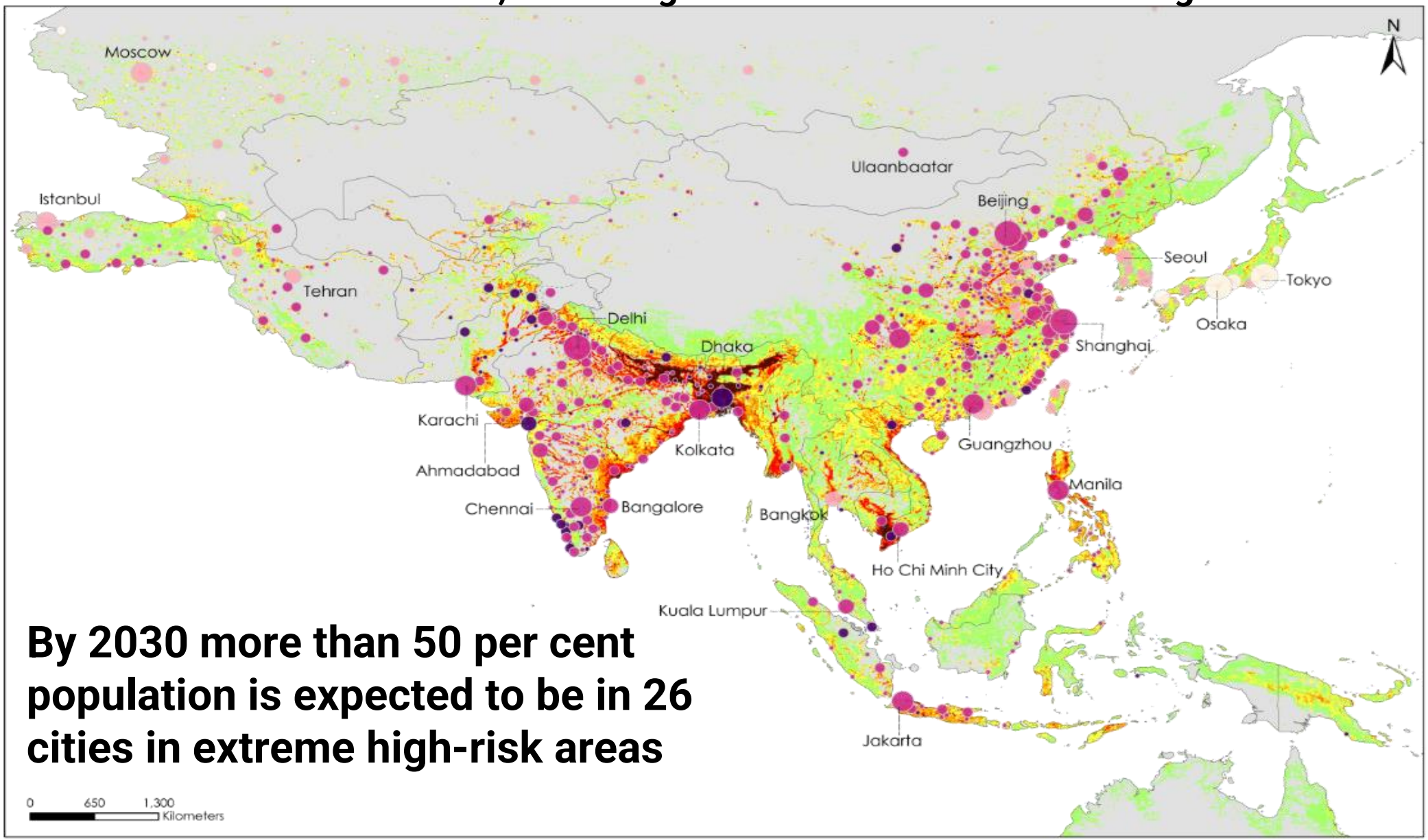
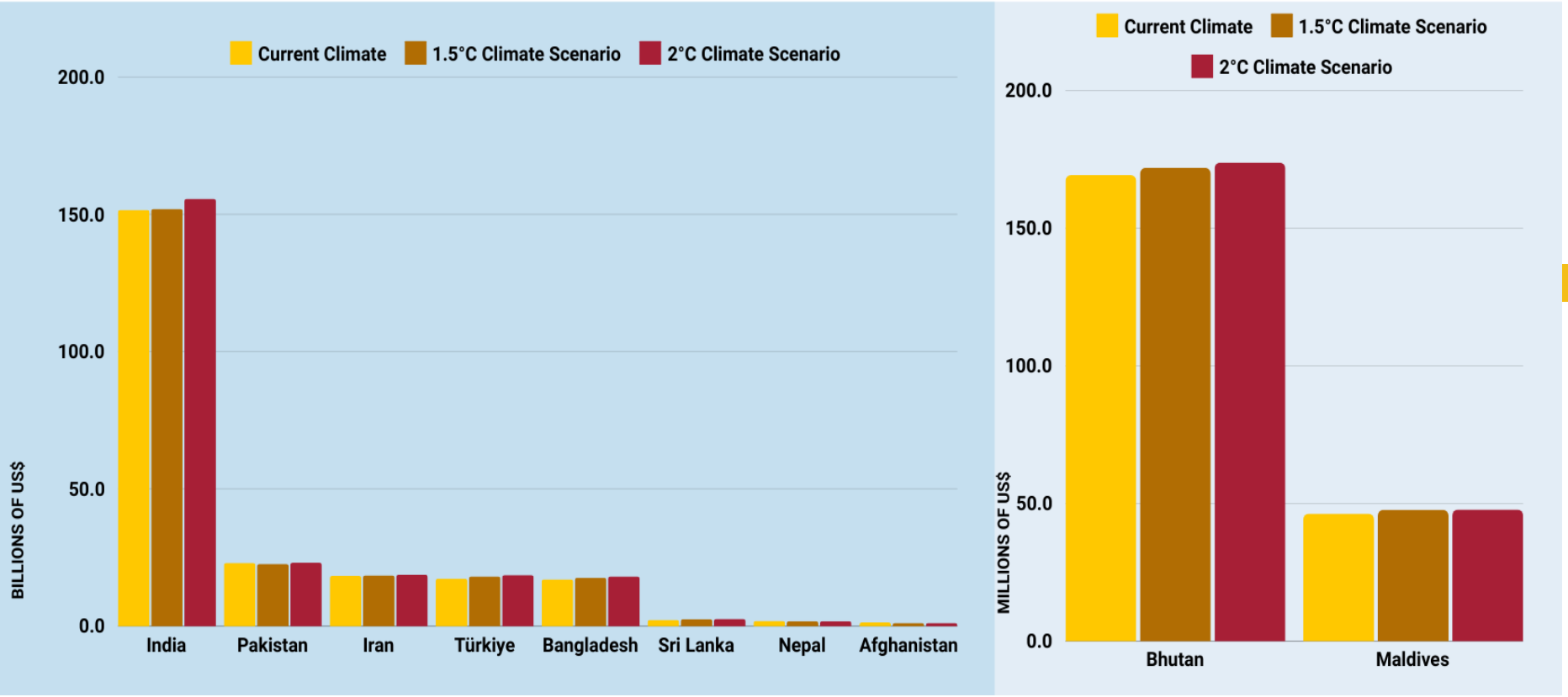
#4. As Asia-Pacific urbanizes, risk accumulates
170 Cities in extreme, 314 in high and 154 in medium risk categories



By 2030 more than 50 per cent population is expected to be in 26 cities in extreme high-risk areas

Economic cost of warming grows as risk amplifies, expands

ABSOLUTE AVERAGE ANNUAL LOSSES FROM CASCADING RISK IN SOUTH AND SOUTH-WEST ASIA



ESCAP estimated the total average annual loss (AAL) in **South and South-West Asia** at around

$240 billion

Adaptation while on the rise investment in adaptation across the sectors too little, too late and not risk informed.

Source: ESCAP

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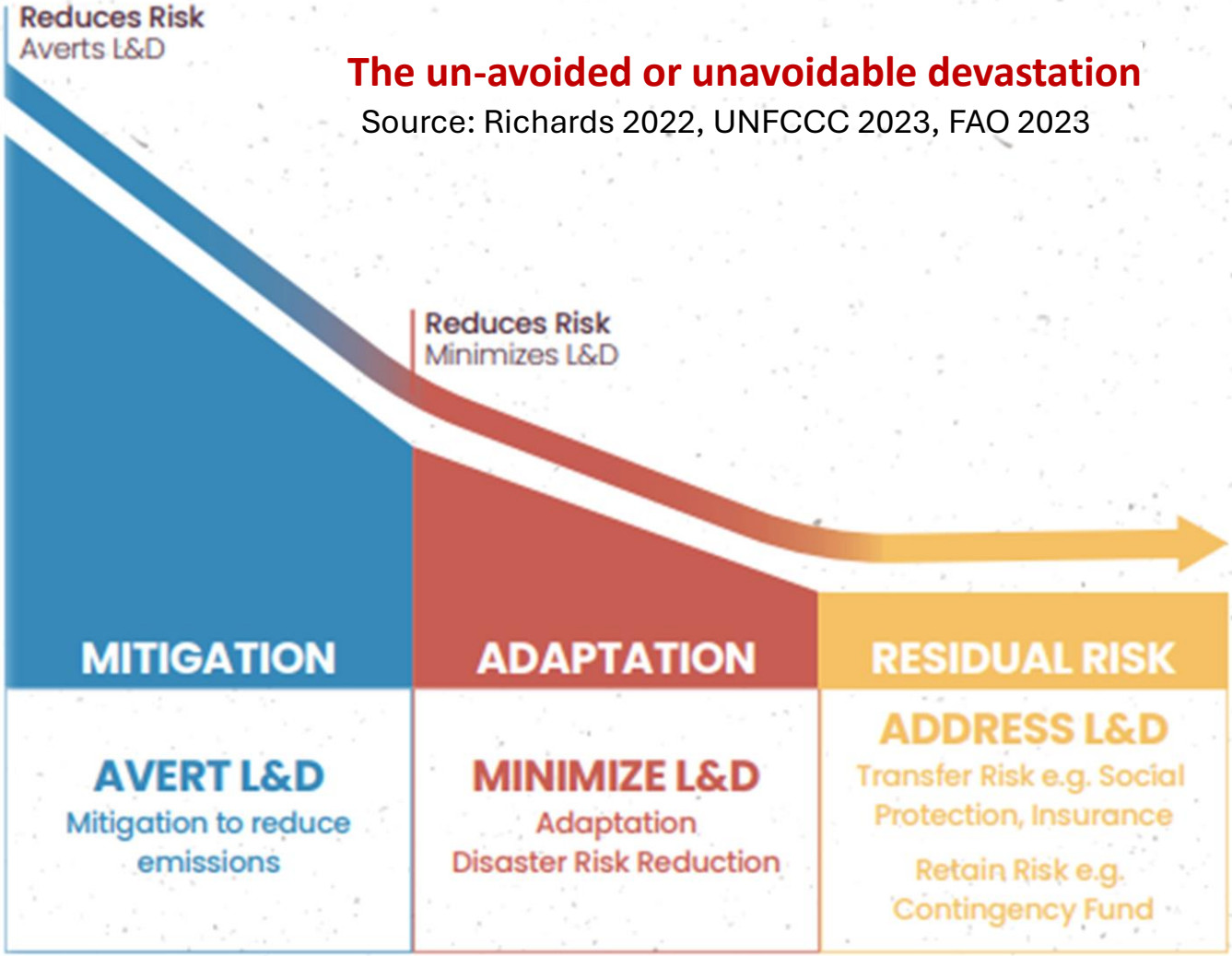
Disproportionate climate induced ‘loss and damage’

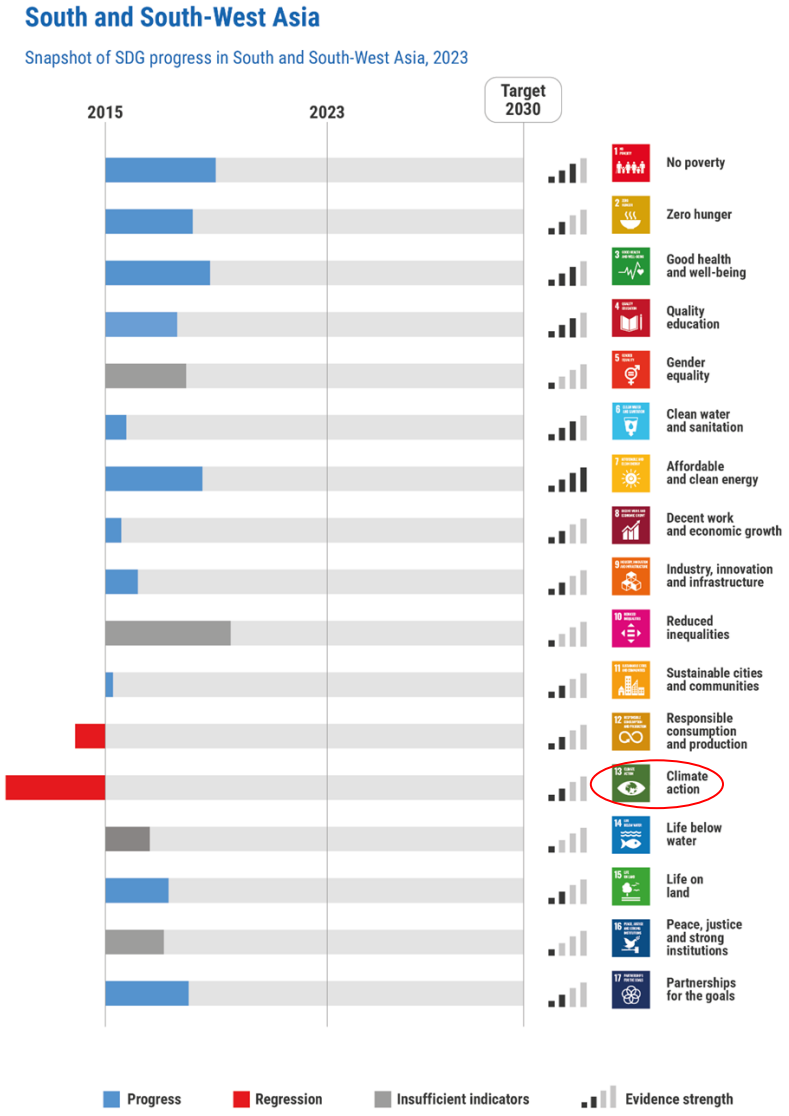
- **Avoided loss and damages** refers to impacts that have or could be averted or minimised through climate change mitigation, adaption and/or DRR measures.
- **Unavoided loss and damages** are those impacts that could not or have not been avoided due to resource and capacity constraints but for which avoidance options do exist.
- Unavoidable loss and damages **refers to those impacts that go beyond existing adaptation and mitigation measures – for example, the irreversible impacts of glacier melt and sea-level rise that are beginning to materialise as the limits of adaptation are reached.**

The un-avoided or unavoidable devastation

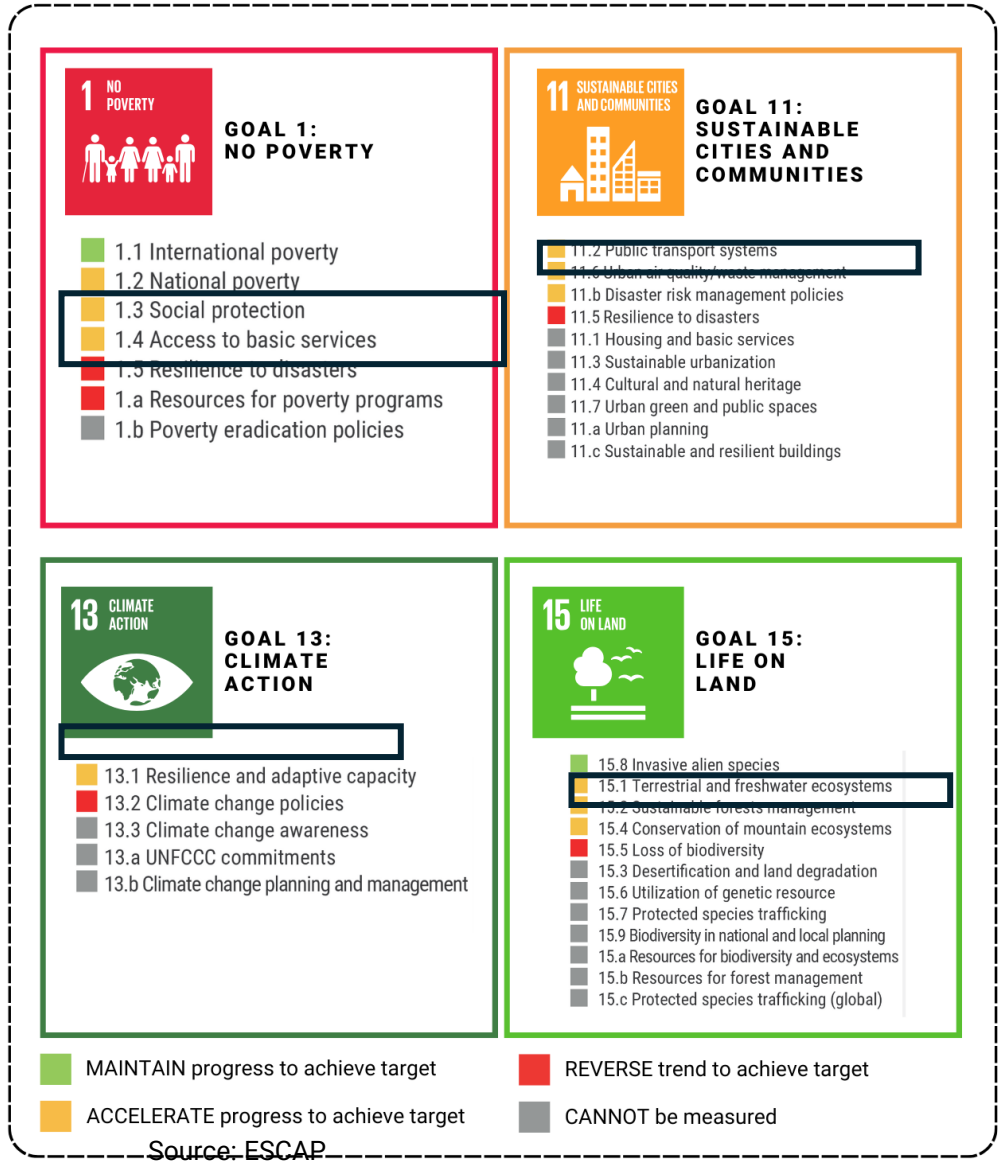
Source: Richards 2022, UNFCCC 2023, FAO 2023



#4. Disaster and Climate Risks contribute to regressing SDG 13



- **50 %** of population exposed to multi-hazard risks under 2°C warming scenarios.
- SDG targets related to **disaster and climate resilience** are **regressing**



Source: ESCAP

Source: ESCAP

#5. What to do to protect at risk - people, sectors and systems

#1. Protect people at risk in multi-hazard risk hotspots, Focus on most vulnerable in intensifying and emerging risk hotspots

#2. Economic case of EW4ALL: 10-fold returns on investments, triples the benefits in vulnerable context

#4 Nature-based solutions (NbS) to sustainably manage, protect and restore the degraded environment and reduce disaster risk.

#3. Sector specific early warnings-Key to safeguard, Resilient infrastructure

5 Opportunities

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#1. Targeting transformative adaptation holds the key in the South and South-West Asia

Building blocks of transformational adaptation: Built on the promises of 'a just transition to adaptation' and 'think resilience'

Leave no one behind at risk: To address unmet needs of adaptation and resilience to vulnerable, poor and marginalized populations in multi-hazard risk areas

Comprehensive risk management: A comprehensive disaster and climate-risk-management strategy with transformative actions in the key sectors such as food and energy systems.

Sector to system approach: Breaking down 'silos' and opening out channels for inter-sectoral communication and coordination along with energy, food, and ecosystems

Technology and innovations: Technology and innovations in policy actions integrating all sectoral interests and capacity building of end users to complete the loop for an actionable agenda, including an effective multi-hazard early warning systems

Climate change disproportionately affects the **most vulnerable**.

A just transition aims to protect these populations.

Integrating Comprehensive Disaster and Climate Risk Management **(CRM)** is essential to enhance DRR and climate adaptation efforts.

Source: ESCAP

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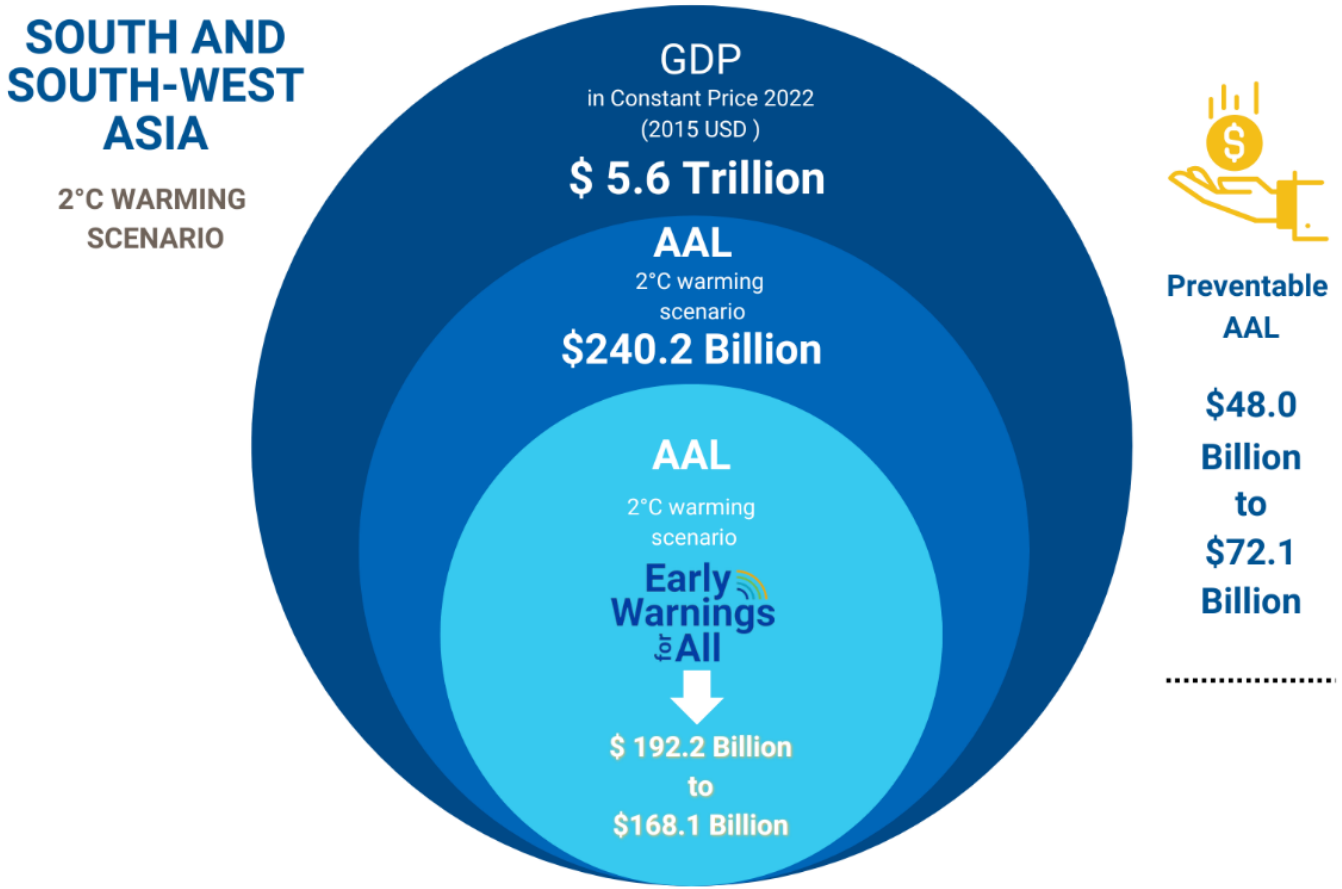
#2. Realizing ‘Early Warnings for All’ can substantially reduce fatalities and losses up to $ 72 billion annually



GDP At constant price figures from SDG Gateway, available at https://data.unescap. org/home and AAL figures from ESCAP

Implementing a 24-hour advance warning for severe weather events, such as storms or heatwaves, can reduce potential damage by up to **30%**.

In South and South-West Asia, with a total cumulative GDP of $5.6 Trillion, AAL under 2°C warming scenario is estimated at around **$240.2 billion**.

However, effective early warning systems could reduce these losses to between $192.2 billion and $168.1 billion, potentially saving **$48.0 billion to $72.1 billion** annually.

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Twin track strategy : Multi-hazard people centred early warning systems coupled with resilient infrastructure and infrastructure for resilience to avoid cascading impacts, supply chain disruptions in cities

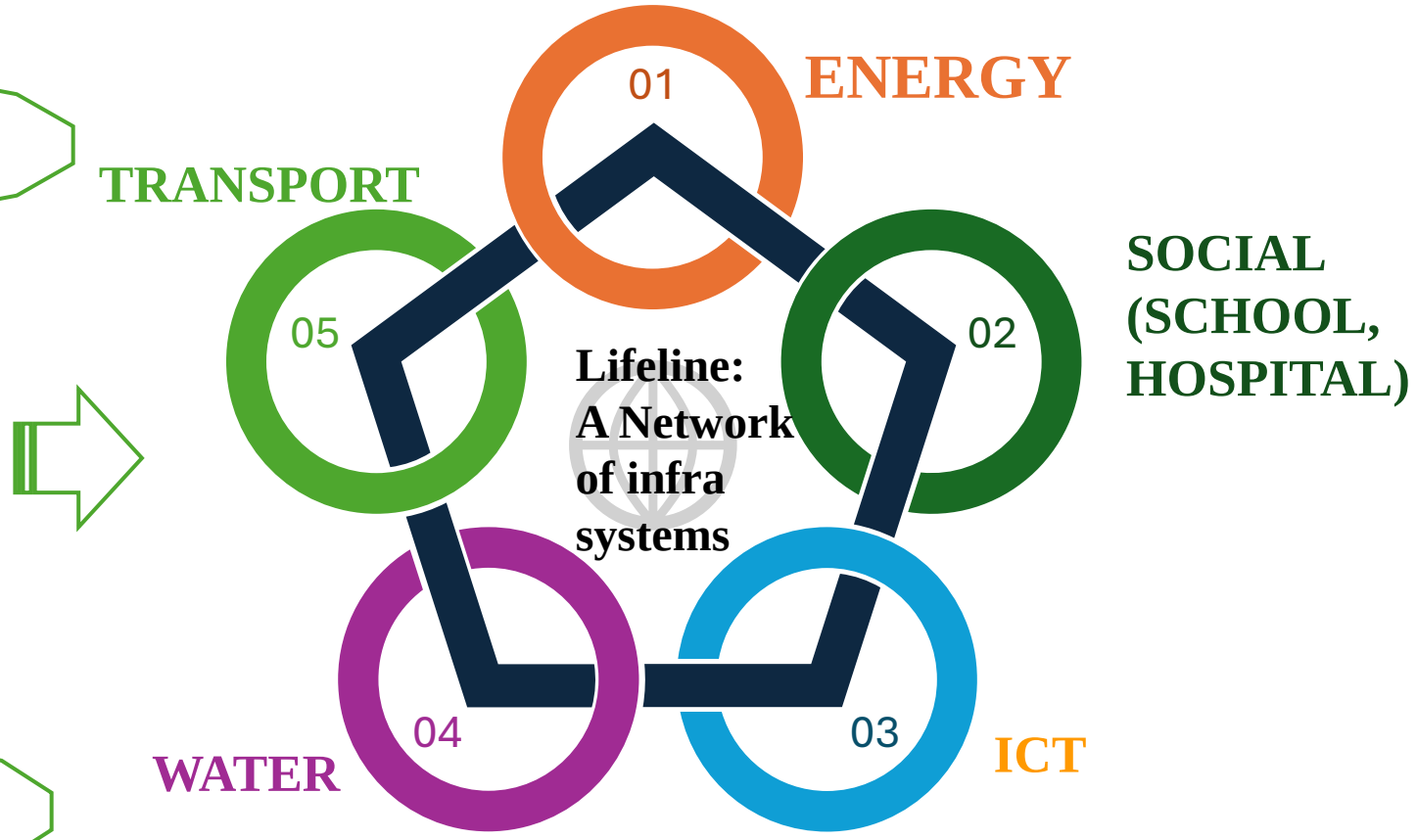
People centered

Impact forecasting

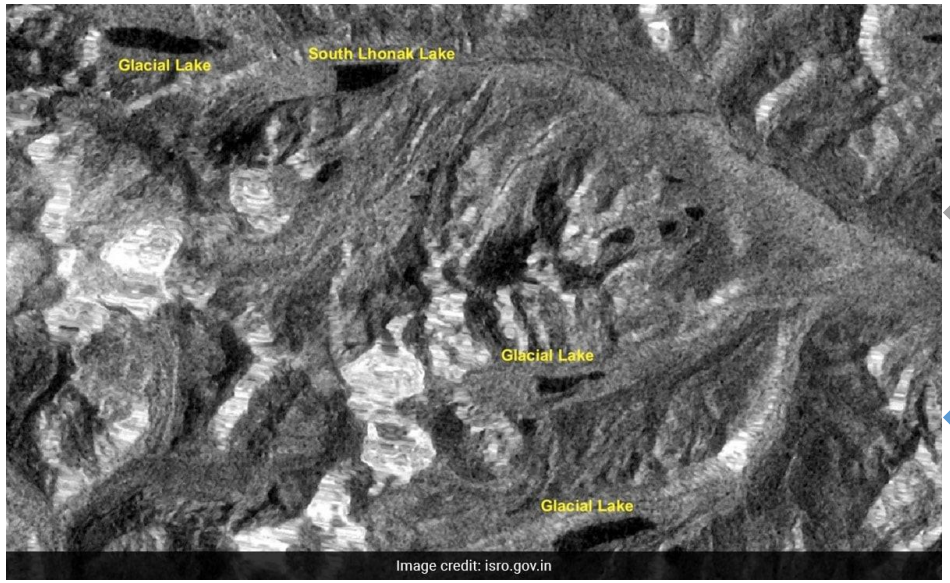
Early Warnings for All

Multi-hazard

Multi-sector



Lesson Leant Hindu Kush Himalaya Context:
Risks are often complex, they compound and cascade

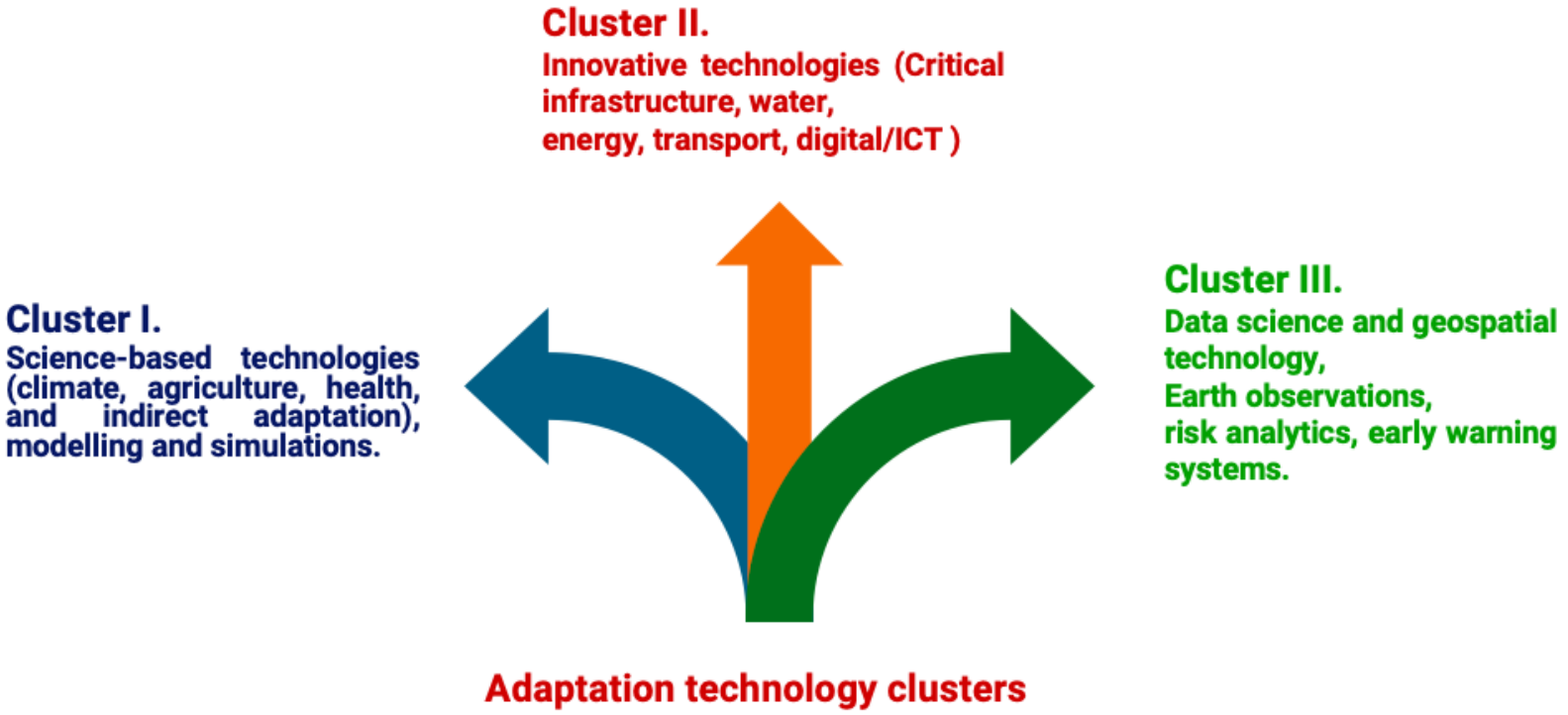


On 4 October 2023, a cloudburst over Lhonak Lake in North Sikkim, claimed over 30 lives, destroyed the 1,200 MW Urja Hydroelectric Chungthang dam and caused widespread damage downstream

1. A dangerous outcome of climate change-induced glacier retreat, this catastrophe exemplifies how disaster risks compound and cascade in the fragile mountainous context.
2. Risk can be transmitted from one system or sector to another, creating new risks and making existing ones severe.
3. These systems/sectors are not single systems but networks, which means that a local emergency could quickly spread and lead to severe disruptions.
4. Glacier/Flash floods/ GLOFs pose a serious threat to mountainous communities across Bhutan, India, Nepal, and Pakistan; from the Himalayas to the Caucasus, Pamir, Hindu Kush-Karakoram and Tien Shan Mountain ranges.

#3. Capitalize on Adaptation Technology

More than 25% technologies are common to adaptation and mitigation



Source: ESCAP, 2024. Available at https://www.unescap.org/blog/scaling-climate-adaptation-technology-just-transition

Effective adaptation strategies necessitate a **combination** of economic incentives, robust policies, and localized actions.

Adaptation technologies are critical for facilitating fair transitions, addressing risks, and building resilience.

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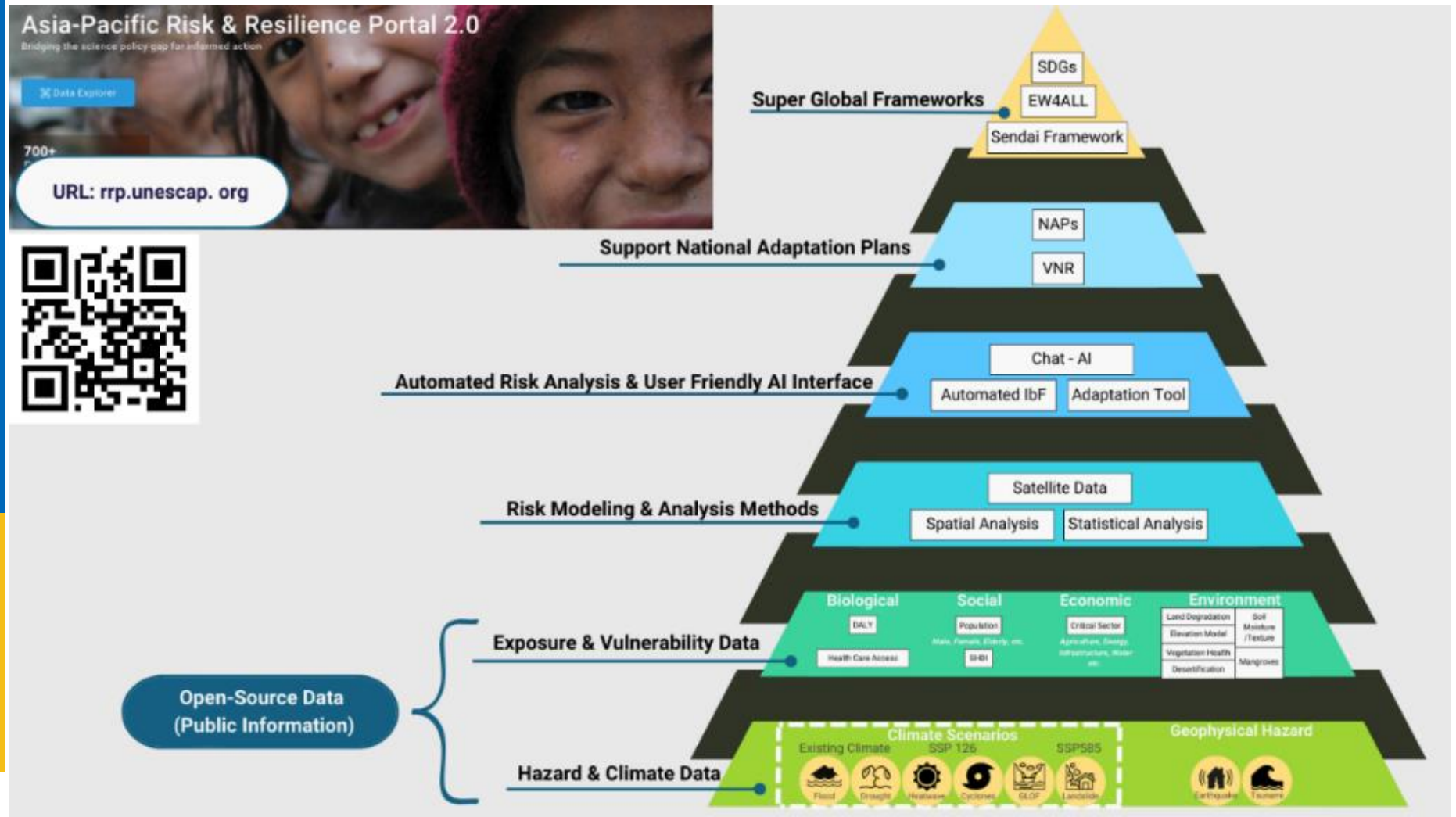
ESCAP Risk and Resilience Portal supports risk informed adaptation and resilience



ESCAP's Risk and Resilience Portal supports **Pillar 1** of Early Warning components by providing critical data on risk hotspots for populations and infrastructure under different climate scenarios.

It also estimates economic and non-economic losses and helps set adaptation priorities, enabling local governments to take **informed actions**

Source: ESCAP

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Harnessing the synergy of platforms

Elaborated modeling to generate hazard data using various variables
Very granular/fine resolution hazard data (100m~4km)

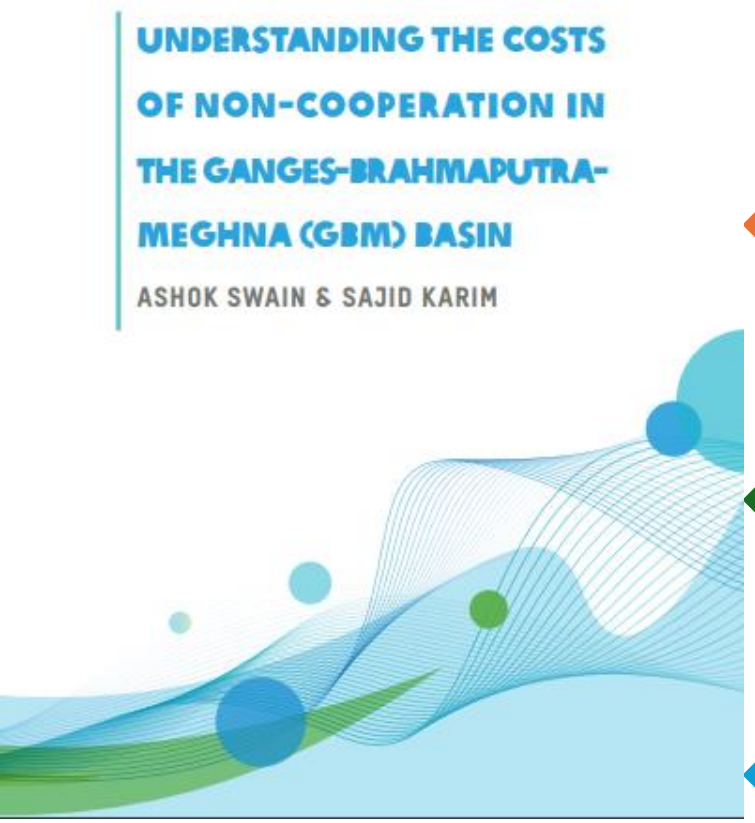
Visualizing and calculating hazards' impacts on exposures

CDRI
Coalition for Disaster Resilient Infrastructure

Rich hazard risk information provided by Global Infrastructure Resilience Index (GIRI)

#4. Unlock the potential of regional co-operation

Reduce disaster and climate induced loss and damage



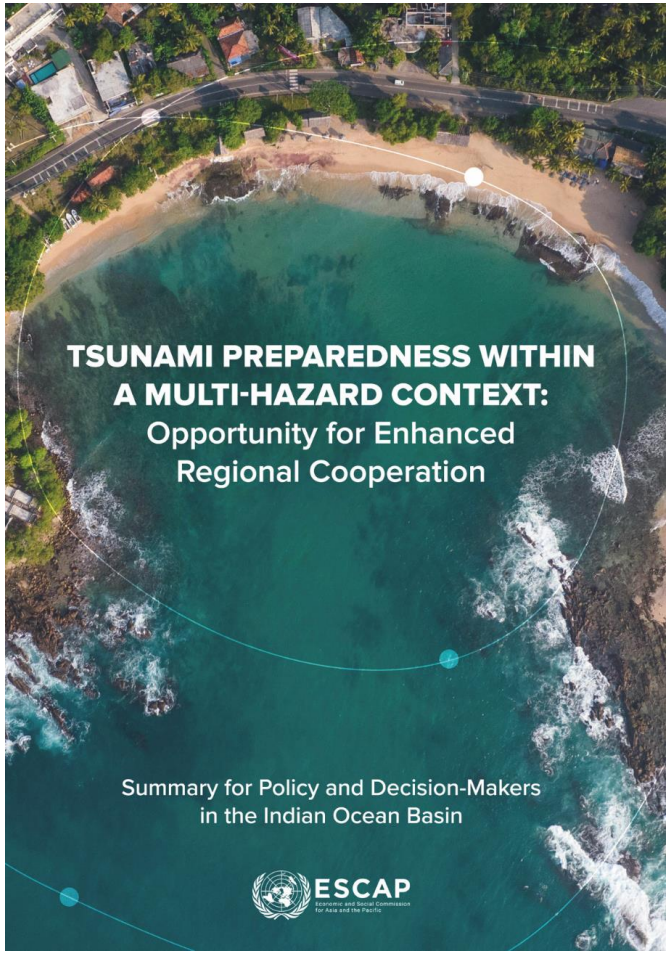
1. **Non-cooperation over shared waters governance in the Ganges-Brahmaputra-Meghna (GBM) basin results in basin countries losing over USD 14.2 billion annually**

2. **A high cost of non-cooperation in one of the most climate-stressed regions warrants for more urgent action by various stakeholders.**

3. **The study identifies nine types of costs resulting from four different sectors - water, energy, food, and environment**

4. **These costs also include increasing disaster impacts, climate impacts across sectors, Ecosystem degradation**

Tsunami Preparedness within a Multi-Hazard Context: Regional Co-operation is the key



Drawing from the 20 years of achievements in tsunami warning, the report presents the progress and existing gaps - emphasizing the need for addressing **climate and geophysical hazards, community preparedness, resilient infrastructure, and regional collaboration**.

Aligning with the UN Secretary-Generals call for **Early warnings for all** by 2027 and the **UN Decade of Ocean Science for Sustainable Development**

Early Warnings for All

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

unesco Intergovernmental Oceanographic Commission

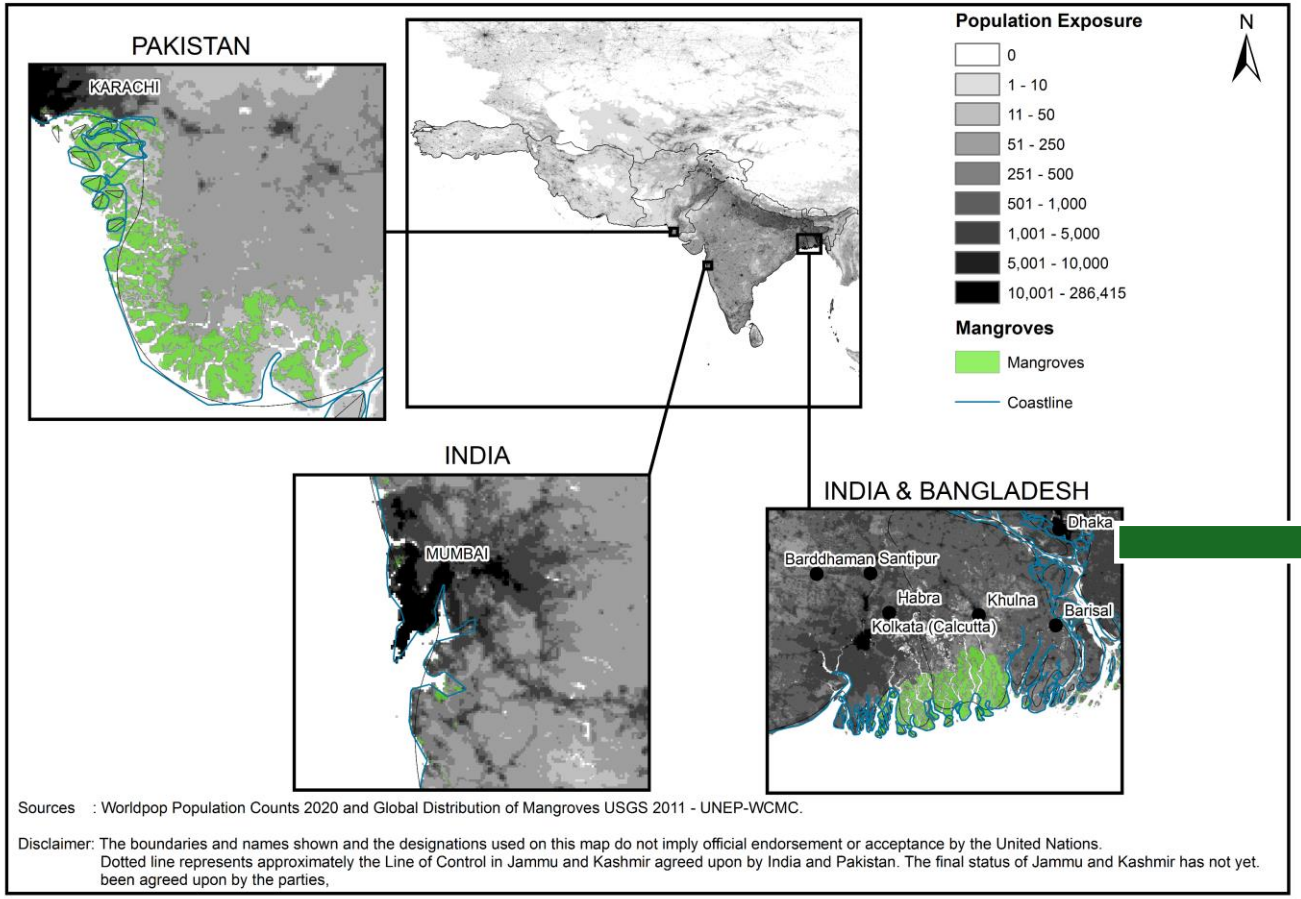
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Ministry of Foreign Affairs and International Cooperation

#5. Nature-based solutions critical for protecting coastal cities

Need to protect at risk communities and economic assets

Population exposure in South Asia



Sources : Worldpop Population Counts 2020 and Global Distribution of Mangroves USGS 2011 - UNEP-WCMC.

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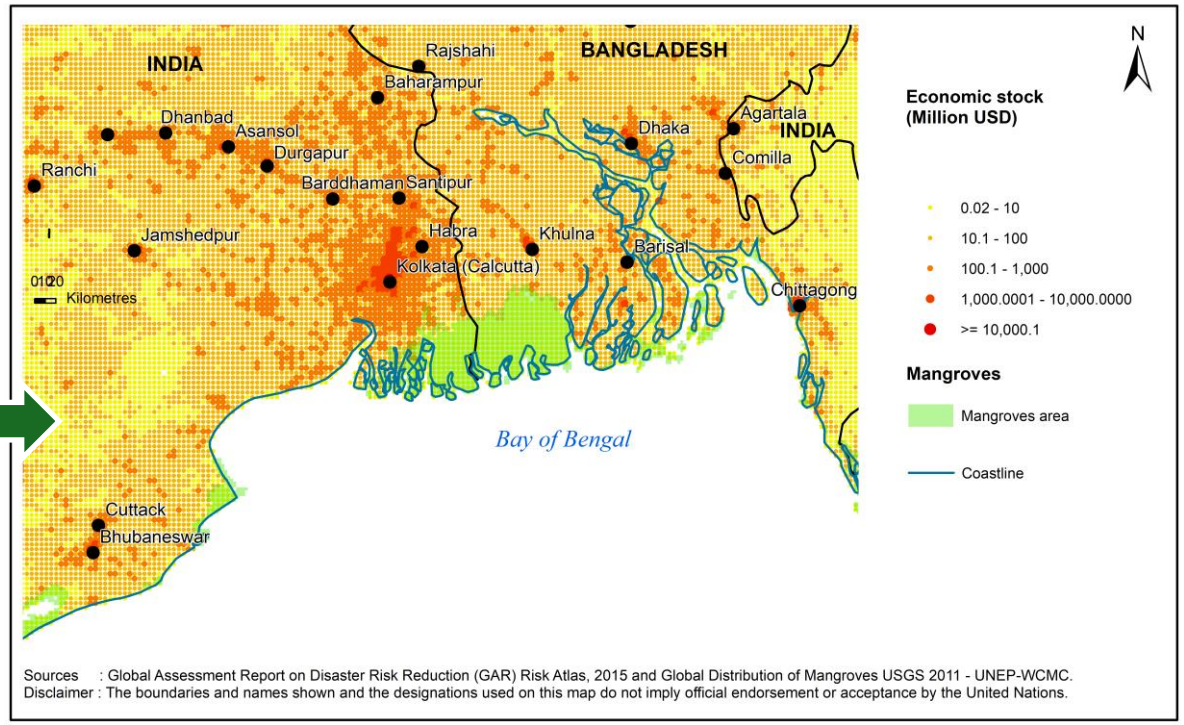
Exposed economic stock exposure in coastal cities nearby Sundarbans area

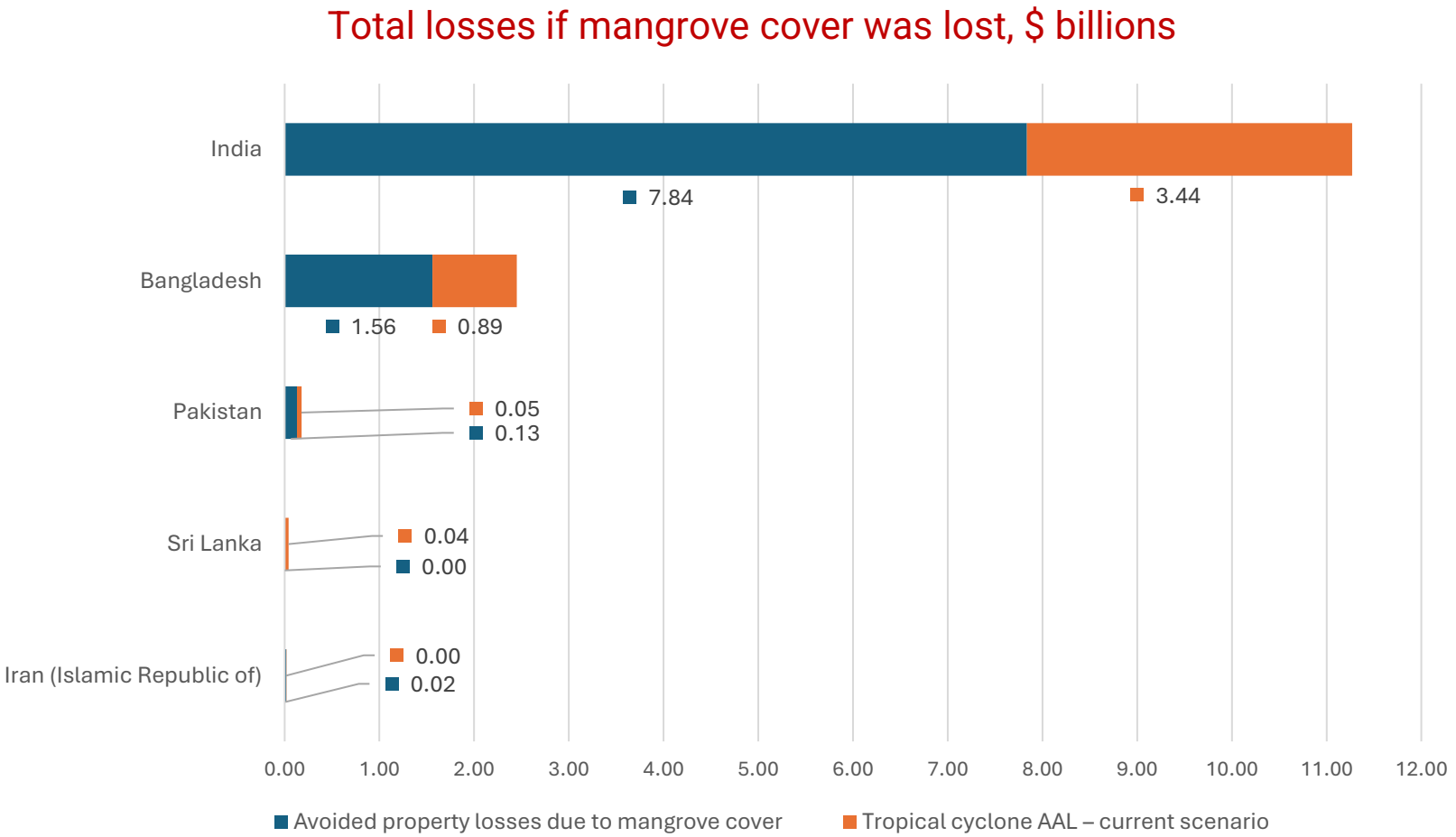


Sources : Global Assessment Report on Disaster Risk Reduction (GAR) Risk Atlas, 2015 and Global Distribution of Mangroves USGS 2011 - UNEP-WCMC.
Disclaimer : The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Why Goal 14 (Coastal ecosystem) is so critical in South and South-West Asia?

Protecting lives, livelihood and economic assets from storm surges, cyclones and floods

Importance of protecting mangroves



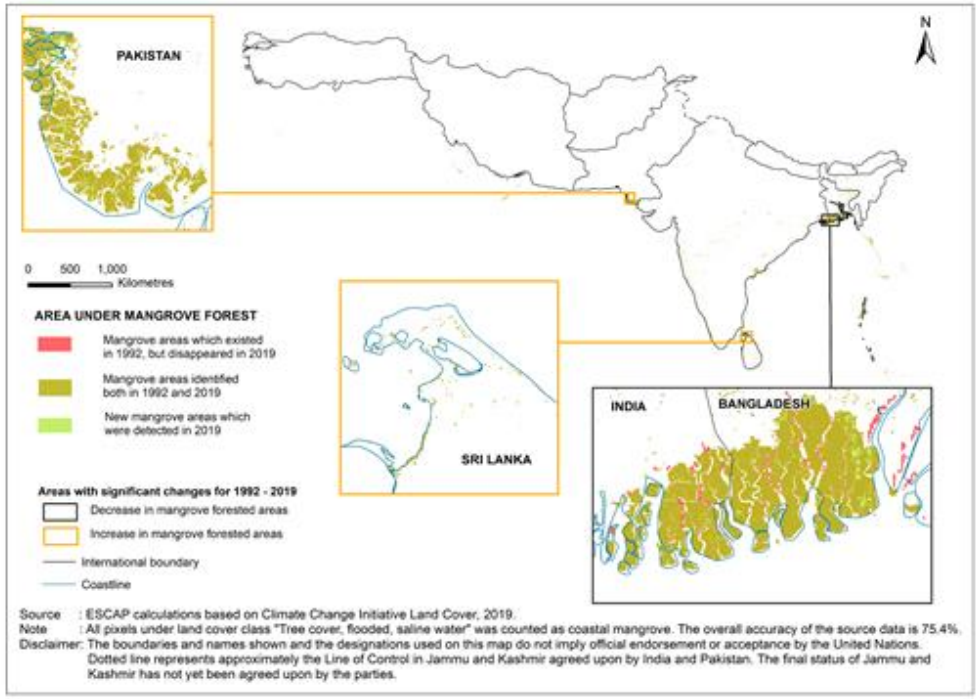
Combining the avoided losses due to mangrove cover with the AAL due to tropical cyclones show that **in absence of mangrove cover, total losses increase substantially**, especially in India, Bangladesh and Sri Lanka

AAL: Average Annual Loss

Source: ESCAP calculations based on Mendelez et al (20

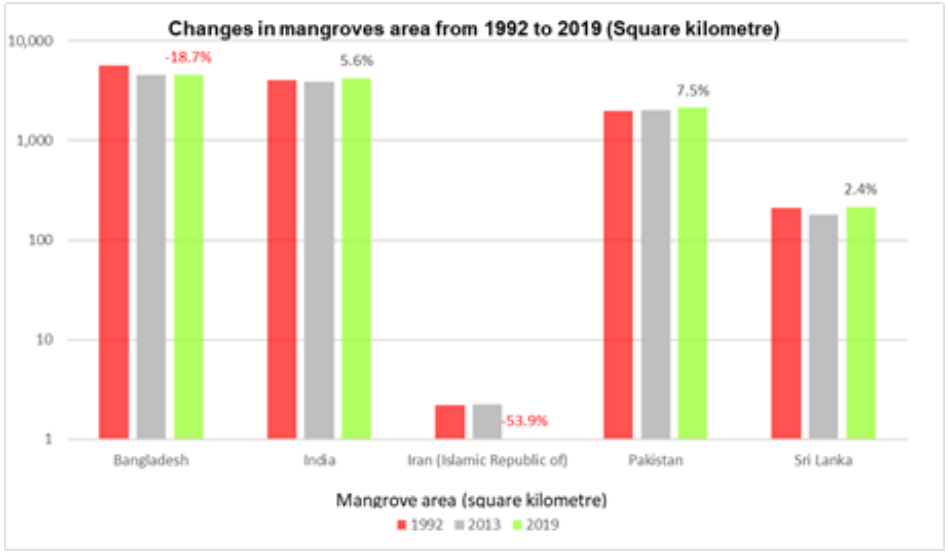
Example: Importance of protecting mangroves in South and South-West Asia

Area under mangrove cover, 1992 and 2019



Mangroves reduce the impact of tropical cyclones, storm surges, coastal flooding and erosion.

Between 1992-2019, **SSWA lost 6% of their mangrove cover** – highest losses in Bangladesh and Iran (Islamic Republic of)



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