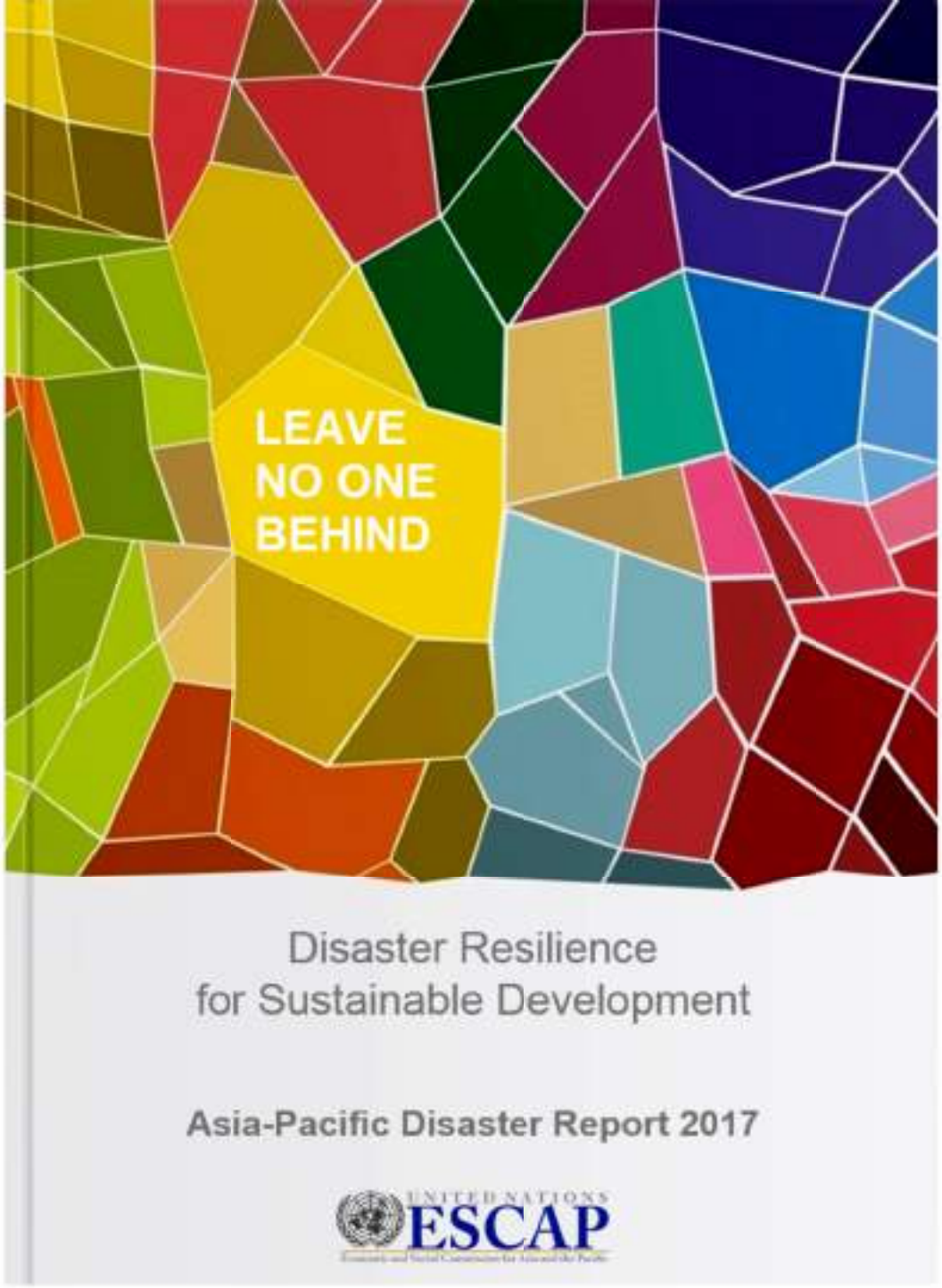
Mainstreaming Disaster Risk Reduction in Infrastructure Development and 2030 Agenda for Sustainable Development

SAARC Training Programme
SAARC Disaster Management Centre (IU)
GIDM Campus
Gandhinagar, India
8 July 2018



UNITED NATIONS
ESCAP

Based on the key findings of ESCAP's analytical research

Message #1

Disaster risk is outpacing resilience.

Human cost significant, while economic cost rising

Asia-Pacific:
Human cost of natural disasters, 1970–2016

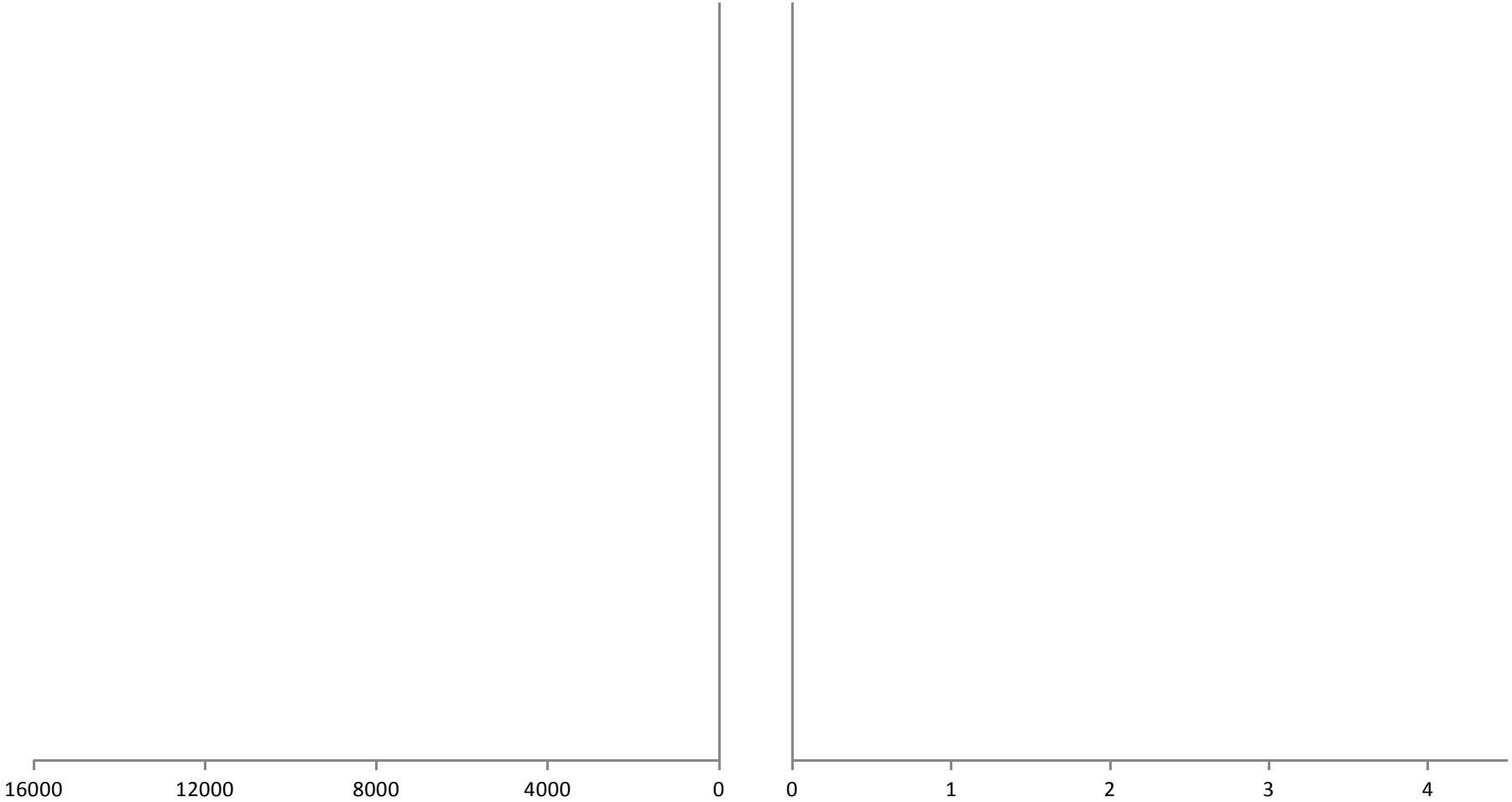
Asia-Pacific
2,038,976

- **2 million lives lost (56% of global fatalities)**
- **88 % of people affected in the world**

Estimated damage, as % of GDP, is rising in the Asia-Pacific region

Economic cost: Asia-Pacific has lost $1.3 trillion due to natural disasters (1970-2016)

Annual Average Losses in South and South West Asia Countries



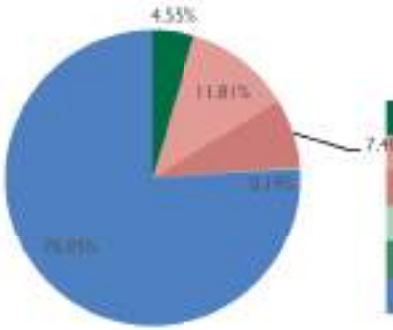
*Note: Bhutan all disaster damage is 4.0% of GDP(2014)

Country risk profile

INDIA

DISASTER RISK

Average Annual Loss (AAL)[7] by hazard



Hazard	Value	AAL/Capital stock	AAL/GFCF	AAL/Social expenditure	AAL/Total reserves	AAL/Gross savings
	[million US$]	[%]	[%]	[%]	[%]	[%]
Earthquake	446,55	0,01	0,08	0,40	0,16	0,08
Cyclonic Wind	1.160,44	0,02	0,22	1,05	0,42	0,21
Storm Surge	726,92	0,01	0,14	0,66	0,26	0,13
Tsunami	19,14	0,00	0,00	0,02	0,01	0,00
Volcano		0,00	---	---	---	---
Flood[10]	7.471,82	0,13	1,40	6,74	2,70	1,33
TOTAL	**9.825**	**0,2**	**1,8**	**8,9**	**3,6**	**1,7**

Risk and Development Implications[11]

58,4

Ranking

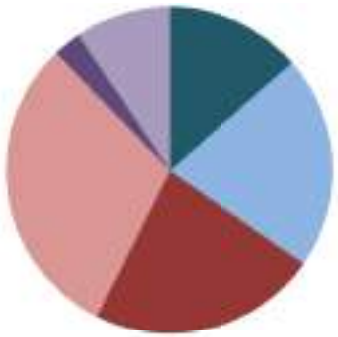
68

out of 213

Disclosed AAL results by sector (Earthquake and cyclonic wind)

Sector	Sub Sector	Capital stock [million US$]	Average Annual Loss (AAL) [million US$]
Residential (income)[12]	Low	725.055	216,40
	Middle low	1.081.117	336,30
	Middle high	0	0,00
	High	0	0,00
Services	Commercial	1.382.413	0,30
	Industrial	1.813.619	0,31
Education	Private	239.256	362,90
	Public	639.336	486,30
Health	Private	2.827	43,80
	Public	1.218	151,20
Public buildings		0	0,10
National		5.884.841	0,00
Fiscal[13]		1.365.609	0,26

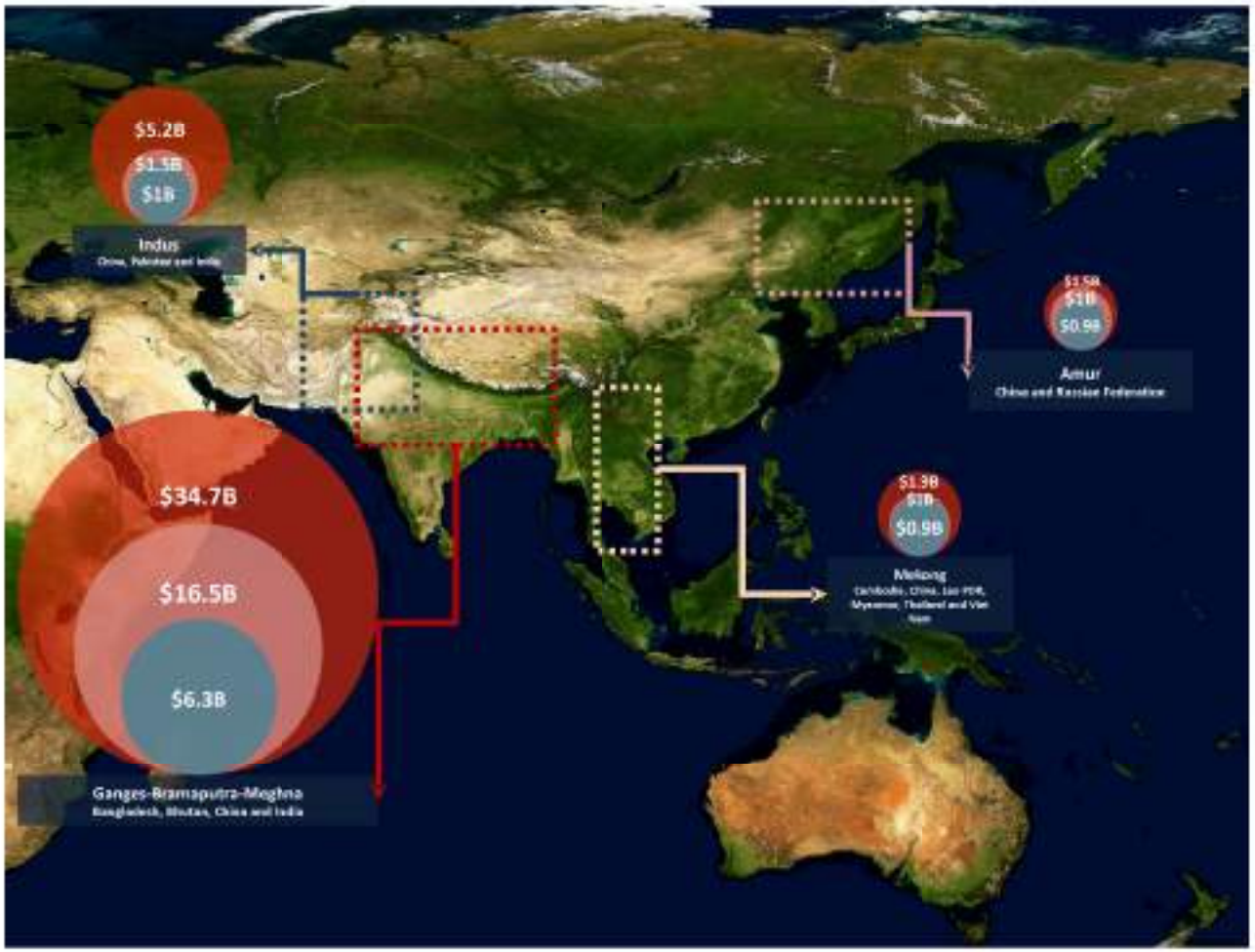
Distribution by sector



Message #2

Hazards are intensifying with transboundary geographical shifts.

Transboundary flooding (Scenarios 2010 and 2030)



A substantial increase in flood losses under both moderate and severe climate scenarios.

China, India, Bangladesh and Pakistan will experience two to three times more in flood losses

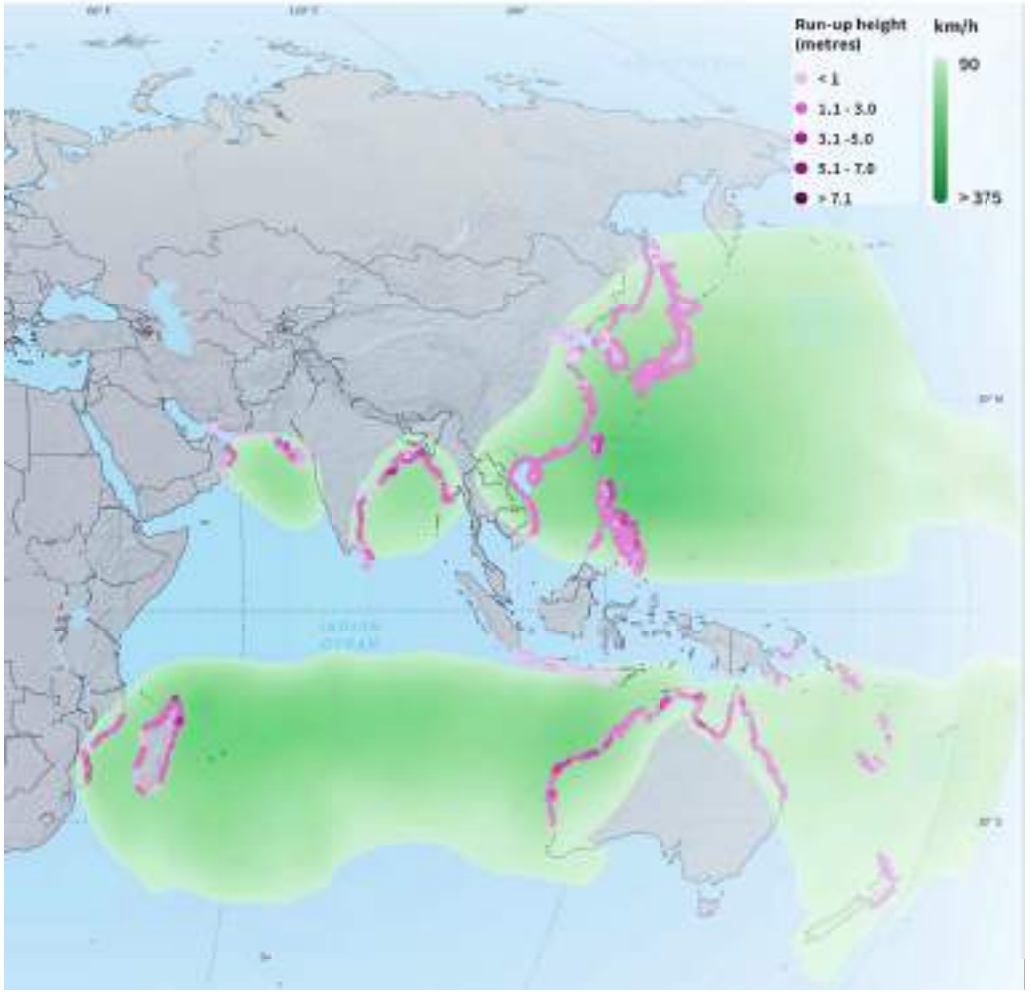
The transboundary flood losses will range from 1.2 to 6 times more in the major river-basins

Tropical cyclone – increasing complexity

Tropical cyclones will have shorter return periods with increasing storm surges and wind speeds.

In the Pacific basin, the track of tropical cyclones may shift eastward or northward.

Three times increase in the number of people and economic assets exposed

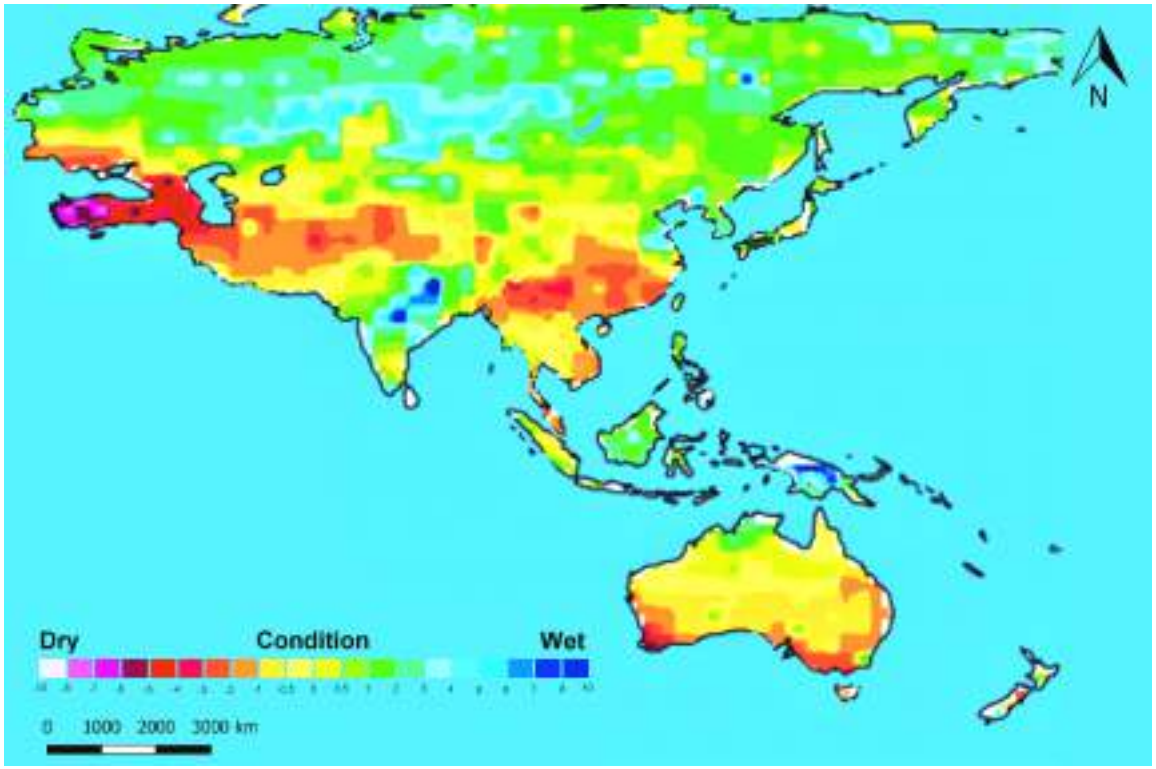


Drought severity by 2030

Drought risk will increase substantially and there will be significant shifts in its geography.

In South Asia, westward shift and in South East Asia, eastward.

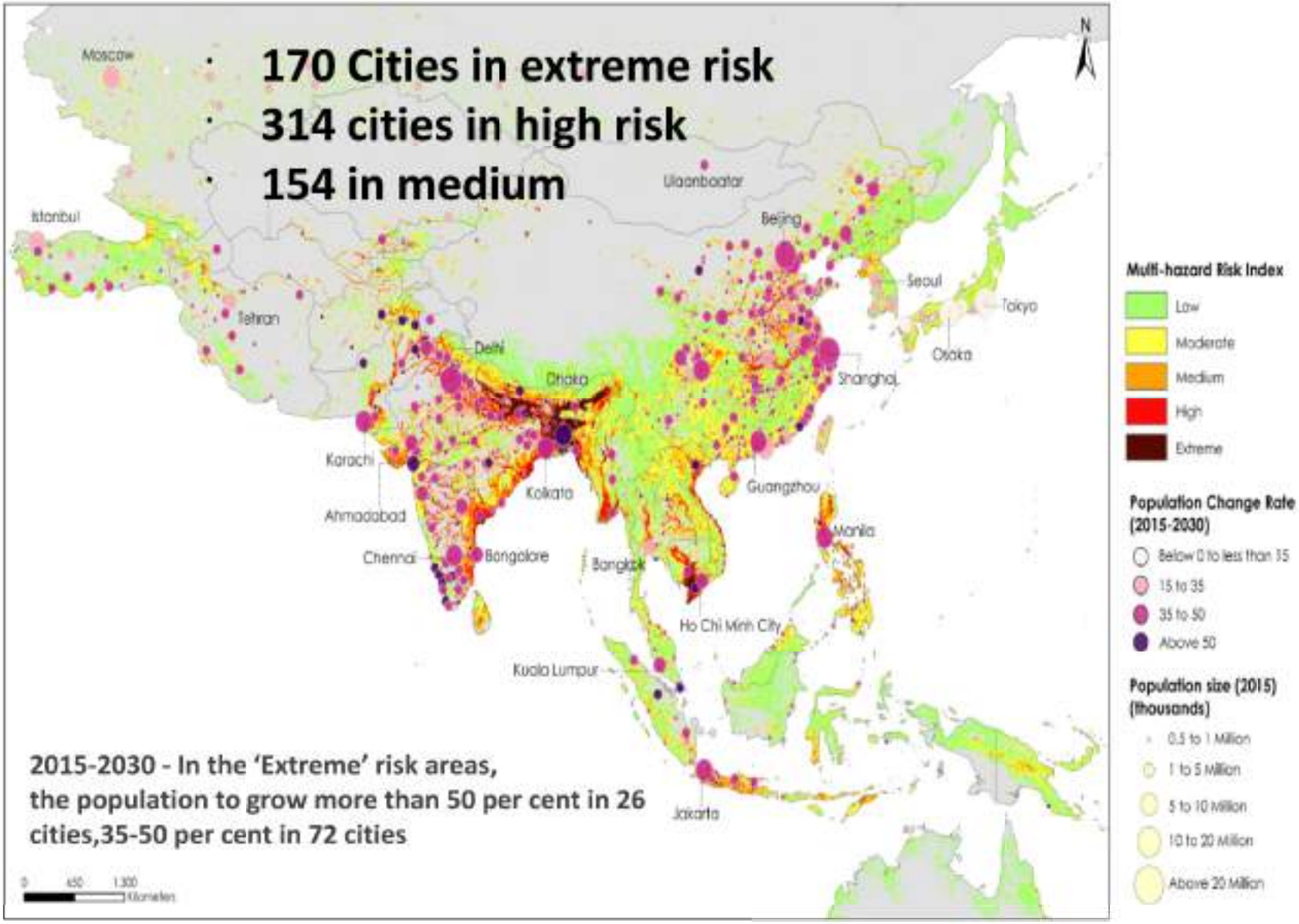
The new geography of drought will cause deep uncertainties on how to manage the risk.



Message #3

Infrastructure @ risk with rapid urbanization

As Asia-Pacific urbanizes, risk accumulates



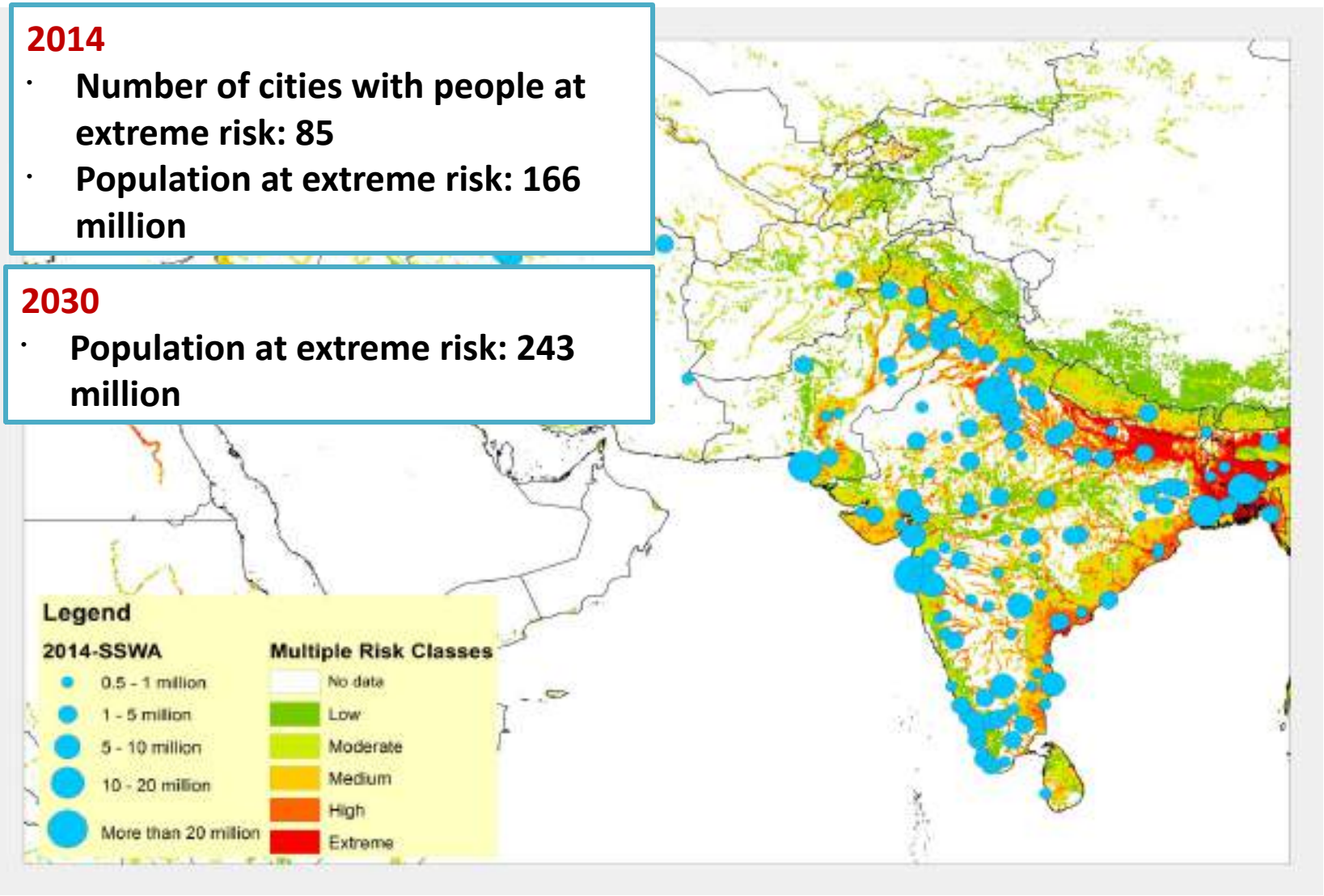
South Asian Cities @ risk

2014

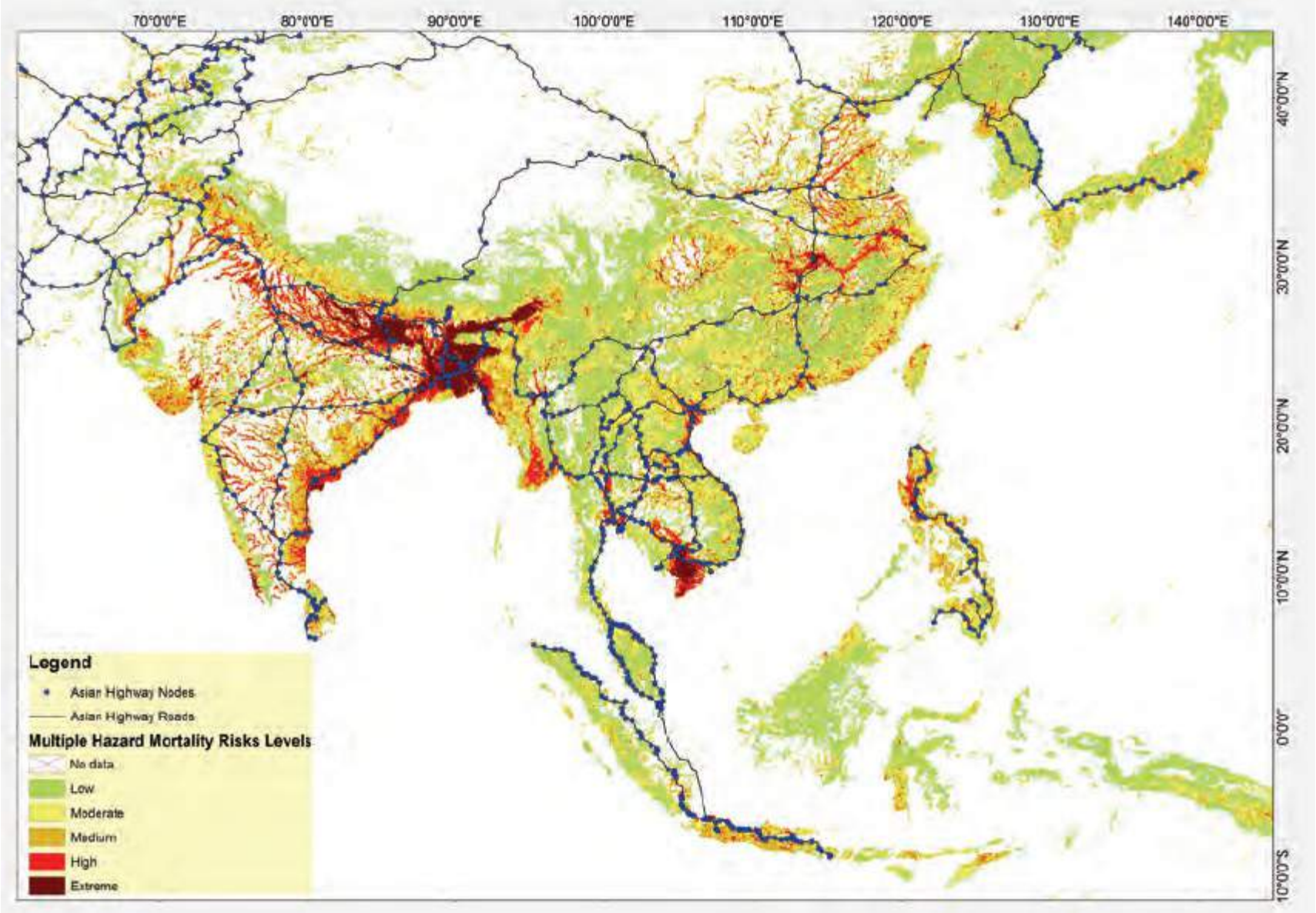
- **Number of cities with people at extreme risk: 85**
- **Population at extreme risk: 166 million**

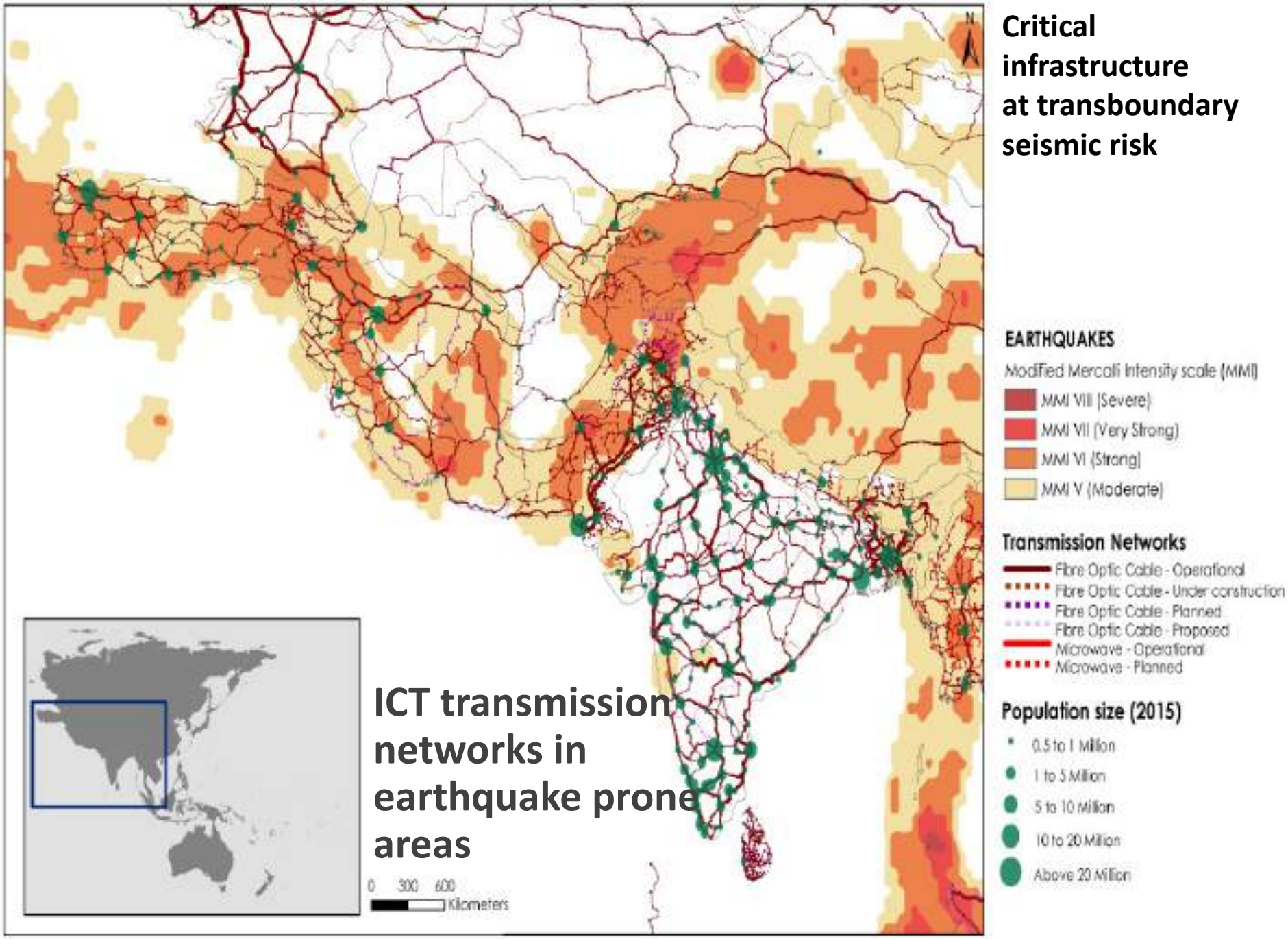
2030

- **Population at extreme risk: 243 million**



Many transport networks in South Asia are in high risk areas





Critical infrastructure at transboundary seismic risk

ICT transmission networks in earthquake prone areas

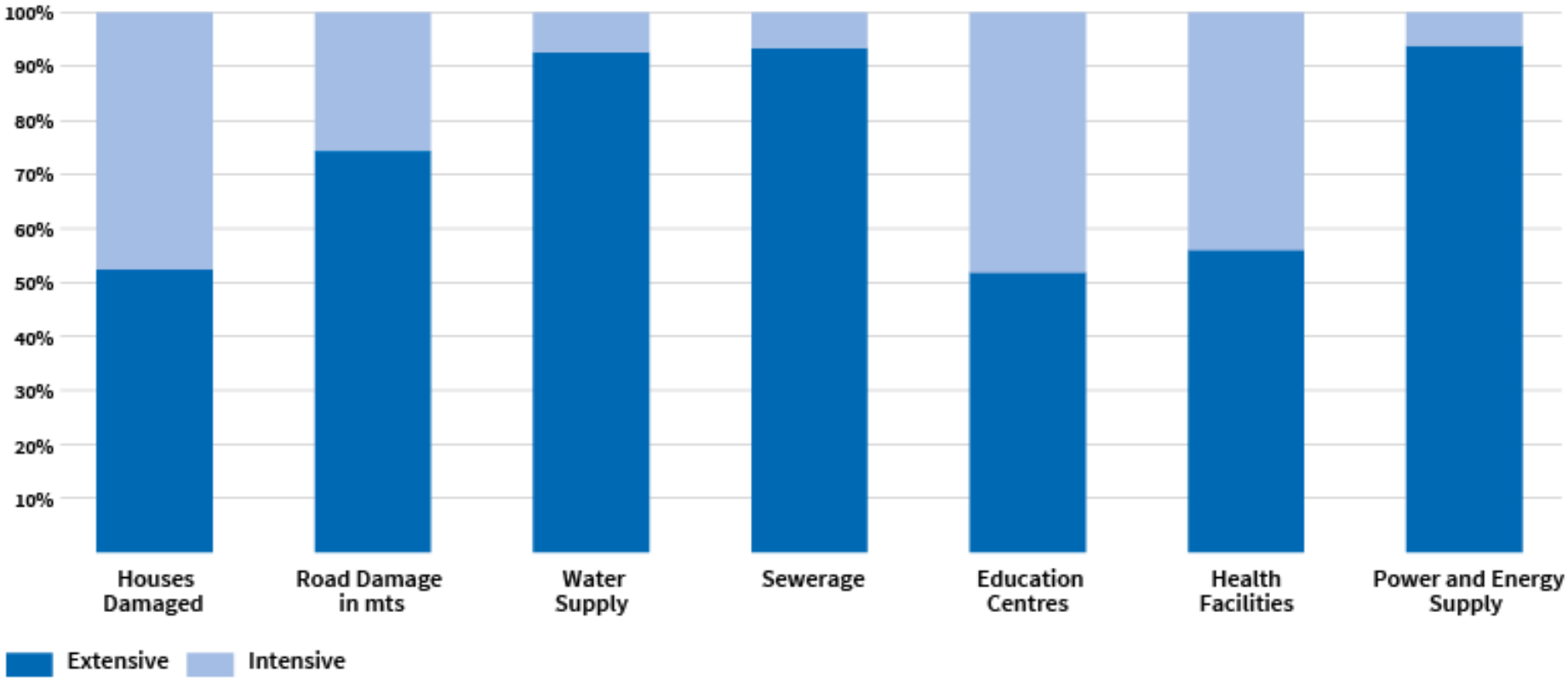
Message #4

Damage to critical infrastructure amplifies overall disaster impacts because sectors are interconnected

Critical Infrastructure

Social Sector	Physical Sector
- Education - Health - Housing and shelters	- Energy - Transport - Water/irrigation dams - water supply and sanitation - ICT - Telecommunication

Most disaster impacts in infrastructure are associated with extensive risk



UNISDR

GAR

Lessons from Cyclone HudHud 12 Oct 2014, Andhra Pradesh India

- **Loss of lives saved: thanks to efficient early warning, timely evacuation and better preparedness at local level.**
- **Damage and loss (critical infrastructure - Airport) could not (11 billion US$) be reduced because of the exposure.**
- **Climate risk is to be taken into account while building the critical infrastructure.**

Social Infrastructures are alarmingly exposed

- **Worldwide, approximately 1.2 billion students are enrolled in primary and secondary schools.**

  Of these, 875 million live in seismic high-risk zones and hundreds of millions more face regular floods, landslides, extreme winds and fire hazards.

Schools are hit the hardest

- **Pakistan, 2005 earthquake – 17,000 students died under 10,000 collapsed schools**
- **China, 2008 earthquake – Almost 10,000 children died when 7,000 classrooms were destroyed**
- **Japan, 2011 earthquake and tsunami – 7,735 school buildings were damaged**

Message #5

Making Critical Infrastructure Resilient

- Three Key Steps for Policy Response

Three key steps…:

1. **Identify critical infrastructure sectors @ risk;**
2. **Identify inter-linkages and interdependencies among critical sectors;**
3. **Put in place “hard” (built environment) and “soft” (land use plan, building codes) resiliency.**

Mapping the critical infrastructure at risk

Tangjiashan quake lake: satellite images provided critical information for decision makers to assess the risk, issue urgent warnings and to arrange for early response actions

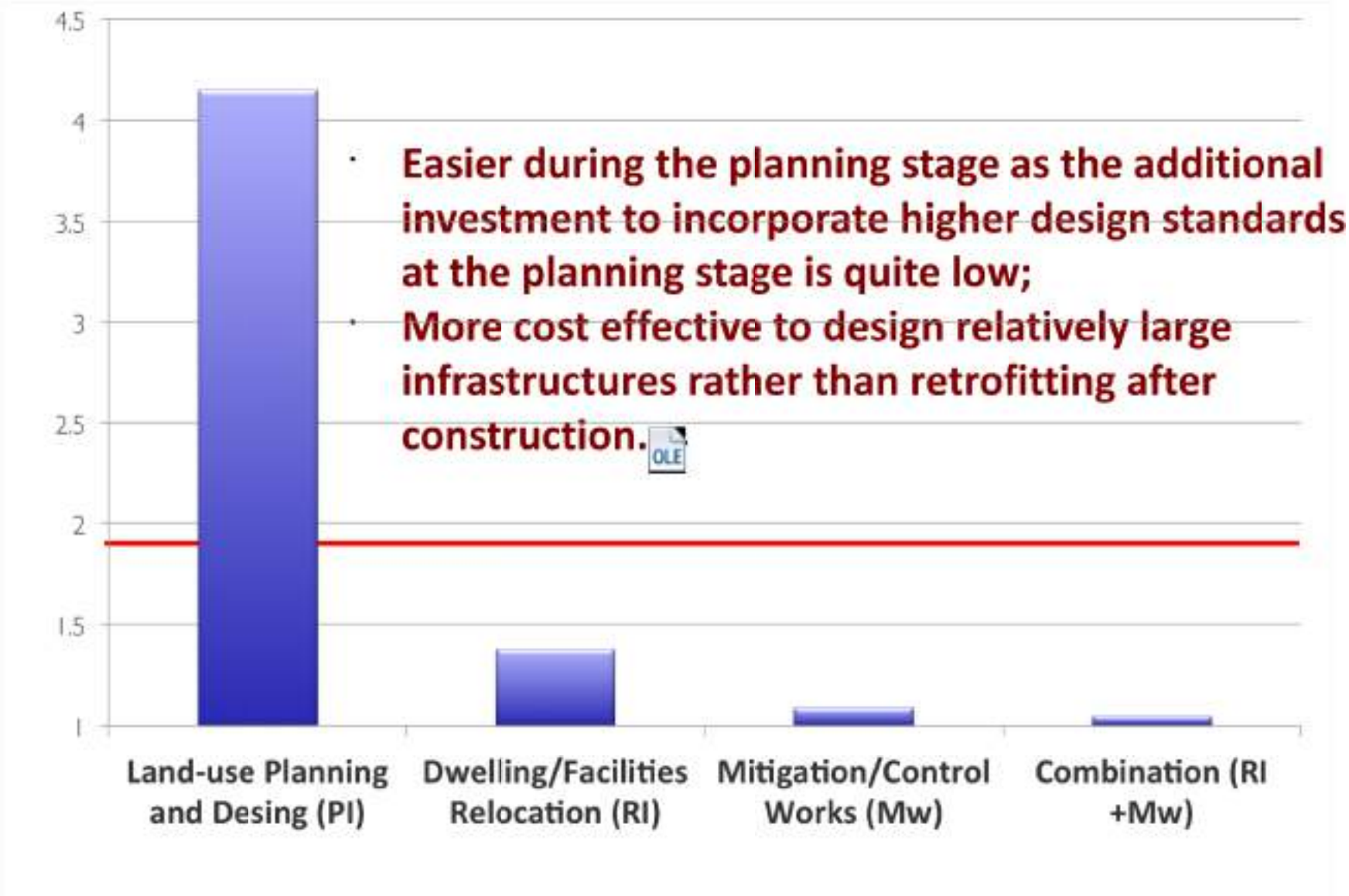
2.

Ten essentials for making cities disaster resilient

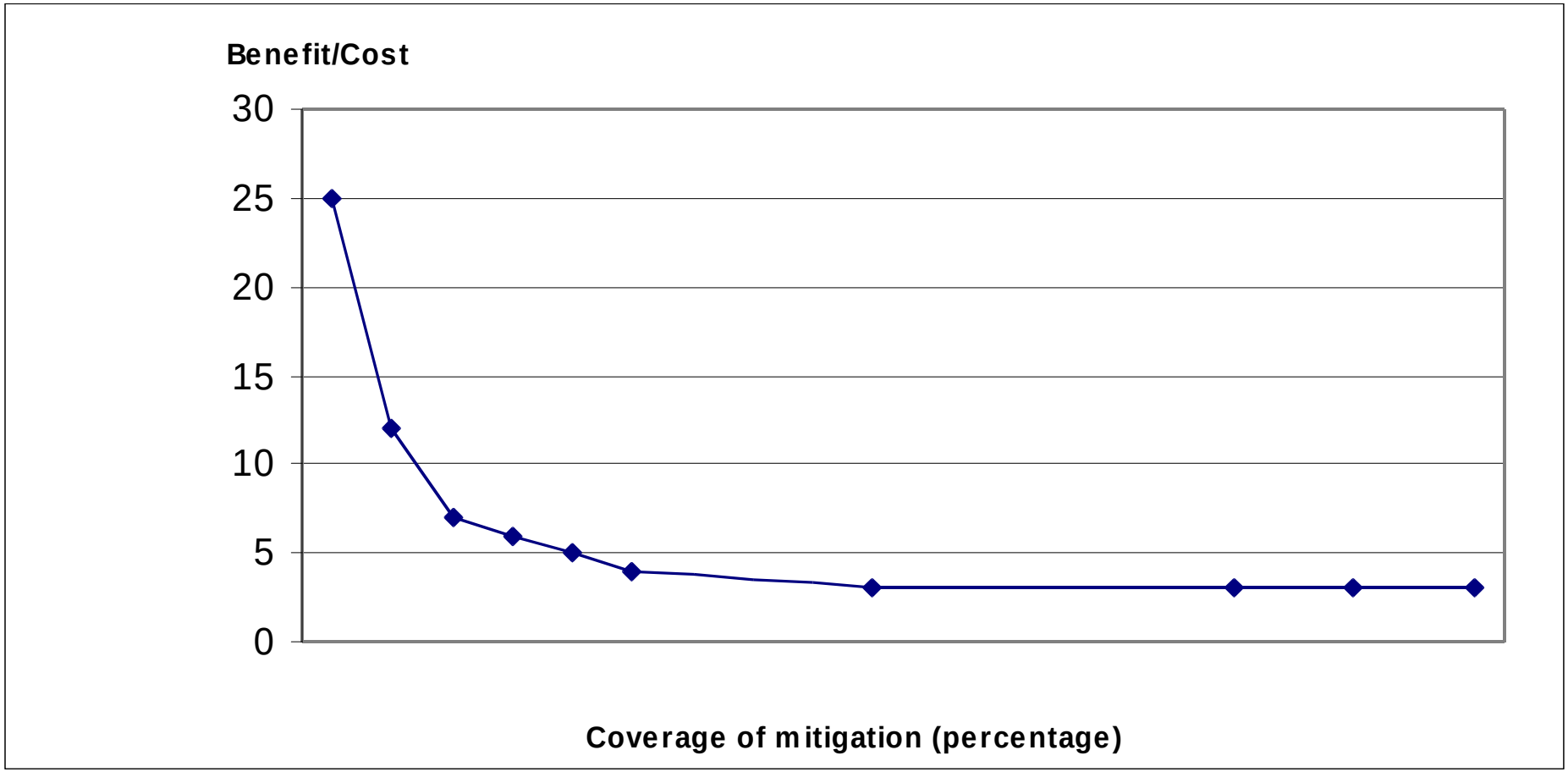
- Institutional and administrative framework
- Financing and resources
- Multi-hazard-risk assessment – know your risk
- Infrastructure protection, upgrading and resilience
- Protect vital facilities: education and health
- Building regulations and land use planning
- Training, education and public awareness
- Environmental protection and strengthening ecosystems
- Effective preparedness, early warning and responses
- Recovery and rebuilding communities

UNISDR Global Partnership Programme“Building Resilient Cities – My city is getting ready

Resilient land use planning has largest ratio of benefit to cost



The risk management investments have been found to be more cost-effective when targeted to critical infrastructure



Message #6

The deep uncertainty lies in climate resilient infrastructure

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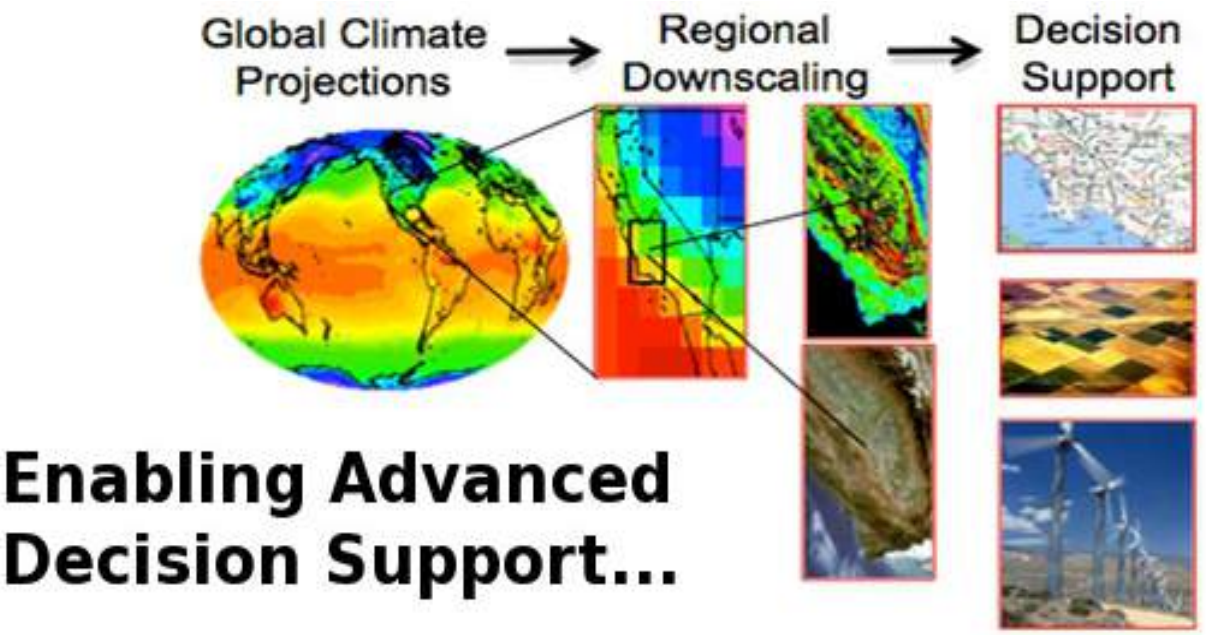
Acting on weather & climate risk information mitigates droughts and floods



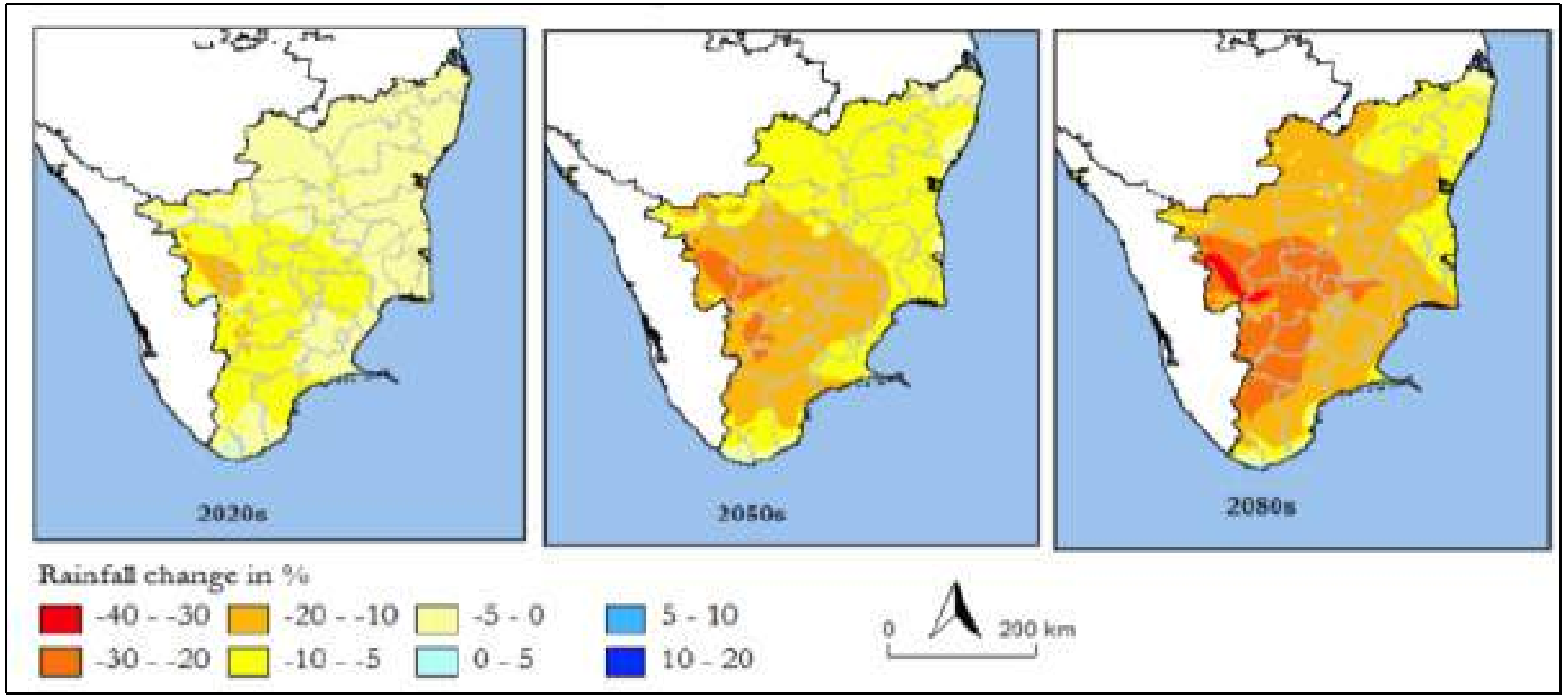
Monsoon Forum

- **In 2016, Sri Lanka saved US$41 million from averting potential flooding by regulating water in dams/ reservoirs.**
- **In 2015, it has increased its cultivation by 23% despite below-normal rainfall.**

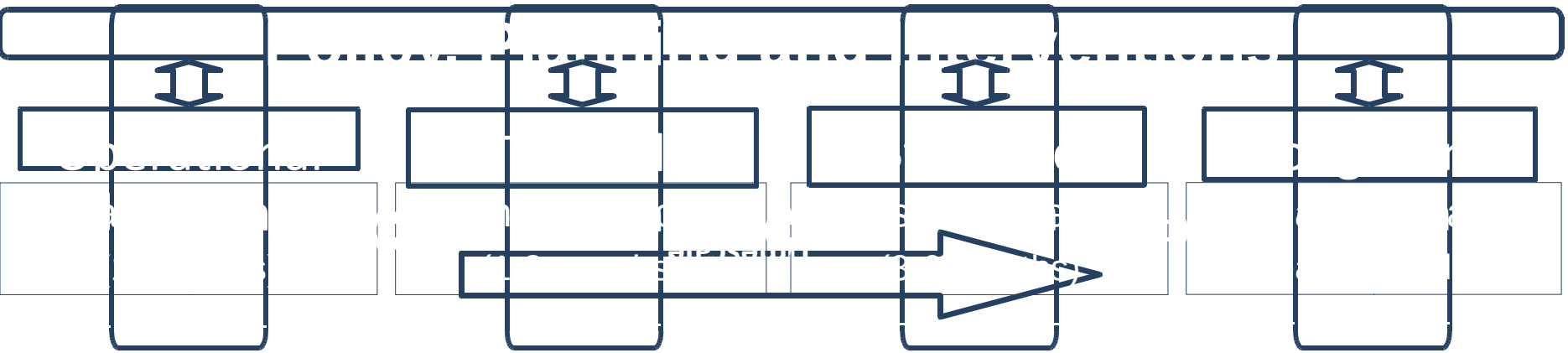
Source: DOM/Sri Lanka – Monsoon Forum

Understanding climate risk for resilient development planning

Tamil Nadu in India is exposed to cyclones, heavy rainfall, floods, droughts and landslides. Downscaled climate scenario based models were used to assess the potential risk in agriculture, and related industry and service sectors for risk -sensitive development planning and decision-making.



Need to support decision-making under uncertainty



- ✓ Downscaled & easily accessible climate change projections
- ✓ Integration of information for different timescales

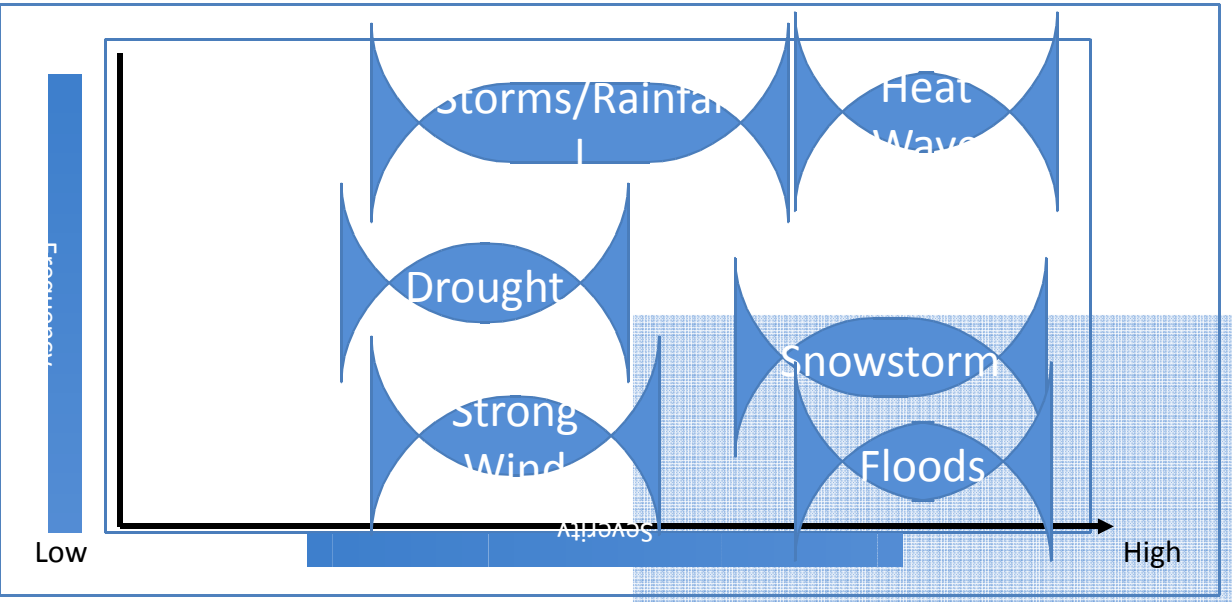
List of sectors in which climate change should already be taken into account due to their investment time scales and exposure to climate conditions

Sector	Time scale (year)	Exposure
Water infrastructure (e.g., dams reservoirs)	30-200	+++
Land-use planning (e.g., in flood plain or coastal areas)	>100	+++
Coastline and flood defenses (e.g., dikes, sea walls)	>50	+++
Building and housing (e.g., insulation, windows)	30-150	++
Transportation infrastructure (e.g., port, bridges)	30-200	+
Urbanism (e.g., urban density, parks)	>100	+
Energy production (e.g., nuclear plant cooling system)	20-70	+

Source : Hallegatte, S. *et al.* (2010)

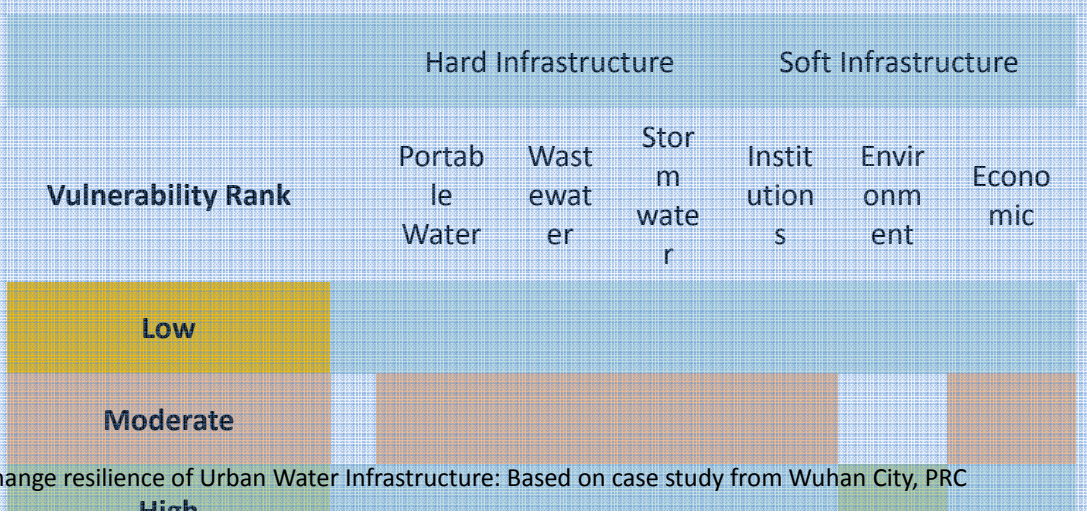
Message #7

Climate risk scenarios based planning does help

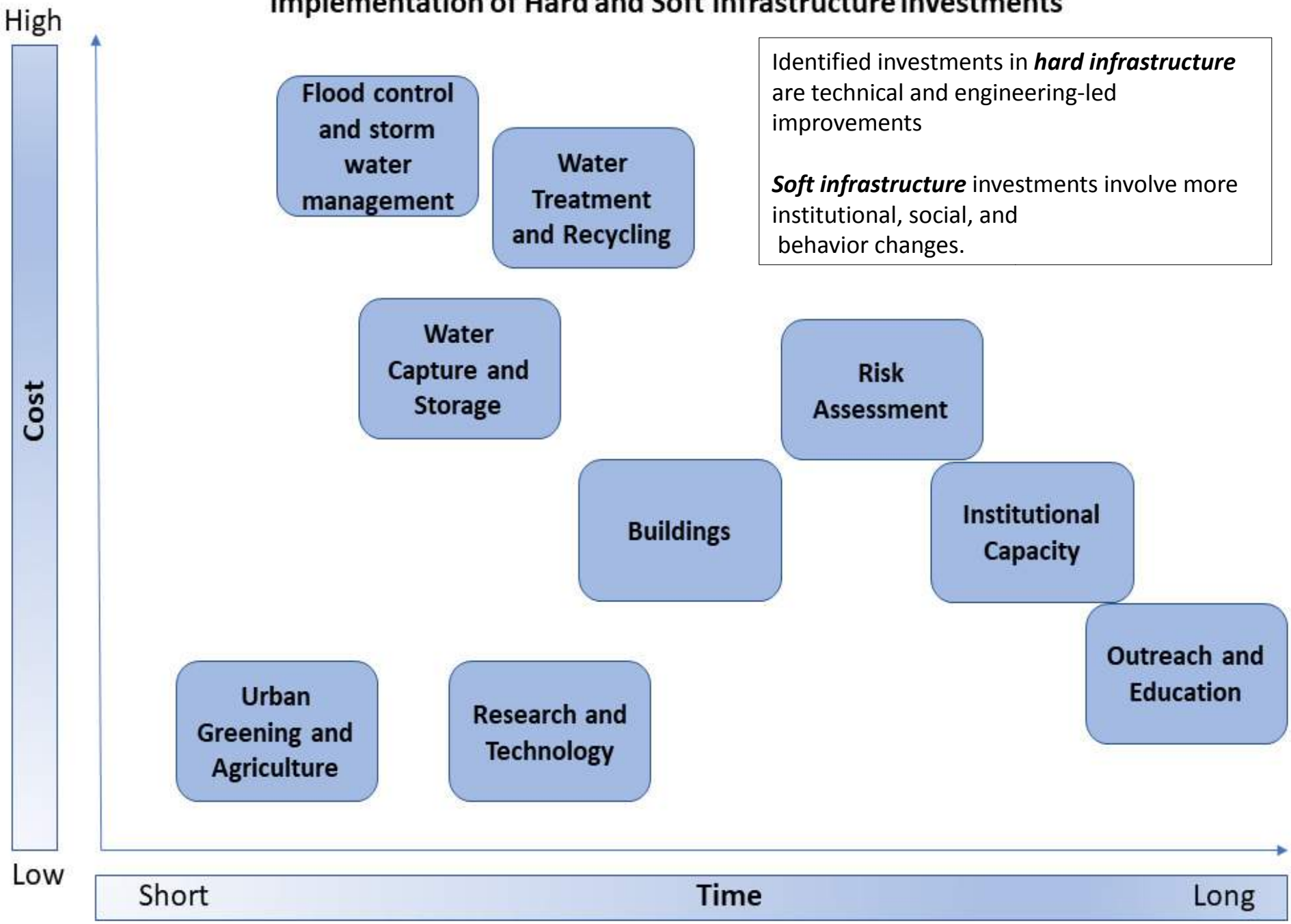


Wuhan's Climate change Impacts

Wuhan's Vulnerability Ranking



Source: Asian Development Bank (2013) Increasing climate change resilience of Urban Water Infrastructure: Based on case study from Wuhan City, PRC



Source: Asian Development Bank (2013) Increasing climate change resilience of Urban Water Infrastructure: Based on case study from Wuhan City, PRC

Baseline Vulnerability

		Hard Infrastructure			Soft Infrastructure		
Vulnerability rank		Potable Water	Waste water	Storm water	Institutions	Environment	Economic
Low							
Moderate							
High							

Implementation of investments and actions for Wuhan's water resilience strategy

Reassessed Vulnerability

		Hard Infrastructure			Soft Infrastructure		
Vulnerability rank		Potable Water	Waste water	Storm water	Institutions	Environment	Economic
Low							
Moderate							
High							

Source: Asian Development Bank (2013) Increasing climate change resilience of Urban Water Infrastructure: Based on case study from Wuhan City, PRC

Case study: Land use planning for flood proofing, Mumbai, India

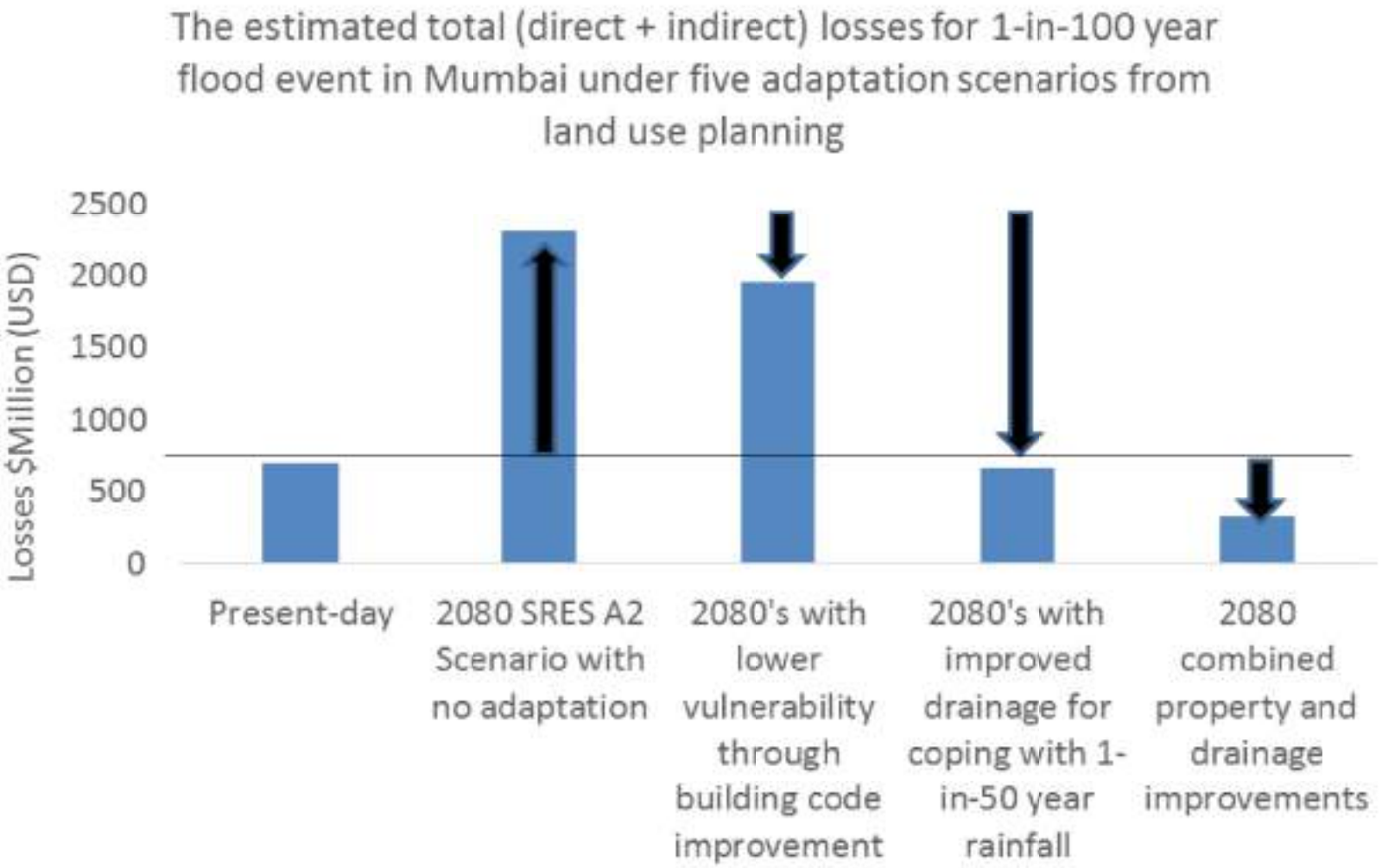
In 2005, Mumbai experienced unprecedented flooding, causing direct economic damages estimated at almost two billion USD and 500 fatalities.

Studies find that by the 2080s, in a SRES A2 scenario, an 'upper bound' climate scenario could see the likelihood of a 2005-like event more than double.

Total losses (direct plus indirect) associated with a 1-in-100 year event could triple compared with current situation (to $690 – $1890 million USD), due to climate change alone.

Continued rapid urbanization could further increase the risk level.

Source: Hallegatte, S. *et al.* (2010), "Flood Risks, Climate Change Impacts and Adaptation Benefits in Mumbai: An Initial Assessment of Socio-Economic Consequences of Present and Climate Change Induced Flood Risks and of Possible Adaptation Options", *OECD Environment Working Papers*, No. 27, OECD Publishing. doi: 10.1787/5km4hv6wb434-en



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Message #8

Policies, actions and tools for resilience reinforce sustainable development

SDG 1.5
Resilience of the poor

SDG 2.4
Resilience agriculture

SDG 11.5
Reduce disaster deaths and affected

SDG 11.b
Urban resilience

SDG 13.1
Resilience to CC and disasters

SDG 16.1
Reduce all forms of violence

LEAVING NO ONE BEHIND

2030 Sendai Framework for Disaster Risk Reduction

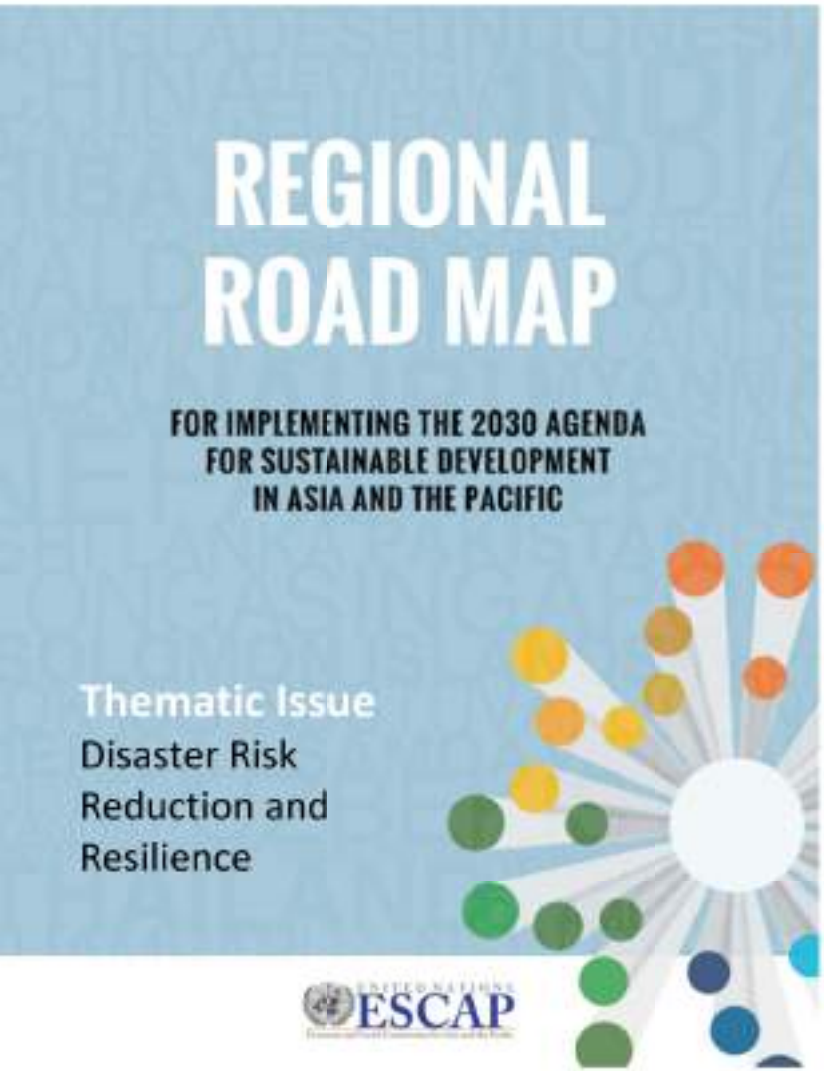
Outcome:

From reduction of disaster losses to reduction of disaster risk

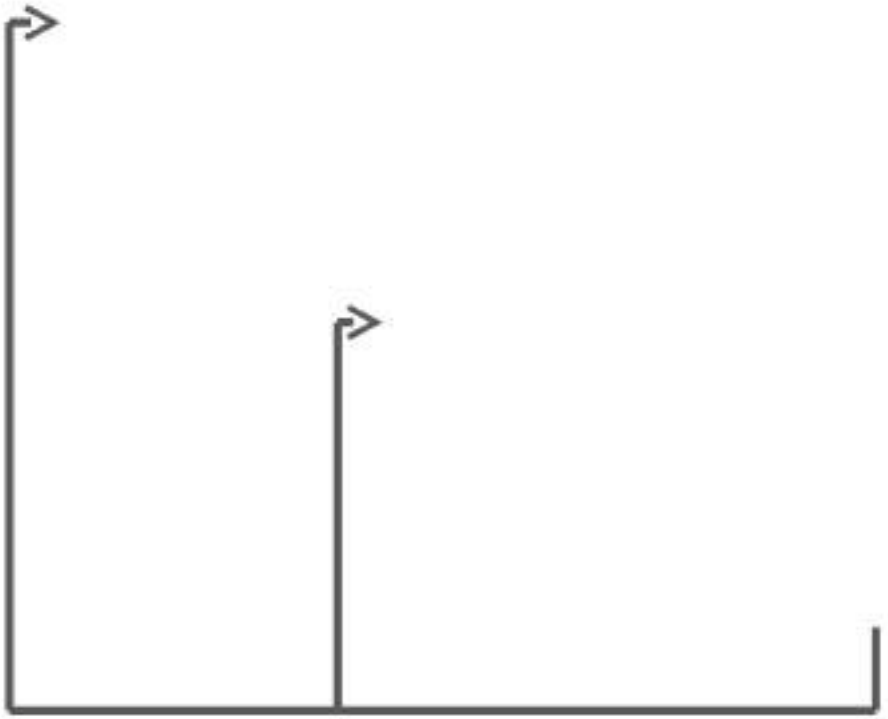
Goal:

- Focuses on preventing new disaster risks, reducing existing disaster risks that strengthen resilience
- Calls various measures to prevent and reduce hazard exposure and vulnerability, increase preparedness and recovery


7 GLOBAL TARGETS
Reduce
Increase
Mortality/
global population
2020-2030 Average << 2005-2015 Average
Countries with national & local DRR strategies
2020 Value >> 2015 Value
Affected people/
global population
2020-2030 Average << 2005-2015 Average
International cooperation
to developing countries
2030 Value >> 2015 Value
Economic loss/
global GDP
2030 Ratio << 2015 Ratio
Availability and access
to multi-hazard early warning systems & disaster risk information and assessments
2030 Values >> 2015 Values
Damage to critical infrastructure & disruption of basic services
2030 Values << 2015 Values



Call for action at regional **level**



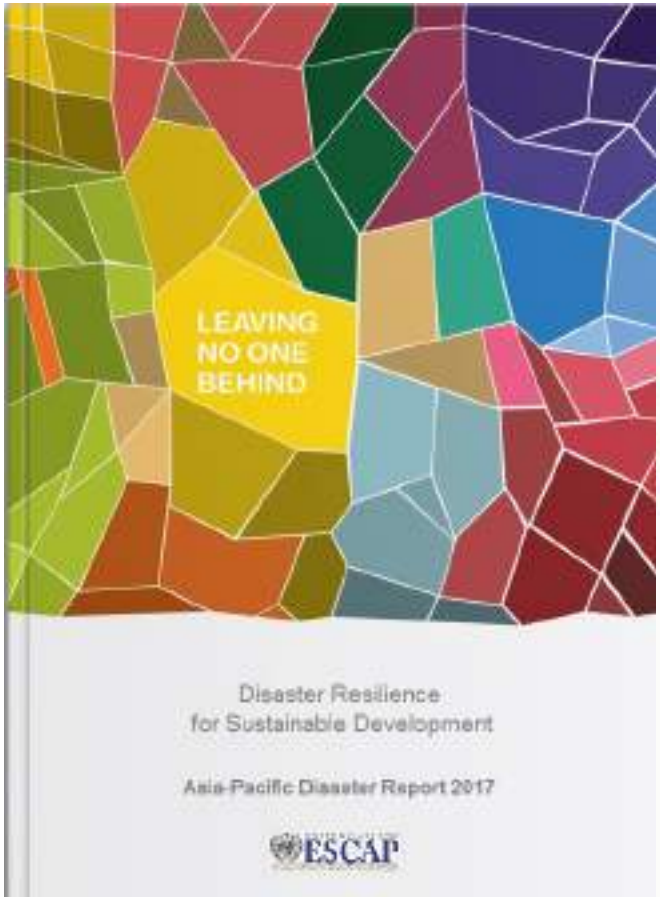
ESCAP Resolution 73/7

Synchronizing Sendai Framework with related SDGs through UN Regional

Sendai Framework for Disaster Risk Reduction 2015 - 2030

SUSTAINABLE DEVELOPMENT GOALS

Mainstreaming disaster risk reduction in 2030 Agenda



Thank you!

For more information:

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