

THE DISASTER RISKSCAPE ACROSS ASIA-PACIFIC

*Key Takeaways For Policymakers
In North-East Asia*

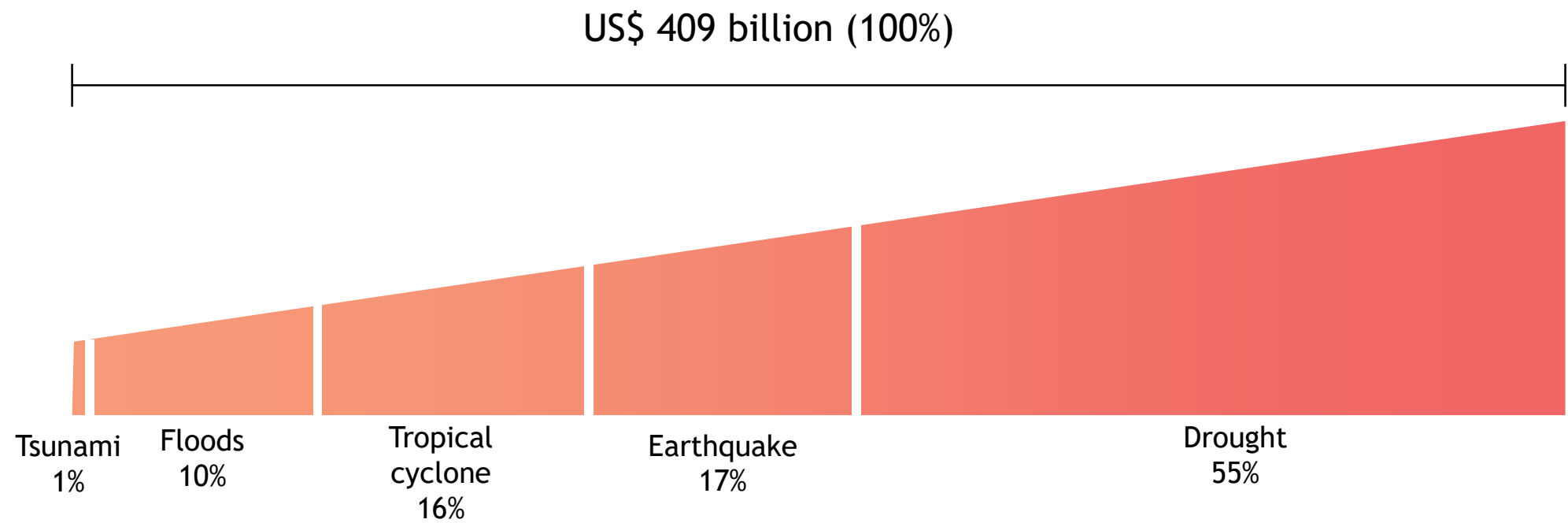
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North-East Asia, ESCAP

North-East Asia faces a new climate reality

- In North-East Asia, 81% of annualized economic losses due to disaster are caused by hydro-meteorological hazards
- With the inclusion of slow onset disasters, annualized economic losses more than double from 184 to 409 USD billion
- The North-East Asian subregion has the highest economic losses due to disaster for the entire Asia-Pacific region

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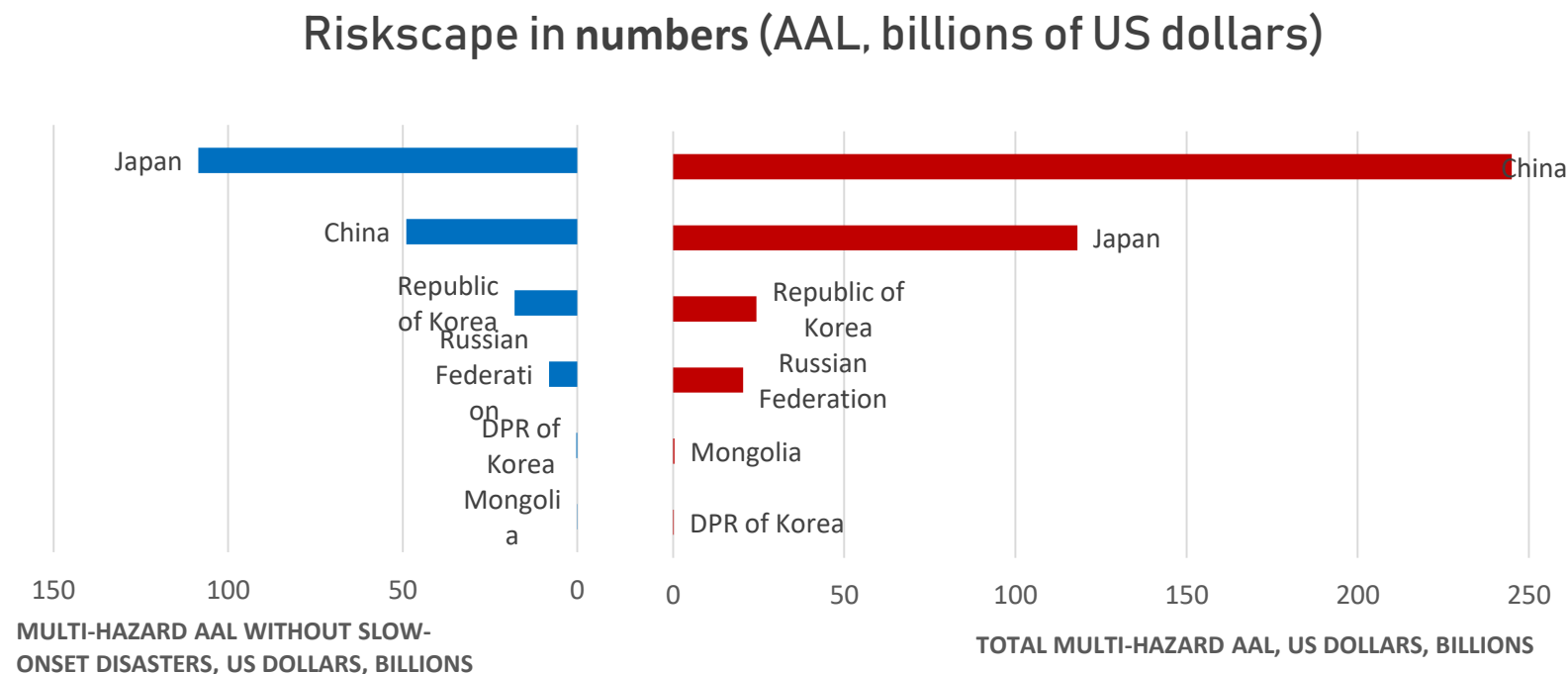


Source: ESCAP, based on probabilistic risk assessment.

Note:

1. Volumetric analysis is a measurement by volume (impacted population, geographical area and economic losses).
2. Drought average annual losses data of Democratic People's Republic of Korea is not available.

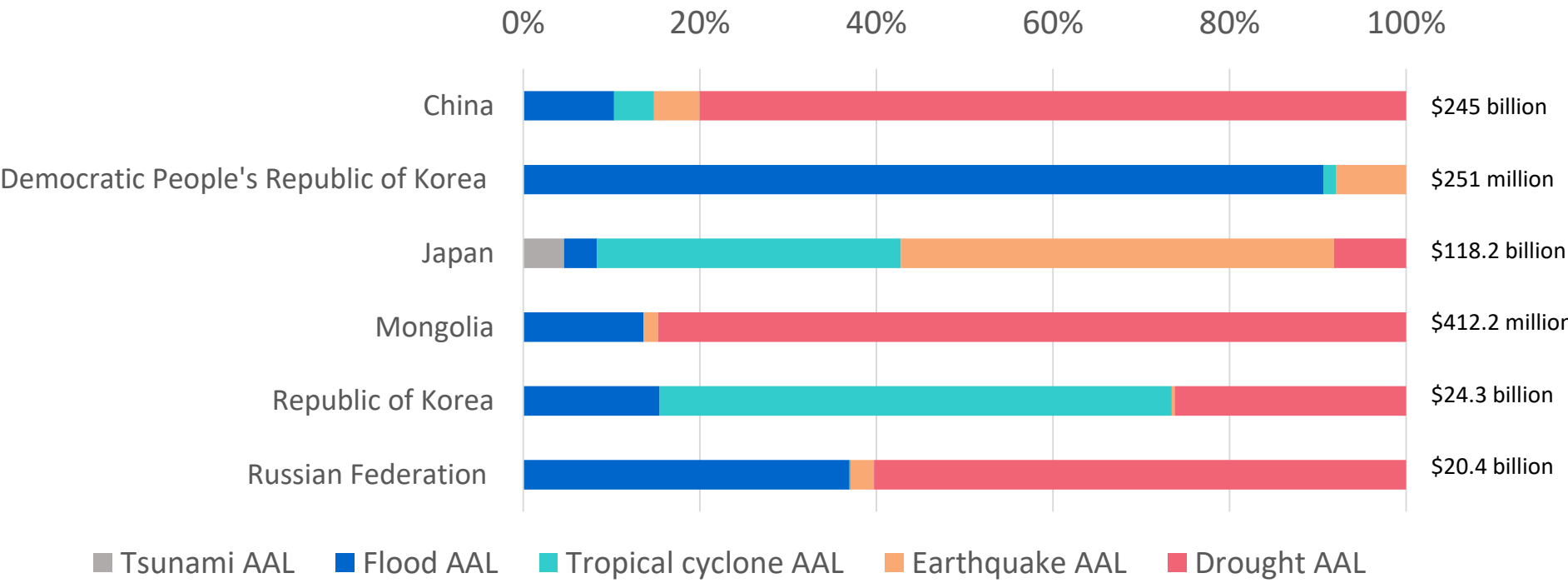
With the inclusion of slow onset disasters, annualized economic losses more than double from 184 to 409 USD billion



Source: ESCAP, based on probabilistic risk assessment.

The North-East Asian subregion has the highest economic losses due to disaster for the entire Asia-Pacific region

- AAL in North-East Asia accounts for 61% of the total AAL for the entire Asia-Pacific region
- China and Japan account for 36 and 18 per cent of Asia-Pacific AAL, respectively



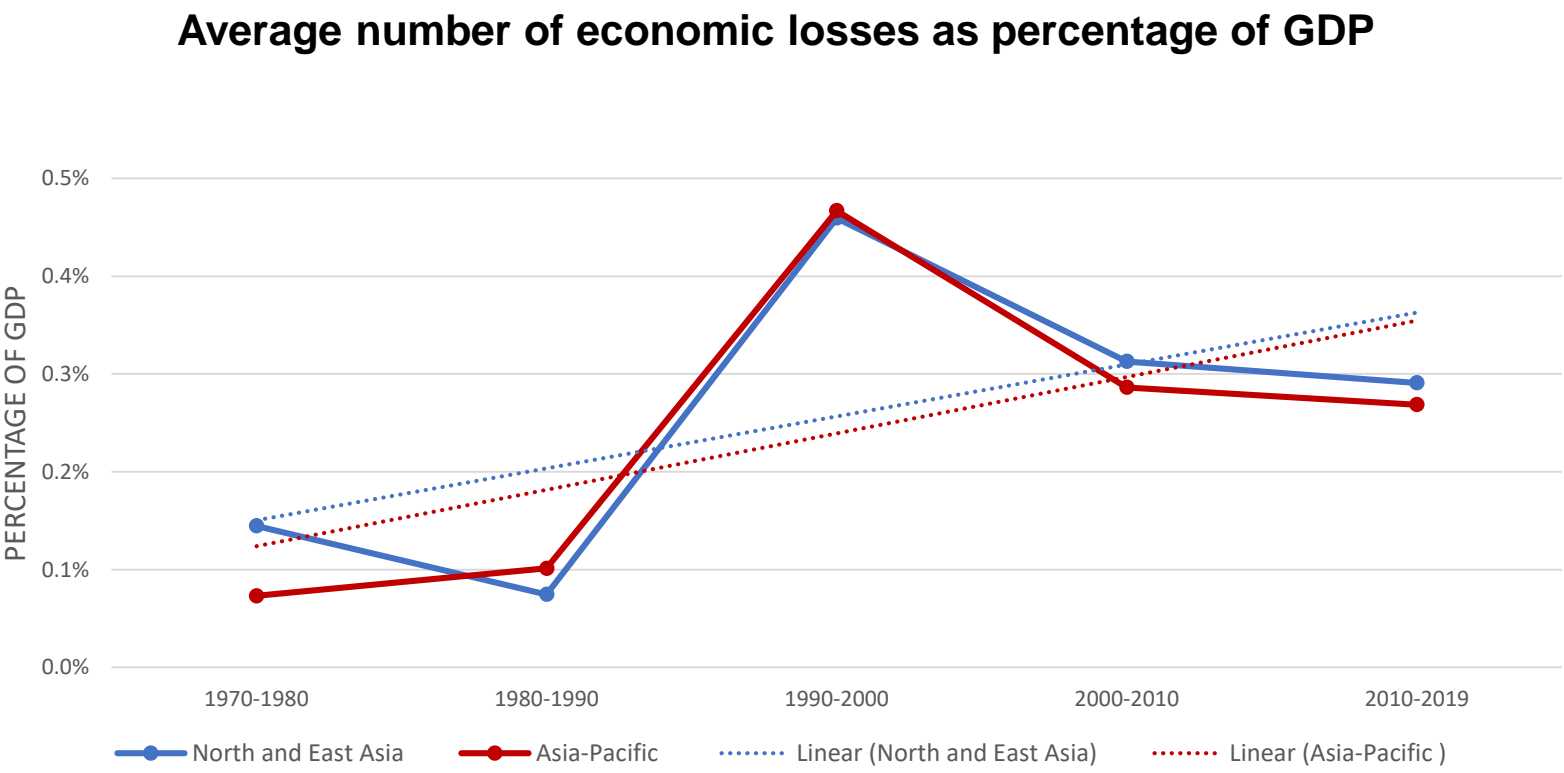
Source: ESCAP, based on probabilistic risk assessment.
Note: Drought average annual losses data of Democratic People's Republic of Korea is not available.

The North-East Asian riskscape is becoming more complex and harder to predict

- **There is an increasing exposure of populations, economic stock and infrastructure to seismic and hydro-meteorological hazards**
- **Critical infrastructure exposure is concentrated in a transboundary hotspot surrounding the Pacific Ring of Fire**

There is an increasing exposure of economic stock and infrastructure to hydro-meteorological and seismic hazards

- Most of the economic losses due to disaster in the Asia-Pacific region over the past 5 decades have been sustained within North-East Asia
- Between 1970 and 2018, North-East Asia lost 2.2 USD trillion due to disasters



Source: Based on data from EM-DAT (Accessed on 30 May 2019).

Critical infrastructure exposure is concentrated in a transboundary hotspot surrounding the Pacific Ring of Fire

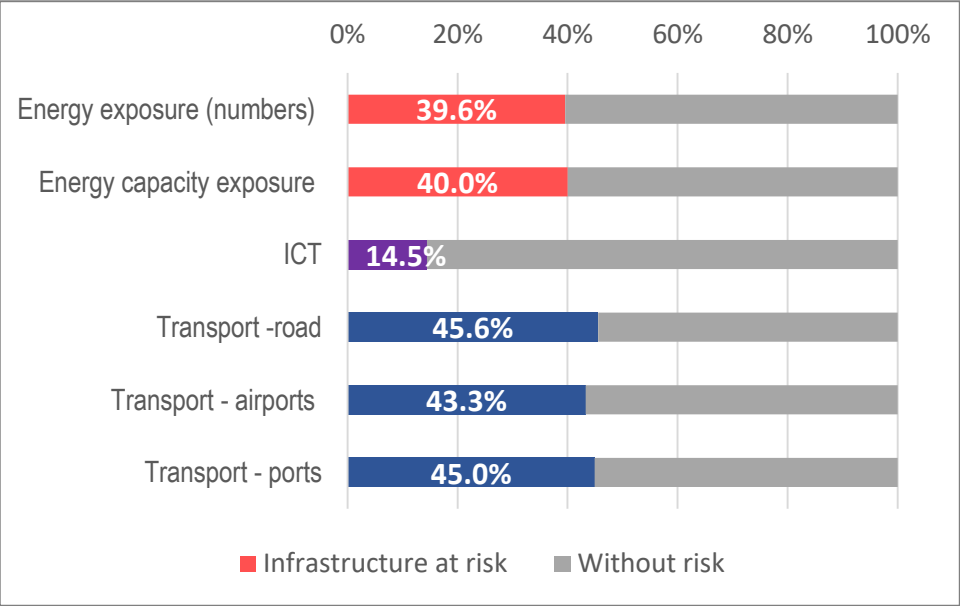
APDR 2019 identified four transboundary disaster risk hotspots, in which the Ring of Fire hotspots have critical infrastructure exposure.

There is also environmental fragility due to the risk of sand and dust storms.

The characteristics of the Pacific Ring of Fire hotspots

HOTSPOT 2	RING OF FIRE
Earthquake, landslide and tsunami, typhoon tracks, North and East Asia, South-East Asia	
Population exposure	High (disproportionate impact on poor)
Economic stock exposure	Very high
Infrastructure: energy	Very high
Infrastructure: transport	High
Infrastructure: ICT	Moderate

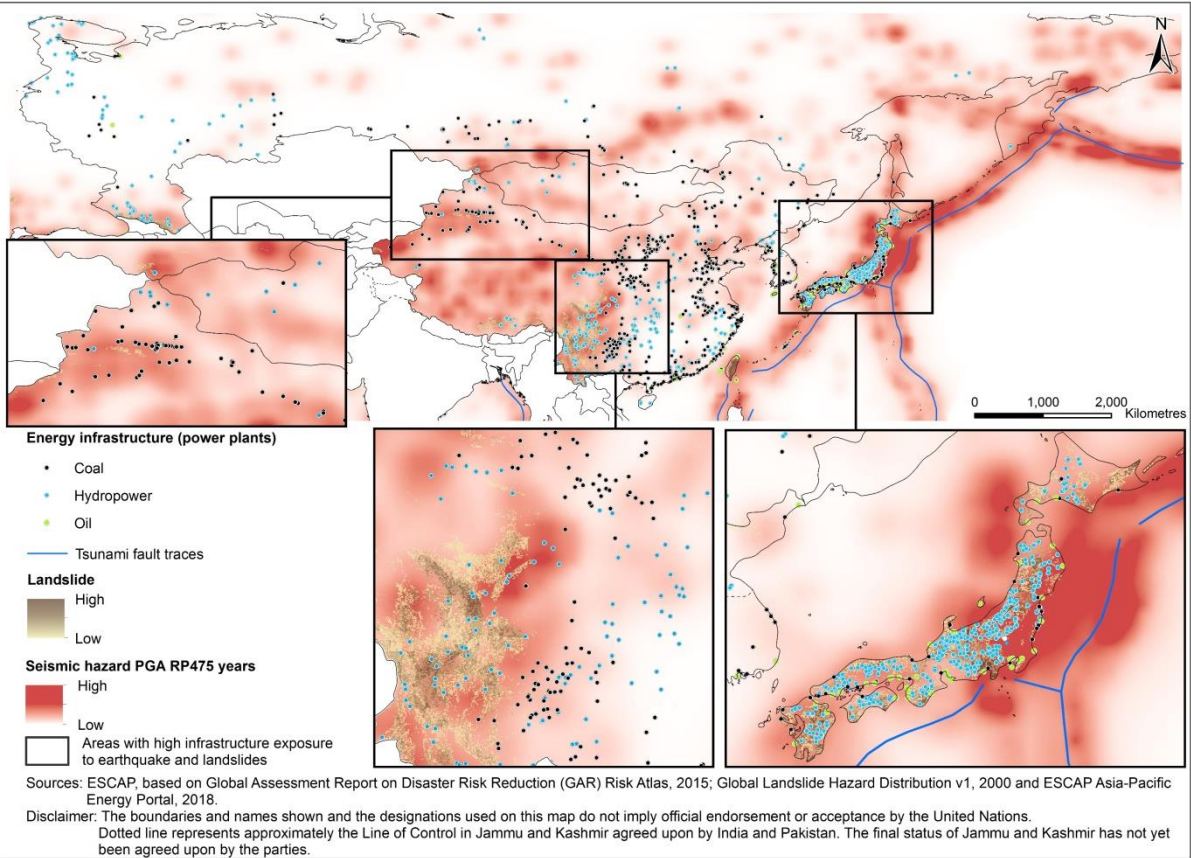
Percentage of infrastructure at risk to multiple hazards



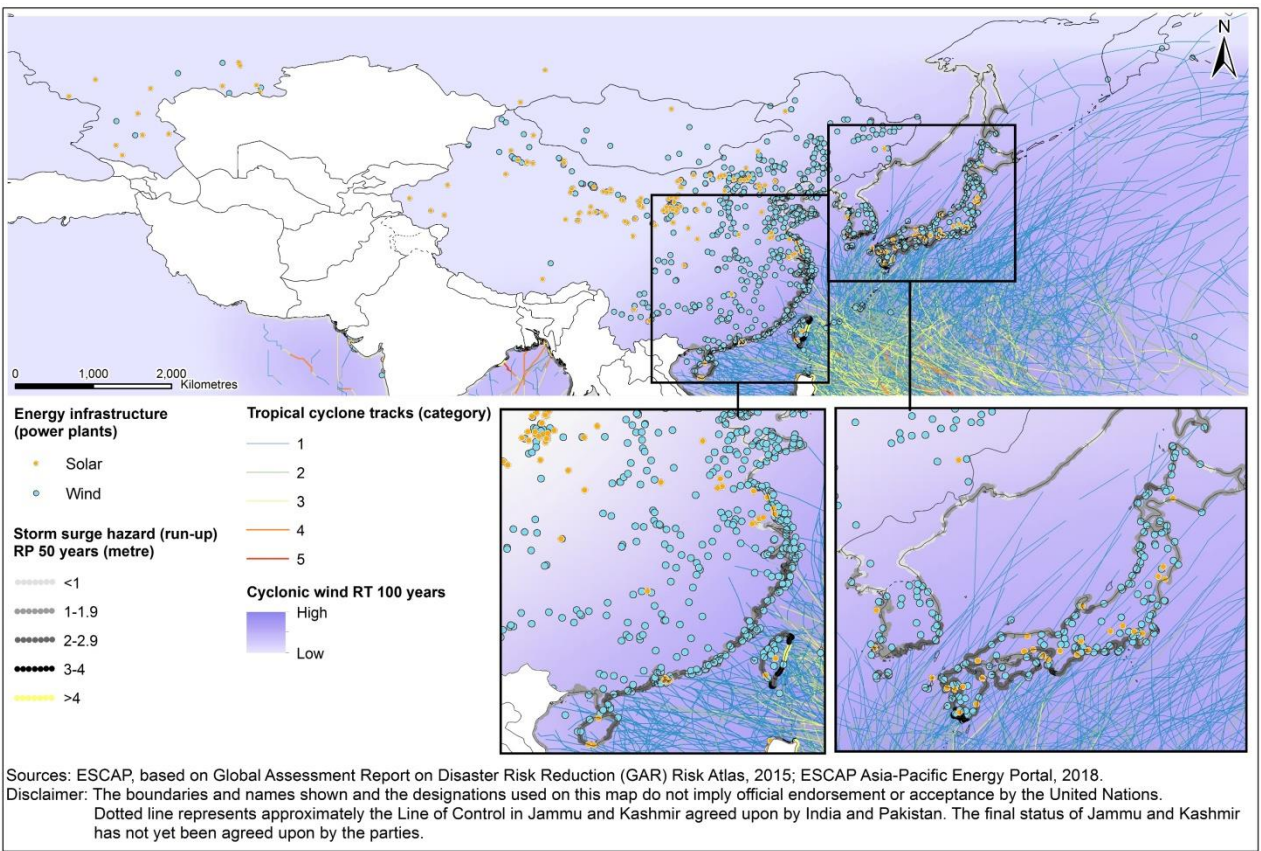
Source: ESCAP, based on Global Assessment Report on Disaster Risk Reduction (GAR) Risk Atlas, 2015; ESCAP Asia-Pacific Energy Portal, 2018; ESCAP Asia-Pacific Information Superhighway, 2018; ESCAP Transportation Data, 2018.

- Note: The risk comprises of multi-hazard
1. Geological hazard (earthquake)
 2. hydro-meteorological hazards (flood and cyclone).

Energy (coal, oil, hydropower) exposed to earthquakes

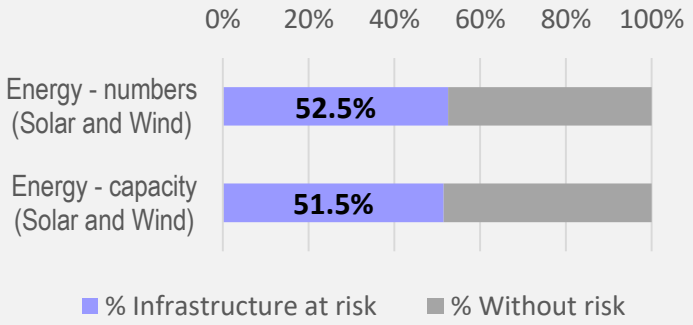
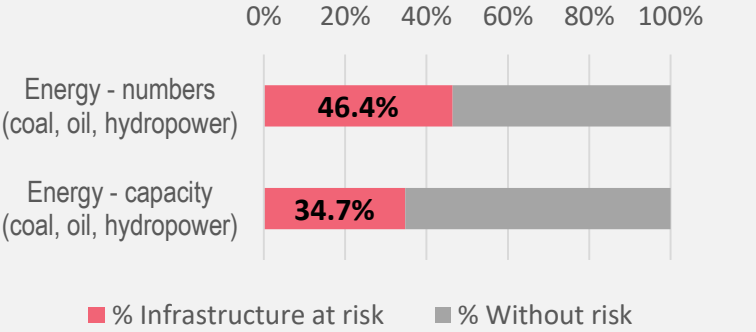


Solar and wind energy exposed to cyclones



Coal, oil, hydropower
Total number:
667

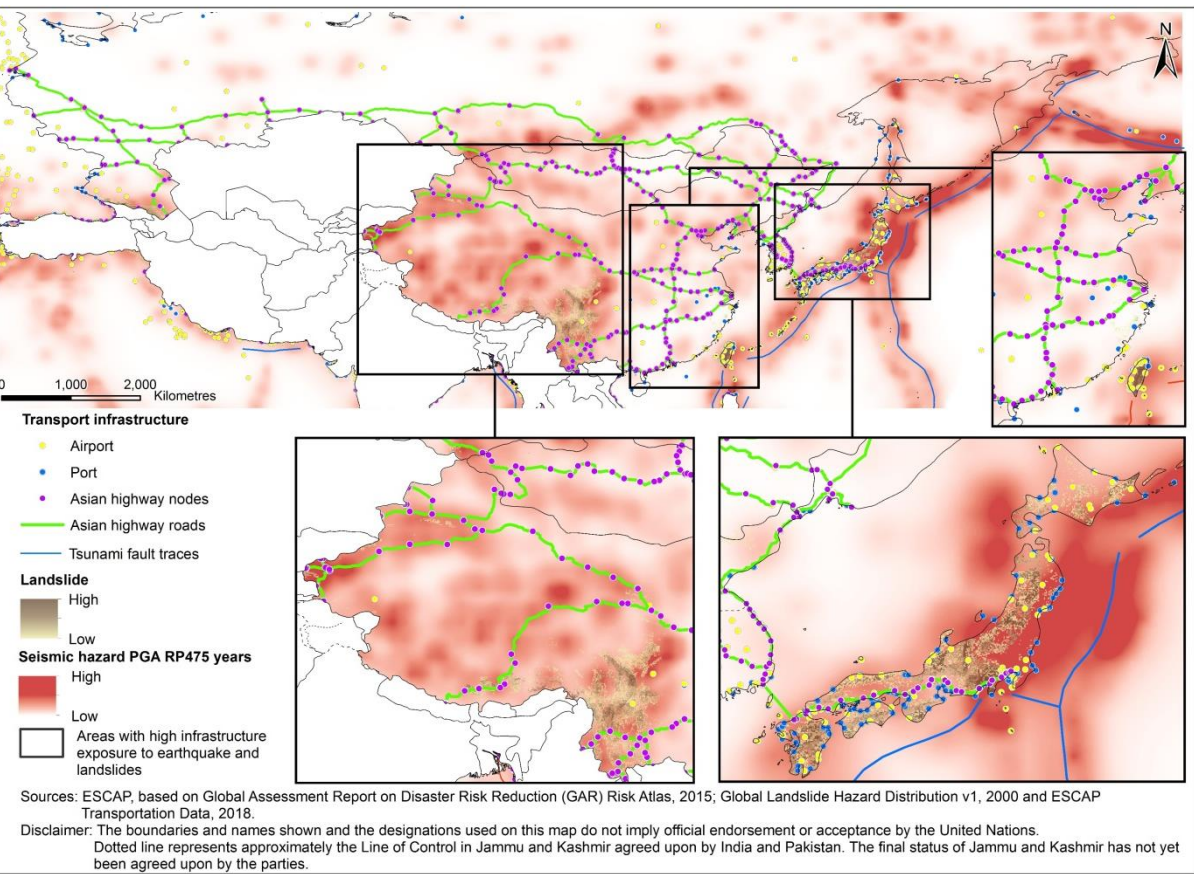
Total capacity:
1,437 MWe



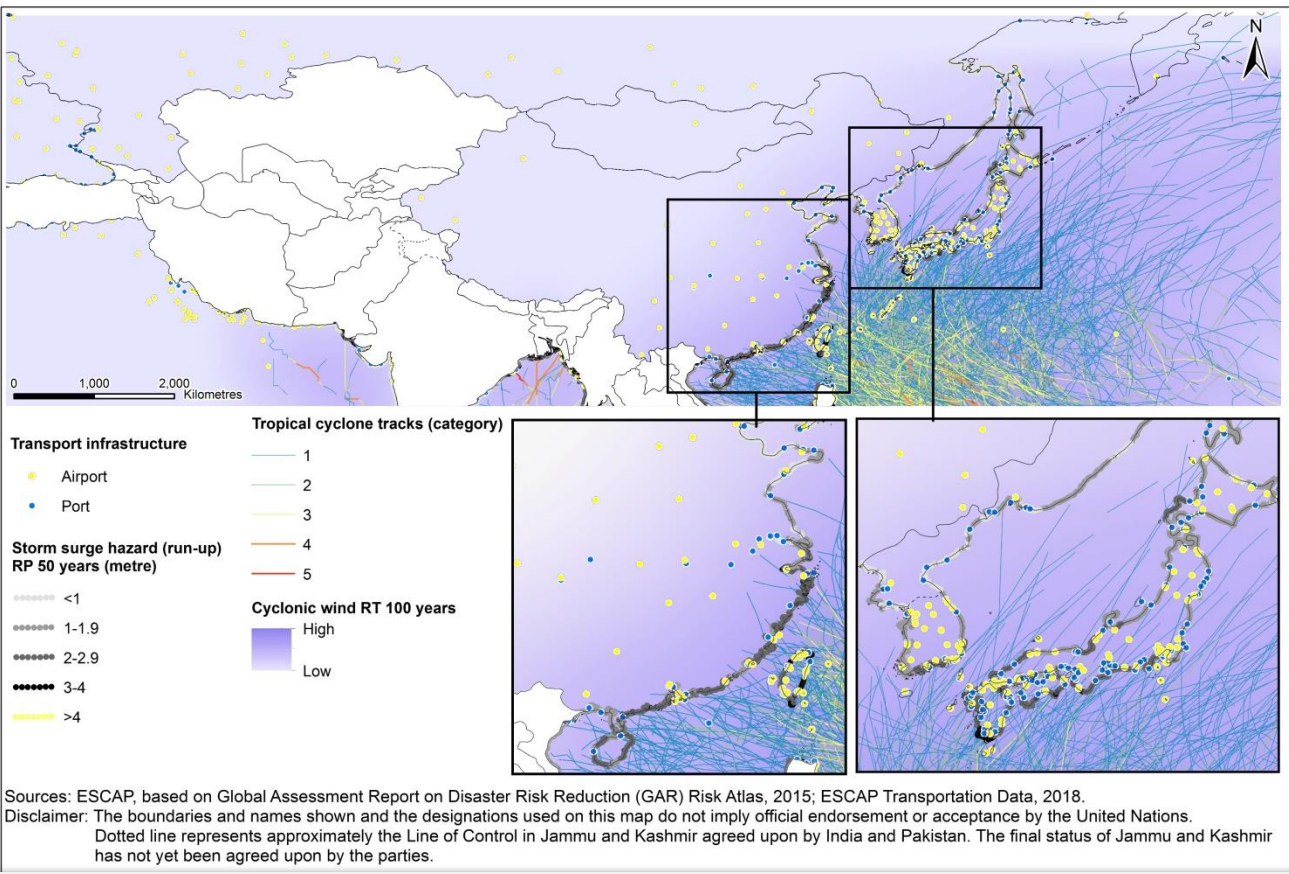
Solar & wind power plants
Total number: 1,398

Total capacity:
977,901 MWe

Asian highway networks exposed to seismic hazards

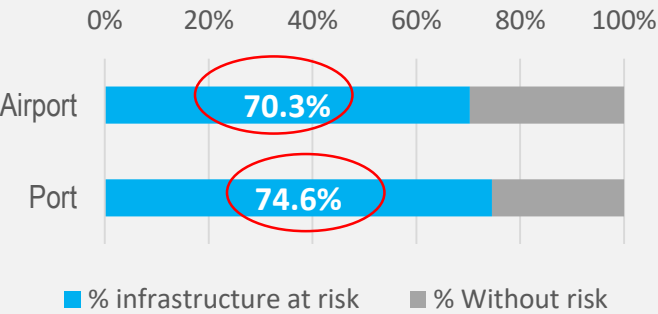
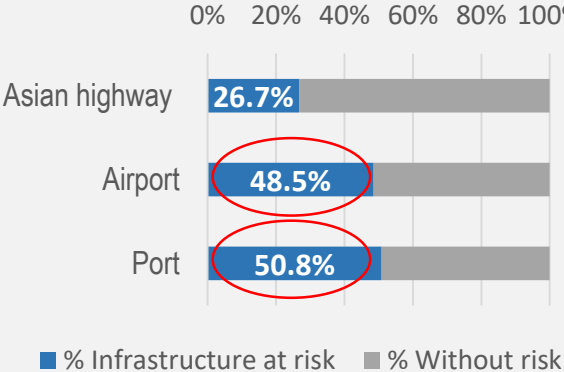


Airports and ports exposed in tropical cyclone



Total number of airports:
239

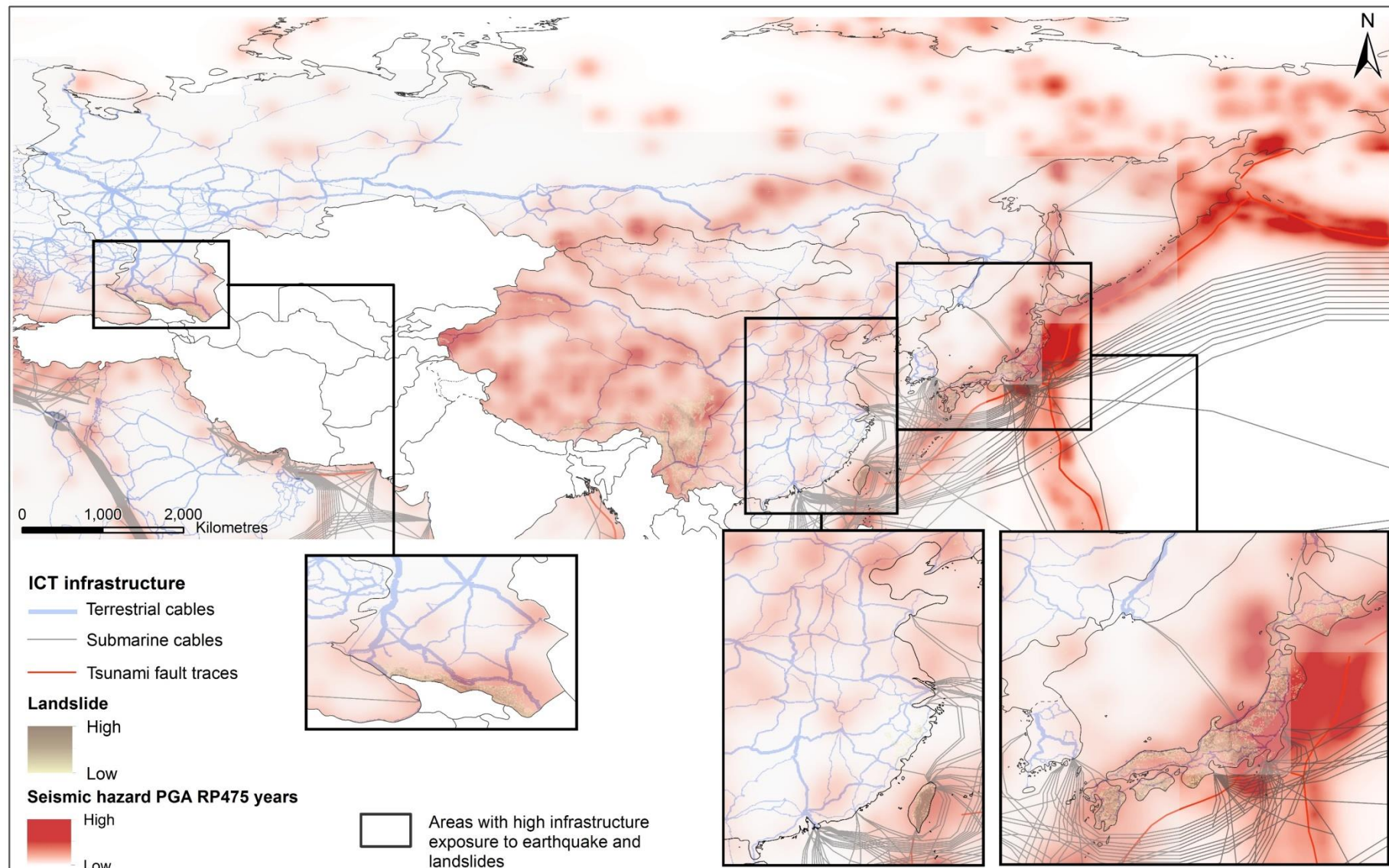
Total number of ports:
248



ICT exposed to earthquake

ICT infrastructure is also exposed to seismic hazards.

17% of North-East Asia's fiber optic infrastructure are exposed to earthquakes.



Sources: ESCAP, based on Global Assessment Report on Disaster Risk Reduction (GAR) Risk Atlas, 2015; Global Landslide Hazard Distribution v1, 2000; ESCAP Asia-Pacific Information Superhighway, 2018.

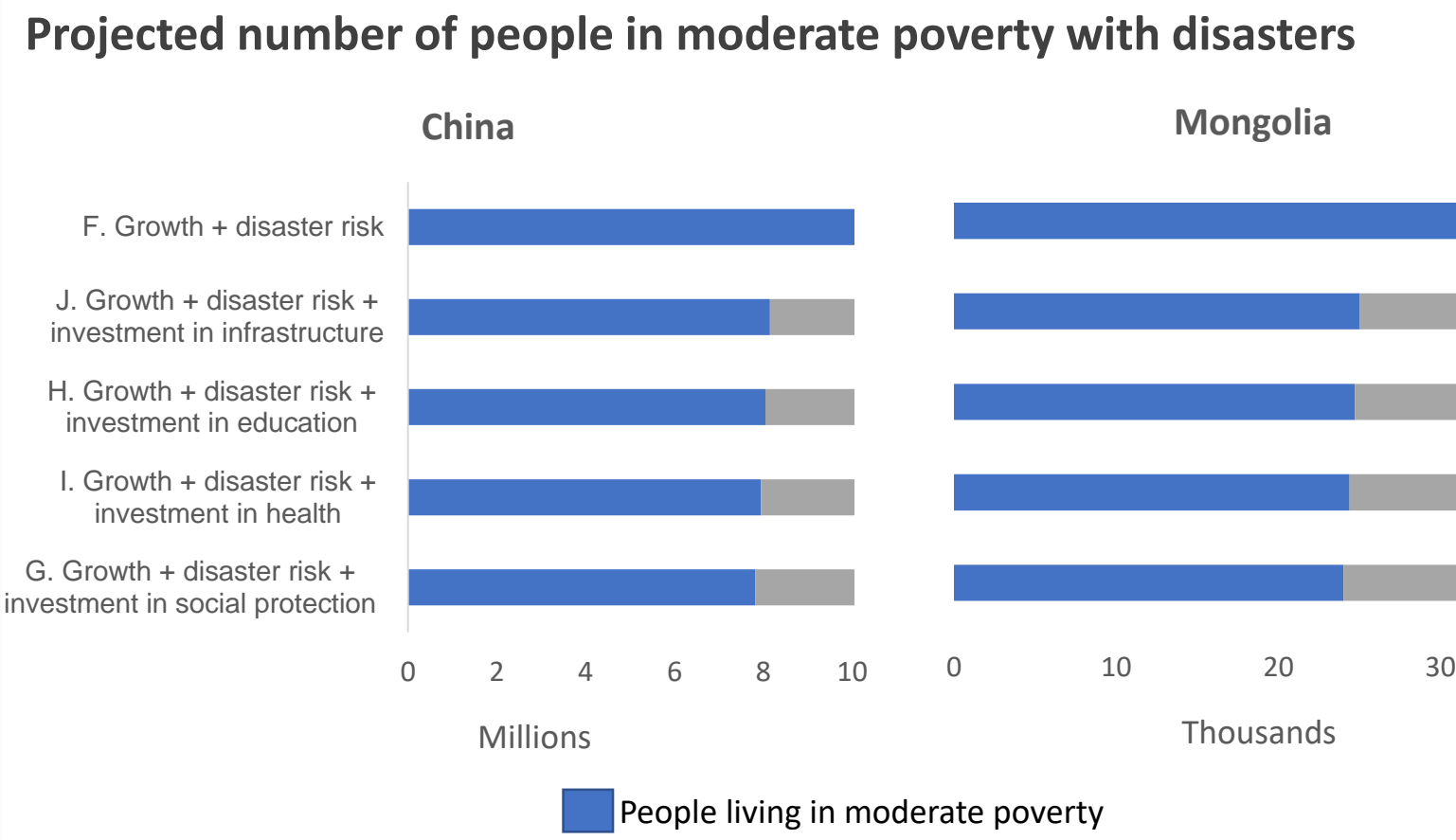
Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Invest to outpace disaster risk

- **Additional investments are required to prevent disasters and build resilient societies**
- **The additional finance is significant, but less than the damage and losses from disasters**

Message: Additional investments are required to prevent disasters from pushing people into poverty

- Within China and Mongolia:
- Projected economic growth will eradicate moderate poverty by 2030.
 - However unmitigated disasters will again raise the number of people living in moderate poverty, to 10 million in China, and 31,000 in Mongolia.
 - Investing in infrastructure, education, health and social protection can bring the number down to approximately 8 million in China, and approximately 25,000 in Mongolia.

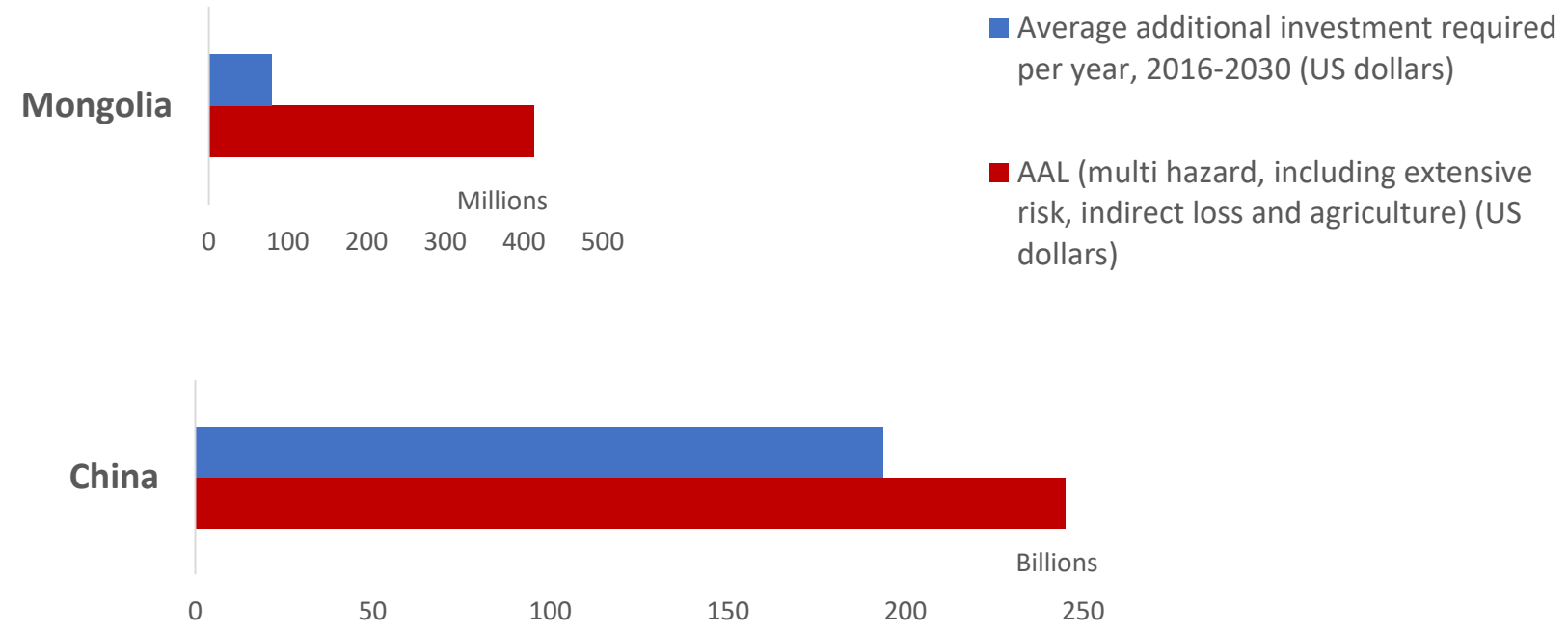


Source: ESCAP based on CGE modelling

| POLICY ACTIONS | Message 3

- The additional finance is significant, but less than the damage and losses from disasters

- Additional investments required per year are lower than the AAL.
- In Mongolia, the additional investments are \$80 million, AAL \$413 million.
- In china, additional investments are \$194 billion, AAL \$245 billion.

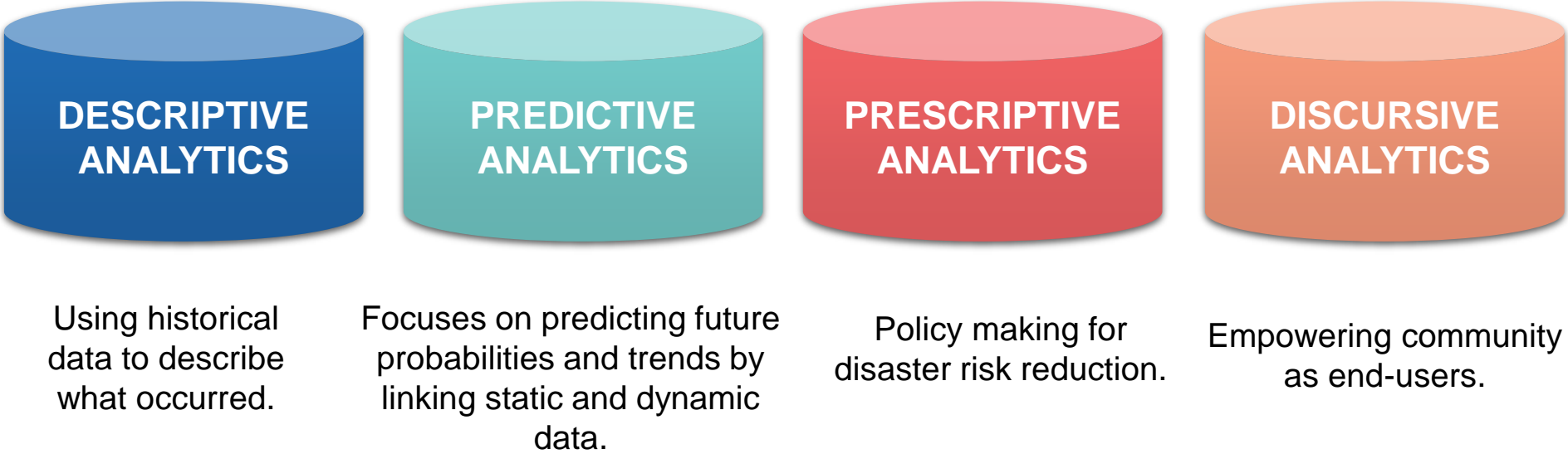


Source: ESCAP based on CGE modelling

Empower the communities through big data and new technologies

- **Big data offers unprecedented opportunities to support all phases of disaster management**
- **Technological applications are already being used within North and East Asian countries to increase delivery time of information for disaster preparedness, response and recovery**
- **Machine learning can be used for smart resilience**
- **Technologies must be applied to ensure that everyone is included within social policy and disaster risk reduction interventions**

Big data offers unprecedented opportunities to support all phases of disaster management

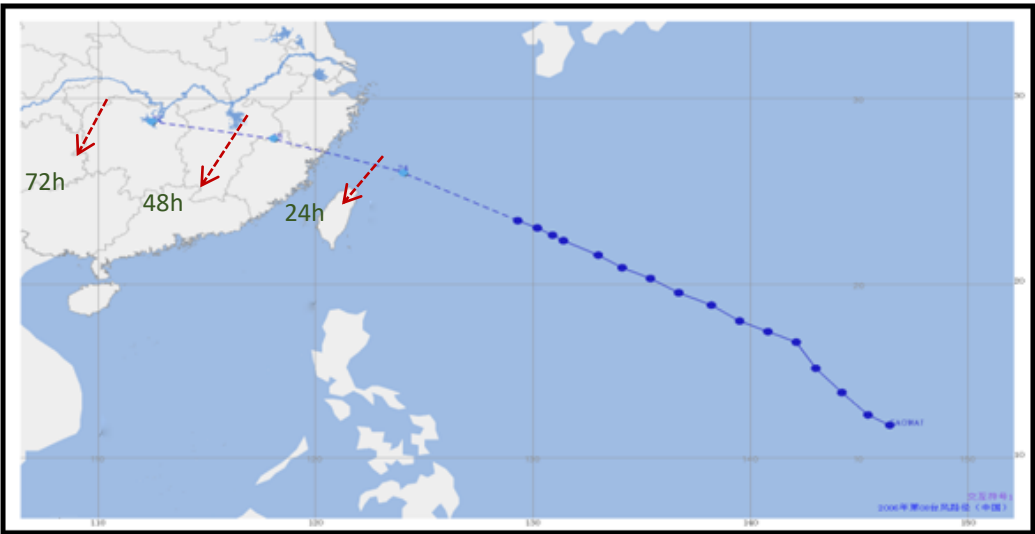


Big data can help in all phases of disaster management (pre-response and post-disaster situations) by filling in gaps in information flows in pre-, response and post-disaster situations, using four types of analytics: descriptive, predictive, prescriptive and discursive.

| POLICY ACTIONS | Message 4

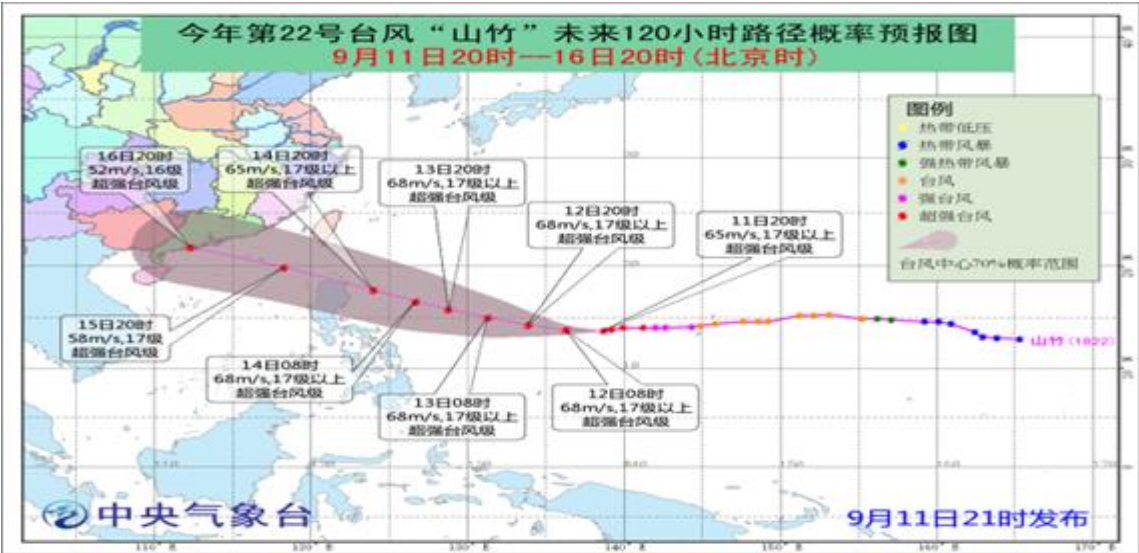
Technological applications are already being used within North-East Asian countries to increase delivery time of information for disaster preparedness, response and recovery

2006 Typhoon Saomeo, track



483 people died, 1.8 million people were evacuated.

2018 Typhoon Mangkhut, track and diameter



Only **6** people died, 1.5 million people were evacuated.

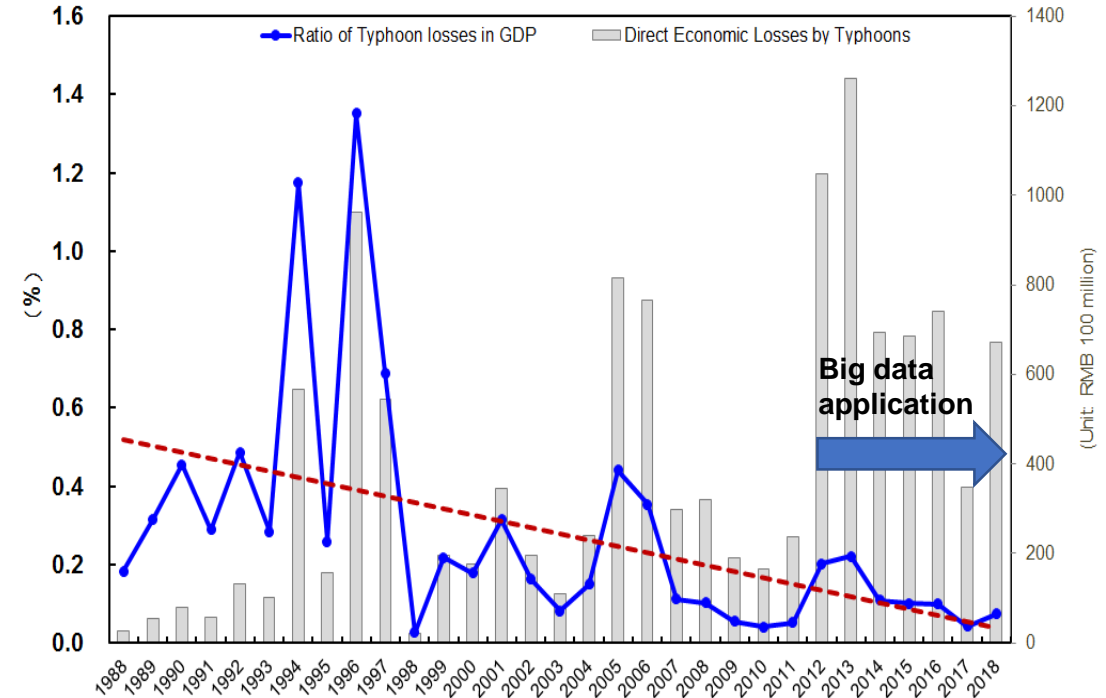
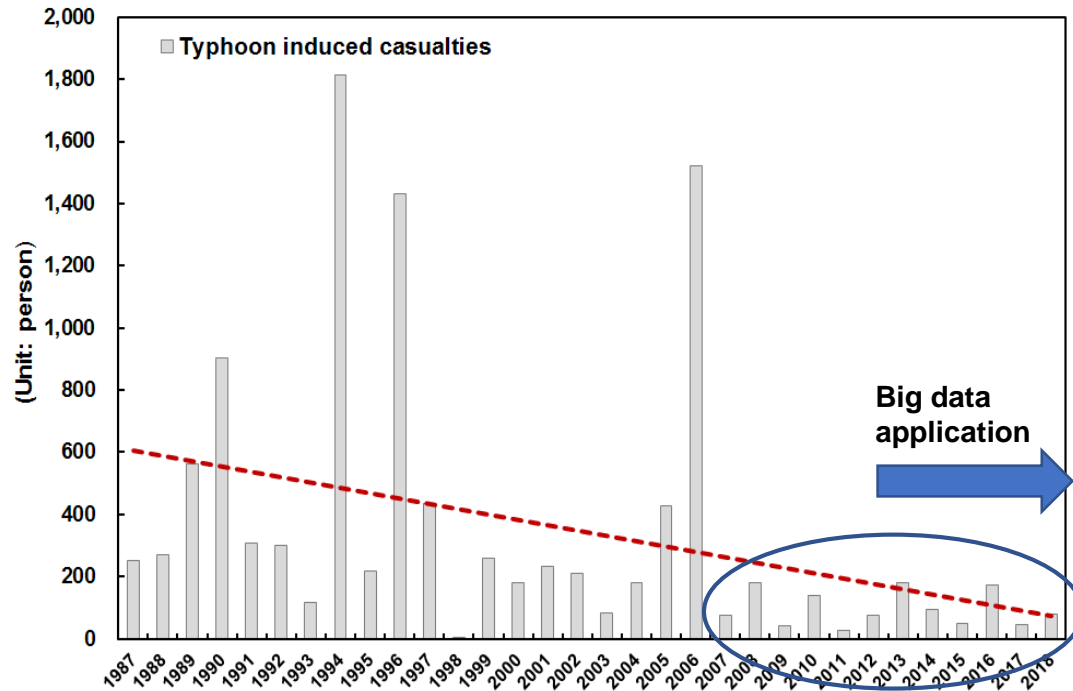
Improvements of satellite observations:

- Increasing numbers and specification of satellites in orbit
- Higher time resolution and horizontal resolution of satellite images
- Higher number of channels

Source: China Meteorological Association (2018)
Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

A significant decrease in casualties, even for super-typhoons, and a reduction in disaster losses as a proportion of GDP as a result of improvements of satellite observations.

Typhoon casualties and losses in China, 1987-2018



Source: China Meteorological Administration (2018)

Due to the improvement of typhoon forecasts and warnings, and more effective emergency responses for typhoon events, **the casualties and the ratio of typhoon-induced losses to GDP reduce remarkably**

Source: WANG Jianjie, CMA 2019

Machine learning can be used for smart resilience.

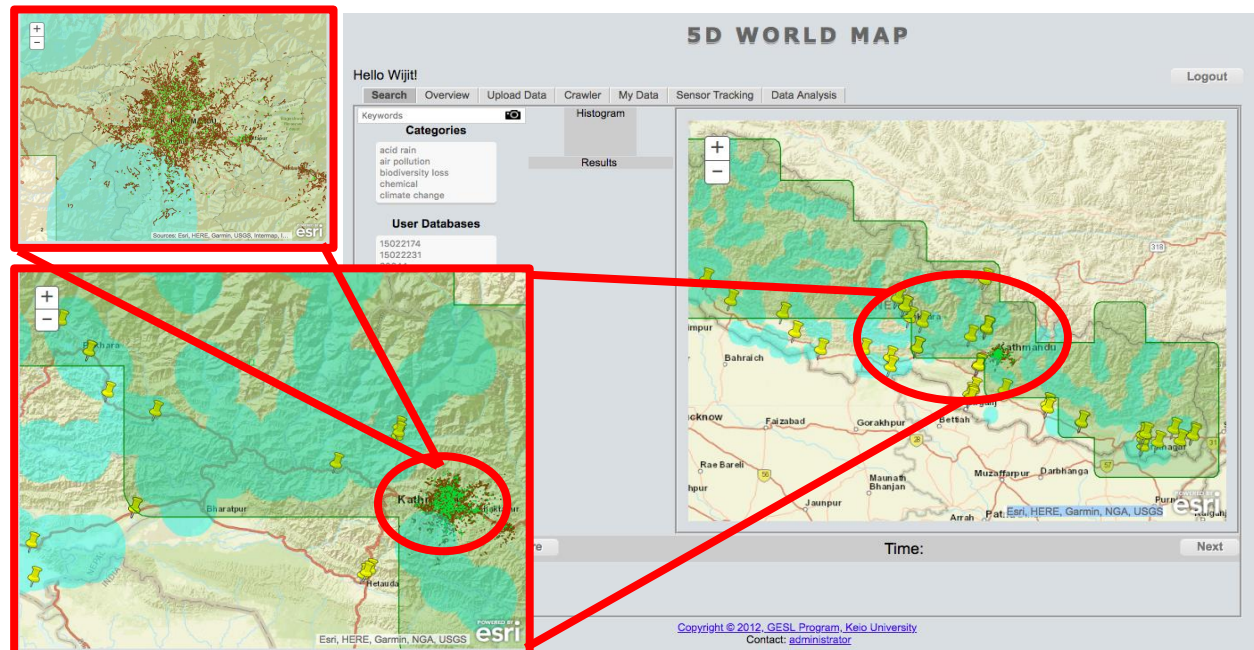
5D-World Map System: Resilience Monitoring from Global to Local

Environmental Computing System with Big-Data Mining

“5-Dimensional World Map System”

Multi-hazard-risk Visualization Experiment

Local/city level – Parameters: **Earthquake Hazard Zone** + **Highest Flood Risk Zone** + **Residential roads** + **Educational facilities** in Kathmandu



Earthquake Hazard Zone

Highest Flood Risk Zone

Trunk Road
Primary Road
Secondary Road
Residential

School

The entire region of Kathmandu is covered by earthquake hazard zone, and the southern part of Kathmandu is included in both earthquake and highest flood risk zone.

Scale up regional action to tackle the challenges posed by the new riskscape

- **Multi-stakeholder engagement for resilience across the riskscape**

Multi-stakeholder engagement for resilience across the riskscape

- **Leverage new technologies to seamlessly integrate disaster risk and early warning information across all timescales into decision-making**
- **Adapt fiscal frameworks to tackle the new climate reality, and diversify financing sources, through public-private partnerships, working through existing initiatives**

KEY MESSAGES

KEY FINDINGS

■ Message 1

North-East Asia faces a new climate reality

■ Message 2

The North-East Asian riskscape is becoming more complex and harder to predict

POLICY ACTIONS

■ Message 3

Invest to outpace disaster risk

■ Message 4

Empower the communities through big data and new technologies

■ Message 5

Scale up regional action to tackle the challenges posed by the new riskscape

Thank you for kind attention !

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