Stakeholders Dialogue on the 12th Malaysia Plan
Water Sector Transformation
05 December 2019 @ Pulse Grande Hotel Putrajaya

Dialogue Session 4: Data-driven and Science-based Decision -making for Sustainable Water Infrastructure

Risk-informed Development and Investment

Promoting TransDisciplinary Approach (TDA) for Disaster Risk Reduction

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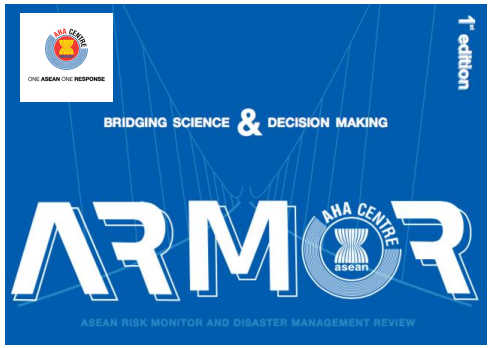
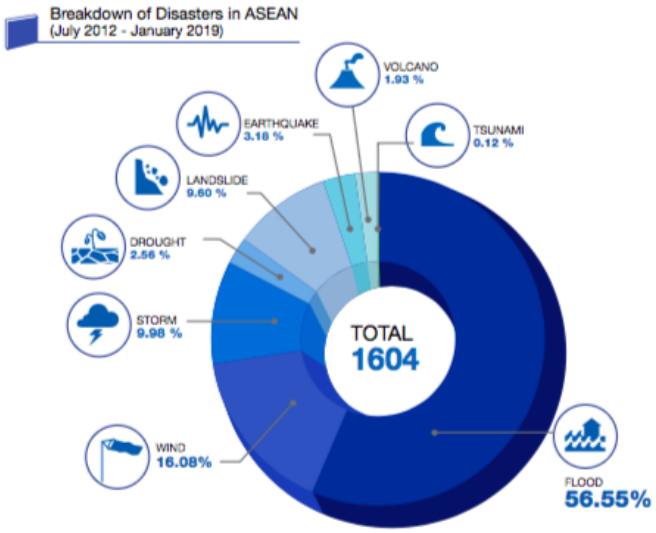
innovative • entrepreneurial • global

Organized and Supported by:

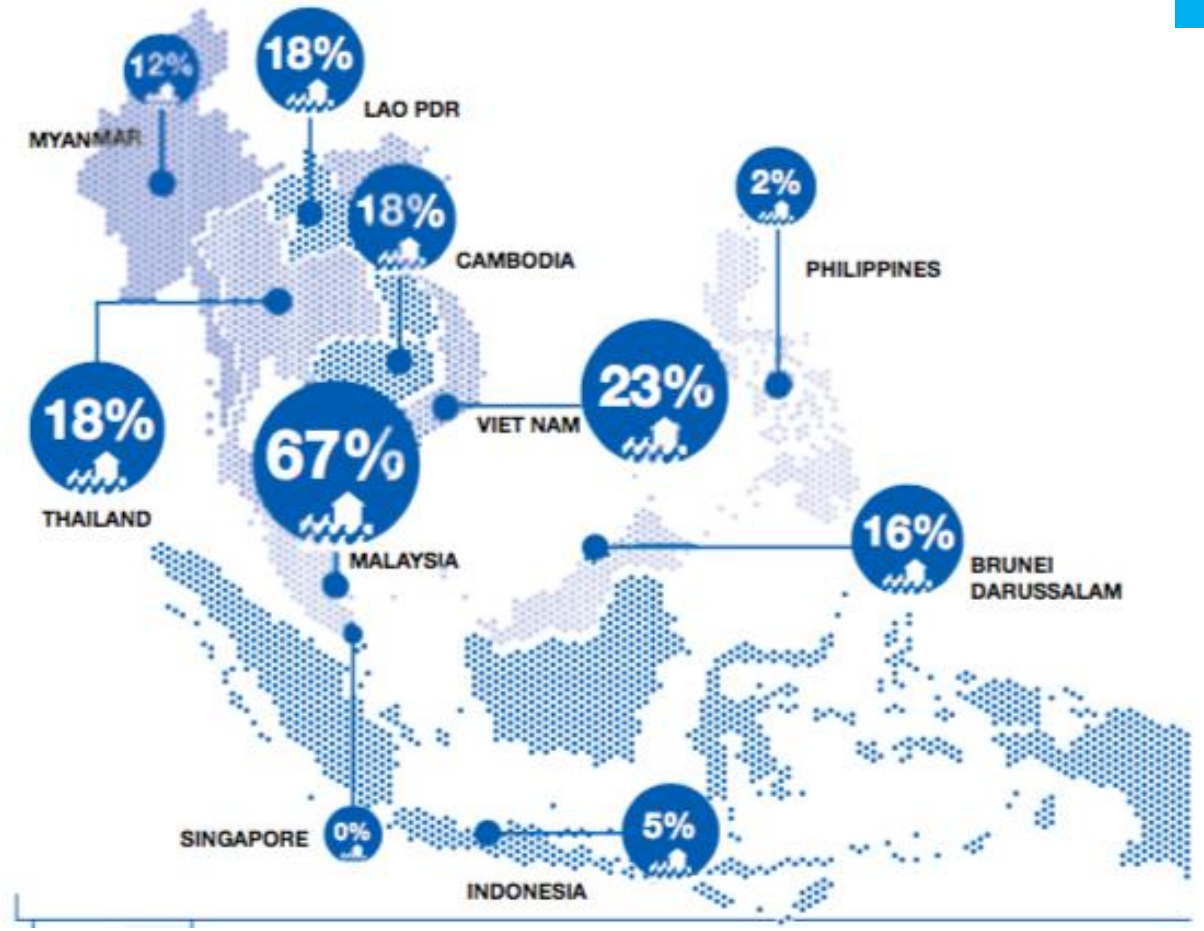
Ministry Of Economic Affairs
Ministry of Water, Land and Natural Resources
Malaysian Water Partnership





Flood (56.55%)

Percentage of Population Exposed to Floods in ASEAN



Distribution of Disasters in ASEAN (July 2012-January 2019)

Trillion Dollar Multi-Hazard Risk Landscape in ASEAN

*In 2018, the combined **nominal GDP** of Southeast Asian countries **ranked fifth globally**, amounting to **USD 2.89 trillion**.*

*However, due to the constant risk of natural hazards, the region's exposed **capital stocks** amount to **USD 8.35 trillion**, or **THREE TIMES OF ITS COMBINED ECONOMY** (Pang & Dimailig, 2019)*

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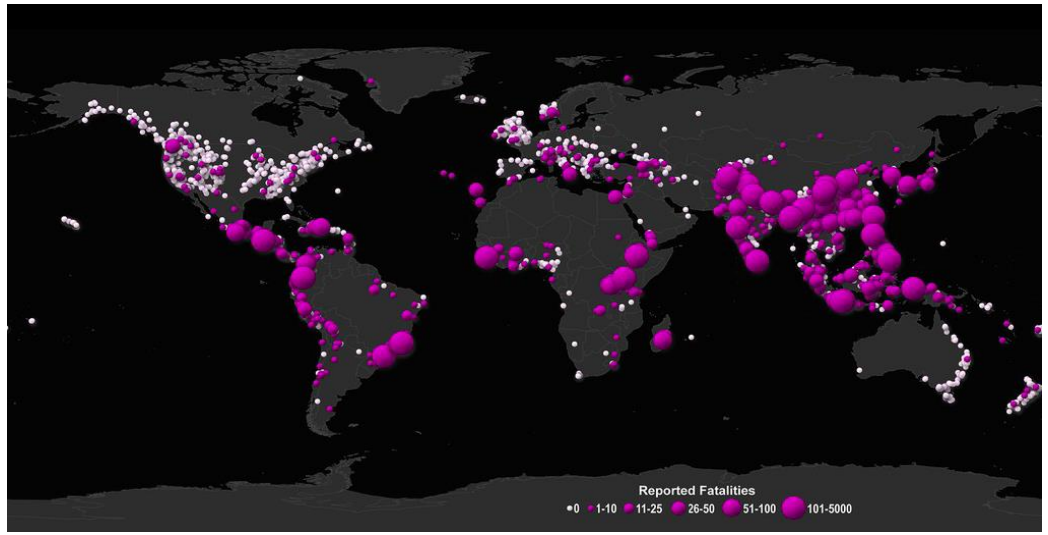
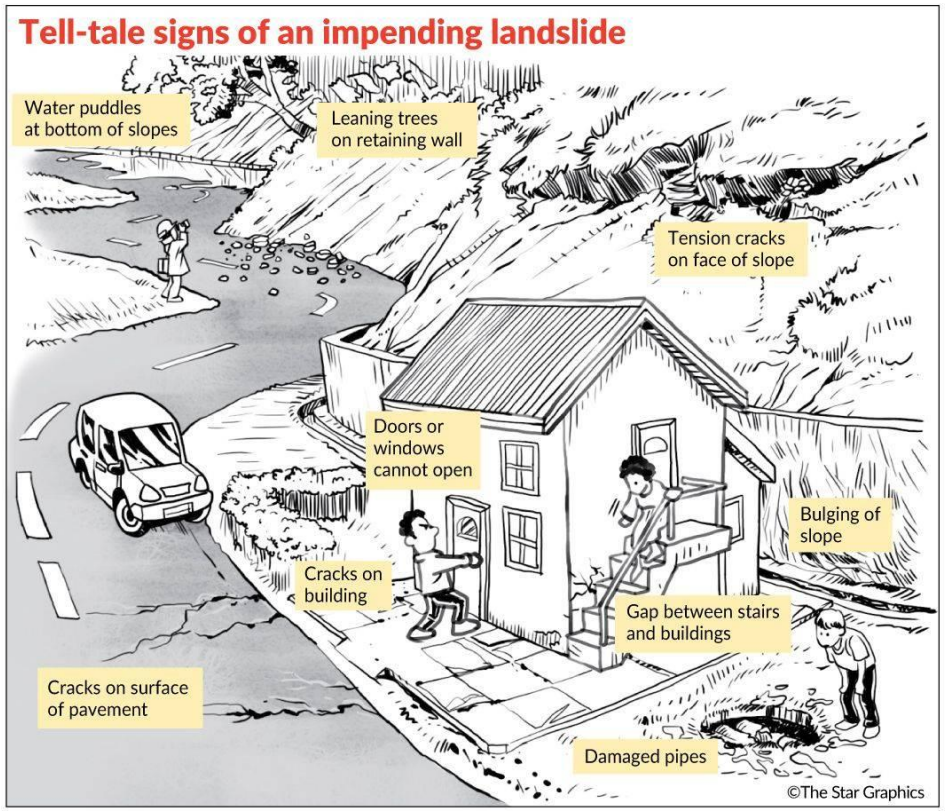
Global Landslide Catalogue (NASA, 2017)



Malaysia is ranked the 10th highest in frequency of landslides (2007-2016)



https://www.thestar.com.my/news/nation/2019/11/20/26000-new-hotspots-on-watch-list

26,000 hotspots nationwide on landslide watch, on top of the 16,454 existing ones that are closely monitored, especially during this year-end rainy season **(Slope Engineering Branch, Public Work Department, 20 November 2019)**

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85 % **Urbanization rate is expected to increase in 2040**[1]

32 % **Rainfall increment (projected future climate, 2041-2050)**[2]

SENDAI FRAMEWORK
FOR DISASTER RISK REDUCTION 2015-2030

Economic losses (C1)[3]

424.29 %

Critical Infrastructure & services (D-5)[3]

17.84 %

[1] Data provided by Federal Department of Town and Country Planning; 2 Projected change in maximum monthly value in North East Region (Terengganu, Kelantan, Northeast coast) based on average annual rainfall and mean temperature (1984-93 vs 2025-34 & 2041-50); 3 Data provided by National Disaster Management Agency (NADMA) Prime Minister's Department based on data compiled in the period of 2009-2018 for the Sendai Framework Monitor Report (as per dated on 29 October 2019).

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GLOBAL YOUNG ACADEMY

TC21 Transdisciplinary Approach (TDA) for Building Societal Resilience to Disasters

Stakeholders Dialogue on the 12th Malaysia Plan, Water Sector Transformation
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Disaster Risk Reduction for Resilience

From Global Policy into Local Practice

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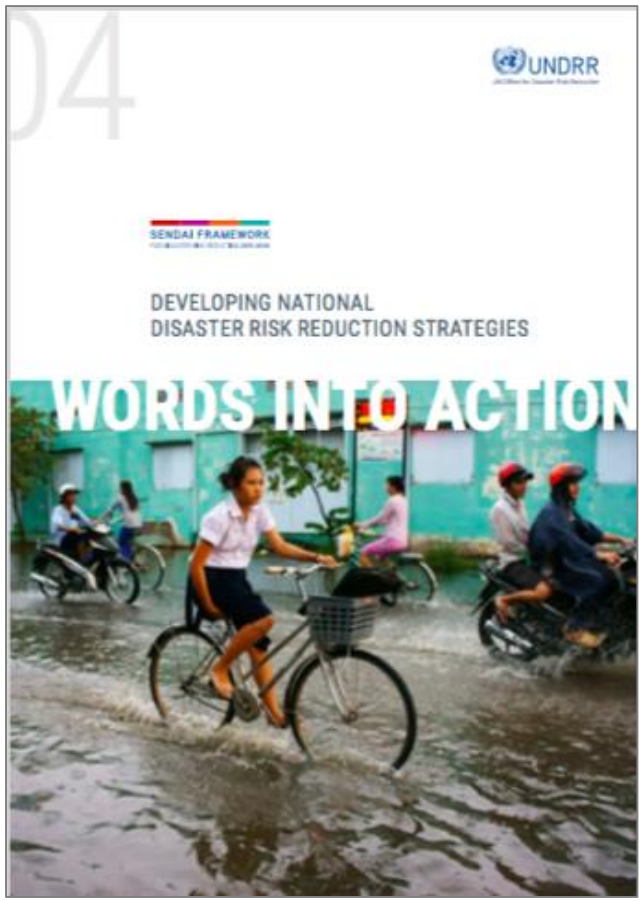

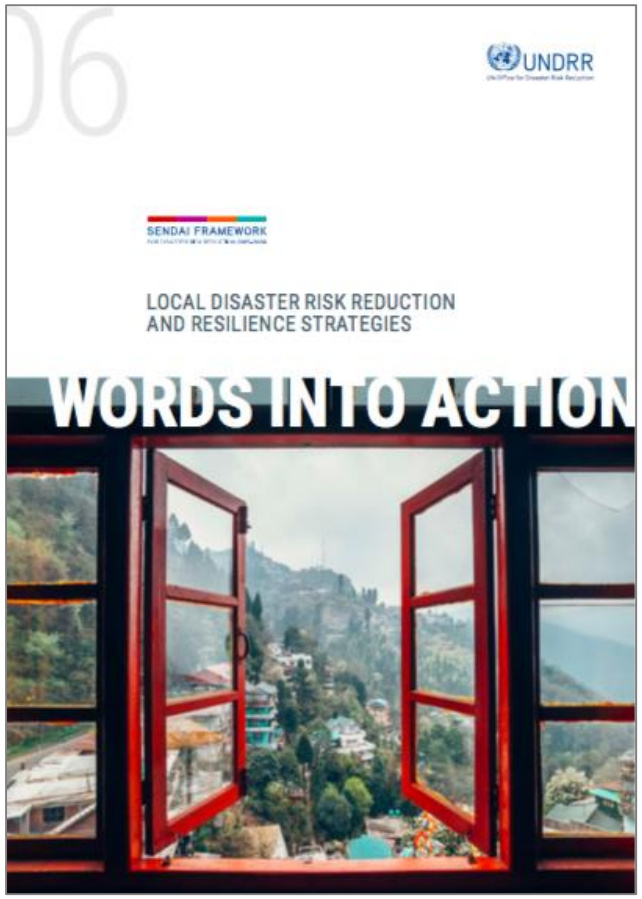

UNDRR GAR2019 @ https://www.unisdr.org/we/inform/gar

UNDRR Words Into Action @ https://www.preventionweb.net/sendai-framework/wordsintoaction

UNDRR
UN Office for Disaster Risk Reduction

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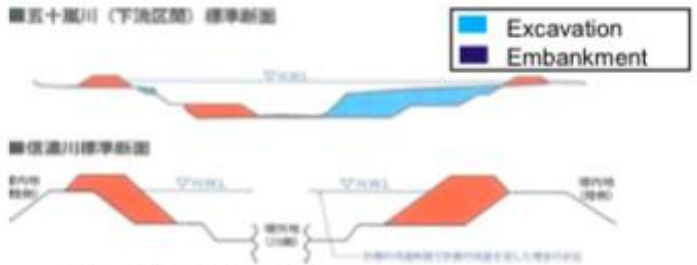
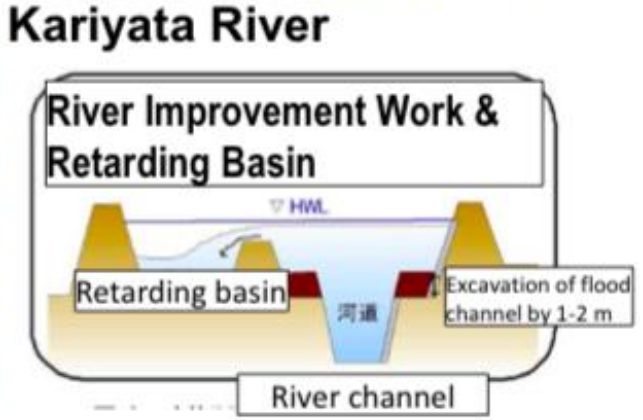
River improvements were implemented based on the July 2004 flood experience.

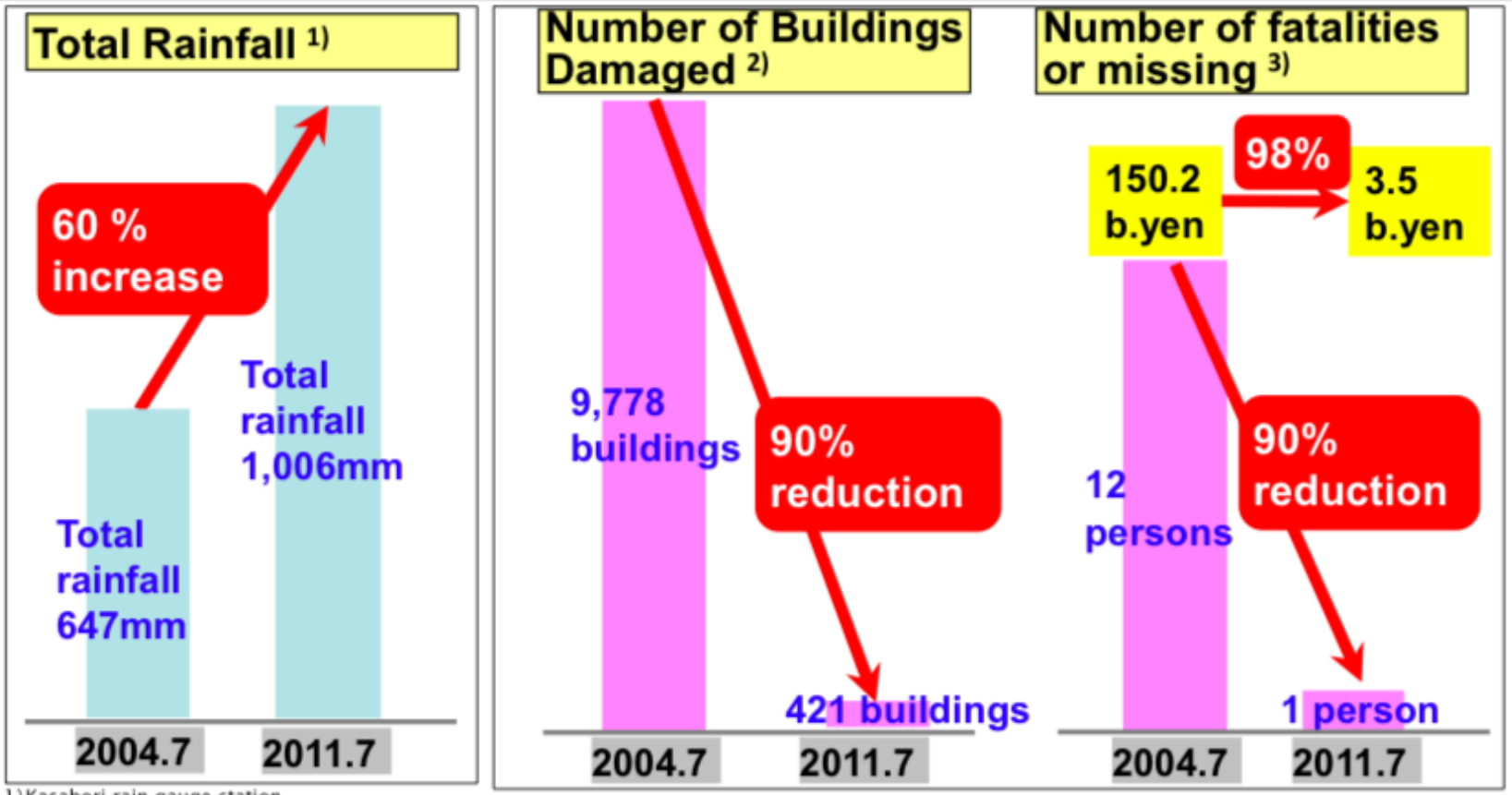
Total cost : about 118.2 billion JPY





Slides by Yusuke Amano, Director of International Cooperation and Engineering for Infrastructure Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism
Promote Public Investment in DRR
@ Global Forum on Science and Technology for Disaster Resilience 2017, 23—25 Nov 2017, Science Council of Japan

In July 2011 the Shinano River Basin experienced a total rainfall of approx. 1,000mm, which was the largest rainfall on record and 1.6 times more than that of July 2004, but both damages to buildings and human casualties were reduced dramatically. **The investments were successfully justified in the end!**



1)Kasabori rain gauge station
2)2004.7:「7.13新潟豪雨 水害記録誌(March 2006 Niigata Prefecture)
2011.7: Produced by Niigata Prefecture based on「第1回平成23年7月新潟・福島豪雨対策検討委員会」
3)Shinano River Downstream, Ikarashi River, Kariyata River Disaster Rehabilitation Emergency Project Pamphlet (Shinano Karyu River Office, Niigata Prefecture)

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Revitalizing disaster area, empowering local community & socio-economic improvement

Interview with Local Champion

A story of Hua-shan (Yunlin County, Taiwan)

1999 Chi-Chi earthquake
2000 Debris Flow
2001 Typhoon Nari
(induced debris flow)

- Hua-shan Debris Flow Educational Park
- Tourists visit different geological landscapes, engineering facilities and ecological treatments towards disaster mitigation and environment protection

GLOBAL ASPECT
Vol.1 No.2 July 2011

When Debris Flow Meets Coffee

Hsiao-Yuan Yin
Section Chief, Debris Flow Disaster Prevention Center,
Soil adn Water Censervation Bureau, Council of Agriculture

When Debris Flow Meets Coffee
When Debris Flow Meets Coffee

Picture 1. Hua-shan is located in Yunlin County. (Source: http://www.orientaltravel.com/)

Hua-shan, a small village located in central Taiwan, was awarded the Taiwan Top 10 Rural Villages in year 2007, and is renowned to be the homeland for Taiwan coffee. There are many characteristic coffee gardens with local features spread all over the village, attracting a continuous stream of tourists during holidays. However, people scarcely know about the fact that the origin of the famous Hua-shan village, now surrounded with a romantic and cultural atmosphere, had a close relationship with debris flow and earthquake disasters about ten years ago.

In 1999, the catastrophic Chi-Chi earthquake with a 7.3 magnitude shook central Taiwan including the Hua-shan village in Yunlin County. Massive landslides in mountain hills induced by the severe quake accumulated a large amount of loose debris and rocks in the valleys. According to the investigation by the Soil and Water Conservation Bureau, the two torrents—the Ke-ciao river and the Hua-shan river – belong to the potential debris flow torrents which are prone to debris flow disasters in Hua-shan village. Extremely heavy rainfall in year 2000 caused several severe debris flow disasters. The fast moving saturated debris accompanied with water, sediments and boulders like flow concrete flushed downstream and washed away bridges, roads and several buildings. In year 2001, a destructive debris flow event erupted again in Hua-shan river due to the torrential precipitation accompanied with Typhoon Nari. The powerful erosion effect of the debris flow caused a sudden expansion of the riverbed, from originally 4 meters up to 40 meters in width. Over sixty thousand cubic meters of sediments buried tens of houses, roads and bridges. Residents in Hua-shan village could hardly keep the faith in reconstructing their homes after these continuous disasters.

In order to protect life and property in Hua-shan village, the Soil and Water Conservation Bureau and local governments came up with debris flow prevention projects immediately after the disasters. The debris flow disaster prevention planning included not only concrete engineering methods (such as check dams, slit dams, ground sills, bank revetment, detention pond and other channel works), but also application of ecological engineering techniques in the designs (such as reforestation, grass-planting, staking and wattling, flow diversion and other treatments, especially in the landslide source areas). Ecological engineering methods took advantage of local materials to create an eco-friendly environment. For example, the materials of masonry bank revetments mainly came from the boulders of debris flow sediments.

Picture 2. Hua-Shan village flushed by severe debris flow after Chi-Chi earthquake (Source: Hsiao-Yuan Yin)

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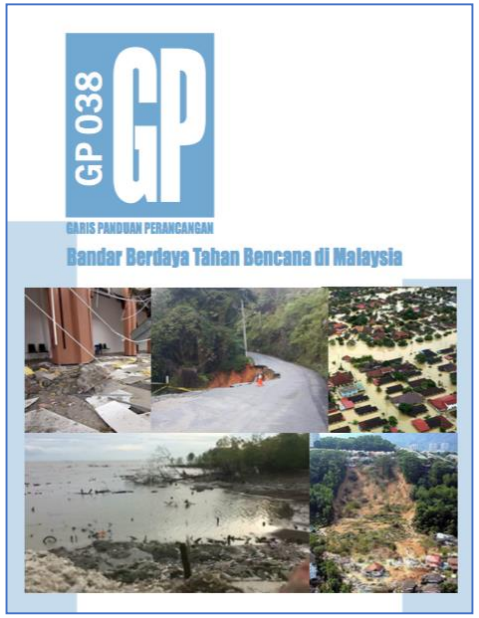
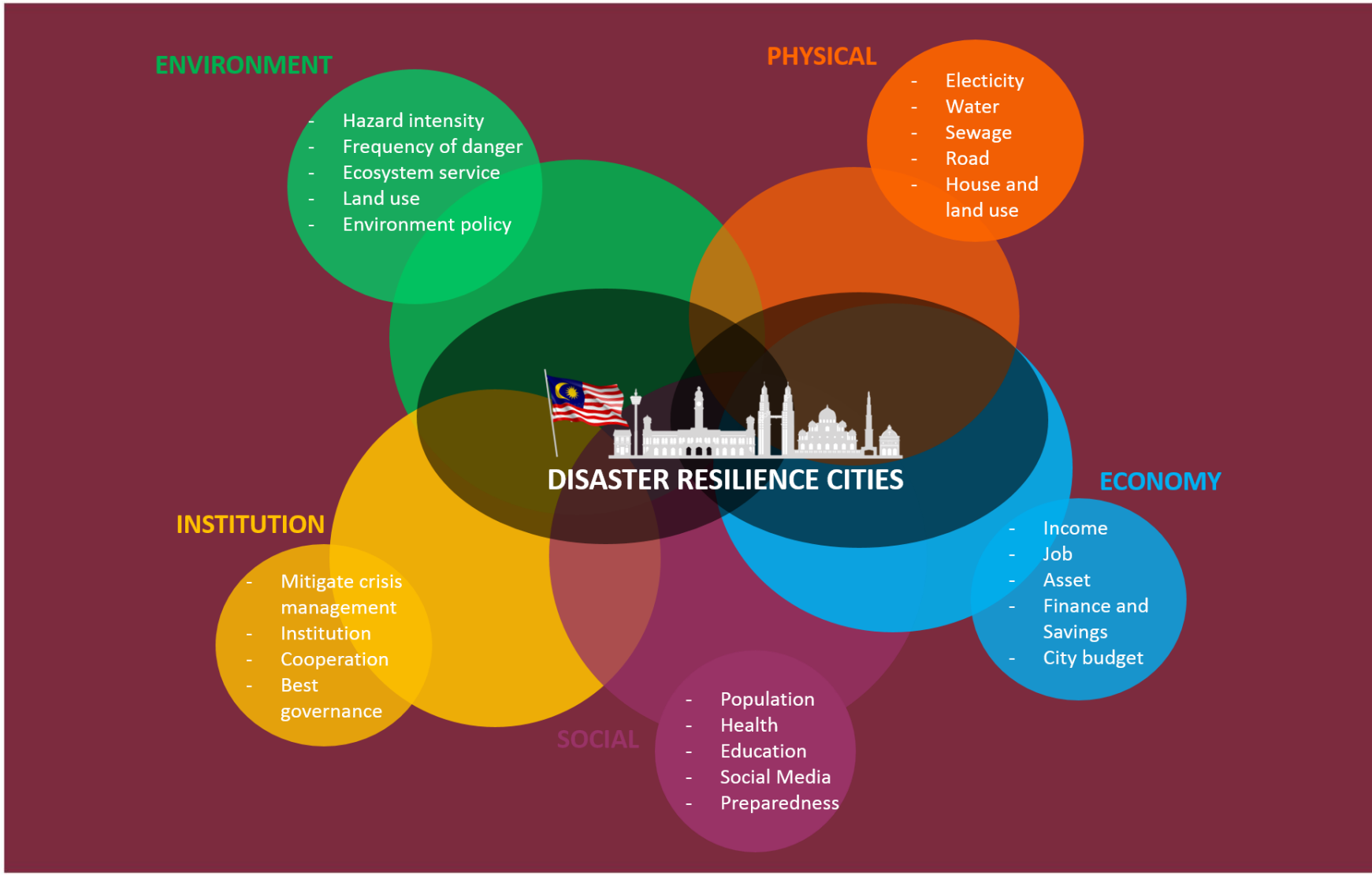
NATIONAL GUIDELINE
Development Planning for Disaster Resilient Cities, 2019

PLANMalaysia

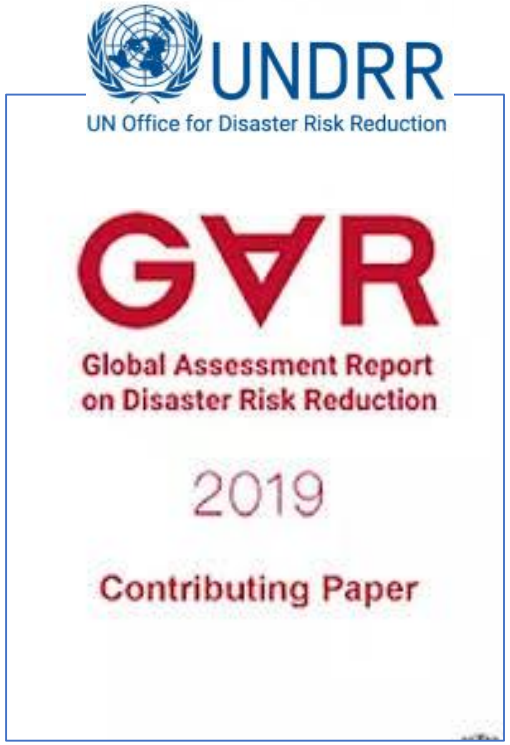


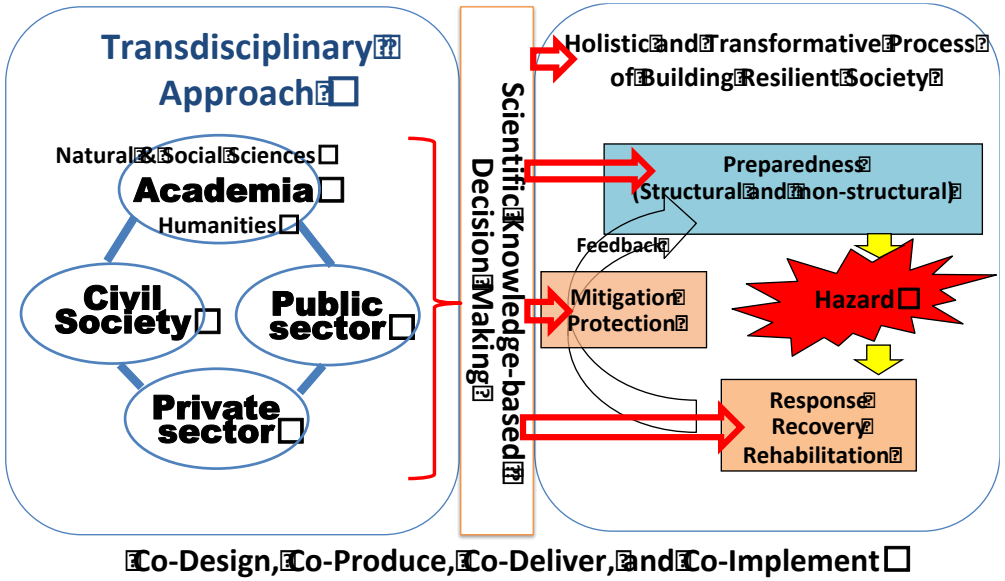


An integrated study covered 6 different disaster types and 12 major cities

Economy (Finance & budgets) I Environment (Land Use) I Institution (Governance)

Exploring transdisciplinary approaches to facilitate disaster risk reduction





https://www.preventionweb.net/publications/view/66188

Matsuura, S. and Razak, K. (2019), "Exploring transdisciplinary approaches to facilitate disaster risk reduction", *Disaster Prevention and Management: An International Journal*. https://doi.org/10.1108/DPM-09-2019-0289

"An approach to achieve a common societal goal, by all players and stakeholders at all levels of all related disciplines (natural, social and humanity sciences) and sectors (public, private, academia, and civil) working together, going beyond the limit of disciplinary knowledge and sectoral capacities by creating innovation means, and making holistic and transformative solutions possible"

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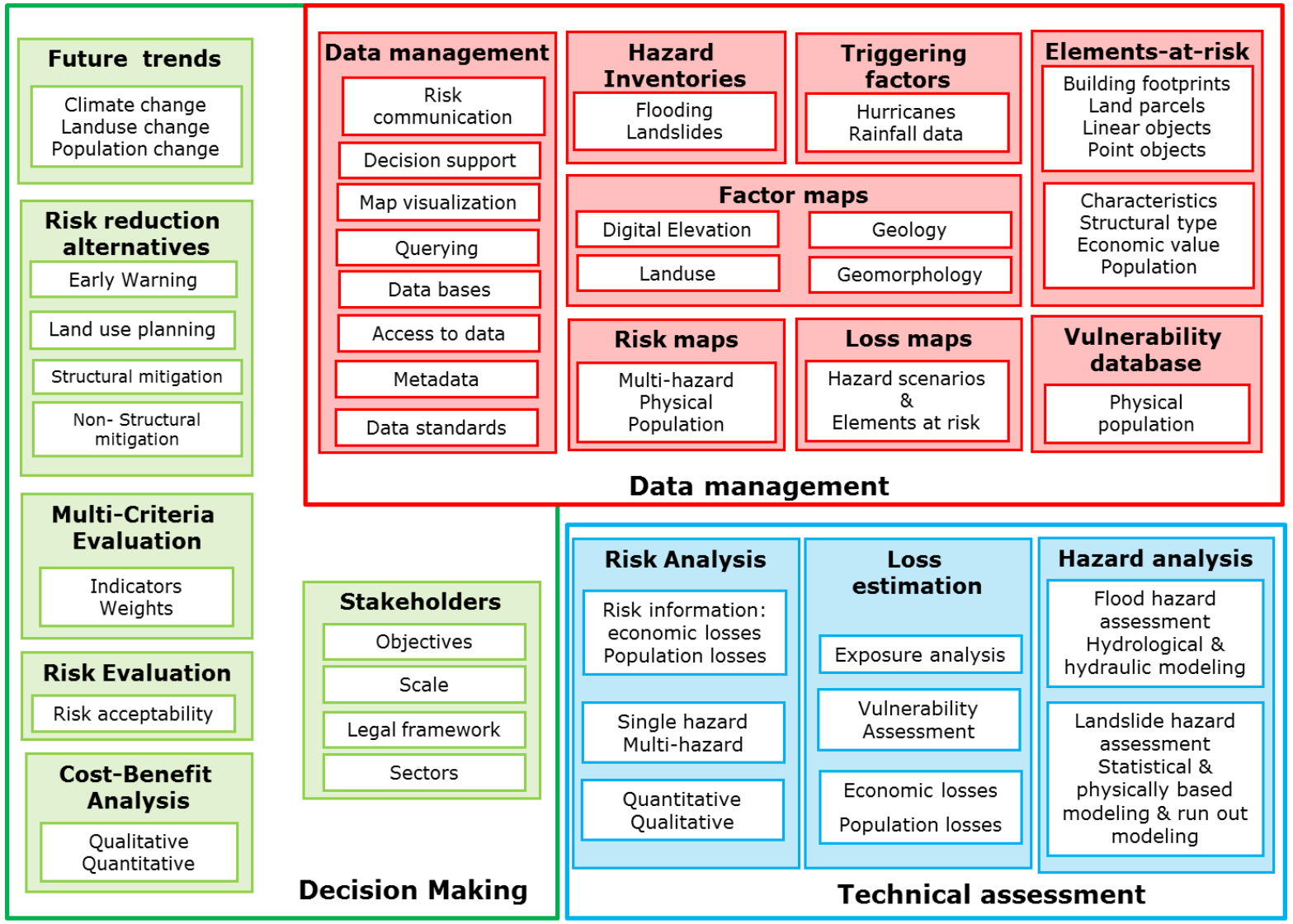
Multi-Hazard Approach

Three main components:

1) Technical assessment (hazard and risk)
2) Big Earth Data Analytics and Management
3) Science- and evidence-based Decision Making



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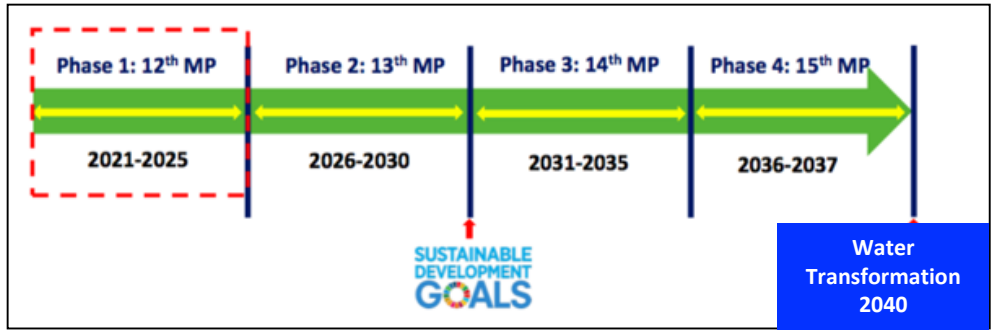
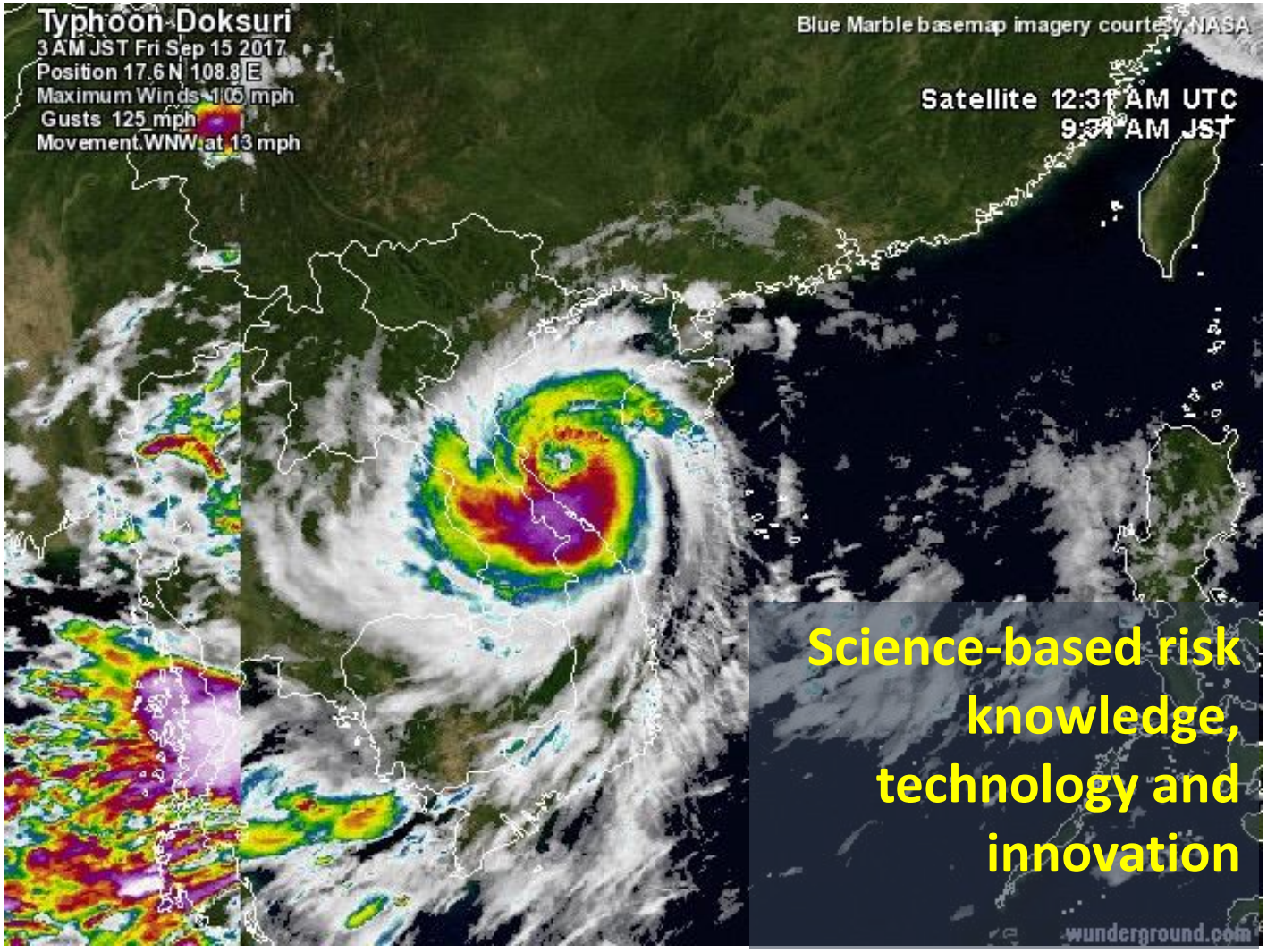
Risk-informed development and investment



It is important to ensure science is used by policy-makers in support of risk-informed decisions and future investment

Sustainable development CANNOT BE achieved UNLESS disaster risk is reduced



Science-based risk knowledge, technology and innovation

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Cascading GeoHazards Research Initiative
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