

Disaster Risk Reduction & Climate Change Adaptation: Initiatives & Approaches

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Southeast Asia Disaster Prevention Research Initiative,
Universiti Kebangsaan Malaysia (SEADPRI-UKM)



SEADPRI-UKM

Established on 1 June 2008

Vision

The leader in Innovative Research and Knowledge Transfer on Holistic Disaster Prevention

Mission

- ❑ **Conduct holistic research on hazards and disasters at national and regional levels**
- ❑ **Enhance human capital and capacity at national and regional levels, particularly in Southeast Asia**
- ❑ **Support knowledge-based decision making on climatic, geological and technological hazards**



SEADPRI-UKM

Established on 1 June 2008

Research Programs

**Holistic and integrated approach
(science, technology, impact,
vulnerability & governance) to
reduce risk of:**

- ❑ **Climatic Hazards**
- ❑ **Geological Hazards**
- ❑ **Technological Hazards**



SEADPRI-UKM

Established on 1 June 2008

Core Activities

- ❑ Research
- ❑ Education and Training
 - ❑ Masters and Doctoral programs
- ❑ Workshop and Training Courses
- ❑ Outreach and Networking



Major Ongoing Projects:

- Assessment of Climatic Hazards for Adaptation Response at the Local Level; Ministry of Education Fund
- Development of Adaptation Roadmap for Malaysia; Ministry of Natural Resources and Environment Fund
- Development of MyDRR; National Security Council
- Assessing Community Risk Insurance Initiatives for Disaster Risk Reduction; IGES/APN Fund
- Integrating CCA, DRR and L+D to Address Emerging Challenges Due to Slow Onset Processes [5 AMS + Japan]; APN Fund
- Enhancing Capacity on Climate Change Adaptation for Disaster Prevention in South East Asia; ASEAN-India Green Fund
- Future Cities: Science to Action for Building Resilience of Urban Communities; Newton-Ungku Omar Fund

Key International Linkages:

- University of Cambridge – Asian Network on Climate Science and Technology (ANCST)
- Kyoto University – Asian University Network on Environment & Disaster Management (AUEDM)
- Kyoto University – Disaster Prevention Research Institute (DPRI)
- ASEAN Secretariat

Activities in 2015:

- ❑ Inception Workshop on Enhancing Climate Change Adaptation In Southeast Asia, Bangi, 5-6 Feb 2015. Collaborators: ASEAN, APN, ANCST, NRE, MITI
- ❑ International Symposium on Multi-Hazard and Risk 2015, Kuala Lumpur, 23 - 24 Mar 2015. In Collaboration with UTM, JMG, ITC-Univ. of Twente & UNU
- ❑ Seminar on Ensuring Climate Resilience of Buildings and Infrastructure, Saujana Hotel, Kuala Lumpur, 7-8 April 2015, In Collaboration with CIDB, Ministry of Public Works, EPU, KeTTHA
- ❑ Workshop on Climate Science for L+D Projections, 11-13 June 2015. Collaborators: APN, ANCST, START
- ❑ ASEAN Final Planning Workshop on Enhancing Climate Change Adaptation, 14-15 October 2015, Manila. Collaborators: UPLB
- ❑ 4th ANCST Workshop on Climate Change and Urban Environment, Beijing, 15-17 July 2015
- ❑ 5th ANCST Workshop on Climate Change and DRR, 16-17 October 2015, Manila. Collaborators: UPLB, APN, AUEDM
- ❑ **National Preparatory Meetings** for WDRR Conference, Sendai, 14-18 March 2015; UNFCCC COP 21, Paris, Dec 2015.
- ❑ **Science to Action (S2A) Initiative**, Office of the Science Advisor to the Prime Minister of Malaysia, Establishment of Scientific Expert Panel on Disaster Management, to support MyDRR and National Security Council.

Asia

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Chapter 24, Asia: Coverage - 51 countries/regions

Central Asia (5)

- Kazakhstan
- Kyrgyzstan
- Tajikistan
- Turkmenistan
- Uzbekistan

North Asia (2)

- Mongolia
- Russia (East of Urals)

East Asia (7)

- China, Hong Kong Special Administrative Region (Hong Kong SAR)
- China, Macao Special Administrative Region
- Japan
- North Korea
- People's Republic of China (China)
- South Korea
- Taiwan Province of China (Taiwan POC)

West Asia (17)

- Armenia
- Azerbaijan
- Bahrain
- Georgia
- Iran
- Iraq
- Israel
- Jordan
- Kuwait
- Lebanon
- Palestine
- Oman
- Qatar
- Saudi Arabia
- Syria
- United Arab Emirates
- Yemen

South Asia (8)

- Afghanistan
- Bangladesh
- Bhutan
- India
- Maldives
- Nepal
- Pakistan
- Sri Lanka

Southeast Asia (12)

- Brunei
- Indonesia
- Lao People's Democratic
- Malaysia
- Myanmar
- Papua New Guinea
- The Philippines
- Republic Cambodia
- Singapore
- Thailand
- Timor-Leste
- Vietnam

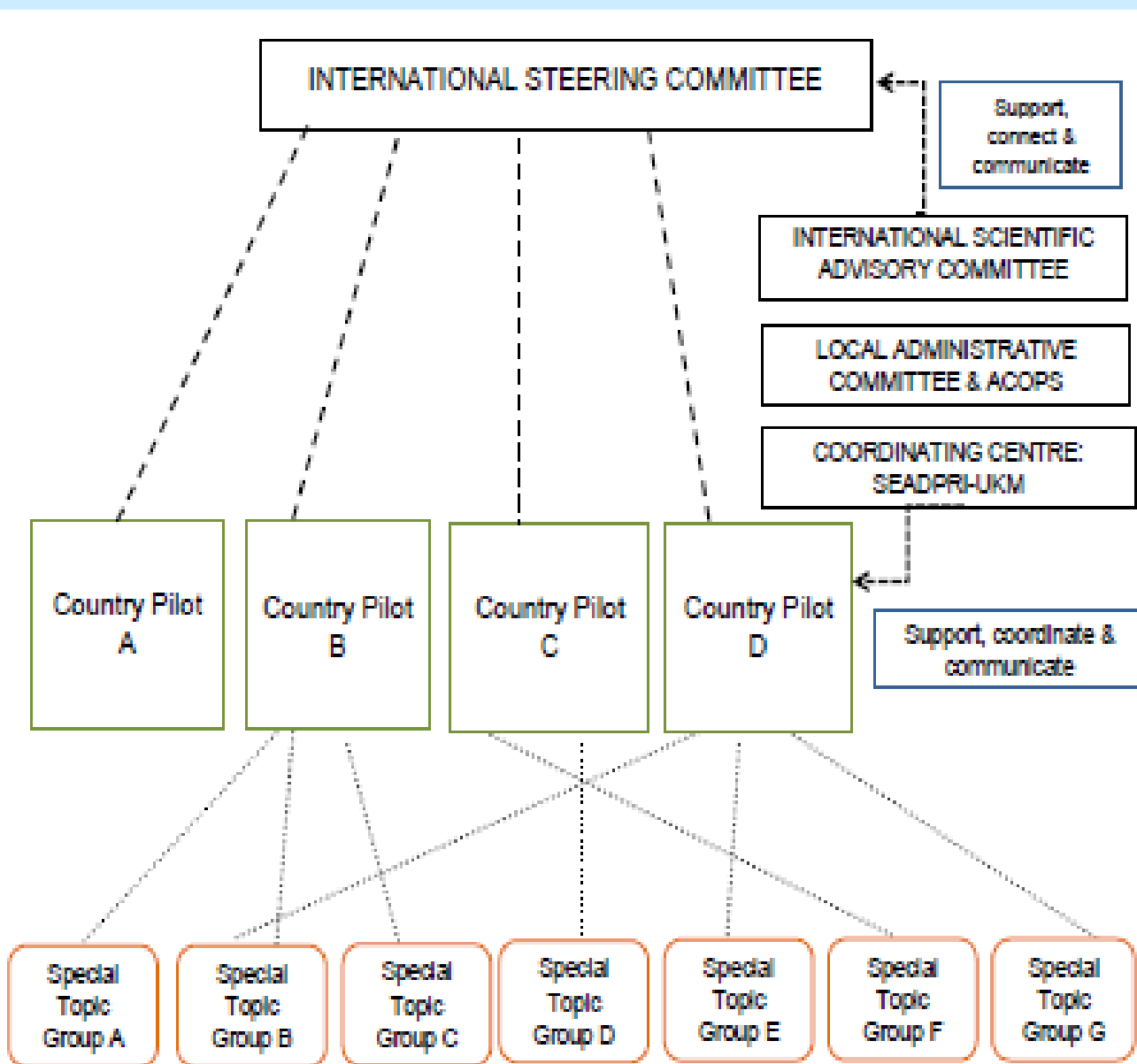


Chapter 24, Asia: Coverage of Information

Sector	Topics/issues	North Asia		East Asia		Southeast Asia		South Asia		Central Asia		West Asia		
		O = Observed impacts, P = Projected Impacts	O	P	O	P	O	P	O	P	O	P	O	P
Freshwater resources	Major river runoff	/	x	/	/	/	/	/	x	x	x	x	x	x
	Water supply	x	x	x	x	x	x	x	x	x	x	x	x	x
Terrestrial and inland water systems	Phenology and growth rates	/	/	/	/	x	x	x	x	x	x	x	x	x
	Distributions of species and biomes	/	/	/	/	x	x	x	/	x	x	x	x	x
	Permafrost	/	/	/	/	/	x	/	/	/	/	/	/	x
	Inland waters	x	x	/	x	x	x	x	x	x	x	x	x	x
Coastal systems and low-lying areas	Coral reefs	NR	NR	/	/	/	/	/	/	NR	NR	/	/	
	Other coastal ecosystems	x	x	/	/	x	x	x	x	NR	NR	x	x	
	Arctic coast erosion	/	/	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Food production systems and food security	Rice yield	x	x	/	/	x	/	x	/	x	x	x	/	/
	Wheat yield	x	x	x	x	x	x	x	/	x	x	/	/	
	Corn yield	x	x	x	/	x	x	x	x	x	x	x	x	
	Other crops (e.g., barley, potato)	x	x	/	/	x	x	x	x	x	x	/	/	
	Vegetables	x	x	/	x	x	x	x	x	x	x	x	x	
	Fruits	x	x	/	x	x	x	x	x	x	x	x	x	
	Livestock	x	x	/	x	x	x	x	x	x	x	x	x	
	Fisheries and aquaculture production	x	/	x	/	x	/	x	x	x	x	x	x	
	Farming area	x	/	x	/	x	x	x	/	x	/	x	x	
	Water demand for irrigation	x	/	x	/	x	x	x	/	x	x	x	x	
Pest and disease occurrence	x	x	x	x	x	x	x	/	x	x	x	x		
Human settlements, industry, and infrastructure	Floodplains	x	x	/	/	/	/	/	/	x	x	x	x	
	Coastal areas	x	x	/	/	/	/	/	/	NR	NR	x	x	
	Population and assets	x	x	/	/	/	/	/	/	x	x	x	x	
	Industry and Infrastructure	x	x	/	/	/	/	/	/	x	x	x	x	
Human health, security, livelihoods, and poverty	Health effects of floods	x	x	x	x	x	x	/	x	x	x	x	x	
	Health effects of heat	x	x	/	x	x	x	x	x	x	x	x	x	
	Health effects of drought	x	x	x	x	x	x	x	x	x	x	x	x	
	Water-borne diseases	x	x	x	x	/	x	/	x	x	x	x	x	
	Vector-borne diseases	x	x	x	x	/	x	/	x	x	x	x	x	
	Livelihoods and poverty	x	x	/	x	x	x	/	x	x	x	x	x	
	Economic valuation	x	x	x	x	/	/	/	/	x	x	x	x	

Asian Network on Climate Science & Technology (ANCST)

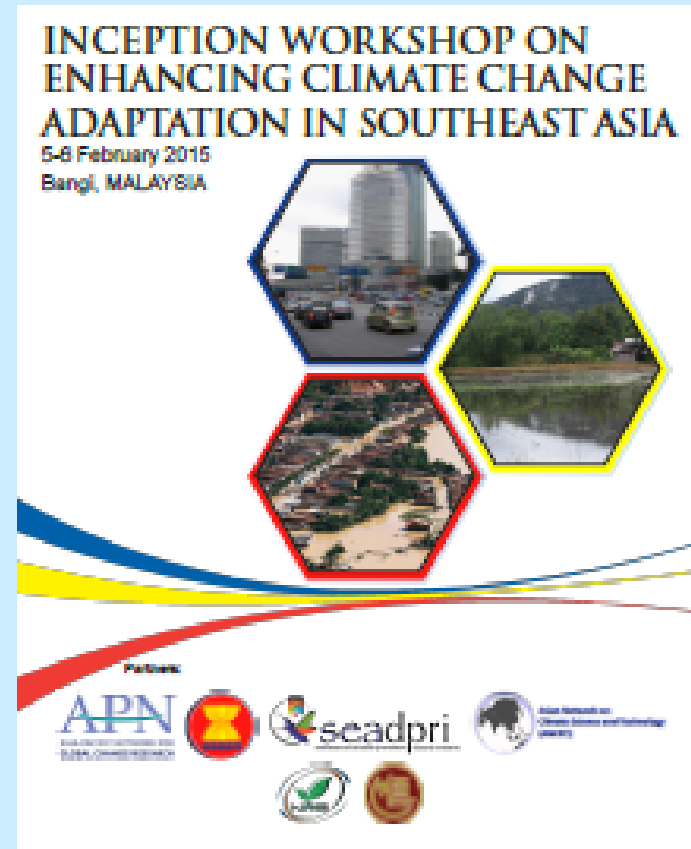
Organisation & Special Topics: [<http://www.ancst.org/>]



- (1) Disaster prevention and climate resilience;
- (2) Downscaling and regional based parameterisations;
- (3) Climate change mitigation, carbon sequestration and low carbon economy;
- (4) Atmosphere-ocean interactions;
- (5) Climate related data for variability and change in regions;
- (6) Urban climate change and resilience;
- (7) Climatic hazards and heritage areas;
- (8) Extreme flooding events;
- (9) Climate and biodiversity; and
- (10) Climate, ecosystems change and services.

Key Meetings of ANCST

- ❑ Workshop on Natural Disasters and Climate Change in Asia, Bangi, 5-7 November 2012.
- ❑ Inaugural ANCST Symposium on Climate Science & Technology for Disaster Prevention, Putrajaya, 20 November 2013.
- ❑ 2nd ANCST Workshop on Atmospheric Chemistry and Climate Change in Asia, Kuala Lumpur, 14-15 July 2014
- ❑ 3rd ANCST Workshop on Atmosphere-Ocean Interactions in the Indo-Pacific Basin and Asian Climate, Bangalore, 23-24 November 2014.
- ❑ Spotlight on ASEAN at the Asia Pacific Climate Change Adaptation Forum, Kuala Lumpur, 3 October 2014



ASEAN Project Arrangements

Government Partners

- National AWGCC Focal Point Representatives
 - Brunei
 - Cambodia
 - Indonesia
 - Laos
 - Malaysia
 - Myanmar
 - Philippines
 - Singapore
 - Thailand
 - Vietnam
- Government of India Representative

Science Partners

- Brunei: Universiti Brunei Darussalam (UBD)
- Cambodia: Pannasastra University of Cambodia, Royal University of Phnom Penh
- Indonesia: Indonesian Institute of Science (IISC), Institut Teknologi Bandung
- Laos: Department of Disaster Management and Climate Change (DDMCC), MoNRE
- Malaysia: SEADPRI, Universiti Kebangsaan Malaysia
- Myanmar: Myanmar Climate Change Watch/Department of Meteorology and Hydrology
- Philippines: University of the Philippines Los Banos
- Singapore: Nanyang Technological University / National University of Singapore
- Thailand: Rangsit University
- Vietnam: Hue University, Institute of Meteorology, Hydrology & Environment (IMHEN), Department of Meteo-hydrology and Climate Change

Administration: Under Guidance of ASEAN Secretariat

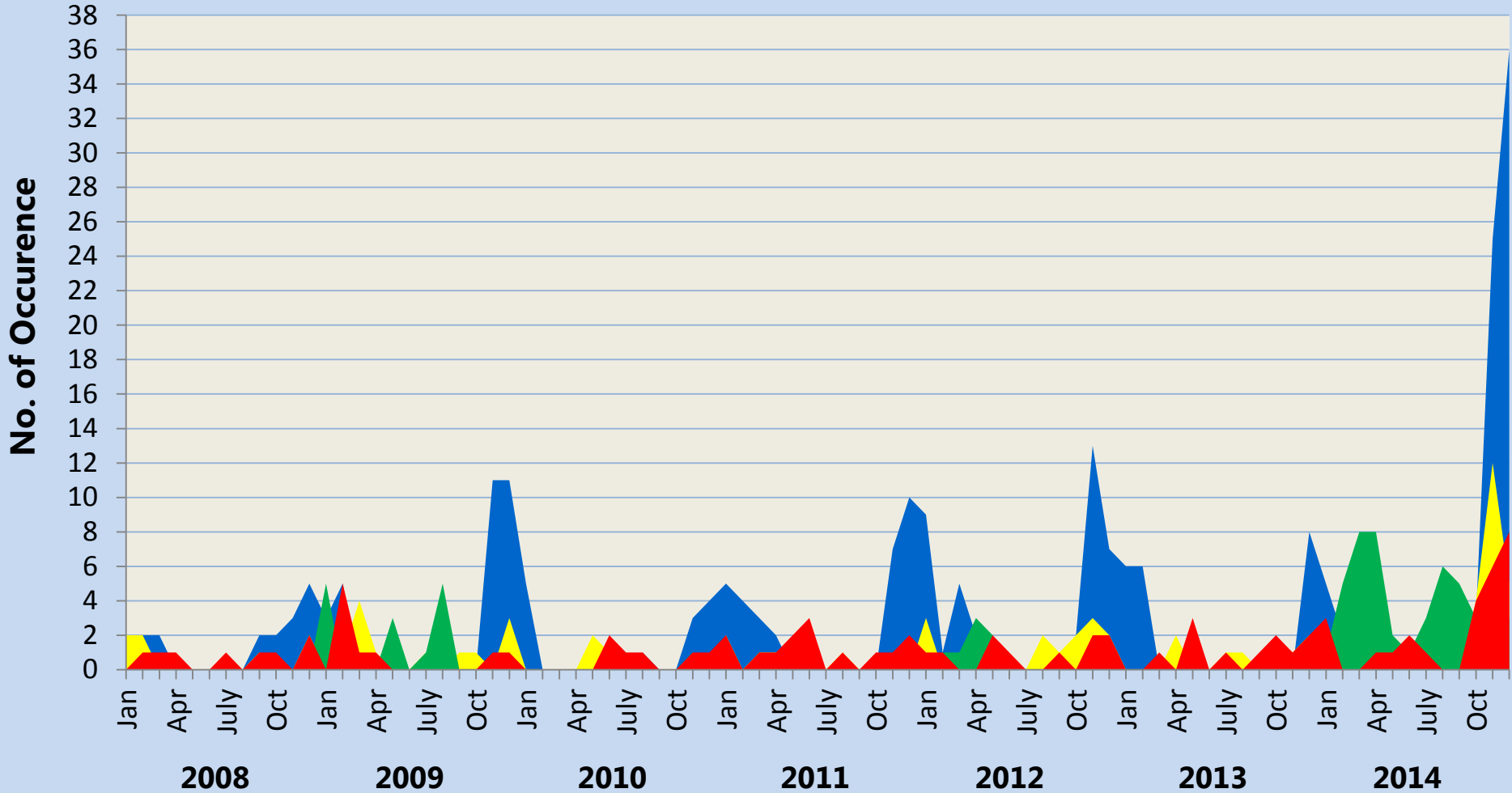
Implementing Agency: SEADPRI, Universiti Kebangsaan Malaysia

ASEAN Coordinator: Prof. Dr. Joy Jacqueline Pereira, SEADPRI-UKM

India Coordinator: Prof. N. H. Ravindranath, Indian Institute of Science

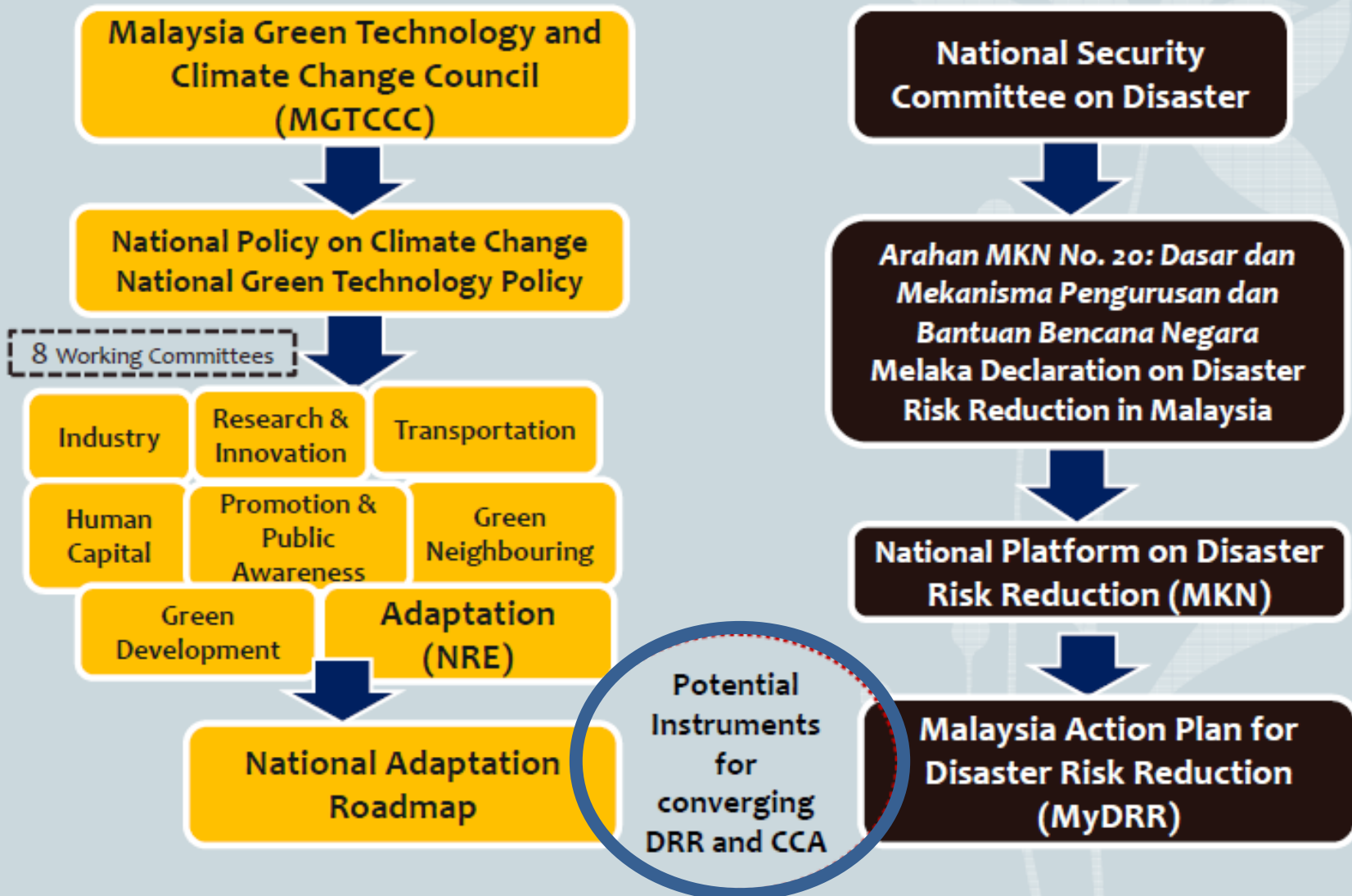
Frequency and Type of Events in Malaysia

Flood Flash Flood Storm Landslide

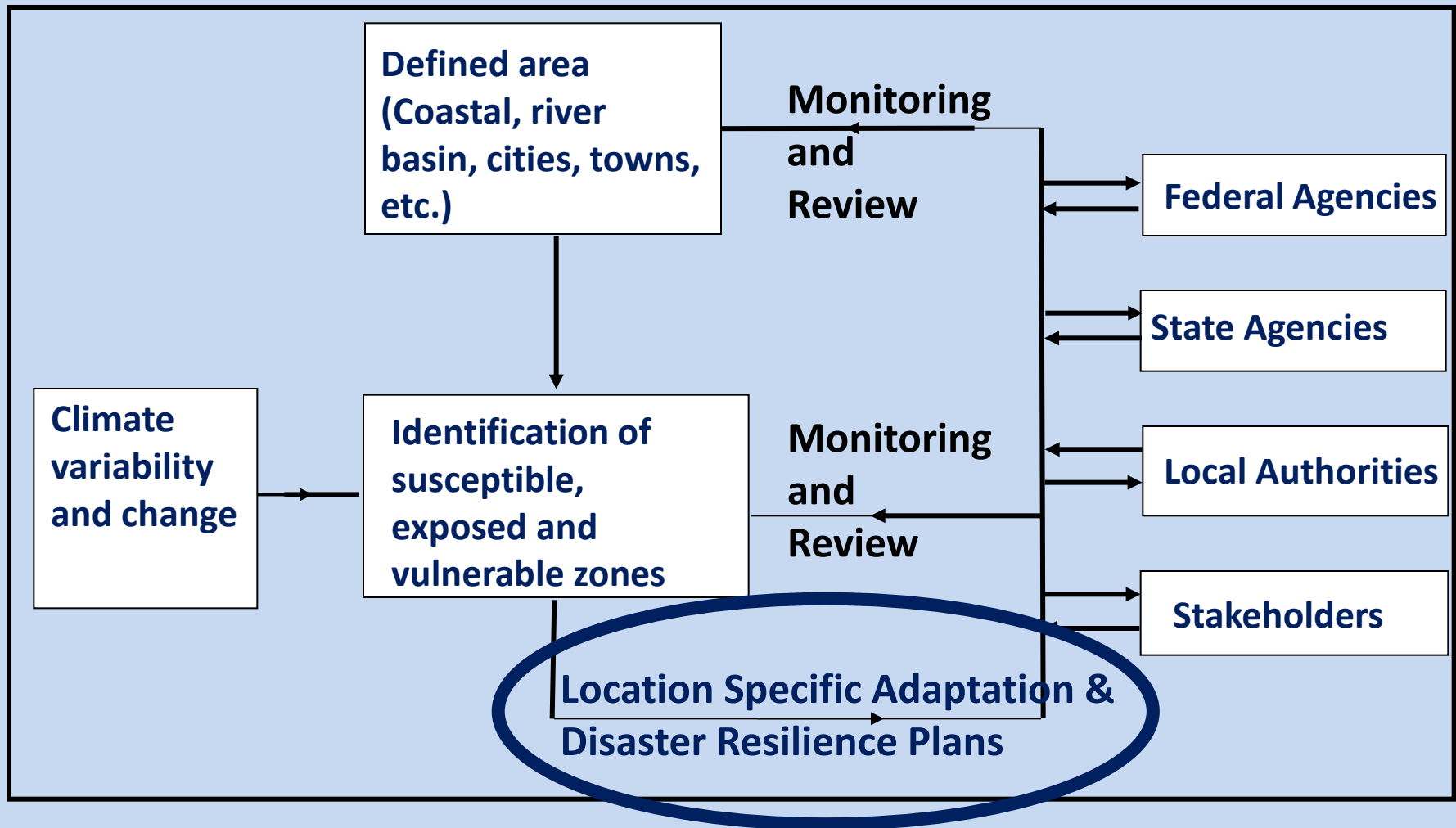


Disaster data compiled by Mohd Faizol Markom, SEADPRI-UKM.

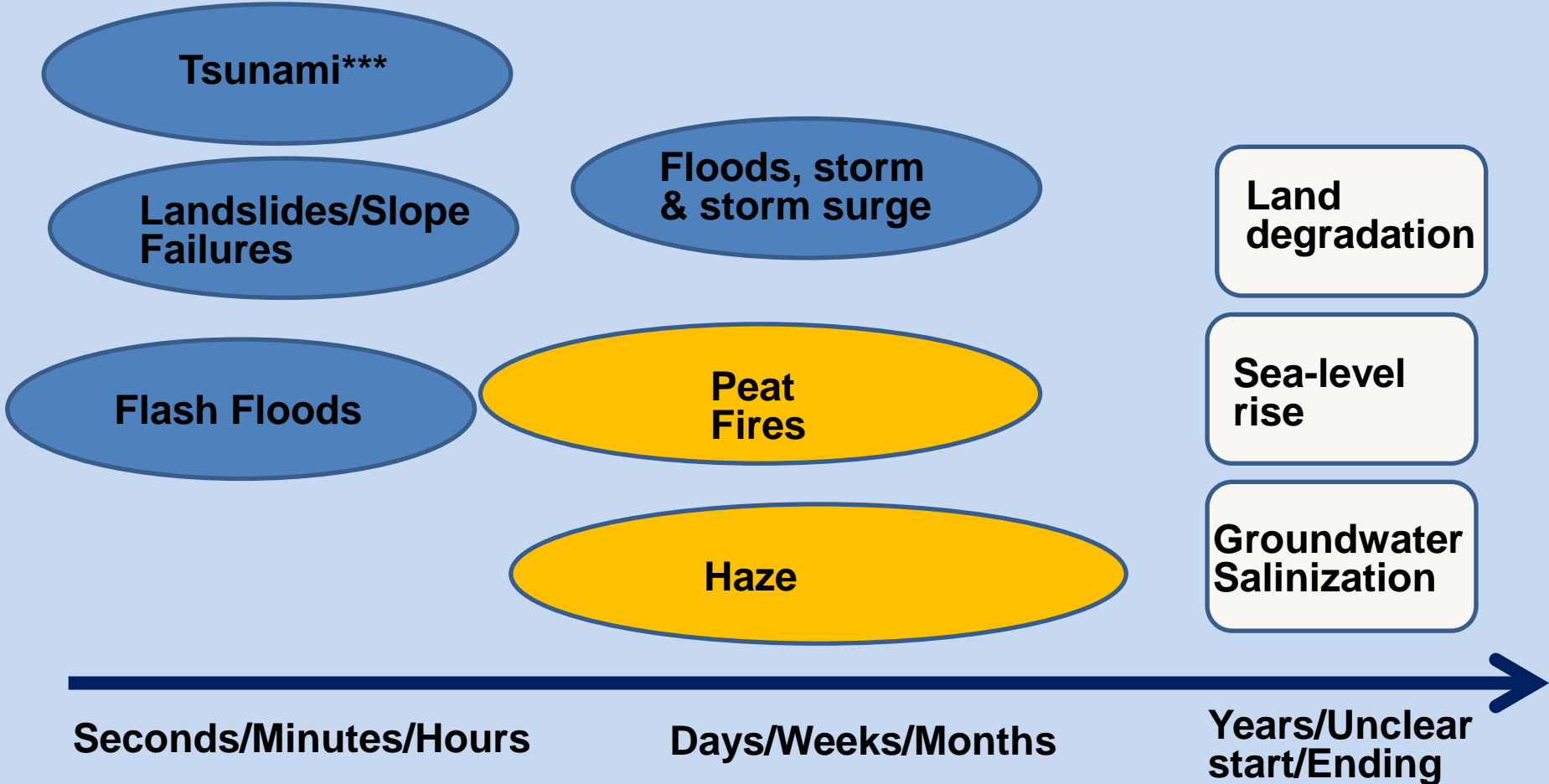
INSTITUTIONAL ARRANGEMENT



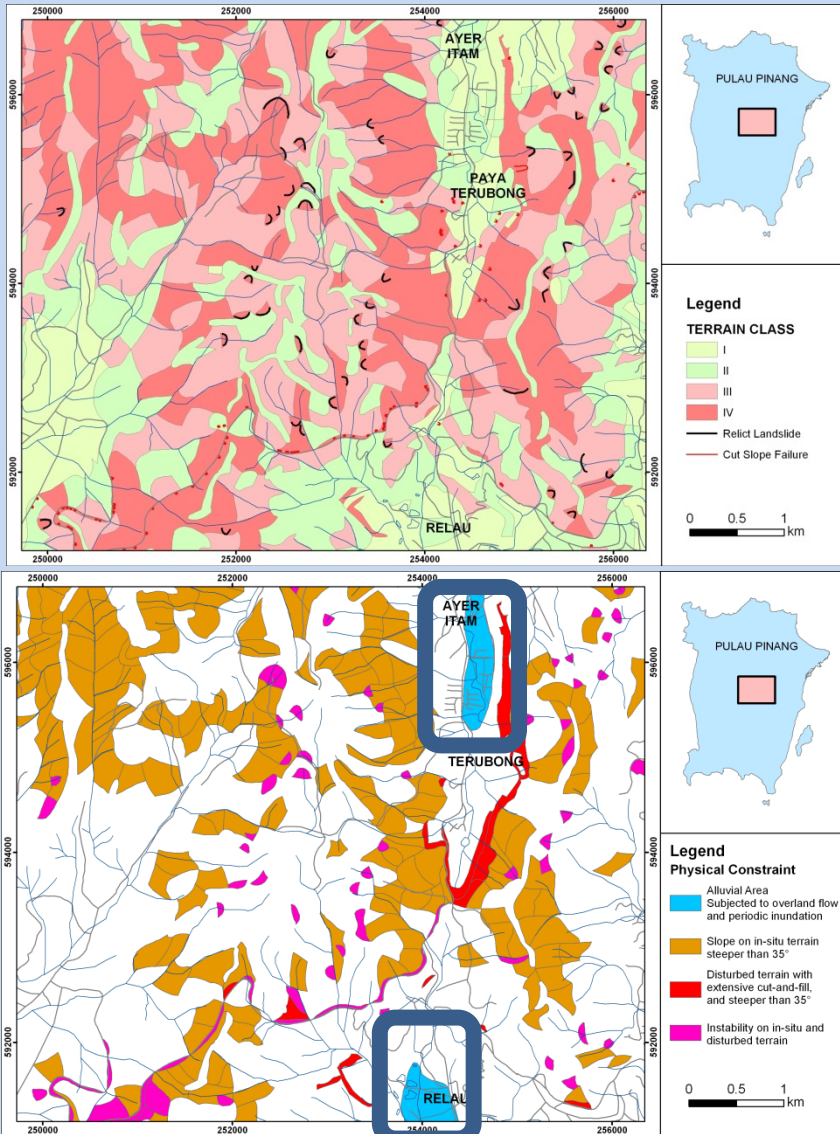
RECOMMENDED APPROACH FOR MALAYSIA: LOCAL LEVEL - SPATIALLY CONTEXTUALISED & COLLABORATIVE



Fast & Slow Onset Events



Managing Risks of Hazards



Risk Factors:

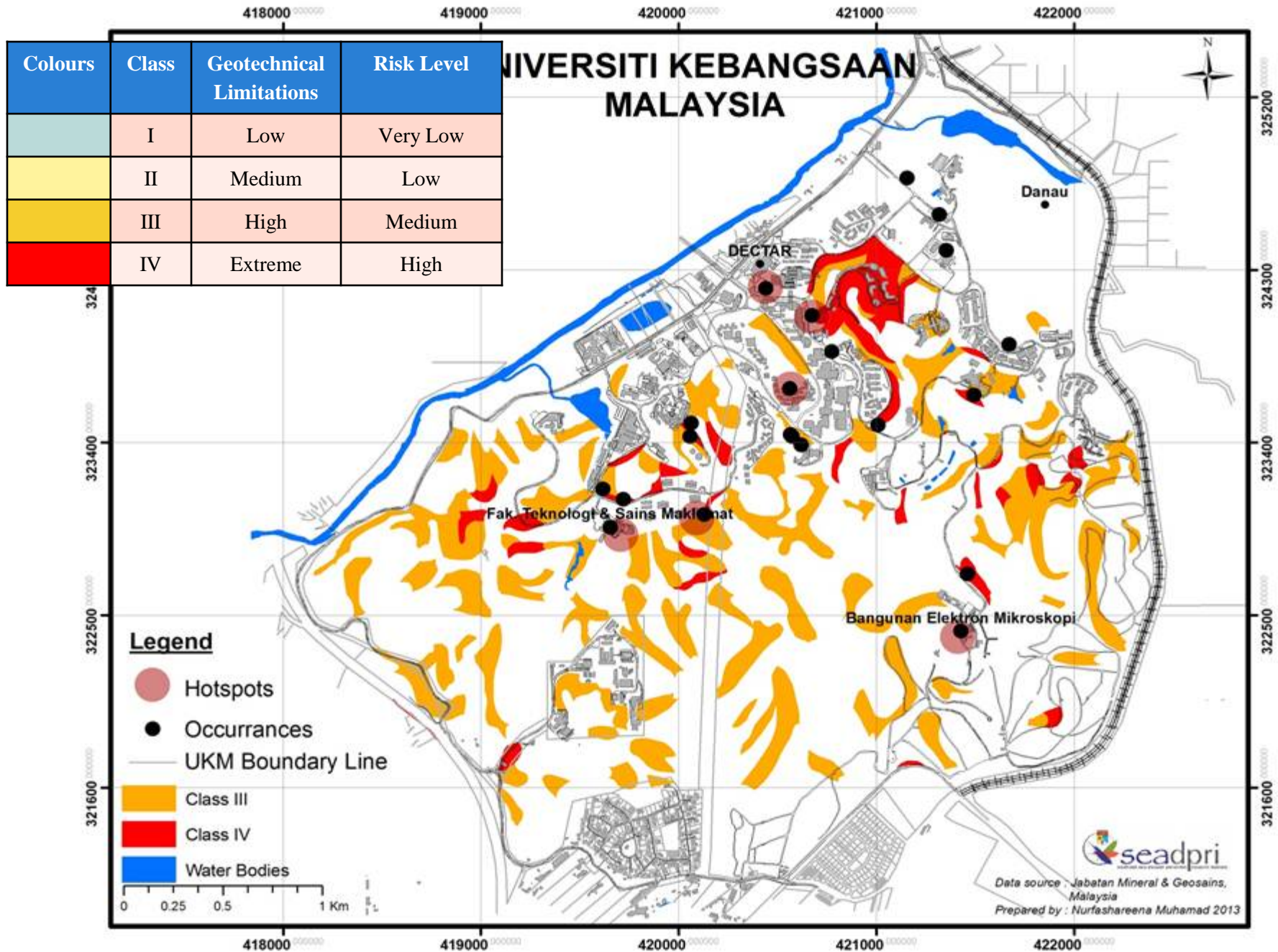
- Uninformed planning
- Development in unsuitable terrain
- Cleared areas/blocked drainage

Adaptation Measures:

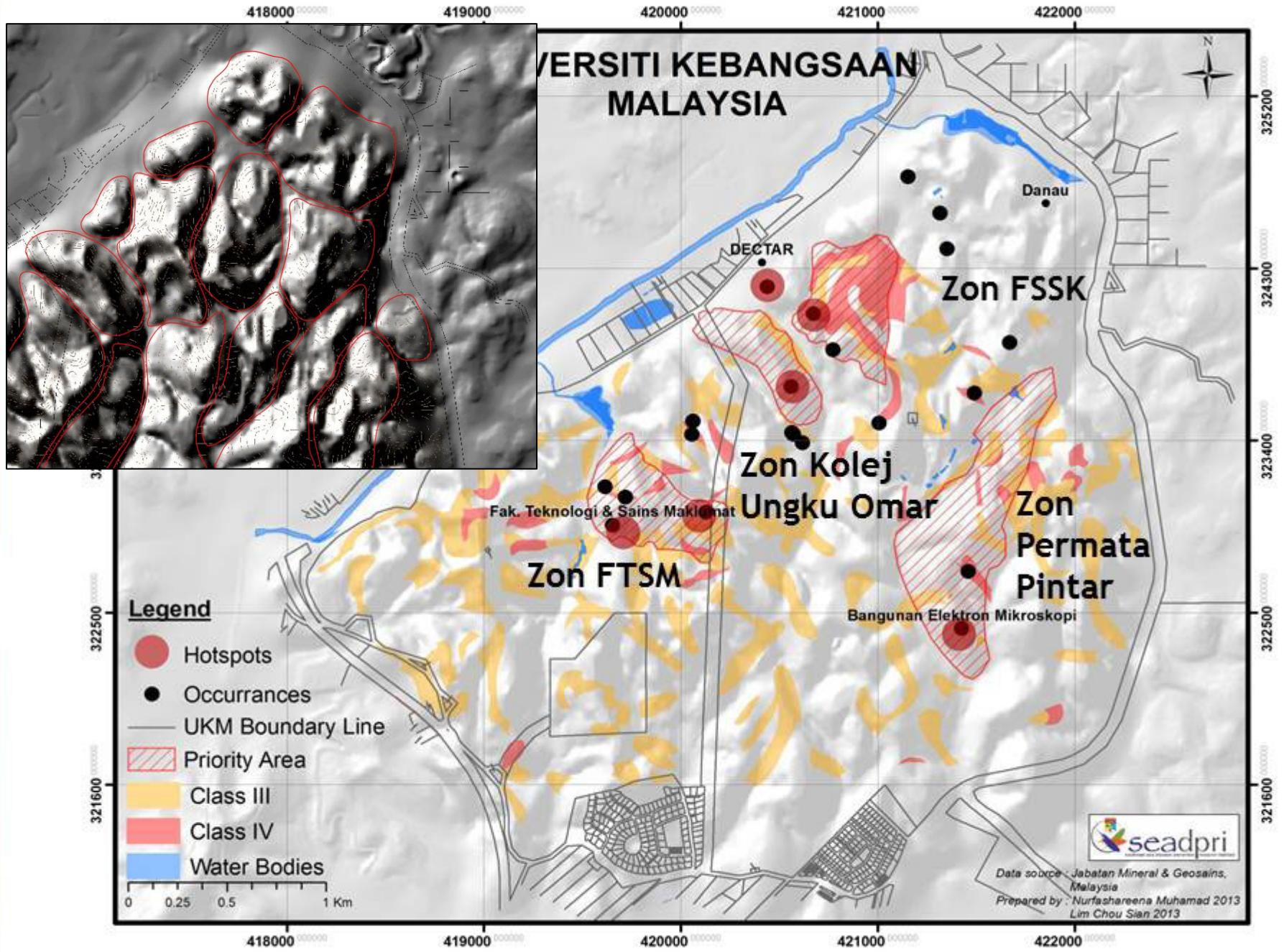
- Informed planning
- Regular slope inspection and maintenance
- Early warning systems
- Local community engagement
- Risk Pooling, etc.

Source: Ng, 2011 based on data from JMG

Landslides locations, built up areas and geological terrain in UKM

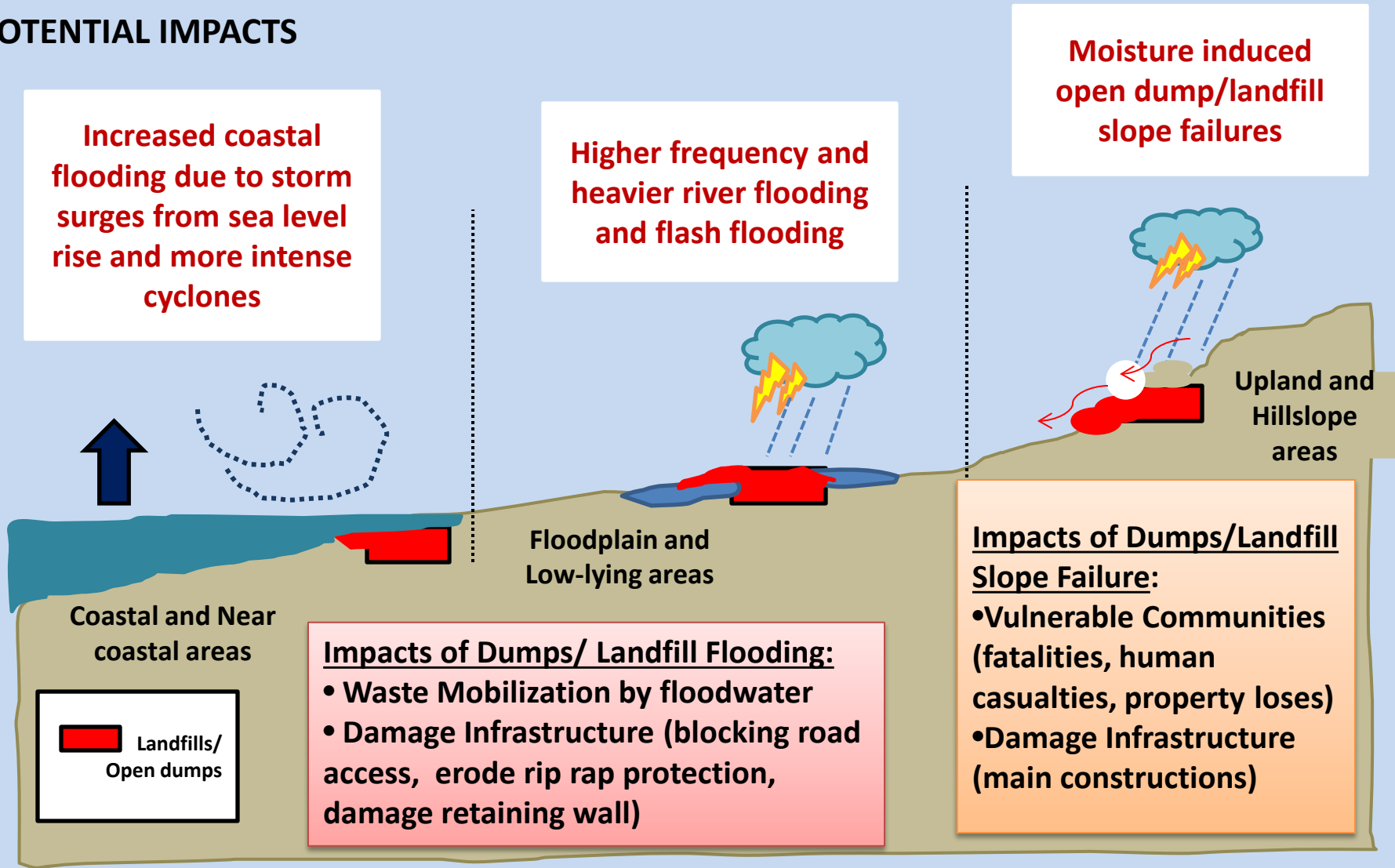


Relief and terrain of classes 3 and 4

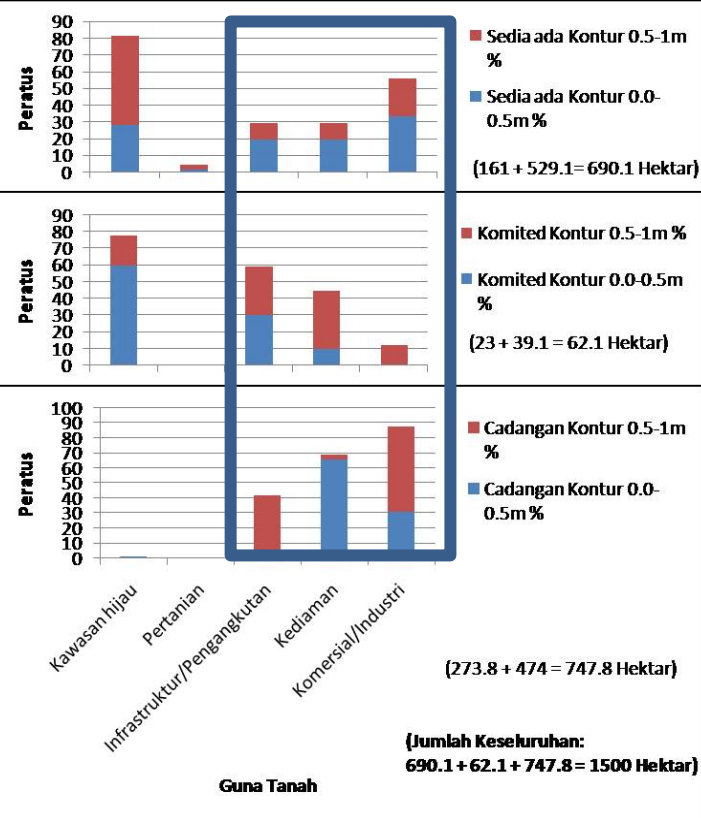
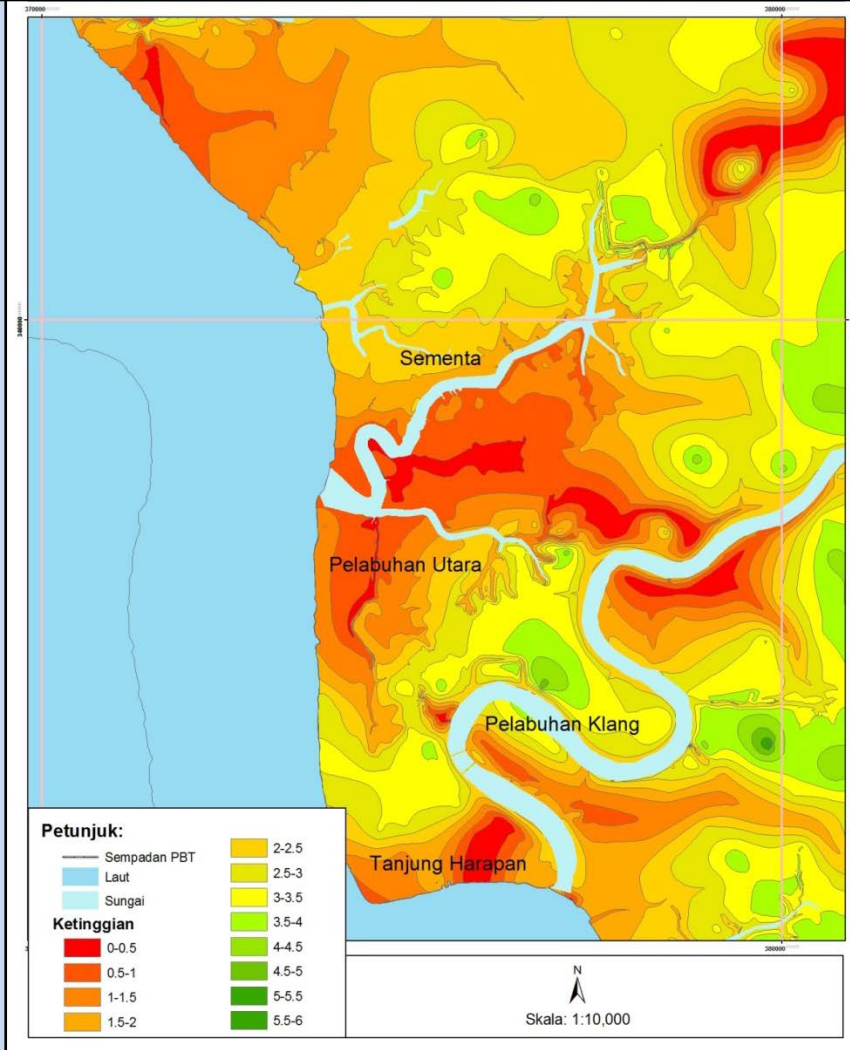


Emerging and Cascading Hazards

POTENTIAL IMPACTS



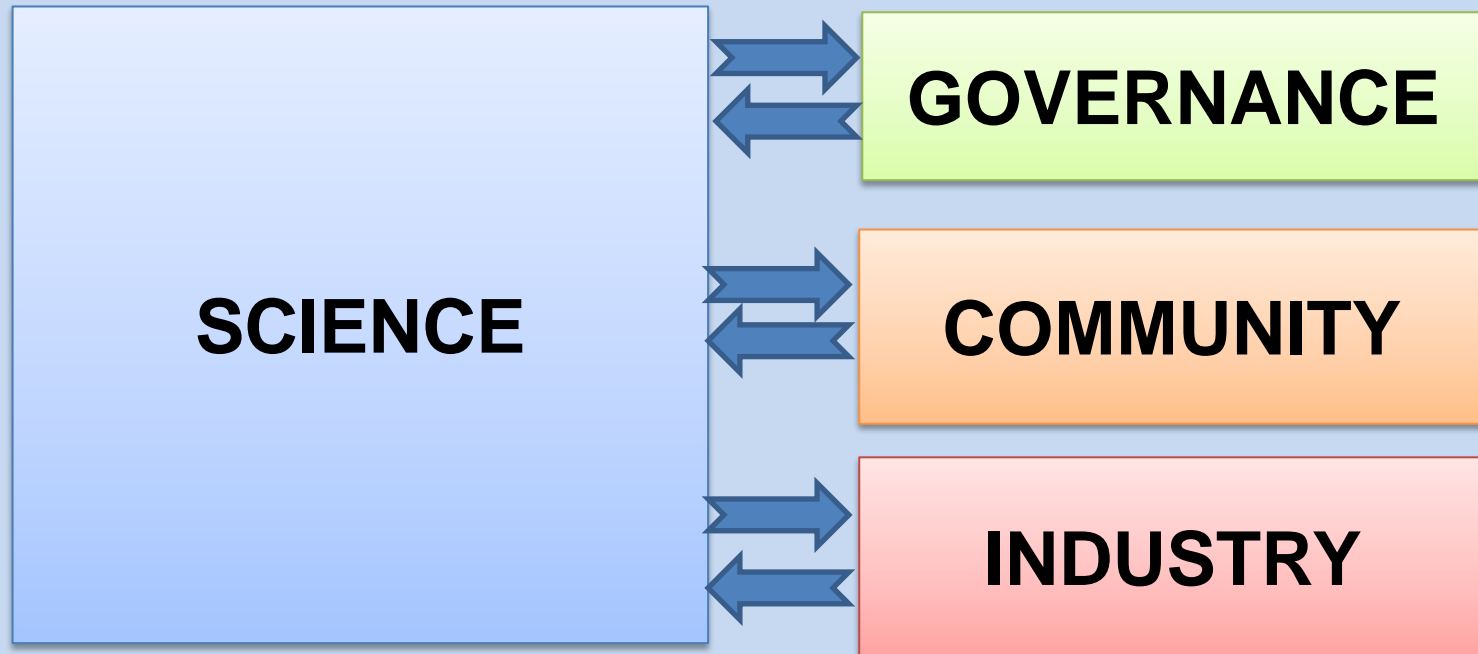
Areas Potentially Affected by Sea Level Rise in Port Klang, Malaysia



Source: Rasyidah et al., 2013 based on data from JPBD Selangor.
Projection by NAHRIM for 2100

Adaptation Measures:
Informed planning; Early warning systems;
Maintenance of drainage; Risk pooling; Relocation, etc.

FRAMEWORK



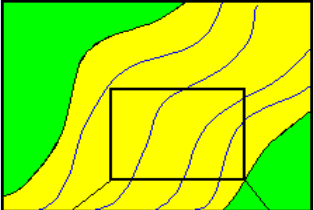
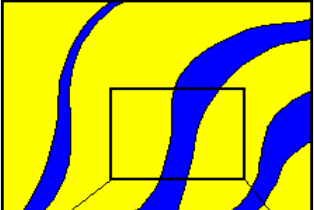
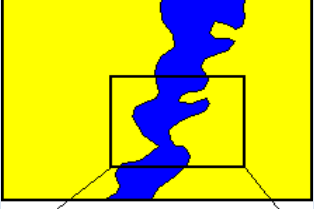

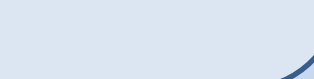

ACTION ORIENTED APPROACH

Conduct 5 local level pilots: Greater Kuala Lumpur, Cameron Highlands, Kundasang, Miri & Kota Bahru

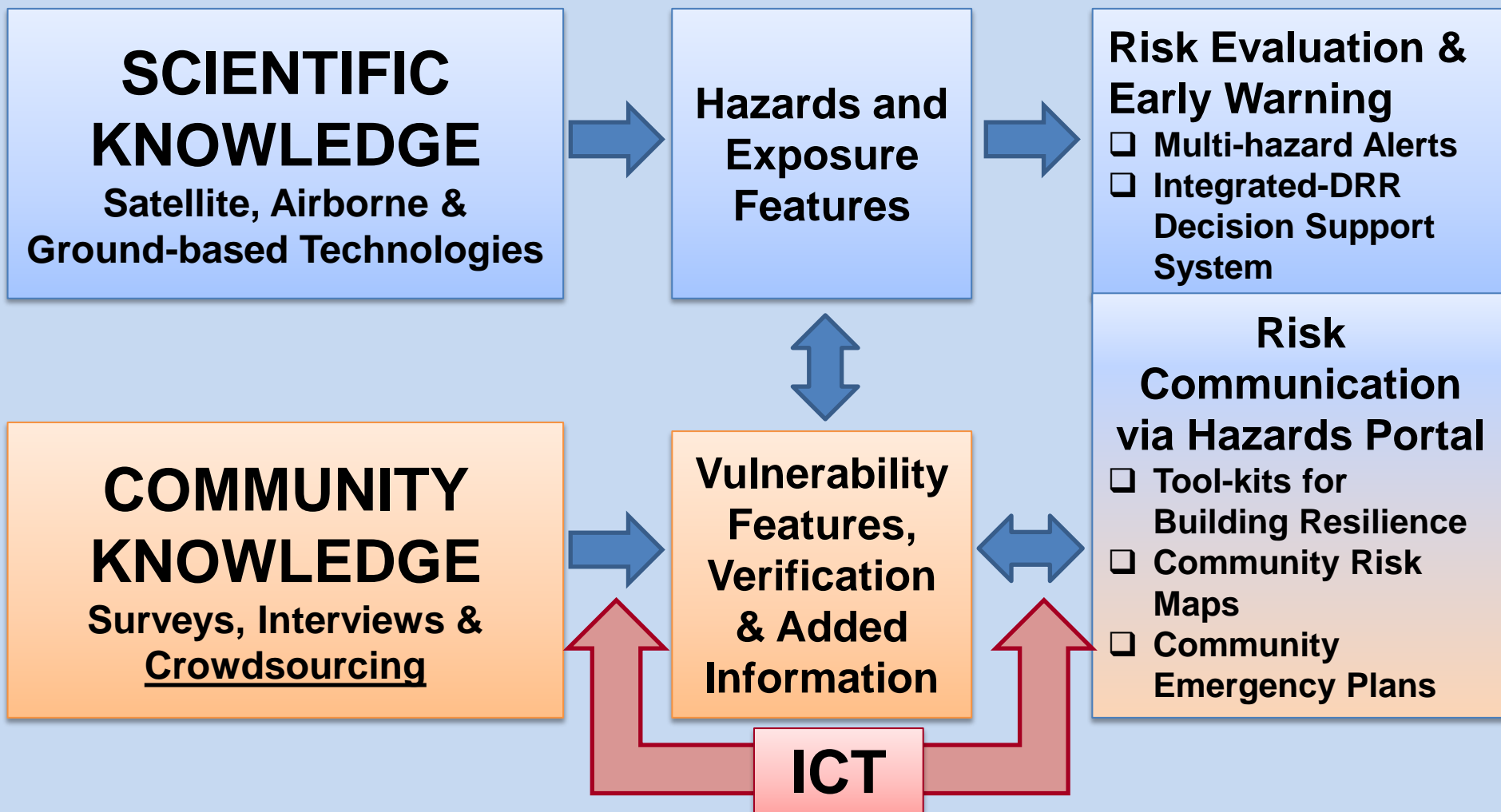
ASM-led, consortium of institutions

Duration: 3 years

CURRENT STATUS: INFORMATION AND KNOWLEDGE

SCALE OF INFORMATION	SIZE OF AREA	TYPE OF DATA	REMARKS
<p>1:100,000</p> 	<p>Large</p>	<p>Interpreted</p>	<p>Scientific Knowledge: Topographic and geological maps for desktop studies and general surveys.</p>
<p>1:50,000</p> 	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">AREA COVERAGE</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">ACCURACY</p>	<p>Scientific Knowledge: Airborne LiDAR, aerial images, etc. for specialized surveys.</p>
<p>1:20,000</p> 			<p>Scientific Knowledge: Terrain mapping for landuse planning and development suitability.</p>
<p>1:10,000</p> 			<p>Scientific Knowledge: Detailed maps for multi-hazards and local zoning.</p>
<p>1:5,000</p> 			<p>Community Knowledge: Survey of households.</p>
<p>1:2,500</p> 			<p>Small</p>

PILOT AREA INVESTIGATION SCHEME



ADVANTAGES: (i) community specific early warning for multi-hazards (ii) community ownership & engagement; (iii) continuously improving quality of information for projection of emerging and cascading hazards; (iv) cost effective.

Terima Kasih!

