

Workshop on Climate Science and Adaptation
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The IPCC Fifth Assessment Report 2014 - Key Findings for Asia

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IPCC Fifth Assessment Report Synthesis Report

2nd November 2014
Copenhagen

IPCC AR5 Synthesis Report

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Key Messages

- Human influence on the climate system is clear
- The more we disrupt our climate, the more we risk severe, pervasive and irreversible impacts
- We have the means to limit climate change and build a more prosperous, sustainable future

AR5 WGI SPM, AR5 WGI SPM, AR5 WGI SPM

Asia

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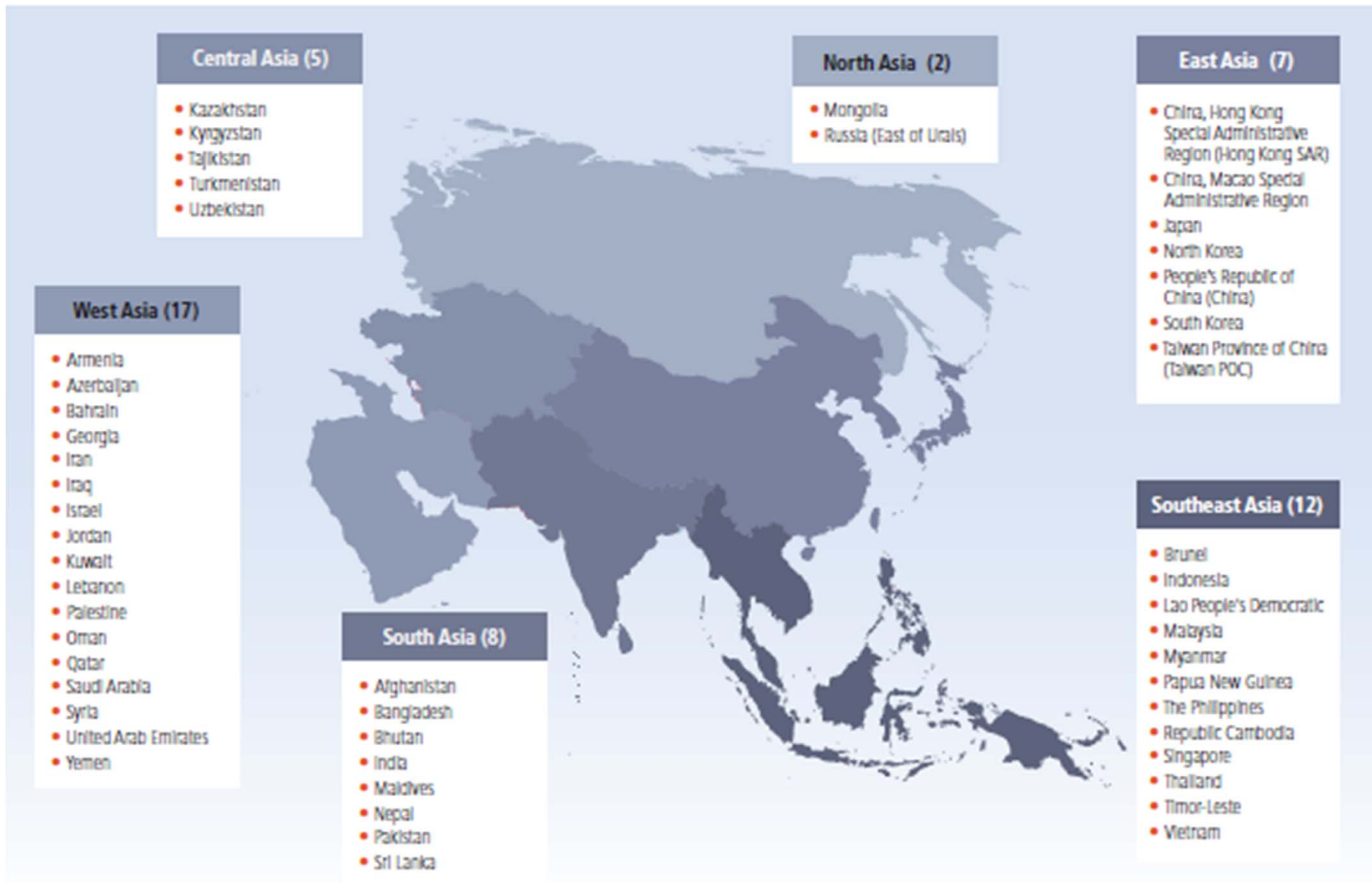
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Chapter 24, Asia: Coverage - 51 countries/regions

Source: IPCC, 2013 
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Observations of Past Events

Climate Phenomenon	Asia	Southeast Asia
Heat Waves	It is likely that the frequency of heat waves has increased in large parts of Asia.	No Specific Observations (published in peer reviewed literature)
Drought	There is medium confidence that more megadroughts occurred in monsoon Asia and wetter conditions prevailed in arid Central Asia monsoon region during the Little Ice Age (1450–1850) compared to the Medieval Climate Anomaly (950–1250).	No Specific Observations (published in peer reviewed literature)
Floods	With high confidence, past floods larger than recorded since the 20th century occurred during the past five centuries in eastern Asia. There is medium confidence that in the Near East and India modern large floods are comparable or surpass historical floods in magnitude and/or frequency.	No Specific Observations (published in peer reviewed literature)

Future Projections

Source: IPCC, 2013



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Climate Phenomenon	Asia	Southeast Asia
Precipitation	Future increase in precipitation extremes related to the monsoon is very likely in East Asia, South Asia and Southeast Asia.	Future increase in precipitation extremes related to the monsoon is very likely in Southeast Asia.
	Indian monsoon rainfall is projected to increase. For the East Asian summer monsoon, both monsoon circulation and rainfall are projected to increase.	There is low confidence in projections of future changes in the Madden-Julian Oscillation due to the poor skill in model simulations of this intraseasonal phenomenon and the sensitivity to ocean warming patterns. Future projections of regional climate extremes in Southeast Asia are therefore of low confidence.
		Reduced precipitation in Indonesia in Jul-Oct due to pattern of Indian Ocean warming (RCP 4.5 or higher end scenarios)
El Niño-Southern Oscillation	Natural modulations of the variance and spatial pattern of El Niño-Southern Oscillation are so large that confidence in any projected change for the 21 st century remains low. Confidence is low in changes in climate impacts for most of Asia.	Low Confidence in any projected change for the 21 st century.

Sea Level Rise (IPCC 2013)

Source: IPCC, 2013

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- Projected climate change (based on RCPs) in AR5 is similar to AR4 in both patterns and magnitude, after accounting for scenario differences.
- Projections of global mean sea level rise has increased in confidence since the AR4 because of the improved physical understanding of the components of sea level, the improved agreement of process-based models with observations, and the inclusion of ice-sheet dynamical changes.
- Global mean sea level will continue to rise during the 21st century. Under all RCP scenarios the rate of sea level rise will *very likely* exceed that observed during 1971–2010 due to increased ocean warming and increased loss of mass from glaciers and ice sheets.

Sea Level Rise (IPCC 2013)

Source: IPCC, 2013

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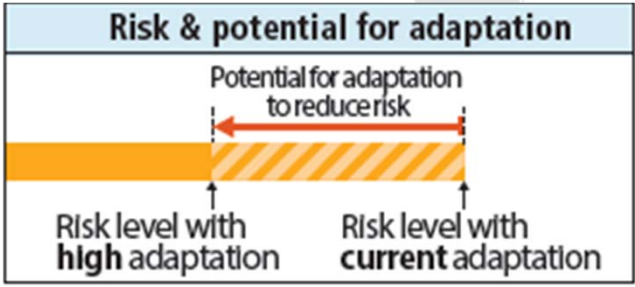
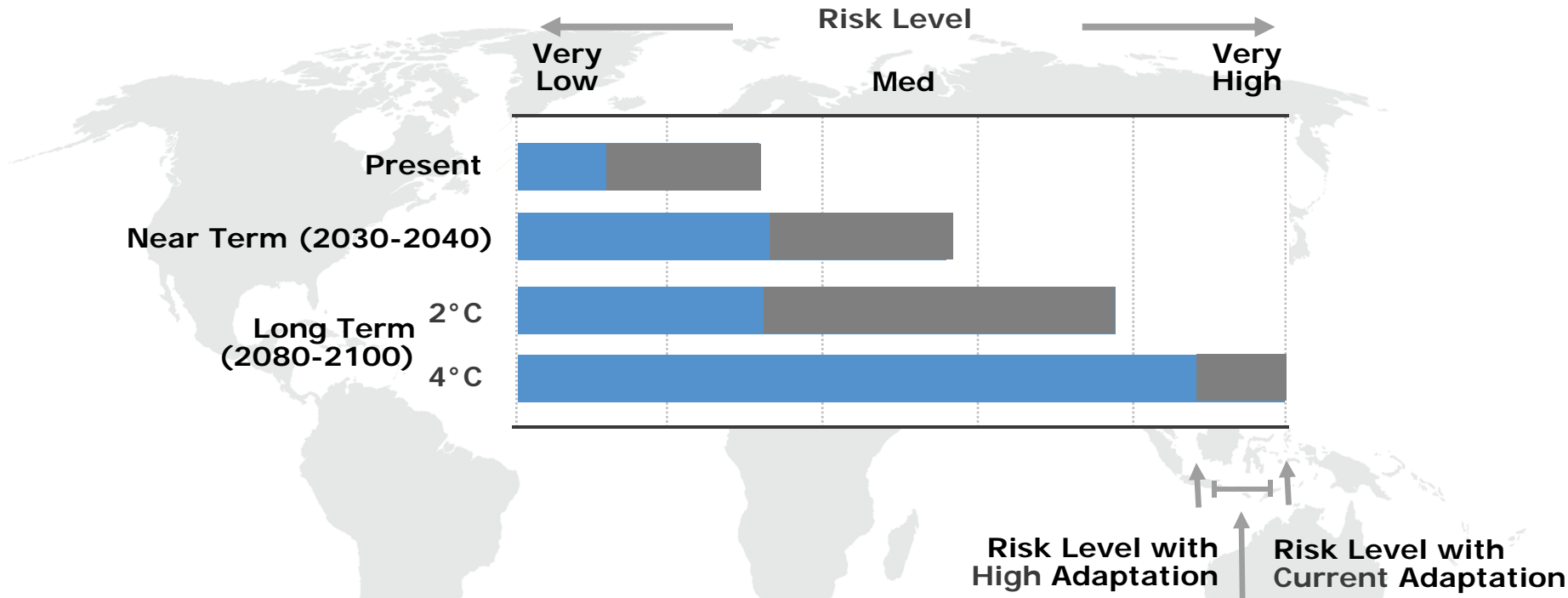
Global mean sea level rise for 2081–2100 relative to 1986–2005 will *likely* be in the following ranges:

- 0.26 to 0.55 m (RCP2.6)
- 0.32 to 0.63 m (RCP4.5)
- 0.33 to 0.63 m (RCP6.0)
- 0.45 to 0.82 m (RCP8.5)

Sea level rise will not be uniform. By the end of the 21st century, it is *very likely* that sea level will rise in more than about 95% of the ocean area.

About 70% of the coastlines worldwide are projected to experience sea level change within 20% of the global mean sea level change.

Assessing risk



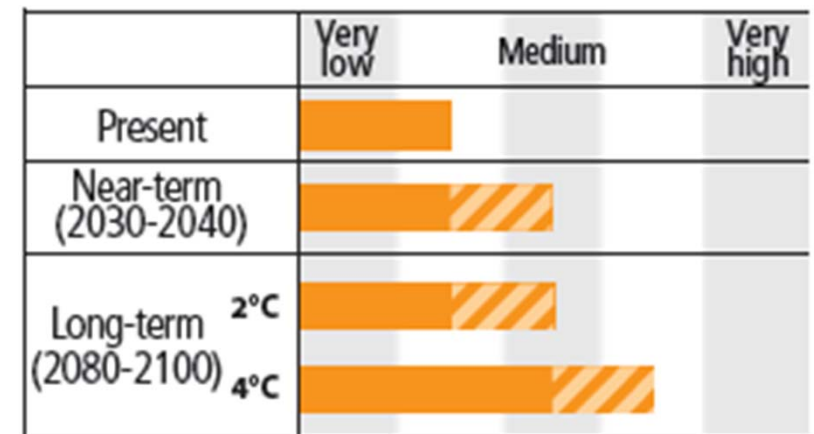
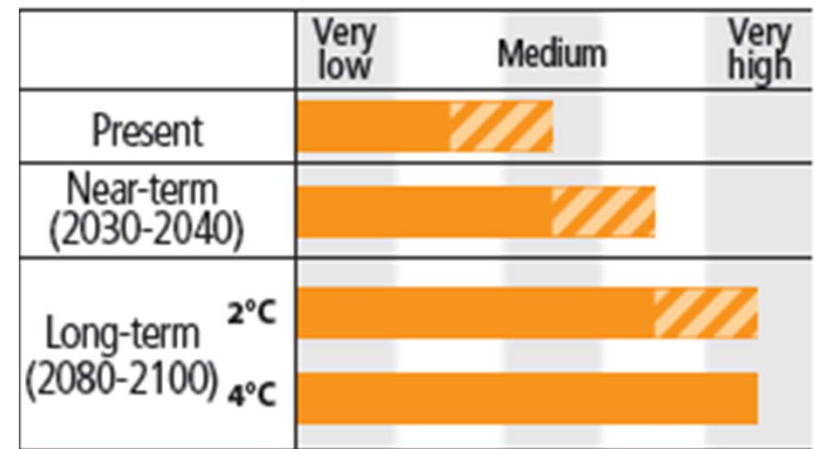
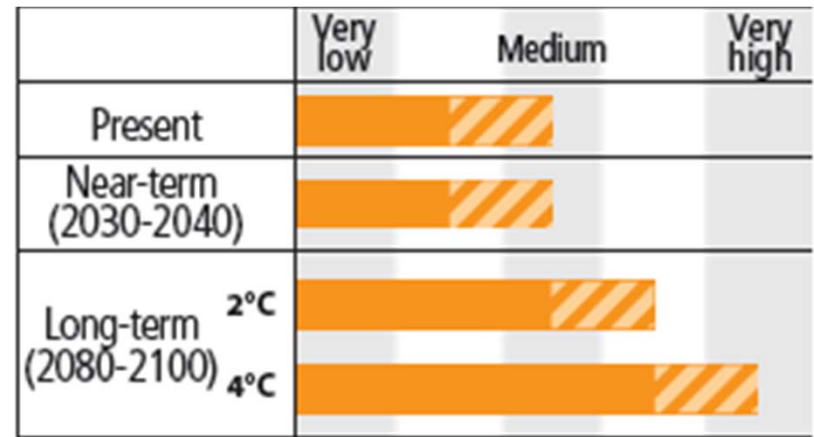
Potential for Additional Adaptation to Reduce Risk

Key Risks in Asia

Increased coastal, riverine and urban flooding leading to widespread damage to infrastructure and settlements in Asia (medium confidence)

Increased risk of heat-related mortality (high confidence)

Increased risk of drought-related water and food shortage causing malnutrition (high confidence)



Key Risks in Asia

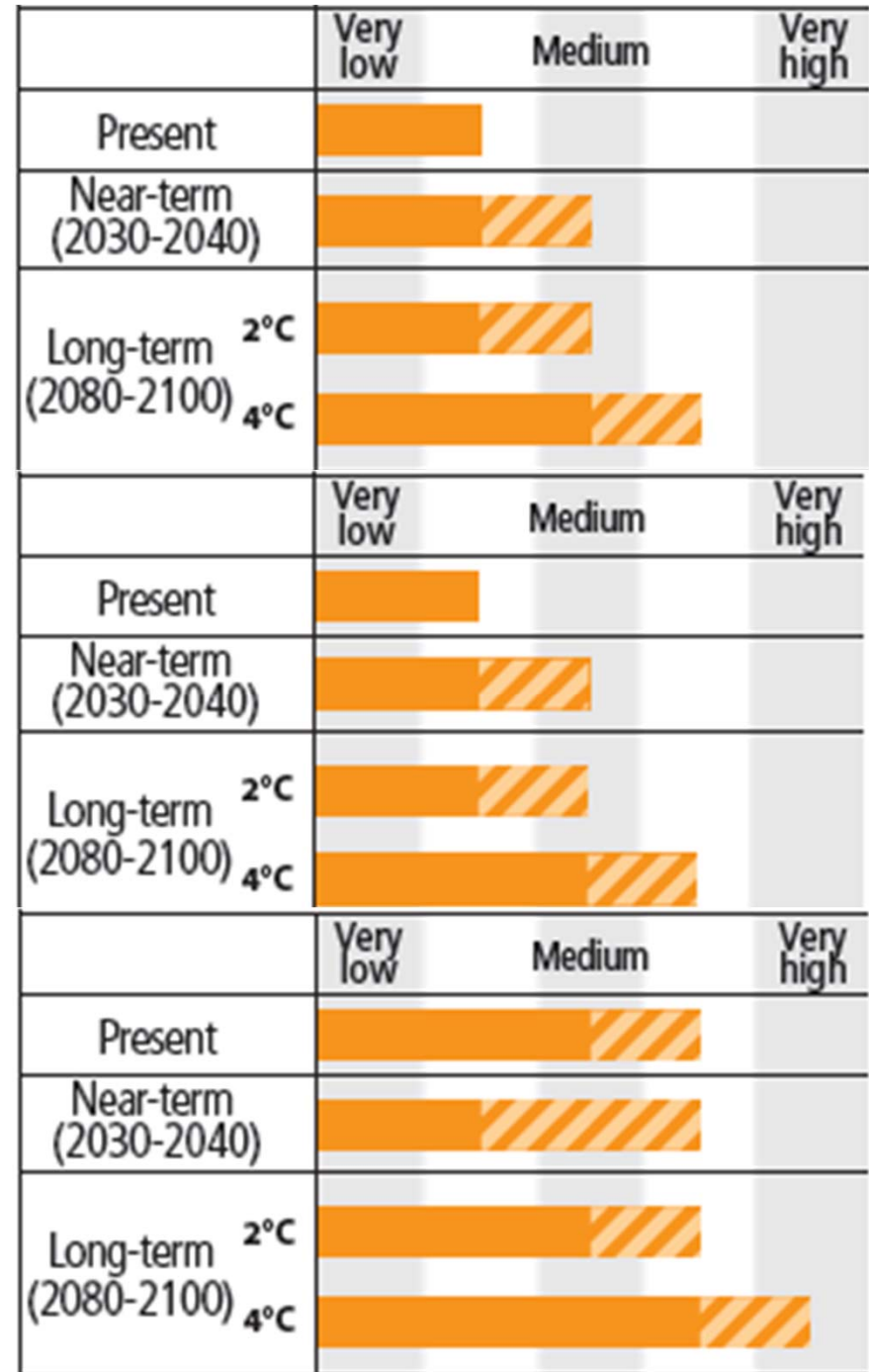
Increased risk of flood-related deaths, injuries, infectious diseases and mental disorders (medium confidence)

Increased risk of water and vector-borne diseases (medium confidence)

Exacerbated poverty, inequalities and new vulnerabilities (high confidence)

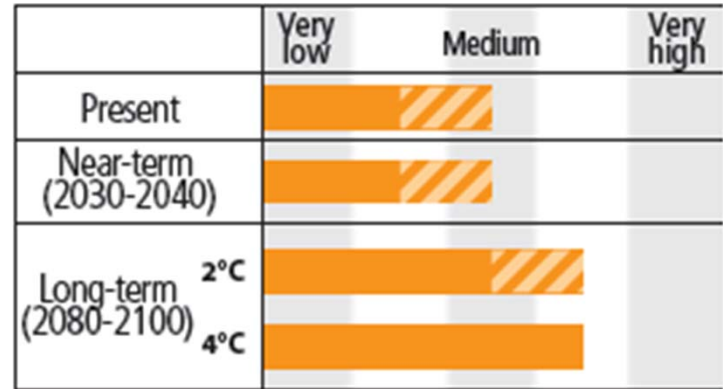
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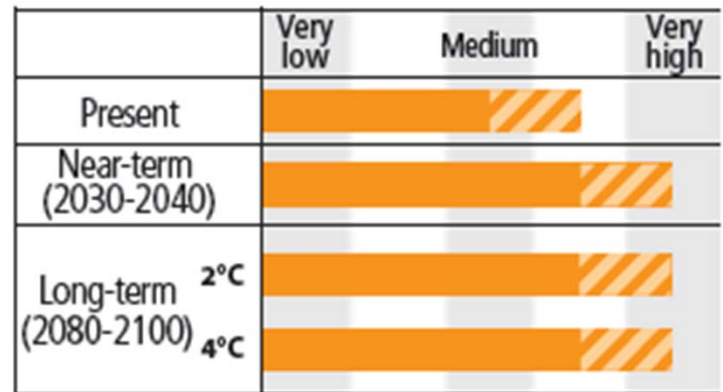


Key Risks in Asia

Increased risk of crop failure and lower crop production could lead to food insecurity in Asia (medium confidence)



Water shortage in arid areas of Asia (medium confidence)



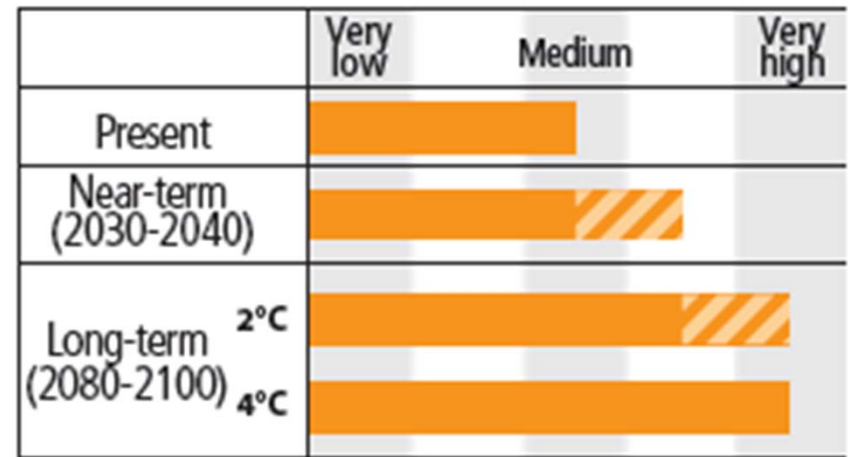
KEY CONCLUSIONS: IPCC-WG2

Chapter 24, Asia

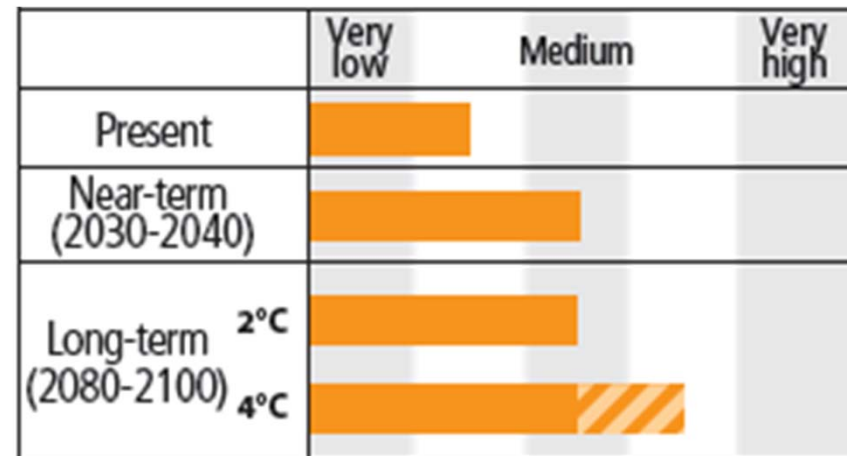
- ❑ Water scarcity is expected to be a major challenge for most of the region due to increased water demand and lack of good management (*medium confidence*)
- ❑ There is *low confidence* in future precipitation projections at a sub-regional scale and thus in future freshwater availability in most parts of Asia.
- ❑ Integrated water management strategies could help adapt to climate change, including developing water saving technologies, increasing water productivity, and water reuse.

Key Risks in Asia

Coral reef decline in Asia (high confidence)



Mountain-top extinctions in Asia (high confidence)



Adaptation is already occurring

- 
- Combining Traditional and Scientific Knowledge
 - Adapting Communications Infrastructure
 - Coastal & Water Management
 - Environmental Protection & Land Planning
 - Disaster Risk Management
 - Municipal-Level Actions
 - Adapting Energy & Public Infrastructure
 - Development Planning
 - Early Warning Systems
 - Mangrove Reforestation
 - Water Resources Management
 - Disaster Risk Management
 - Basic Public Health
 - Livelihood Diversification
 - Ecosystem-Based Adaptation
 - Water Resources Management
 - Resilient Crop Varieties
 - Planning for Sea-Level Rise
 - Planning for Reduced Water Availability
 - International Cooperation
 - Marine Spatial Planning

Effective risk management and adaptation are tailored to local and regional needs and circumstances

- **Changes in climate extremes vary across regions**
- **Each region has unique vulnerabilities and exposure to hazards**
- **Effective risk management and adaptation address the factors contributing to exposure and vulnerability**



Source: IPCC, 2012

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Impacts of climate extremes can be felt locally or regionally

Source: IPCC, 2012 
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AGRICULTURE

“Mongolian herdsman face starvation”

March 14, 2000, BBC World News

ENERGY

“Heatwave hits French power production”

August 12, 2003, The Guardian

WATER

“Drought returns to haunt Ethiopia”

May 19, 2008, Reuters

PUBLIC HEALTH

“Cholera confirmed in Pakistan flood disaster”

August 14, 2010, Associated Press

TOURISM

“Alpine resorts feel heat during record warm spell”

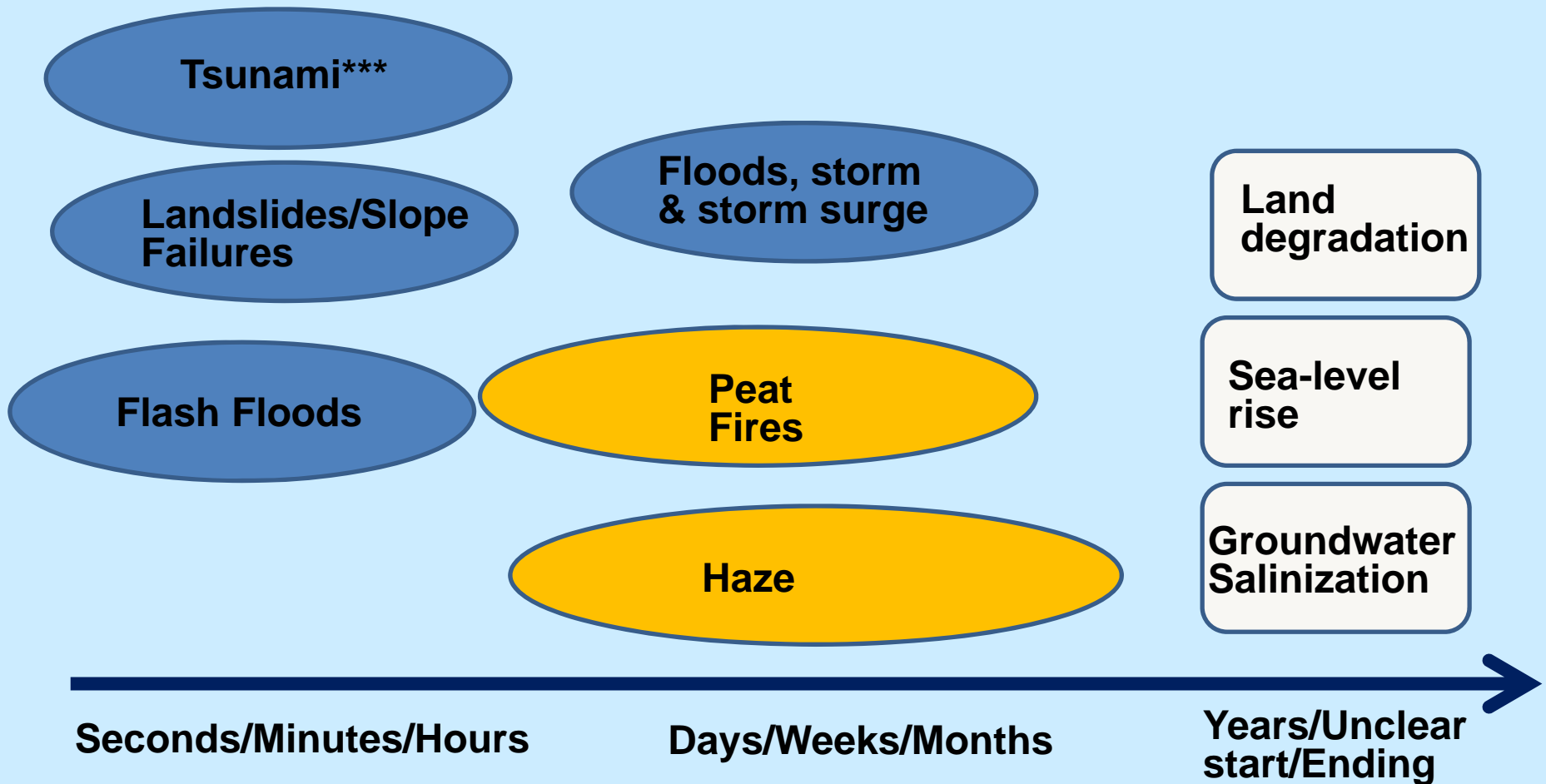
December 08, 2006, CNN World News

TRANSPORTATION

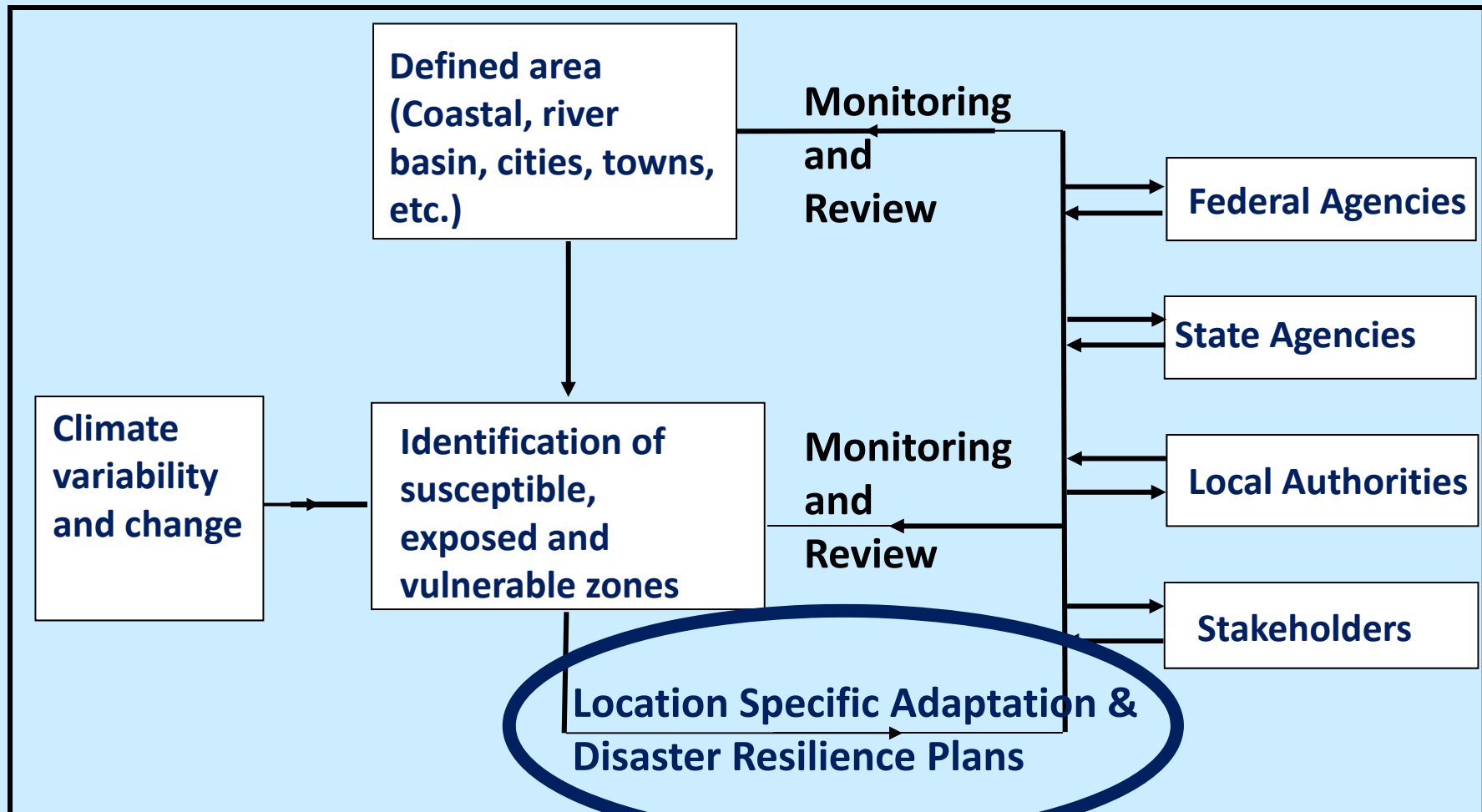
“Flash flooding causes train to derail”

July 30, 2001, Chicago Sun Times

Fast & Slow Onset Events



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

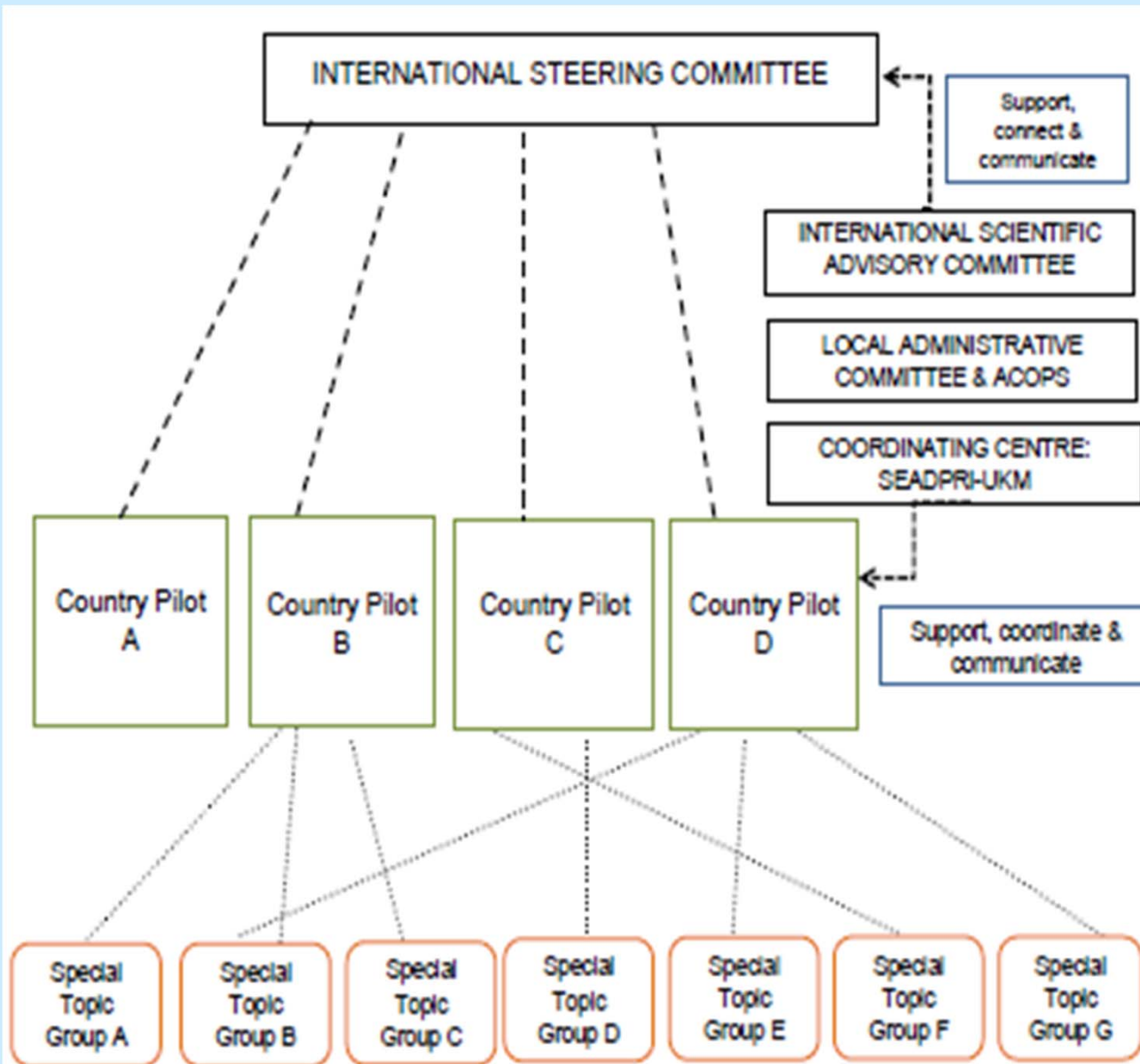


Challenges in Mobilizing Science and Technology

- **Availability of data; limited data sets on weather related natural disasters and regional climate change**
- **Limited access to scientific data in many sub-regions, particularly at the national level.**
- **Incomplete and non-existent scientific records; usually of limited use for modelling and accurate prediction.**
- **Limited use of data from geological, archaeological, social and historical studies to provide longer records and provide valuable insights into past impacts.**
- **Greater capacity to innovate and transmit S&T; ASEAN Initiative has commenced, led by SEADPRI-UKM.**
- **Networking among researchers and academics; Asian Network on Climate Change Research was established, coordinated by SEADPRI-UKM, with support from CMEDT/MCSC, University of Cambridge**

Asian Network on Climate Science & Technology (ANCST)

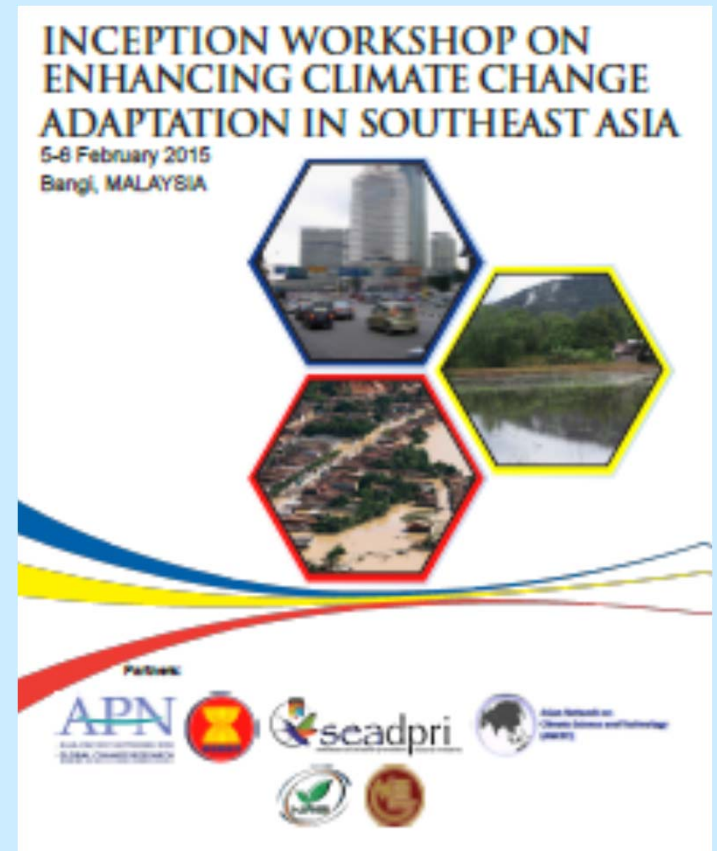
Organisation & Special Topics: [<http://www.ancst.org/>]



- (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



CONCLUDING REMARKS

- **Networking among researchers, academics and practitioners of multidisciplinary background is critical for advancing science, technology & innovation in DRR and CCA.**
- **Communication among policy and decision-makers (at all levels), and with researchers and academics is critical for building capacity as well as developing policy relevant tools and techniques.**
- **Availability and access to data is a challenge, limited use of data from geological, archaeological, social and historical studies.**
- **DRR and CCA as an iterative process using the best available science; combine top-down and bottom-up approaches, participation of all stakeholders, and community engagement should be a priority.**
- **Future lies in collaborative research with an area-based approach:
AREA BASED DISASTER RESILIENCE PLAN**

<http://www.ancst.org>

Terima Kasih!



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