Science-Based Action for Climate Change Adaptation

Gordon McBean CM, OOnt, PhD, FRSC
Chair, Policy, Institute for Catastrophic Loss Reduction
Professor Emeritus, Department of Geography, Western University

Past-President, International Council for Science (2014-18)
Member, Governing Council, Future Earth: Research for Global Sustainability

Presentation to: ***RACC10***

How to adapt to climate change(s) – face reality and take action
～Resilient Society against Climate Change～
October 6th, 2018

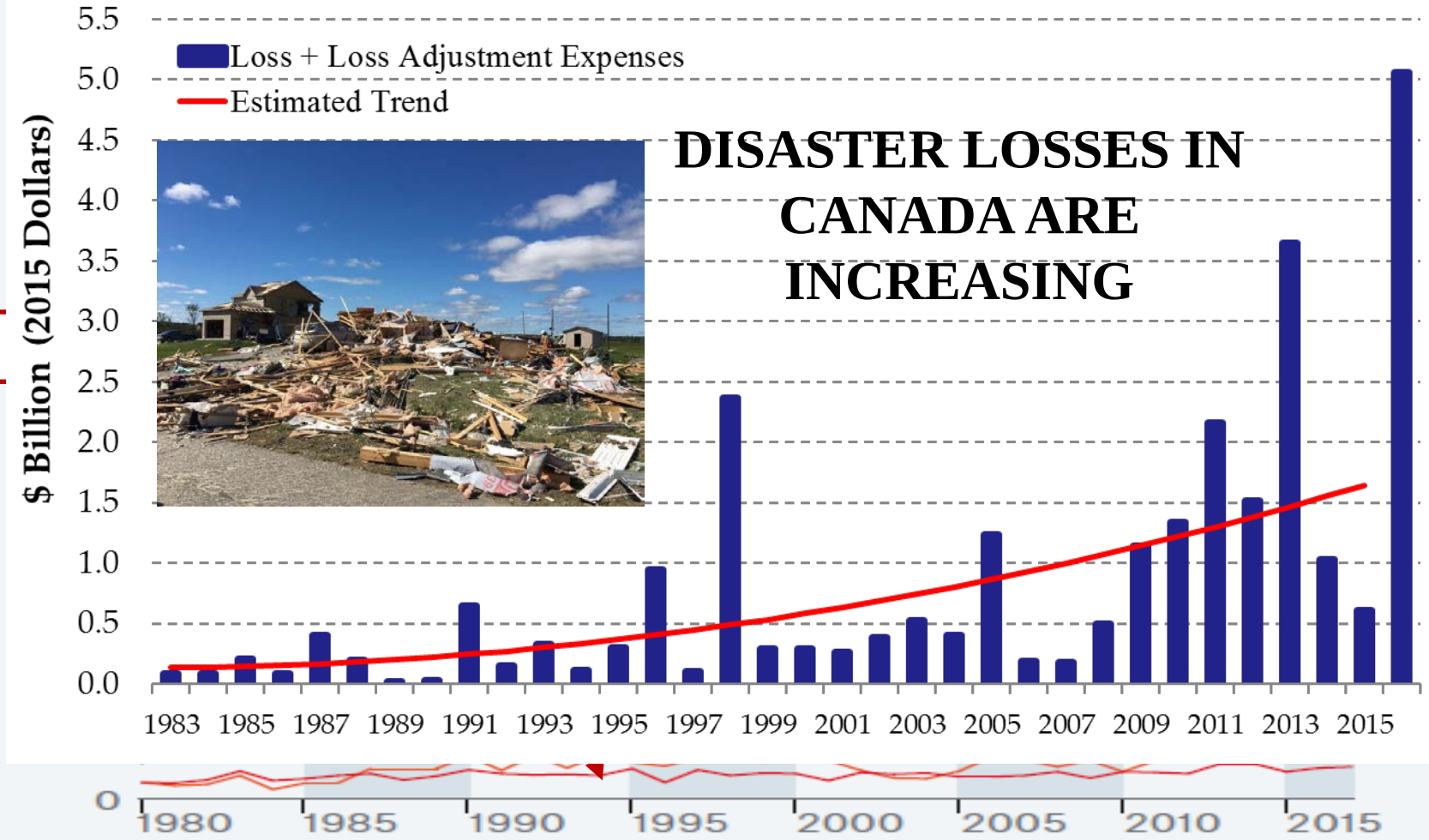
Western UNIVERSITY · CANADA

Institute for Catastrophic Loss Reduction
Institut de Prévention des Sinistres Catastrophiques

MEOPAR
MARINE ENVIRONMENTAL OBSERVATION PREDICTION & RESPONSE NETWORK

STS forum
環境省 Ministry of the Environment
文部科学省 MEXT
National Institute for Environmental Studies, Japan
IGES Institute for Global Environmental Strategies
RIHN
JAMSTEC

THE NUMBER OF "NATURAL" CATASTROPHES IS INCREASING



NatCatSERVICE, Munich Re, 2017

World Econom n - G 8

Societal

Biodiversity Loss and Ecosystem Collapse

Water crises

Failure of climate change mitigation and adaptation

Extreme Weather Events

Spread of infectious diseases

Natural Disasters

Large-scale involuntary migration

Food crises

Human-made Environmental Disasters

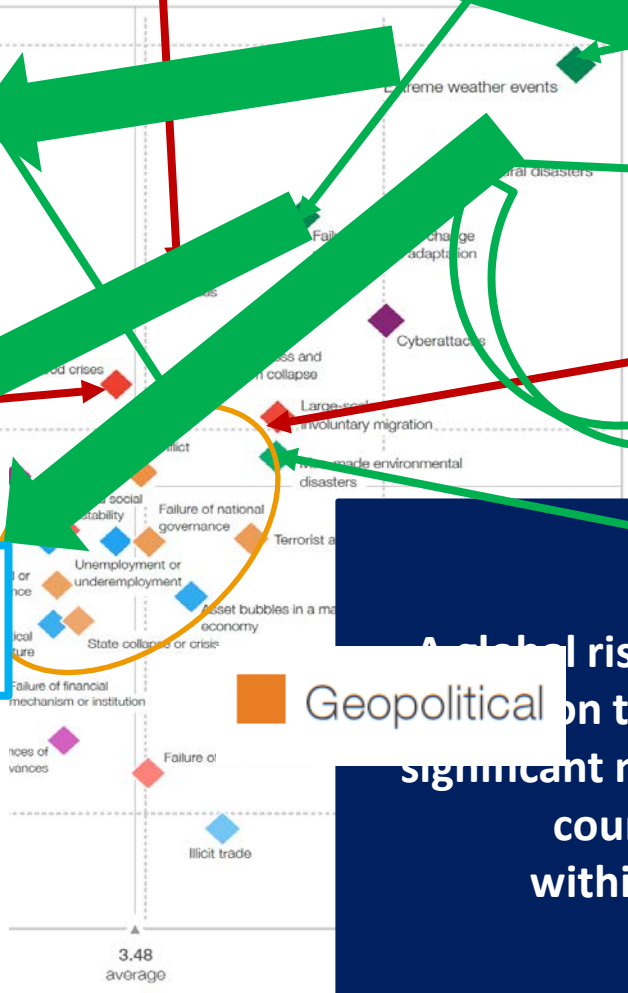
Failure of Critical Infrastructure

Geopolitical

Economic

Environmental

A global risk is a … on that, if it … significant negati… countries within the next 10 years.



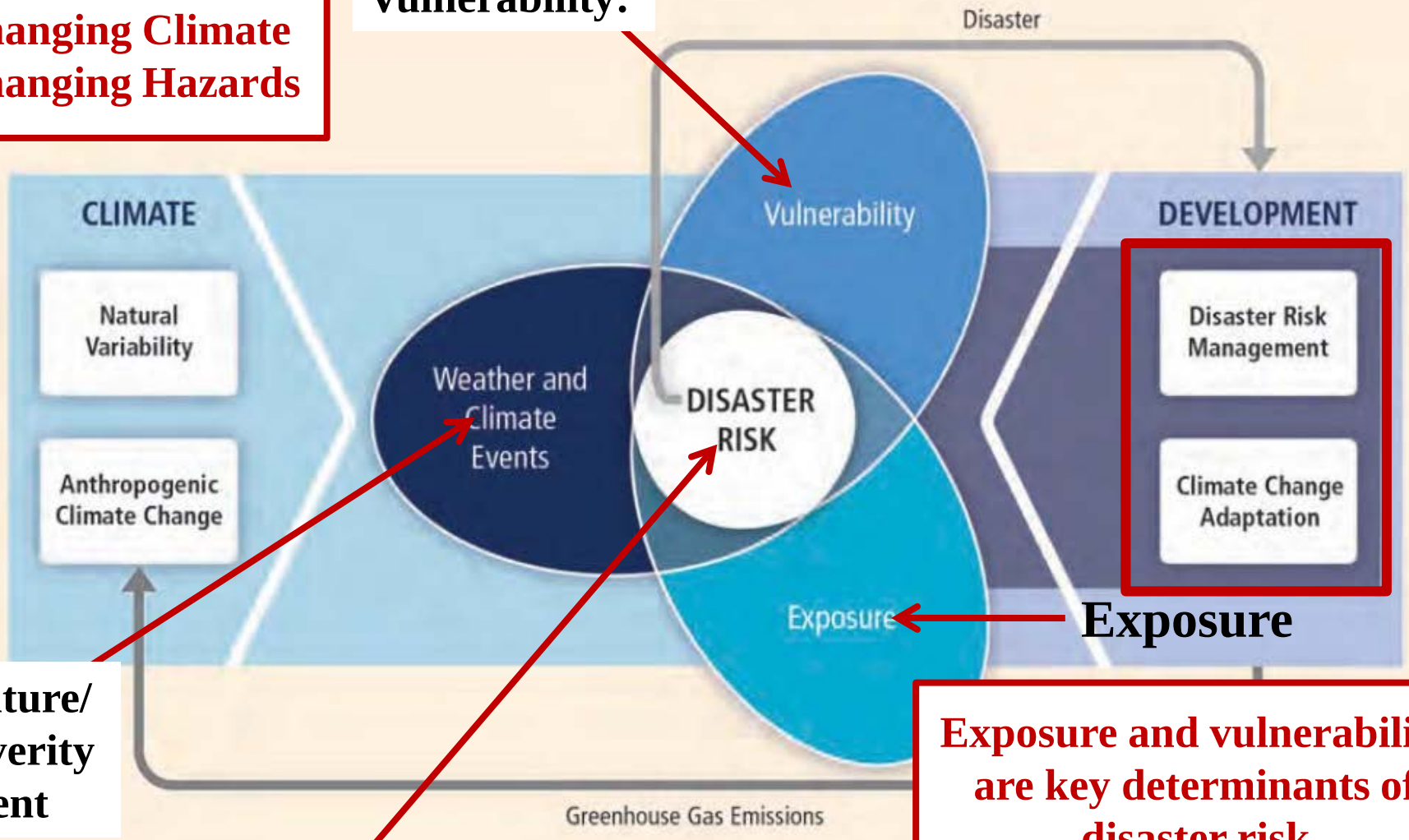
Impact

HIGH

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Changing Climate Changing Hazards

Vulnerability:



Exposure

Nature/ severity event

Exposure and vulnerability are key determinants of disaster risk

<u>Disaster Risk</u>: the likelihood of severe alterations in the normal functioning of a community or society due to <u>hazard</u> events interacting with <u>vulnerable social conditions</u>

GLOBAL AGENDA 2030

Climate Convention CoP21 Paris, 2015

Article 2 1. This Agreement, .. aims to strengthen the global response to .. threat of climate change, .. context of sustainable development and efforts to eradicate poverty:

(a) Holding the increase .. global average temperature to well below 2 °C above pre-industrial levels and pursuing .. Limit .. to 1.5 °C .., significantly reduce the risks and impacts of climate change; MITIGATION

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; ADAPTATION

Article 7 Parties hereby establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, … sustainable development and ensuring an adequate adaptation …

Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems,

The process to formulate and implement NATIONAL ADAPTATION PLANS;

GLOBAL AGENDA 2030

Sendai Framework for Disaster Risk Reduction 2015-2030

UN World Conference on Disaster Risk Reduction 2015 Sendai Japan

Lead - S&T Major Grp

INTERNATIONAL COUNCIL FOR SCIENCE

The post-2015 development agenda, financing for development, climate change and disaster risk reduction …

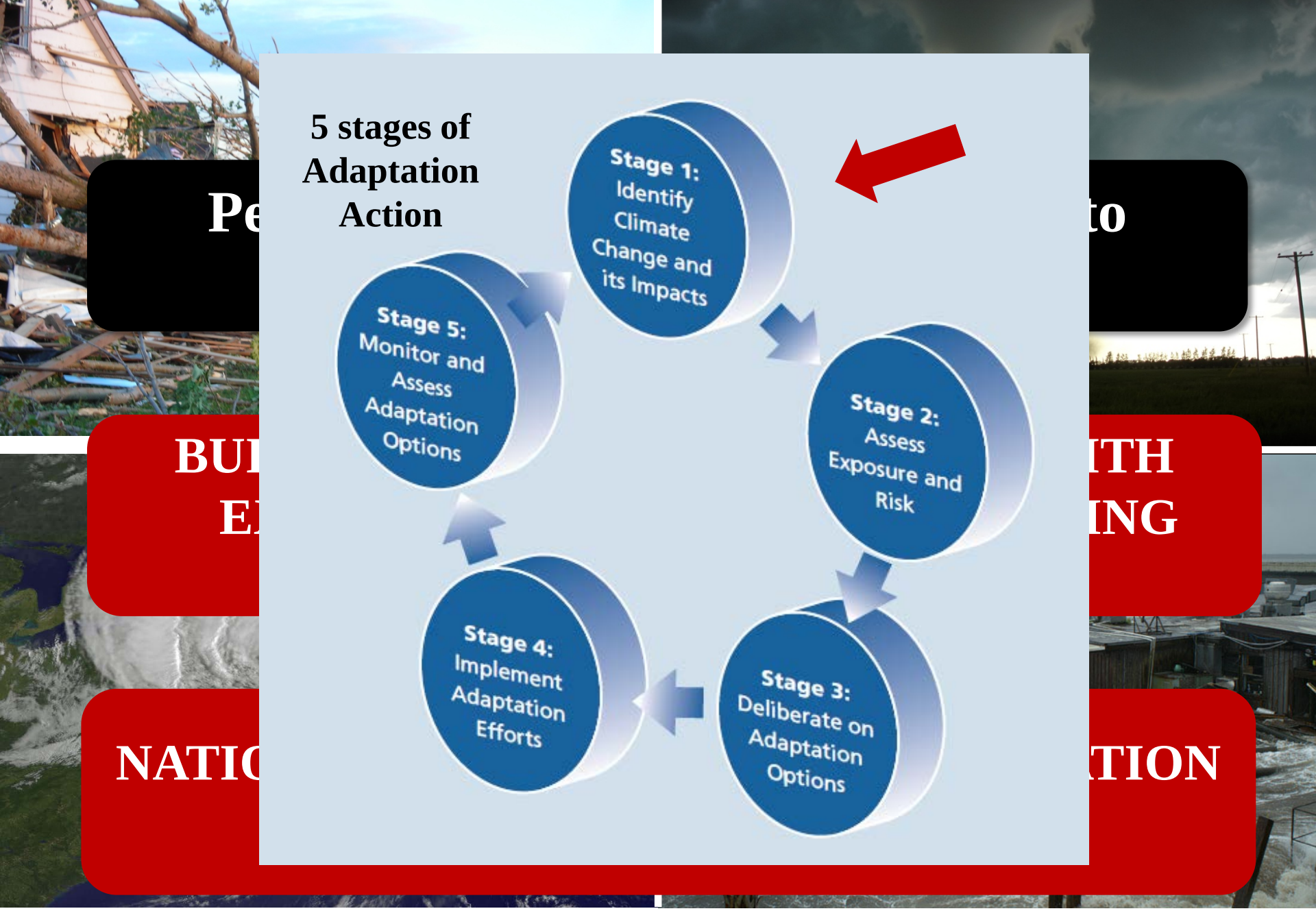
Ensuring credible links, … between these processes will contribute to building re… al of eradicating poverty.” **. …y**

States at local, national, …

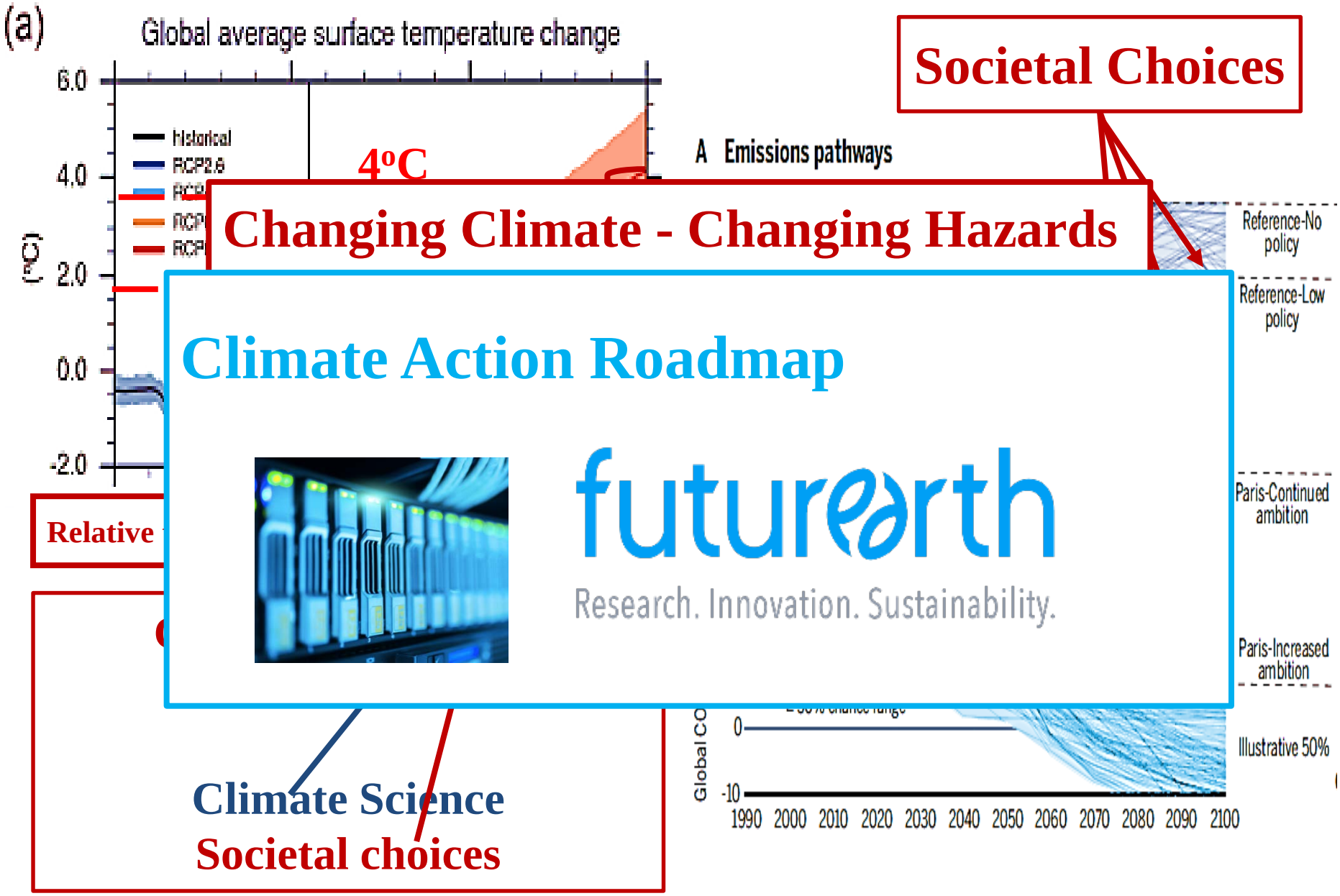
Four priority areas for D…

RISK GOVERNANCE
DISASTER PREPAREDNESS
RESILIENCE
“BUILD BACK BETTER”

1. **Understanding disast…**
2. **Strengthening disaster risk governance to manage disaster risk;**
3. **Investing in disaster risk reduction for resilience;**
4. **Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction.**

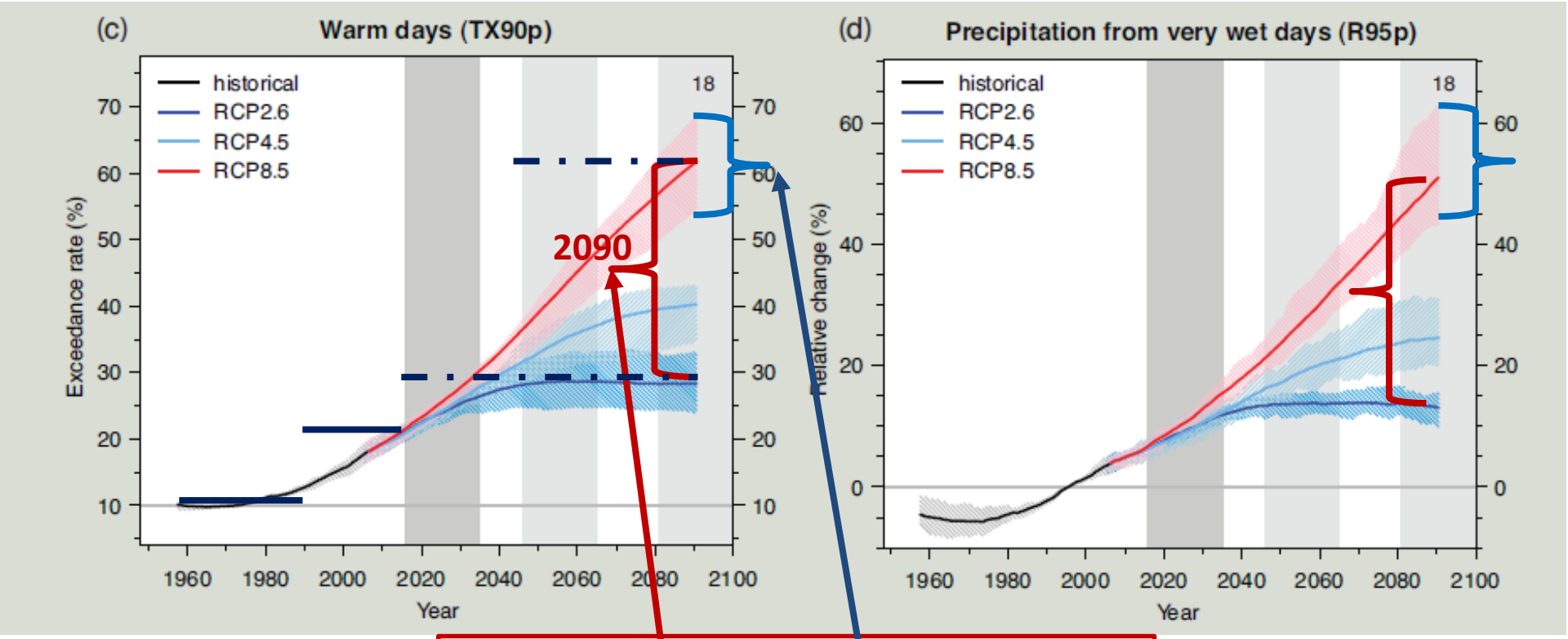

5 stages of Adaptation Action
Stage 1: Identify Climate Change and its Impacts
Stage 2: Assess Exposure and Risk
Stage 3: Deliberate on Adaptation Options
Stage 4: Implement Adaptation Efforts
Stage 5: Monitor and Assess Adaptation Options

Climate Projections for future



Changing Climate
Changing
Hazards

Hot and Wet Days.



(c) warm days (TX90
air temperature (Tma
(d) very wet day prec
ann

maximum surface
or 1961 to 1990 and
ve to 1986–2005 of
e.

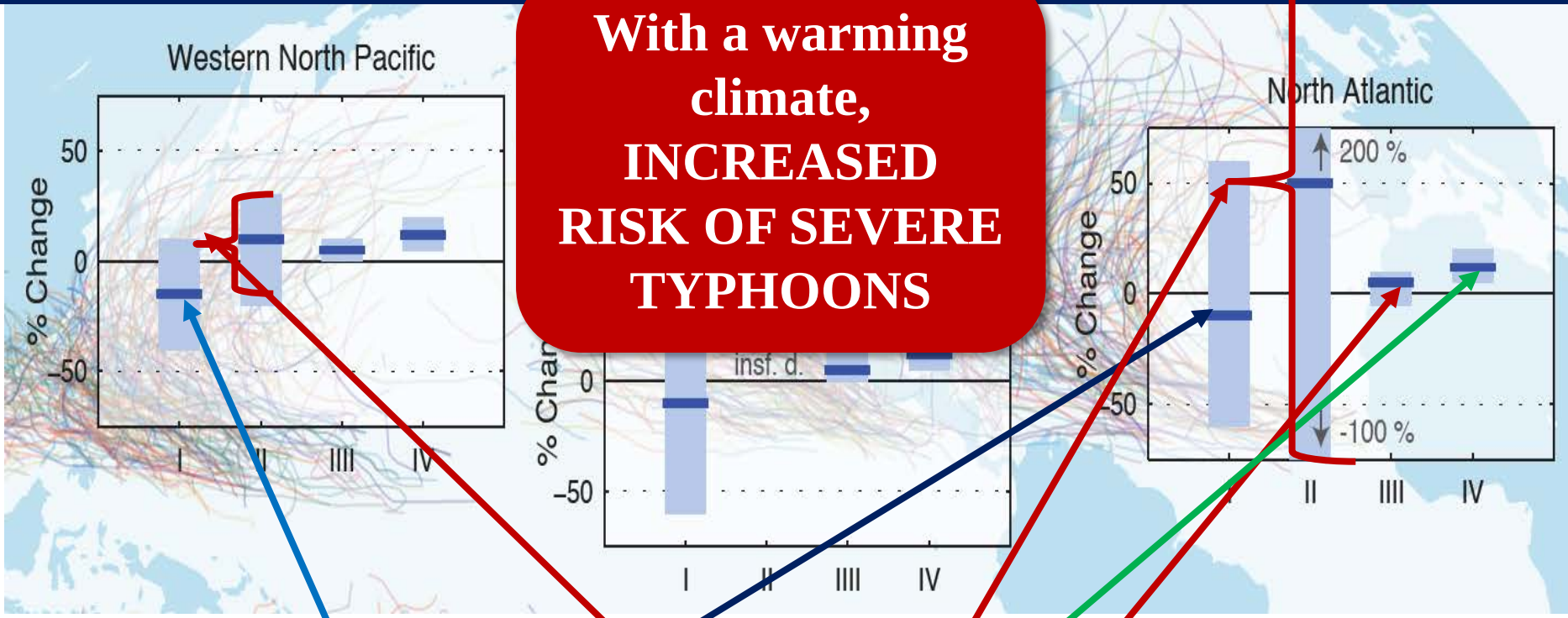
Climate Projections
Uncertainties:

Climate Science
Societal choices

IBC/WBAC

Typhoons – Projections with Climate Change

With a warming climate, INCREASED RISK OF SEVERE TYPHOONS



IPCC 2014 Projected changes in tropical cyclone statistics. Expected % change over period 2081–2100 relative to 2000–2019, A1B-like scenario. % in
I) the TOTAL ANNUAL frequency of tropical storms.
II) the annual frequency of CATEGORY 4 AND 5 STORMS,
III) the mean LIFETIME MAXIMUM INTENSITY
IV) the PRECIPITATION RATE within 200 km of storm center at the time of LMI. solid blue line is the best guess of the expected % change. coloured bar = 67%

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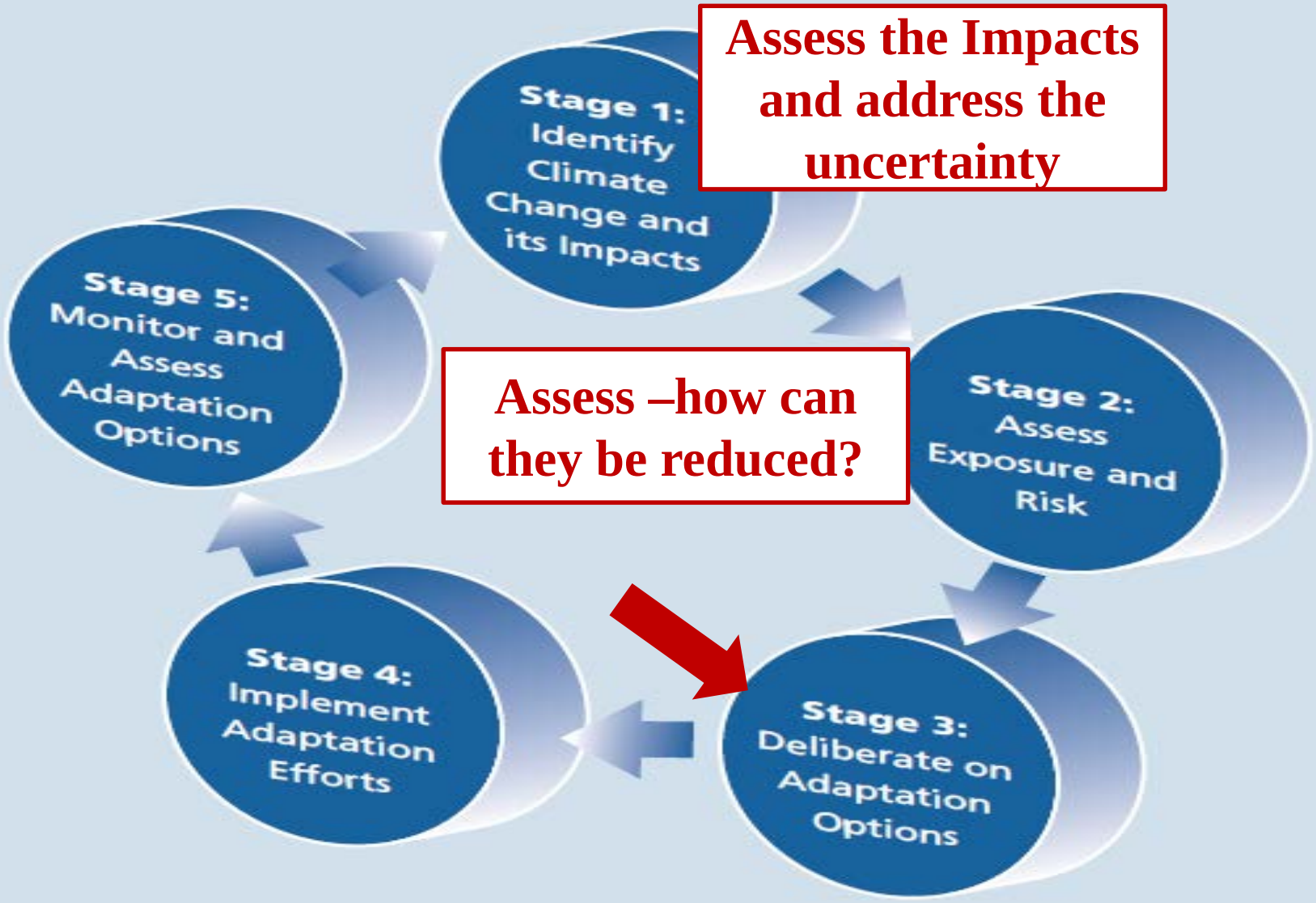


Adap gement
Ap ate

Challenges:

- **Political**
- **Societal**
- **Economic**

IRDR
Integrated Research on Disaster Risk

UN World Conference on
Disaster Risk Reduction
2015 Sendai Japan

Risk Interpretation to Action

Objectives:

1. Science for … hazards, vulnerability and risk
2. Effective decision making … … <u>risk interpretation to action</u>
3. Reducing risk and curbing losses …

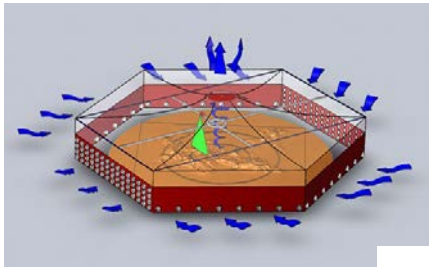
IRDR International Centres of Excellence – ICOE (16)

IRDR
Integrated Research on Disaster Risk

1. Academy of Sciences, Taipei
3. Community Resilience - Joint Centre for Disaster Research, Massey University, New Zealand
6. Risk Interpretation and Action - Centre for Integrated Research on Risk and Resilience (CIRRR), King's College London, UK
7. Disaster Resilient Homes, Buildings and Public Infrastructure – ICLR, Western University, Canada
10. Disaster Risk and Climate Extremes - *Southeast Asia Disaster Prevention Research Initiative, National University of Malaysia*

Adaptation and Resilience – Structural – Protecting Homes

- **Improved observations and predictions**
- **Better structural design of homes and property.**
  - **Correcting ageing infrastructure**
  - **Adjusting behaviour (finished basements)**
  - **Guidebooks for homeowners**
- **Reducing population growth in areas of risk**



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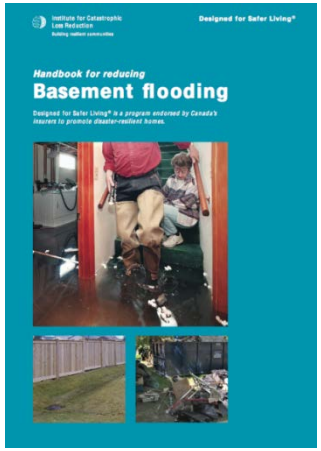
www.iclr.org

Municipal Planning and Standards – implementation, regulation, …



Science Based Action for Climate Change Adaptation

Challenges: political, economic, social, …

Health impacts – a motivating factor

futurearth
Research. Innovation. Sustainability.

URBAN HEALTH AND WELLBEING
A SYSTEMS APPROACH

Weather forecasts for all: Improving access to weather information for women and ethnic minorities

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Stage 5: Monitor and

Stage 4: Implement Adaptation Efforts

Stakeholder Involvement - Co-Design

futurearth
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Knowledge Action Networks

International Science Council

INTERNATIONAL COUNCIL FOR SCIENCE

ISSC international social science council

International Science Council

Math; Physics; Chemistry; Biology; Mechanics; Geology; Anthropology, Geodesy and Geophysics; Geography; Sociology; Psychology; Arctic Social Sciences; Public Opinion; Population; Economics; Political Science; Peace; …

A global voice to advance science as a global public good

- **Mobilizing science for policy and public action on issues of global public concern**
- **Safeguarding the free and responsible practice of science**
- **Co-sponsoring international scientific programmes, networks and committees**

futureearth Research. Innovation. Sustainability.

IRDR Integrated Research on Disaster Risk

WCRP World Climate Research Programme

URBAN HEALTH AND WELLBEING A SYSTEMS APPROACH

START global change SysTem for Analysis, Research and Training

GCOS GLOBAL CLIMATE OBSERVING SYSTEM

Science-Based Action for Climate Change Adaptation

FACE REALITY AND TAKE ACTION