

LSE Cities



The Ove Arup Foundation

LSE Cities public lecture in partnership with Ove Arup Foundation

## From Response to Resilience: the role of the engineer in disaster risk reduction

**Jo da Silva**

*Founding Director, Arup International Development*

**Professor Ricky Burdett**

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LSE events

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# Shifting agendas: response to resilience

## The role of the engineer in disaster risk reduction

The Institution of Civil Engineers 9<sup>th</sup> Brunel International Lecture Series  
London School of Economics - 4<sup>th</sup> June 2013  
Jo da Silva - Director, Arup International Development

> Facts and figures

> An uncertain future

> Shifting agendas

> Future horizons

## > A significant issue

Between 2000 and 2009

**2 billion people**

were affected by natural disasters.

Disaster losses over the last decade averaged almost

**US\$100 billion**

per annum.

Earthquakes caused

**60% of disaster-related deaths**

Between 2000-2009.

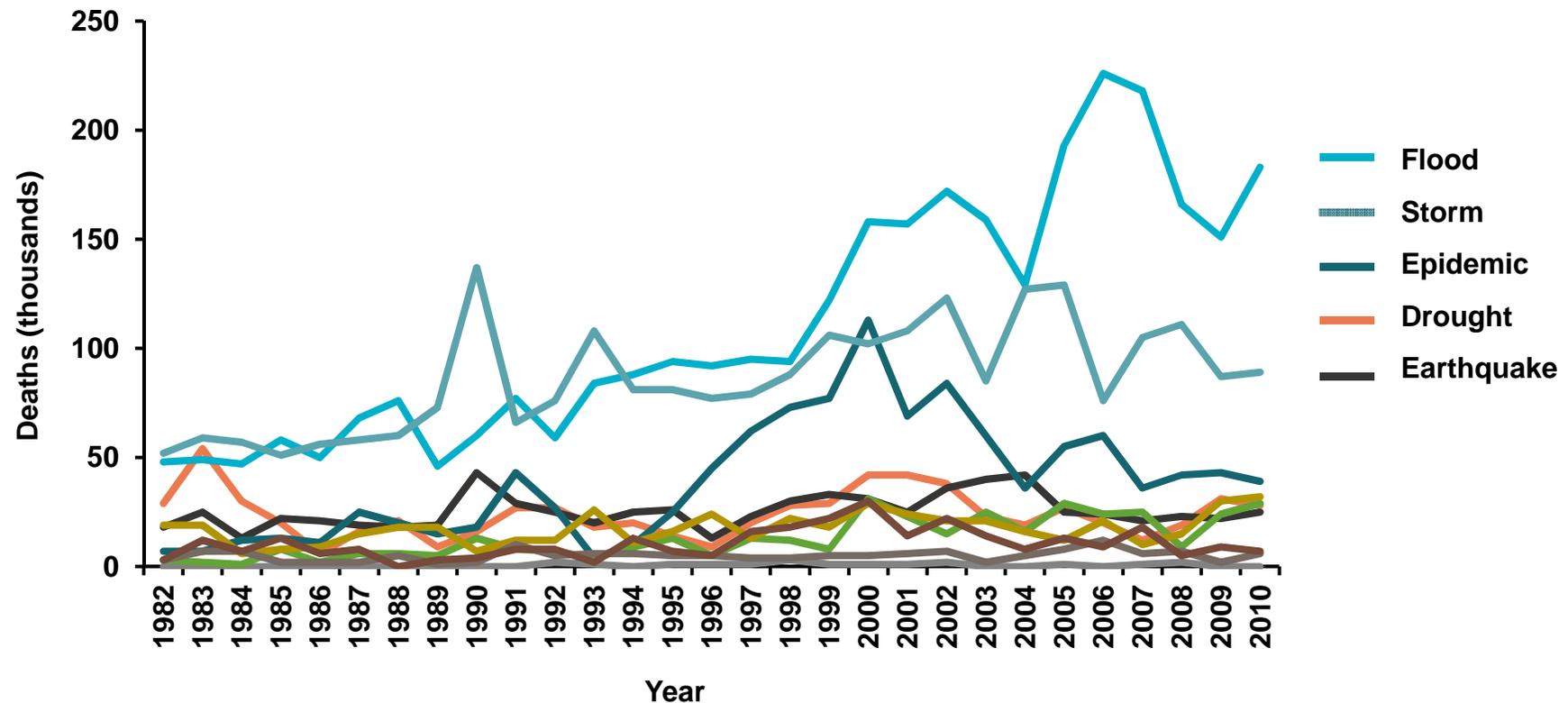
In 2010 floods in Pakistan affected

**12% of the population**

and covered an area the size of Italy.

# > A climatic issue?

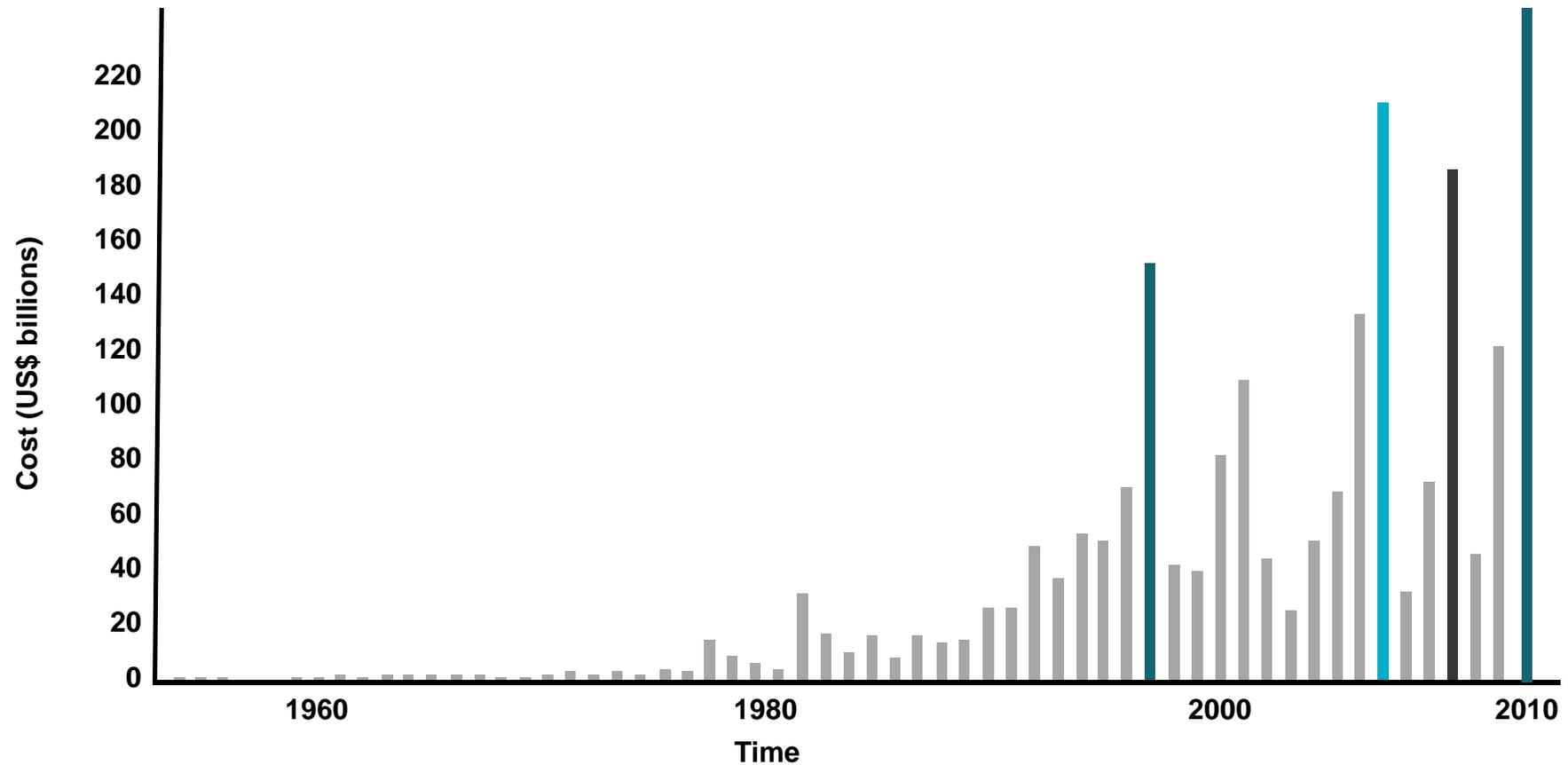
## Disasters since 1982



Source: Guha-Sapir et al. (2010) *Annual Disaster Statistical Review 2010: The numbers and trends*. CRED: Brussels

# > An economic issue

Estimated damage (US\$ billion) caused by reported natural disasters



Source: EM-DAT (2010)

## > A community issue



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## > Future challenges



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## A humanitarian challenge

**‘ a race between the growing size of the humanitarian challenge and our ability to cope; between humanity and catastrophe – and at present, this is not a race we are winning’**

The Humanitarian Emergency Response Review (HERR) DFID: 2011

# An urban challenge



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# Exposure

## Top 20 cities for exposed population for weather related hazards



Source: OCED

# Vulnerability



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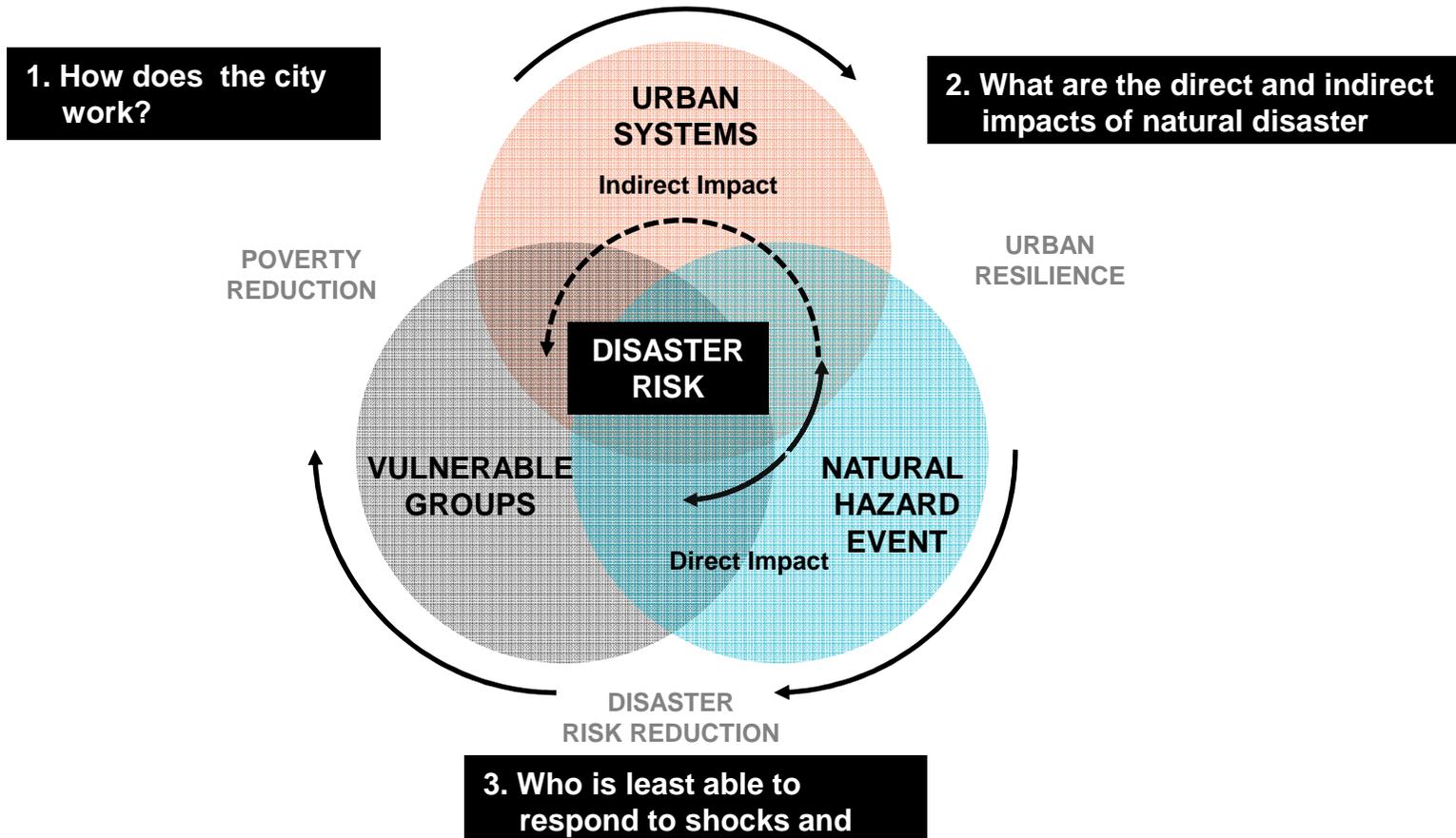
# Poverty



© Arup

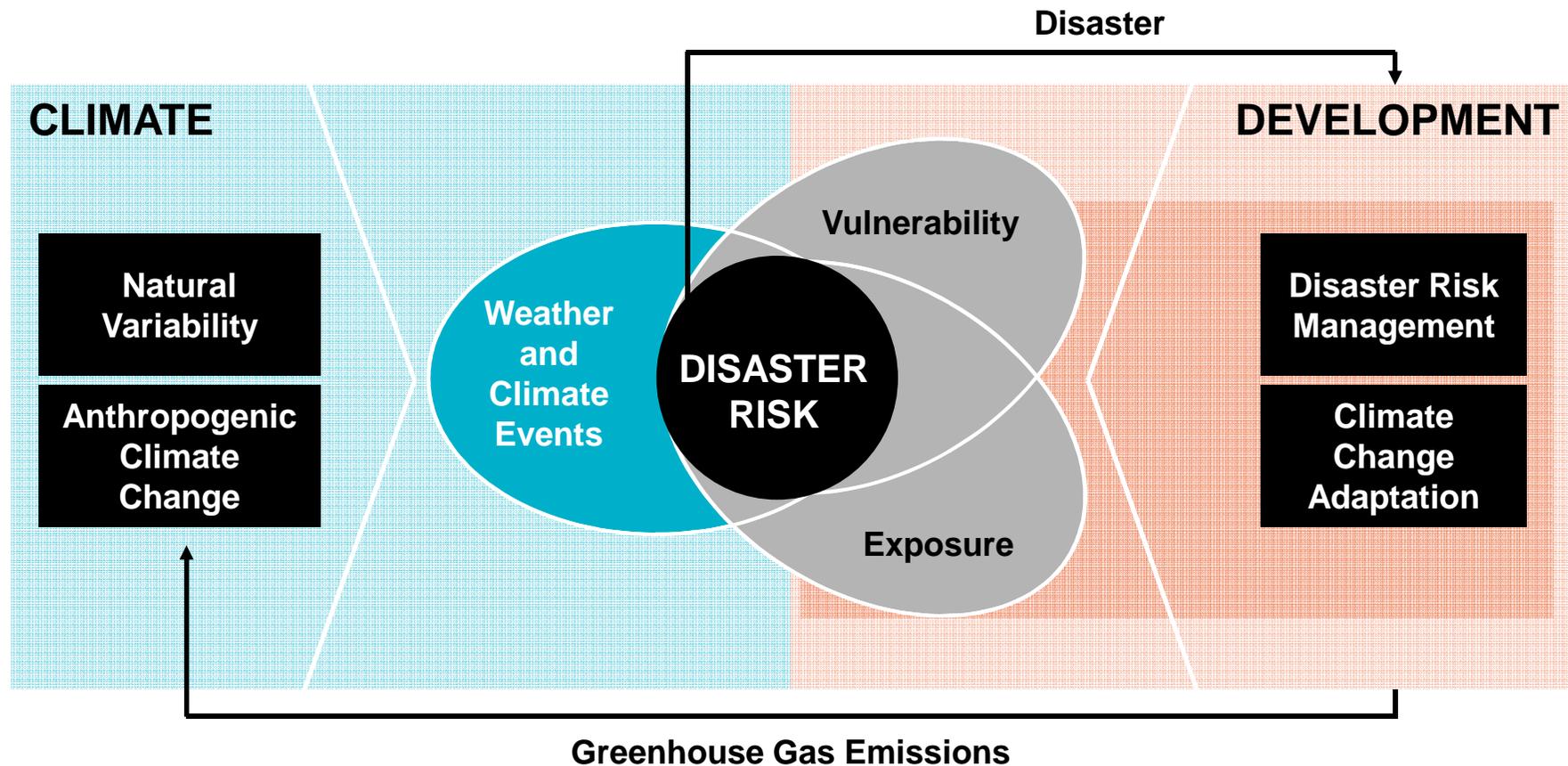
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# Cities > a complexity challenge



Source: da Silva et al. (2012) 'A systems approach to meeting the challenges of urban climate change'. FORTHCOMING.

# Climate change > an uncertainty challenge



Source: IPCC (2012) Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). IPCC: Geneva.



## > Shifting agendas

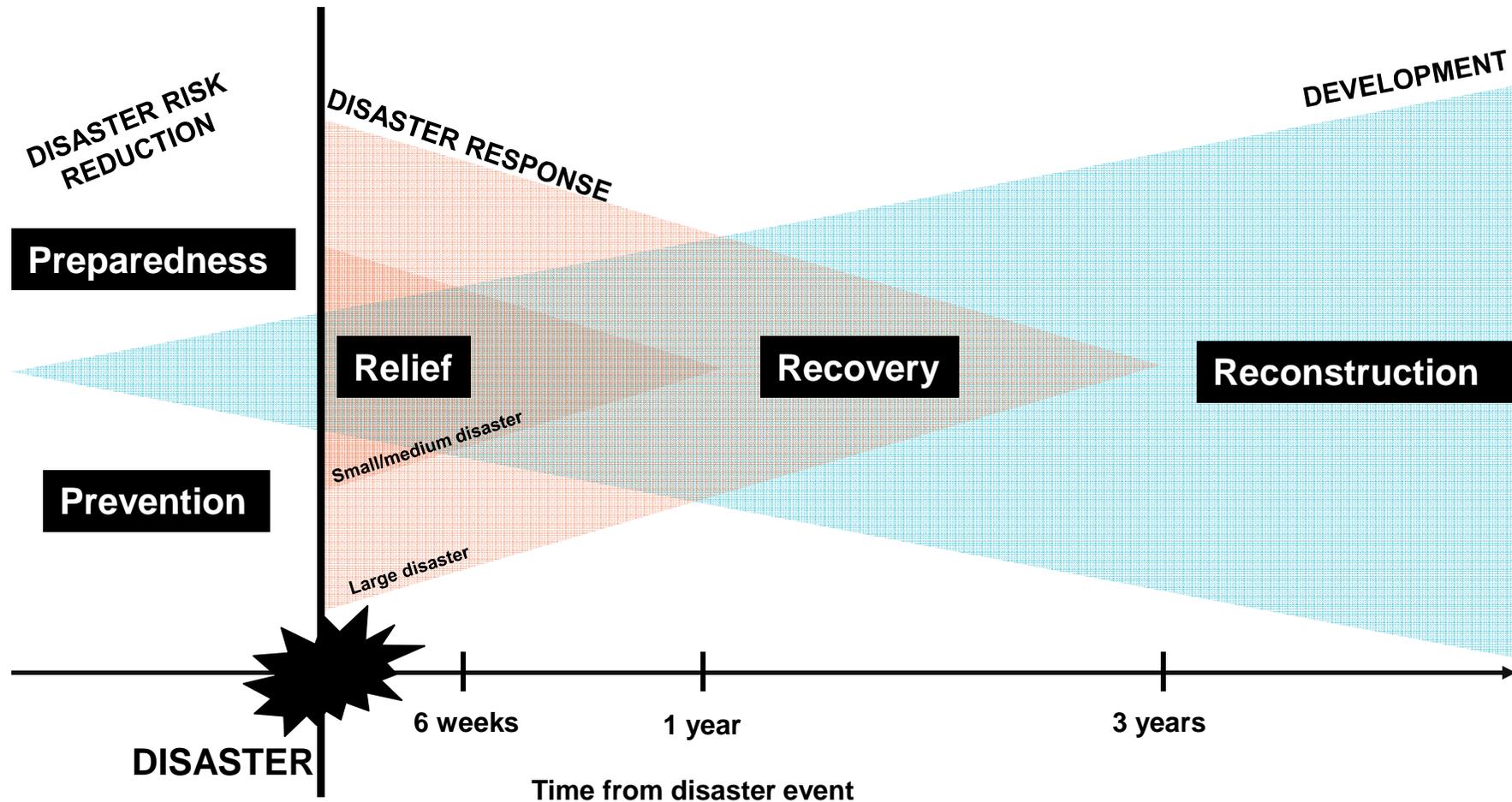


# Haiti > humanitarian + urban



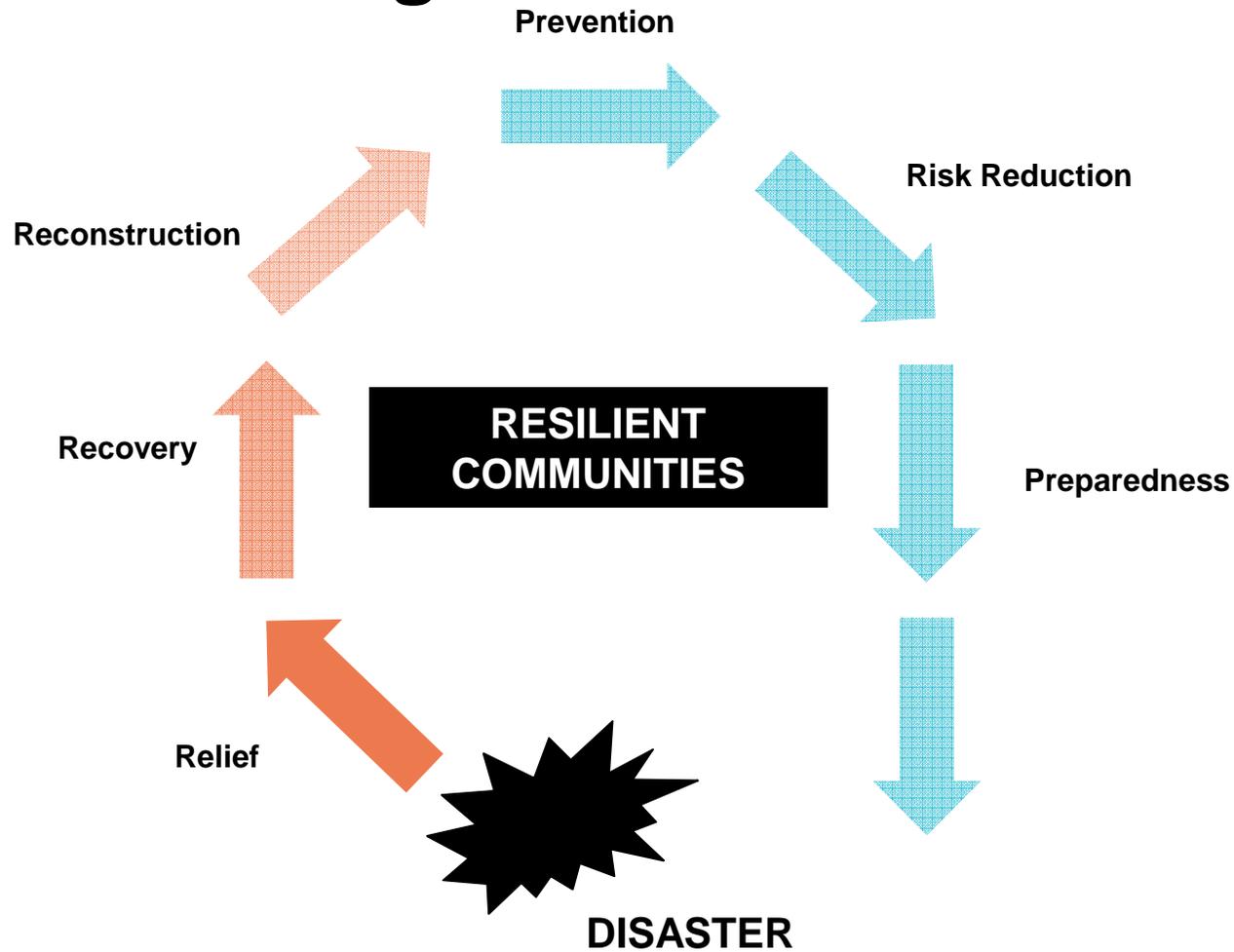
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# Response > reaction



Source: diagram adapted from UNDP Policy on Early Recovery

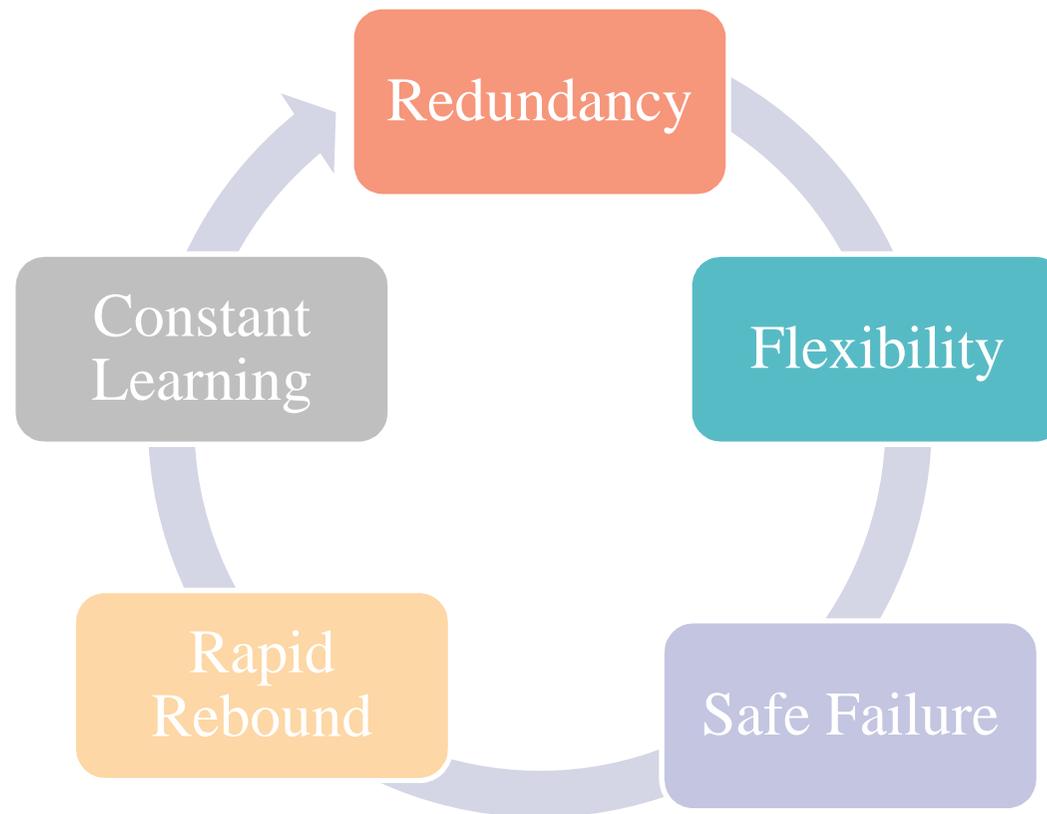
# Resilience > integration



Source: © Arup / Jo da Silva



# Resilient systems



**Resilience** is the ability of a system to withstand shocks and stresses while still **maintaining its essential functions**. Resilient systems are also better able to repair and recover afterwards.

Adapted from: da Silva et al. (2012) 'A systems approach to meeting the challenges of urban climate change' for NYS 2100 Commission.

# Resilient communities



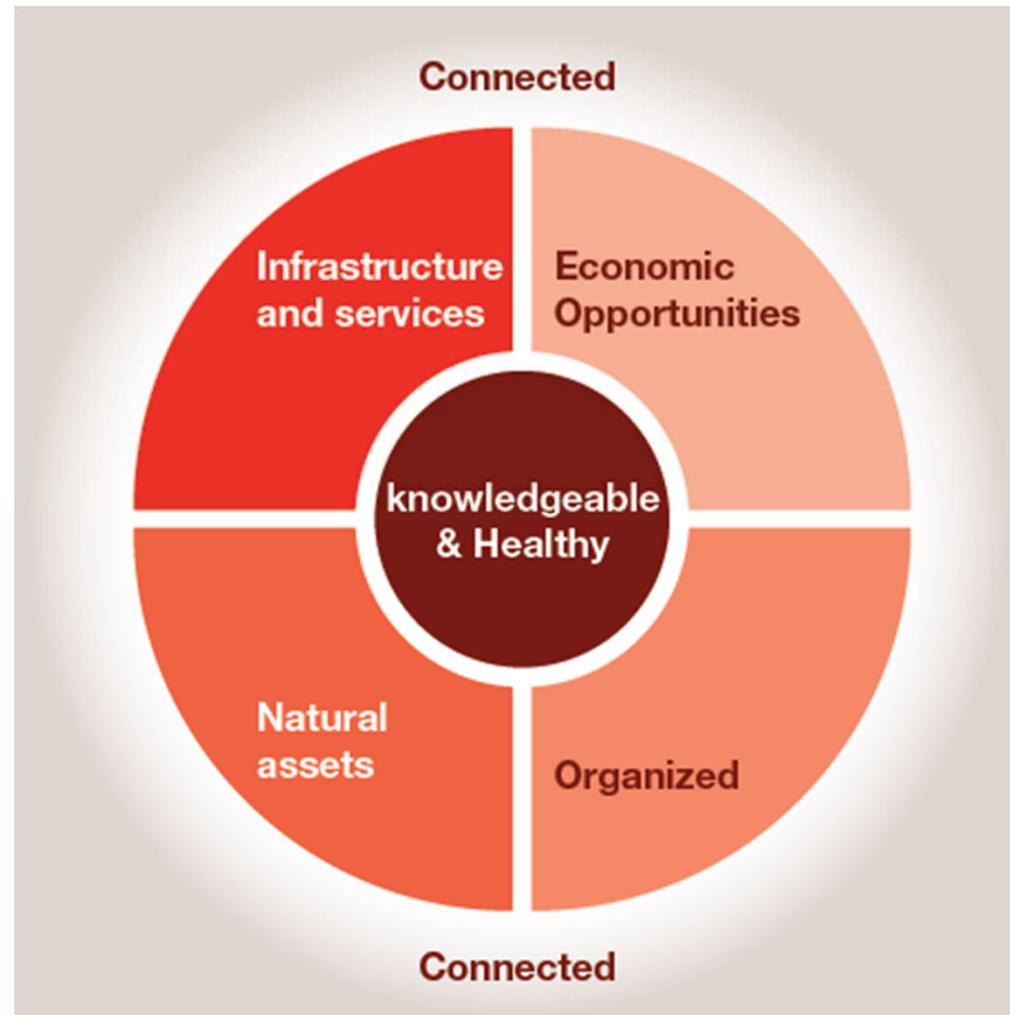
## Characteristics of a Safe and Resilient Community

Community Based Disaster Risk Reduction Study

ARUP International Development - September 2011

ARUP  
Saving lives - changing minds

International Federation  
of Red Cross and Red Crescent Societies



# Building resilience



Asian Cities  
**Climate Change  
Resilience Network**

Through the actions of the Asian Cities Climate Change Resilience Network by 2012  
a network of cities in Asia will have developed robust plans to prepare, withstand  
and recover from climate change impacts.



- Local **champions**
- Diverse **stakeholders**
- Peer-to-peer **knowledge exchange**
- Building on **‘now’ issues**
- Integration into **urban planning and investment**
- Alignment with **national policy**

## > Future horizons

# Hyogo Framework for Action 2005-2015

- Integration of risk reduction in **infrastructure** projects is an area that still requires urgent attention;
- Safer **schools and hospitals** remain a critical priority;
- Addressing '**urban risk**' ('making cities resilient') is a key focus area.'

The Hyogo Mid-term Evaluation: UNISDR: 2011

# 1. A holistic understanding of risk

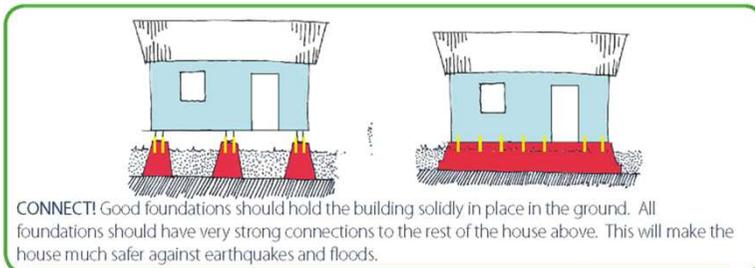
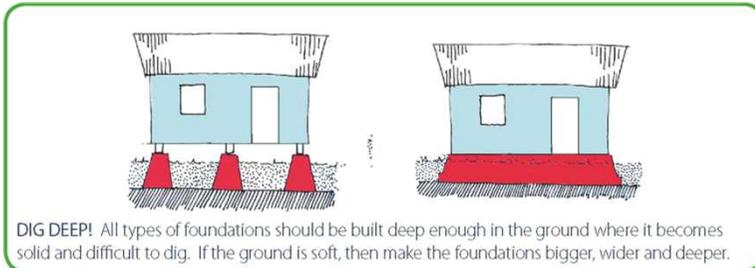
Recognise the opportunities infrastructure projects afford to reduce or increase vulnerability



© Anna Brown

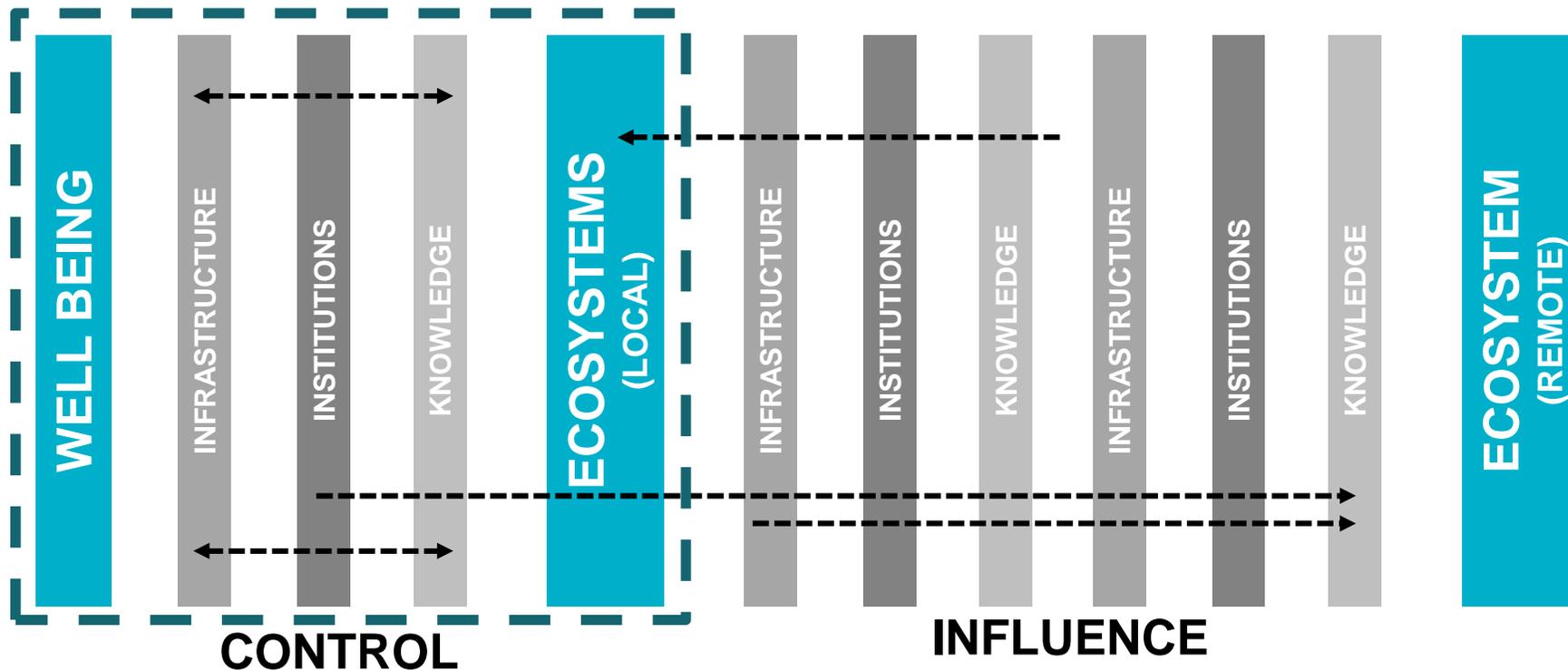
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# ‘Build back better’



## 2. A systems perspective

Adopt a systems perspective in designing infrastructure that recognises integration and interdependencies.



Source: da Silva et al. (2012) 'A systems approach to meeting the challenges of urban climate change'. FORTHCOMING.

### 3. A new culture of safety

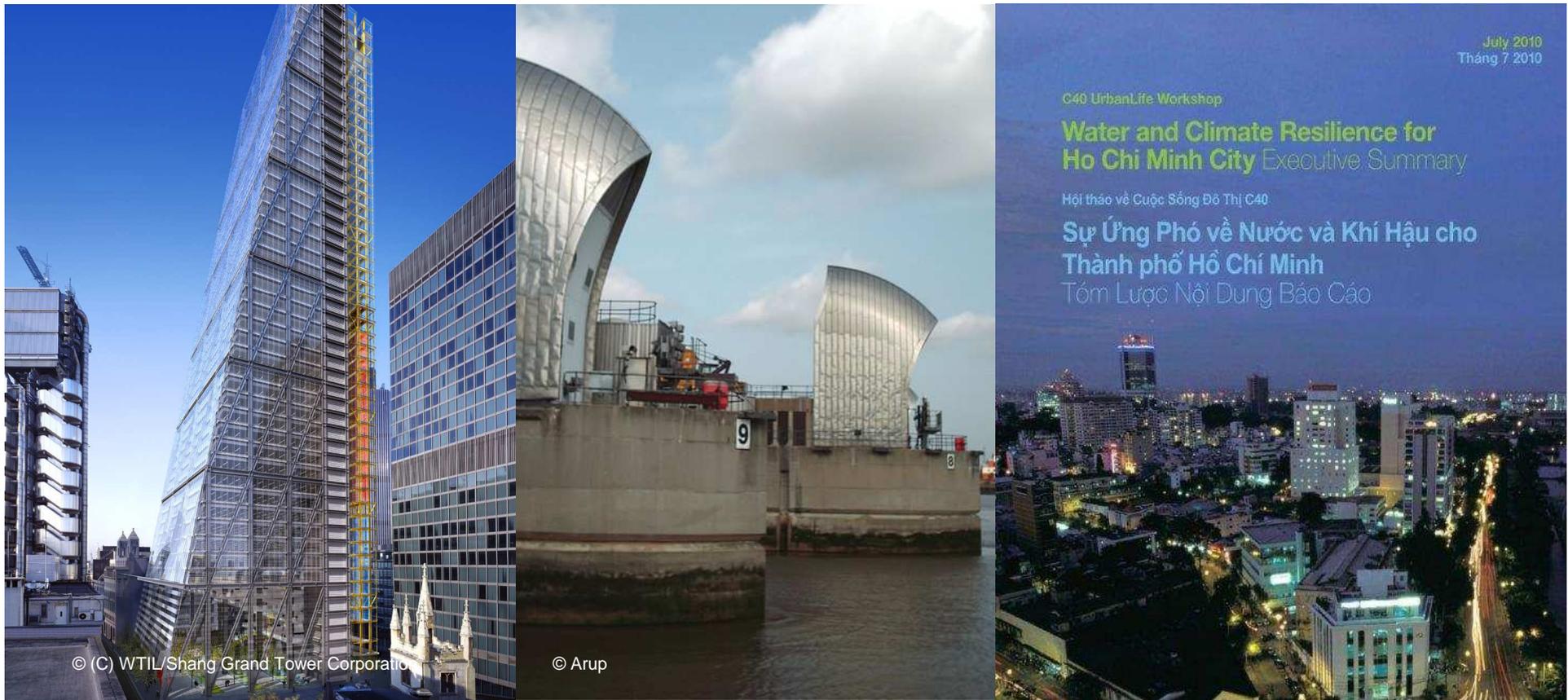
Acknowledge uncertainty and recognise the possibility of failure.



© Arup

## 4. Appropriate strategies

Adopt strategies that reflect local perceptions of risk, and availability of financial and technical resources.



## 5. Safer construction practices

Promote safer construction practices alongside the introduction of codes of practice.



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# Vernacular construction



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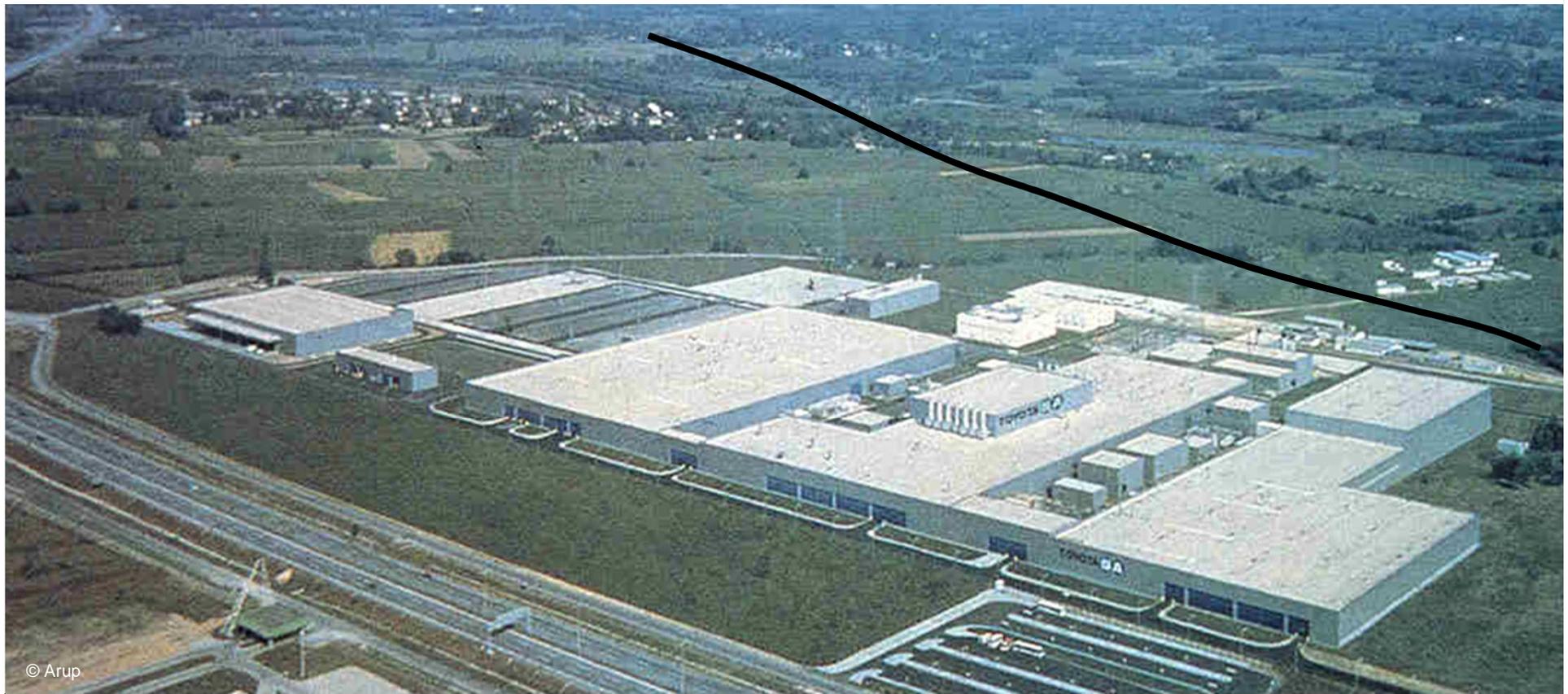
## 6. Effective humanitarian response

Provide technical and project management expertise to improve the effectiveness of humanitarian response.



## 7. A business case for DRR

Engage the private sector by demonstrating the business case for disaster risk reduction



- **A holistic understanding of risk**
- **A systems perspective**
- **A new culture of safety**
- **Appropriate strategies**
- **Safer construction practices**
- **Effective humanitarian response**
- **A business case for DRR**

**‘By our actions we either  
compound disasters or  
diminish them.’**

Ban Ki Moon, Global Platform for Disaster Risk Reduction, 2011

# Thank you

For further information on The Institution of Civil Engineers 9<sup>th</sup> Brunel International Lecture  
please see: <http://www.ice.org.uk/brunel> or [www.jodasilva.me](http://www.jodasilva.me)

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