

Urban Floods – Challenges

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Director

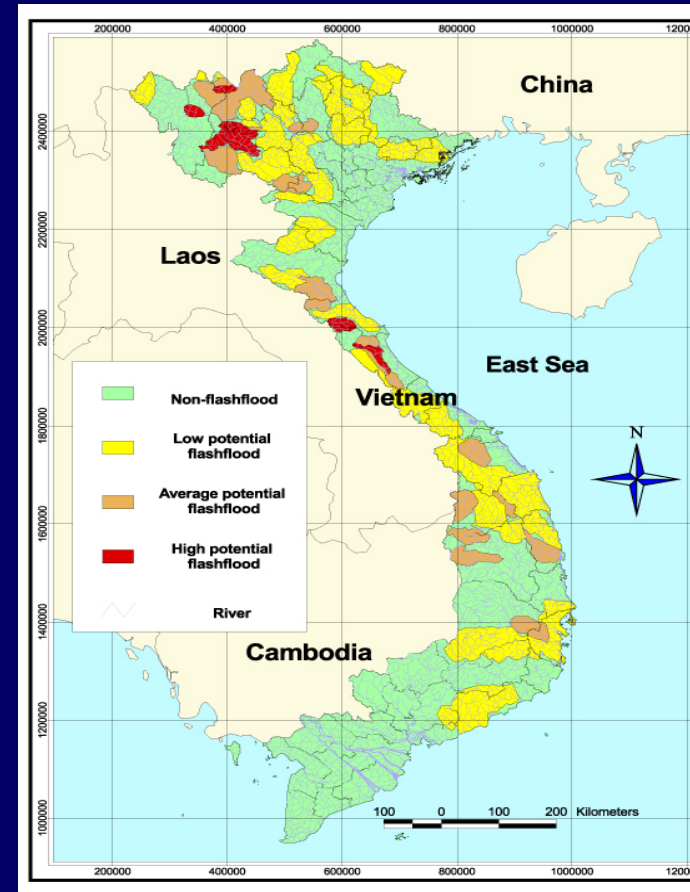
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Srikantha Herath

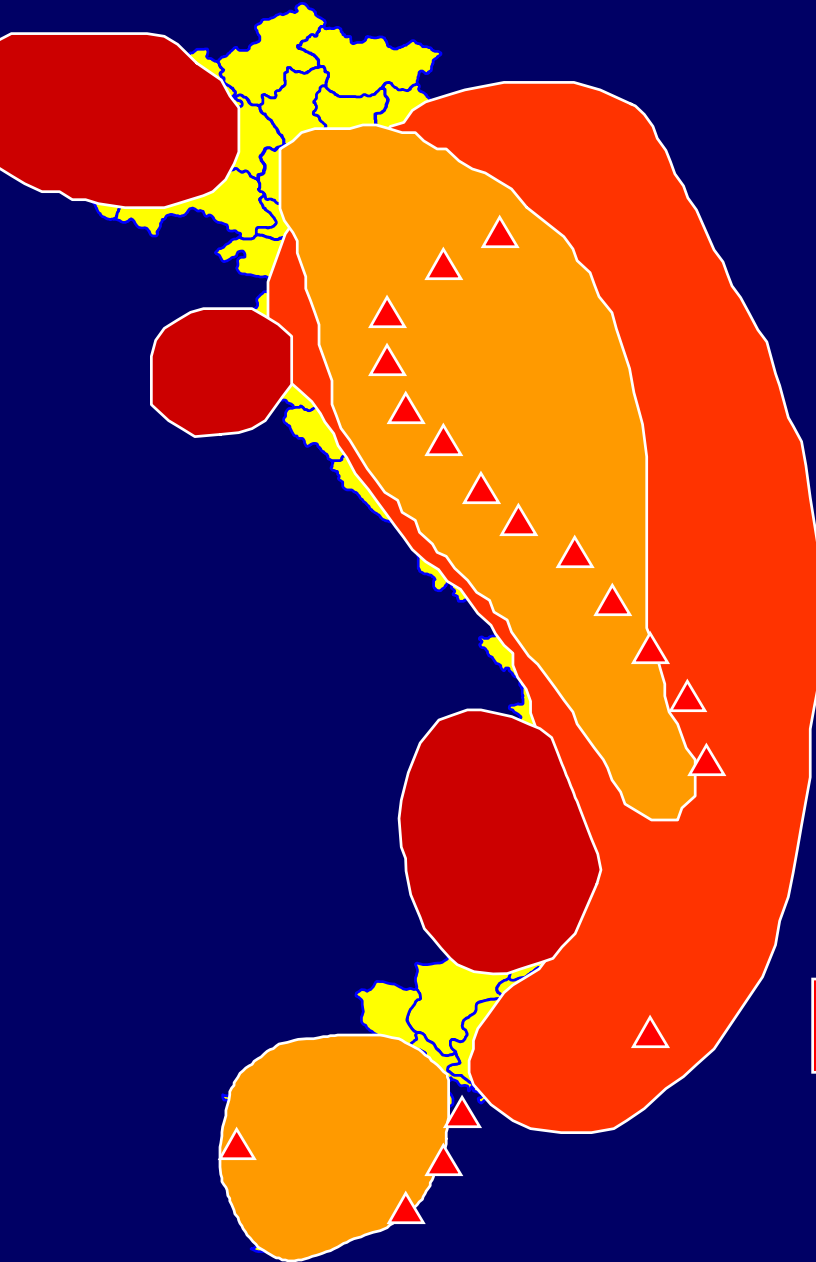
**Environment and Sustainable Development
United Nations University**

Viet Nam

- ❑ Located in South-East Asian with total Land area of 333,000 sq.km and coastline of 3200 km
- ❑ 14 major river systems including 02 large international river basin: Red River in the North; Mekong River in the South.
- ❑ Vietnam is affected by : Floods, Typhoon, Drought, Landslide, Storm Surges, Flashflood.
- ❑ Almost Urban areas are located along Sea Coast and River Sides
- ❑ 2 big Cities have Population 3- 6 million
- ❑ 11 Cities have population 1- 3 millions
- ❑ More than 10 cities have population 0.5 - 1 millions



Major Urban Disaster: Flooding



River Flooding



Flash floods



Typhoons



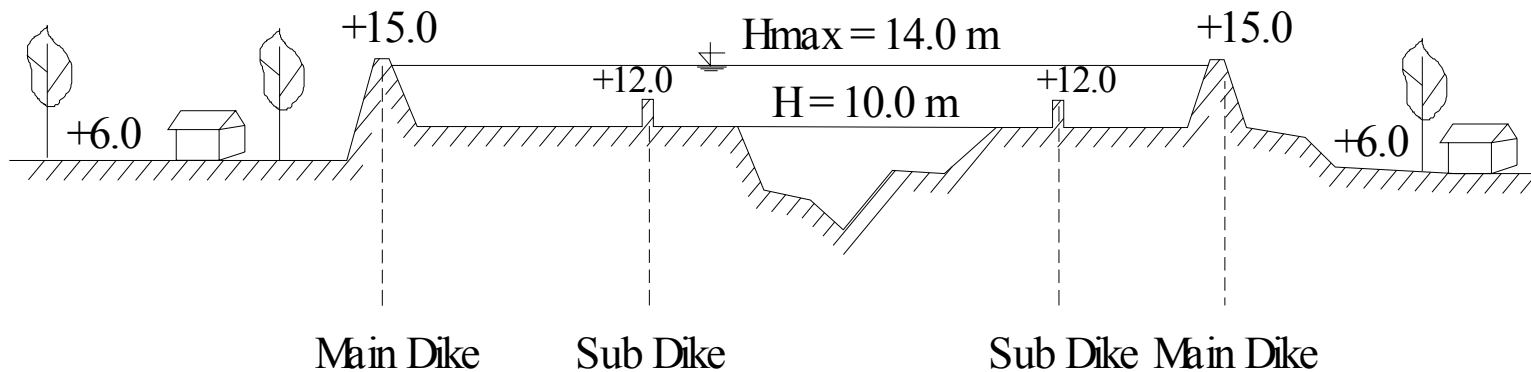
Storm Surges



Capital -- Hanoi City

- ❑ Located in Red River Delta
- ❑ Area: 920.97 km²
- ❑ Population : 3,600,000 (2000)

Density is high - average is 2,993 person/km². Central districts: 17,489: Suburb: 1,533



City's altitude is 6 m, the lowest water level is 8 m, the highest is 14.6 m (flood in 1971)

Dike system now can stand for flood level of 13.5 m

The Measures for Flood Mitigation

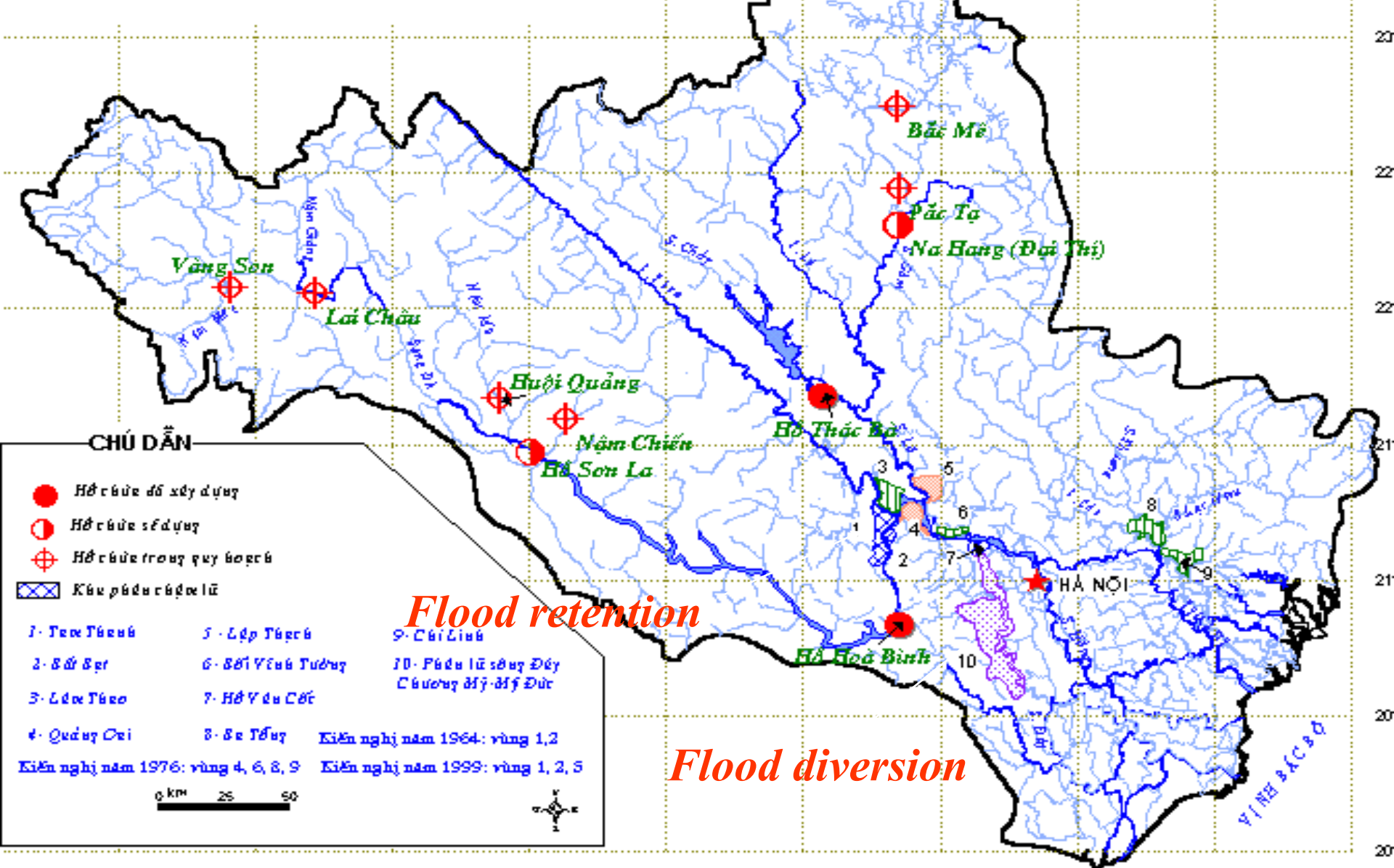
For the Red River Delta, especially Ha Noi City .



- 1. Closely and frequently managing the dike systems**
- 2. Building Reservoirs upstream**
- 3. Flood Diversion and Retarding area.**
- 4. Dike System Protection and Support**
- 5. Draining the flood water: dredging and extending river flood, plain**

102° 00' 103° 00' 104° 00' 105° 00' 106° 00' 107° 00'

BẢN ĐỒ CÁC CÔNG TRÌNH PHÒNG LŨ CHIẾN LƯỢC CHO ĐỒNG BẰNG SÔNG HỒNG



CHÚ DẪN

- Hệ cửa đê xây dựng
- ◐ Hệ cửa sê dựng
- ⊕ Hệ cửa trong quy hoạch
- ▣ Khu phân vùng lũ

1- Tọa Tôan	5- Lấp Tôan	9- Cầu Cầu
2- Bở Bở	6- Bở Yên Tôan	10- Phân vùng sùng Đáy Cầu đê Mỹ-Đy Đư
3- Lấp Tôan	7- Hệ Yên Cầu	
4- Cầu Cầu	8- Bở Tôan	

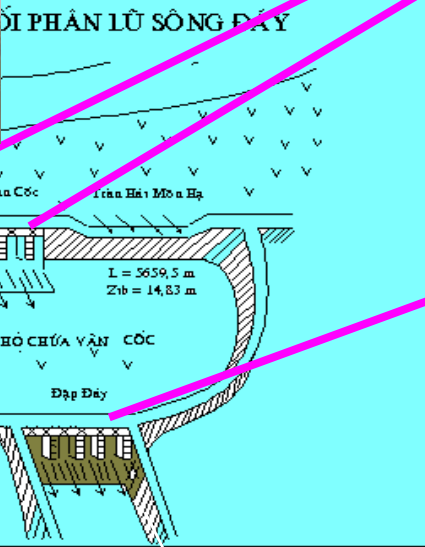
Kiến nghị năm 1964: vùng 1,2
 Kiến nghị năm 1976: vùng 4, 6, 8, 9
 Kiến nghị năm 1999: vùng 1, 2, 5

0 KM 25 50

Flood retention

Flood diversion

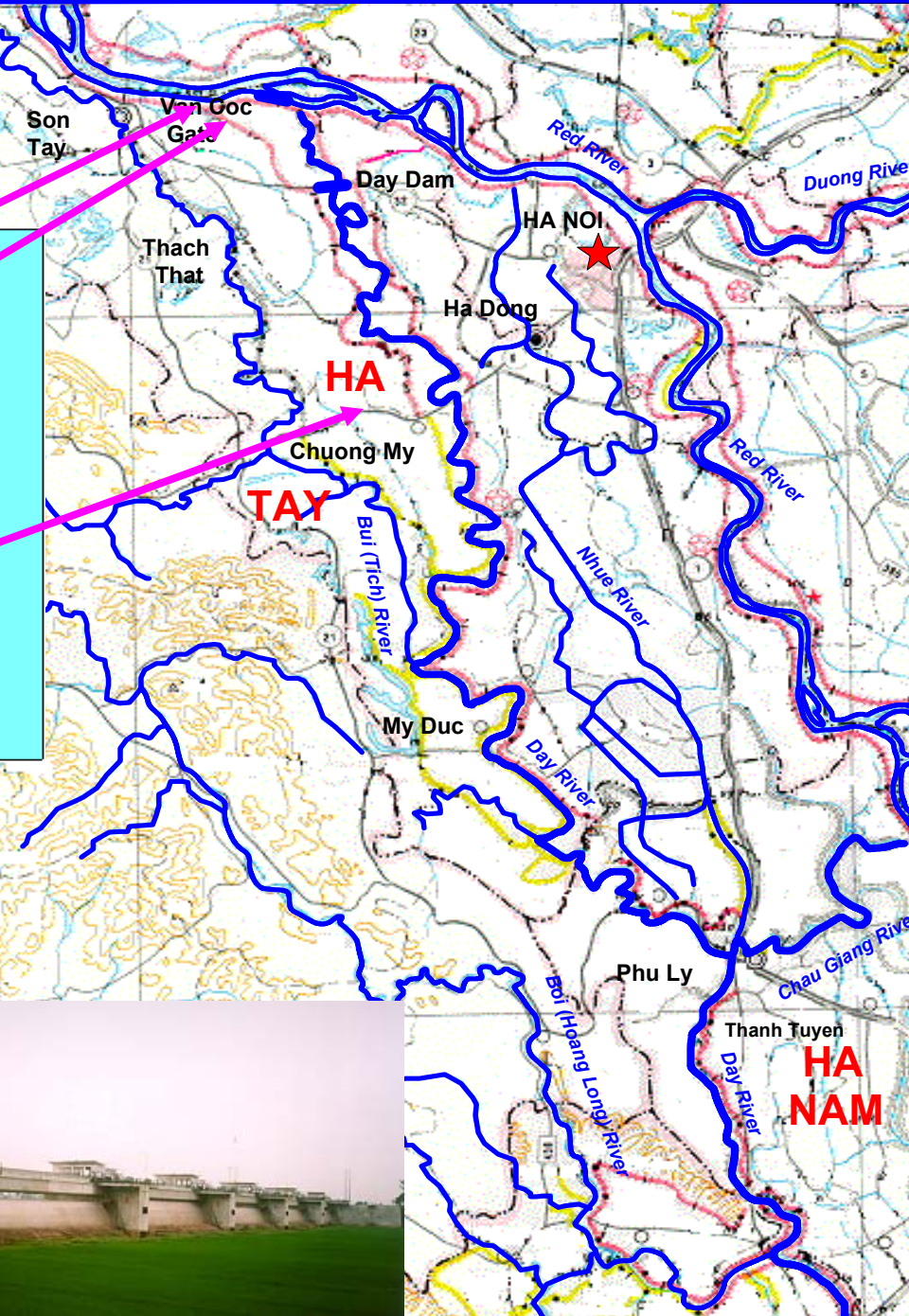
VĨNH BẮC BẮC



CHỮ THÍCH

	Cổng
	Đê bao
	Hướng vận chuyển

Day River Flood Diversion



Ha noi Concrete Dike

- Flood occur annually
- Historical great floods:
1945, 1964,
1966, 1971
(125 yr r.p.),
1986, 1996
- Dyke breaks upstream



Images of local floods in Hanoi



1996



1998



2000



2001

WHAT IF?

- ❑ **An extreme flood that exceed flood control design standards considerably happens in a major urban area?**

Or

- ❑ **There is an unexpected failure of flood control infrastructure of a major city?**

Some near misses !

In 1992 there was a large flood in Colombo Sri Lanka

A record rainfall - 1/1000

Rainfall 493 mm -> Total discharge 29 million cubic m.

Drainage capacity 2 mil. cu. m, and it took 10 days to discharge the flood

The rainfall was only limited to Colombo - No river overflow.

If a river embankment breach occurs → A catastrophic loss





2002 July Flooding in Kathmandu



2002 floods in Kathmandu, Nepal had created severe damage

The inundation was caused by flow capacity restriction downstream of Kathmandu

The rainfall that produced the flood was not the largest expected

What is the 'worst case' rainfall? This is one of the biggest problems for Nepal and elsewhere

Asia Pacific Initiative on Catastrophic Flood Risk Reduction

Bangkok Resolution:

The need for an Asia Pacific Initiative on Catastrophic Flood Risk Reduction, and pledged support for the mission and goals of this initiative by representatives from:

Bangladesh, Cambodia, China, Fiji, India, Indonesia, Lao PDR, Malaysia, Nepal, Pakistan, Philippines, Singapore Sri Lanka, Thailand and Vietnam

at this Regional Workshop “*Ensuring Flood Security for Sustainable Urbanization in the Asia Pacific Region*”, 2003

Asia Pacific Initiative on Catastrophic Flood Risk Reduction

Mission: GOAL

To integrate

- **Prior risk assessment (catastrophic flood scenario)**
- **Basic framework for response (action plan)**

into urban development and planning process for sustainable urban futures

Asia Pacific Initiative on Catastrophic Flood Risk Reduction

Components:

1. **Clarifying Catastrophic Floods and relations to physical and social conditions**
2. **Estimating extreme Rainfall for the basin**
3. **Inundation modeling and prediction**
4. **Risk Assessment (socio-economic)**
5. **Community participation**
 - Focus on those who are subjected to hazard
6. **Capacity development: Institutional needs**

Challenges

- ❑ **As urban centers grow and develop, there will always be new risks**
 - Increased floods, underground space flooding, etc.
- ❑ **Ensuring security in urban areas – from ‘fail-safe’ to ‘safe-fail’**
 - Infrastructure development considering vulnerability
 - Guide lines for ‘catastrophic flood’ resistant urban communities
- ❑ **Catastrophic flood risk assessment**
 - Methods to assess losses → consensus
 - Methods that would be useful not only in managing extreme floods but also ordinary floods.

Thank you
for your attention