

Ad Hoc Expert Meeting on

**Climate Change Impacts and  
Adaptation: A Challenge for  
Global Ports**

29 – 30 September 2011

**The Experiences of Chinese Ports in  
Adapting to Climate Changes –  
“Still a House of Cards”**

Presentation by

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UNCTAD *Ad Hoc* Expert Meeting, 29-30 September 2011

“Climate Change Impacts and Adaptation: A Challenge for Global Ports”

## The Experiences of Chinese Ports in Adapting to Climate Changes – “Still A House of Cards”

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香港理工大學





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# Acknowledgements



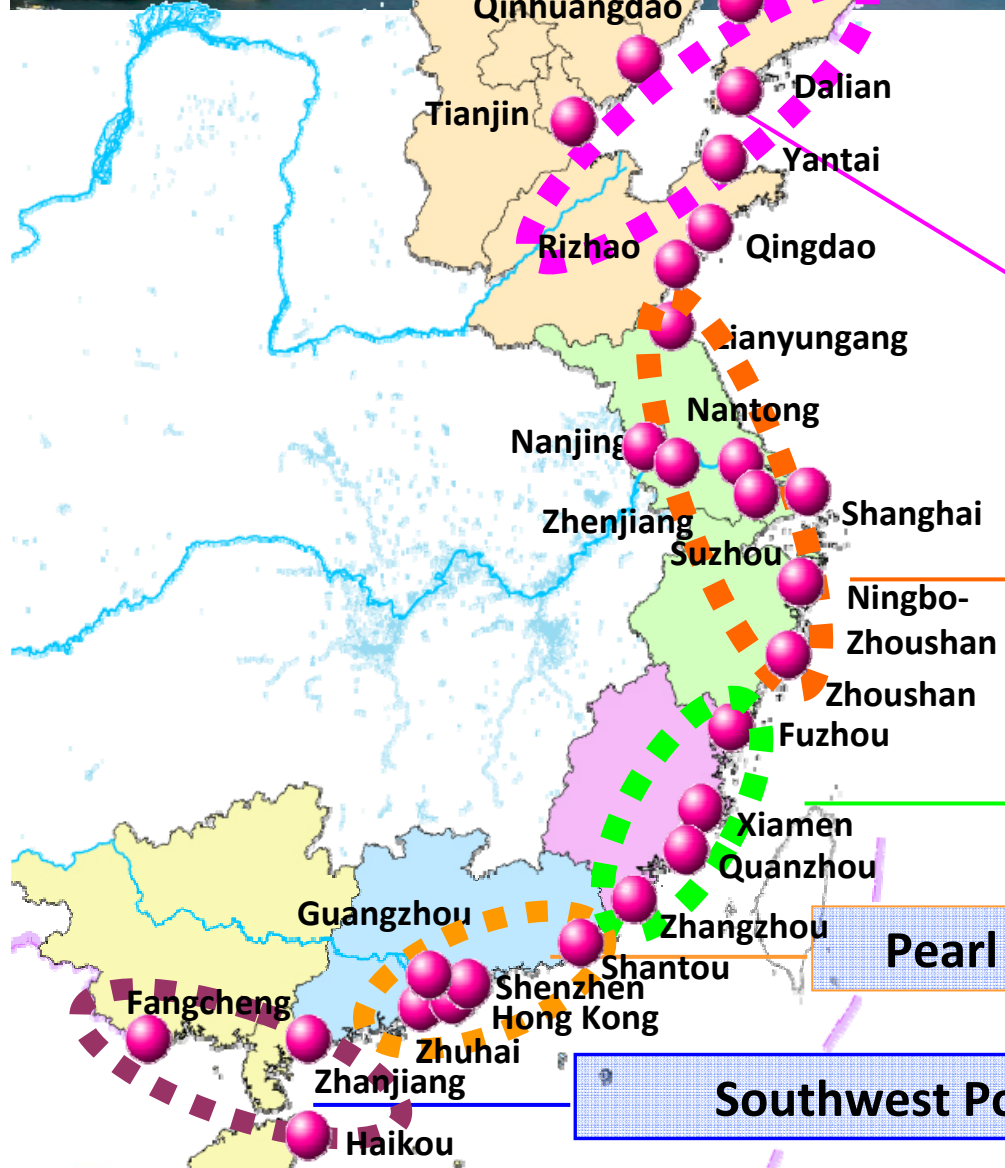
**Marine Department**  
The Government of the Hong Kong Special Administrative Region







# Major Seaports and Port Regions in China



**Bohai Rim Port Region**

**Yangtze Delta Port Region**

**Southeast Port Region**

**Pearl River Delta Port Region**

**Southwest Port Region**



# Background

## By 2070...

- 90% of the total estimated asset exposure in large port cities would be concentrated within 8 countries, namely **China**, USA, India, Japan, Netherlands, Thailand, Vietnam and Bangladesh

- For population, 90% of the exposure would be concentrated within 11 countries, namely **China**, USA, India, Japan, Thailand, Vietnam, Bangladesh, Myanmar, Egypt, Nigeria and Indonesia

- 9 “top-20” cities would have high exposure to coastal flood risks, namely Tokyo, New York, **Shanghai**, Kolkata, Dhaka, Osaka, Mumbai, **Guangzhou** and Miami

Source: Nicholls et al. (2008): ‘Ranking port cities with high exposure and vulnerability to climate extremes: exposure estimates’. OECD Environment Working Papers, No. 1 (OECD Publishing, Southampton).



# Background

According to China's State Oceanic Administration's (SOA) Estimation:

2030: water level will rise by about 10-40 cm

2050: 30-60 cm

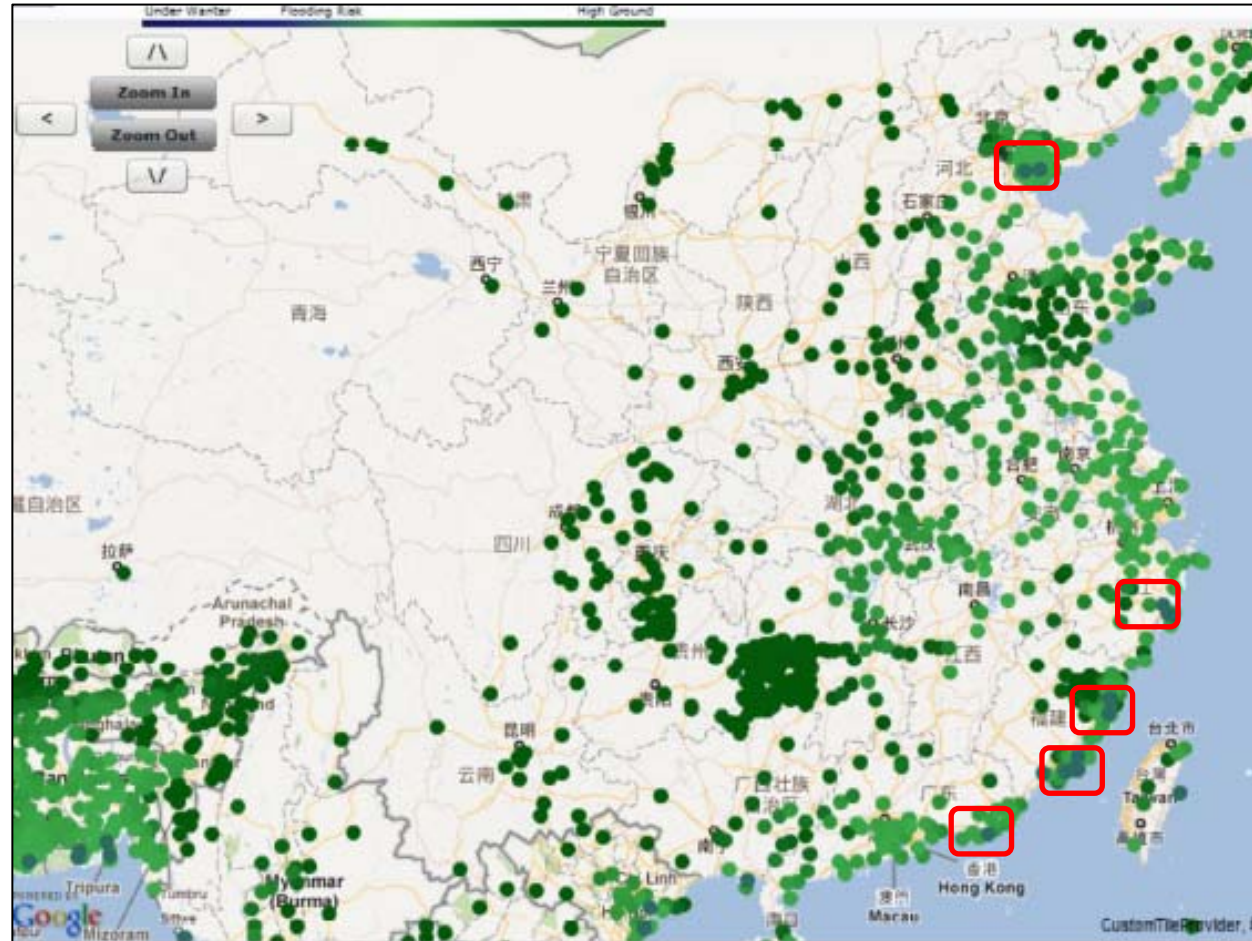
2100: 40-90 cm





# Background

By 2030 (40 cm)

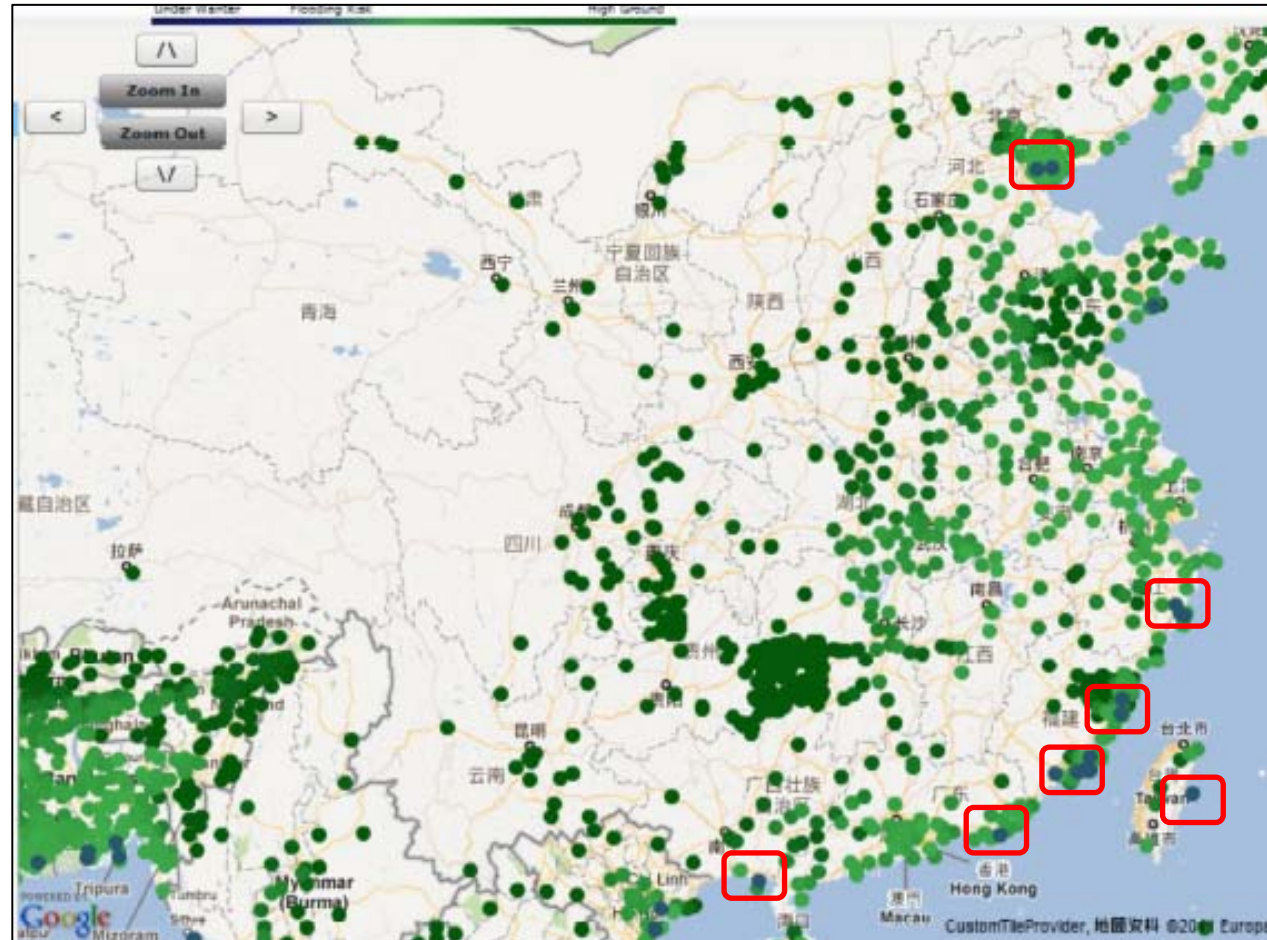






# Background

By 2050 (60 cm)

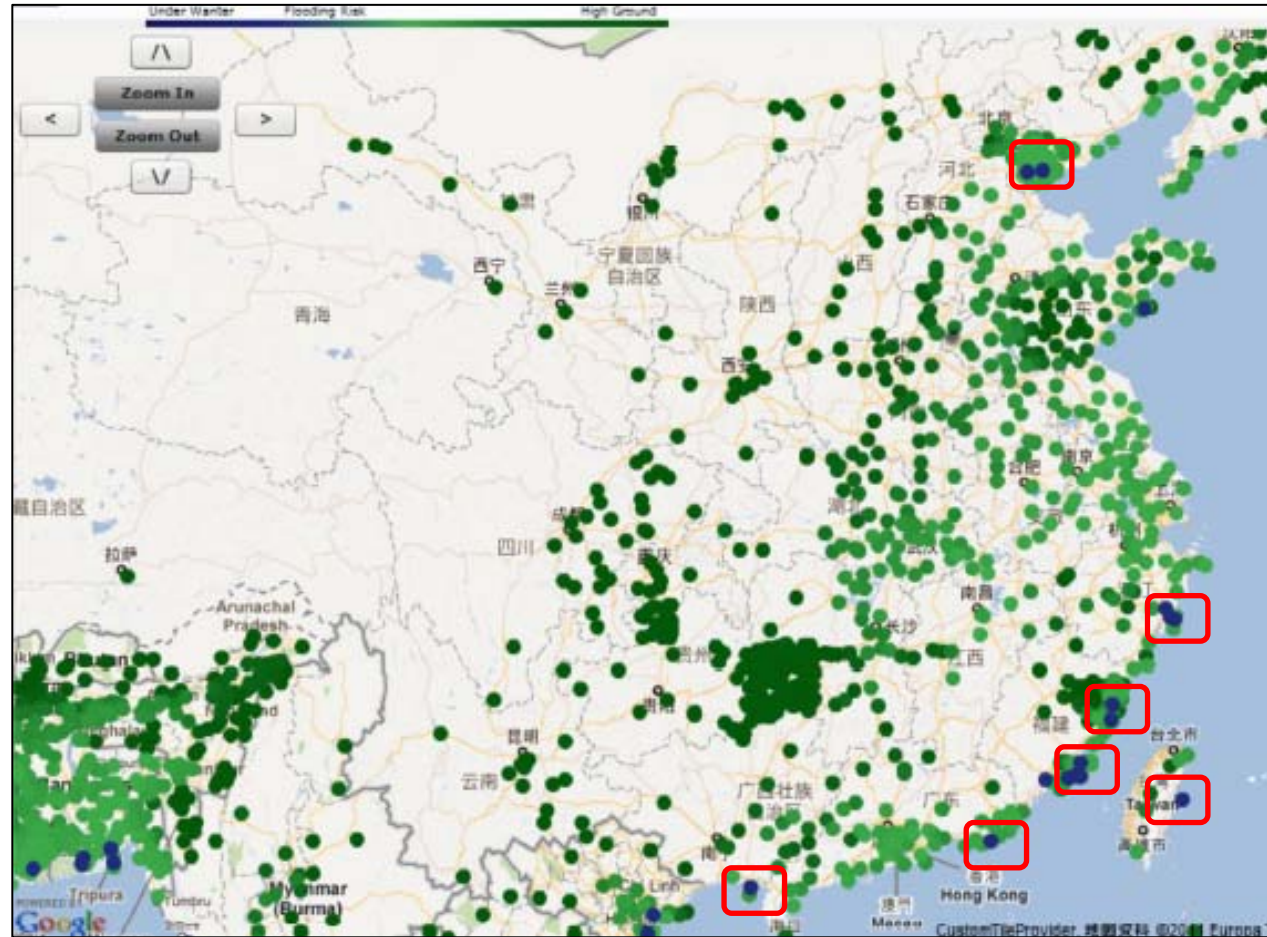






# Background

By 2100 (90 cm)





# Background

**If forecasts were accurate, Chinese ports are actually highly vulnerable to climate changes, especially the Southeastern region...**



# ‘Willingness to Adapt’ Problem

- The impacts posed by climate changes on ports seem to be too ‘gradual’ or ‘moderate’ when compared to other aspects...
- Is adaptation by ports a priority?





# ‘Willingness to Adapt’ Problem

Google 地圖  
香港



China Flood 2010 affected provinces 中國水災2010受影響省份

- China is a country which had frequent serious flooding since 5,000 years ago !
- Simply speaking, flooding was always part of the “Chinese Culture”
- Only in 2010, 16 Chinese provinces had been affected by the impacts of flooding



# ‘Willingness to Adapt’ Problem



**What are the priorities?**



# ‘Willingness to Adapt’ Problem

- The impacts of climate changes on (major) ports seem to be too moderate, or implicit, when compared to other aspects of lives; and thus no/little incentive for ports to adapt...
- This is not dissimilar to the rather implicit impacts of routine, day-to-day shipping activities to the environment except explicit, large scale marine disasters, like large scale oil spills (Ng and Song, 2010)\*

\* Ng, A.K.Y. and Song, S. (2010): ‘The environmental impacts of pollutants generated by routine shipping operations on ports’. *Ocean and Coastal Management* 53(5-6): 301-311.

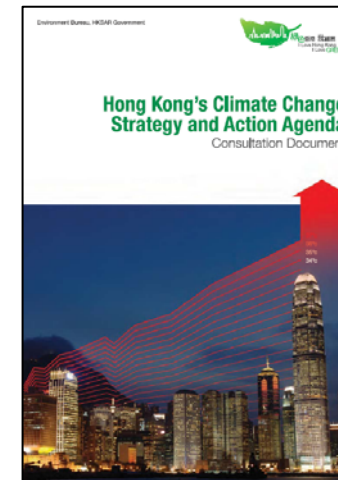




# ‘Willingness to Adapt’ Problem

The ‘key’ vulnerable areas to climate changes in Hong Kong as identified by HKSAR Government:

- Biodiversity and Nature Conservation
- Built Environment and Infrastructure\*
- Business and Industry
- Energy Supply
- Financial Services
- Food Resources
- Human Health
- Water Resources



*\* The major items are building foundations, utility cablings and pipes*

Source: *HK's Climate Change Strategy & Action Agenda*, published by Environment Bureau, HKSAR Government (September 2010)





# ‘Willingness to Adapt’ Problem

- Will adaptation affect the efficiency, and thus competitiveness, of ports?



Source: Stichting Deltawerken Online



# ‘What to Adapt’ Problem

- In fact, the exact impacts of climate changes, apart from rising water levels and thus flooding, are still rather unclear...



# ‘What to Adapt’ Problem

- Alter the balance of coast and beach erosion sedimentation around ports and access channels
- Additional dredging (and thus increased operation costs)
- Higher water temperature and increased salinity which could affect port infrastructure



# ‘What to Adapt’ Problem

- China is a huge country in terms of area size
- A long coastline with more than 18,000 km
- 3 of the world’s longest rivers (Yellow, Yangtze and Pearl)
- Impacts of climate changes are highly diversified
- What will be affected (seaports, river ports...)?
- How will they be affected (flood, ice...)?
- Considerable differences exist among port (regions) due to specific local/regional characteristics





# 'What to Adapt' Problem





# 'What to Adapt' Problem





# 'What to Adapt' Problem



Damages of Harbor Facilities in Lanzhou, Ganxu Province in 2010

Source: <http://www.gscn.com.cn>







# ‘What to Adapt’ Problem



Source: China Meteorological Administration (2011)





# ‘Capacity of Adaptation’ Problem

- Availability of resources (not just money)
- Reliable data and information
- Scientific studies on the topic

In general, they are still in serious shortage in China (including Hong Kong)

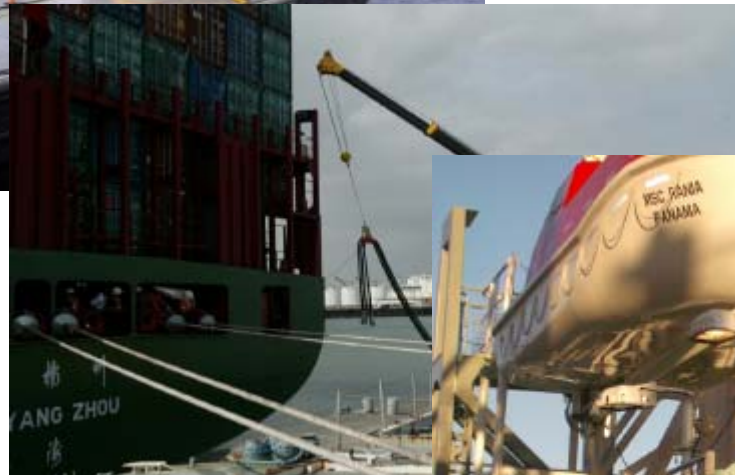


# 'Capacity of Adaptation' Problem

- Do we really understand the issue?
- In China (including Hong Kong), there seems to be a general misunderstanding (or mix-up) between 'adaptation to climate changes' and 'addressing climate changes'
- Considerable resources and efforts have been spent on 'slowing down' climate changes, rather than 'adapting' or 'enhancing resilience' to climate changes...



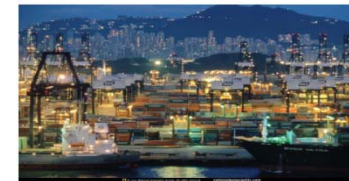
# 'Capacity of Adaptation' Problem



CREATING A GREEN PORT CULTURE – PORT ENVIRONMENTAL SUSTAINABILITY

## "CREATING A GREEN PORT CULTURE"

Leadership Strategies in Environmental Sustainability  
for the Port of Hong Kong



2010 Industry White Paper from Turnkey Consulting Limited

- in association with M Power Associates





# ‘Capacity of Adaptation’ Problem

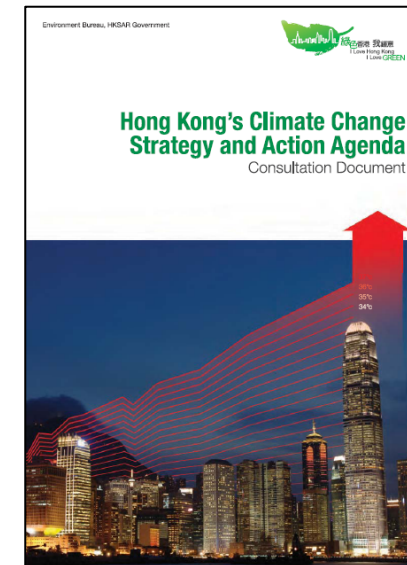
In the consultation document, *HK’s Climate Change Strategy & Action Agenda* (September 2010), Section V (pg. 24-55):

## Part 1: GHG Reduction Measures (pg. 24-28)

- > Maximizing energy efficiency
- > Greening road transport
- > Promoting use of clean fuels for motor vehicles
- > Turning waste to energy
- > Revamping fuel mix for electricity generation
- > HK’s target on reducing GHG emissions

## Part 2: Adaptation to Climate Change (pg. 49-55)

- > Key vulnerable areas of HK
- > Adaptation options and measures







# 'Capacity of Adaptation' Problem

Vulnerable areas	Possible major impacts	Adaptation options
<p>Built environment and infrastructure</p>	<ul style="list-style-type: none"> <li>• Heavy rain, thunderstorm and extreme weather leading to damaging of building foundations, increased risk of rain penetration of building fabric, and damage to utilities cabling and pipes</li> <li>• Potential asset damage because of flooding, landslides, wind damage, storm surge and lightning strike, etc.</li> </ul>	<p><b>Capacity building</b></p> <ul style="list-style-type: none"> <li>• To develop and use climate risk assessment tool for screening future development projects to minimize potential risks posed by climate change and variability</li> <li>• To regularly update and adjust, if necessary, construction-related codes, guidelines and design standards for buildings and infrastructure</li> <li>• To develop flood and landslip risk strategies for increasing adaptive capacity to extreme weather and sea level rise</li> </ul> <p><b>Research</b></p> <ul style="list-style-type: none"> <li>• To identify at risk infrastructure that are likely to be vulnerable to climate impacts</li> <li>• To update flood risk maps</li> </ul>



# Concluding Remarks

- In adapting to climate changes, it seems that Hong Kong and Chinese ports are still lacking...
- **“Organizational Resilience”**
- The positive ability of an institution to adapt itself to the consequences of (catastrophic) failure
- Preparedness (incl. Awareness); Protection; Response; Recovery

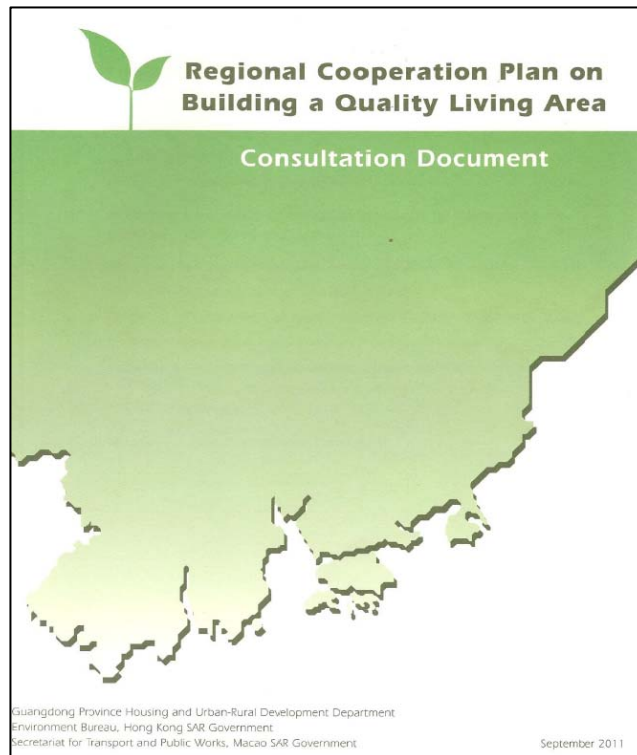


# Concluding Remarks

- Chinese ports (including Hong Kong) seem yet to be ready in adapting to climate changes
- Adaptation is a highly localized/regionalized issue
- A very new concept with a significant scarcity of scientific studies, thus misunderstanding and rather low social awareness, on the impacts of climate changes on ports
- Support for research and database building, both via financial and non-financial means, should be encouraged



# Concluding Remarks



Regional Cooperation has been initiated in Pearl River Delta (PRD):

- Planning from a regional perspective
- Cooperation between ports within the 'Pan-PRD Port Region'
- Sharing of information and mutual-learning





# Thank You Very Much!

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