



# A tale of two cities: Governance lessons for flood risk management in a time of climate change - the cases of Jakarta and Rotterdam

Philip Ward, Pieter Pauw, Arwin van Buuren, Muh Aris Marfai

# Outline

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- Background
- Introduction
- The flood problem in Jakarta and Rotterdam
- Governance lessons for flood risk management
- Examples / problems in Jakarta and Rotterdam
- Conclusions



# Background



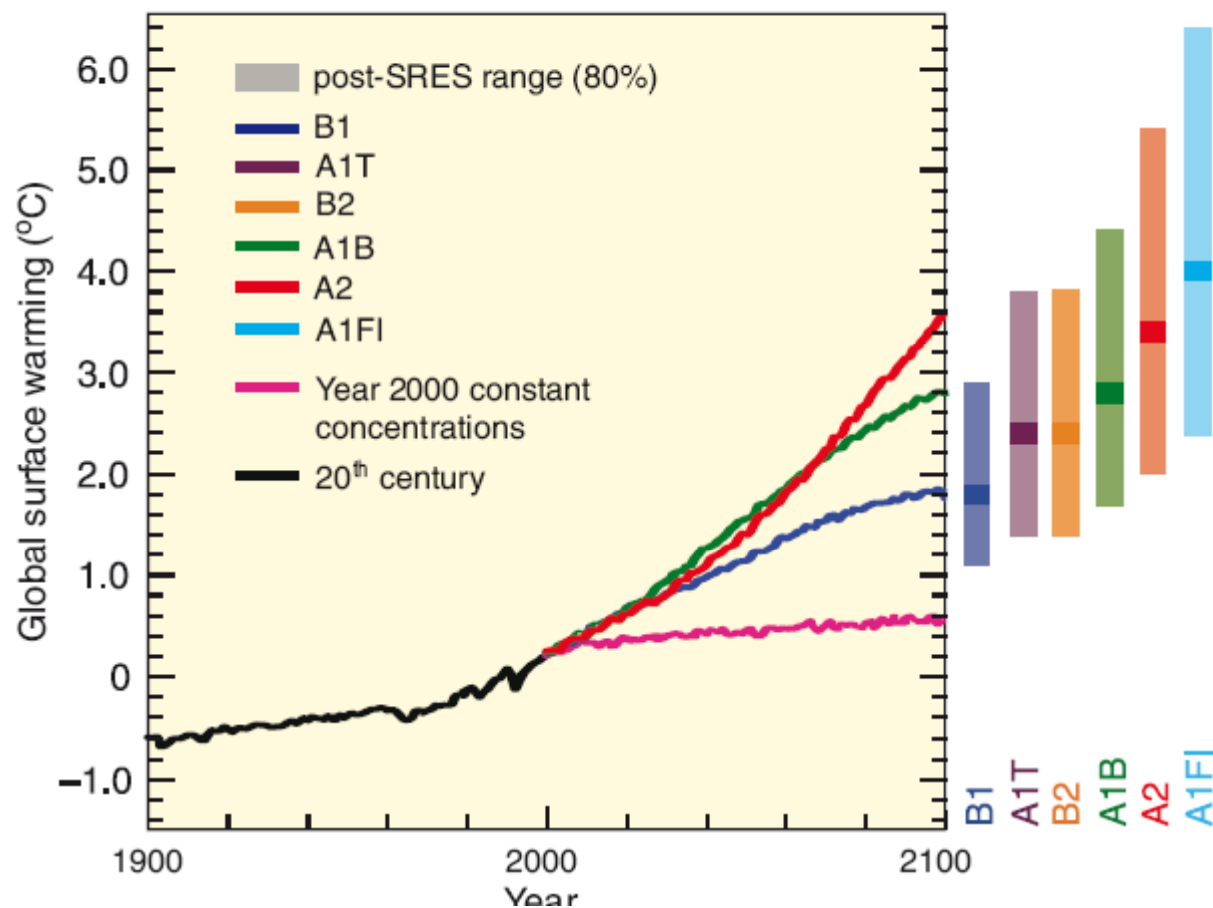
High spring tide in the Kepulauan Seribu  
(Thousand Islands)

# Introduction

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- Flood damage = >30% of global economic losses from natural hazards (Munich Re)
- >50% world population living in cities (UN, 2010)
- More than >66% world's cities will be vulnerable to flooding in next 30 years:
  - Sea level rise
  - Climate change
  - Subsidence
  - Socioeconomic changes
  - ...

# Introduction – climate change in 21<sup>st</sup> century



Source: IPCC (2007)

# Introduction: adaptation

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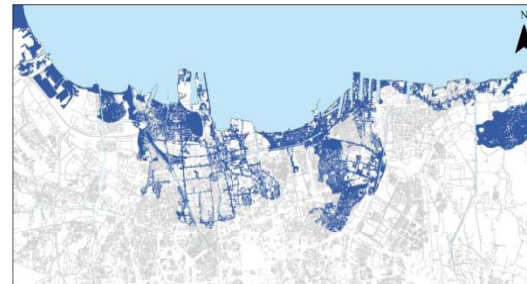
- From mitigation → adaptation
- Adaptation: (add definition)
  - an adjustment in ecological, social or economic systems in response to observed or expected changes in climatic stimuli and their effects and impacts in order to alleviate adverse impacts of change or take advantage of new opportunities (Adger et al., 2005; based on IPCC, 2001)
- From flood management → flood risk management
- Many examples at national/ transboundary scale
  - European Flood Directive / Delta Plan
- City-scale fewer examples
  - Rotterdam Climate Proof / NYC 2030, ...)
- Role of governance in paradigm shift: little academic research

# Flood risk management

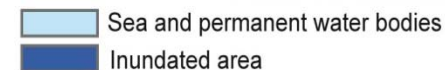
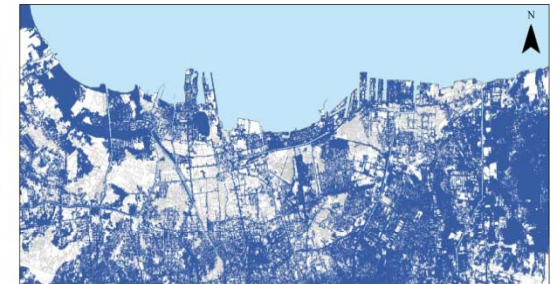
- Flood risk = probability of flood x effects of flood
  - e.g. economic damage, loss of lives, etc.
- Examines both hazard and consequence
- Flood risk mapping



a) Current conditions



b) Includes sea level rise and land subsidence



# Introduction: adaptation

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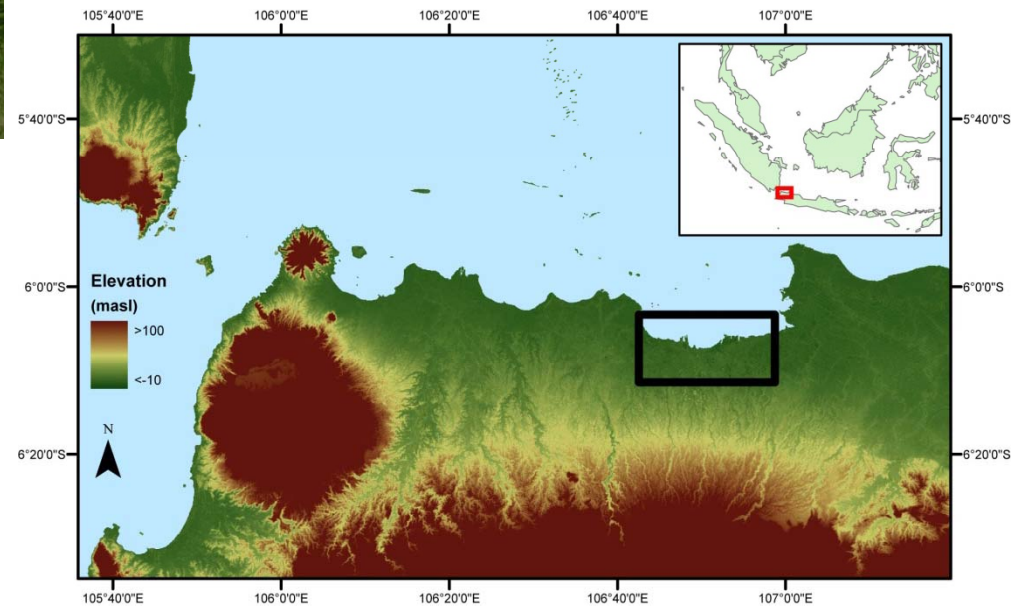


## Introduction: aims

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- What are the main governance lessons learnt from recent experiences with regards to the transition from flood protection to flood risk management?
- What adaptation strategies are being adopted in Jakarta and Rotterdam that incorporate these lessons, and what are the main challenges?
- How could city-to-city learning stimulate the adoption of flood risk management in global cities?

# Case study location



# The flood problem in Jakarta and Rotterdam

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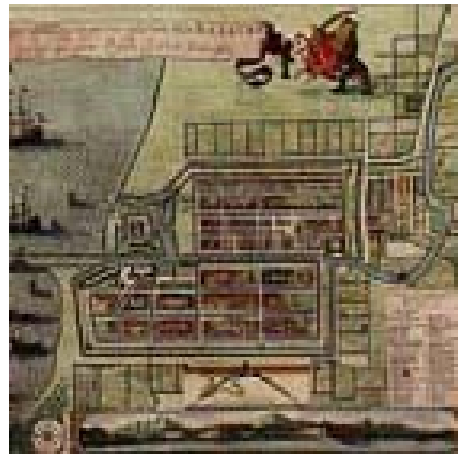
- **Brief history**
- Traditional adaptation strategies
- Changes in physical and socioeconomic conditions

# Brief history of flooding

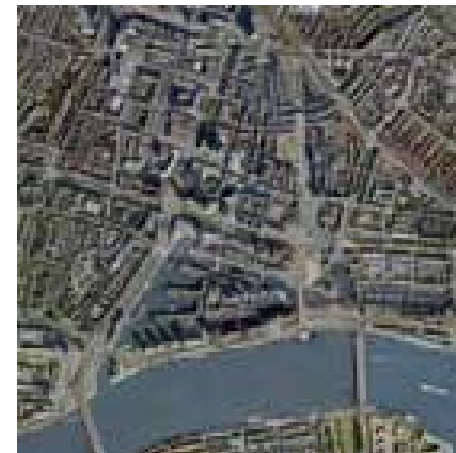
1652

Present

Jakarta



Rotterdam





# Brief history of flooding



Floods of 1855



Watersnoodramp: 1953

- Watersnoodramp: 1835 deaths, >70,000 evacuated, >47,000 buildings damaged (ca. 10,000 destroyed)
- → Delta Plan (policy window)



# Brief history of flooding



- Parts of city flood every month (high tides)
- Major river floods in 2005 and 2007
- Flood of 2007
  - 58-74 deaths
  - > USD450 million direct damage
  - Closure of many main arterial routes for days
  - Missed work days (indirect economic damage)



# The flood problem in Jakarta and Rotterdam

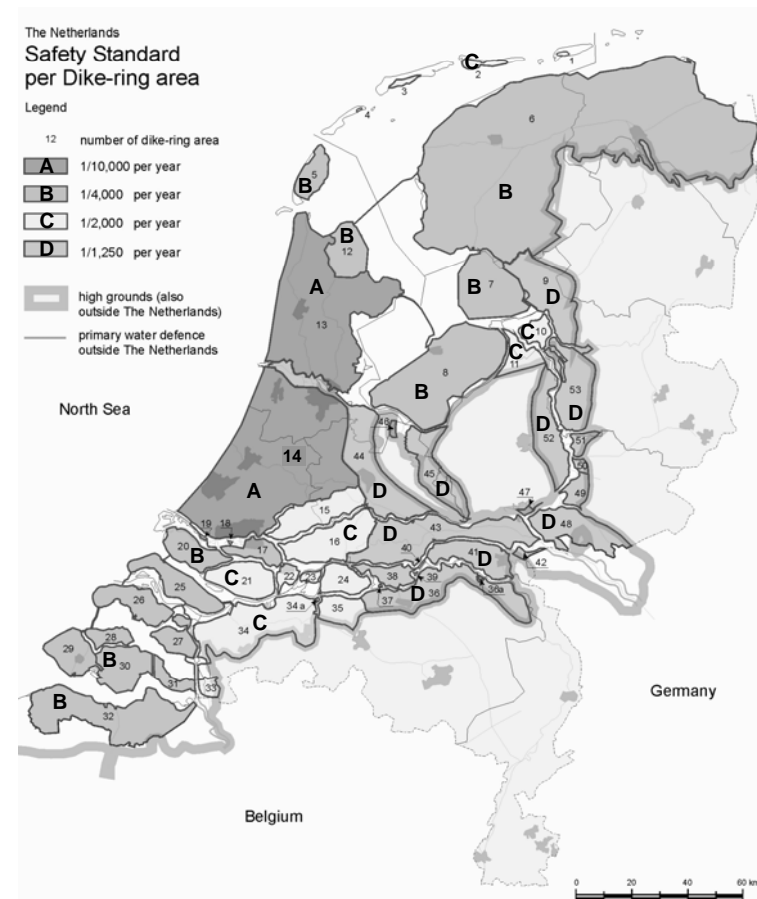
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- Brief history
- **Traditional adaptation strategies**
- Changes in physical and socioeconomic conditions



# Traditional adaptation strategies - Rotterdam

- Aimed at reducing probability of flood by technical means
  - Storm surge barriers
  - Dikes
  - River straightening
  - River deepening
  - ...





# Traditional adaptation strategies - Jakarta



- Major problems in past
  - Implementation delays
  - Underdesign
  - Lack of maintenance
  - Lack of transparency / consultation

# The flood problem in Jakarta and Rotterdam

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- Brief history
- Traditional adaptation strategies
- **Changes in physical and socioeconomic conditions**

# Changes in physical and socioeconomic conditions

Parameter	Jakarta	Rotterdam
Mean temperature	Increase 0.1°-0.3°C per decade	Increase of 1.8-4.6°C (winter), and 1.7-5.6°C (summer) by 2100
Mean precipitation	Small decrease in some models	Increase in winter
Extreme rainfall	Increase in severity and frequency	Increase in extreme summer precipitation intensity and extreme 10-day rainfall sums in winter
Sea level rise and land subsidence	Average land subsidence of 4 cm/yr Sea level rise of 18-59 cm by 2100	Increase in relative sea level of 35-85 cm (relatively small role for subsidence)
Socioeconomic change	GDP increase 4.5% p.a. between (to 2030) Population increase 9 million (2007) → 25 million (2050)	Population increase 6% between 2009-2040 Increase in number of jobs and relative importance of commercial sector

# Adaptation governance lessons

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- Four lessons for successful adaptation governance in flood risk management:
  - *Structure*: multilevel, multi-domain, and multi-actor governance
  - *Orientation*: goal-seeking, adaptive, and explorative
  - *Content*: accommodate a plurality of societal, economic, and other values in combination with flood risk management
  - *Timeline*: focused on the long-term, but looks for opportunities to integrate urgent matters on the short term



## Adaptation governance lessons: *structure*

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- Climate change → Broad uncertainties
- National adaptation programmes often underspecified in terms of options at local level
- Predicates need for:
  - Multi-level government
  - Catchment scale approach
  - Multi-actor governance
  - Transparency and openness on responsibilities and tasks

# Structure – multi-level government

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- Rotterdam
  - Institutionalised and made legitimate
  - Long history of decentralised decision-making and consensus building
  - But difficult to synchronise governance processes at local and national scale → misfits / coordination problems
- Jakarta
  - Decentralisation process since 1990s
  - JMA politically / administratively fragmented
  - Decentralisation patchy: in some cases more intense exploitation of natural resources
  - Unclear division of responsibilities

# Structure – catchment scale approach

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- Rotterdam
  - European Flood Directive
  - International Rhine / Meuse Commissions
  - Delta Programme and Delta Commissariat
- Jakarta
  - Identified as major problem source for JMA
  - National decree on Spatial Planning → but implementation at regional level (not basin scale; Cooperating Body of JMA Development has no implementation powers
  - Upstream forest rehabilitation project (Ministry of Forestry)
  - No strong basin authority

## Structure – multi-actor governance

- Climate change: common but differentiated consequences  
→ stakeholder participation required
- Rotterdam
  - RCI (Rotterdam Climate Initiative)
  - Strong history of consensus building
  - But involvement of societal actors mainly reserved for formulating policy alternatives (after problem definition)
- Jakarta
  - The main challenge for Jakarta (Steinberg, 2007)
  - Strategic Development Plan 2002-2007: behind closed doors
  - Feeling of mistrust



# Structure – Transparency and openness

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- Rotterdam
  - Buitendijks bouwen (building outside diked areas)
  - No clarity on responsibility
  - → Stagnation in proposals for developments
- Jakarta
  - BKSP
- charged with coordinating, planning, and monitoring development in the JMA
- No power of authority for implementation
- Ineffective in coordinating developing programmes

# Adaptation governance lessons: *orientation*

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- Flexible and robust
  - robust aims
  - flexibility of organisations to work and cooperate on project basis
- Rotterdam Climate Initiative (RCI)
  - Local government, private parties, NGOs
  - Climate-proof, attractive, safe port city
  - Investments not only for climate change, but simultaneously attractiveness of city
- Jakarta
  - Decentralisation & increases stakeholder participation
    - Windows of opportunity

# RCI



# Jakarta – Windows of opportunity





# Adaptation governance lessons: *content*

- Synergy between policy domains, values, interests
- e.g. Interdisciplinary alliances
  - Rotterdam and Jakarta: spatial planning and water management separate for policy making



a) Current conditions



b) Includes sea level rise and land subsidence



Sea and permanent water bodies  
Inundated area

## Adaptation governance lessons: *timeline*

- Integration of long-term ambitions and short term-needs
- Adaptation integrated into other societal aims and interests
- Mainstreaming
  - integration of current and future climate change vulnerabilities (or adaptation) into broader government policy aims and implementation
  - fosters good water governance
  - Fits with concepts of multilevel governance, flexibility, robustness
  - Well established in developing country context
  - In a way, adaptation governance in Rotterdam also mainstreaming:
    - Combines climate change adaptation with urban renewal, transport, etc.
    - e.g. water playing fields, underground water storage/parking / green roofs (nature), floating houses
- Flexibility

## Summary / outlook for networking

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- Flood safety → flood risk management
- Little research at city level
- Jakarta and Rotterdam: historical and present day ties
- Similar but differentiated problems and measures
- Governance lessons: structure, orientation, content, timeline
- City to city learning can assist in transfer of best practices
- Direct replication improbable and not desired (similar drivers, different socioeconomic, cultural, physical settings)
- Different development phases & therefore goals
  - Rotterdam – world port and positive brand
  - Jakarta – primary values of security and development

# Thank you

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Philip Ward  
[philip.ward@ivm.vu.nl](mailto:philip.ward@ivm.vu.nl)