

# **Transitions to a Low Risk Coast Lessons from Cape Town**

**Worldwide Universities Network  
Changing Coasts Group**

**Geoff Brundrit, UCT**



DSCF1263.JPG

# CHANGING COASTS

Thursday 14<sup>th</sup> March

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**Nanjing University China: Shu Gao.**

**Pennsylvania State University USA: Patrick Applegate.**

**University of Western Australia: Chari Pattiaratchi.**

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**Federal University of Rio de Janeiro Brazil: Claudio Neves.**

**Global Climate Forum Germany: Jochen Hinkel.**

**Munich RE Germany: Wolfgang Kron.**

**Oxford University UK: Andres Payo.**

**Polytechnic University of Catalunya Spain: José Jiménez, Agustin Sanchez-Arcilla**

**Stockholm Environmental Institute Sweden: Richard Klein.**

**Vrije University Netherlands: Philip Ward.**

**University of Wollongong Australia: Colin Woodroffe.**

# Is This a Low Risk Coast?



2009



# Is This a Low Risk Coast?





# What is a Transition?

A Transition is a change in thinking about a problem, coupled with a change in the governance of that problem

OR

A Transition produces a significant and long term reduction in the level of risk associated with a stressor

**Coping**

**Short Term**

**Often reactive**

**Same way of thinking**

**Adaptation**

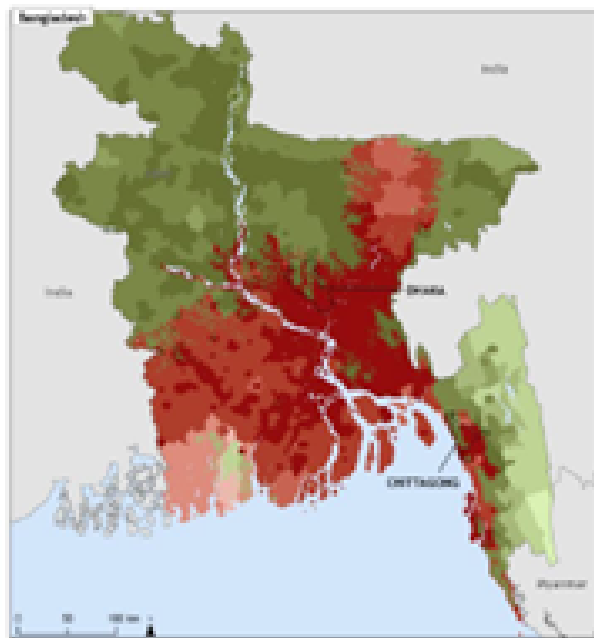
**Long Term**

**Proactive**

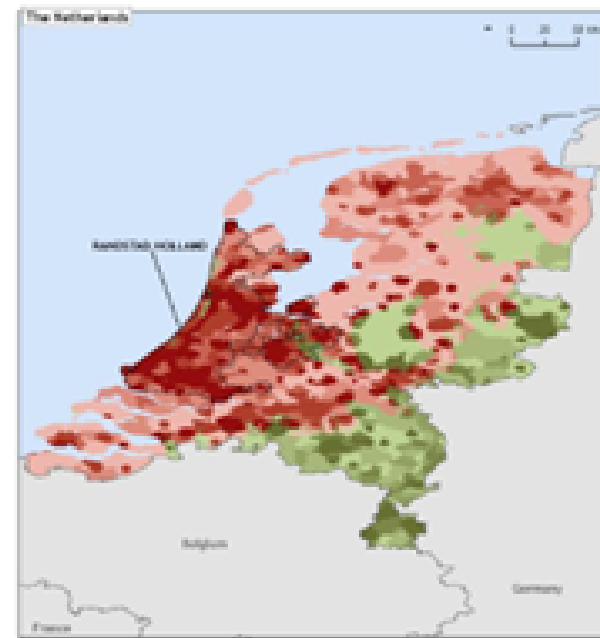
**New way of thinking**

- LECZ covers 2% of the total land area
- Contains 10% of the global population (ca 640 million people, in year 2000) and ...
- ... 13% of the global urban population
- Population in the coastal zone is increasing faster than global population

Population Density within and outside LECZ

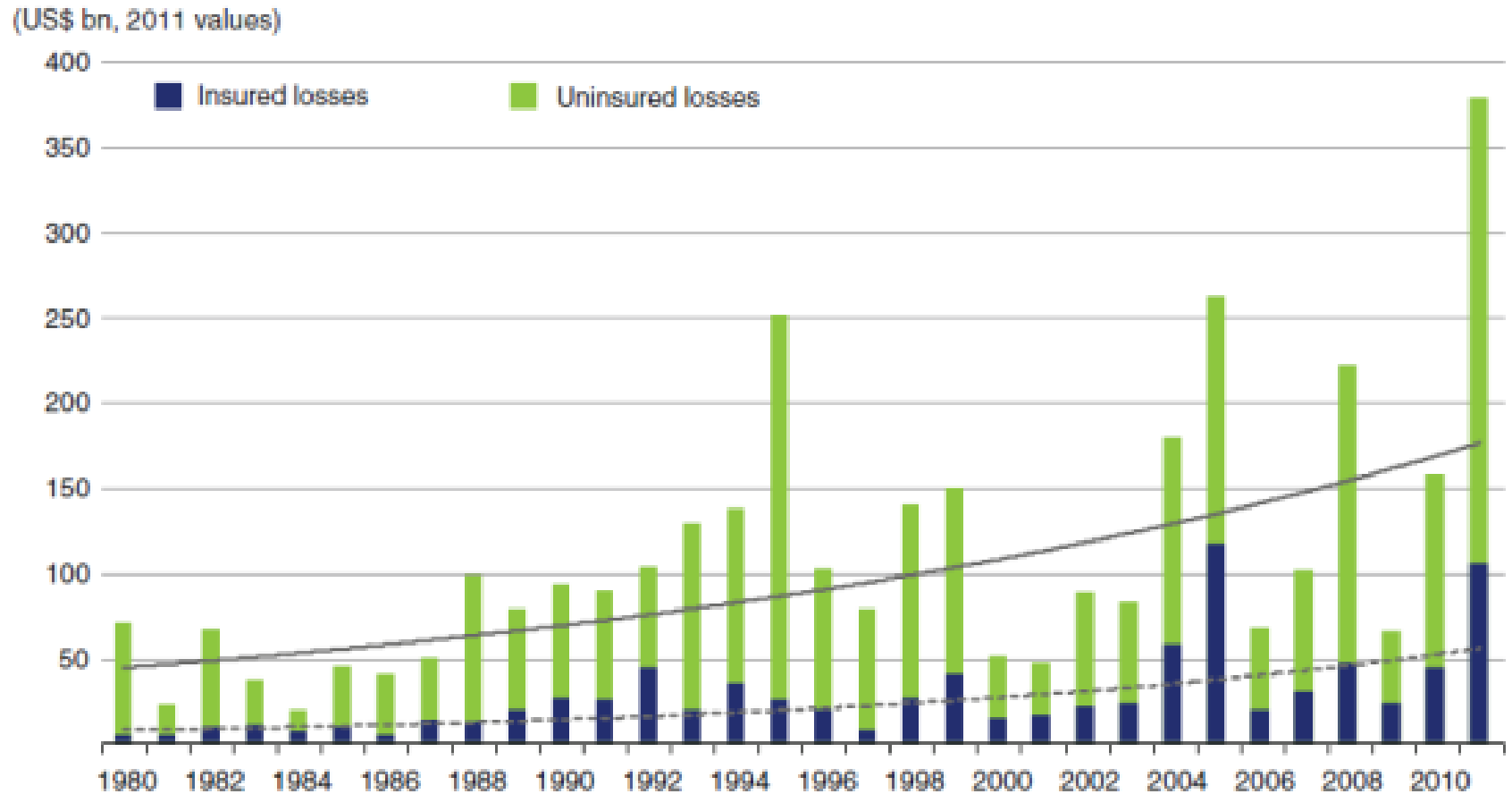


Population Density within and outside LECZ



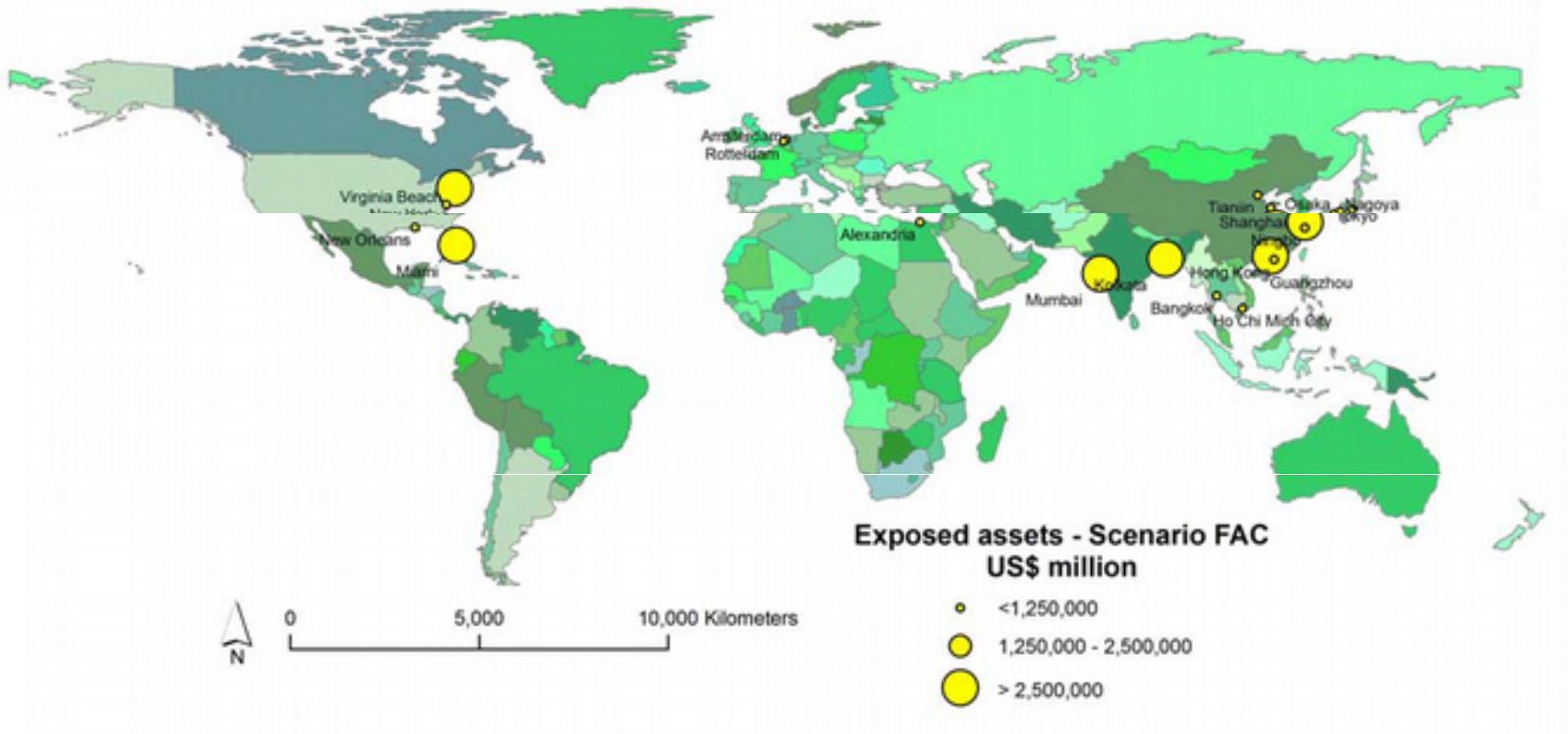
Source: Global Urban Areas  
(<http://sedac.ciesin.columbia.edu/gpw/lec2.jsp>)

# What is the evidence that Transitions are required?



**Fig. 4** Natural catastrophe losses 1980–2011: annual overall losses and insured portion with exponential trend curves (in 2011 values) (Source: Munich Re NatCatSERVICE, January 2012)

# Top 20 Cities for Exposed Assets OECD 2007



# El Iskandariya Alexandria

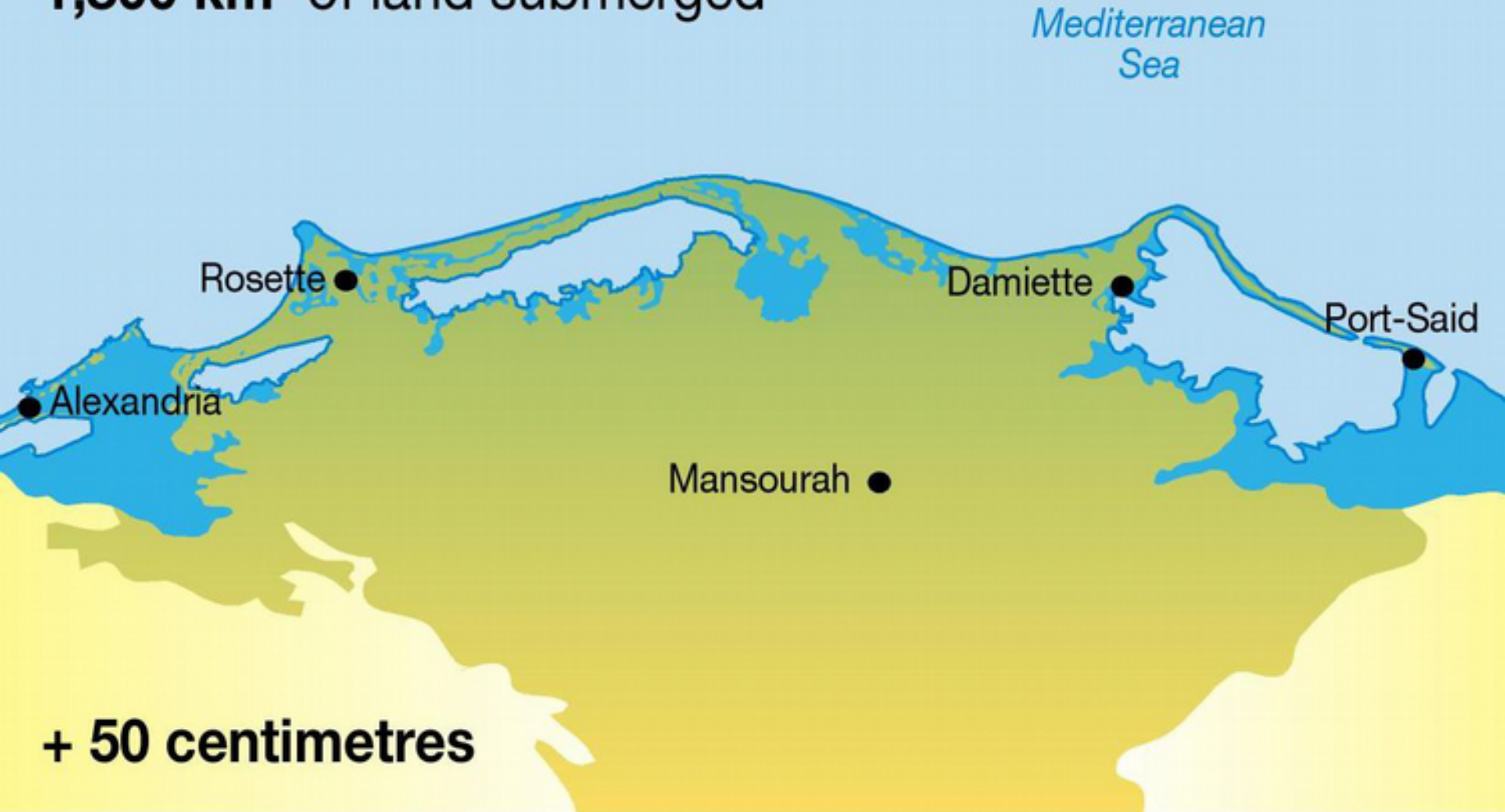


# Alexandria protected?



# With Modest Sea Level Rise

**4 million** people affected  
**1,800 km<sup>2</sup>** of land submerged



# Approximate Protection Standards Return Period in Years OECD 2007

City	Protection
London	1000
Shanghai	1000
Osaka	300
New York	100
Tokyo	1000
Amsterdam	10000
Rotterdam	10000
New Orleans	200*



Mississippi River

French Quarter

Superdome

Tulane

Lower 9th Ward

Old Metairie

London Ave. Canal

Bayou St. John

Orleans Canal

17th St. Canal

Industrial Canal

City Park

★ Levee breaches during Hurricane Katrina  
August 29, 2005

Lakefront Airport

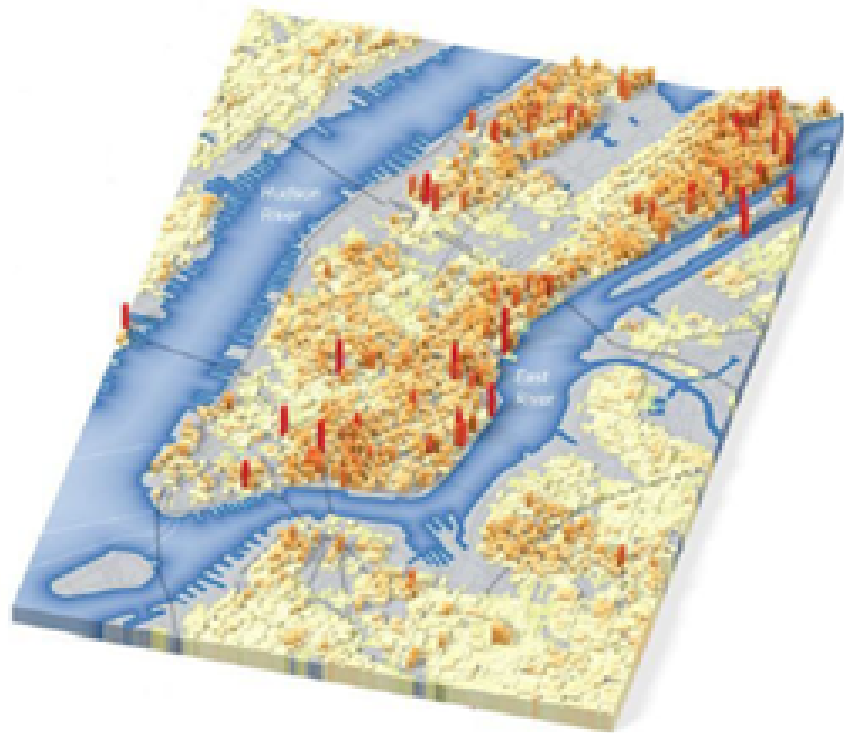
Lake Ponchartrain

Image © 2007 DigitalGlobe  
Image © 2007 TerraMetrics

©2007 Google

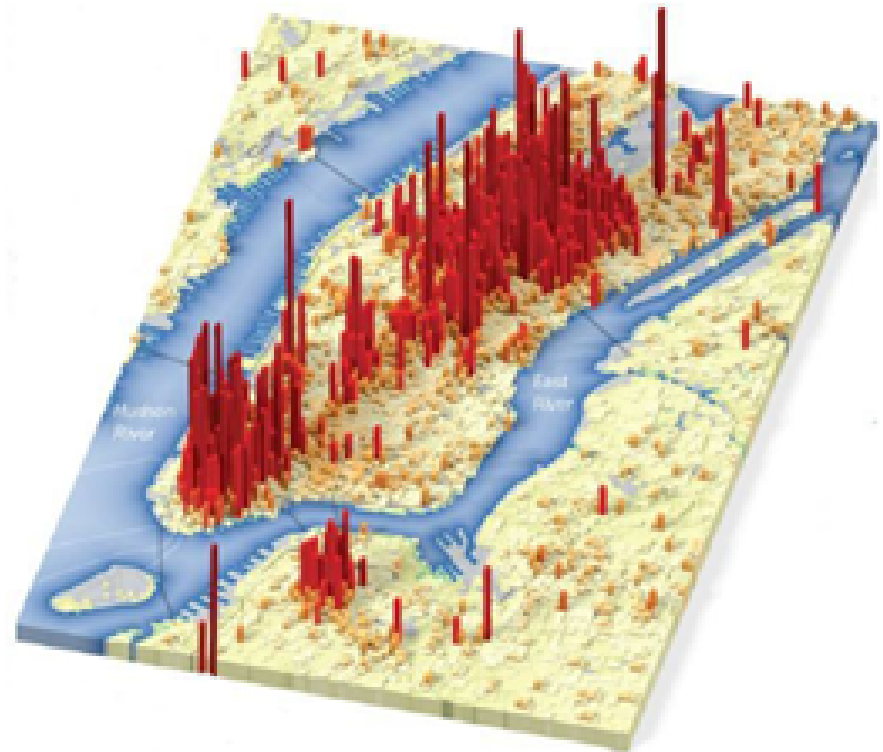


at night...



- Ambient population

...and by day



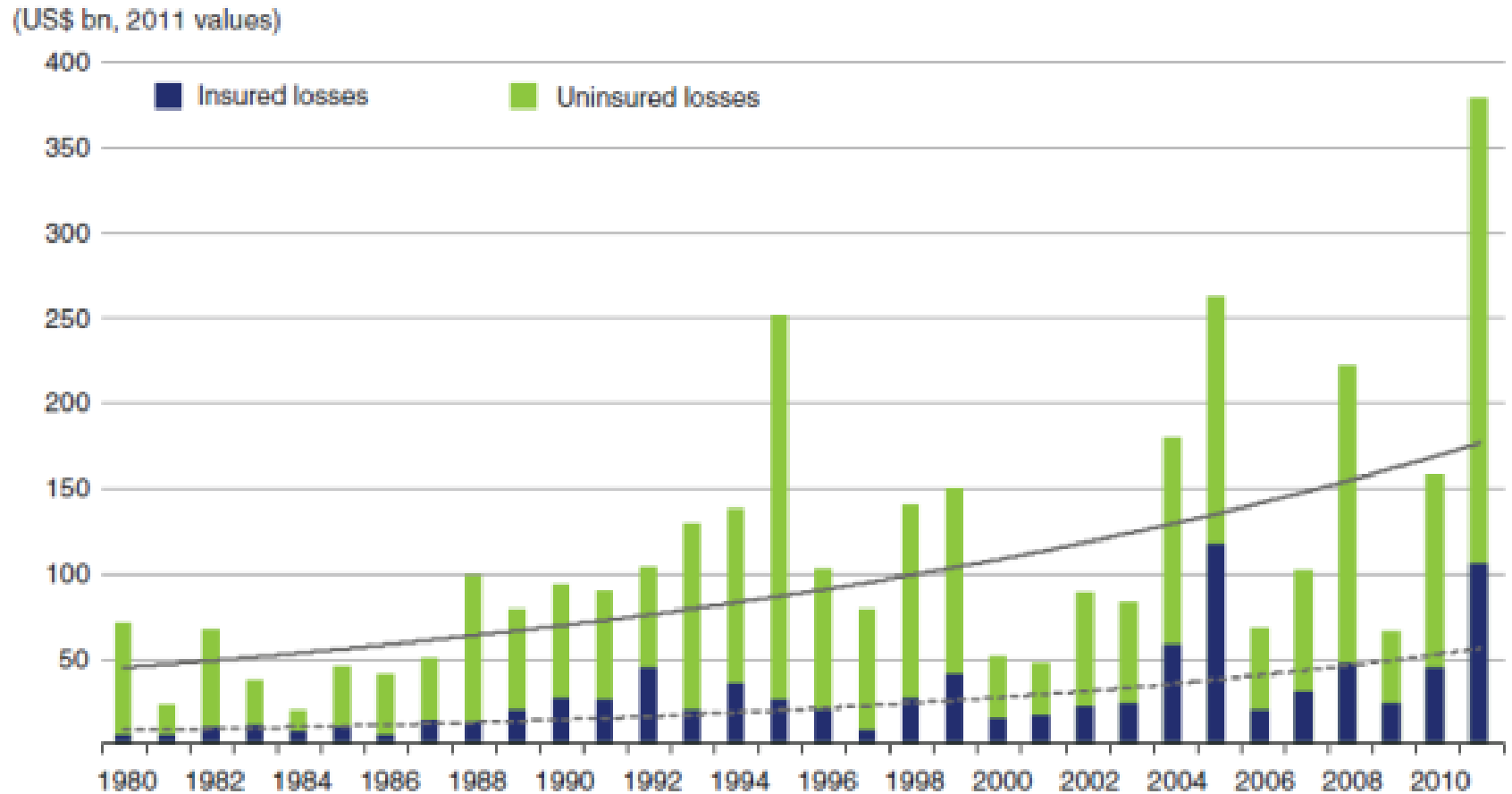
- Time is important!!

*(<http://www.joelertola.com/grfx/index.html>)*

# Water Street Subway Station after Superstorm Sandy



# What is the evidence that Transitions are required?



**Fig. 4** Natural catastrophe losses 1980–2011: annual overall losses and insured portion with exponential trend curves (in 2011 values) (Source: Munich Re NatCatSERVICE, January 2012)

# What Transitions Are Desirable?

Protect, **ADAPT**, Retreat, and....

- Move towards long-term perspectives.
- Assess competing visions of what society wants.
- Develop Governance Institutions that have the capacity to learn.
- Encourage pathways that adapt as the future unfolds and society evolves.

# What Transitions Have Been Achieved? Learning from Experience

- Coastal habitats United Kingdom: From protecting coasts “as they are”, to allowing the coasts to become “porous”.
- Cyclone preparedness Bangladesh: From lack of awareness of risks, to full participation of civil society in Disaster Risk Management.
- Coastal set-back lines in Australia and New Zealand.

# Why No Implementation?

## The Usual Suspects

- Short-term decision making
- Over-reliance on past experience
- Fragmentation in coastal governance
- Lack of strategic planning
- Emphasis on reactive adaptation
- Corruption

# Lessons from Cape Town

- *Holding back an advancing sea*  – Cape Times 26 August 2013 – Leonie, Anton and Anna.
- A transition took place when the harbour was built to protect shipping. The land behind became available for reclamation and development, and was also protected.
- However, the land on the side is becoming increasingly vulnerable, and leads back behind the lines of protection.
- A new transition is needed.



LLD+2.5m (sheltered environments)

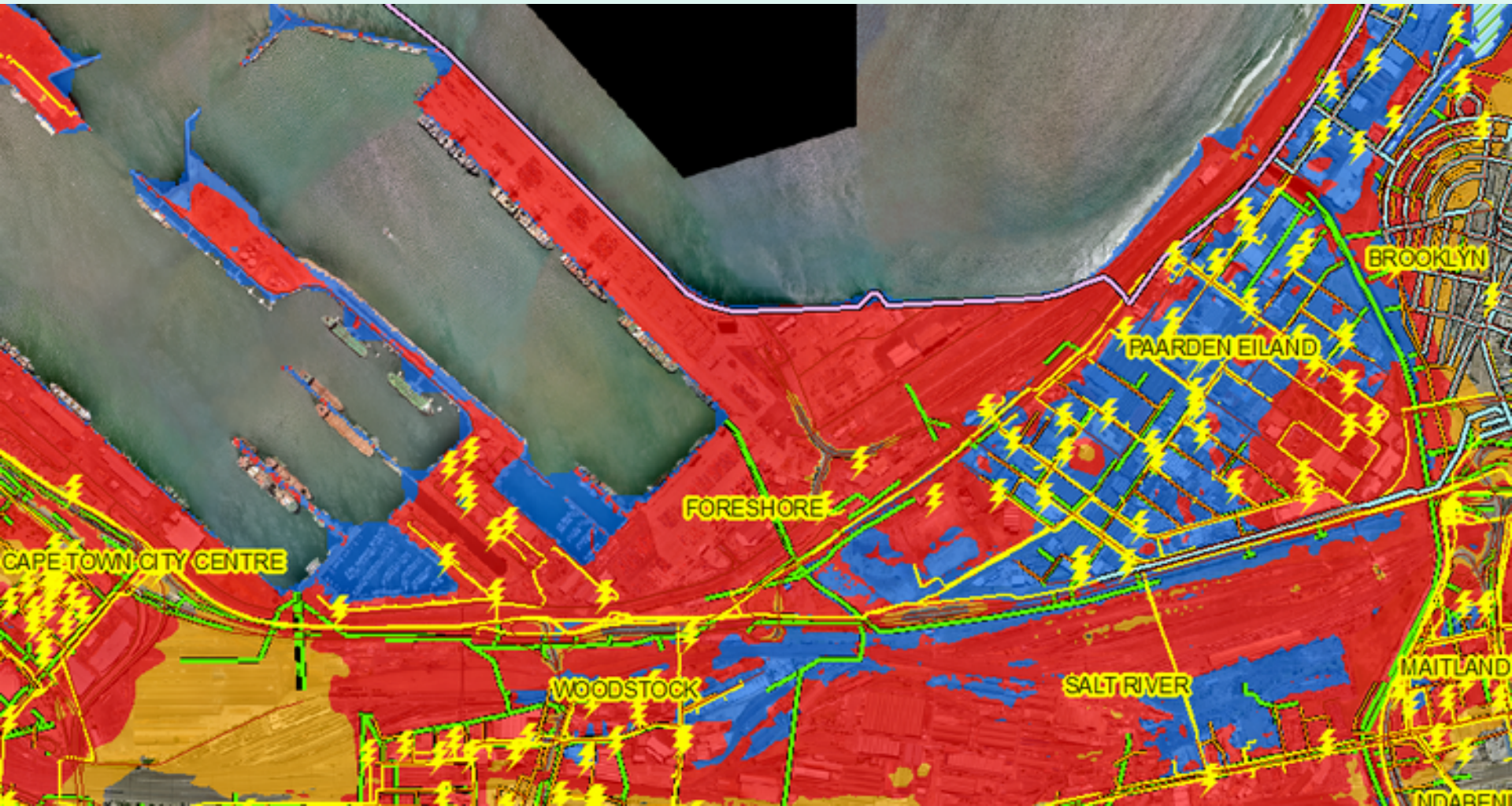
LLD+4.5m (exposed environments)

LLD+6.5m (very exposed environments)

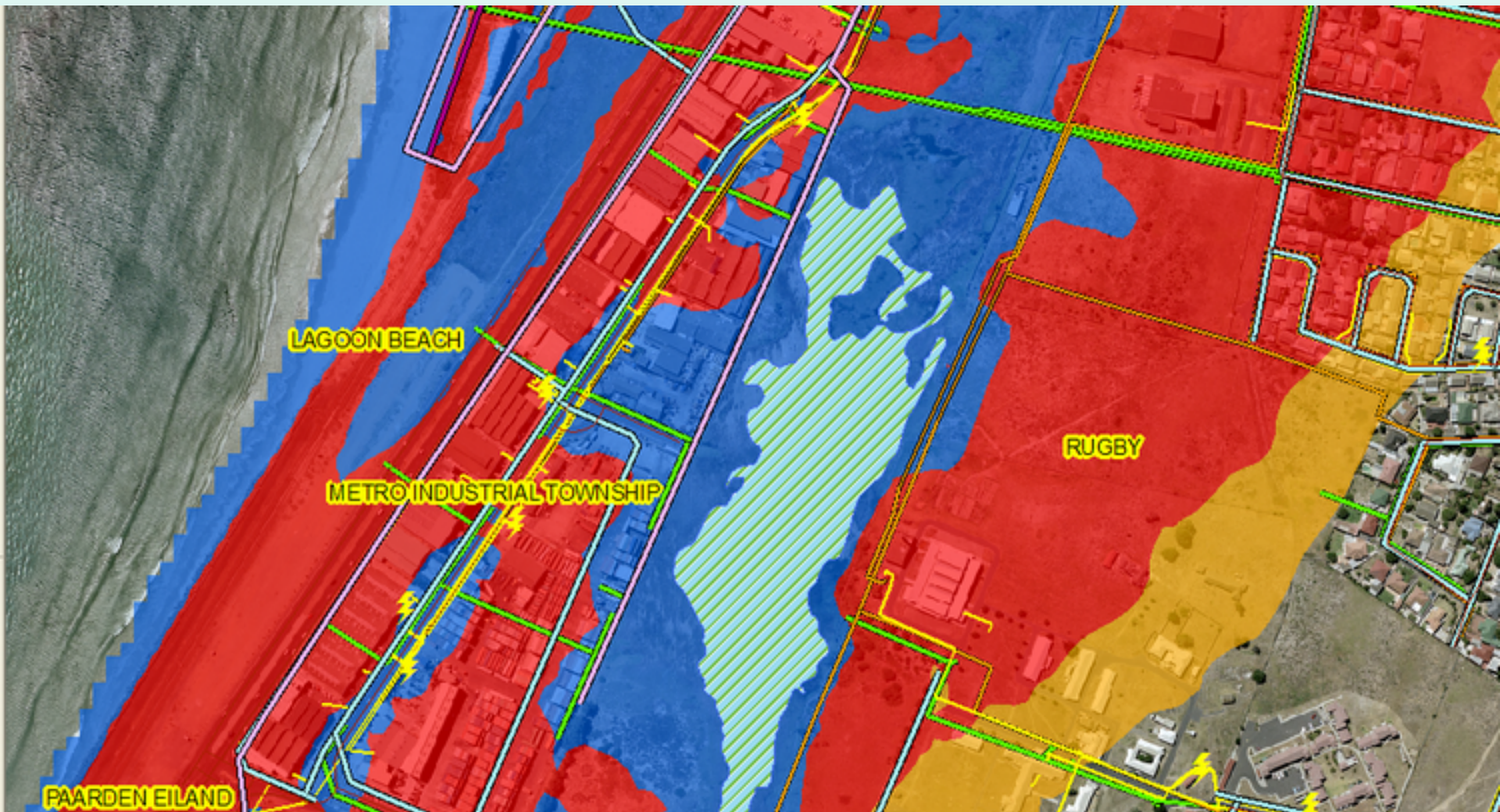
**Exposure to Worst Case Storms**

# Cape Town Harbour Area

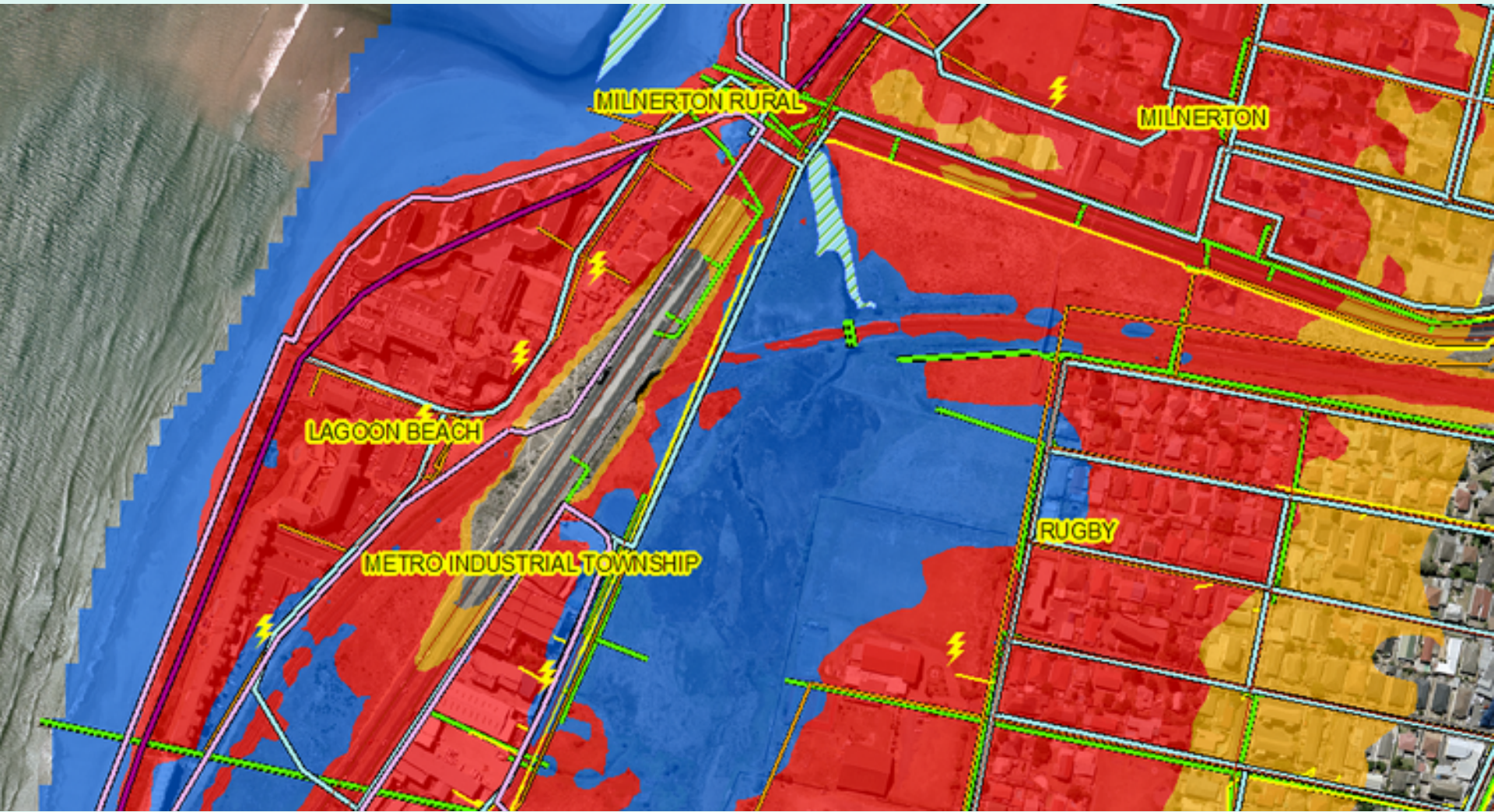
LLD+2.5m (lowest land)



# Further North



# Final Entrance from Sea



# Lessons from Cape Town

- Instead of protecting coasts “as they are”, try allowing the coasts to adapt “naturally”.
- Protect “naturally”.
- Change land use at the coast – “drawing the set-back line”.
- Explore all the options and apply them where they will be most effective.
- Full participation with and from civil society.

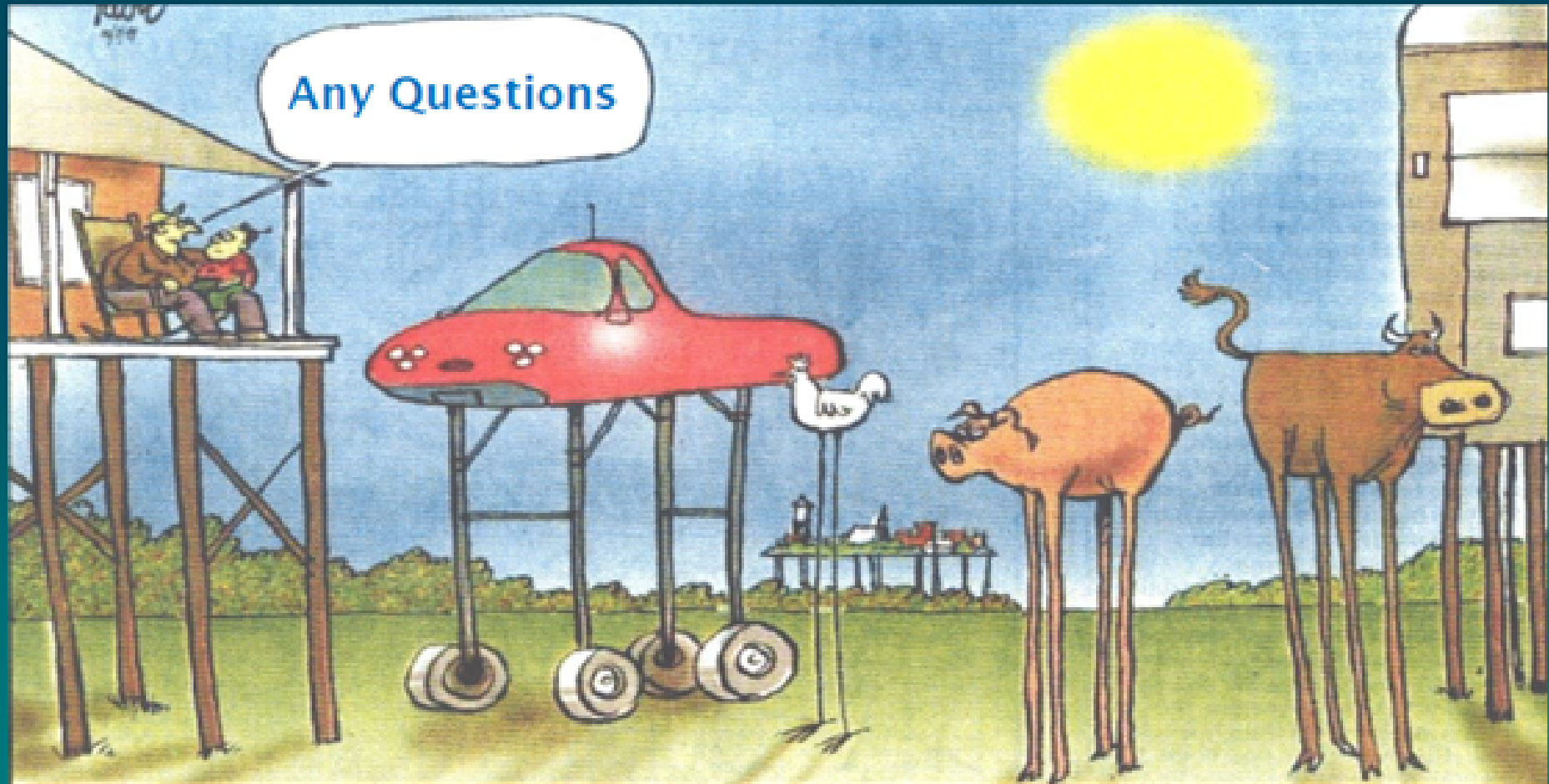
# WUN Changing Coasts Group

## An Agenda for Future Research

- Strategic assessment rather than projects.  
Assess what society wants from the coast.  
Define appropriate governance.  
Analyse multiple futures—with imagination.  
Communicate.
- Take the assessment to rapid application.  
Look for desirable transitions.  
The benefits are huge! If we can avoid half the recent coastal disasters, we save \$300bn

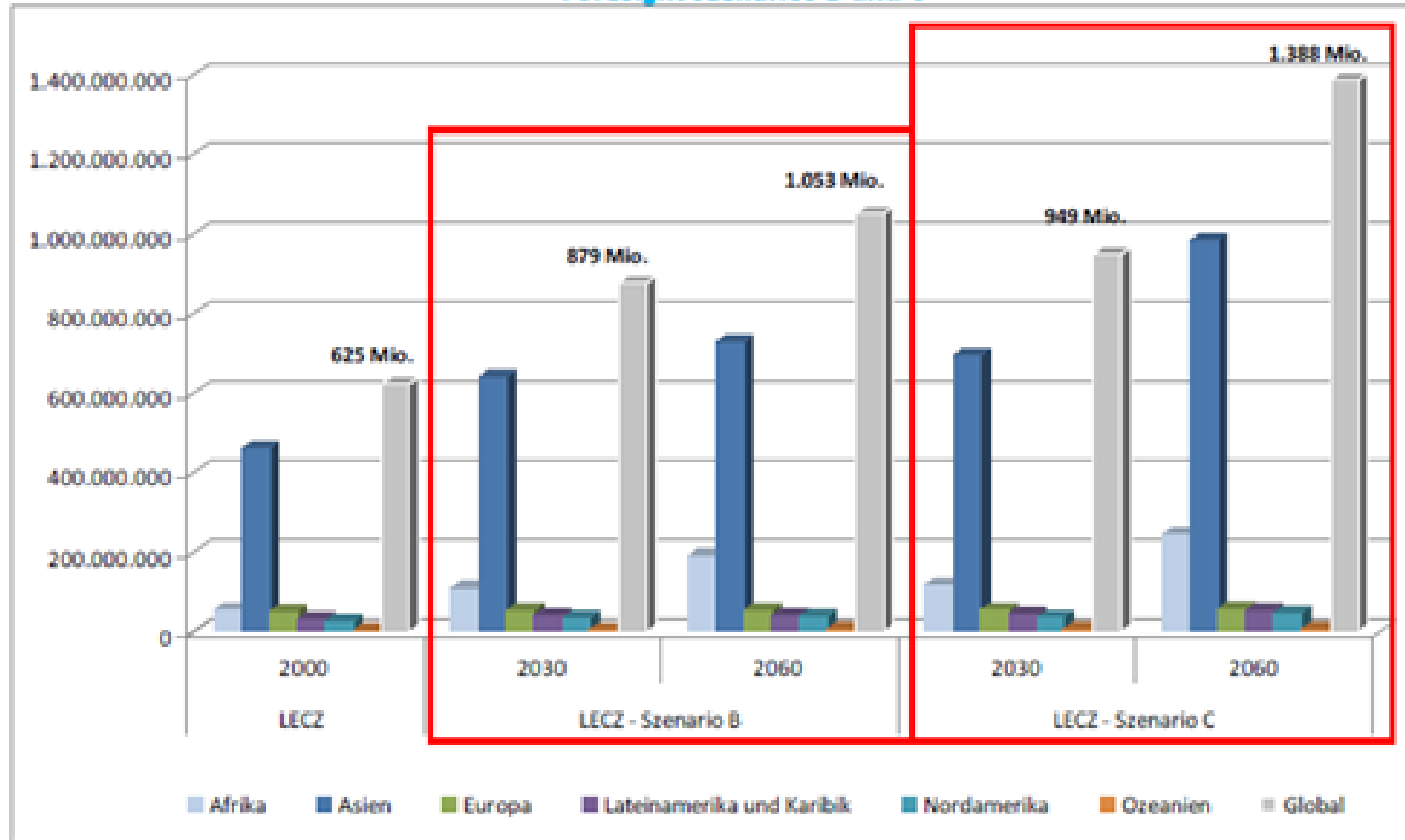
# Thank you ...

UNIVERSITY OF  
Southampton





## Population development in the LECZ Foresight Scenarios B und C



Vafeidis et al., 2011

To create (and to maintain)  
provide beach surface for  
ensuring beach carrying  
capacity



# HUMAN 'PROCESSES'

River Floods/ Sediment Supply  
Changing Land Use/Catchment Management

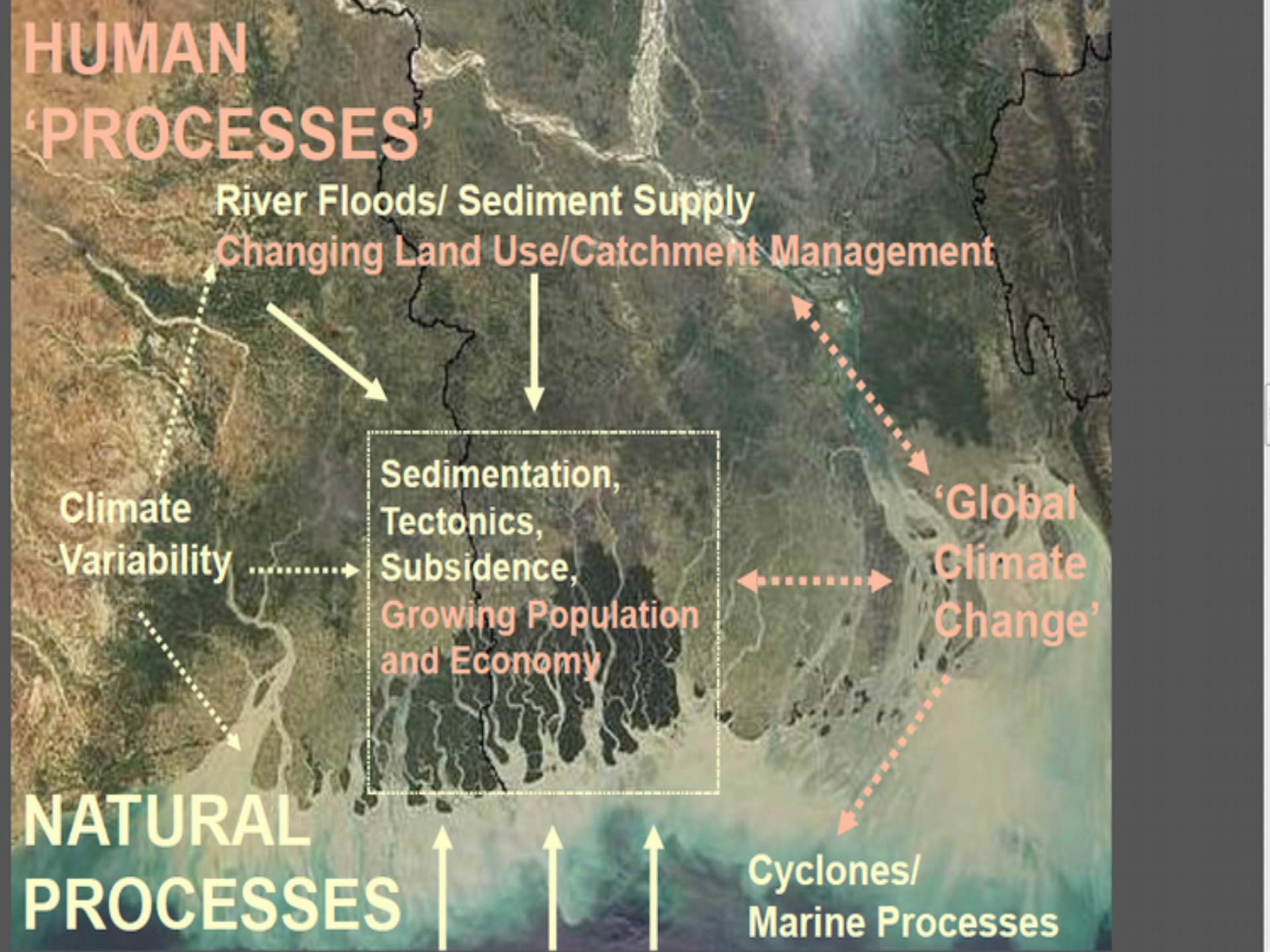
Climate  
Variability

Sedimentation,  
Tectonics,  
Subsidence,  
Growing Population  
and Economy

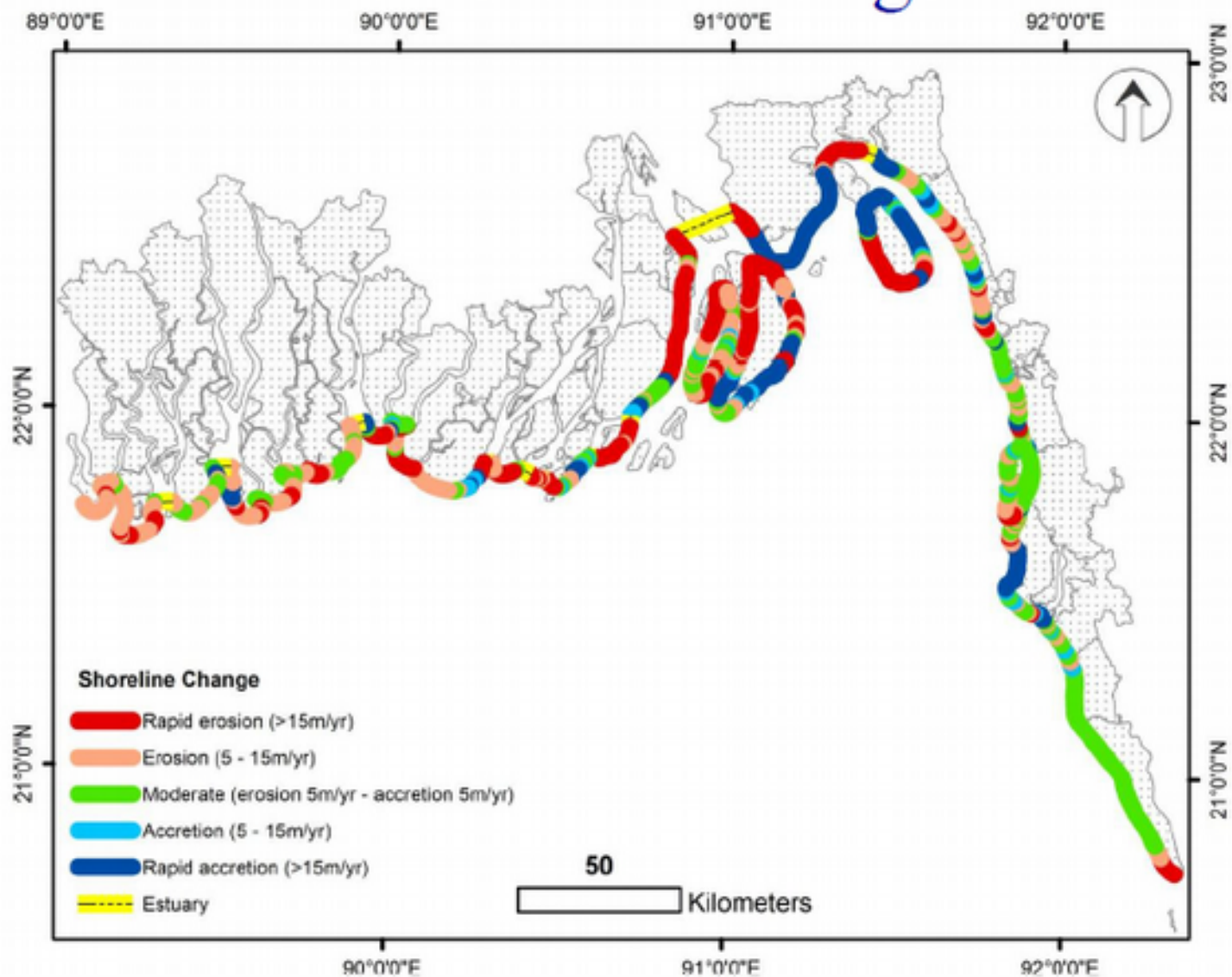
'Global  
Climate  
Change'

# NATURAL PROCESSES

Cyclones/  
Marine Processes



# Shoreline change



Sarwar, PhD thesis

# Uses, Functions and Services of Coastal Regions

Offshore Windparks

Built areas, Cities, Industry, Ports

Shipping, Military

Agriculture

Water treatment, Desalination

Tourism

Use of Minerals, Oil, Sand etc.

Use of littoral „Products“, Algae, Crabs

Fisheries and Mariculture

MPAs, National parks

Climate Change and Impacts