

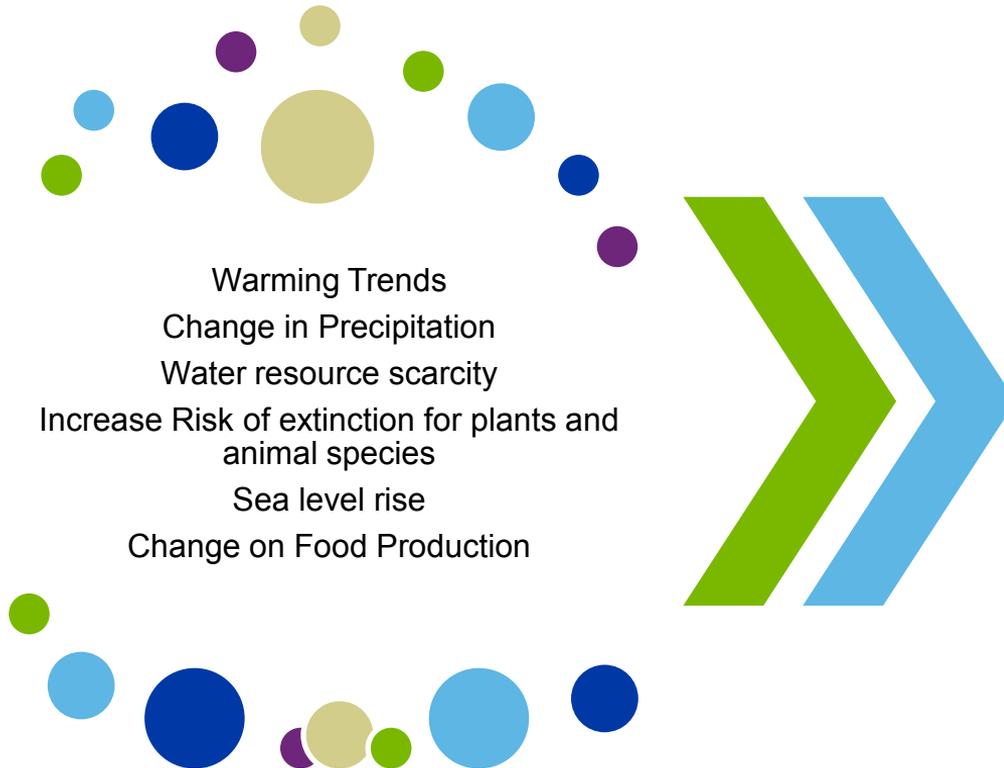


# Opportunities in a changing landscape: climate, demographics and emerging risks

PII Climate Change & Emerging Risks 9-11 April 2017

Brad Weir

# Asia Climate Change Assessment



Source: IPCC Report 2014

Climate change will impinge on sustainable development of most developing countries of Asia as it compounds the pressures on natural resources and the environment associated with rapid urbanization, industrialization, and economic development

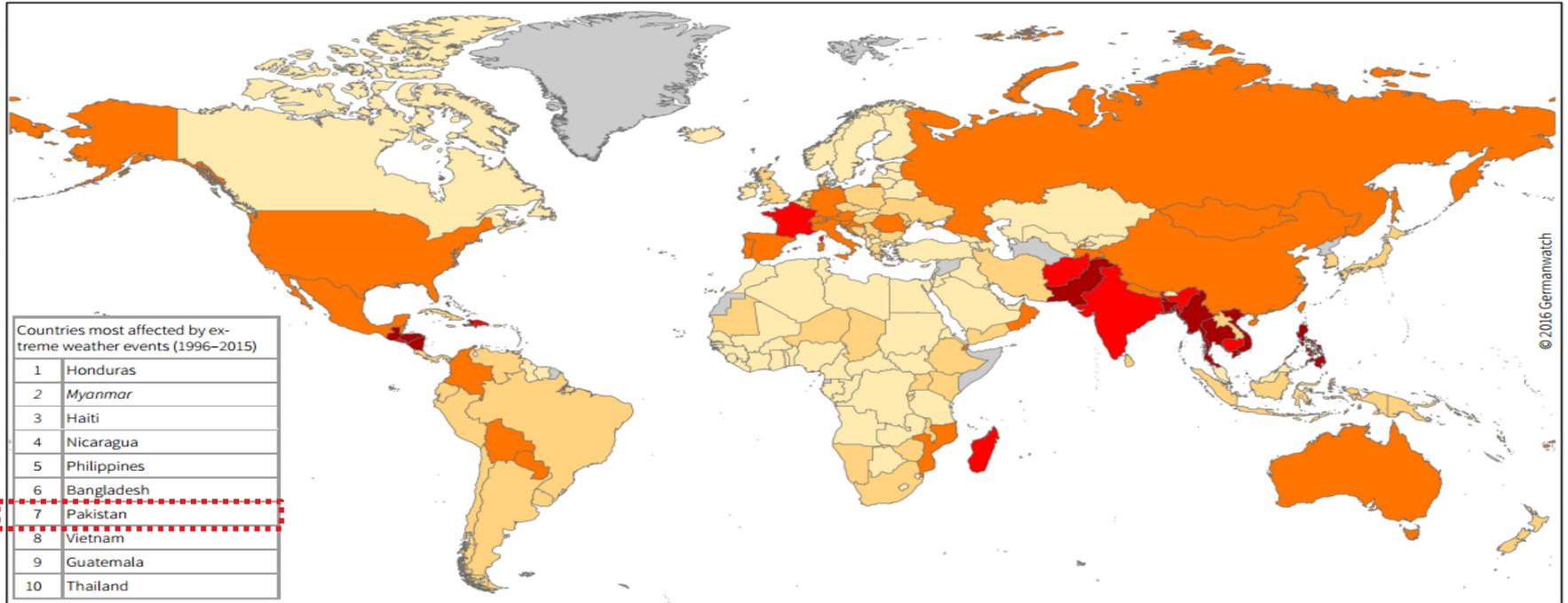
# People in Asia are in Risk Because of Climate Change?

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- People living in low-lying coastal zones and flood plains are probably most at risk from climate change impacts in Asia Half of Asia's urban population lives in these areas.
- Compounding the risk for coastal communities, Asia has more than **90% of the global population exposed to tropical cyclones**.
- Asia is predominantly agrarian, with 58% of its population living in rural areas, of which **81% are dependent on agriculture for their livelihoods**. Rural poverty in parts of Asia could be exacerbated due to negative impacts from climate change on rice production, and a general increase in food prices and the cost of living
- Climate change will have widespread and **diverse health impacts**. More frequent and intense heat waves will increase mortality and morbidity in vulnerable groups in urban areas

Source: IPCC Report 2014

# World Map of The Global Climate Risk Index 1996 - 2015



*Italics: Countries where more than 90% of the losses/deaths occurred in one year/event*

**Climate Risk Index: Ranking 1996–2015**

1–10
  11–20
  21–50
  51–100
  >100
  No data

Source: Germanwatch and Munich RE NatCatSERVICE

# Countries Most at Risk From Climate-Related Threats

Drought	Flood	Storm	Coastal 1m <sup>a</sup>	Coastal 5m <sup>a</sup>	Agriculture
<ul style="list-style-type: none"> <li>• Malawi</li> <li>• Ethiopia</li> <li>• Zimbabwe</li> <li>• India</li> <li>• Mozambique</li> <li>• Niger</li> <li>• Mauritania</li> <li>• Eritrea</li> <li>• Sudan</li> <li>• Chad</li> <li>• Kenya</li> <li>• Iran</li> </ul>	<ul style="list-style-type: none"> <li>• Bangladesh</li> <li>• China</li> <li>• India</li> <li>• Cambodia</li> <li>• Mozambique</li> <li>• Laos</li> <li>• <b>Pakistan</b></li> <li>• Sri Lanka</li> <li>• Thailand</li> <li>• Vietnam</li> <li>• Benin</li> <li>• Rwanda</li> </ul>	<ul style="list-style-type: none"> <li>• Philippines</li> <li>• Bangladesh</li> <li>• Madagascar</li> <li>• Vietnam</li> <li>• Moldova<sup>b</sup></li> <li>• Mongolia<sup>b</sup></li> <li>• Haiti</li> <li>• Samoa</li> <li>• Tonga</li> <li>• China</li> <li>• Honduras</li> <li>• Fiji</li> </ul>	<ul style="list-style-type: none"> <li>• All low-lying Island States</li> <li>• Vietnam</li> <li>• Egypt</li> <li>• Tunisia</li> <li>• Indonesia</li> <li>• Mauritania</li> <li>• China</li> <li>• Mexico</li> <li>• Myanmar</li> <li>• Bangladesh</li> <li>• Senegal</li> <li>• Libya</li> </ul>	<ul style="list-style-type: none"> <li>• All low-lying Island States</li> <li>• Netherlands</li> <li>• Japan</li> <li>• Bangladesh</li> <li>• Philippines</li> <li>• Egypt</li> <li>• Brazil</li> <li>• Venezuela</li> <li>• Senegal</li> <li>• Fiji</li> <li>• Vietnam</li> <li>• Denmark</li> </ul>	<ul style="list-style-type: none"> <li>• Sudan</li> <li>• Senegal</li> <li>• Zimbabwe</li> <li>• Mali</li> <li>• Zambia</li> <li>• Morocco</li> <li>• Niger</li> <li>• India</li> <li>• Malawi</li> <li>• Algeria</li> <li>• Ethiopia</li> <li>• <b>Pakistan</b></li> </ul>

<sup>a</sup> Meters above the sea level

<sup>b</sup> Winter storms

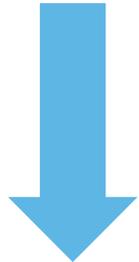
Source: <http://www.lead.org.pk>

PII Climate Change & Emerging Risks' | Opportunities in a changing landscape: climate, demographics and emerging risks

# Predicted Impacts of Climate Change in Pakistan



- ↑ Frequency and intensity of extreme weather events
- ↑ Siltation of major dams
- ↑ Temperatures resulting in enhanced heat and water-stressed conditions
- ↑ Intrusion of saline water in the Indus delta
- ↑ Cyclonic activity



- ↓ Projected recession of the Hindu-Kush-Karakoram-Himalayan glaciers due to warming temperatures and carbon soot deposits from trans-boundary pollution sources

- Climate change is predicted to have severe consequences for South Asia, particularly in agriculture
- Agriculture Industry employs more than 60 per cent of labor force in South Asia

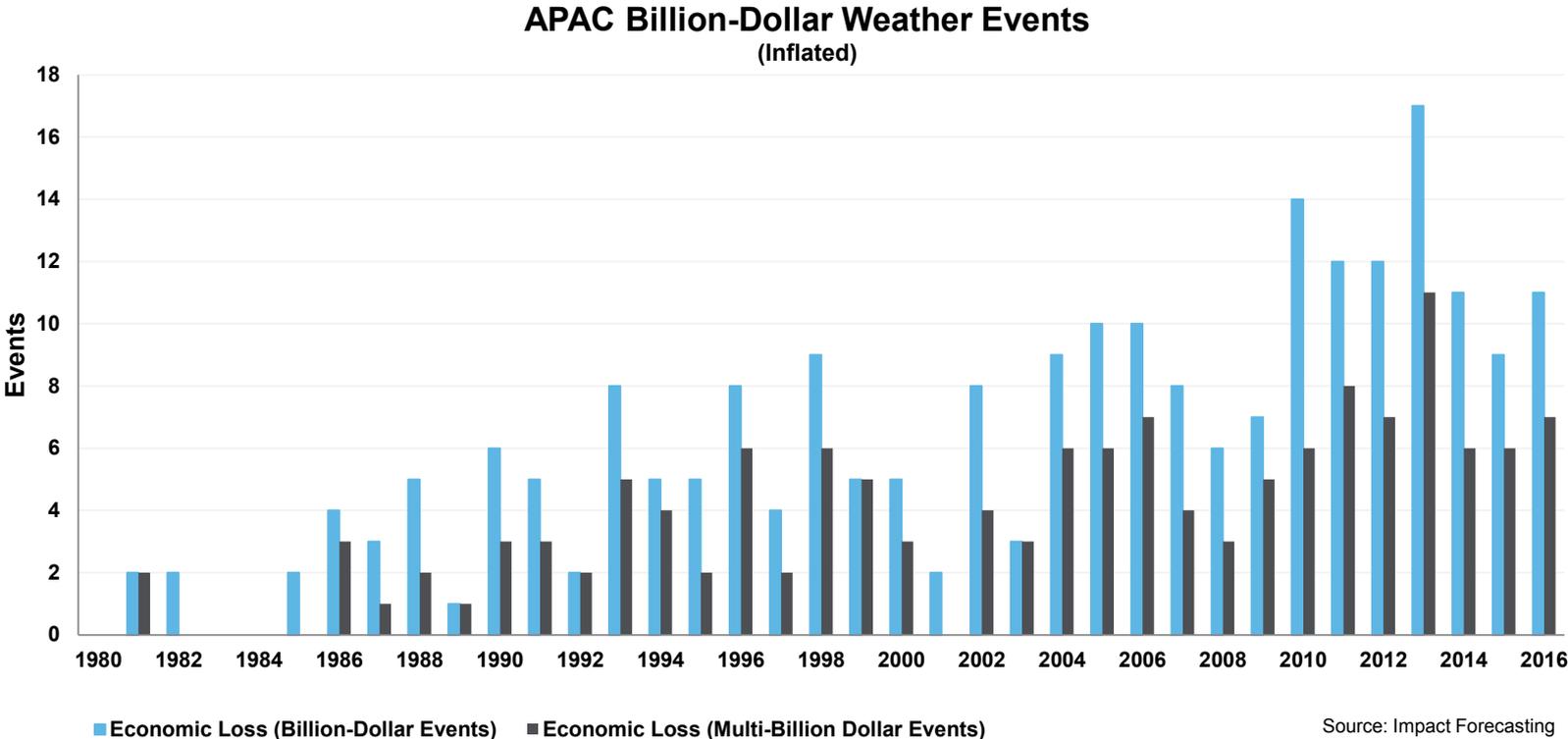
Source: Climate Adaptation Knowledge Exchange

Source: NCCP (Pakistan)

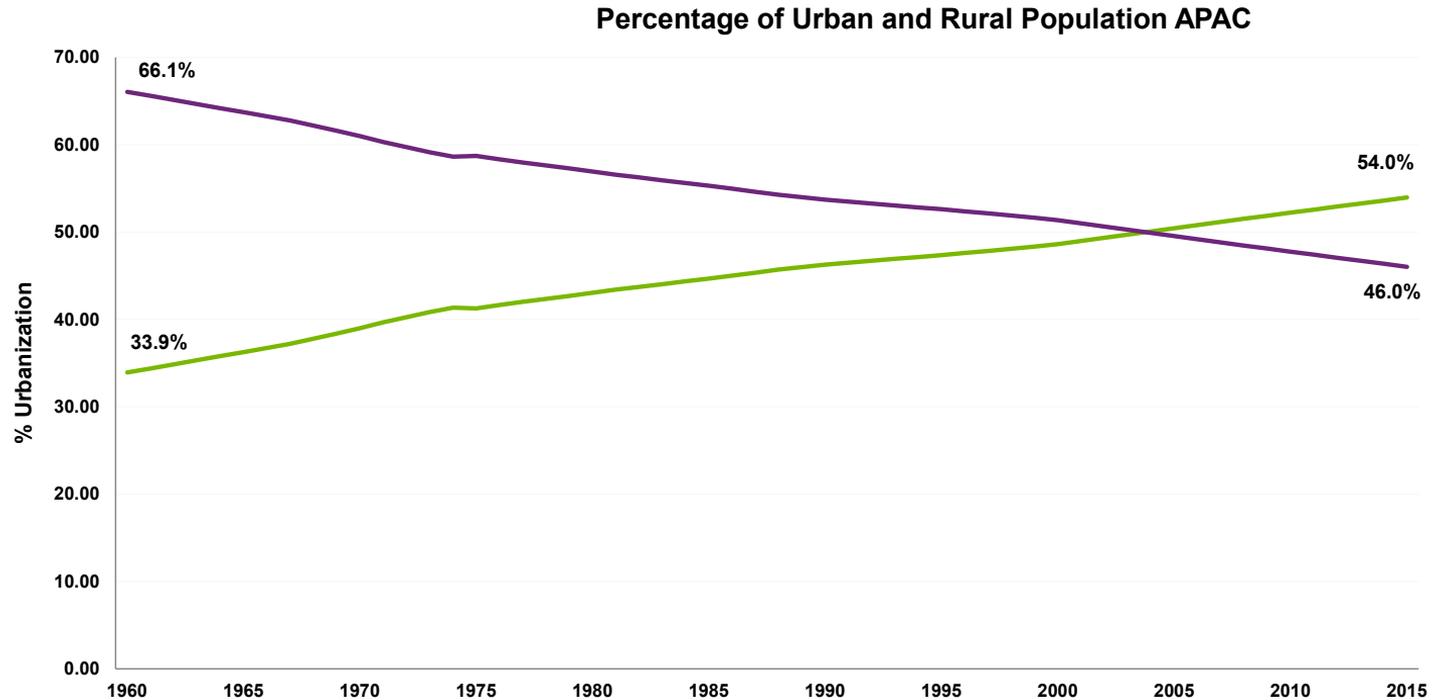


# Climate Change and Catastrophes

# APAC Economic Loss on Billion-Dollar Weather Events



# Demographics: rate of urbanisation



Source: Aon Benfield & World Bank

# Catastrophes and Climate Change

Weather-related catastrophe losses are **increasing** above the rate of inflation

Estimated contribution to losses < 15%



Economic growth, exposure, and urbanisation account for ~85% of increased loss trend

# Catastrophes and Climate Change

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Estimated climate  
contribution to losses  
< 15%

85% of the historic loss  
increase is related to our own  
portfolio



# Demographics and Urbanisation

# Impact of Urbanisation

## Demographics, Development, Disasters

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1990



<http://www.laboiteverte.fr/>

# Urbanisation in Pakistan

- Total population in Pakistan grew by about 400% from the 1950s to 2010, while the total urban population increased by 700%.
- It is estimated that by 2025, nearly 50% of the population will be urban dwellers, up from about a third currently of the 190 million countrywide population.



*Financial street of Karachi, Pakistan*



*Fawara Chowk, Rawalpindi*

# Impact of Urbanisation: rapid change of the risk landscape

## An example of significant urbanisation impact

### Subsidence in Jakarta

- Continued subsidence in Jakarta leading to drainage challenges
- Continued development of seawalls to combat the problem
- Inundation from the sea presents a significant challenge

Long term Resilience may now require massive, international, multi-agency investment.

### Great Garuda Project

- *The 35-kilometre wall, across the Bay of Jakarta off the city's northern coast, is the centerpiece of a project that will cost up to US\$40 billion over 30 years.*
- Long term – what guaranteed outcome?
- But may also present an economic opportunity.



Source: Deltares



<http://www.kuiper.nl/en/news/the-great-garuda-to-save-jakarta/>

# Subsidence in Pakistan as a result of Climate and Groundwater Usage

“According to Global Positioning System (GPS) data, the Quetta zone is subsiding at the rate of 10cm every year,”

*Dr. Din Mohammad Kakar, a professor at the Geology Department in the University of Balochistan*



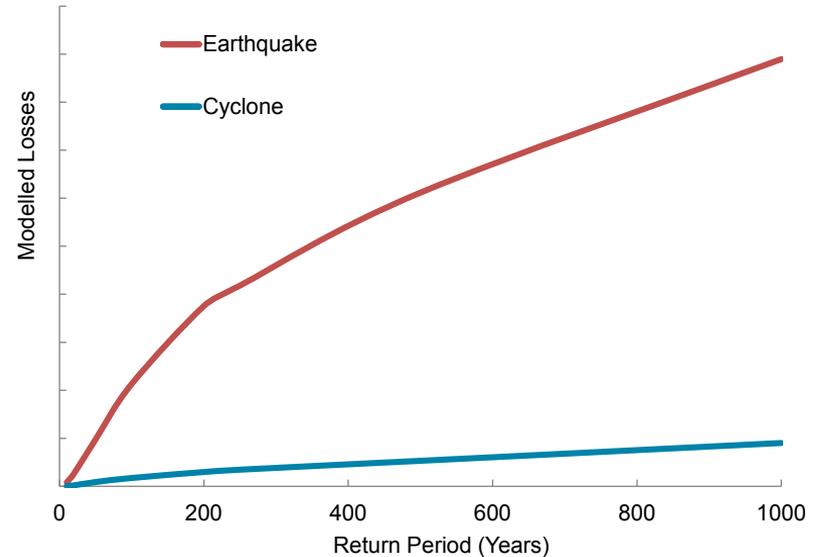
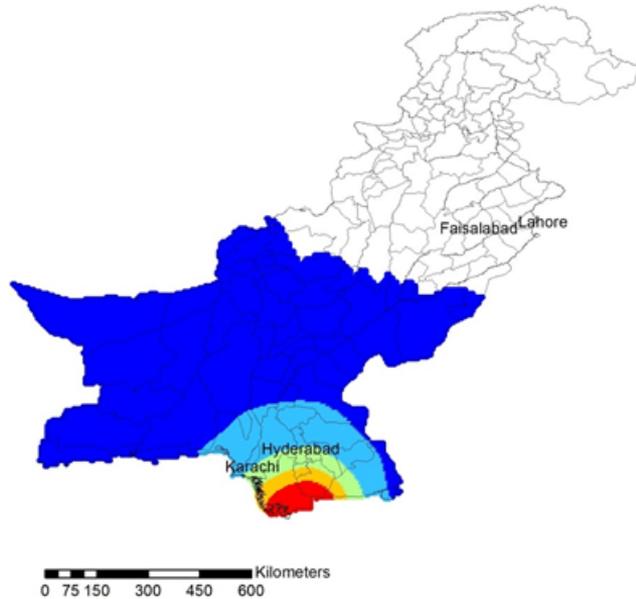
*Cracked walls in a hospital in Quetta due to land subsidence*

- Lahore and Faisalabad, the 2<sup>nd</sup> and 3<sup>rd</sup> most populous cities, has groundwater as their primary source of water.
- Increasing urbanisation and population growth, as well as industrialisation and agriculture, will result in increased water usage and increase the risk of subsidence in these major cities.
- **Karachi** is situated in the low-lying areas of Sindh province and as it is, can be inundated by a major cyclone and is also vulnerable to tsunamis and sudden high tides.
- Subsidence will only lead to aggravating and intensifying the effects of these floods.

# Urbanisation and Climate Impact on Cyclone Risk

## Cyclonic Activity expected to increase over time as part of Climate Change

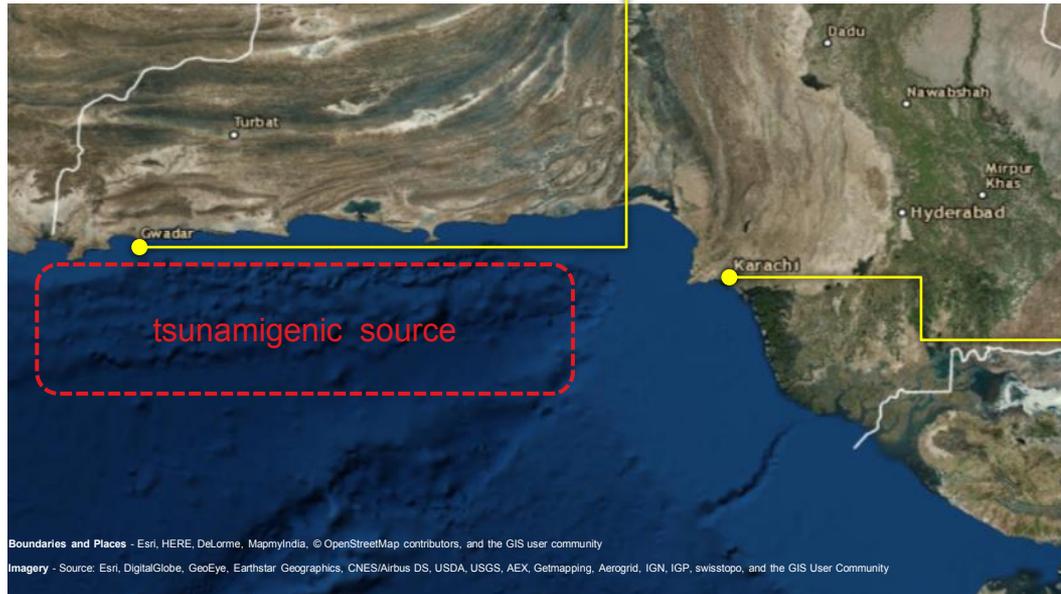
- Karachi is within the Cyclone exposed coastal region for Pakistan
- However, should be considered in the context of other natural perils



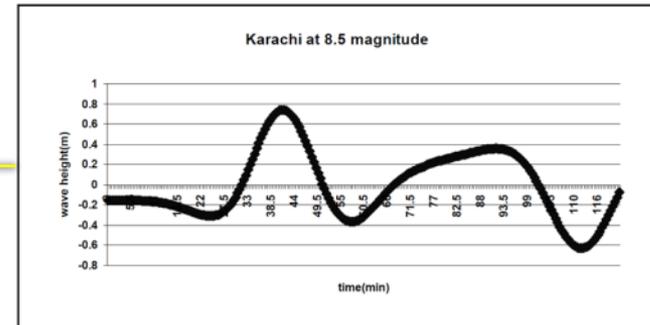
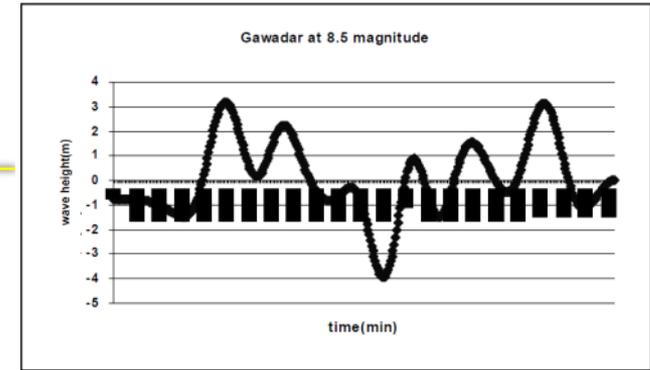
# Urbanisation and Tsunami Following an Earthquake

Large earthquake in Makran trench could cause tsunami in addition to shake damage

- Similar to 1945 earthquake along the Makran coast of Pakistan
- Karachi protected due to source orientation and Cape Monze promontory
- Any subsidence could increase exposure



Boundaries and Places - Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community  
Imagery - Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Humeira Hafeez 2007, Pakistan Meteorological Dept.

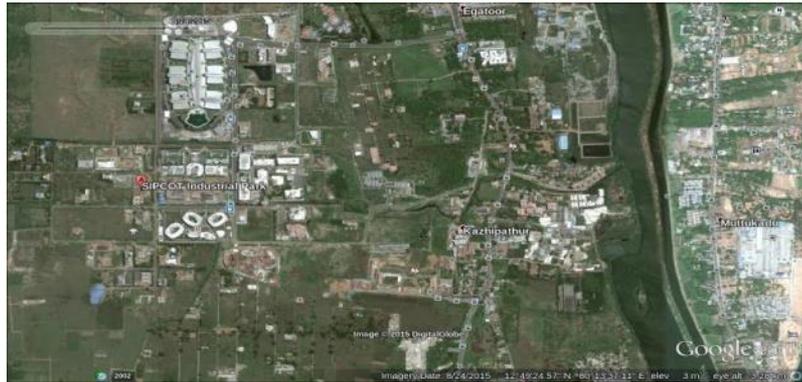
# Karachi Vulnerable Regions

On 1 July 1977, Karachi received its third highest recorded rainfall of 207 millimetres within 24 hours, causing a devastating flood in the city and took 248 lives. This event triggered the only widely known flood defense mechanism, the Malir River Embankment, which aimed primarily at protecting the Korangi Industrial Area against another total inundation.

- Besides Tidal Flooding and Cyclone-induced Flooding, Karachi and its surrounding area is prone to
  - Pluvial flooding, from heavy precipitation
  - Fluvial flooding, from Lyari/Malir rivers and their tributaries
- The deltaic area, adjacent to the settlement of Karachi is highly prone to total inundation as witnessed in the 2010 floods due to the proximity to the Indus.
- Karachi could become more prone over time due to similar elevation, rising sea levels and increasing land subsidence.



# Continual Reminders: recent floods in Chennai



2015



# Local Knowledge is Critical: simple observations from floods in Chennai

Flood risk mitigation varies greatly within the impacted area

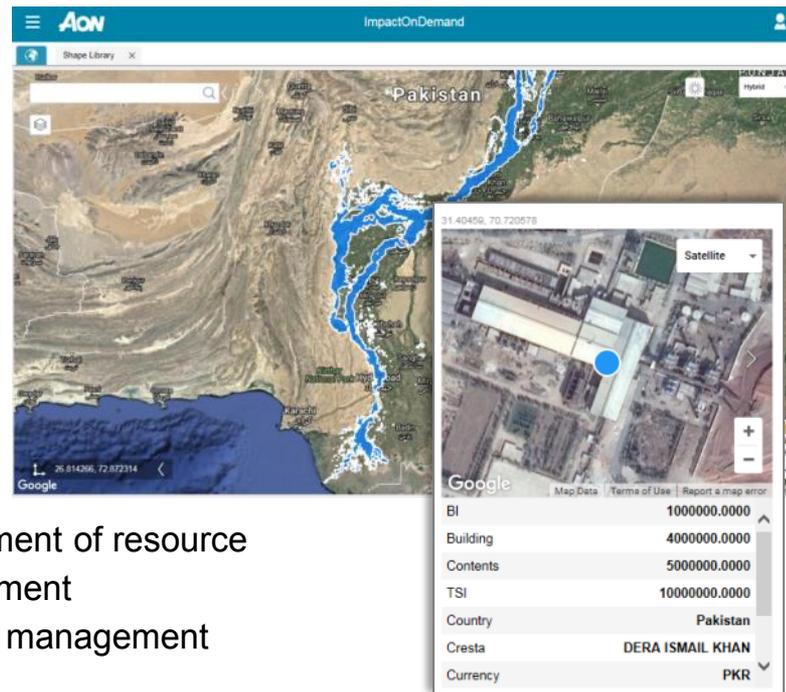
- Awareness
- Preparedness
- Coverage considerations
  - Business continuity
- Risk assessment

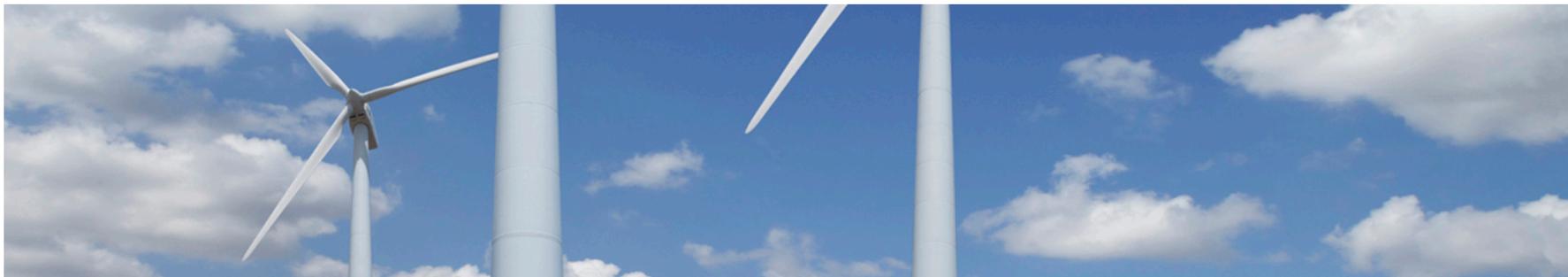


# Risk Management: what can we do?

Continual Risk Management and Monitoring is critical to increase our understanding and mitigate or protect the risk

- History can provide an insight
  - but be mindful of what has changed
- Utilise available resources and tools
  - Catastrophe models
  - Scenarios (current and future), scientific reports
  - Exposure management tools
- What and where is insured
  - Can you easily identify where your key exposures are and what they are exposed to?
  - Accept that improving current process will take an investment of resource
- Clear understanding of limitations around current risk assessment
- Local underwriting knowledge is a key component to any risk management assessment





# Emerging risks

# Aon 2015 Risk Manager Survey

## Top Risks

Damage to reputation/ brand	Economic slowdown/ slow recovery	Regulatory/ legislative changes	Increasing competition	Failure to attract or retain top talent	Failure to innovate/ meet customer needs	Business interruption	Third-party liability	Computer crime/ hacking/ viruses
Property damage	Commodity price risk	Cash flow/ liquidity risk	Technology failure/ system failure	Distribution or supply chain failure	Political risk/ uncertainties	Corporate governance/ compliance burden	Exchange rate fluctuation	Weather/ natural disasters
Capital availability/ credit risk	Directors & Officers personal liability	Failure of disaster recovery plan	Corporate social responsibility/ sustainability	Injury to workers	Crime/ theft/ fraud/ employee dishonesty	Loss of intellectual property/ data	Failure to implement or communicate strategy	Counter party credit risk
Merger/ acquisition/ restructing	Environmental risk	Inadequate succession planning	Lack of technology to support business needs	Workforce shortage	Product recall	Accelerated change in market & geopolitics	Aging workforce and related health issues	Globalization/ emerging markets
Interest rate fluctuation	Outsourcing	Unethical behaviour	Natural resource scarcity	Terrorism/ sabotage	Asset value volatility	Understaffing	Pandemic risk/ health crises	Climate change
Social media	Absenteeism	Joint venture failure	Share price volatility	Pension scheme funding	Sovereign debt	Kidnap and ransom/ extortion	Harassment/ discrimination	

# Aon 2015 Risk Manager Survey

## Where are the Potential Product Opportunities?

General Business Risk		Insurable & Generally Insured	Insurable & Not Enough Insured	Unclear loss amount or loss trigger	Social or Global Risk	Financial Risk	
Economic slowdown/ slow recovery	Inadequate succession planning	Third-party liability	Business interruption	Damage to reputation/ brand	Environmental risk	Commodity price risk	Pension scheme funding
Regulatory/ legislative changes	Lack of technology to support business needs	Property damage	Computer crime/ hacking/ viruses	Failure of disaster recovery plan	Accelerated change in market & geopolitics	Cash flow/ liquidity risk	Sovereign debt
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Merger/ acquisition/ restructuring			Absenteeism			Share price volatility	
			Harassment/ discrimination				

# Pakistan Crop Insurance

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## Climate change will have a big impact to agriculture in Pakistan

### DRIVERS OF CHANGE FOR CROP INSURANCE

- There is a need to increase the size of the crop insurance scheme and potentially reduce the complexity of mechanism
- Climate is unpredictable and Government can be the main driver of change, but greater financial commitment is required and would allow the Government to:

1

Expand the existing programme to more farmers, non-loanees. Subsidise the premium to an extent that all farmers can afford the insurance product.

2

Consider new catastrophe type weather insurance product, based on rainfall. This could give some protection to farmers from drought or widespread flooding

3

Use new remote sensing technology to introduce a more comprehensive crop insurance scheme. Govt. could also subsidise the premiums to make it affordable and scalable,

# Pakistan Crop Insurance

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Expanding through increased financial commitment from the government would result in :

- *Greater number of farmers covered, increasing the financial security of many farmers and the Country*
- *Increased financial security of farmers brings stability and could reduce rural – urban migration*
- *Increase the domestic cropped area and so improve Pakistan's food security*
- *Help the government manage their disaster relief budget following a catastrophic event*
- *Help to mitigate the potential impacts of climate change through diversification and stabilisation*

# Role of the Broker: From Placement to Risk and Capital Management Advisory

- Scale
- Local, Regional and Global
- Market perspective
- Independent advice
- Technology platforms

- Reinsurance structuring
- Market intelligence
- Negotiation and placement
- Policy administration
- Run off management

**Transactional broking only**  
1990's

**Local**

- **Catastrophe management**
- **Reinsurance & portfolio optimisation**
- **Peer analysis/benchmarking**
- **Market analysis**
- **Rating advisory**
- **Security analysis**
- **M&A and Capital Market**
- **Liability management**
- Reinsurance structuring
- Market intelligence
- Negotiation and placement
- Policy administration
- Run off management

**+ Advisory**  
2000's

**Regional**

- **Multi-model risk assessment**
- **Proprietary models & solutions**
- **Reinsurance as capital**
- **Analytics Product and Solutions**
- **Risk and Capital Strategy**
- **Strategic Consulting**
- **Life Reinsurance**
- Catastrophe management
- Reinsurance & portfolio optimisation
- Peer analysis/benchmarking
- Market analysis
- Rating advisory
- Security analysis
- M&A and Capital Market
- Liability management
- Reinsurance structuring
- Market intelligence
- Negotiation and placement
- Policy administration
- Run off management

**+ Consulting**  
2010's

**Global**



# Questions

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