PRINCIPLES OF SUSTAINABLE FINANCE

Chapter 11: Insurance – managing long-term risk

Overview of the book

Part I: What is sustainability and why does it matter?

1. Sustainability and the transition challenge

Part II: Sustainability's challenges to corporates

2. Externalities - internalisation
3. Governance and behaviour
4. Coalitions for sustainable finance
5. Strategy and intangibles – changing business models
6. Integrated reporting - metrics and data

Part III: Financing sustainability

7. Investing for long-term value creation
8. Equity – investing with an ownership stake
9. Bonds – investing without voting power
10. Banks – new forms of lending
11. **Insurance – managing long-term risk**

Part IV: Epilogue

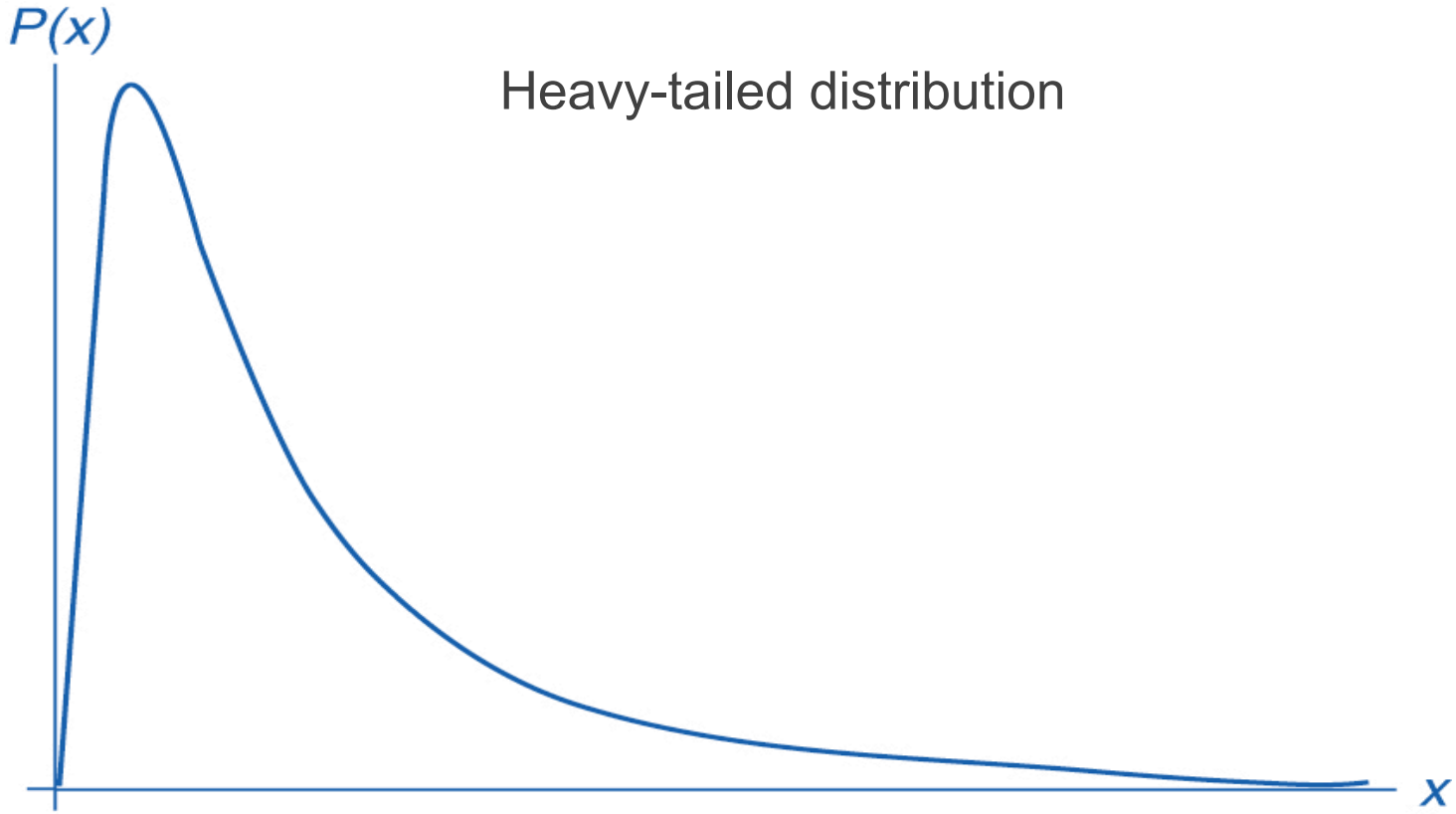
12. Transition management and integrated thinking

Learning objectives – chapter 11

- explain the nature of insurance business
- identify the physical risk of catastrophes
- appreciate the liability risk for environmental hazards
- understand the basics of catastrophe modelling
- explain the function of micro-insurance

Insurance and catastrophe risk

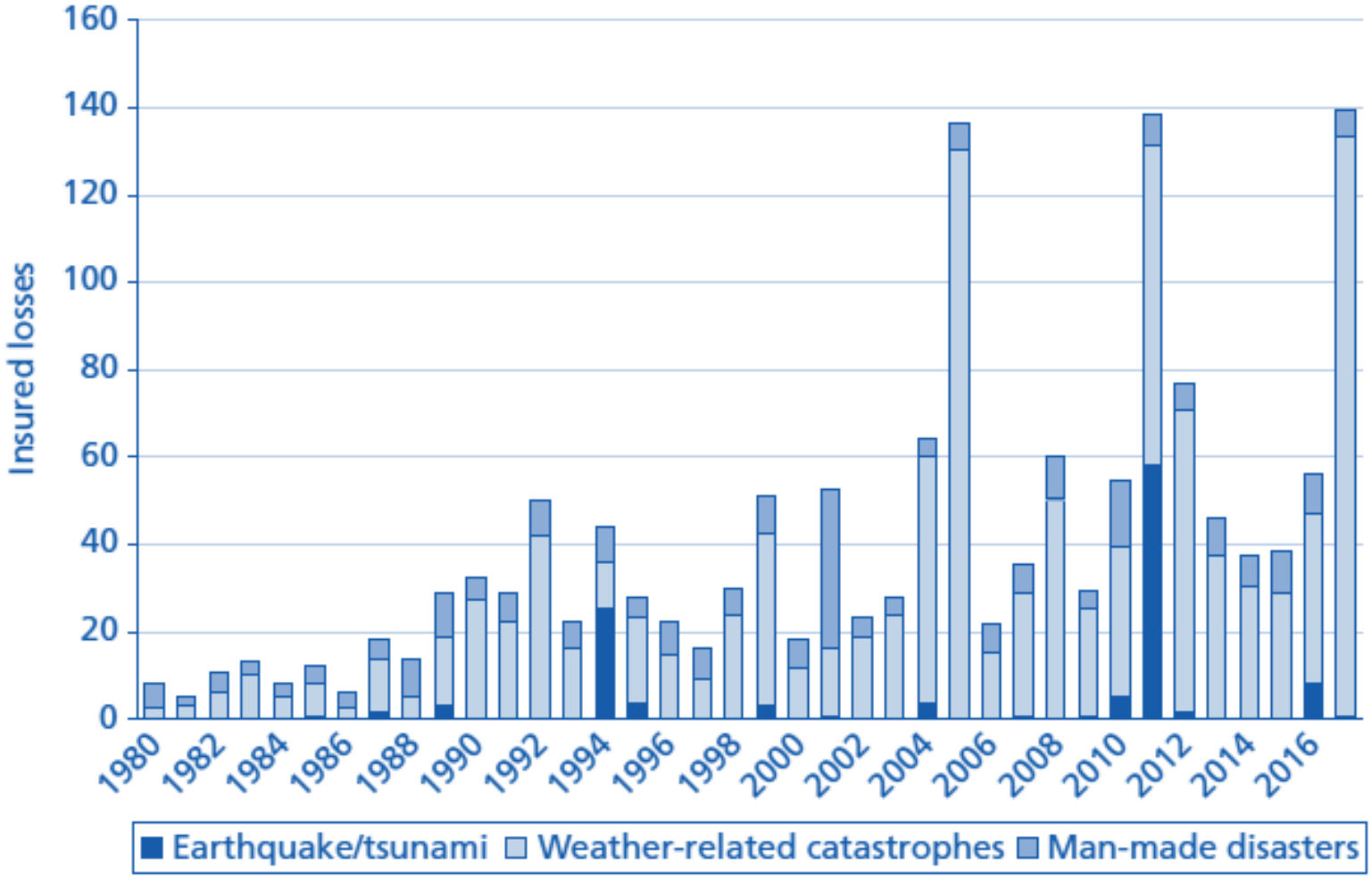
Large claims: catastrophes



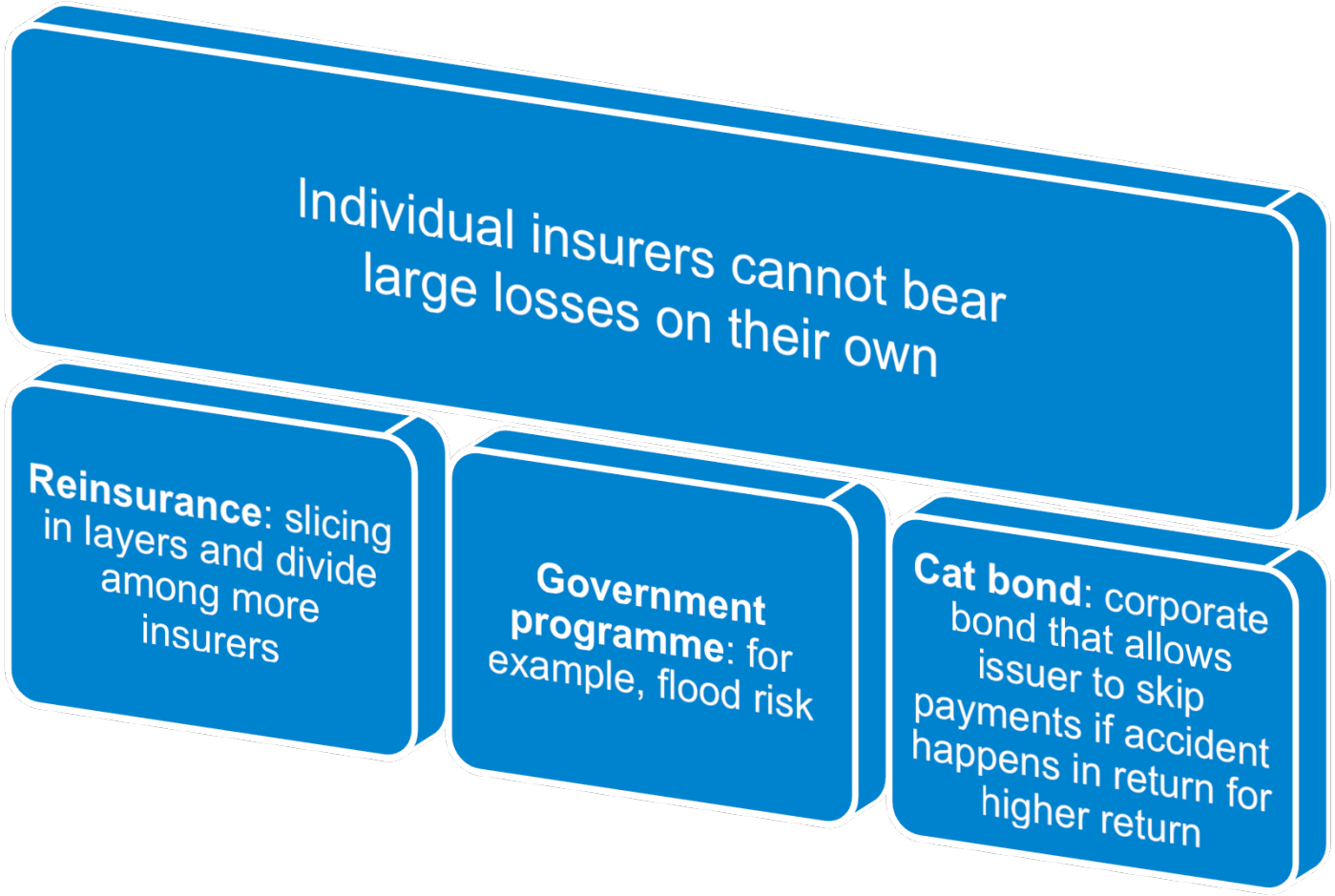
Catastrophes: the most costly insurance losses

Insured loss (in $ billion)	**Victims**	**Date** (year)	**Event**	**Country**
82.4	1,836	2005	Hurricane Katrina: storm surge, floods	US, Mexico
38.1	18,451	2011	Earthquake (Mw 9.0) triggers tsunami	Japan
32.0	136	2017	Hurricane Maria	US, Puerto Rico, Caribbean
30.8	237	2012	Hurricane Sandy: storm surge	US (New York)
30.0	126	2017	Hurricane Irma	US, Puerto Rico, Caribbean
30.0	89	2017	Hurricane Harvey	US
27.9	65	1992	Hurricane Andrew: floods	US, Bahamas
26.0	2,982	2001	Terror attack on WTC, Pentagon	US
25.3	61	1994	Northridge earthquake (Mw 6.7)	US
23.1	193	2008	Hurricane Ike: floods, damage to oil rigs	US, Caribbean
19.1	185	2011	Earthquake (Mw 6.1), aftershocks	New Zealand
16.8	119	2004	Hurricane Ivan: damage to oil rigs	US, Caribbean
16.3	815	2011	Heavy monsoon rains: extreme flooding	Thailand
15.8	53	2005	Hurricane Wilma: torrential rains, floods	US, Mexico
13.5	34	2005	Hurricane Rita: floods, damage to oil rigs	US, Mexico
11.7	123	2012	Drought in the Corn Belt	US

Insured catastrophe losses are rising

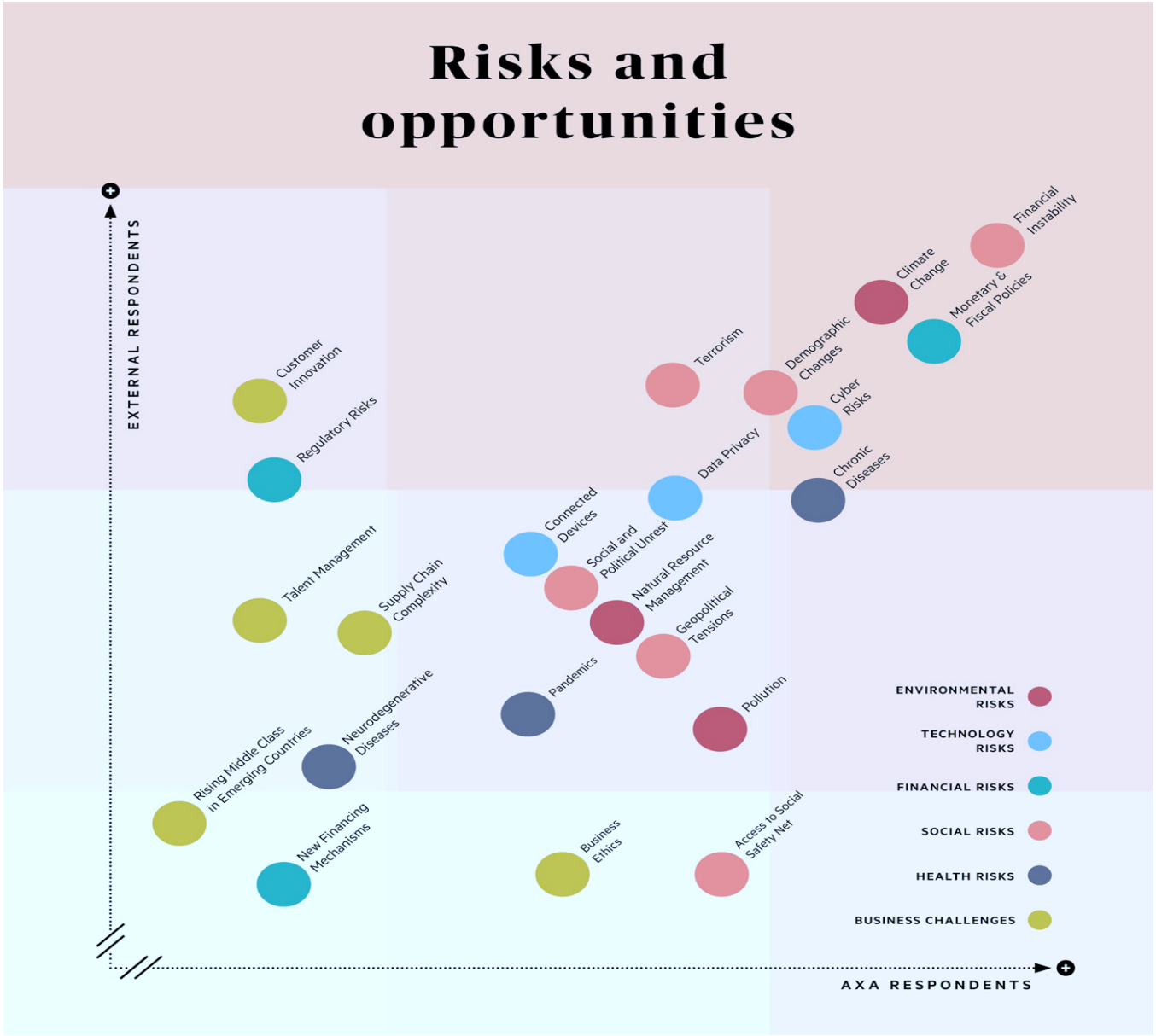


How to share risk of catastrophe?



Why does sustainability matter to insurance?

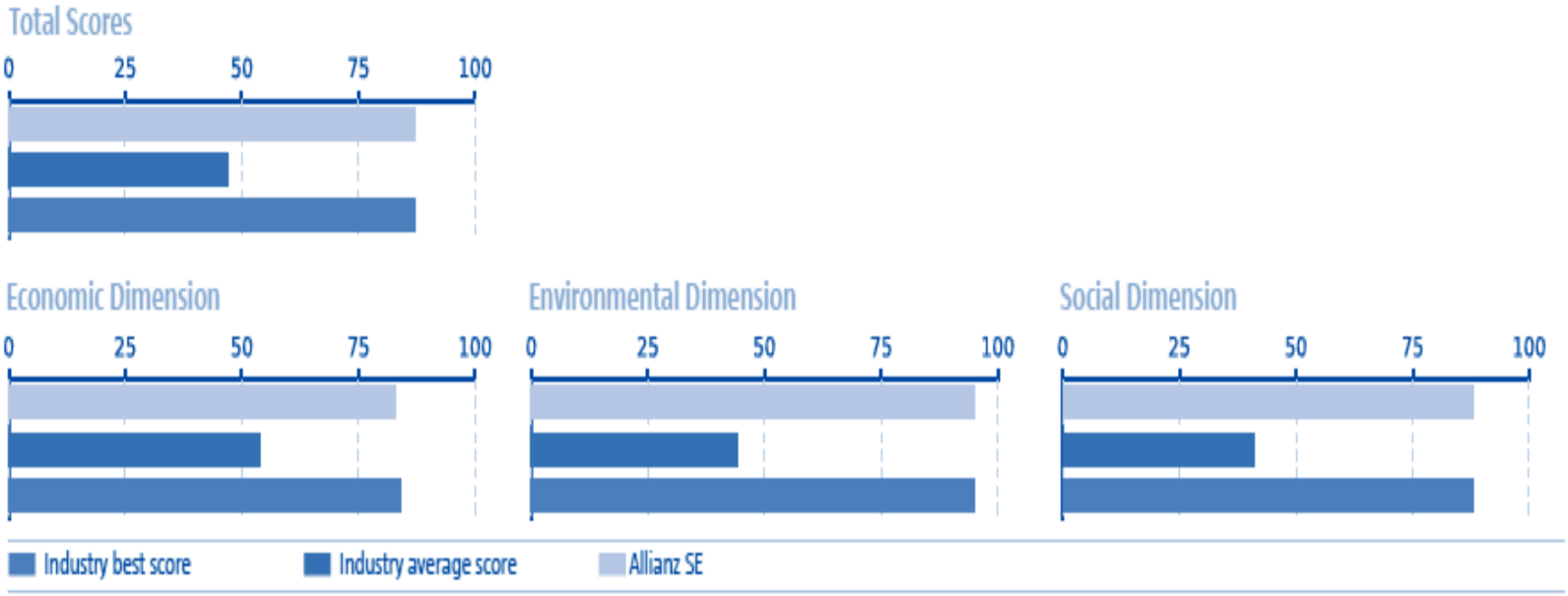
AXA's materiality matrix



Swiss Re's climate change policy

- Advancing its understanding of climate change risks, quantifying and integrating it into its risk management and underwriting frameworks
- Developing products and services to mitigate or adapt to climate risk
- Raising awareness about climate change risks through public dialogue, and advocating a worldwide policy framework for climate change
- Tackling its own carbon footprint and ensuring transparent, annual emissions reporting

Sustainability scores of Allianz (by RobecoSAM)



Managing long-term catastrophe risk

Catastrophe model

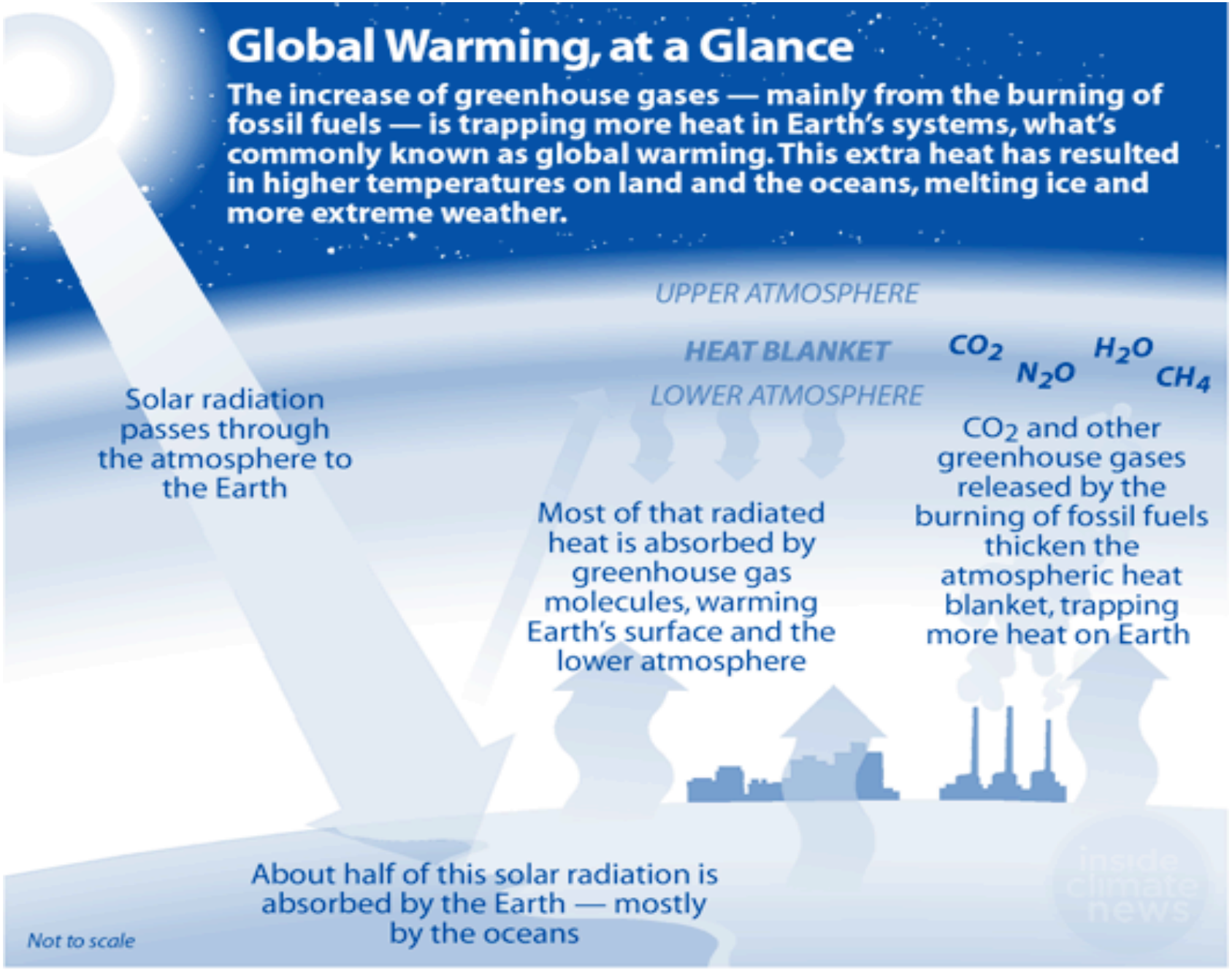
1. The **hazard component** estimates the extent and intensity of the natural catastrophe

2. The **vulnerability component** assesses the relative damage to the assets (like property and infrastructure)

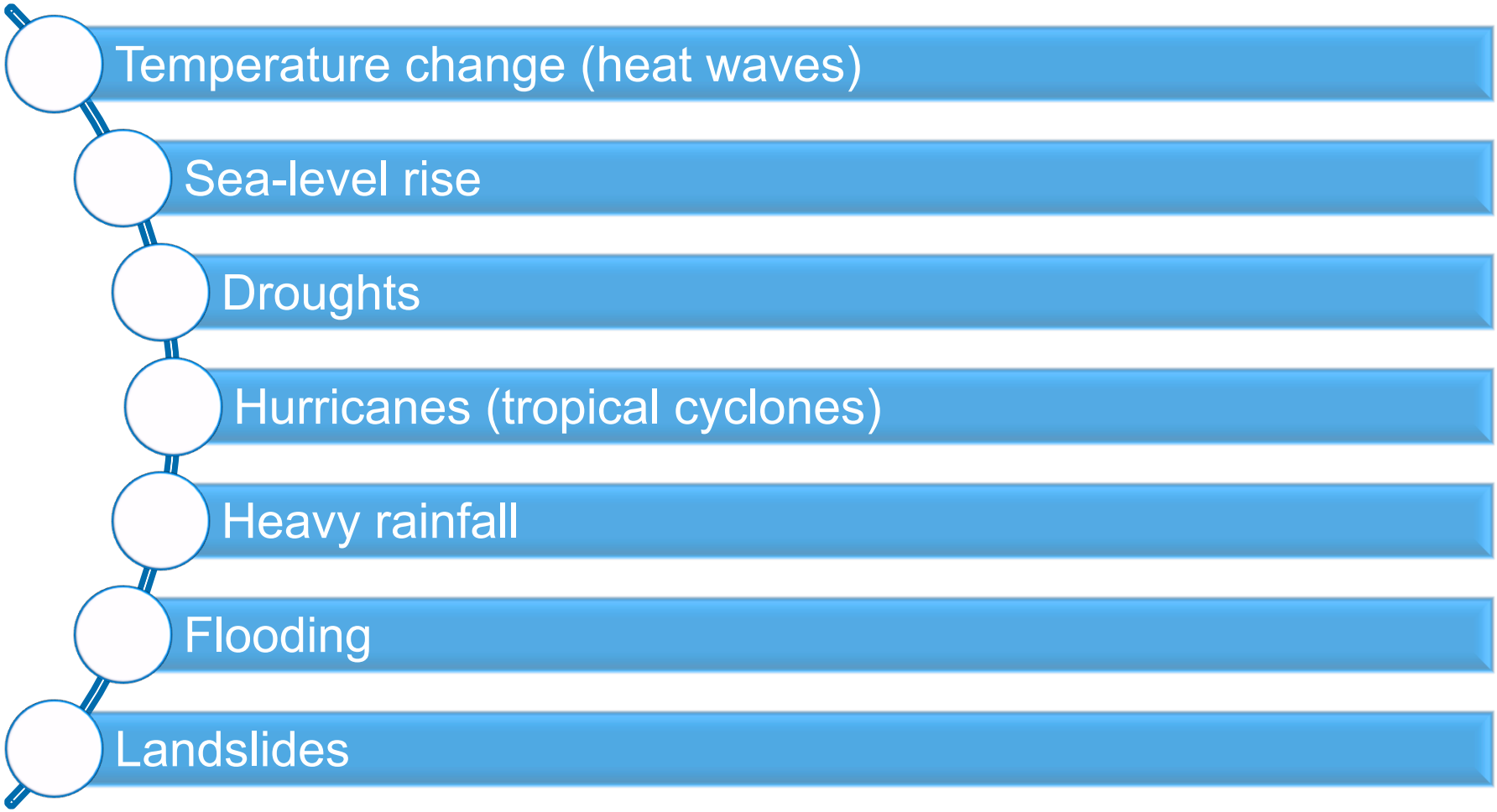
3. The **exposure component** is split between building values, contents values and business interruption values

4. The **financial loss component** translates the physical damage into total monetary loss before the application of insurance

5. The **platform component** integrates the four model components

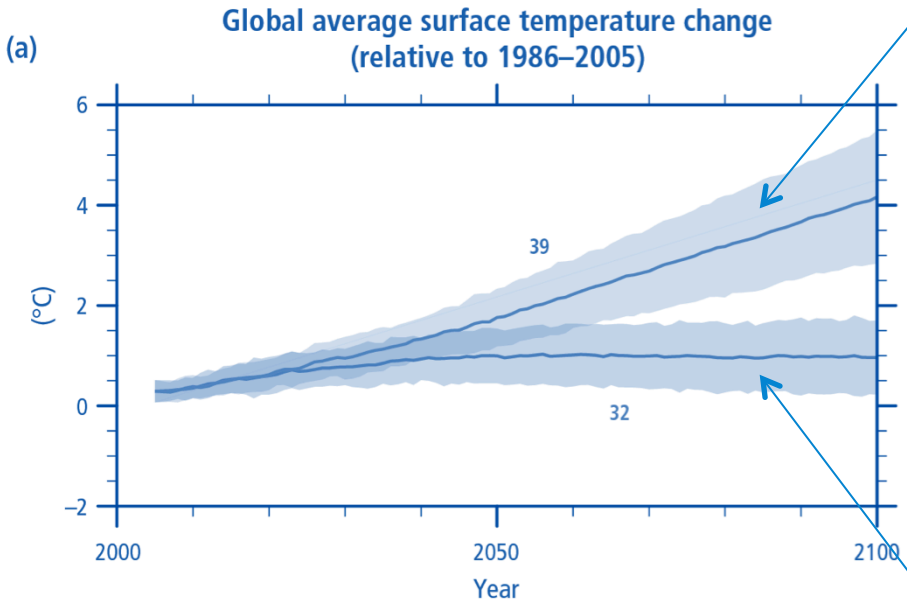

Global Warming, at a Glance
The increase of greenhouse gases — mainly from the burning of fossil fuels — is trapping more heat in Earth's systems, what's commonly known as global warming. This extra heat has resulted in higher temperatures on land and the oceans, melting ice and more extreme weather.
UPPER ATMOSPHERE
HEAT BLANKET
LOWER ATMOSPHERE
CO_2 N_2O H_2O CH_4
Solar radiation passes through the atmosphere to the Earth
Most of that radiated heat is absorbed by greenhouse gas molecules, warming Earth's surface and the lower atmosphere
CO_2 and other greenhouse gases released by the burning of fossil fuels thicken the atmospheric heat blanket, trapping more heat on Earth
About half of this solar radiation is absorbed by the Earth — mostly by the oceans
Not to scale
SOURCES: NASA; Intergovernmental Panel on Climate Change; InsideClimate News research
PAUL HORN / InsideClimate News

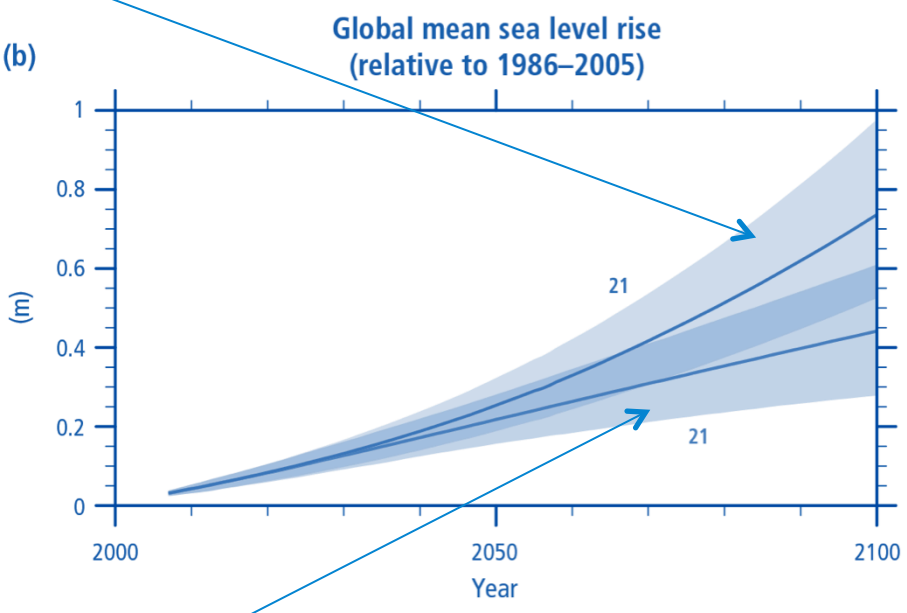
Climate change intensifies natural hazards



Projections by the IPCC

Upper line: the highest carbon emission scenario

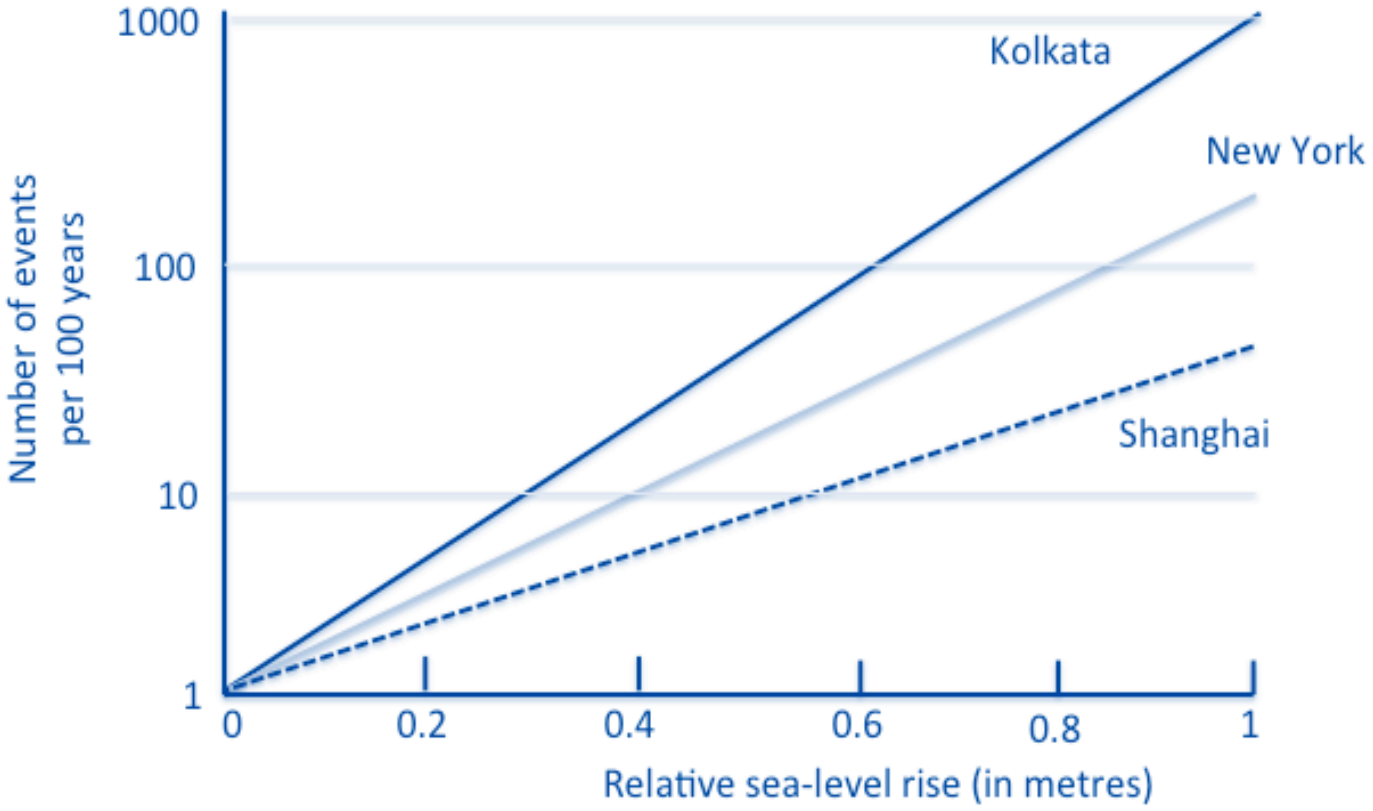




Lower line: most stringent carbon emission reduction scenario ('only' +2^0 Celsius)

Sea-level rise

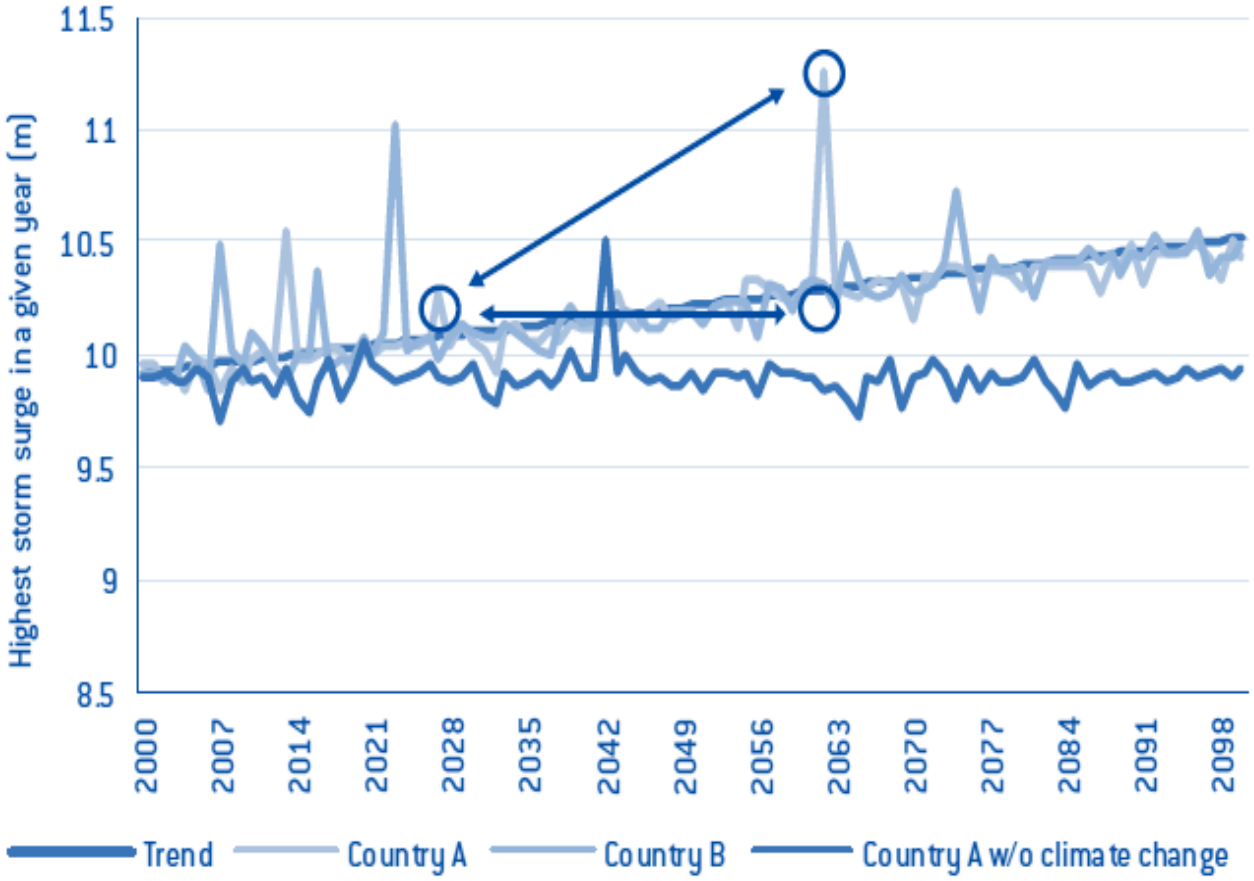
Increase of frequency of present 100-year events with rising sea levels



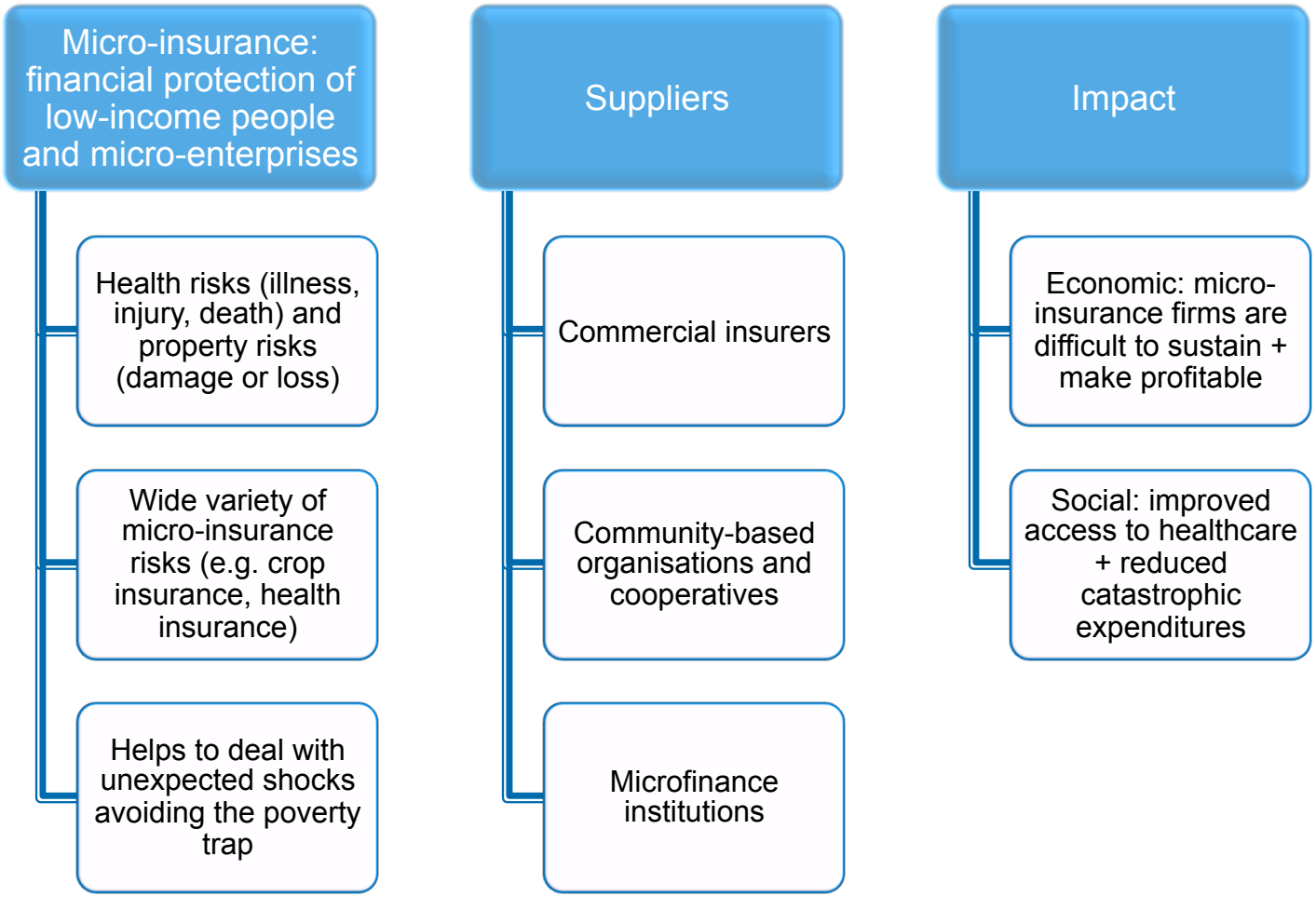
Mitigation and adaptation

Mitigating strategies	• Reducing carbon emissions very important to reduce climate change • But even if global temperature stabilised, sea-level will rise as the deep ocean warms slowly
Adaptation to minimise disruptions	• Insurance provides financial risk transfer, but not against physical impact • Also disaster risk reduction measures: early warning, education, etc.
Low and middle-income countries more affected by adverse weather events	• Global climate risk pool to help these countries at macro level • But can only insure extreme events that strongly exceed trend line

Climate risk pool for annual storm-surge



Micro-insurance



Conclusions

- Insurers play key role in managing catastrophe risk
  - Mitigation to reduce emissions
  - Adaption to deal with natural hazards
  - And managing liability risks
- Long-term impact of climate change is uncertain
  - Catastrophe models to capture LT trends of natural hazards
  - Projected sea-level rise increases, for example, flooding of coastal areas
- Micro-insurance can protect low-income individuals against shocks