



Understanding disaster risk in a changing world:

Achievements and remaining challenges

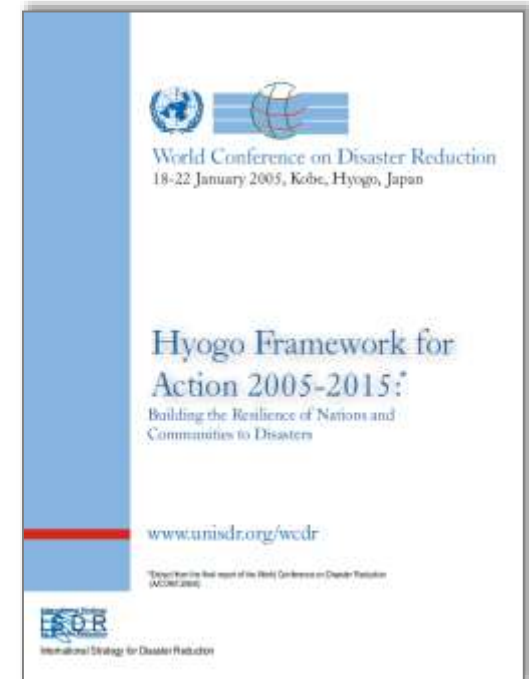
Dr. Matthias Garschagen

Head of Vulnerability Assessment, Risk Management and Adaptive Planning

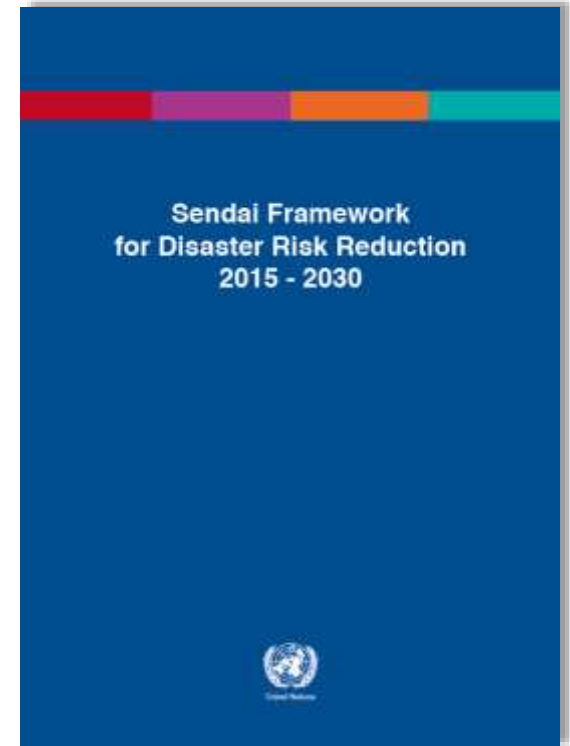
United Nations University – Institute for Environment and Human Security (UNU-EHS)

Knowledge Partnership Day | BMZ-GFDRR | 27 October 2015 | Berlin

“The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.” (HFA: Priority for Action 2)



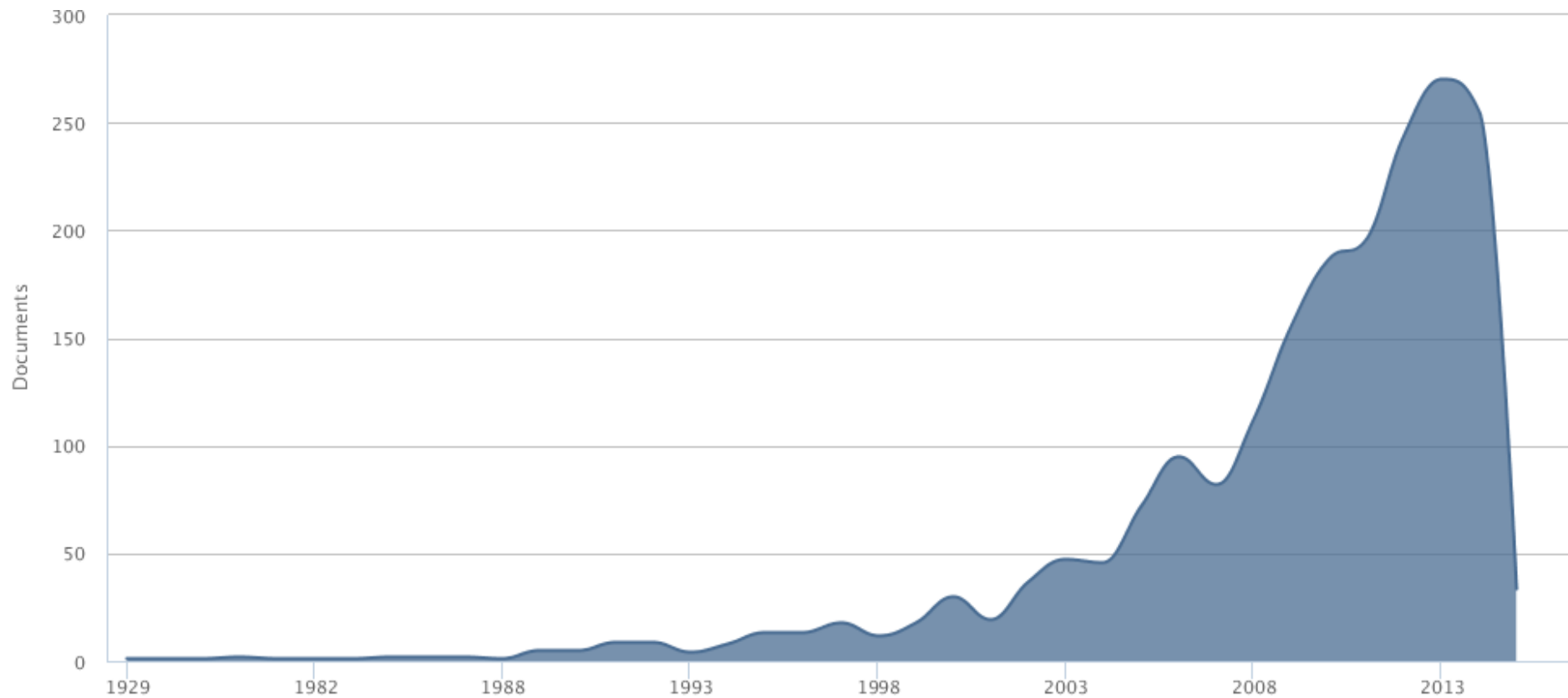
“Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be leveraged for the purpose of pre-disaster risk assessment, for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters.” (SFA: Priority for Action 1)



- What are key (scientific) achievements reached since the HFA regarding a better understanding of
 - (1) the causal fabric of vulnerability and risk,
 - (2) drivers of vulnerability and risk,
 - (3) hotspot regions and sectors,
 - (4) risk reduction measures?
- Which knowledge gaps do still exist?
- What are emerging fields of research that deserve increased attention in terms of understanding risk and vulnerability?

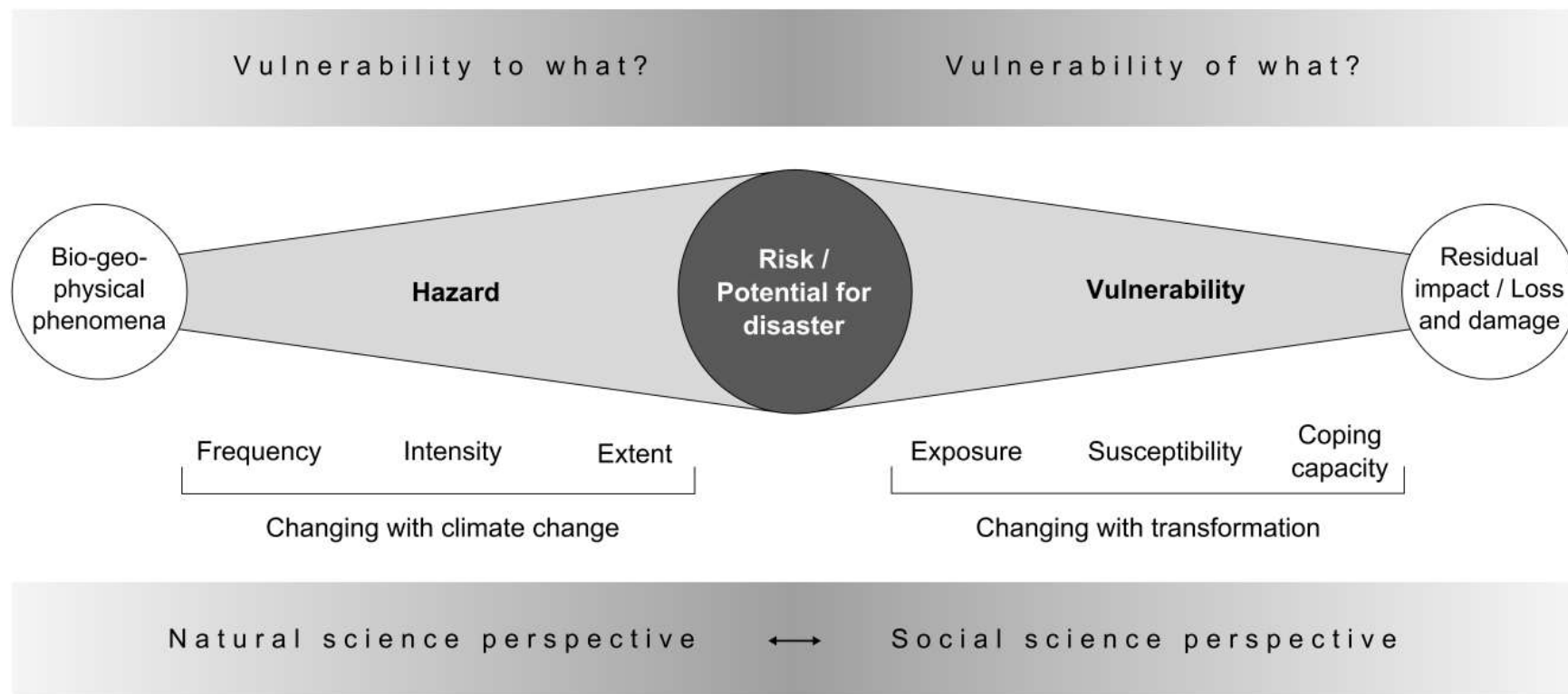
Scientific engagement with disaster risk reduction

“disaster risk reduction” in title, keyword and/or abstract



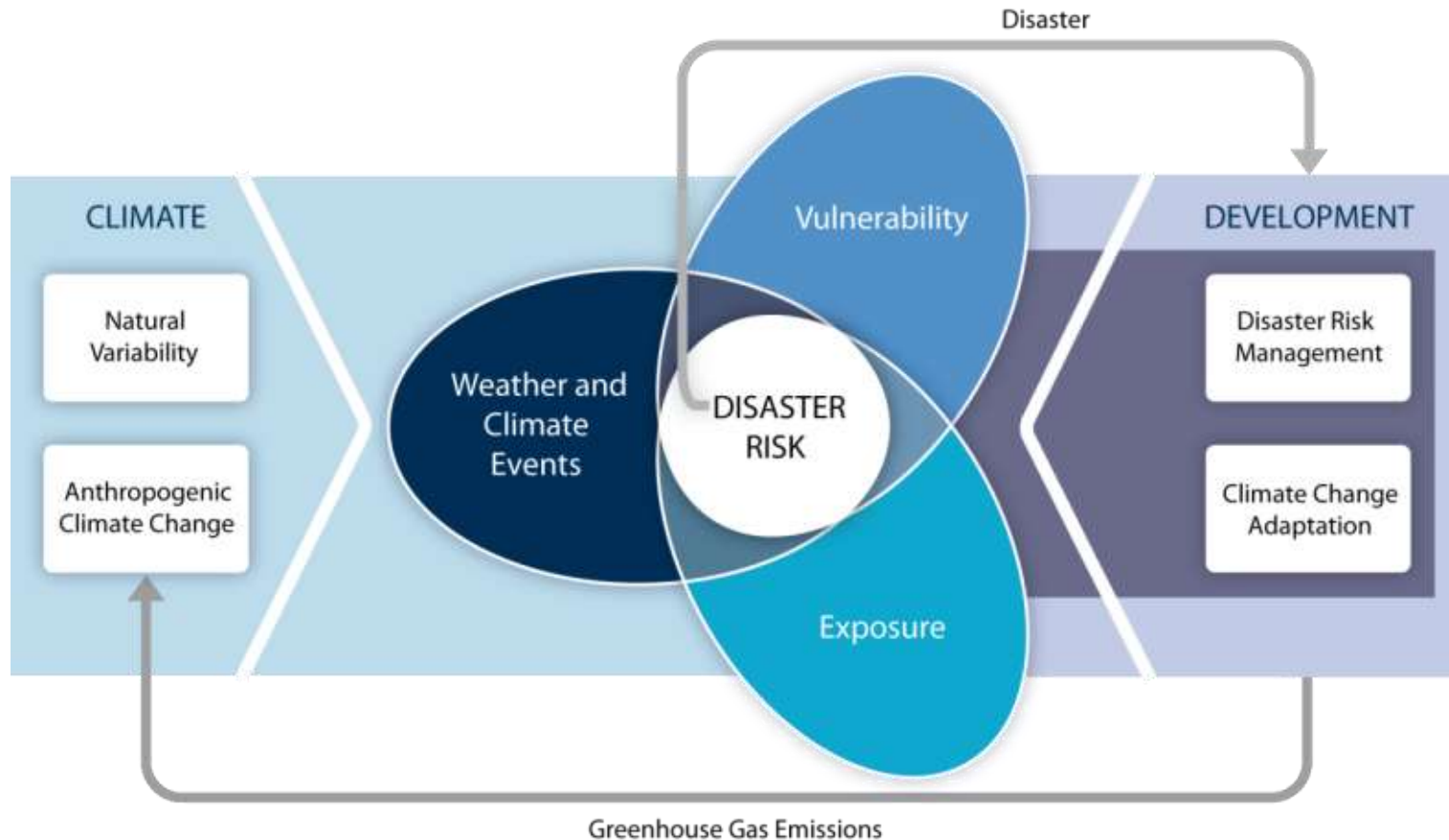
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Integrative perspectives in risk research: from natural hazard to vulnerability



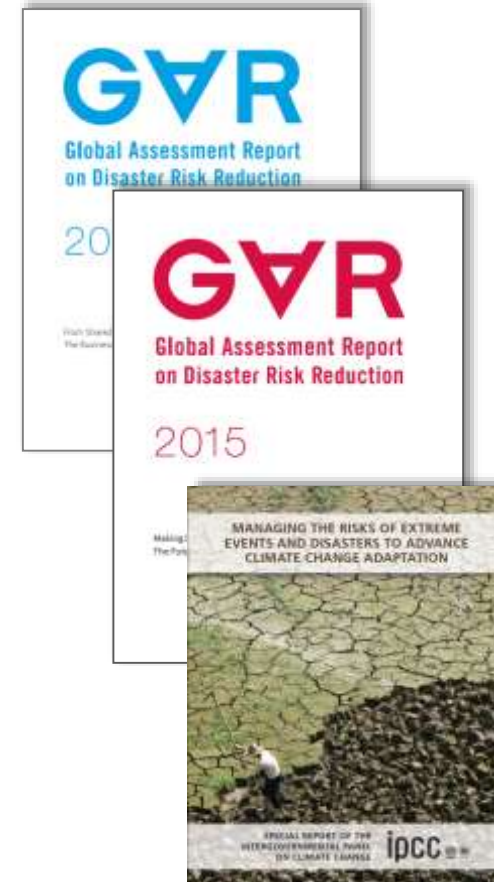
Source: Garschagen 2013, partly inspired by (Bohle 2008b: 108)

Integrative perspectives in risk research: from natural hazard to vulnerability



Source: IPCC 2012

- Which achievements have been made?
 1. causal fabric of vulnerability
 2. analyzing past disasters
 3. seeing risk/disaster as a social vs. a technical/natural problem
 4. methods to assess risk and vulnerability across different scales
 5. different hazard types
 6. regional patterns of risk and vulnerability
 7. urban vs. rural settings
 8. integrated perspectives on DRR and CCA
 9. integrated perspectives on DRR/CCA and development



Identifying patterns of risk: The World Risk Index



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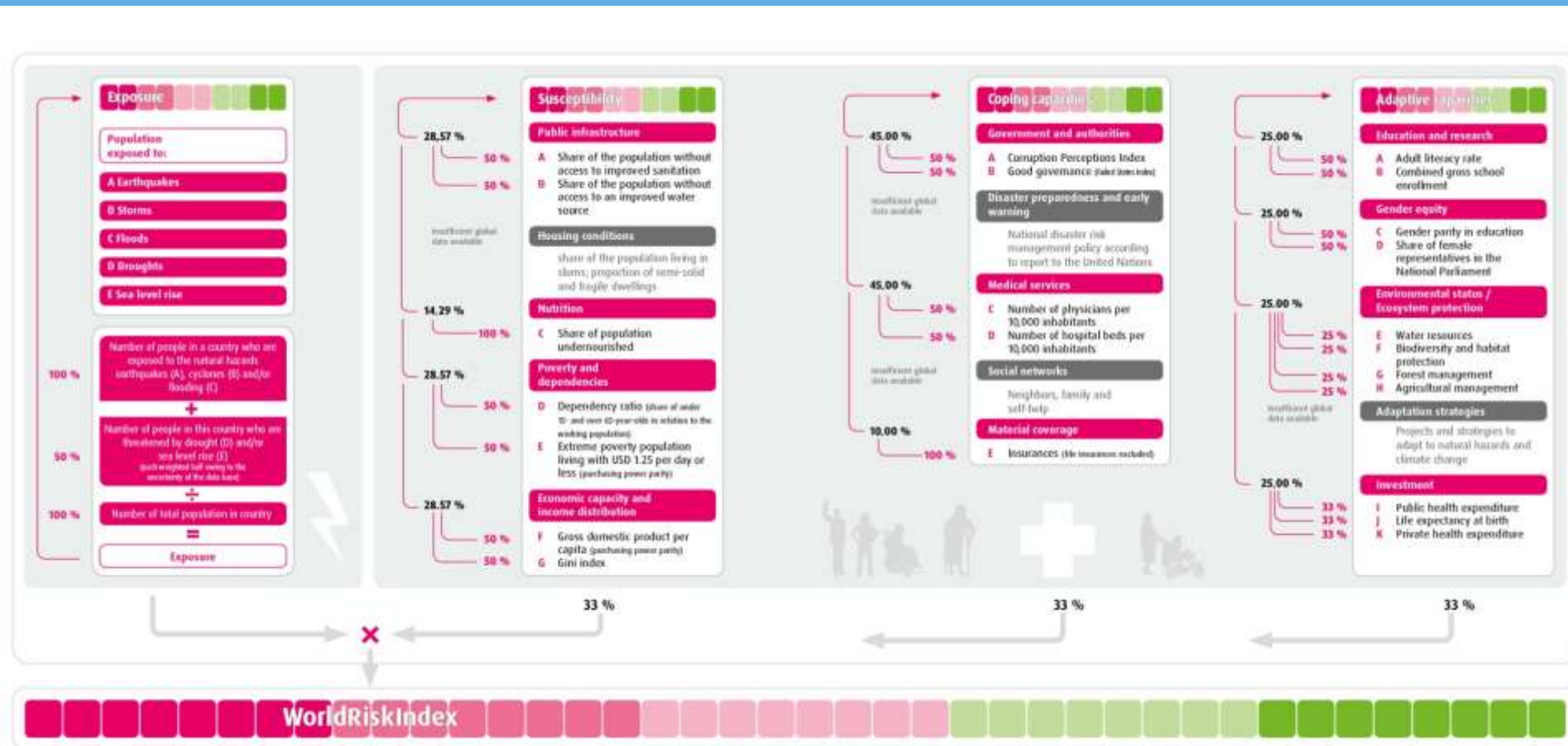
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Source: World Risk Report



Identifying patterns of risk: The World Risk Index



Source: World Risk Report

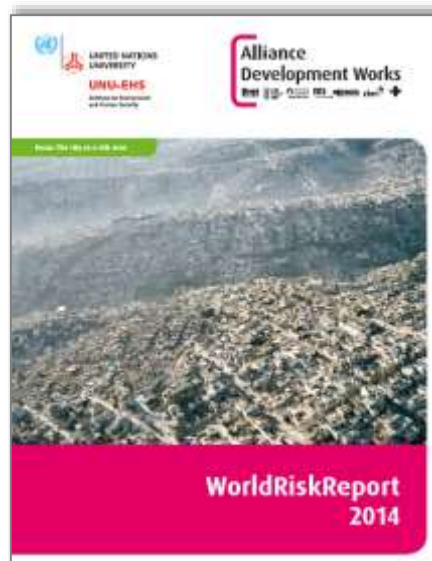
Identifying patterns and hot-spot areas of risk



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Exposure

Exposure of the population to the natural hazards earthquakes, storms, floods, droughts and sea level rise.



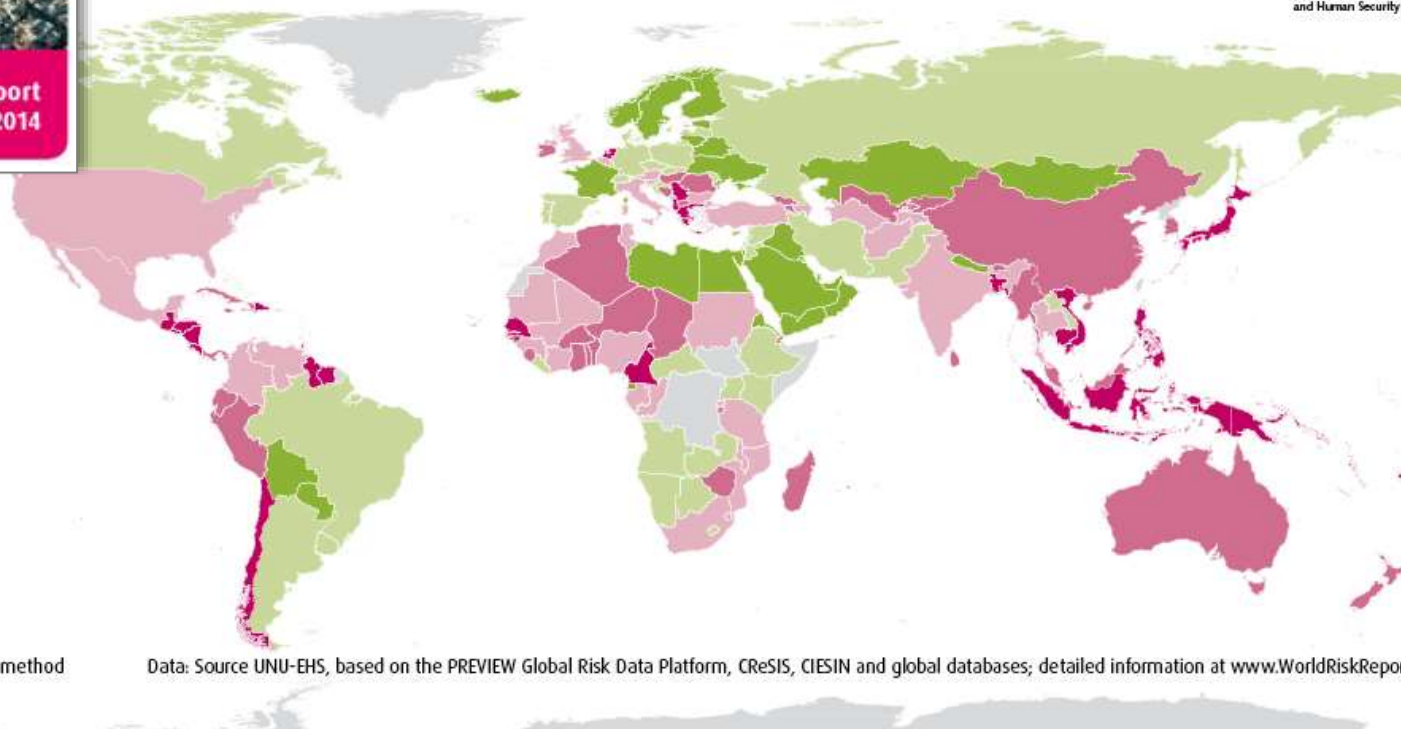
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very low	0.28 – 9.25
low	9.26 – 11.53
medium	11.54 – 13.85
high	13.86 – 17.45
very high	17.46 – 63.66
no data available	

Max. exposure= 100 %,
Classification according to the quantile method



Data: Source UNU-EHS, based on the PREVIEW Global Risk Data Platform, CReSIS, CIESIN and global databases; detailed information at www.WorldRiskReport.org

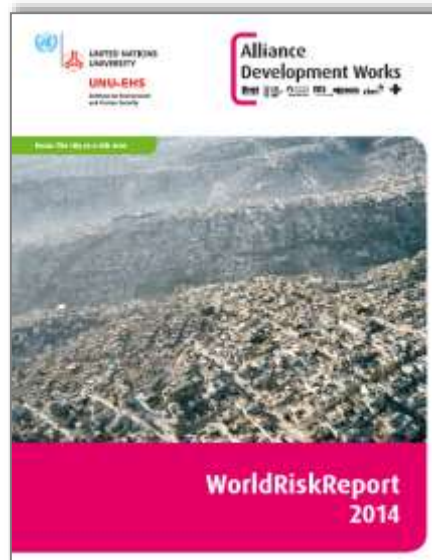
Identifying patterns and hot-spot areas of risk



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Vulnerability

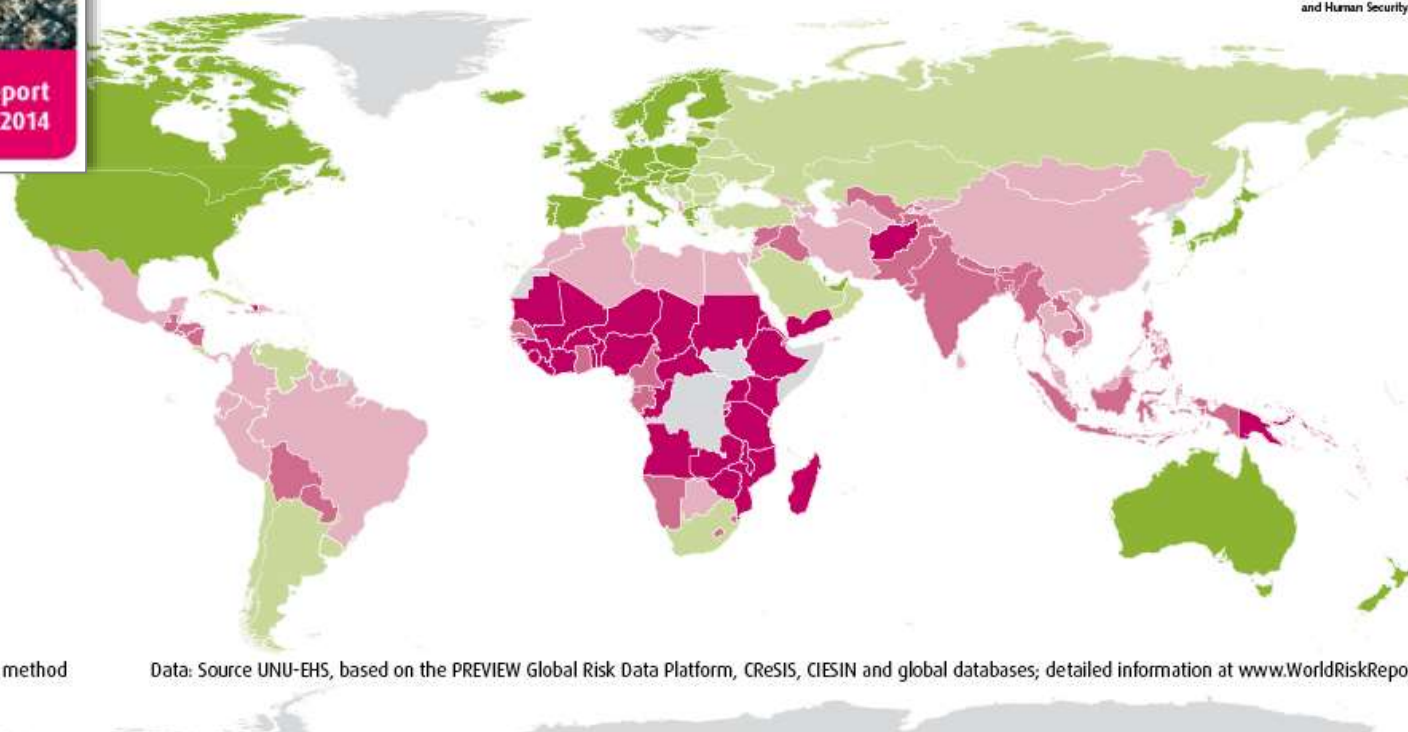
Vulnerability of society as the sum of susceptibility, lack of coping capacities and lack of adaptive capacities



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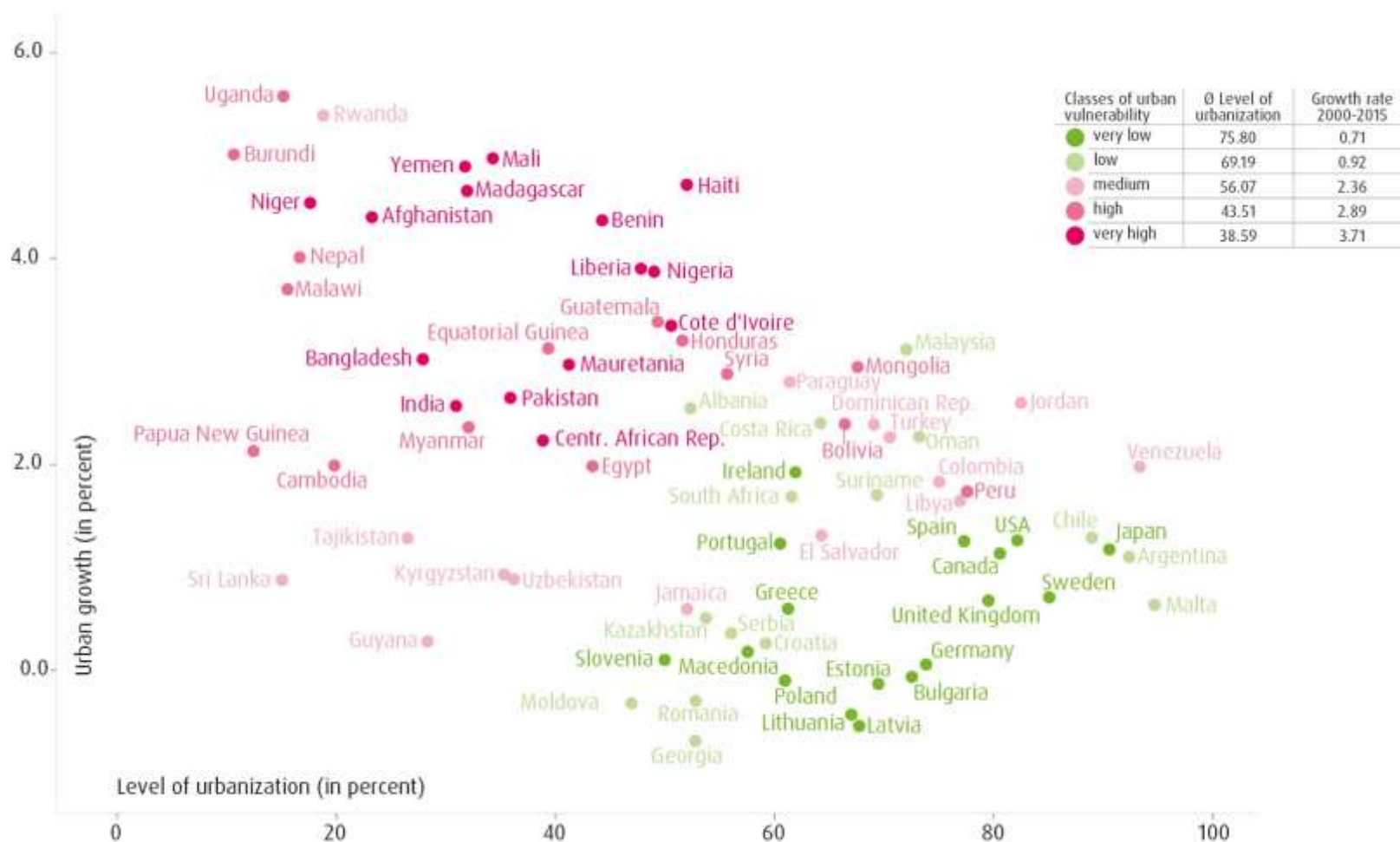


very low	25.98 – 34.96
low	34.97 – 44.55
medium	44.56 – 51.64
high	51.65 – 63.76
very high	63.77 – 75.72
no data available	

Max. vulnerability = 100 %,
Classification according to the quantile method

Data: Source UNU-EHS, based on the PREVIEW Global Risk Data Platform, CReSIS, CIESIN and global databases; detailed information at www.WorldRiskReport.org

Where rapid growth faces high vulnerability



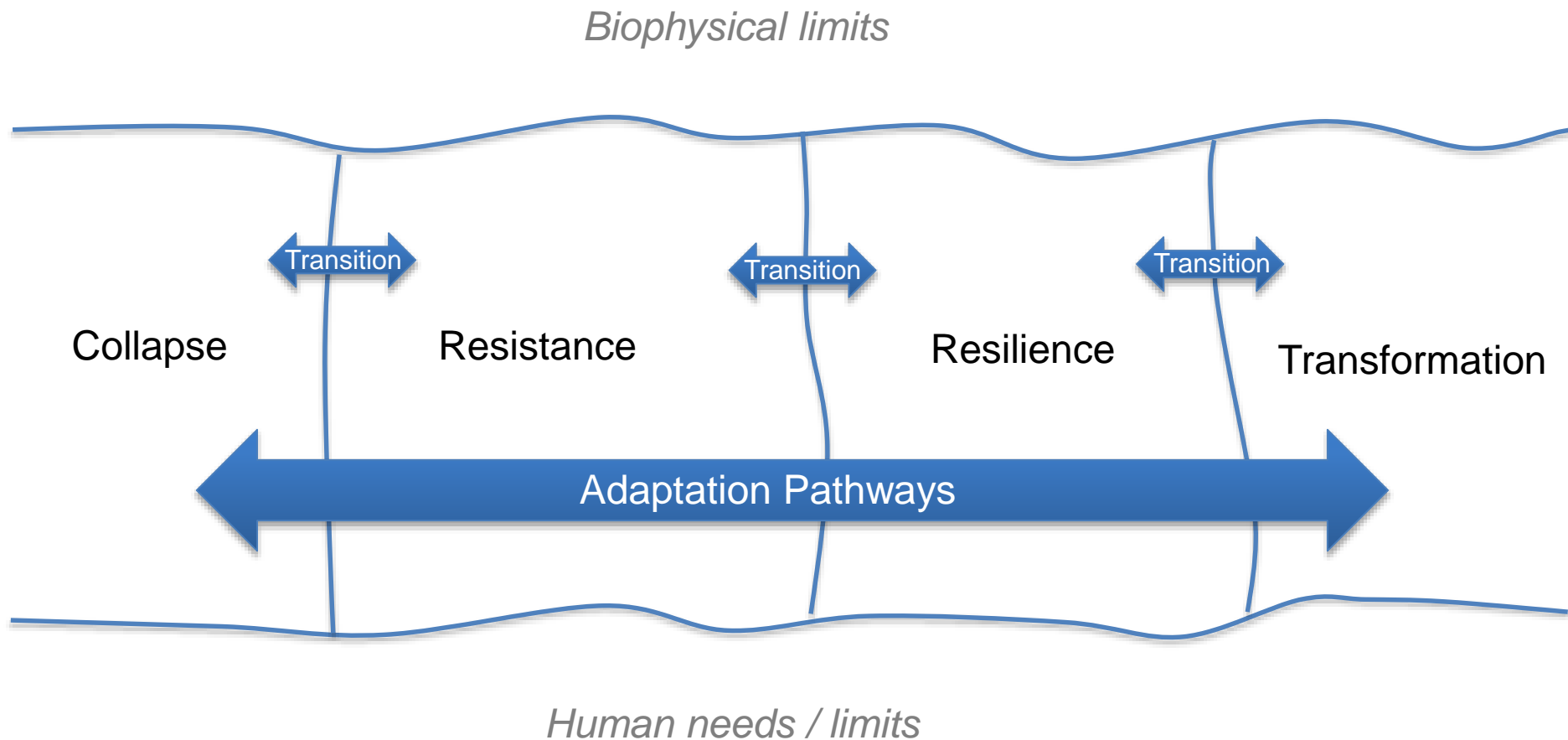
Data: Source UNU-EHS based on UN DESA (2012)

Source: World Risk Report 2014

- Which challenges and knowledge gaps do still exist?
Which emerging fields need more attention?
 1. research on risky systems/places that have not yet experienced a major disaster but might do so in future (e.g. through CC)
 - epistemological challenges
 - scientific credibility and legitimacy of the research (e.g. funding)
 - lack of experience of local actors
 2. compounding causes and consequences of disasters
 - e.g. fragile states cum epidemics cum disasters
 3. cross-boundary implications of disasters
 - e.g. Douglass et al. 2015

- Which challenges and knowledge gaps do still exist? Which emerging fields need more attention?
 6. mid-sized cities and urban-rural linkages
 7. private business sector and its risk mitigation action
 8. **future shifts in vulnerability patterns and adaptive capacity along with socio-economic transition**
 9. **evaluation of different adaptation options**
 - beyond economic cost-benefit-analysis
 10. **different types/paradigms of adaptation trajectories**
 - collapse, resistance, resilience, transformation
 - is resilience enough?

Adaptation pathways and paradigms

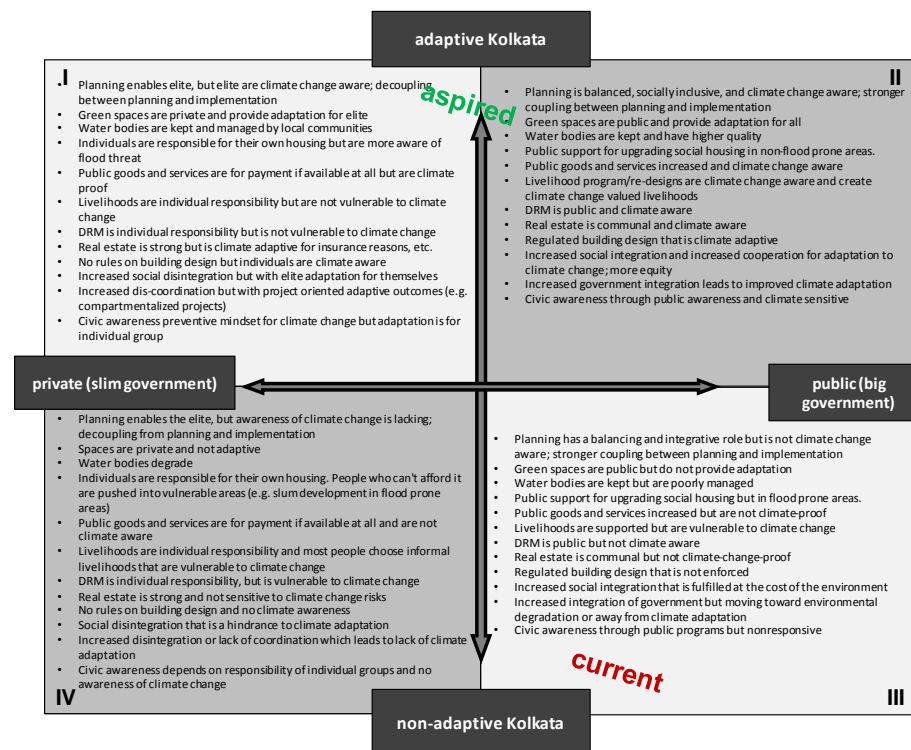
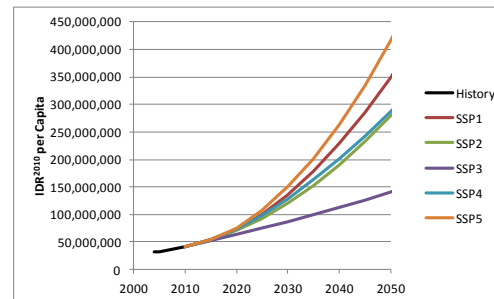


Source: Solecki et al. 2014

Vulnerability scenarios and adaptation decisions



Source: M. Garschagen 2015



- A lot of progress has been made in terms of understanding disaster risk
- But open questions remain and new fields emerge
 - vulnerability scenarios
 - evaluation of adaptation options
 - adaptation paradigms
- Knowledge gaps vs. implementation gaps

Thank you very much for attention and questions !

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Chapter 10 Vulnerability, Coping and Adaptation to Water Related Hazards in the Vietnamese Mekong Delta

Chapter 9 Dynamic Resilience of Peri-Urban Agriculturalists in the Mekong Delta Under Pressures of Socio-Economic Transformation and Climate Change

Chapter 4 Socio-Economic Development in the Mekong Delta: Between the Prospects for Progress and the Realms of Reality

Matthias Garschagen, Javier Revilla Diaz, Hang Kien Nhat,
and Franka Kruse

Mat Garschagen (2013) 97143-2013
DOI 10.1007/978-94-007-5010-0_4

Framing vulnerability, risk and societal responses: the MOVE framework

J. Birkmann · D. D. Cardoso · M. L. Corredo · A. H. Barbat ·
M. Polking · D. Alexand

Received: 11
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Abstract
and: Introduction

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New challenges for adaptive urban governance
in highly dynamic environments: Revisiting
planning systems and tools for adaptive and
strategic planning

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Article 11
Climate Change
DOI 10.1007/s10584-013-0913-2

Abstract
Received: 15 May 2013
Revised: 20 December 2013
Accepted: 21 January 2014

Keywords
Urban governance
Climate change adaptation
Strategic planning
Urban planning
Vietnam
Indonesia

Scenarios for vulnerability: opportunities and constraints in the context of climate change and disaster risk

Joern Birkmann · Susan L. Cutter · Dale S. Rothman ·
Torsten Welle · Matthias Garschagen ·
Ben van Ruijven · Brian O'Neill · Benjamin L. Preston ·
Stefan Kleinberger · Omar D. Cardoso ·
Tiedora Siagian · Dany Hidayat · Neysa Setiadi ·
Matthias Garschagen

The Research
Unit for Environmental and
Societal Change

Extreme events and disasters: a window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters

J. Birkmann · P. Beckle · J. Jager · M. Polking · N. Setiadi ·
M. Garschagen · N. Fernando · J. Kruse

Abstract: The
disasters have
highlighted the
importance of the
formal and informal
responses to disasters

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Chapter 13 Urban Climate Change Adaptation in the Context of Transformation: Lessons from Vietnam

Matthias Garschagen and Franka Kruse

Abstract
Introduction
1. Introduction
2. Urban Climate Change Adaptation
3. Urban Climate Change Adaptation
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8. Urban Climate Change Adaptation
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10. Urban Climate Change Adaptation

Adaptive urban governance: new challenges for the second generation of urban adaptation strategies to climate change

Joern Birkmann · Matthias Garschagen ·
Franka Kruse · Nayan Choudhury

Abstract: The
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importance of the
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Resilience and organizational institutionalization: from a cross-cultural perspective: an exploration based on urban climate change adaptation in Vietnam

Matthias Garschagen

Climate Change
DOI 10.1007/s10584-013-0913-2

Exploring the relationships between urbanization and climate change vulnerability

Matthias Garschagen · Patricia Romero-Lankao

Received: 16 January 2013 / Accepted: 29 May 2013
© Springer Science+Business Media Dordrecht 2013

Abstract There is increasing scientific and political interest in the links between urbanization and human vulnerability to climate change. However, our literature review shows that the existing scholarship has largely focused on exposure resulting from urbanization, while other dimensions of urban vulnerability such as sensitivity or capacity to cope and adapt have been insufficiently represented or understood. Furthermore, most attention has been given to the negative effects of urbanization, while opportunities for vulnerability reduction have been and emphasized. Therefore, this paper takes a broader perspective to explore key relationships between urbanization, economic development and socio-economic vulnerability on a global scale. Using data with national resolution, we applied a clustering approach to identify ten country groups sharing similar patterns of urbanization and national income. We then explored associations between these country groups and selected indicators of exposure

