



DIMTEC – Conference in Disaster Risk Reduction, University of the Free State, Bloemfontein, South Africa 26-27 May 2009

Vulnerability Concepts in Disaster Risk Reduction and Climate Change Adaptation – Opportunities and Limitations –

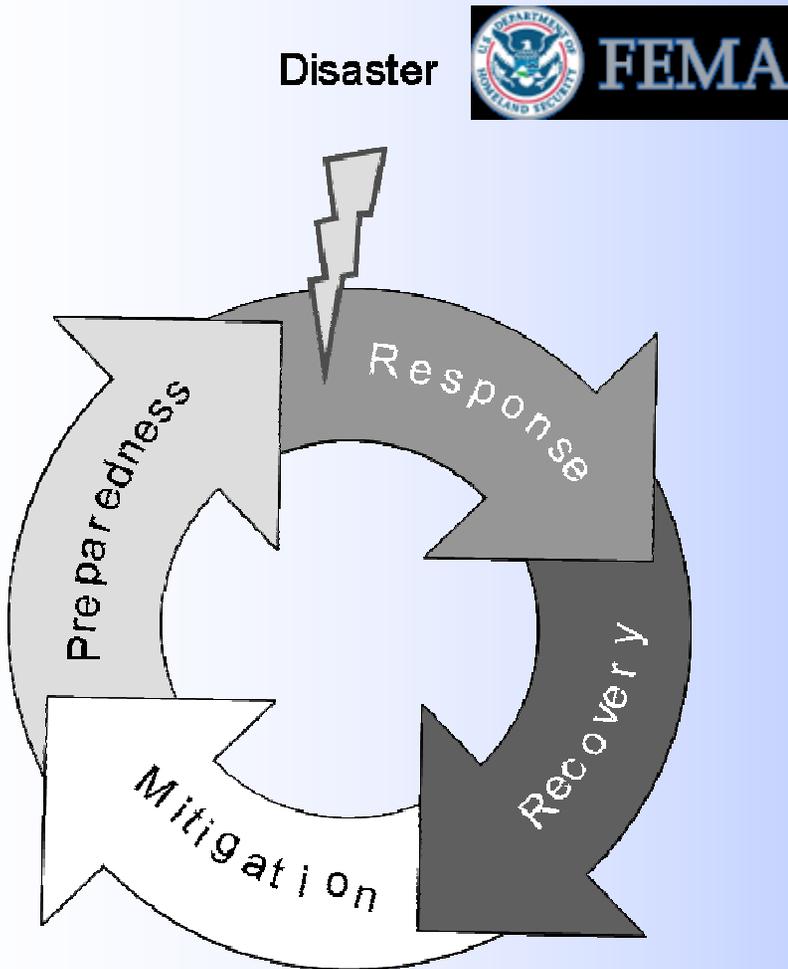
Dr.-Ing. Jörn Birkmann/ Head of Section VA



UNITED NATIONS UNIVERSITY



Different Perspectives



Source: FEMA according to
Cutter/Gall 2008, S. 356

Social-Ecology

- Crises in form of the use and anthropogenic transformation of nature, values and perceptions, power relations
- Cases: traditional environmental problems, such as housing, water use, food and consumption patterns

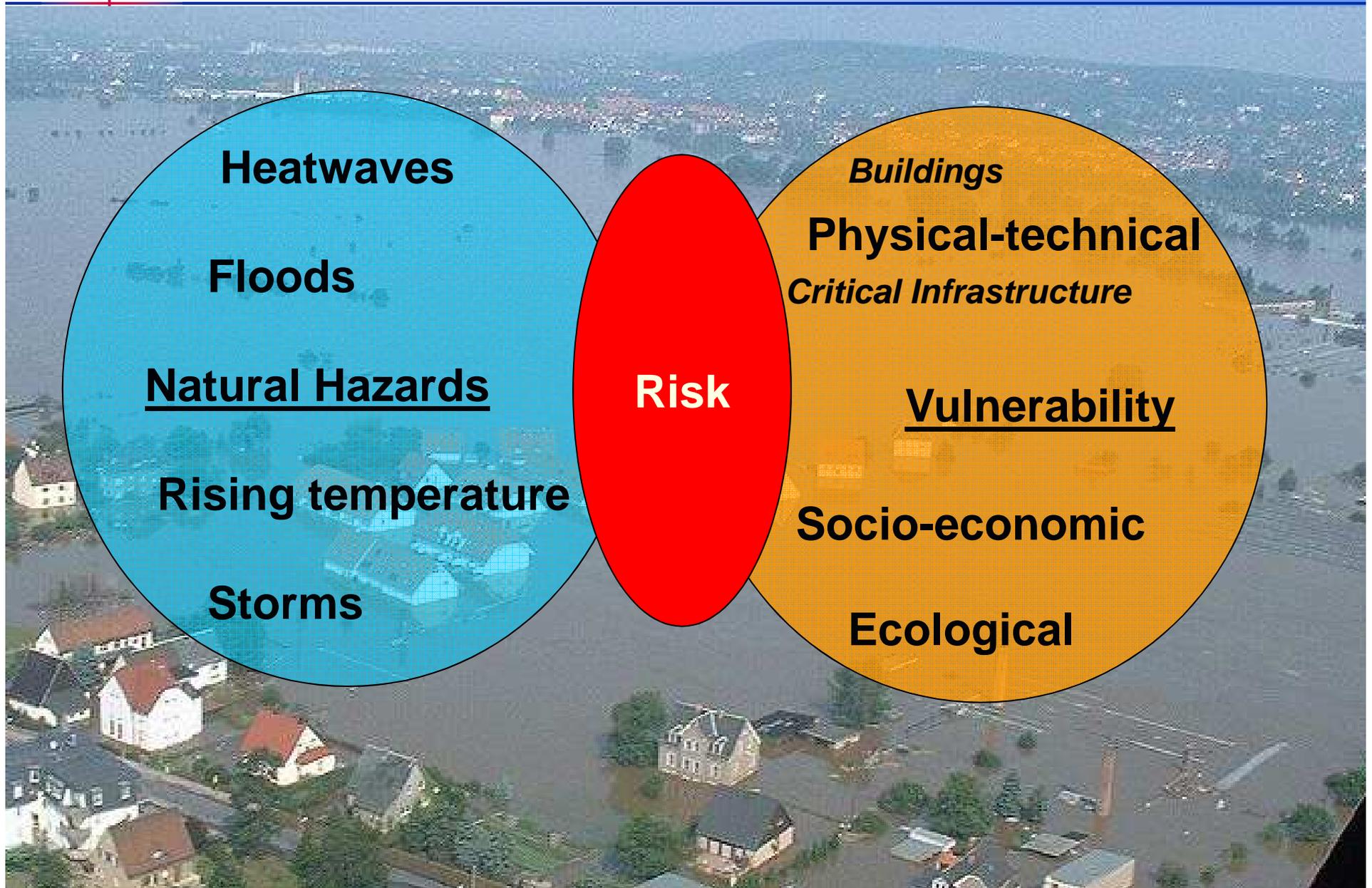




The Focus of Disaster Risk and Vulnerability Research



Risk f = Hazard and Vulnerability





Key Dimensions of Vulnerability



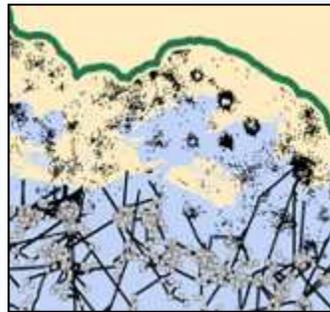
Social Dimension

Vulnerability of different social groups,
Role of social networks (coping)



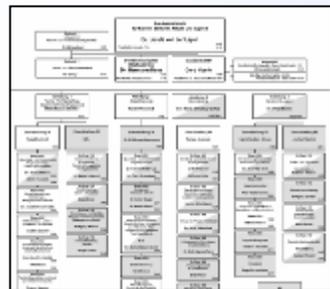
Economic Dimension

Vulnerability of different economic sectors and
critical infrastructure



Environmental Dimension

Environmental fragility (groundwater, land)
Dependency on environmental services



Institutional Dimension

Effectiveness and failure of structures and
institutions

Dr.-Ing. Birkmann
UNU-EHS

birkmann@ehs.unu.edu



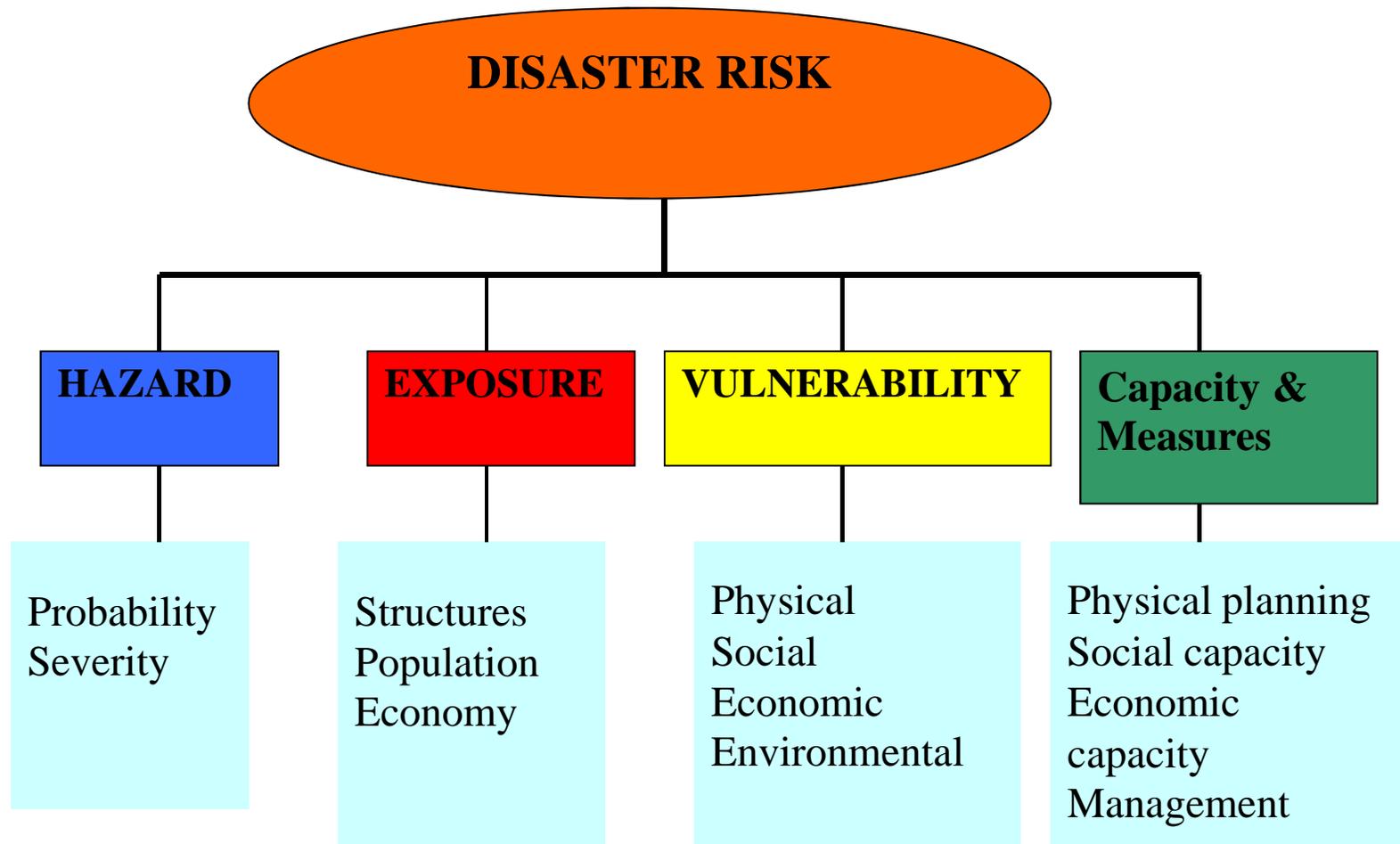
Vulnerability Definitions

“... a human condition or process resulting from physical, social, economic, and environmental factors which determine the likelihood and scale of damage from the impact of a given hazard”
(UNDP, 2004)

“... the likelihood of injury, death, loss, disruption of livelihood or other harm in an extreme event, and/or unusual difficulties in recovering from such effects”
(Wisner, 2002)



The conceptual framework to identify disaster risk

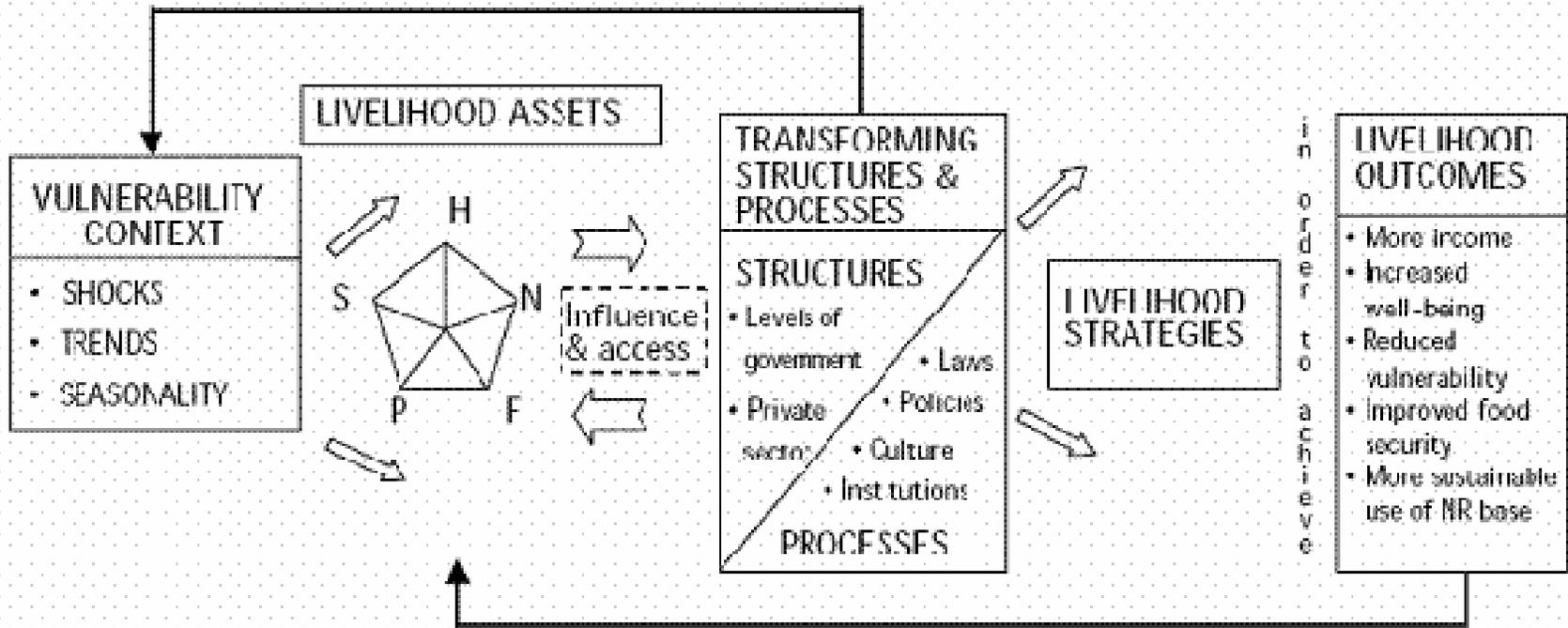


Source: Davidson 1997 : 5; and Bollin et al. 2003 : 67

Sustainable Livelihood Framework

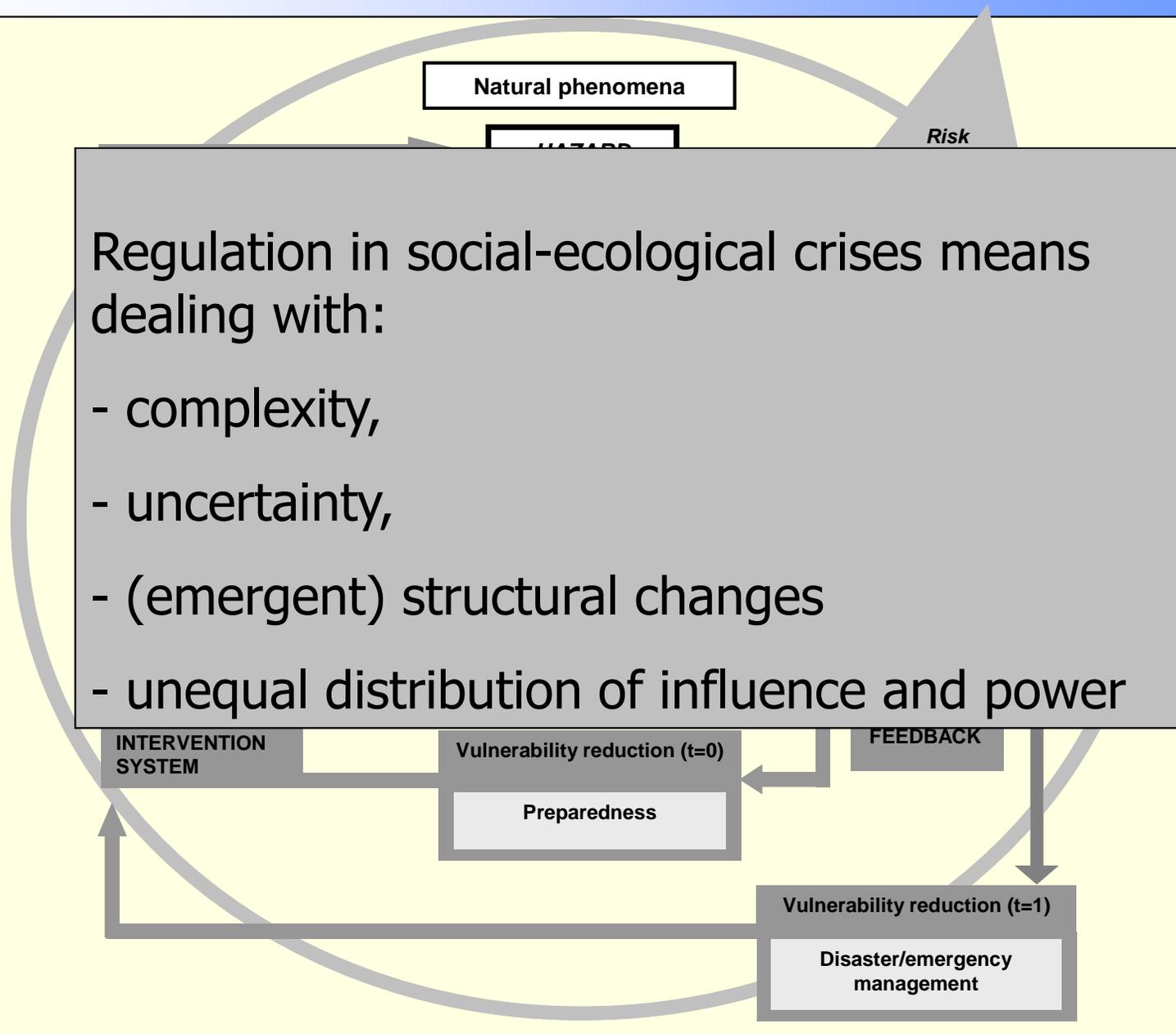
Figure 1. Sustainable livelihoods framework

Key	
H – Human Capital	S – Social Capital
N – Natural Capital	P – Physical Capital
F – financial Capital	



Source: DFID 1999

The BBC-Framework

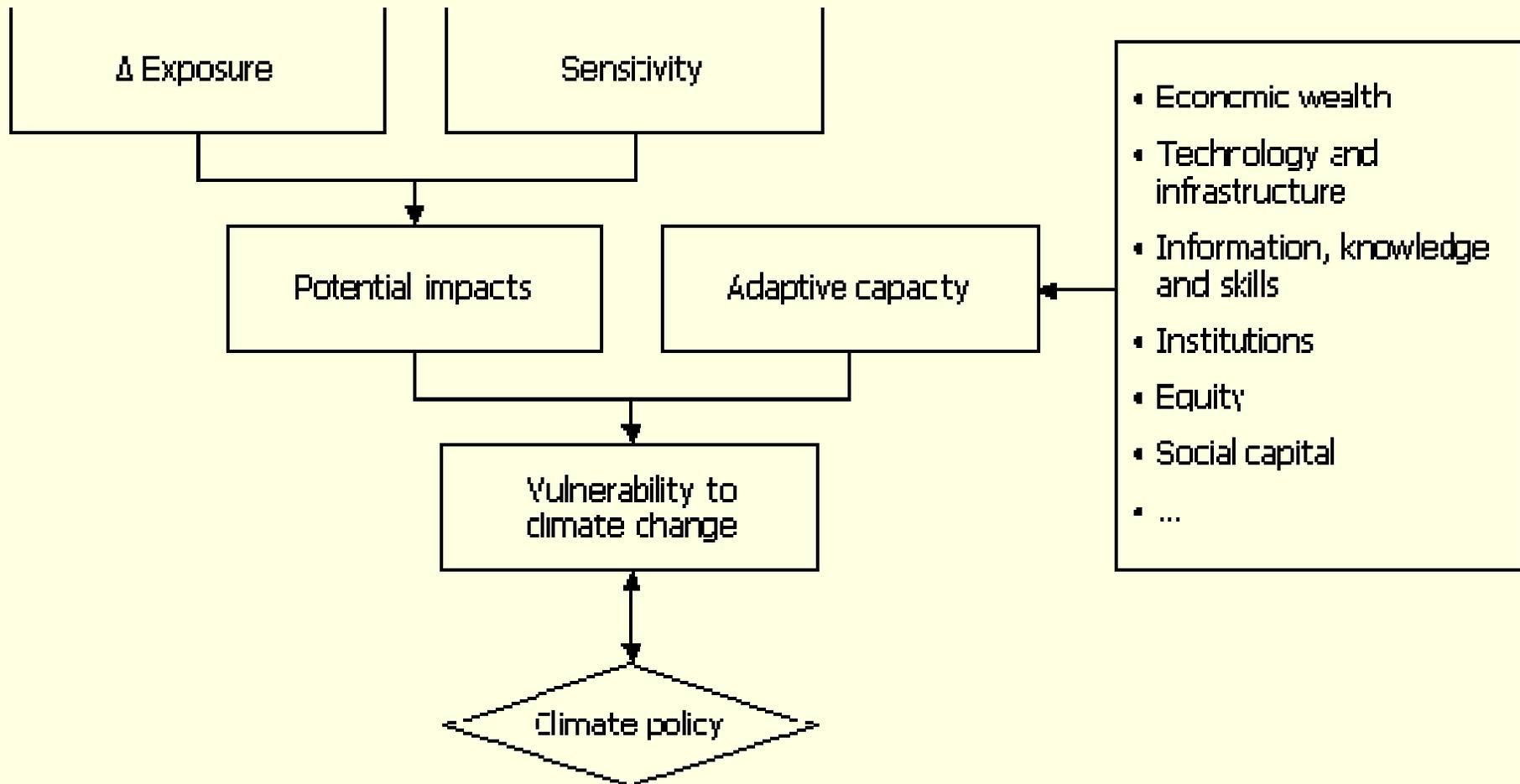




The Focus of the Climate Change Research on Vulnerability



Vulnerability in the CCA-Perspective



Source: R. Klein (2003) in website of the Potsdam-Institute for Climate Impact Research



Comparing DRR and CCA Foci

Different perspectives on how to act

C.C.

DRR

Indicators

How to adapt to climate change (stress) ?

- Progressive process, ongoing but not well estimated
- Obligation of adaptation: what are the best measures ?
- Long term analysis (2100)
- Vulnerability=ending point :
V=impacts - adaptation

How to resist to/cope with natural hazards (shock) ?

- Abrupt change, pressure, hazardous
- How to reduce risks: reduce hazard exposure, enhance resilience and reduce vulnerability
- Limited time-scale: before/during/after disaster
- Vulnerability= starting point of risk assessment
 $R=H*E*V$

Where are the « cooperation areas » ?

- Estimation of physical exposure to combined coastal processes (erosion, flooding, sea level rise)
- Socio-economic exposure: qualitative
- Give geographical priorities for action
- Vulnerability=ending point, sometimes only physical processes

Different objectives, time-scales

Scale issue

Determining adaptation needs

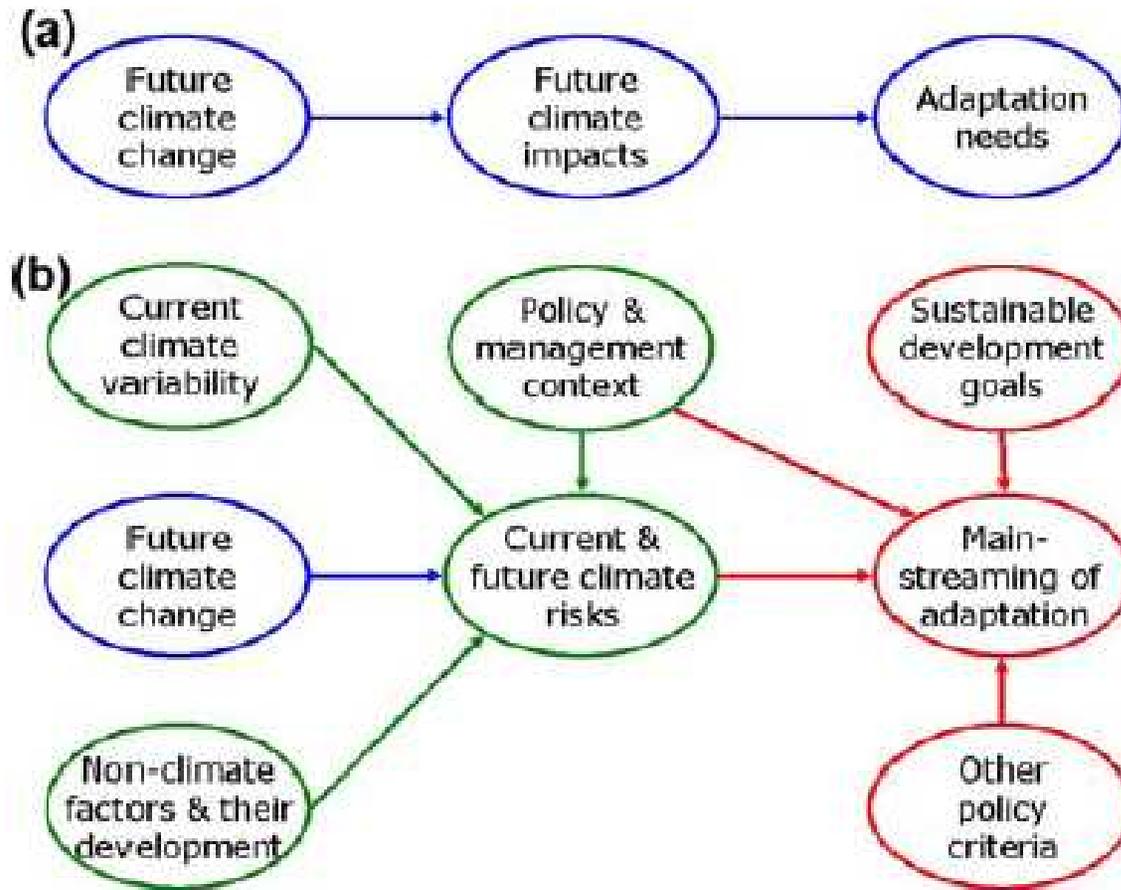


Fig. 3 Evolution of approaches for determining adaptation needs: **a** linear hazards-based approach; **b** complex integrative approach



Linking DRR and CCA

Arguments for linking both schools of thought:

- Vulnerability: essential for highlighting other means for action than hazard/stress exposure
- Learn from each other
- Preparing for extreme events are a common interest
- Vulnerability and risk assessment should inform adaptation strategies

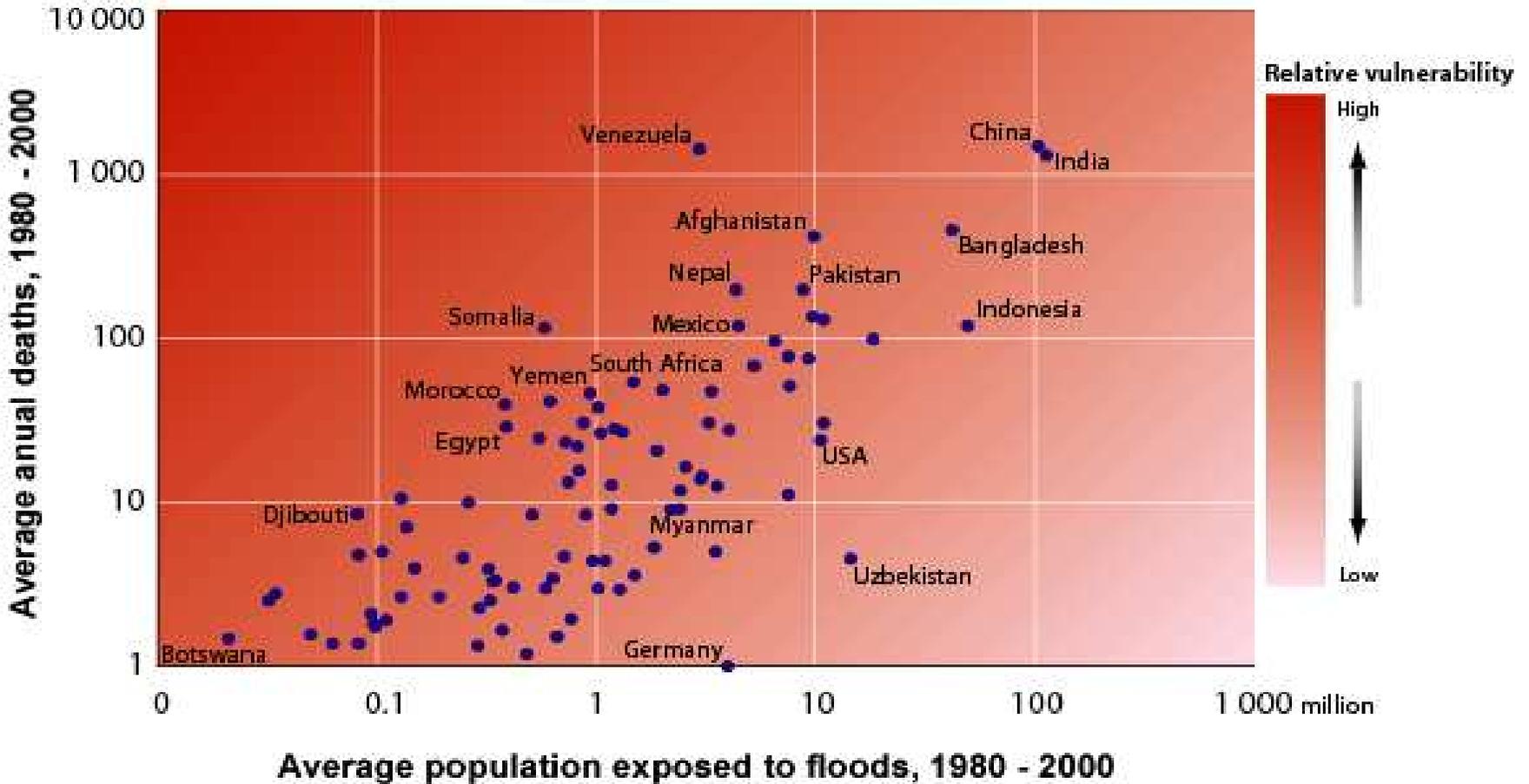


What can DRR contribute to CCA



Global Vulnerability Assessments by UNDP

Relative Vulnerability for Floods



Source: The EM-DAT OFDA/CRED International Disaster Database and UNEP/GRID-Geneva

Source: UNDP 2004

Dr.-Ing. Birkmann
UNU-EHS
birkmann@ehs.unu.edu



Local Level Approaches



EXAMPLE: STRUCTURE OF THE QUESTIONNAIRE FOCUSING ON VULNERABILITY

Vulnerability

susceptibility and degree of exposure

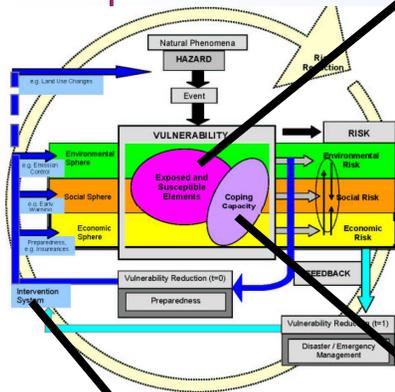
- 1) impact of tsunami on household members and their assets
- 2) structure of the household
- 3) housing conditions and the impact of the tsunami
- 4) direct loss of possessions
- 5) activity and occupation of the household members

coping capacity

- 6) social networks
- 7) knowledge about coastal hazards and tsunami
- 8) financial support from formal and informal organizations
- 9) access to information, e.g. radio

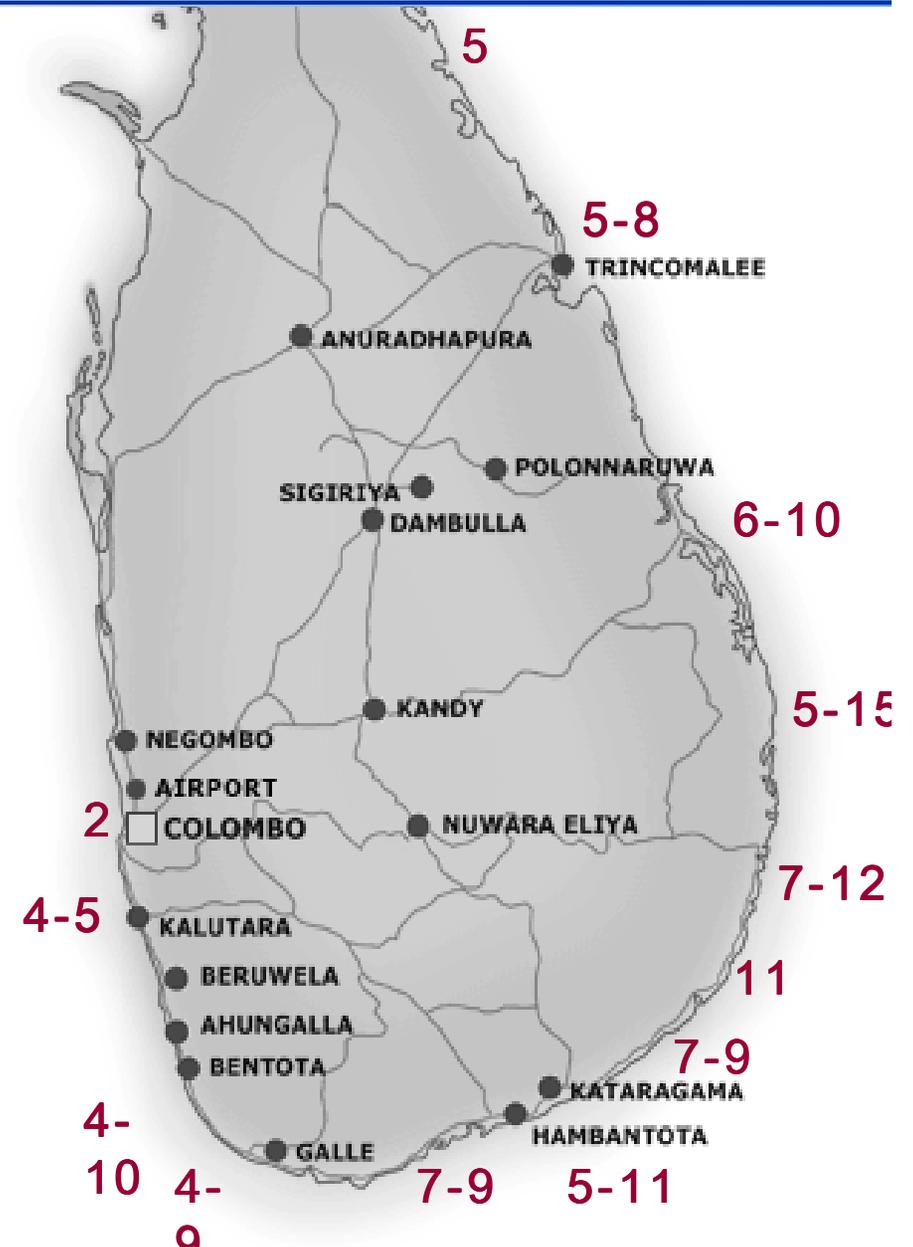
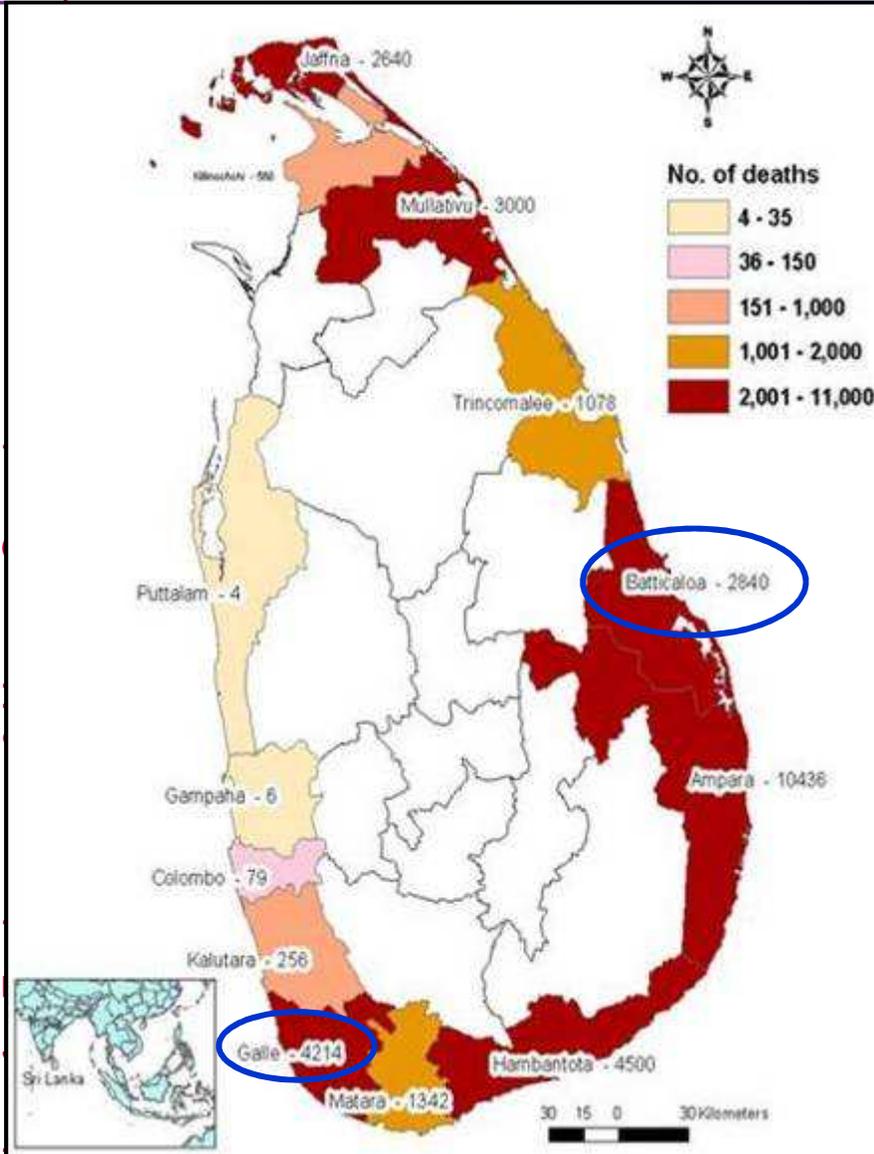
intervention tools

- 10) relocation of housing and infrastructure to inland
- 11) early warning system
- 12) 100 meter “buffer zone” (implemented by the government)



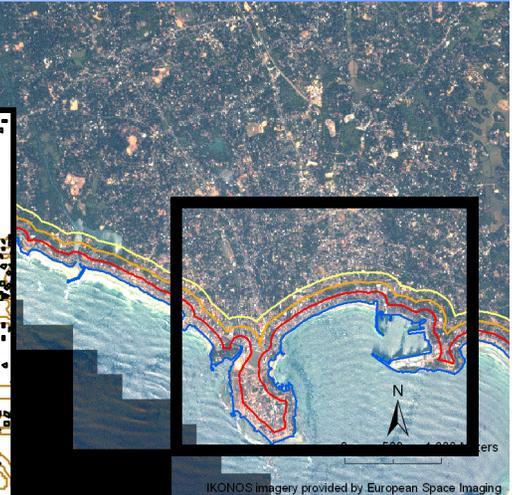
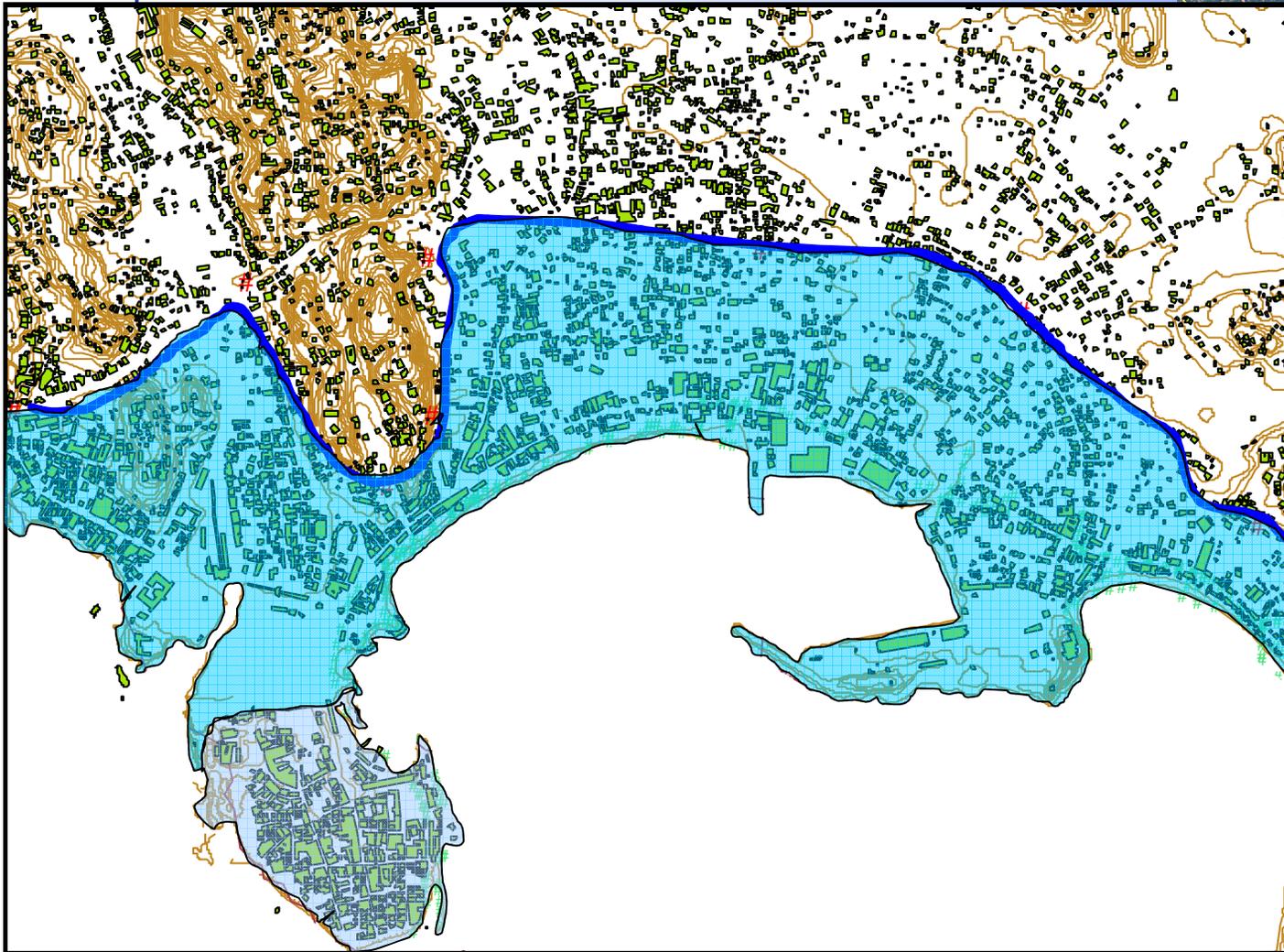


Sri Lanka



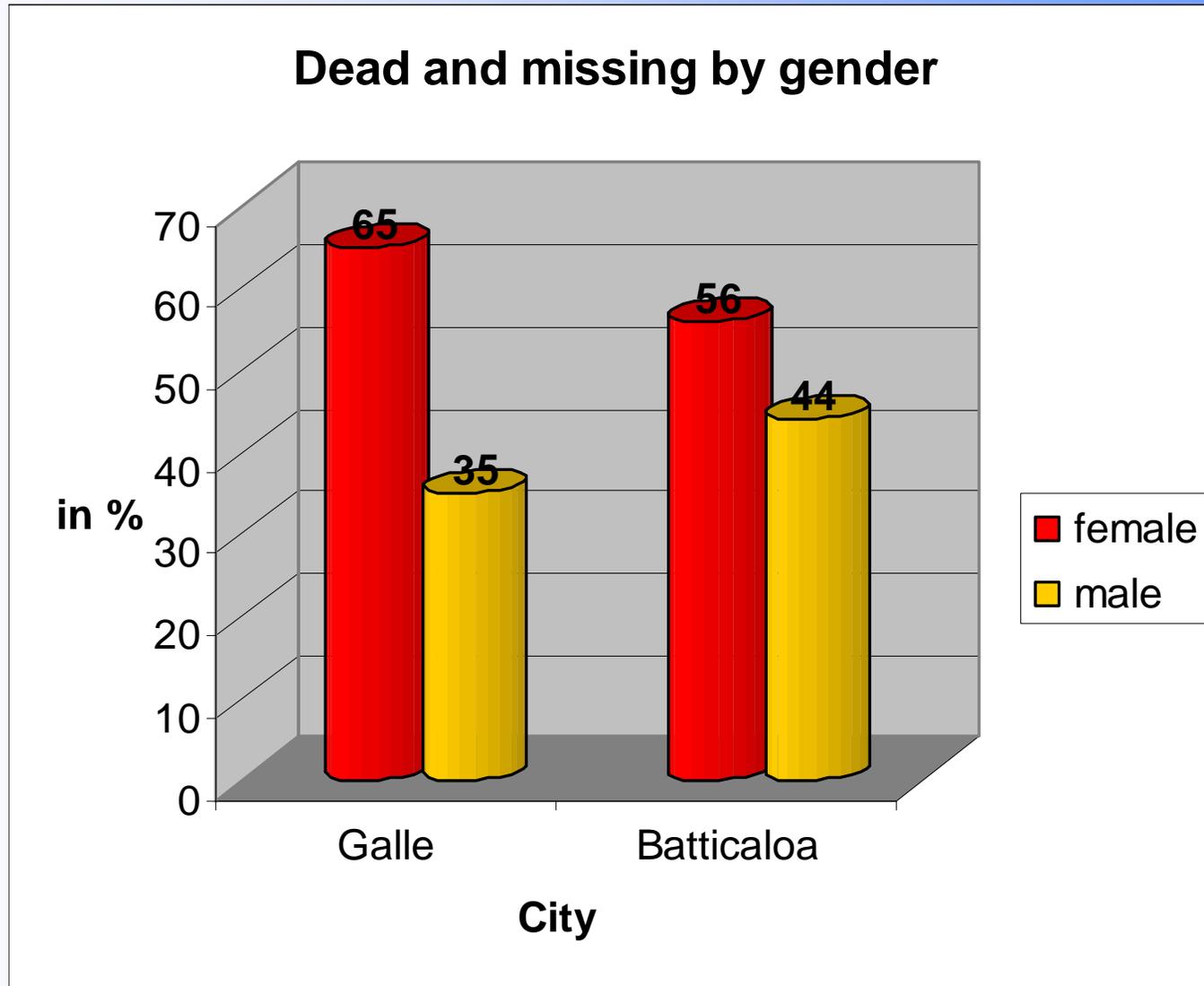


Inundation went beyond 100 meter zone





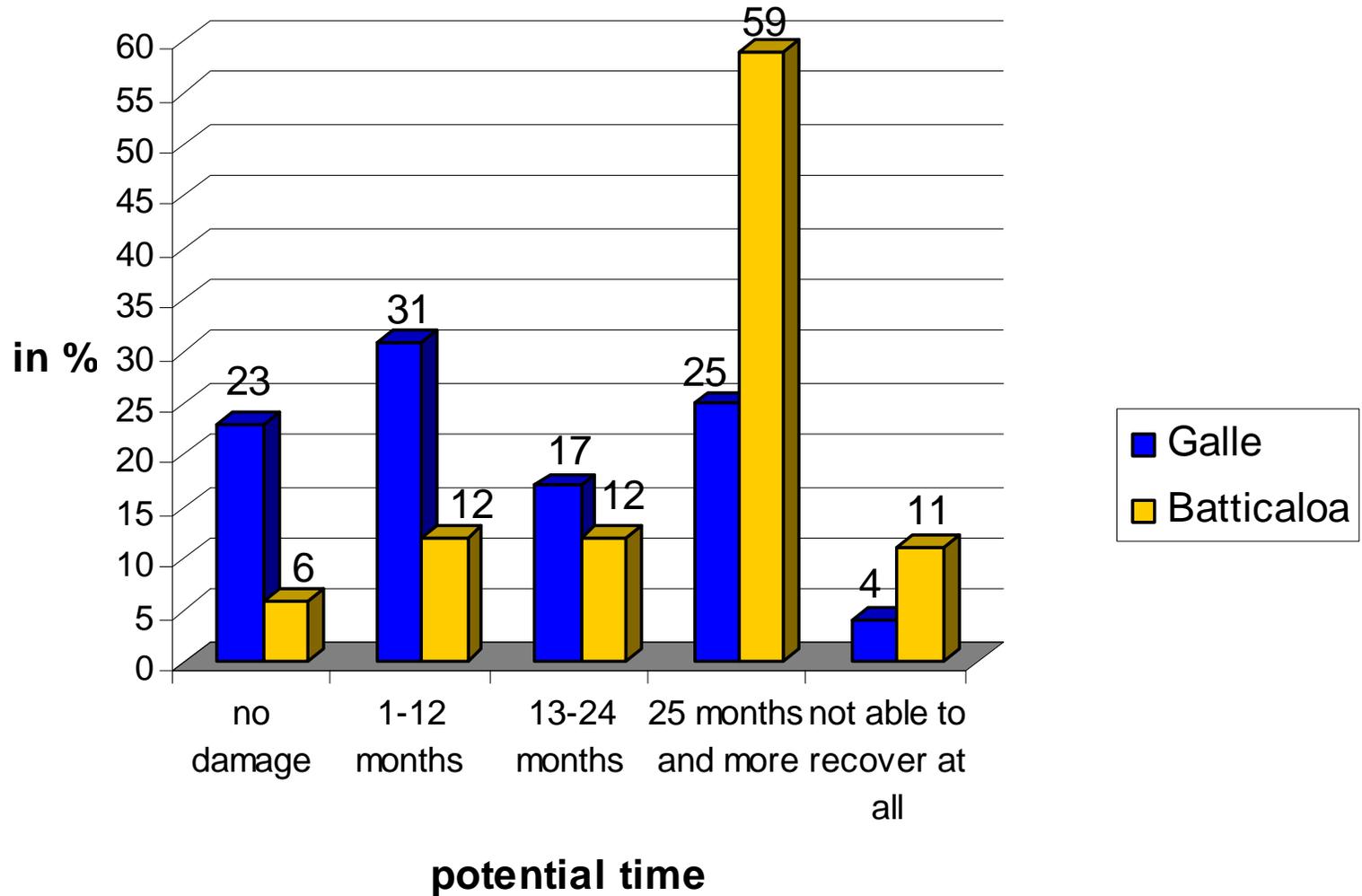
Differences Reveal Vulnerability





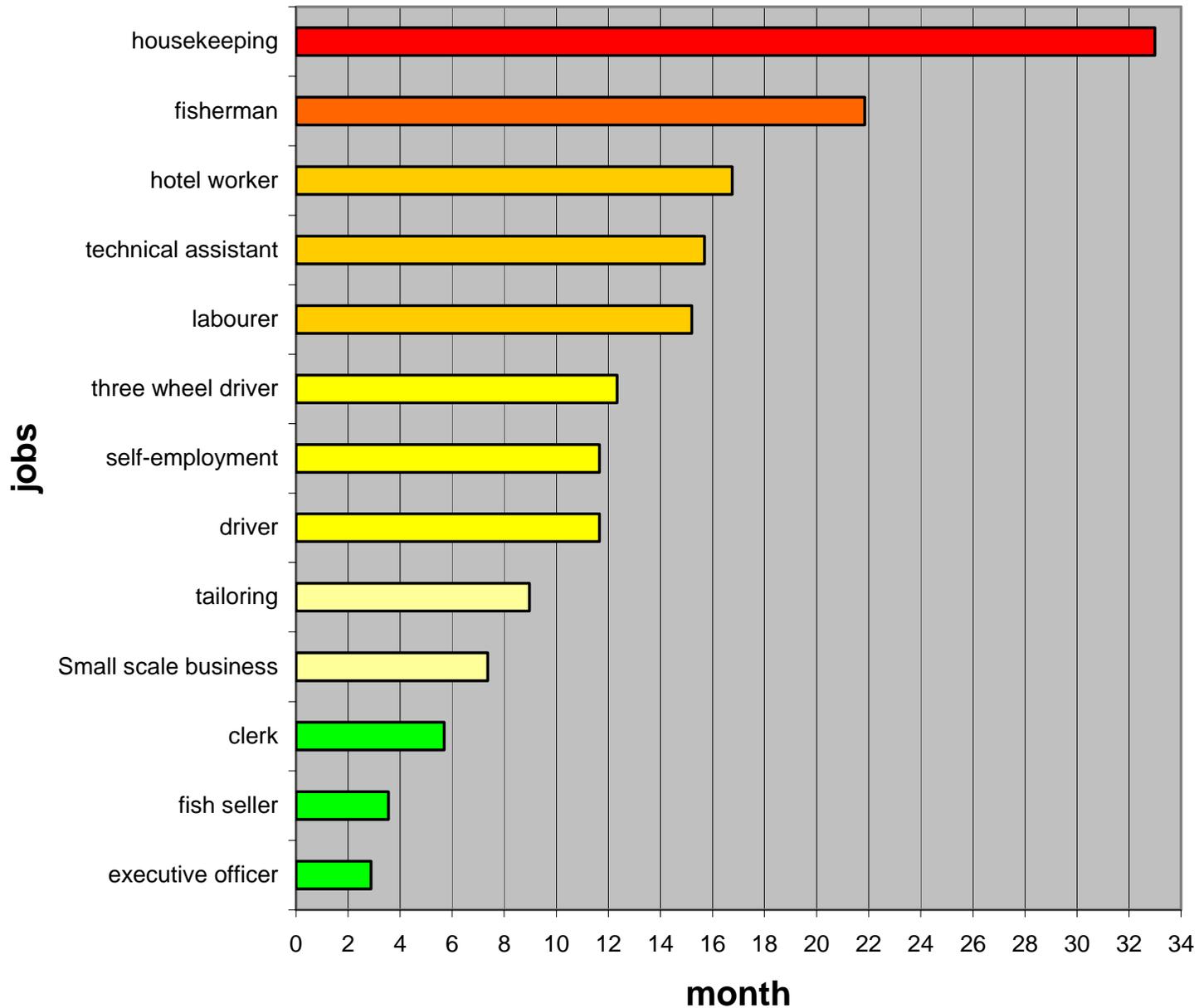
Differences Reveal Vulnerability

Unusual difficulties in recovering





Social Groups & Recovery

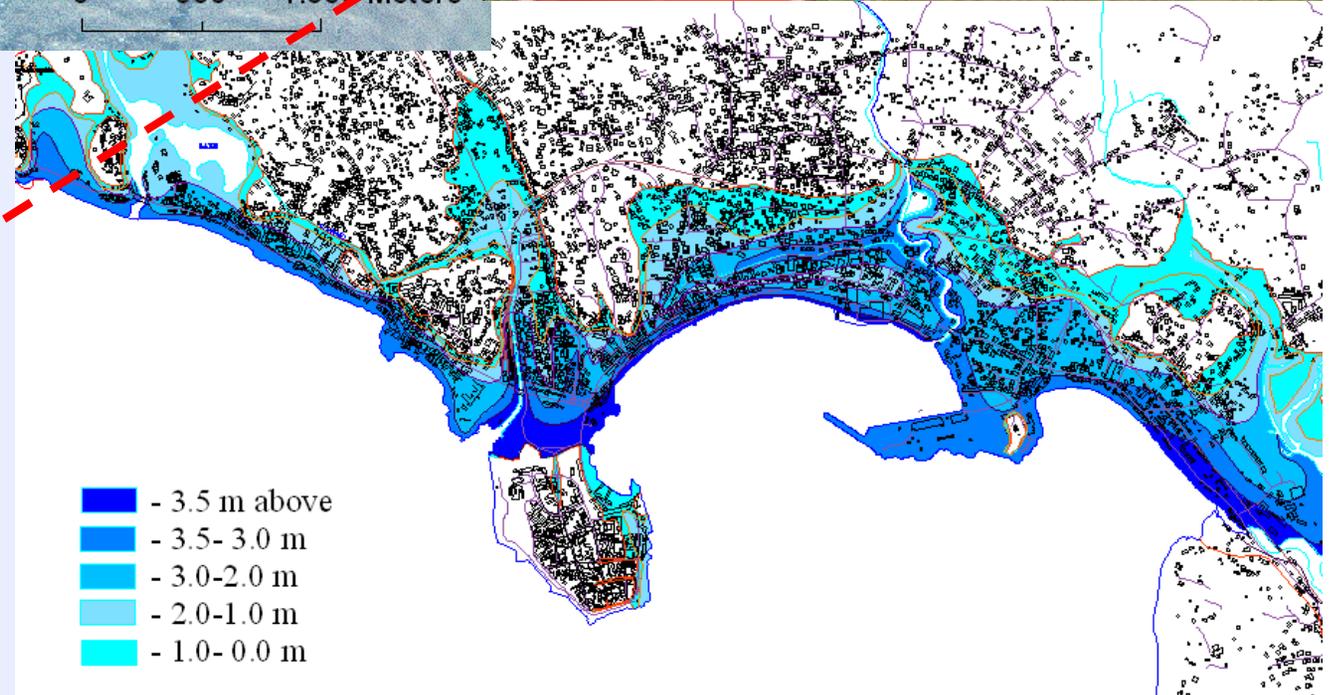
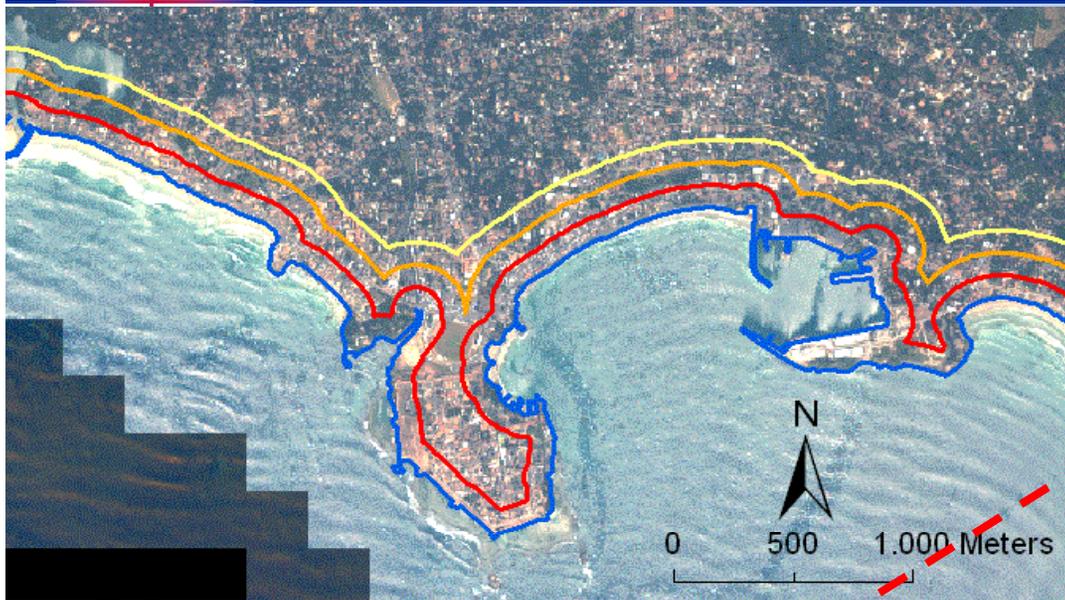




Evaluation of Strategies to Reduce Vulnerability and Risk



Intervention: 100 Meter Buffer-Zone



United Nations University
Institute for Environment & Human Development

Source: DLR 2005;
Hetterachi 2006

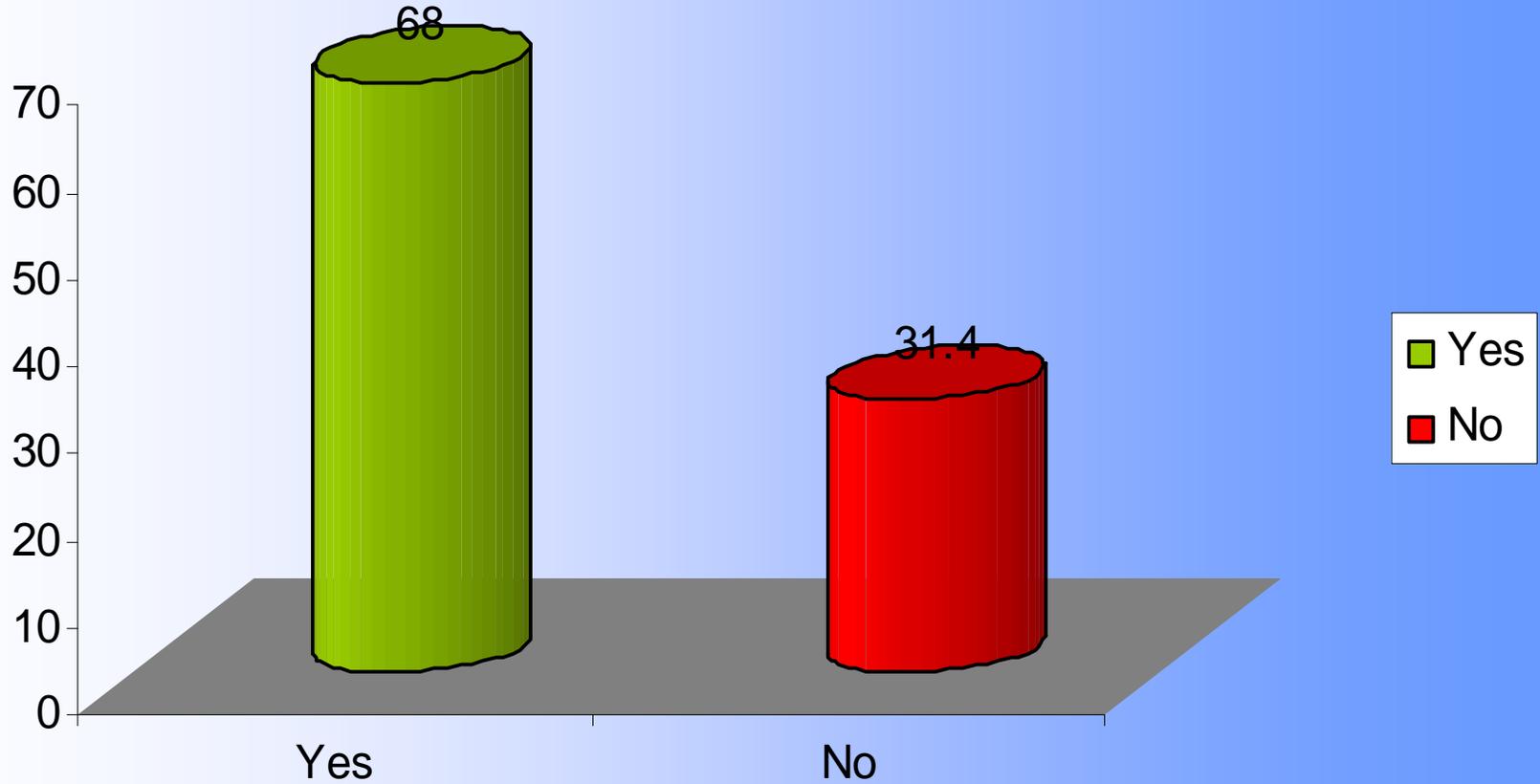


Resettlement





Willingness to Resettle - Safer Location

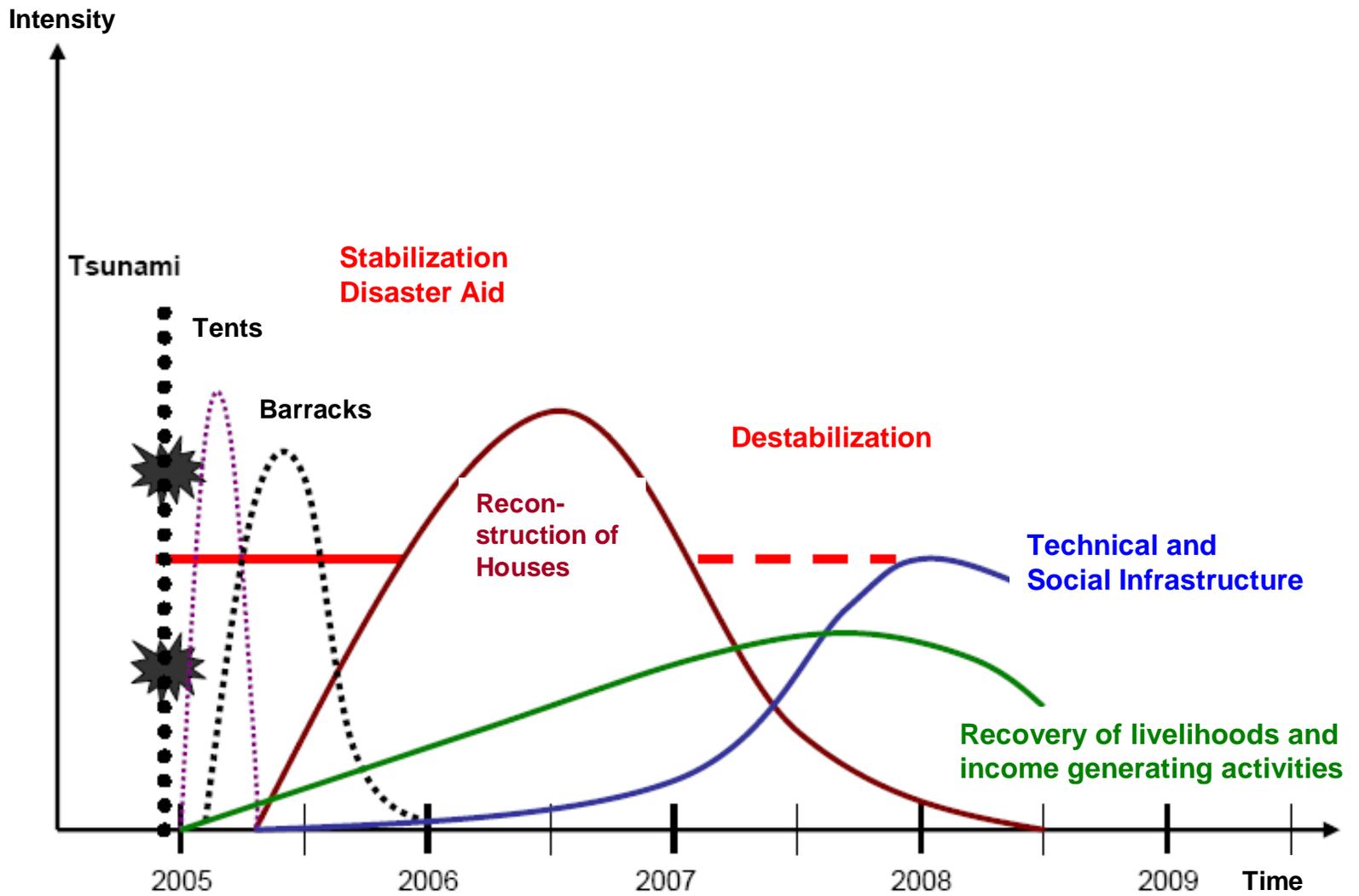


Landownership and Exposure in Galle



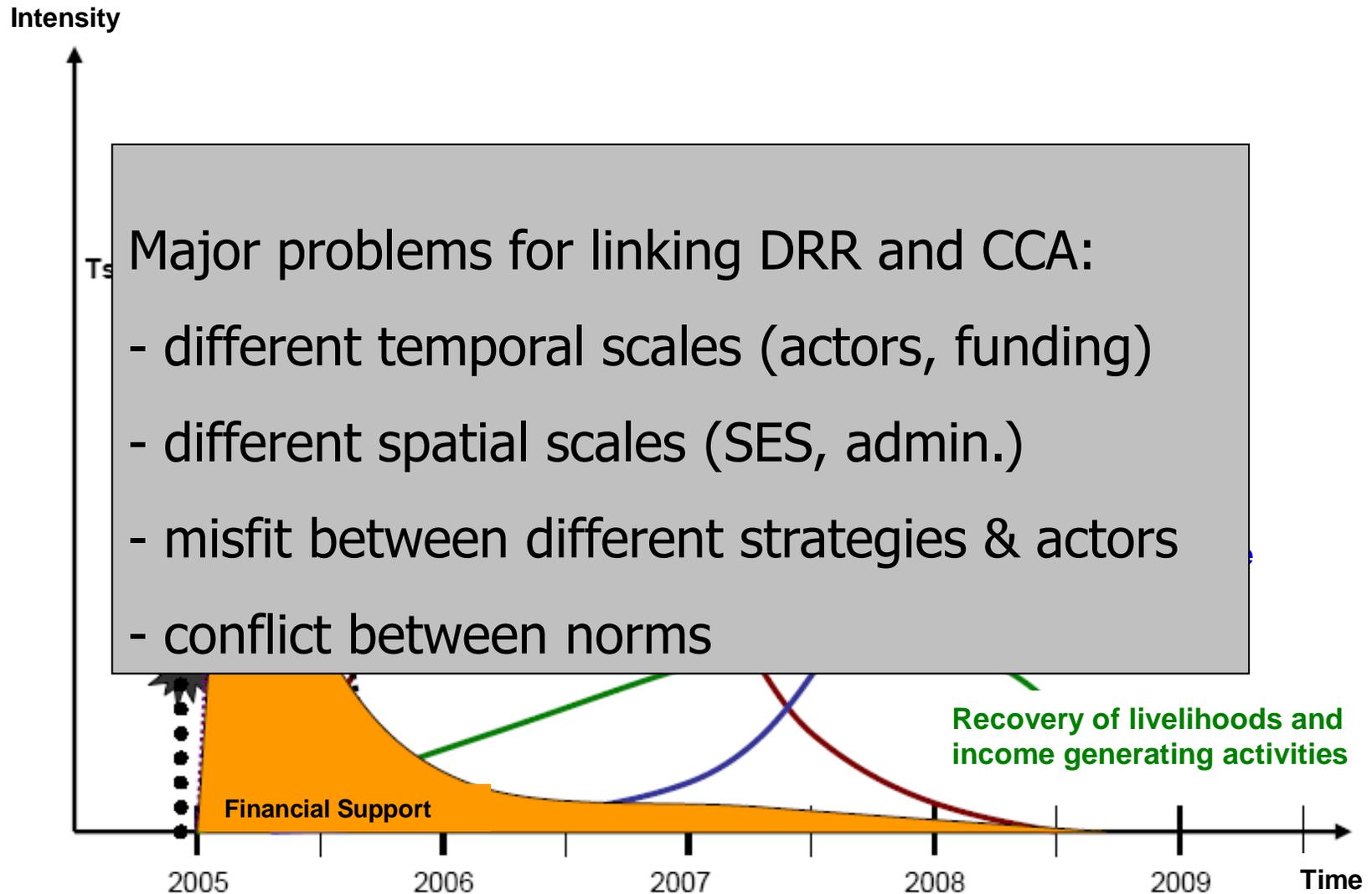


Recovery and Social-Ecological Crises





Recovery and Social-Ecological Crises





Ongoing Research and Conclusions



2. How do different institutions and organizations cooperate regarding integrative strategies of Disaster Risk Reduction and Climate Change Adaptation – please indicate the level of cooperation and integration

Good Medium Low

The cross-sectoral and integrative character of current adaptation strategies is...

The link between disaster risk reduction and climate change adaptation in current strategies and action plans is...

The link between adaptation strategies at different governance levels (international, national, sub-national, local) is...

The cooperation between different ministries regarding adaptation is...

The synergies between different stakeholders in DRR and CCA is...

The cooperation between scientists and practitioners is...

The collaboration between different development organizations/ NGOs is...

Other:

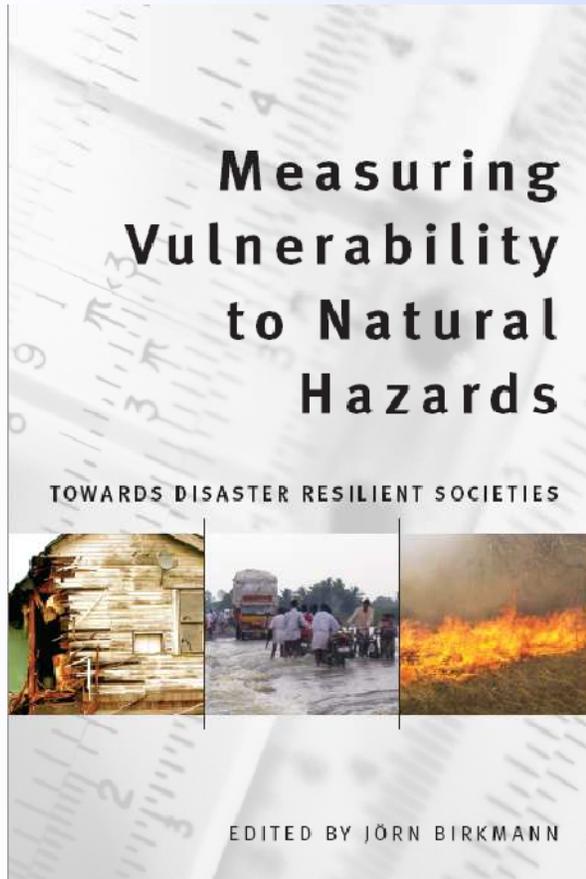


Conclusions

1. Disaster Risk Reduction and Climate Change Adaptation should be linked, however, conceptual and practical gaps have to be addressed.
2. CCA with a focus on global and national scales and DRR with an emphasis on the local scale – need to be linked at a “meso-level”
3. Disasters, recovery and reconstruction are heavily modifying the vulnerability of different regions, groups as well as social-ecological systems – thus they should be used also as catalysts for CCA
4. Vulnerability Assessment can help to identify priority areas for adaptation and might help as well to understand limits of adaptation



Thank you for your attention



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Birkmann, Jörn (2008): Assessing Vulnerability Before, During and After Natural Hazards Occurred in Fragile Regions – Case Study: Tsunami in Sri Lanka and Indonesia. In: **UNU-WIDER Research Paper** – Based on the Presentation at the UNU-WIDER conference on fragile groups and fragile states, Helsinki, 24 p. (peer-reviewed)

Birkmann, Jörn; Buckle, Philip, Jaeger, Jill; Pelling, Mark; Setiadi, Neysa; Garschagen, Matthais; Fernando, Nishara; Kropp, Juergen (2009): Extreme Events and Disasters: A Window of Opportunity for Change? Analysis of Changes, Formal and Informal Responses After Mega-Disasters; **Natural Hazards Journal** (in print)

birkmann@ehs.unu.edu