

International Conference on Sustainable
Development of Natural Resources in Africa 2011
Accra, 5-7 Dec. 2011



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Fabrice Renaud, Head of Section



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Mission and Vision

Mission:

Advancing human security through knowledge-based approaches to reducing vulnerability and environmental risks

Vision:

That by 2015 our ability to integrate multidisciplinary research and postgraduate education will have secured us the position of a world-class leader in **policy-relevant** science with specific thematic focus on

- *Vulnerability assessment, resilience analysis, risk management and adaptation strategies within linked human-environment systems*
- *Internal displacement and trans-boundary migration due to environmental push factors*

Human Security – Definitions used in CLICO



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Human security can be described as **protection of individuals or communities** from threats and disruption as well as **protection of their rights and basic needs** (Kaldor, 2007; Human Security Network, 2010; UNDP, 1994) and is closely related to concepts such as **human well-being**.

UNDP definition: **Human security** can be said to have two main aspects. It means, first, **safety from** such chronic threats as **hunger, disease and repression**. And second, it means **protection from sudden and hurtful disruptions in the patterns of daily life** – whether in homes, in jobs or in communities. (UNDP, 1994a: 23)

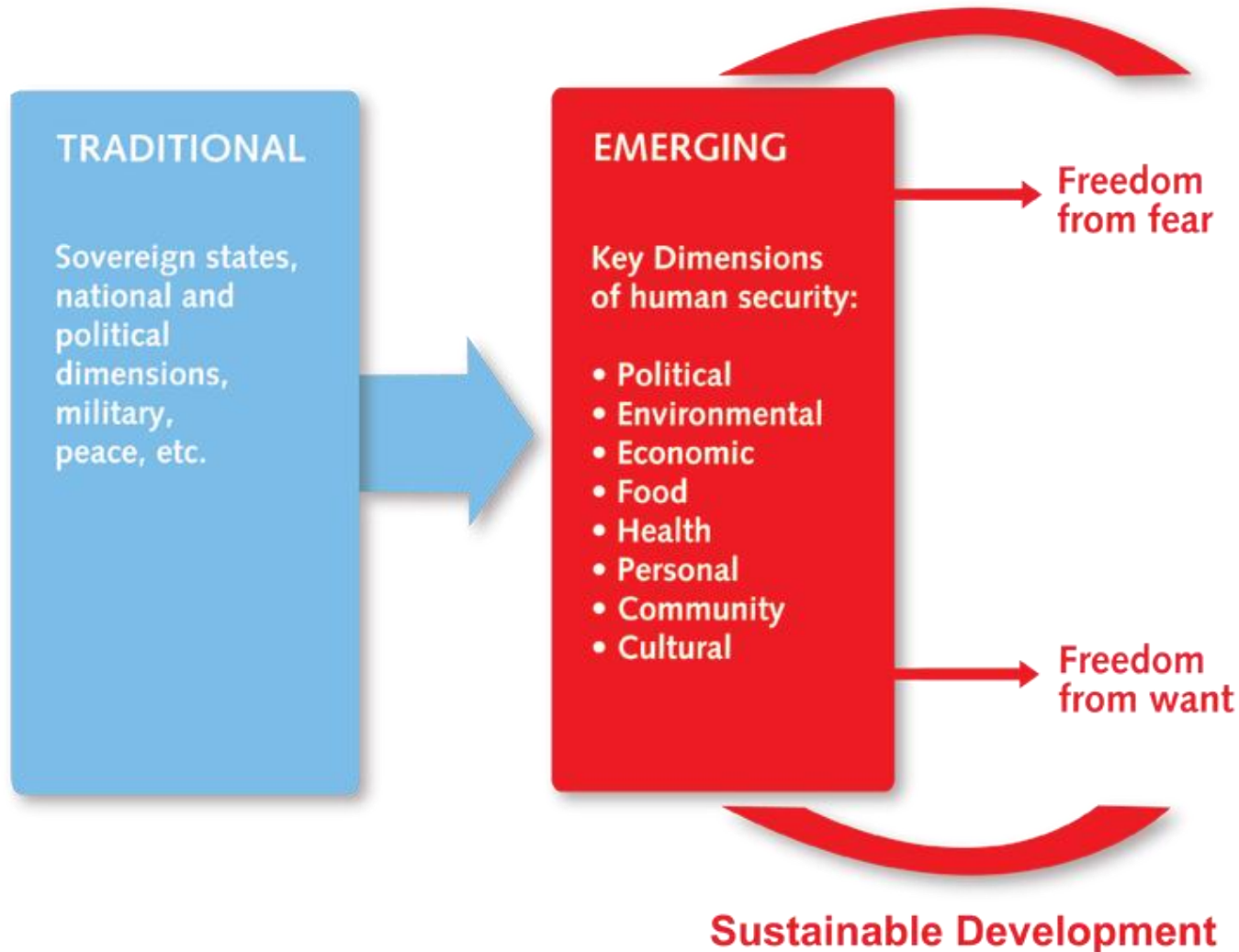
Human Security



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2011

Program structure



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- **EMSVA**: Environmental Migration, Social Vulnerability & Adaptation
Lead: [Koko Warner](#), scientific staff: 11
- **VARMAP**: Vulnerability Assessment, Risk Management & Adaptive Planning
Lead: [Joern Birkmann](#), scientific staff: 11
- **EVES**: Environmental Vulnerability & Ecosystem Services
Lead: [Fabrice Renaud](#), scientific staff: 14
- **EGECHS**: Enhancing Graduate Educational Capacities for Human Security
Lead: [Jörg Szarzynski](#), scientific staff: 2

2011

Research



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PhD students (currently): 13

Graduated in reporting period: 4

Research projects : 15 (most of them including more than one programme)

Publications (mid 2010/11):

- 33 peer reviewed articles
- 10 conference proceedings
- 6 policy / research briefs
- 16 book chapters
- 11 Articles in magazines



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Selection of Projects



WASCAL

- Addresses climate change and land use in West Africa
- Large-scale research-focused program
- **Aim:**
 - Enhance the resilience of human and environmental systems to climate change and increased variability
- **Objectives:**
 - Strengthening the research infrastructure and capacity in West Africa related to climate change
 - Creating attractive scientific “on place” working environment in West Africa
 - Pooling the expertise of ten West African countries and Germany
- **Funded by BMBF, coordinated by Center for Development Research (ZEF, Bonn University), with a network of German and African universities**





- Lead workpackage 5.1 on Risk Assessment:
 - Collaboration with German Aerospace Centre, ZEF & UNU-INRA; Collaboration between EVES and VARMAP sections of EHS
 - Mutli-hazard vulnerability and risk assessment
 - Research carried out in watersheds in Burkina Faso, Ghana and Bénin

- Official “German” counterpart in the Graduate Research Programme “Climate Change and Human Security”
 - MSc programme led by Université de Lomé in Togo
 - Support in curriculum development
 - Support in teaching (vulnerability and risk assessment; social-ecological systems, ecosystem services)

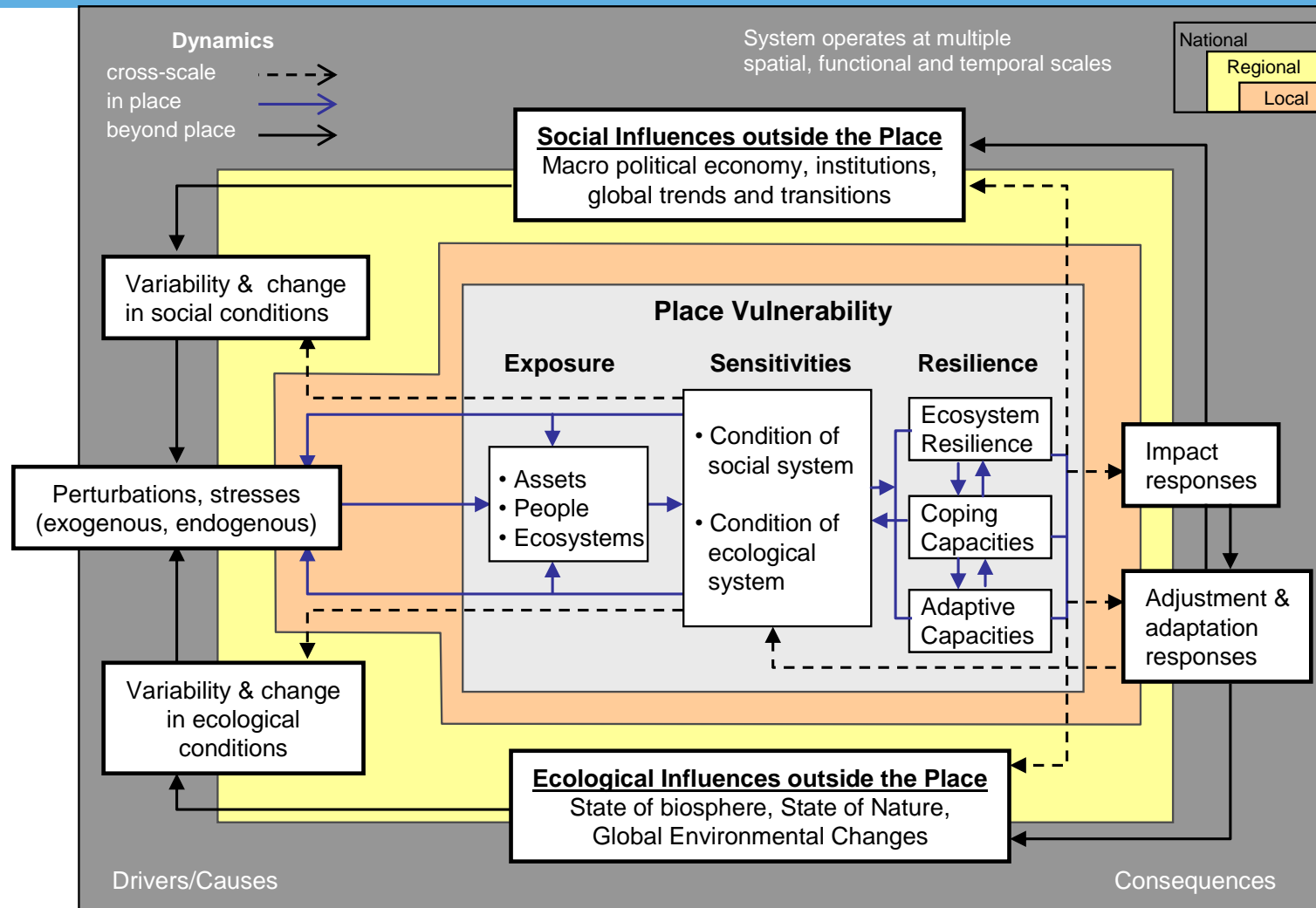
Vulnerability of Coupled Systems: a Proxy for Human Security



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Use of SUST for Specific Sectors

Indicators



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Agricultural Sector

Exposure (E)

- % farmland (e_1)
- % employees (e_2)

Sensitivity (S)

- unemployment rate of district (sh)
- contamination potential (se_1)
- erosion potential (se_2)
- water quality index (se_3)

Resilience (R)

- Water storage capacity (er_1)
- Filter/buffer capacity (er_2)
- % perm. grasslands (er_3)
- GDP per capita district (c_1)
- GDP per capita FS (c_2)
- side business income (c_3)
- % organic farms (a_1)
- % protected areas (a_2)

Forest Sector

Exposure (E)

- % forested area (e_1)
- % employees (e_2)

Sensitivity (S)

- unemployment rate of district (sh)
- % pre-damaged forest (se_1)
- water quality index (se_2)

Resilience (R)

- forest size (er_1)
- forest type (er_2)
- forest fragmentation (er_3)
- GDP per capita FS (c_1)
- GDP per capita district (c_2)
- mean annual income of households (c_3)
- forest growth rate (a_1)
- protected areas (a_2)

Vulnerability Maps



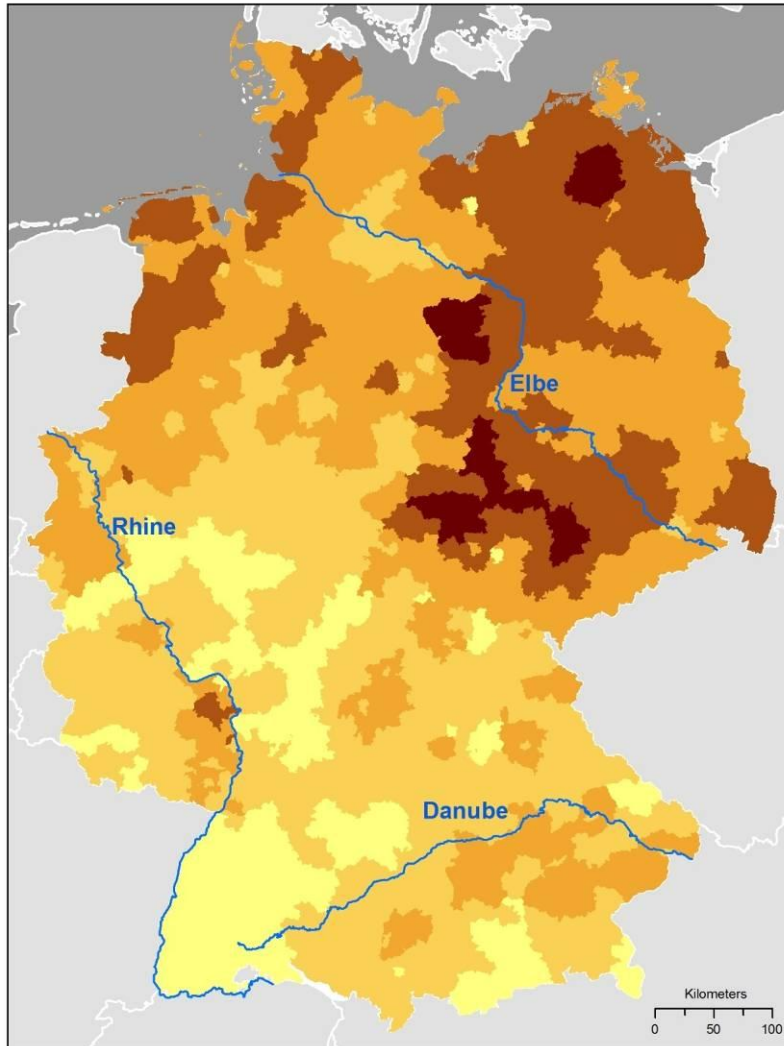
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Source: PhD research of Marion Damm (UNU-EHS) – DISFLOOD Project

Vulnerability of the agricultural sector to river flooding



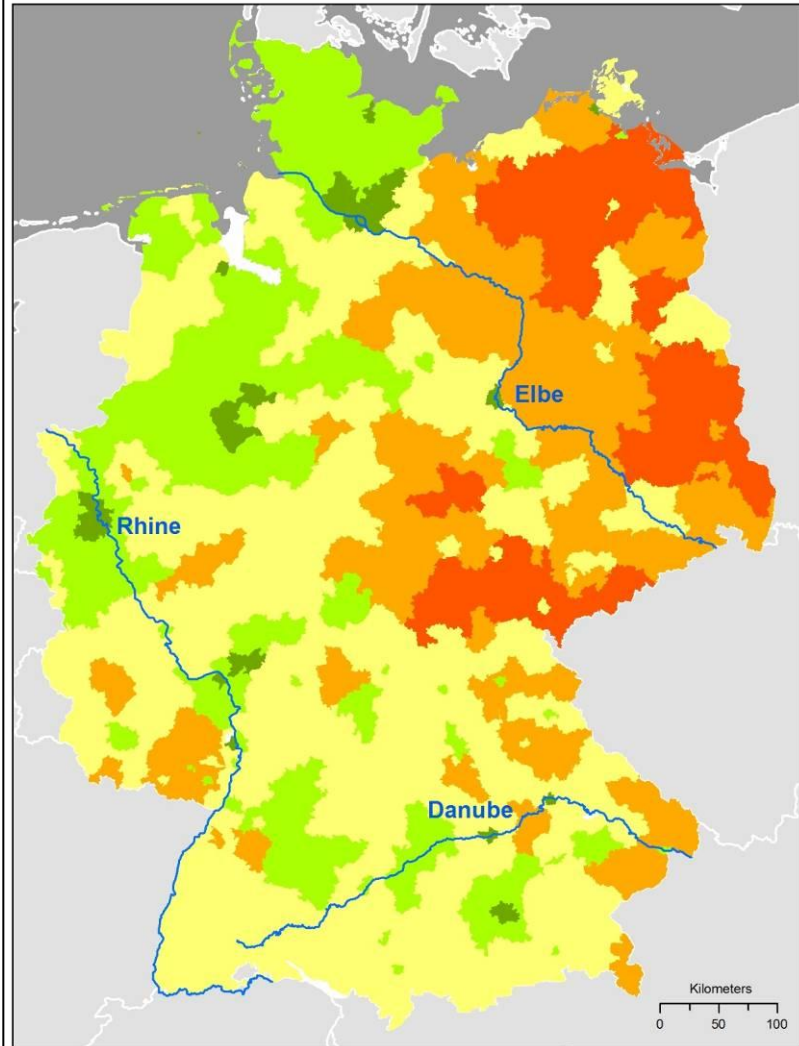
Agricultural S. Vulnerability



Vulnerability ranges between [-2, 3]. Five classes are formed by using equal distances as criterion for class building. Low values indicate low vulnerability, high values indicate high vulnerability in a district.



Vulnerability of the forest sector to river flooding



Forest sector vulnerability



Vulnerability ranges between [-2, 2]. Five classes are formed by using equal distances as criterion for class building. Low values indicate low vulnerability, high values indicate high vulnerability in a district.



World Risk Index



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Risk and Vulnerability Index

Exposure

Exposure to natural hazards

Susceptibility

Likelihood to suffer damage in an emergency

Coping Capacity

Capacity to reduce negative impacts in case of emergency

Adaptive Capacity

Capacity for long-term adaptation and change

---- Core components of vulnerability ----

NATURAL HAZARDS
SPHERE

SOCIETAL SPHERE

Global Index / Indicators with national scale resolution

Local Indicators und criteria with sub-national, local and household scale resolution

Indicators selected



1. Exposure

EXPOSED POPULATION IN REGARD TO

- A) Earthquakes
- B) Cyclones
- C) Floods
- D) Droughts
- E) Sea level rise

2. Susceptibility

NUTRITION

- A) Percentage of undernourished population

PUBLIC INFRASTRUCTURE

- B) Population without access to improved sanitation
- C) Population without access to clean water

HOUSING CONDITIONS

Proportion of population in slums;
proportion of semi-solid and fragile
houses
→ limited data availability

POVERTY AND DEPENDENCIES

- D) Dependency ratio (proportion of under 15 – and above 65-year-olds in relation to the working population)
- E) Extreme poverty (population living on less than 1.25 USD (live PPPs) per day)

ECONOMIC CAPACITY AND INCOME

- F) Gross Domestic Product per capita (Purchasing Power Parity)
- G) Gini-Index

3. Coping Capacity

GOVERNMENT AND AUTHORITIES

- A) Corruption Perception Index
- B) Failed States Index

DISASTER PREPAREDNESS AND EARLY WARNING

National disaster risk
management policy according
to the report of UN / ISDR

MEDICAL SERVICES

- C) Number of physicians per 10,000 population
- D) The number of hospital beds per 10,000 population

SOCIAL NETWORKS: NEIGHBORHOOD, FAMILY AND SELF-HELP

→ No data available

ECONOMIC COVERAGE

- E) Insurance (except life insurance)

4. Adaptive Capacity

EDUCATION AND RESEARCH

- A) Adult literacy rate
- B) Combined gross school enrolment (rate of school-aged children in primary, secondary and tertiary educational institutions)

GENDER EQUITY

- C) Gender parity in education (in primary, secondary and tertiary educational institutions)
- D) Percentage of female representatives in the National Parliament

ENVIRONMENTAL STATUS / ECOSYSTEM

PROTECTION

- E) Water resources
- F) Protection of biodiversity and habitats
- G) Forest Management
- H) Agricultural Management

ADAPTATION STRATEGIES

Volume of National Adaptation
Programmes of Action to Climate
Change, Climate Change Convention
(available for 45 of the least developed
countries)

FINANCING

- I) Life expectancy at birth
- J) Private health expenditure
- K) Public health expenditure

Hazard Exposure (annual pop. exposed)



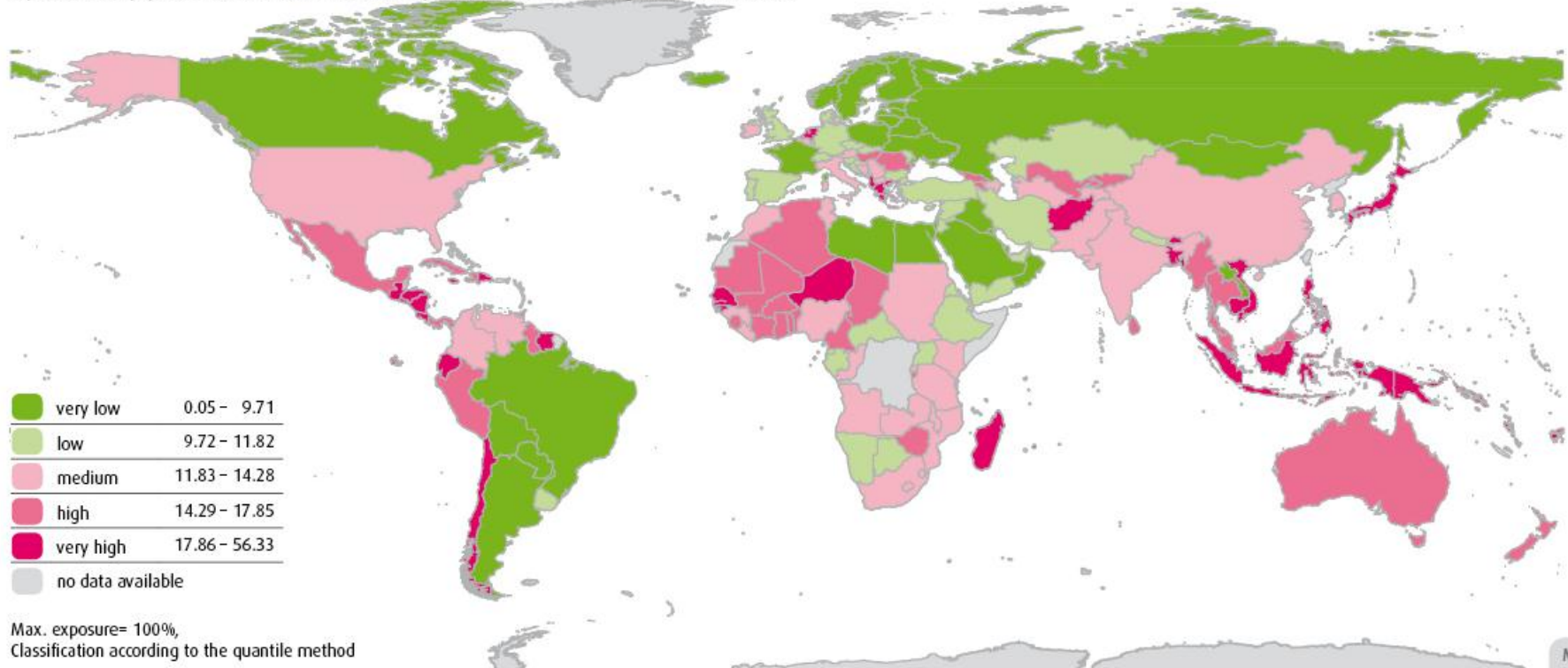
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Exposure

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

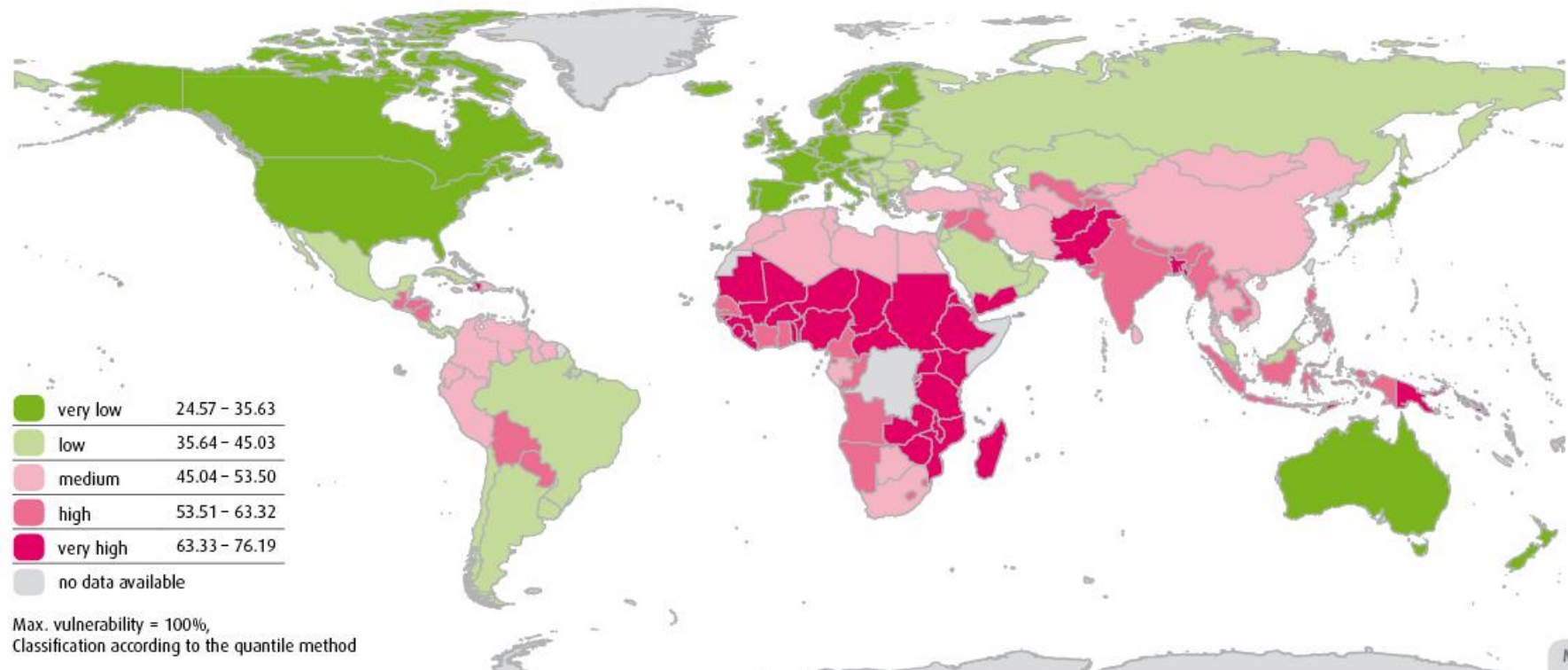




Vulnerability

Vulnerability

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



Risk



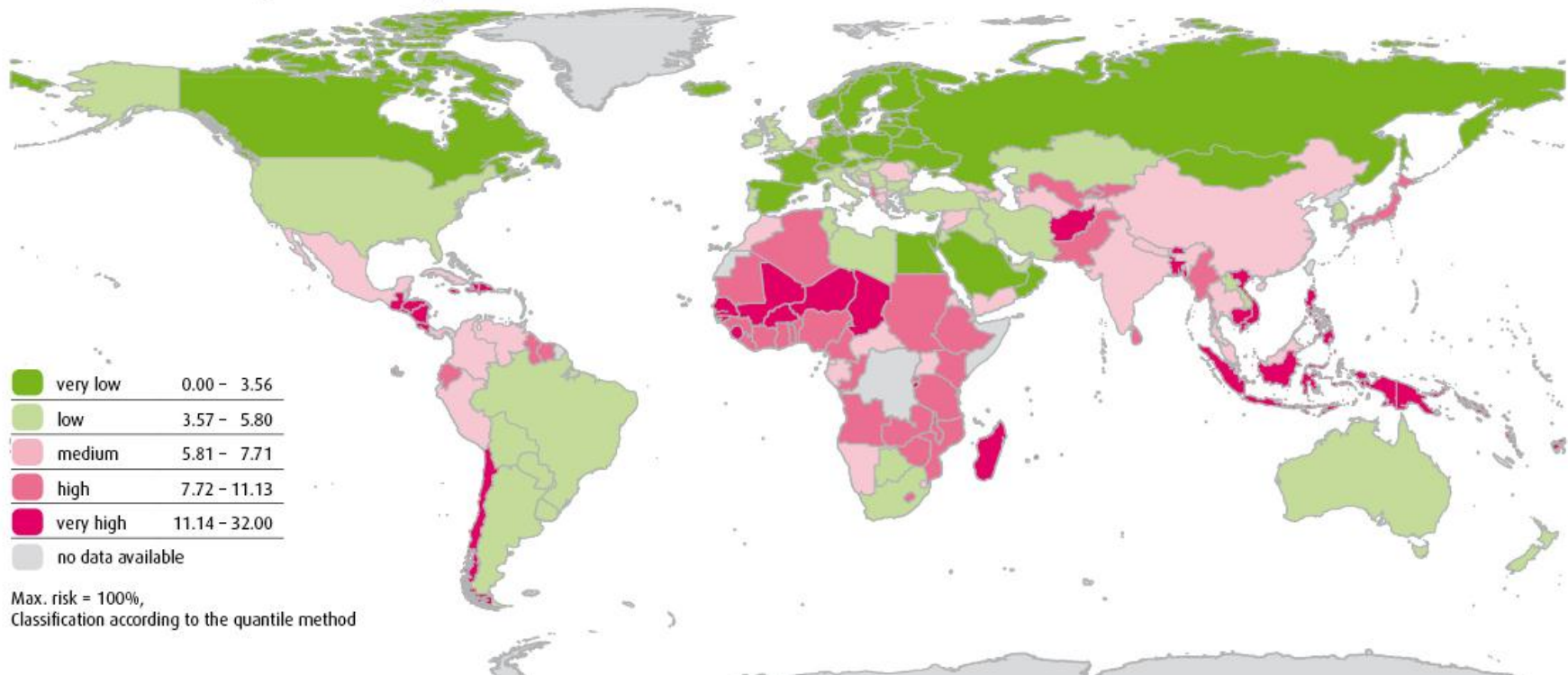
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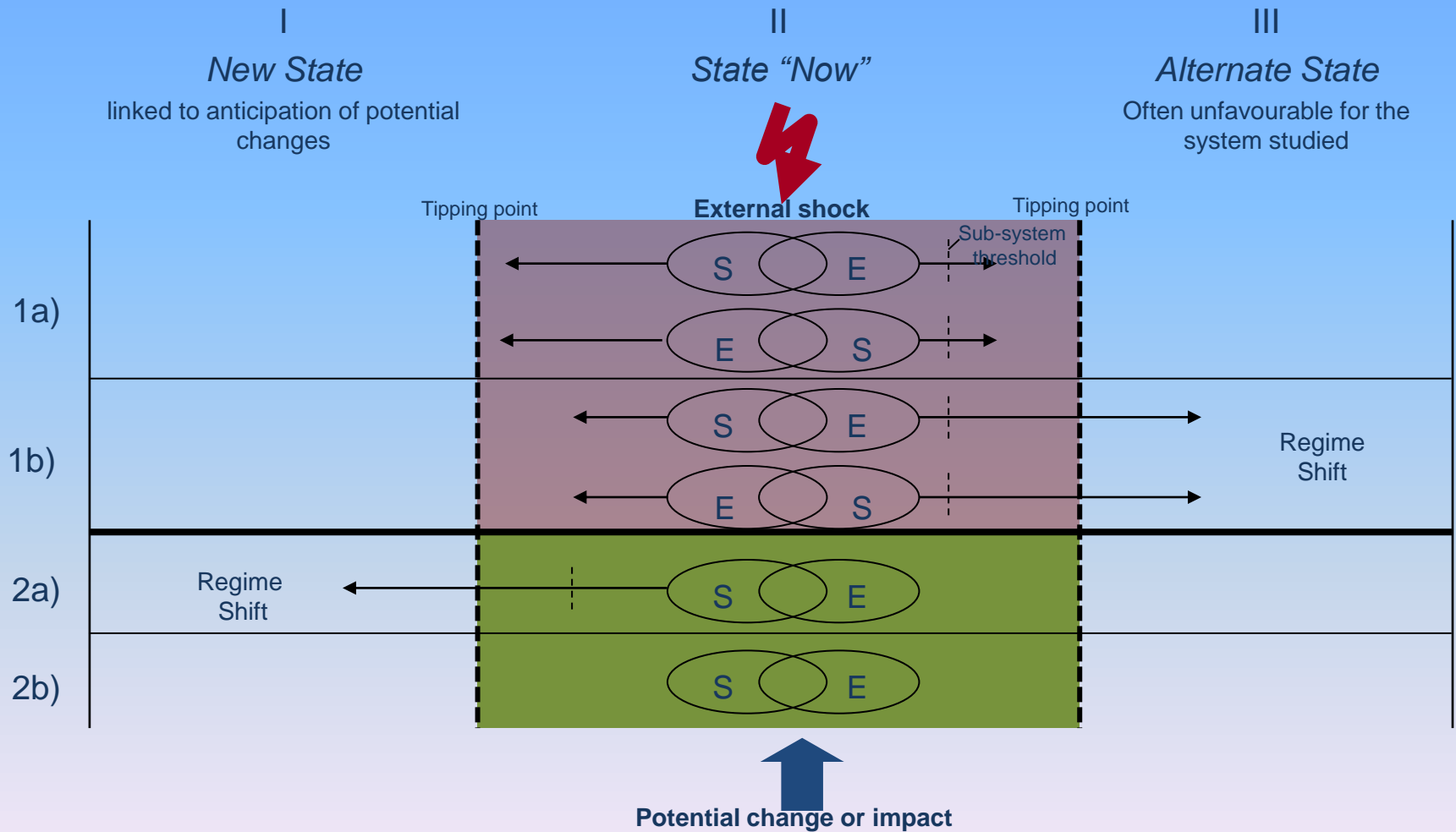
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WorldRiskIndex

WorldRiskIndex as the result of exposure and vulnerability



System Shifts and Thresholds



Policy Bridging



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Livelihood Security

Climate Change, Migration and Conflict
in the Sahel



United Nations Environment Programme

PEDRR

Partnership for Environment
and Disaster Risk Reduction

www.pedrr.net



Managing watersheds for urban resilience

Policy Brief

Presented at the Global Platform for
Disaster Risk Reduction

Roundtable on "Managing watersheds
for urban resilience"

12 May 2011

Geneva, Switzerland





Geography of Environmental Risks and Human Security

- Core partner: Department of Geography, University of Bonn
- Type: Two-year consecutive research Master's degree programme with 120 credit points (ECTS)
- Degree: Master of Science (M.Sc.)

Education Programs: Joint Master



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Year 1		Year 2	
Fall	Spring	Fall	Spring
1. Introduction 14 CP	2. In-depth studies 24 CP		
3. Methods and skills 18 CP		4. Research project 6 CP	7. Master's thesis 30 CP
5. Linking Concepts 18 CP			
	6. Internship 10 CP		

THANK YOU !



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