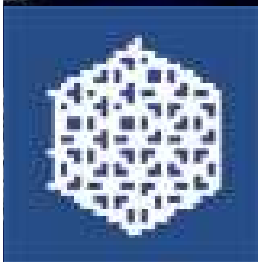# Hans Günter Brauch

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Institute on Environment and Human Security of the
United Nations University (UNU-EHS) in Bonn;
Peace Research and European Security Studies (AFES-PRESS)
Editor, Hexagon Series on Human, Environmental Security and Peace**

Reconceptualizing Security:
Global Environmental Change and
Security Impacts for Society
UC Berkeley, 1 April 2008

UNITED NATIONS
UNIVERSITY

UNU-EHS

Institute for Environment
and Human Security

Freie Universität Berlin

AFES-PRESS

http://veimages.gsfc.nasa.gov//136/nocal_fire_19990902_lrg.jpg

Contents

1. Introduction: The Thesis

- **Global environmental change (GEC)** refers to anthropogenic changes in climate, water, soil, population, urbanization and food
- **GEC** has become a major new security danger and concern
- **GEC** has been killing and affected people often by pushing them to migrate due to hydro-meteorological hazards (drought)
- **GEC** poses security threats, challenges, vulnerabilities & risks for humankind and persons or for global, international, national & human security
- **GEC is being securitized!**
- **The enemy is us:** our consumption of water, soil and hydro-carbons and our way of life. The Military offers no solution!
- **The solution requires both global multilateral cooperation and national as well as local action by people at the level of their home, neighbourhood, city, county and state.**

2. Reasons for Reconceptualization of Security

- **What did change? Contextual factors**:
  - End of the Cold War: 9 November 1989: Berlin Wall;
  - Events of 11 September 2001;
  - Process of globalization (1492, 1945, globalized in 1990)
  - Shift from 'Holocene' to 'Anthropocene' (Crutzen thesis)

- **Guiding Question:**
  - Did these global and regional political contextual changes trigger a reconceptualizing of security?

- **Which were the conceptual innovations?**
  - Theoretical: social constructivism & Ulrich Beck: risk society
  - Widening, deepening & sectorialization of security

2.1. Global Mental Mapping of Rethinking on Security

- **What does security mean globally?**
  - Security debate was influenced by the North Atlantic debate
  - What are the cultural, philosophical, religious influences?
- **How has security been reconceptualized?**
  - What are objective security dangers & subjective security concerns: threats, challenges, vulnerabilities and risks?
  - Answer depends on our mindset, our perception that are influenced by our governments, scientific knowledge & media

Does GEC & hazards pose new security dangers?
  - Can September 11 and August 29 (Hurricane Katrina) be compared as posing threats to security and survival of people?
  - Did both pose security dangers and security concerns?
  - For whom? The state or the people? For national and human security?
  - Our worldviews, conceptual lenses, interpretations and scientific approaches in the study of security differ!!

3. Concepts of Security and Theory of Securitization: Objective, Subjective and Intersubjective Security

- Wolfers (1962) pointed to two sides of the security concept: "Security, in an *objective* sense, measures the absence of threats to acquired values, in a *subjective* sense, the absence of fear that such values will be attacked".

- **Objective security dangers:** absence of threats

- **Subjective security concerns: perception of** absence of fear

- From a **constructivist approach** in international relations 'security' is the outcome of a process of social & political interaction where social values & norms, collective identities & cultural traditions are essential. Security: **intersubjective** or **"what actors make of it".**

- **Copenhagen school** (Buzan/Waever/de Wilde 1998) security as a "speech act", "where a securitizing actor designates a threat to a specified reference object and declares an existential threat implying a right to use extraordinary means to fend it off".

- Such a process of "securitization" is successful when the construction of an "existential threat" by a policy maker is socially accepted and where the "survival'" against existential threats is crucial.

3.1. Copenhagen School: Securitization

- **Securitization**: discursive & political process through which an inter-subjective understanding is constructed within a political community to treat something as an existential threat to a valued referent object, and to enable a call for urgent and exceptional measures to deal with the threat.
- '**Referent object**' (that is threatened and holds a general claim on 'having to survive', e.g. the **state, environment or liberal values**),
- '**Securitizing actor**' (who makes the claim – speech act – of pointing to an existential threat to referent object thereby legitimizing extraordinary measures, often but not necessarily to be carried out by the actor), and
- '**Audience**' (have to be convinced in order for the speech act to be successful in the sense of opening the door to extraordinary mea-sures).
- **It is not up to analysts to settle the 'what is security?'** question – widening or narrowing– but more usefully one can study this as an open, empirical, political and historical question.
- **Who manages to securitize what under what conditions & how?**
- **What are the effects of this?** How does the politics of a given issue change when it shifts from being a normal political issue to becoming ascribed the urgency, priority and drama of 'a matter of security'.
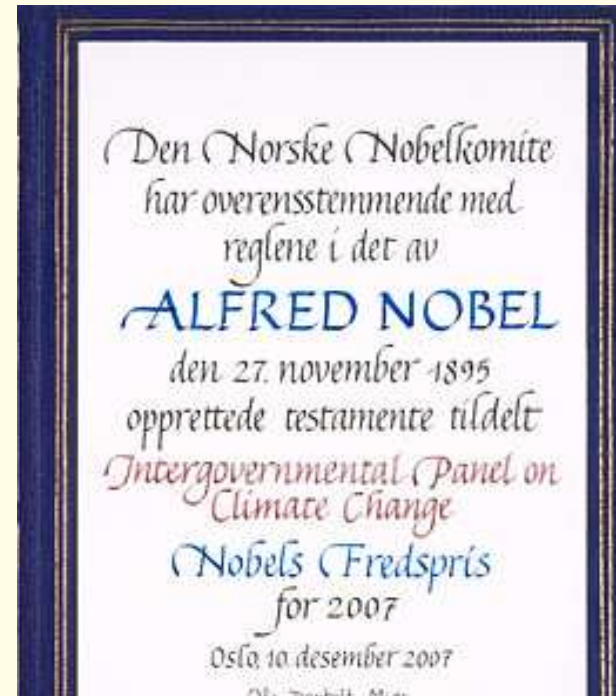
3.2. Two Securitzing Actors

- U.S. Department of Defense

- The U.S. President
- US.National Security Strategy of 2002, 2006
- QDR 2002, 2006

- Intergovernmental Panel on Climate Change (IPCC)
- Fourth Assessment Report of 2007
- IPCC with Al Gore Recipient of Nobel Peace Prize

Den Norske Nobelkomite har overensstemmende med reglene i det av

ALFRED NOBEL

den 27. november 1895 opprettede testamente tildelt

Intergovernmental Panel on Climate Change

Nobels Fredspris for 2007

Oslo 10. desember 2007

3.3. Concepts of security in relation with peace, environment and development

Programmes, pillars & linkage concepts within the quartet

IR research programmes	Conceptual Quartet	Conceptual Linkages
▪ **Peace Research** ▪ **Security Studies** ▪ **Development Stud.** ▪ **Environment Studies** **4 conceptual pillars** ▪ I: *Security dilemma* ▪ II: *Survival dilemma* ▪ III: *Sustainable deve-lopment* ▪ IV: *Sustainable peace*	**Peace** **Security** ▪ *I: Security dilemma* *IV* **Development** **Environment** *III: Sustainable development*	**Political use of con-cepts & theoretical debates on 6 linkages** ▪ Peace & security ▪ Peace & development ▪ Peace & environment ▪ Devel. & security ▪ Devel. & environment Of interest here: ▪ **Security & environment**

3.4. From International & National to four Pillars of Human Security

- **International Peace & Security**: League of Nations (1919):"high contracting parties"; UN Charter (1945): "*We the peoples of the United Nations*"
- **National Security:** new U.S. concept World War II, post WW II: National Security Act (1947), before: goal defence, means: Army (War Dep.), & Navy Dept.
- **Alliance Security:** NATO (1949-), WP (1955-2001)
- **Common Security** (Palme Report 1982)
- **Environmental Security** (Brundtland 1987)
- **1990:** Widening, Deepening, Sectorialization
- **2001:** Shrinking: U.S. nat. security agenda
- **Global Security:** Steinbrunner (2000)
- **Cooperative Security:** Brookings Institution (1990's)
- **Human Security:** UNDP (1994): 4 pillars of HS

3.5. Widening of Security Concepts: Towards Environmental Security

4 trends in reconceptualisation of security since 1990:

Widening (dimensions, sectors), Deepening (levels, actors)

Sectorialisation (energy, food, health),

Shrinking (WMD, terrorists)

Dimensions & Levels of a Wide Security Concept

Security dimension⇒ ⇓ Level of interaction	Mili-tary	Political	Economic	Environ-mental ⇓	Societal
Human individual ⇒			Food sec. Health sec.	Cause & Victim	Food sec. Health sec.
Societal/Community				⇓⇑	
National	Shrinking (WMD)		Energy security	⇓⇑	Food & health security
International Regional			Water security	⇓⇑	Water security
Global/Planetary ⇒				GEC	

3.6. Environmental & Human Security

Label	Reference object	Value at risk	Source(s) of threat
National security	The State	Territ. integrity	State, substate actors
Societal security	Societal groups	Nation. identity	Nations, migrants
Human security	Individual, humankind	Survival	Nature, state, global.
Environmental sec.	Ecosystem	Sustainability	Humankind
Gender security (Oswald Spring)	Gender relations, indigenous people, minorities	Equality, identity, solidarity	Patriarchy, totalitarian institutions (governments, churches, elites) intoler.

Human security: Referent: individuals and humankind. [**Human Sec. Network**]

❖Values at risk: survival of human beings and their quality of life.

❖Major source of threat: nature (global environmental change), globalisation, nation state with its ability to cope with this dual challenge.

Environmental Security: Referent: Ecosystem; Value at risk is sustainability.

❖ **Major challenges**: global environmental change & humankind,

❖ **Focus: Interactions between ecosystem & humankind**, impact of **GEC** on **environmental degradation**, of **increasing demand** on **environmental scarcity** & **stress**.

[**No Environment Security Network of States, & IGOs & NGOs**]

3.7 Four Pillars of Human Security

- **"Freedom from want" human development agenda: poverty** (stimulated by Asian economic crisis of 1990s) by reducing social vulnerability through poverty eradication programmes (UNDP 1994; CHS: Ogata/Sen: Human Security Now, 2003, Human Security Trust Fund, HSU of OCHA), **Japanese approach.**

- **"Freedom from fear": humanitarian agenda: violence, con-flicts, weapons** (Canada, Norway, Human Security Network) (UNESCO,HSN), **Canadian approach:** Human Security Rep.(2005).

- **"Freedom to live in dignity": agenda: rule of law, human rights, democratic governance** (**Kofi Annan:** *In Larger Freedom* (2005)

- **"Freedom from hazard impact": environmental (GEC) & natural hazard agenda**: Bogardi/Brauch vision, goal: securitize: "environment" (GEC as pressure) and "natural hazards" as impact by reducing environmental & social vulnerability & enhancing coping capabilities of societies confronted with natural & human-induced hazards (Bogardi/Brauch 2005; Brauch 2005a, 2005b).
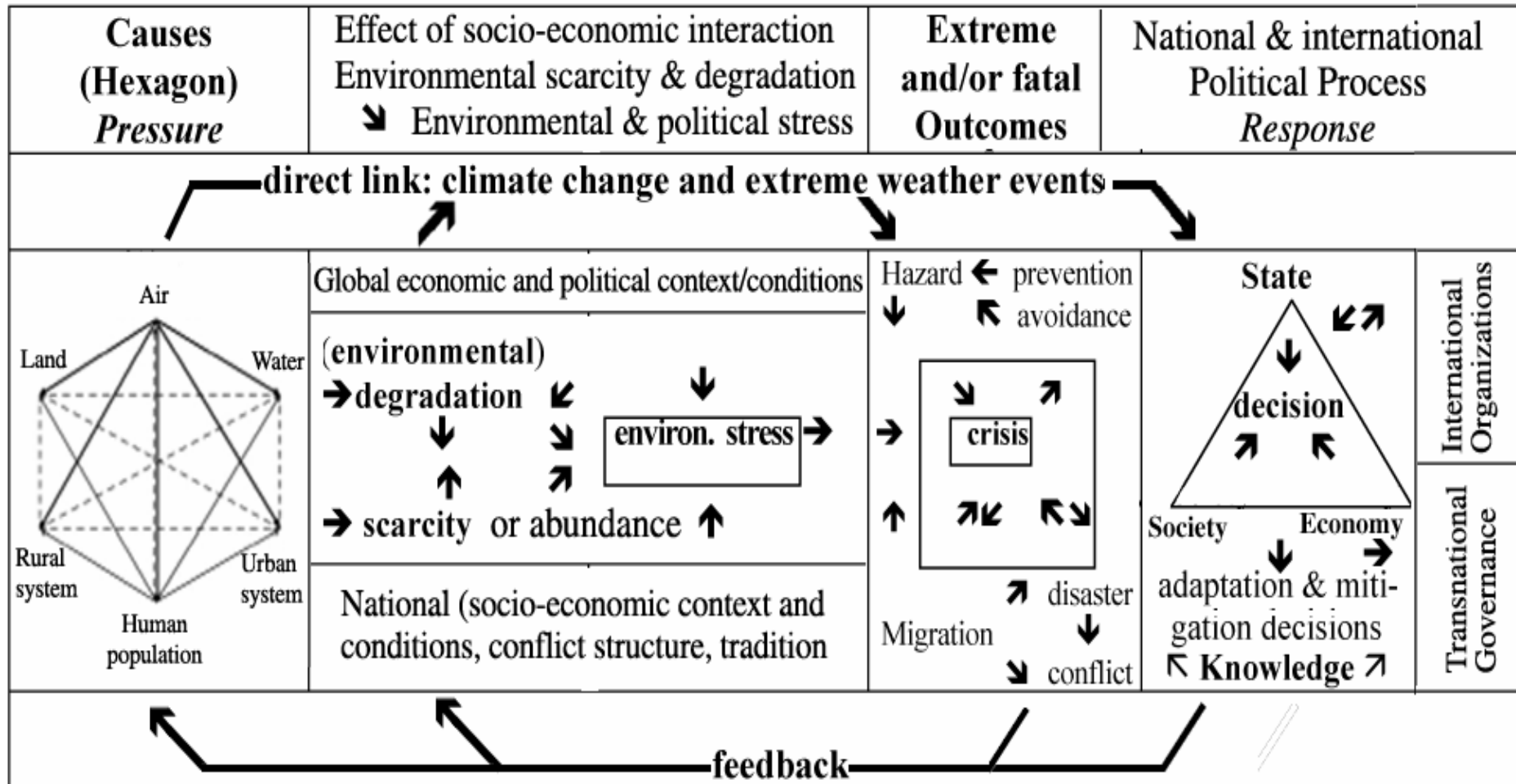
4. Global Environmental Change and Climate Change

- Since 1970s & 1980s: '*global environmental change*' (GEC) became a topic in the natural & social sciences
- Since the late 1980s and 1990s policy efforts on:
  - Climate Change: 1988: issue of G7; 1990: UN GA mandate; 1992: Rio summit: UNFCC (1992) and Kyoto Protocol (1997)
  - Desertification: UNCCD (1994)
- Since 2000: both are considered as security issues
  - Valencia: 2003: Desertification as a security issue in Medit.
  - Since 2002: climate change seen as a security threat/risk
    - **2002: BMU study: climate change and conflicts**
    - **2003: Schwartz/Randall: Pentagon Study**
    - **2007: Climate Change debated by UN Secur. Council**
    - **2007/2008: WBGU: Security Risk Climate Change**
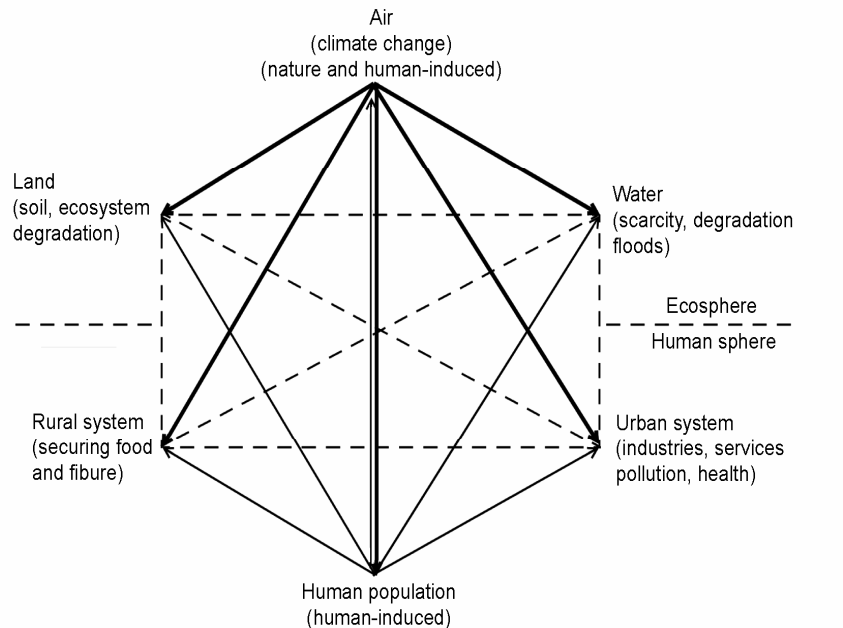
5. Analyzing GEC: PEISOR Model Scenarios on Climate Change Impacts

- **Focus: environment <–> human interaction**
- **Other Models: Environment – Policy Response**
  - **OECD: PSR-Model (pressure, state of env., policy response)**
  - **UN-CSD** (Committee for Sustainable Development)
  - **EEA** (European Environment Agency)
- **PEISOR model distinguishes 5 stages:**
  - **P: P**ressure: <u>Causes</u> of GEC : Survival hexagon
  - **E: E**ffect: environm. scarcity, degradation & stress
  - **I: I**mpact: Extreme or fatal outcome: hazards
  - **SO: S**ocietal **O**utcomes: disaster, migration, crisis, conflict etc.
  - **R: R**esponse by state, society, business and by using knowledge to enhance coping capacity and resilience

5.1. PEISOR Model: Global Change, Environmental Stress, Impacts & Extreme Societal Outcomes

Causes (Hexagon) *Pressure*	Effect of socio-economic interaction Environmental scarcity & degradation ↘ Environmental & political stress	Extreme and/or fatal Outcomes	National & international Political Process *Response*

direct link: climate change and extreme weather events

Global economic and political context/conditions

(environmental)
→ degradation
environ. stress →
→ scarcity or abundance ↑

National (socio-economic context and conditions, conflict structure, tradition

Air
Land — Water
Rural system — Urban system
Human population

Hazard ← prevention
↓ ↖ avoidance
crisis
↗ disaster
Migration ↓
↘ conflict

State
decision
Society   Economy
adaptation & miti-gation decisions
↖ Knowledge ↗

International Organizations

Transnational Governance

feedback

5.2. PEISOR: Pressure or Causes of GEC (Survival Hexagon)

Air
(climate change)
(nature and human-induced)

Land
(soil, ecosystem
degradation)

Water
(scarcity, degradation
floods)

Ecosphere
Human sphere

Rural system
(securing food
and fibure)

Urban system
(industries, services
pollution, health)

Human population
(human-induced)

→ direct impact of nature and human-induced "root cause": climate change on five factors

→ direct impact of human-induced "root cause": population on five factors

- - → complex interaction among four structural factors: land, water, urban and rural systems

Six causes of GEC or pressure factors

Nature & human-induced
Supply side
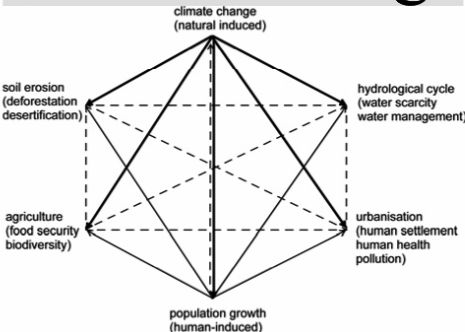
❖ **Air:** Global climate change
❖ **Soil** degrad., desertification
❖ **Water** scarcity, hydrol. cycle

Human-induced factors
Demand Side

❖ **Population** growth
❖ **Urban** systems: Urbani-sation, Pollution, Health
❖ **Rural** systems: Agriculture: Food & Fibre

Six Contextual Factors

5.3. PEISOR: Effect: Environmental Scarcity, Degradation & Stress and Impacts

Causes (Hexagon)	Effect (Interaction)	Environmen-tal Stress	Probable Outcomes
Extreme Weather Events			

Extreme Weather Events

Causes (Hexagon)	Effect (Interaction)	Environmen-tal Stress	Probable Outcomes
Climate change	**environmental** → **degradation** (soil, water) → **scarcity** (water, food, housing)	global cond. → Environ-mental stress ↑ nation. cond.	**disaster** conflict avoidance → **Crisis** **migration** **conflict**

climate change (natural induced)

soil erosion (deforestation desertification)

hydrological cycle (water scarcity water management)

agriculture (food security biodiversity)

urbanisation (human settlement human health pollution)

population growth (human-induced)

→ direct impact of nature-induced „root cause": climate change on five factors

→ direct impact of human-induced „root cause": population on four factors

- - - complex interaction among four structural factors: urbanisation, water scarci-ty, soil erosion and desertification and food scarcity and agricultural policy

5.4. PEISOR: Impact (Hazard/Disaster) & Social Outcomes (Migration, Crises & Conflicts)

Hazard Disaster

Prevention Avoidance of Conflicts

Crisis

Migration ↔ **Conflict**
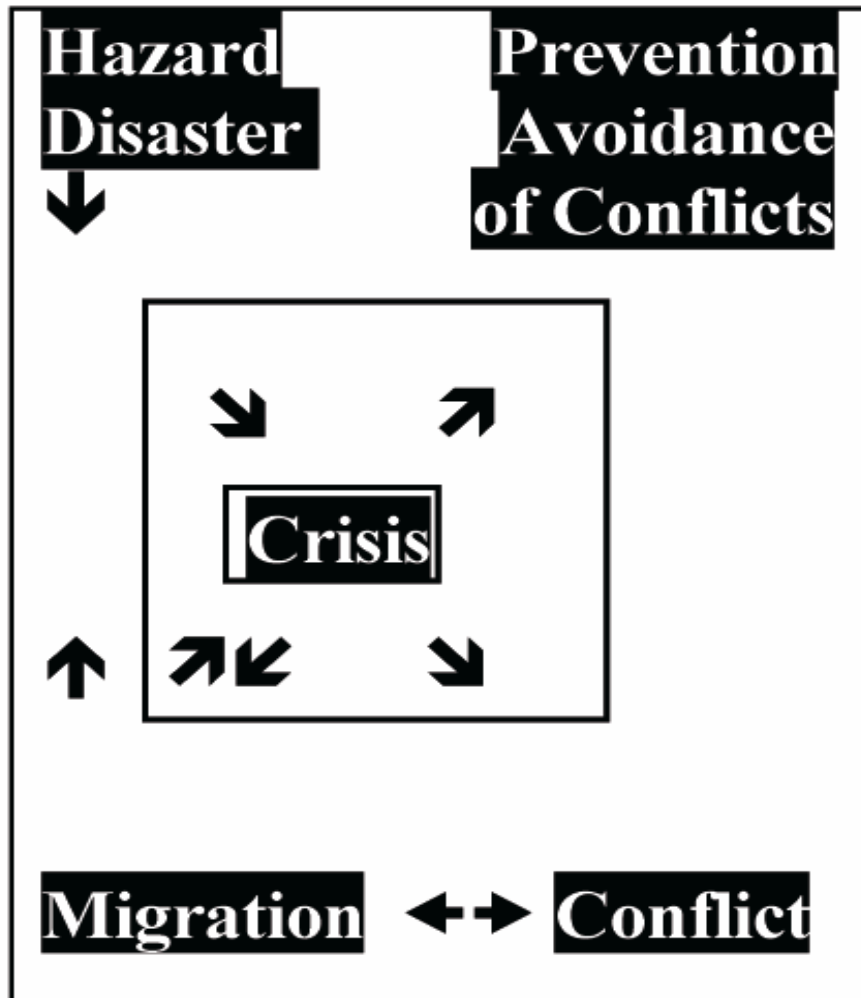
Much knowledge on four factors:
- ✓ Hazards, migration, crises, & conflicts

By different scientific communities

Lack of knowledge on linkages among extreme - fatal outcomes
- ➤ Disasters & disaster-induced migration
- ➤ Famine & environm.-induced migration
- ➤ Conflicts & conflict-induced migration

Lack of knowledge on societal consequences: crises & conflicts
- ➤ Domestic/international crises/conflicts
- ➤ Environmentally or war-induced migra-tion as a cause or consequence of cri-ses and conflicts

Dual Scientific & Policy Goal
- ➤ Reduce Vulnerab. & Hazard Impact
- ➤ Avoid Extreme Societal Outcomes

5.5. Response: Climate Change as a (Human) Security Danger and Concern

- **Twofold link between environment & conflict**
  - **Conflicts, wars as a cause of environmental damage**
  - **Global Environmental Change as a cause of conflicts**
- **Do GEC, CC & hazards pose security dangers?**
  - Global Environmental & Climate Change: pressure & cause
  - **Climate-related natural hazards:** impacts & societal outcome (victims) depend on social vulnerability
- **Policy Response: Reactive vs. proactive**
  - Stern (06) Price of non-acting is higher than two world wars!
  - **Energy resource conflicts**: wars over control of oil and gas
  - **Reactive:** postpone burden on next generations, adaptation
  - **Proactive:** emissions reduction: Shift in consumption, **energy:** from fossil to renewable sources of energy: solar.

6. Causes and Impacts of Global Environmental Change
Projected Global Climate Change up to 2100
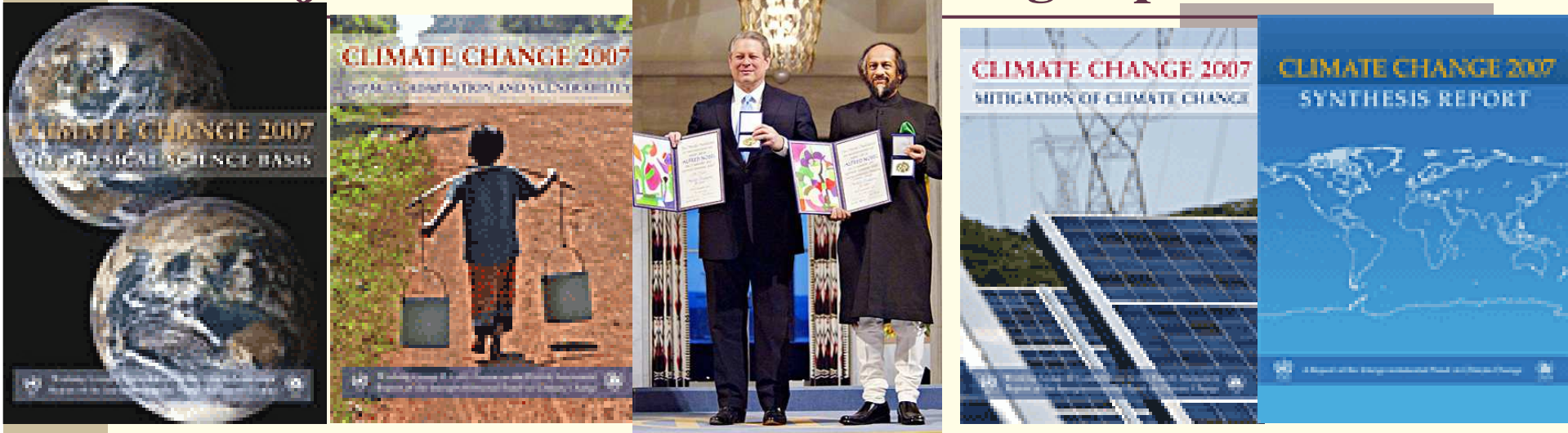
- **IPCC was set up in 1988 by UNEP & WMO: Assessment Reports FAR 1990, SAR 1995, TAR 2001 and AR4 2007.**

- **2007: IPCC and Al Gore received Nobel Peace prize**

- **UNGA in 1990 set up International *Negotiating Committee on Climate Change* (INC) to negotiate the *United Nations Framework Convention on Climate Change* (UNFCCC)**

- **1997: Kyoto protocol (-5.1% 1990-2012)**

- **2009-11: Post Kyoto 2012 Climate Change Regime**

6.1. Global Climate Change: Temperature Increases & Sea Level Rise

Climate Change Impacts: Temperature & Sea level Rise

❖ **Global average temperature rise in 20th century: + 0.6°C**

Projected temperature rise:
❖ **TAR (1990-2100):+1.4-5.8°C**
❖ **AR4 (07):+1.1-6.4 (1.8-4)°C**
Sources: IPCC 1990,1995,2001,'07
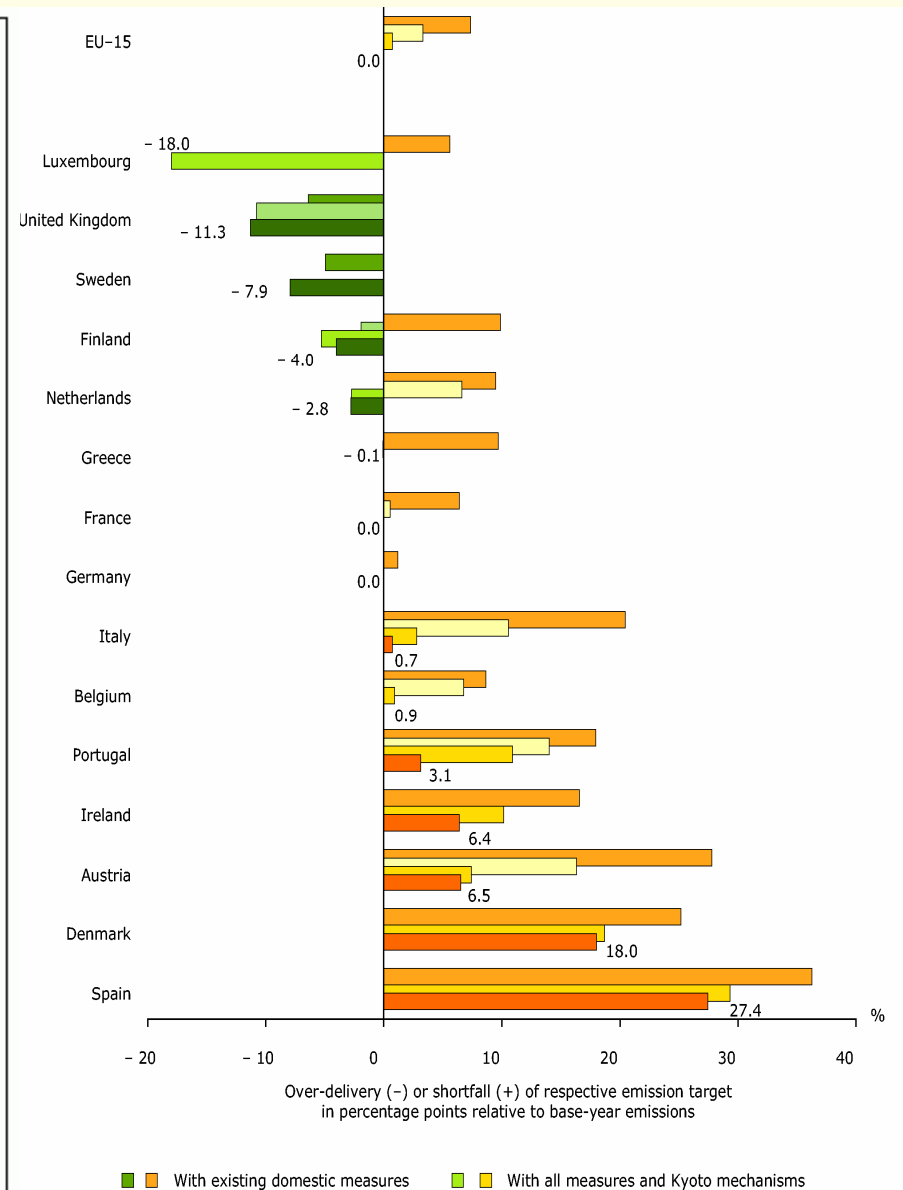
Sea level Rise:
❖ **20th cent.: +0,1-0,2 metres**
❖ **TAR: 21st century: 9-88 cm**
❖ **AR4 (2000-2100): 18-59 cm**

Projected changes in global temperature:
global average 1856-1999 and projection estimates to 2100

Global average temperature in °centigrade

IPCC estimate

High

Best (constant aerosol)
Best (increasing aerosol)

Low

1999

GRID Arendal UNEP
GRAPHIC DESIGN : PHILIPPE REKACEWICZ

Source : Temperatures 1856 - 1999: Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

Trend in global average surface temperature

°C
15,68 °C
15,48 °C
15,28 °C
15,08 °C
14,88 °C
14,68 °C
14,48 °C

Positive deviation (in °C)   Negative deviation (in °C)

GRID Arendal UNEP
GRAPHIC DESIGN : PHILIPPE REKACEWICZ

Source: School of environmental sciences, climatic research unit, university of East Anglia, Norwich, United Kingdom, 1999.

6.2. Implementing the Kyoto Protocol:
Performance: Greenhouse Gase Reductions

Change in GHG emissions excluding LULUCF (%)

Country	Value
Turkey	74.4
Spain	53.3
Portugal	42.8
Greece	26.6
Ireland	26.3
Australia	25.6
Canada	25.3
New Zealand	24.7
Austria	18.0
Liechtenstein	17.4
United States of America	16.3
Italy	12.1
Iceland	10.5
Norway	8.8
Japan	6.9
Switzerland	1.7
Luxembourg	0.4
Slovenia	0.4
Netherlands	-0.4
Belgium	-1.3
European Community	-1.5
France	-1.6
Finland	-2.5
Monaco	-3.1
Croatia	-5.4
Denmark	-7.0
Sweden	-7.3
United Kingdom	-14.8
Germany	-18.4
Czech Republic	-25.8
Russian Federation	-28.7
Hungary	-30.7
Poland	-32.0

Over-delivery (−) or shortfall (+) of respective emission target
in percentage points relative to base-year emissions

- ■ With existing domestic measures
- ■ With additional domestic measures
- ■ With all measures and Kyoto mechanisms
- ■ With all measures, Kyoto mechanisms and carbon sinks

6.3. Current Emissions Per Capita are Higher in Developed Countries

2002 CO2
Energy Emissions only

Tonnes per person per year CO2

Country	Value
United States of America	20
Russian Federation	11
Japan	10
European Union (25)	9
World	4
China	3
Brazil	2
India	1

STERN review
ON THE ECONOMICS OF CLIMATE CHANGE
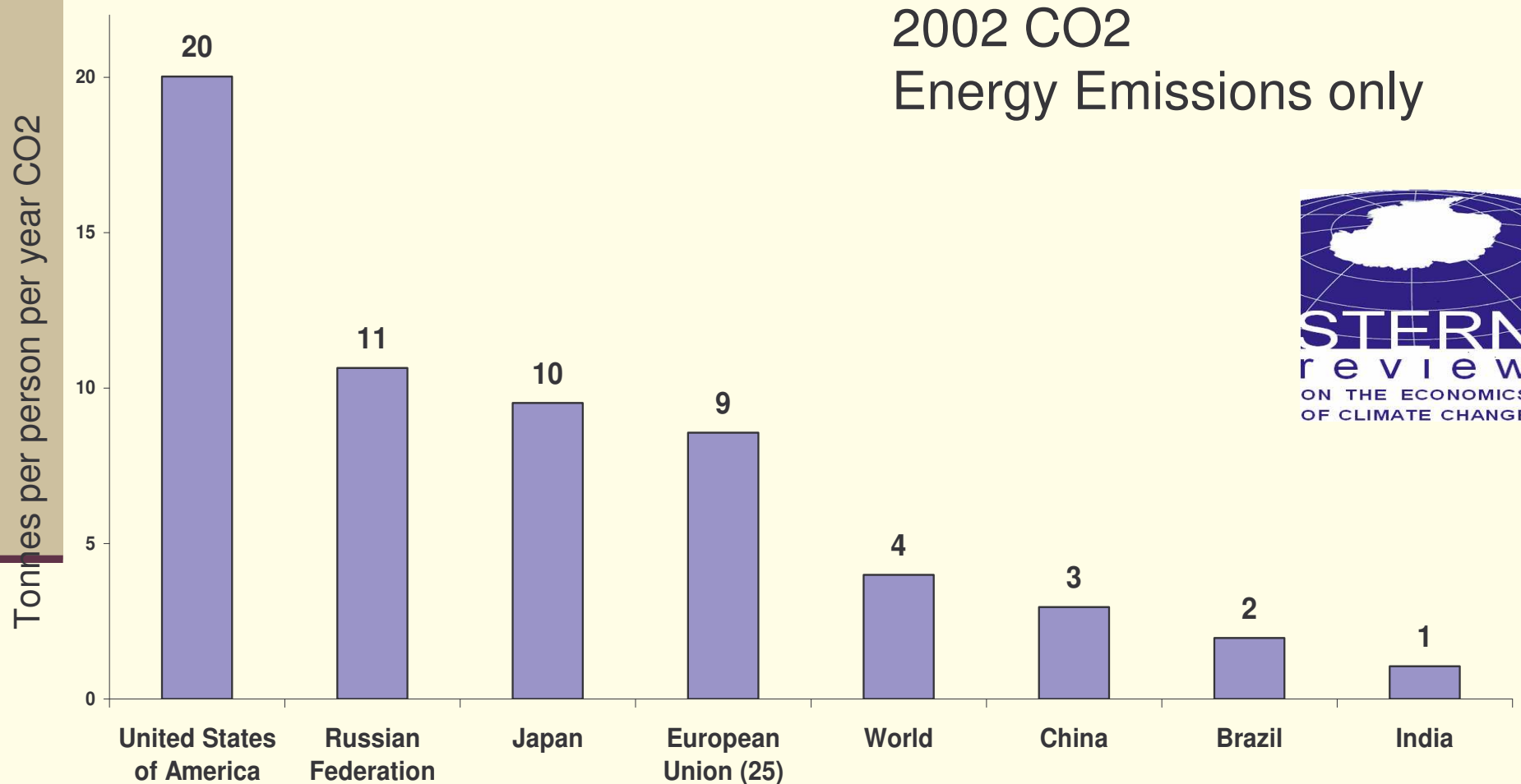
Source: World Resources Institute, CAIT

6.4. Larger Developing Countries Account for Much of the Forecast Rise in Emissions

Gt CO2

Legend:
- ■ Projected emissions, 2025 (red)
- ■ 2002 emissions (dark)

Energy Emissions only

Percentages above bars:
- US: 39%
- West Europe: 11%
- China: 145%
- Russia: 32%
- Japan: 5%
- India: 95%
- Africa: 78%
- Mexico: 63%
- Brazil: 99%
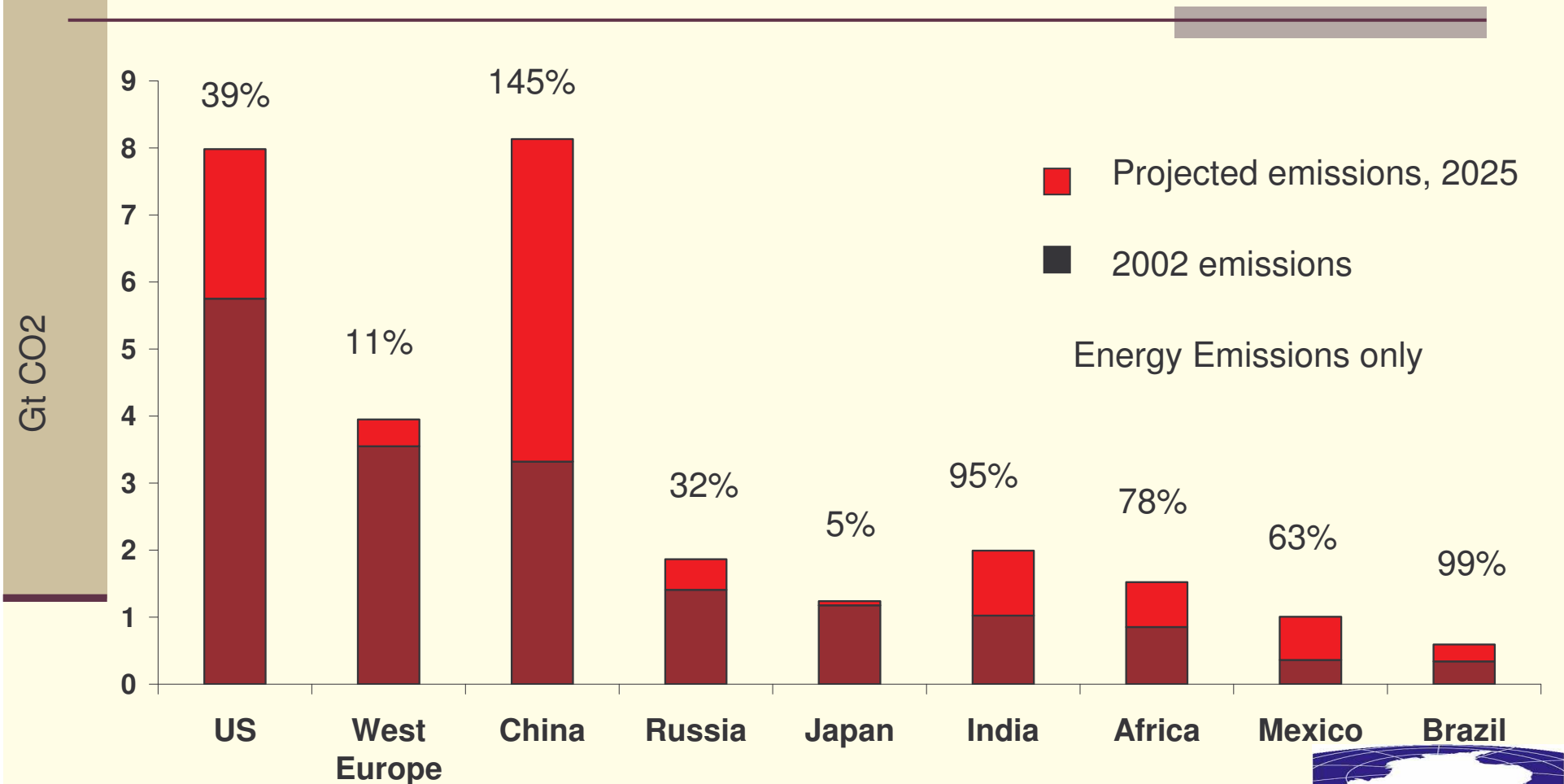
Source: World Resources Institute, CAIT Energy Information Administration Reference Scenario, Energy emissions only

STERN review ON THE ECONOMICS OF CLIMATE CHANGE

6.5. Projection: Stabilization at 550 ppm

Source IPPC
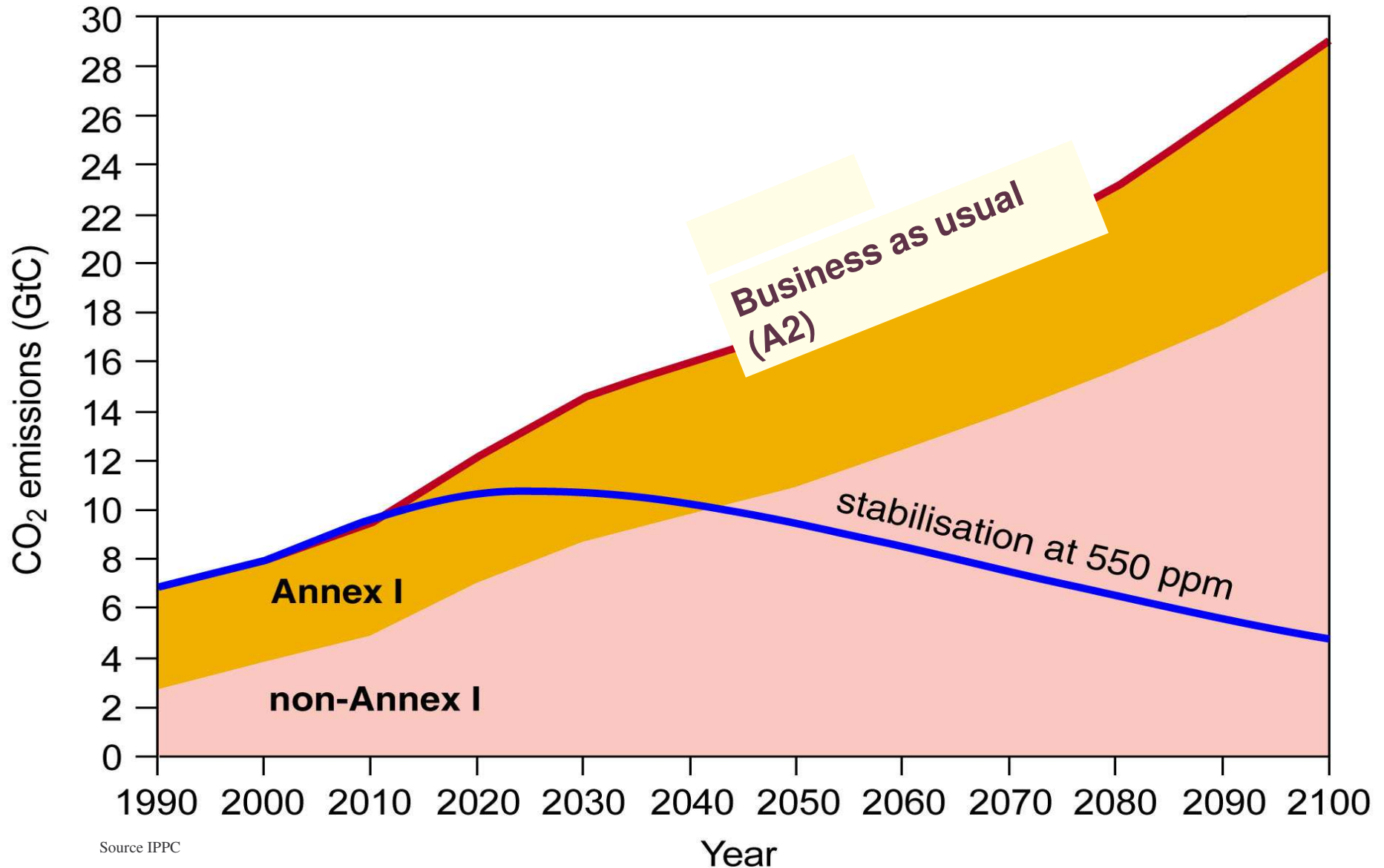
6.6. Stabilization & Temperature Increase

Stabilisation and Commitment to Warming

5%   400 ppm CO_2e 95%

450 ppm CO_2e

550 ppm CO_2e

650ppm CO_2e

750ppm CO_2e

Eventual temperature change (relative to pre-industrial)
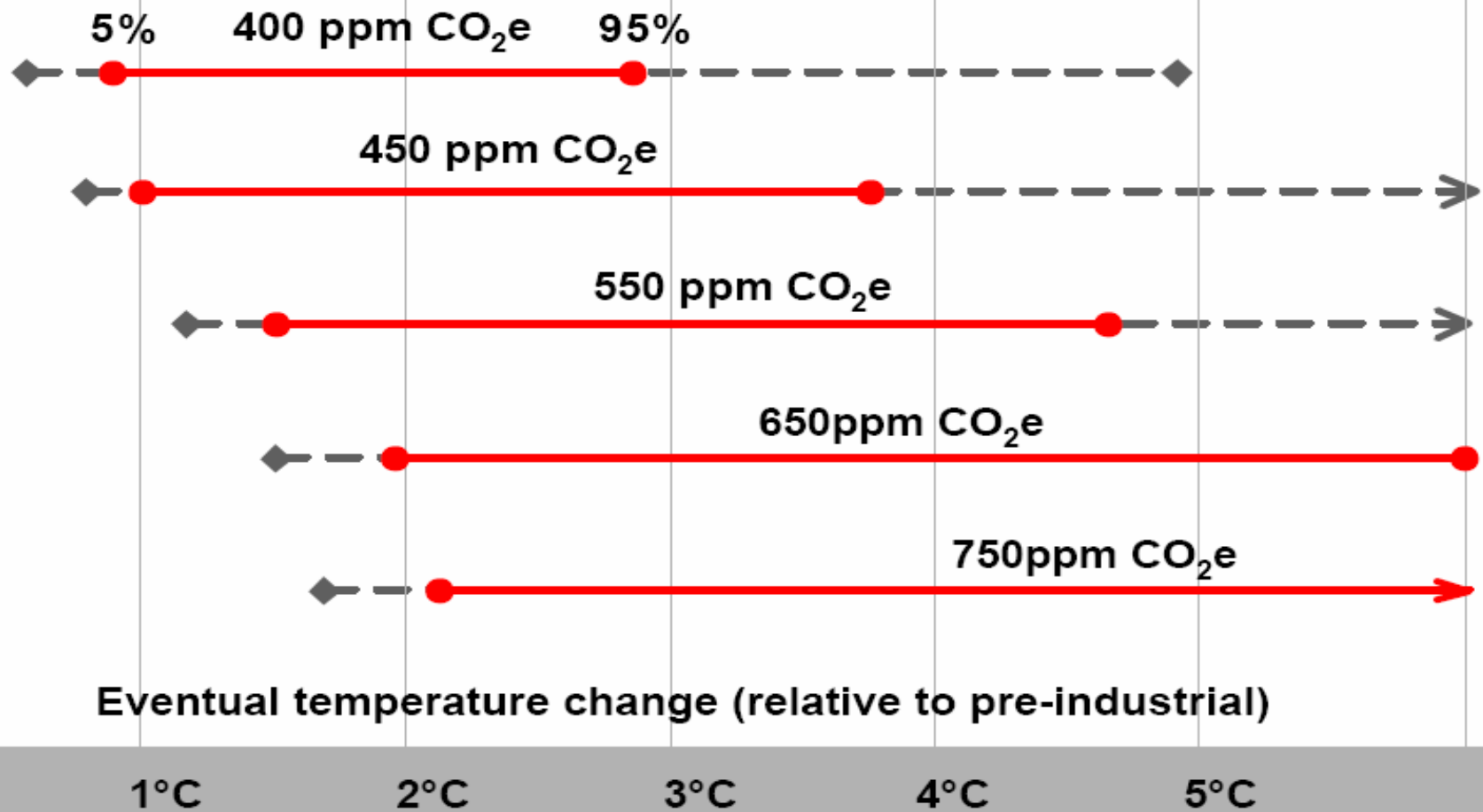
0°C   1°C   2°C   3°C   4°C   5°C

6.7. Projected Impacts of Climate Change

Projected Impacts of Climate Change

Global temperature change (relative to pre-industrial)

0°C	1°C	2°C	3°C	4°C	5°C

Food
- Falling crop yields in many areas, particularly developing regions
- Possible rising yields in some high latitude regions
- Falling yields in many developed regions

Water
- Small mountain glaciers disappear – water supplies threatened in several areas
- Significant decreases in water availability in many areas, including Mediterranean and Southern Africa
- Sea level rise threatens major cities

Ecosystems
- Extensive Damage to Coral Reefs
- Rising number of species face extinction

Extreme Weather Events
- Rising intensity of storms, forest fires, droughts, flooding and heat waves

Risk of Abrupt and Major Irreversible Changes
- Increasing risk of dangerous feedbacks and abrupt, large-scale shifts in the climate system

6.8. Average Value of Surface Temperature (IPCC 2007, WG 1, AR4, p. 14)

MULTI-MODEL AVERAGES AND ASSESSED RANGES FOR SURFACE WARMING

©IPCC 2007: WG1-AR4

Legend:
- A2
- A1B
- B1
- Year 2000 Constant Concentrations
- 20th century

Y-axis: Global surface warming (°C)
X-axis: Year (1900, 2000, 2100)

Bars at right: B1, A1T, B2, A1B, A2, A1FI
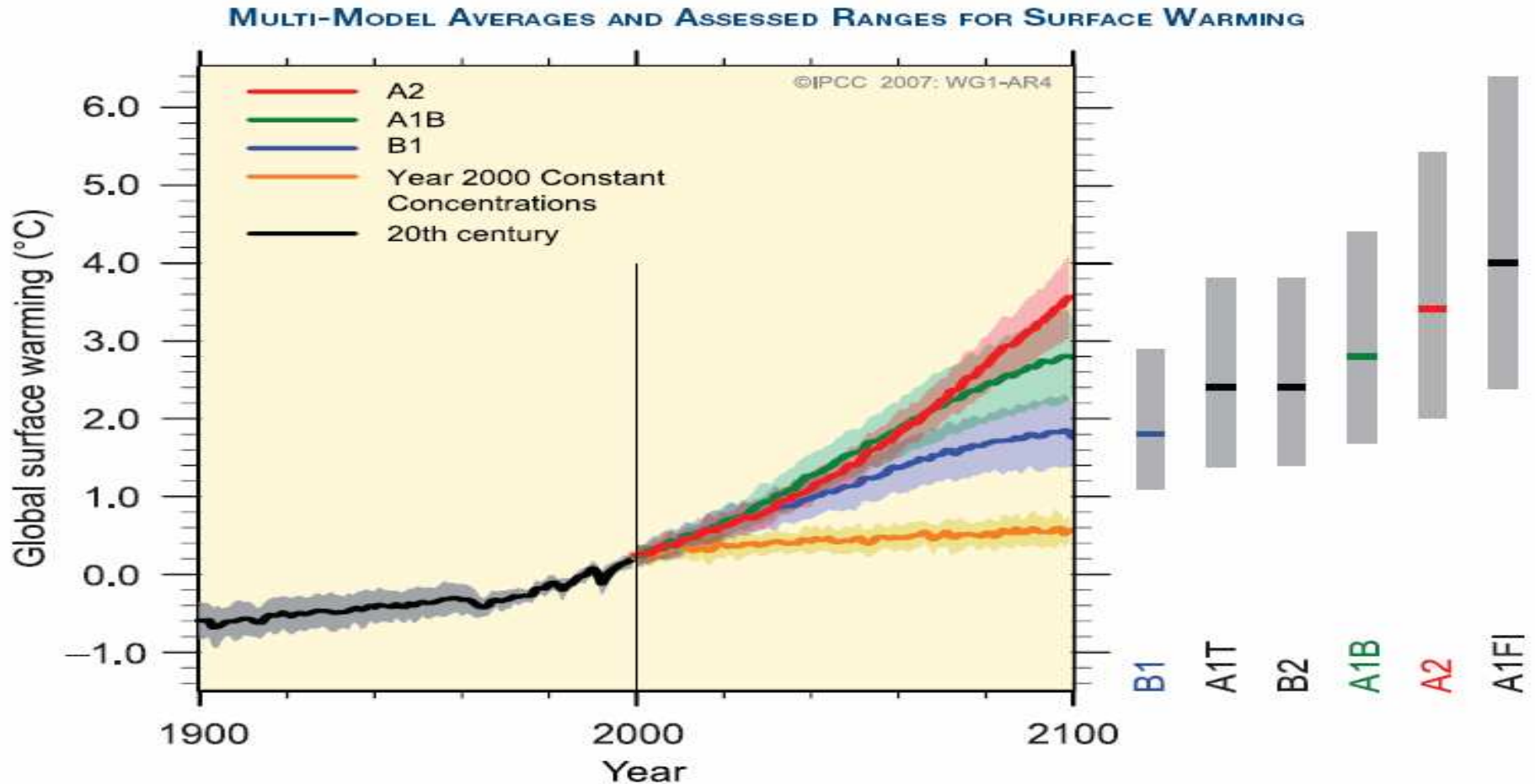
Figure SPM.5. Solid lines are multi-model global averages of surface warming (relative to 1980–1999) for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulations. Shading denotes the ±1 standard deviation range of individual model annual averages. The orange line is for the experiment where concentrations were held constant at year 2000 values. The grey bars at right indicate the best estimate (solid line within each bar) and the **likely** range assessed for the six SRES marker scenarios. The assessment of the best estimate and **likely** ranges in the grey bars includes the AOGCMs in the left part of the figure, as well as results from a hierarchy of independent models and observational constraints. {Figures 10.4 and 10.29}

6.9. GEC: Desertification and Drought
Drylands and their Categories

Drylands include all terrestrial regions where the production of crops, forage, wood and other ecosystem services are limited by water. Formally, the definition encompasses all lands where the climate is classified as dry subhumid, semiarid, arid or hyper-arid. This classification is based on Aridity Index values[†].

EQUATOR

Dryland Systems
- Hyper-arid
- Arid
- Semiarid
- Dry subhumid

Source: Millennium Ecosystem Assessment

Dryland comprise 41.3 % of the global terrestrial area

in percent of the global terrestrial area

| Surface Area | Dry subhumid | Semiarid | Arid | Hyper-arid |

Population

in percent of the global population

Drylands are home to 34.7 % of the global population in 2000
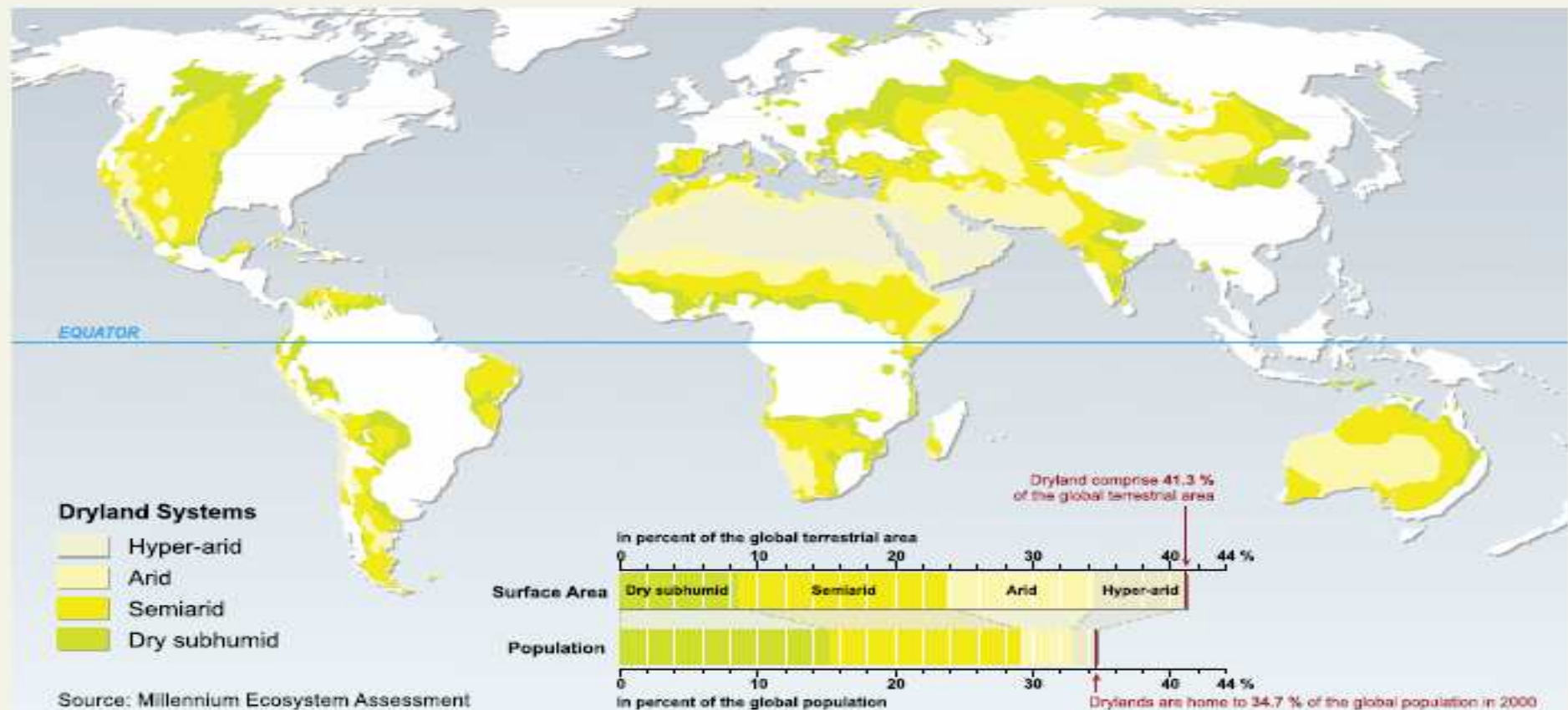
[†] The long-term mean of the ratio of an area's mean annual precipitation to its mean annual potential evapotranspiration is the Aridity Index (AI).

Notes: The map is based on data from UNEP Geo Data Portal (http://geodata.grid.unep.ch/). Global area based on Digital Chart of the World data (147,573,196.6 square km); Data presented in the graph are from the MA core database for the year 2000.

6.10. Number of Drought Disasters by Country & Affected Persons (1970-2006)
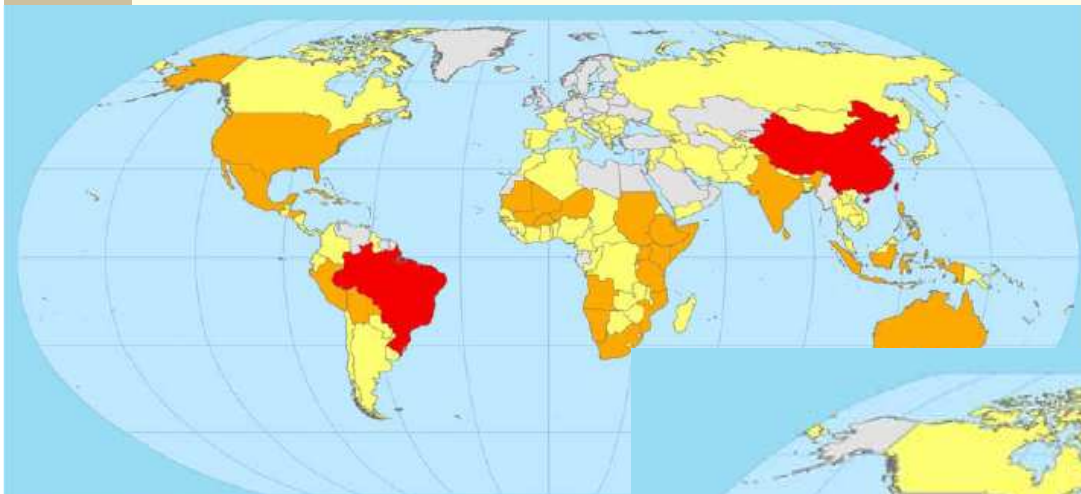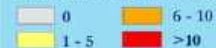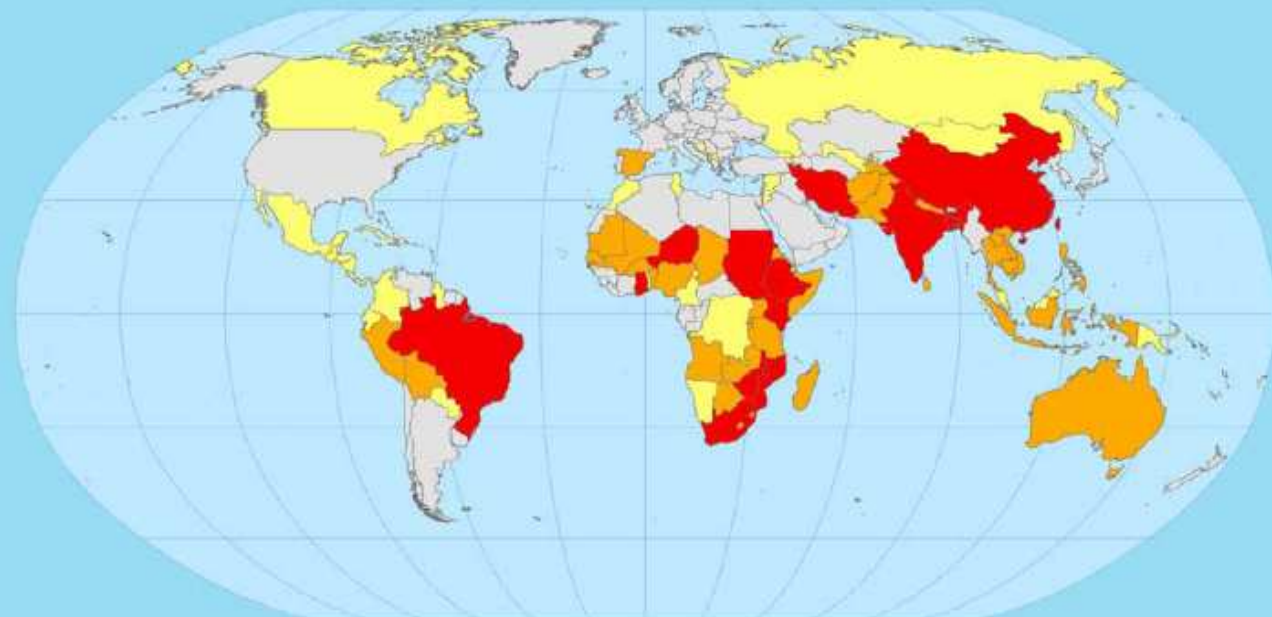
6.11. Food Security by 2080: Changes in Crop Yield

Food security 2070 - 2099 (HADCM3 GGa1)
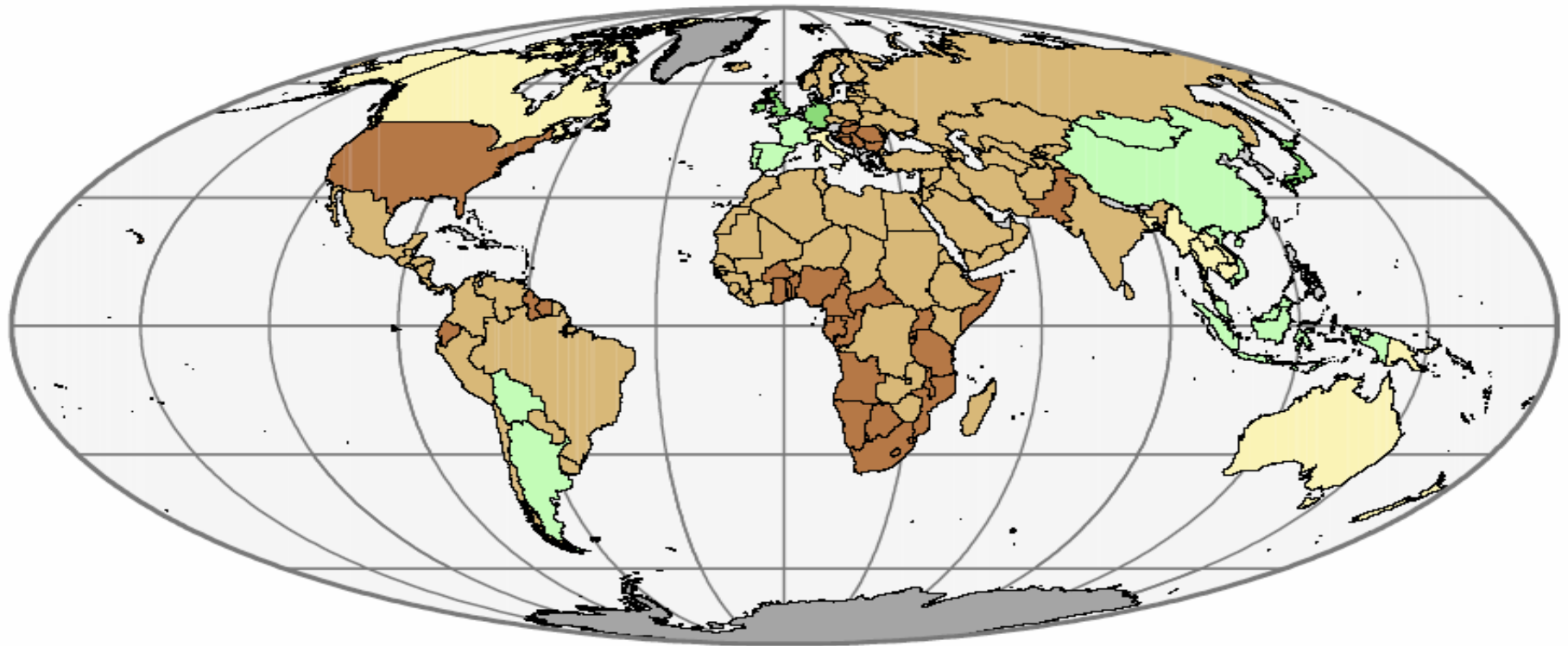
potential yield change [%]

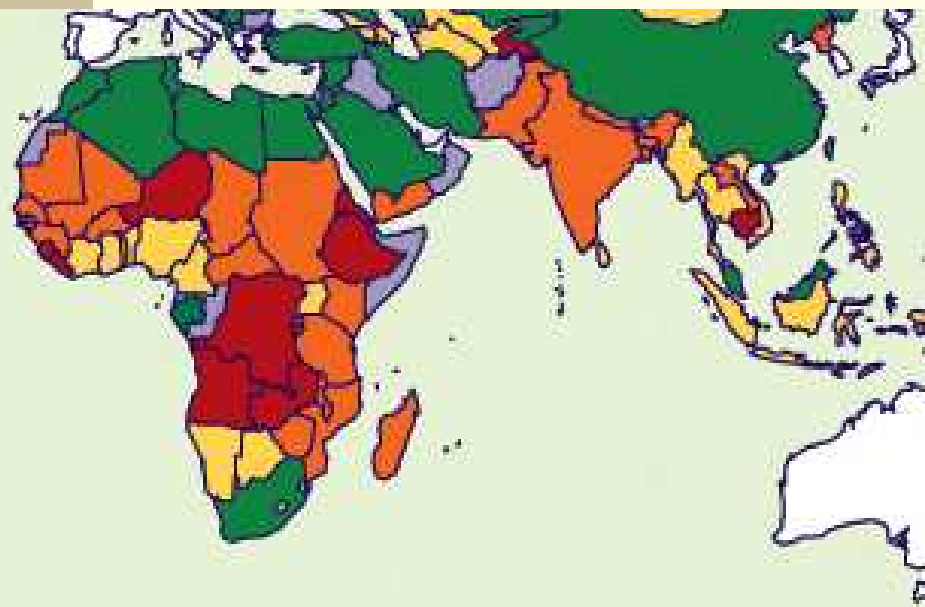no data   -10   -5   -2.5   0   2.5   5   10
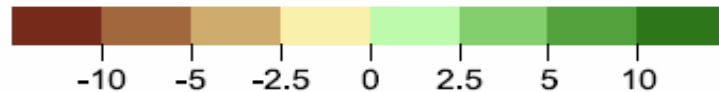
6.12. Drought, Famine and Conflicts in Africa

Alexander Carius, Dennis Tänzler, Judith Winterstein:
Weltkarte von Umweltkonflikten – Ansätze zur Typologisierung
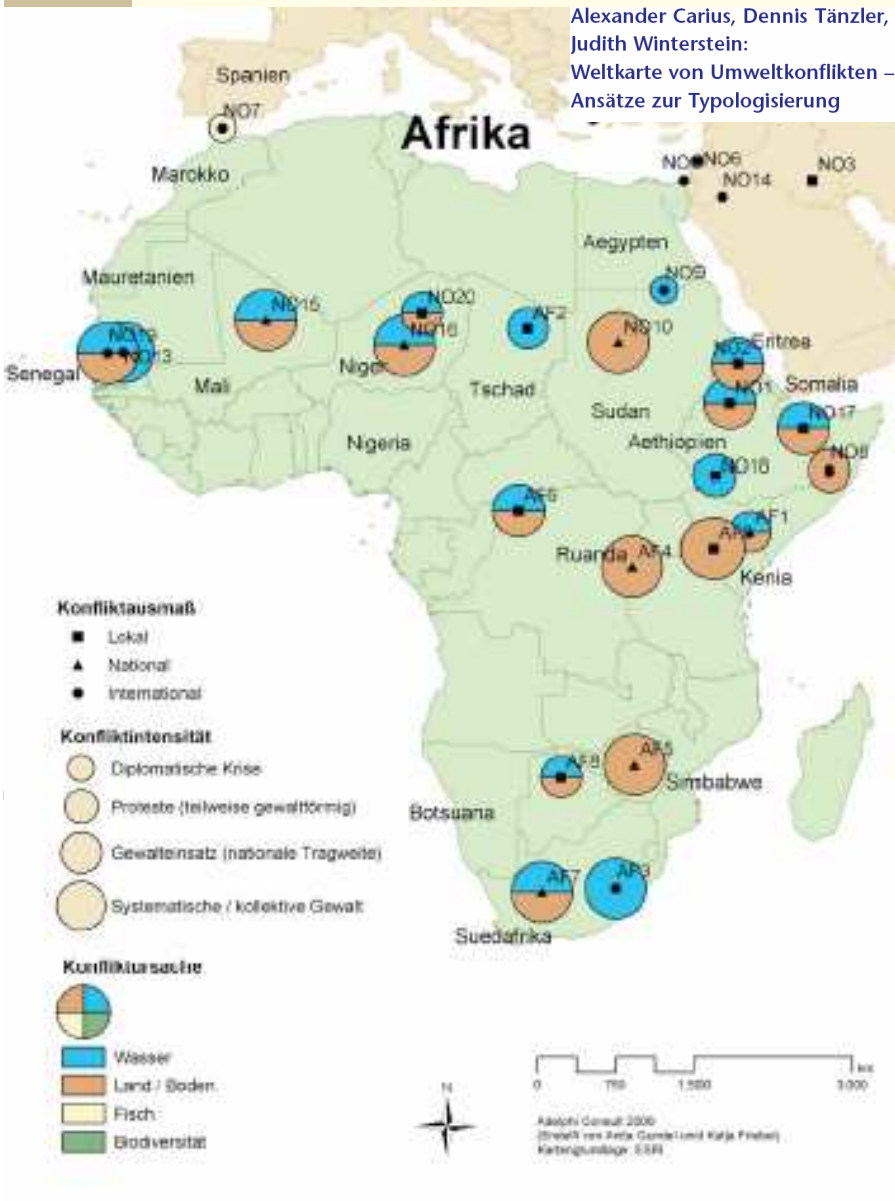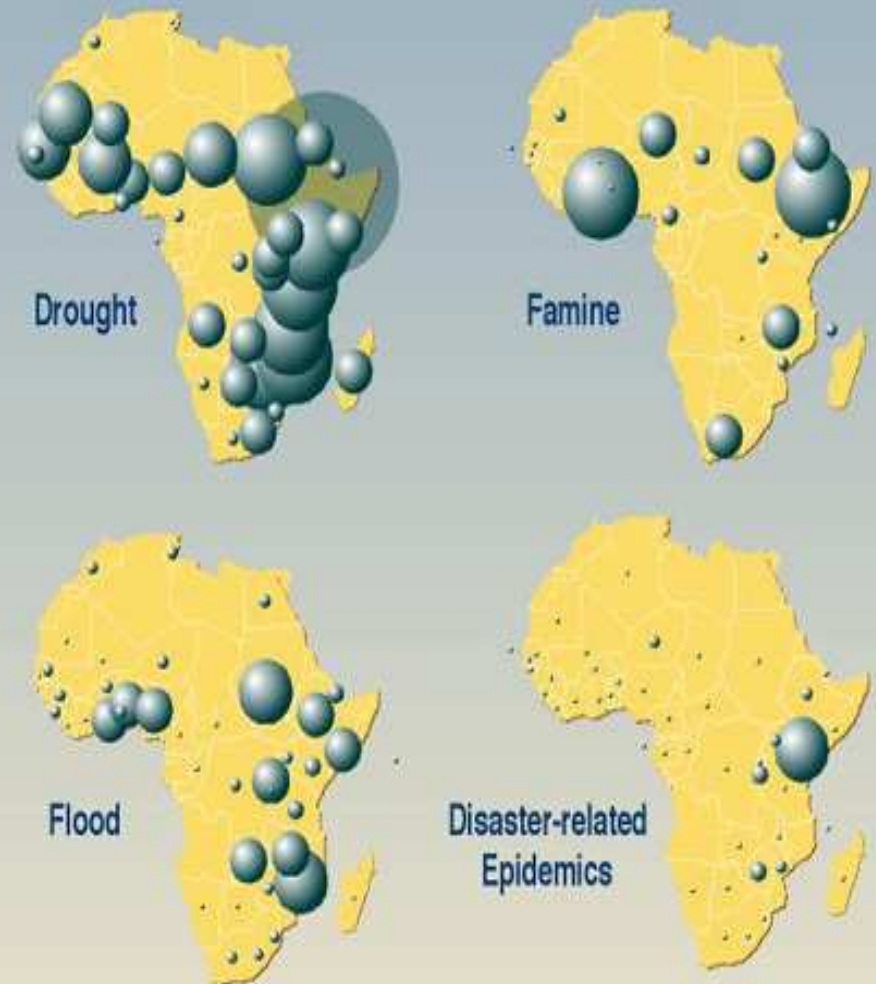
6.13. IFRI: Global Hunger Index: Oct. 2006

Global Hunger Index

- ≥ 30.0, extremely alarming
- 20.0 – 29.9, alarming
- 10.0 – 19.9, serious
- 1.5 – 9.9, low to moderate hunger
- no data
- excluded from GHI

- **Global Hunger Index** of Internat. Food Policy Research Institute
- **Of 12 countries** with highest hunger levels, **nine** were affec-ted by **civil wars or violent conflicts**.
- **The 10 worst cases are all in Sub-Saharan Africa**.
- Among **most affected** are coun-tries in Nile Basin (**Eritrea, Ethio-pia**), in Sahel (**Niger**)
- In all other countries: **alarming**.
- **Situation may get worse:**
    - **demand increase** and
    - **supply decline** due to impects of **Global environmental change**.

6.14. Population Change in Nile Basin Countries
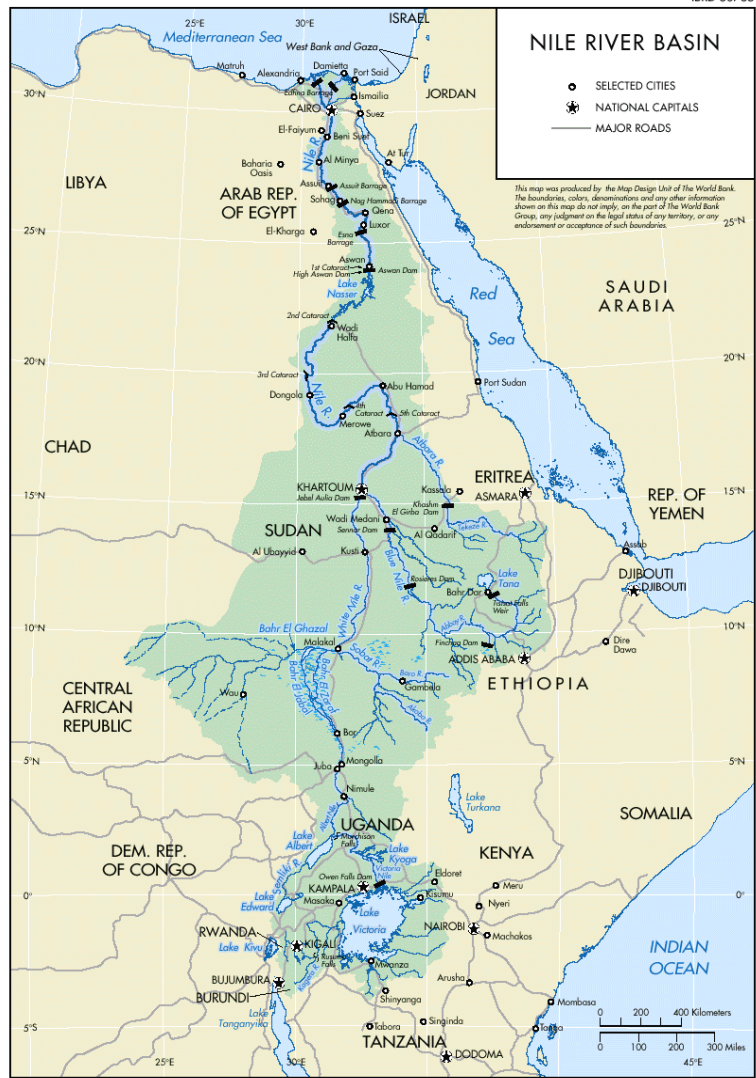
NB countr.	1950	2000	2025	2050	2005-2050
Burundi	2,5	6,4	13,9	22,9	15,1
D.R.Congo	12,2	51,0	108,0	183,2	122,4
Egypt	21,8	67,9	101,1	125,9	51,9
Eritrea	1,1	3,7	7,2	10,2	5,5
Ethiopia	18,4	62,9	118,4	170,2	92,8
Kenya	6,3	30,7	49,4	64,8	31,0
Rwanda	2,1	7,6	12,9	17,4	8,7
Sudan	9,2	31,1	61,3	84,2	44,0
Tanzania	7,9	35,1	52,6	71,4	34,9
Uganda	5,2	23,3	55,8	130,9	104,0
Total	86,7	280,8	580,6	881,1	510,3

6.15. Global Impacts: Major Natural Disasters 1950 – 2005. Source: MunichRe, 2006

© 2006 NatCat*SERVICE*, GeoRisikoForschung, Münchener Rück
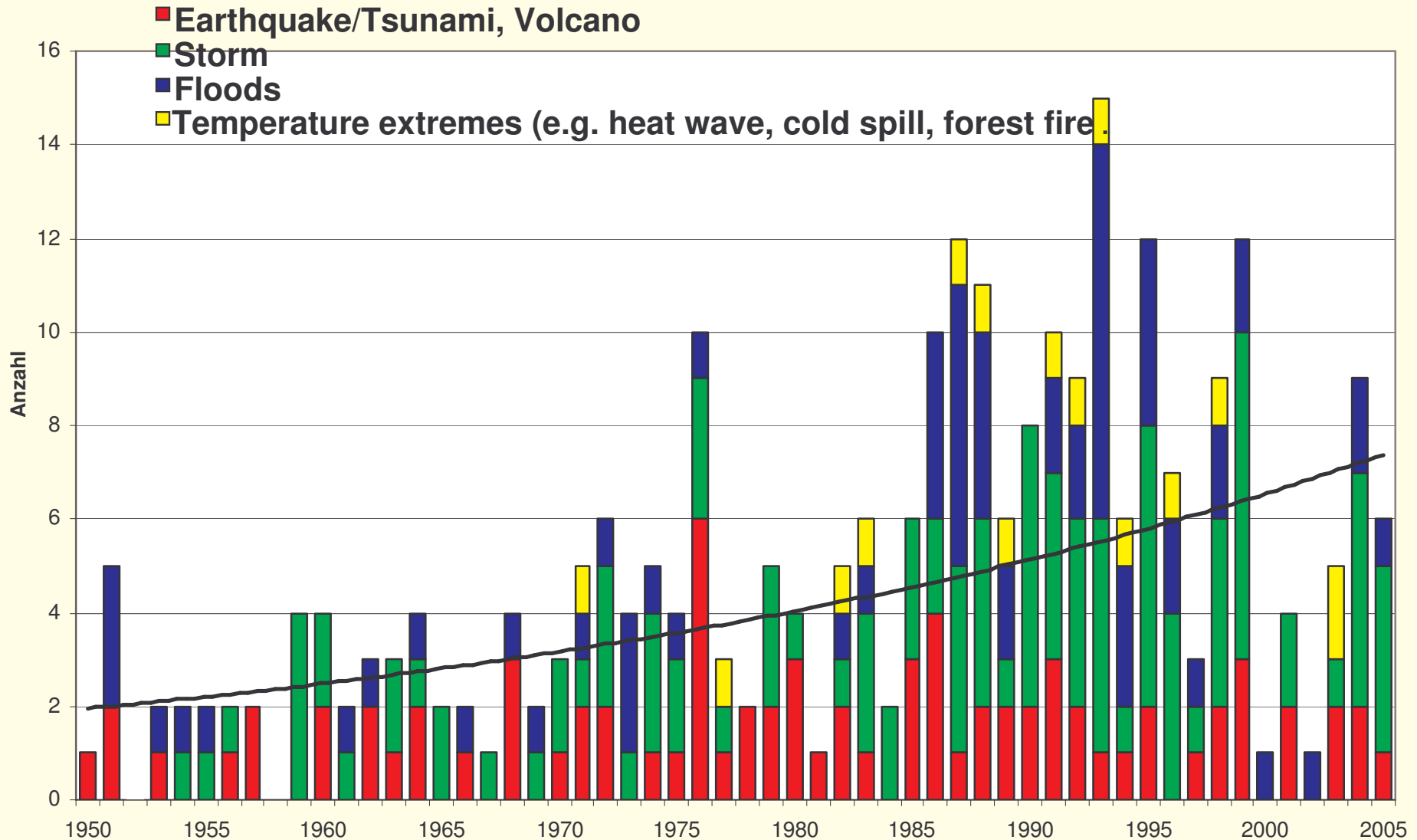
6.16. Major Natural Hazards (1950-2005). Source: Munich Re Research Div., 2006

267 Events

1,75 Million Dead
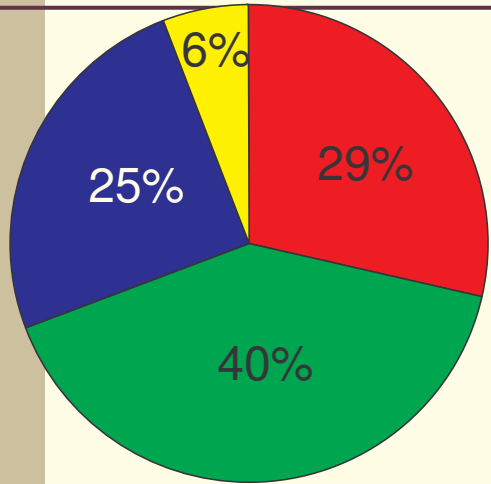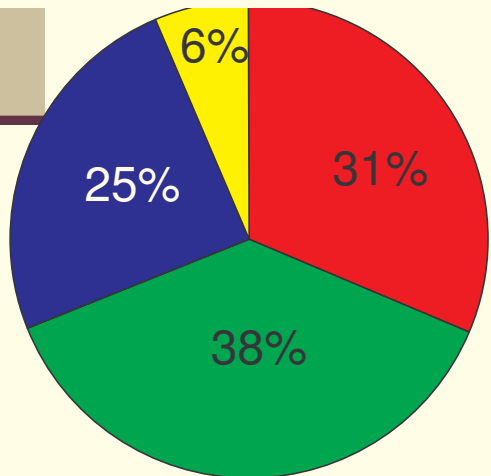
Geological events

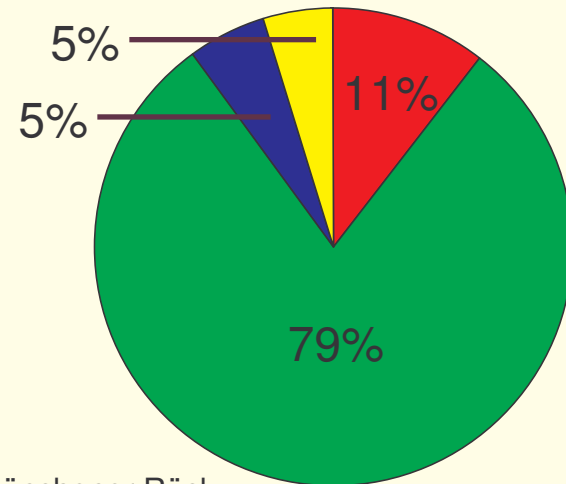- 🟥 **Earthquake/Tsunami, Volcano**

Weather-related events

- 🟩 **Storm**
- 🟦 **Floods**
- 🟨 **Extreme temperatures**

267 Events pie:
- 6%
- 25%
- 40%
- 29%

1,75 Million Dead pie:
- 2%
- 7%
- 36%
- 55%
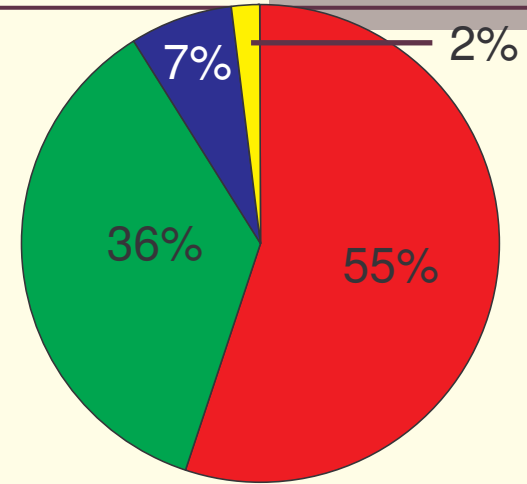
Economic damage: 1.400 billion US$
- 6%
- 25%
- 38%
- 31%

Insured damage: 340 billion US$
- 5%
- 5%
- 11%
- 79%

*in Werten von 2005

© 2006 GeoRisikoForschung, Münchener Rück

6.17. Impacts of Drought (1974-2003)

Reported Death of Natural Hazards globally: 2.066.273 persons

■ **Affected persons of Natural Hazards: 5 076 494 541 .**
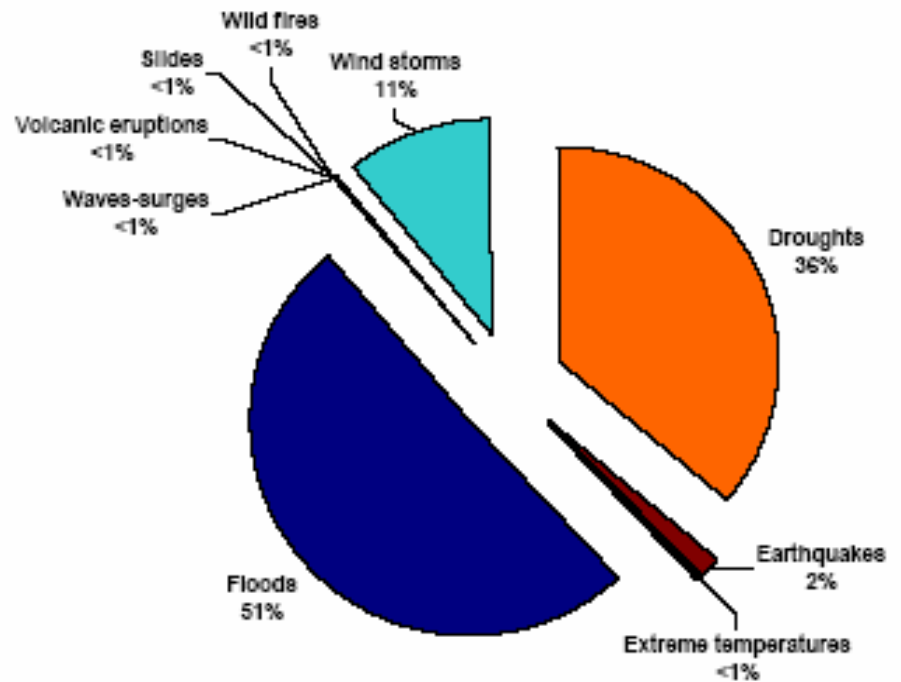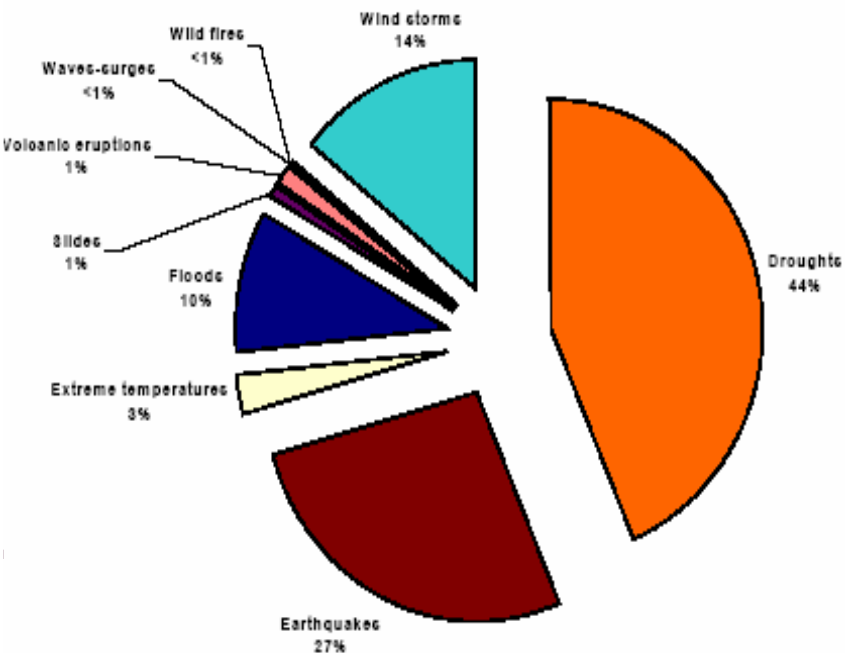
Source: Hoyois/Guha-Sapir (2004)

6.18. Heat Wave of 2003 in Europe
10 Most Deadly Disasters (1987-2006)

Year of occurrence	Disaster type	Region / Country	Number of killed
2003	Heat wave	Europe	72.210
2006	Heat wave	Western Europe	3.392
1998	Heat wave	India	2.541
2003	Heat wave	Indian Subcontinent	1.472
2005	Cold wave	Europe	1.330
2002	Heat wave	India	1.030
1987	Heat wave	Greece	1.000
2002	Cold wave	India	900
2002	Cold wave	Bangladesh	700
1995	Heat wave	United States	670

2003 heat wave mortality	
Country	Number of killed
Italy	20.089
France	19.490
Spain	15.090
Germany	9.355
Portugal	2.696
Belgium	1.175
Switzerland	1.039
Netherlands	965
Croatia	788
Czech Rep	418
Austria	345
United Kingdom	301
Slovenia	289
Luxembourg	170

CRED CRUNCH

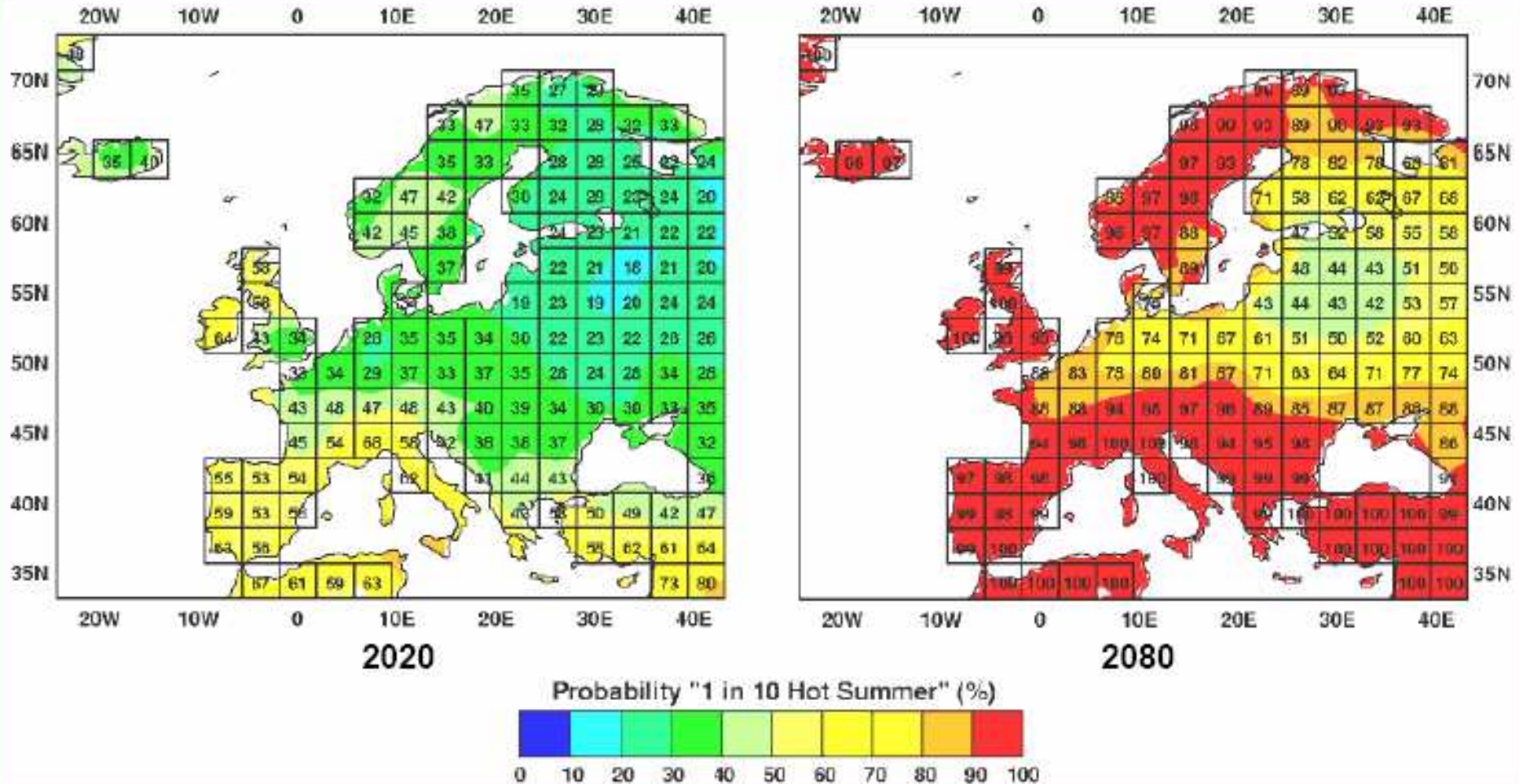# 6.19. Effects of 2003 summer heat wave on agricultural yield in five EU countries

Effects of 2003 summer heat wave on EU agriculture
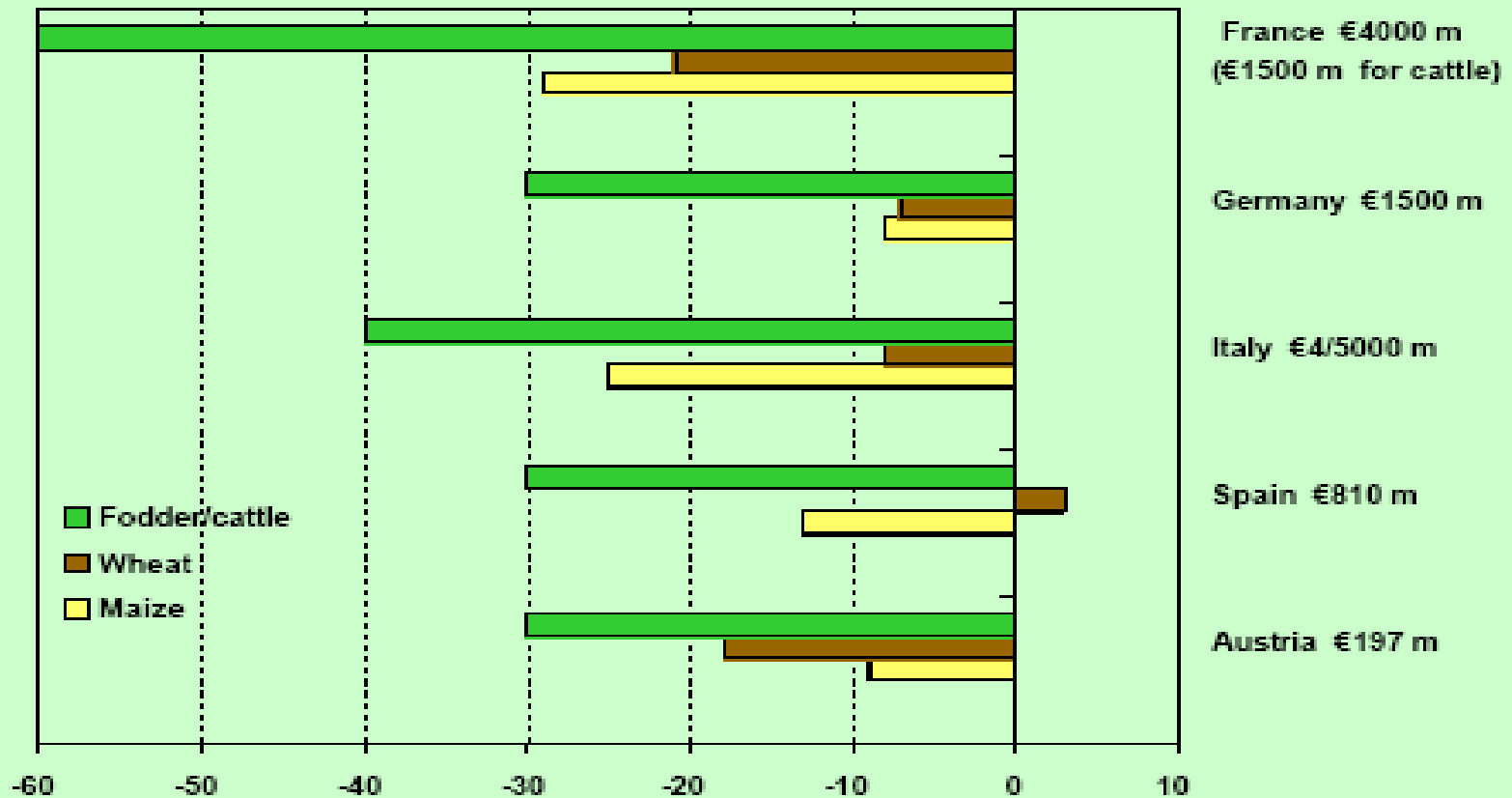
6.20. Probability of Hot Summers (M. Parry, IPCC, London, 2005)

Probability "1 in 10 Hot Summer" (%)

7. Securitization of GEC in Policy: Climate Change, Water & Soil

UN context

- UNDP 1994; UNESCO: Human Security Progr. (1996-2007)
- UN-GA Resolution September 2005. Human Security
- UN-SC Discussion: 17 April 2007: Climate Change
- UN-GA Debate on climate change in September 2007

North Atlantic and European context:

- NATO: Environmental Security: 1990's
- OSCE/UNDP/UNEP/NATO: ENVSEC initiative in Central Asia

GEC & security for the people: as a security issue

- Project GECHS of IHDP (1999: Science Plan)
- UNU-EHS (2003): Strategic Plan, Intersection 2, Source 1
- Human Security Network: *Greek Presidency (2007-2008): Climate Change & Human Security*
- Policy memo: *Climate Change & Human Security* (15.4.2007)

7.1. Climate Change & Desertification as Security Dangers and Concerns

Security danger posed by whom?

- Anthropogenic climate change as a security (threat) multiplier
- Anthropogenic desertification
- Human caused water scarcity and desertification

Security concern for whom?

- Victims of climate change and desertification
- Recipients of environmentally induced migration

Effects: Internal Displacement & Migration

- The *Survival Dilemma* of the Victims
- The *Security Dilemma* of the Recipients

- Problem of Global Equity: Cause & Victims differ

- **Military superiority does not matter** – No military solution: only cooperation among all countries

- Needed: Reduction in social vulnerability + resilience

7.2. Climate Change as a Security Danger and Concern

- **Since early 21st century climate change has increasingly been perceived as a threat to 'national', 'international', and 'human security'.**

- **Climate change is being securitized in government reports and in statements of government officials in the UK & Germany**

- **Since 2007 several policy-oriented studies have securitized climate change from different vantage points and concepts of security by analyzing climate change as:**

  - an *international security* threat, challenge, vulnerability, risk;

  - a *national security* threat for the United States and as

  - a *human security* challenge that will affect the highly socially vulnerable poor population in the North (Hurricane Katrina) and South

7.3. Climate change as a threat to international security

■ **WBGU: climate change could exacerbate environmental crises: drought, water scarcity & soil degradation, intensify land-use conflicts & trigger further environmentally-indu-ced migration.**

■ **New conflict constellations are likely to occur. Sea-level rise; storm & floods could threaten cities & industrial regions in China, India & USA.**

■ **WBGU identified 4 conflict constellations in different world regions:**

1. **"Climate-induced degradation of freshwater resources": 1.1 billion people are currently without access to safe drinking water. The situation could worsen for hundreds of millions of people as climate change alters the variability of precipitation & quantity of available water.**

2. **"Climate-induced decline in food production": More than 850 million people worldwide are undernourished. This situation is likely to worsen in future as a result of climate change.**

3. **"Climate-induced increase in storm and flood disasters".**

4. **"Environmentally-induced migration",**

7.4. Climate Change as a New U.S. National Security Threat

- **P. Schwartz/. Randall: Contract Study for DoD, Oct. 2003**
  - *Goal: "to imagine the unthinkable – to push the boundaries of current research on climate change so we may better under-stand the potential implications on United States national security."*
- **Nils Gilman, Doug Randall, Peter Schwartz:**
  - **Impacts of Climate Change: A system Vulnerabiliy Approacjh to Consider the Potential Impacts to 2050 of a Mid-Upper Greenhouse Gas Emissions scenario (Janaury 2007);**
- March 2007, the **Strategic Studies Institute** conducted a colloquium: "Global Climate Change: National Security Implications"
- March 2007, **Senators Richard J. Durbin (D-IL) and Chuck Hagel (R-NE)** submitted a bill requesting a **National Intelligence Estimate to assess whether and how climate change might pose a national security threat.**
- **CNA:** *National Security & the Threat of Climate Change* **(April 2007)**
  - **Climate change can act a s a threat multiplier for instability in some of the most volotile regions… presents national security challenge for U.S.**
- November 2007, *Center for Strategic and International Studies* **(CSIS); the** *Centre for a New American Security* **(CNAS):** *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change*
- November 2007, the ***Council on Foreign Relations*** (CFR) released a report on: *Climate Change and National Security* by Joshua W. Busby

7.5. Climate Change as a Problem of Human Security

- **GECHS** Science Strategy (1999): Global Environmental Change as a Problem of Human Security

- **GECHS** - Cicero Conference in June 2005: Climate Change and Human Security

- **UNU-EHS:** Floods and drought as a Problem of Human Security

- **UNU-EHS/MunichRe Foundation: Chairs on Social Vulnerability:** impact on natural hazards

- **Politicy Memorandum:** Climate Change and Human Security (15 April 2007) at: <http://www.afes-press.de/html/texte_presse.html>

8. Need for Anticipatory Learning and Proactive Policies

- Different nature of security dangers & concerns: terrorism vs. climate change
- Enemy is ‚us' and are not ‚they'
- Cause is our economic behaviour and way of life based on waste of fossil fuels (coal, oil, gas)
- Difference of securitizing actor: Pentagon: worst case human behaviour, intentions and interests of states and non-state actors (terrorists)
- IPCC: knowledge assessment based on GC models and on sectoral & regional impact studies
- Role of Scientific Research: to identify the danger and communicate it to the media to citizens & policy makers
- We need an anticipatory research and learning to triger proactive policies to face climate change impacts and to cope with them by adaptation and mitigation what requires knowlege and technology sharing.
- Knowledge is the task of universities, of research community and students
- German President Horst Köhler in his Berlin speech of 1 October 2007 said: We need bread & books for the Third World and not weapons!

8.1. From Research to Action:
Enhancing Environmental & Human Security
Towards Environmental Conflict Avoidance

- **Primary Goal:** address fatal outcomes of GEC: hazards and disasters, migration, crises & conflicts that may have been caused, triggered, induced, influenced by: a) environmental stress and b) extreme weather events,

- **Enhance Environmental Security:** Address human behaviour that contributes to GEC via climate change, soil degra-dation, water pollution & scarcity: sustainable strategies

- **Enhance Human Security:** address factors of GEC that challenge survival of individuals, families, villages, ethnic groups

- **Avoid Environmentally-induced Conflicts:** address structural or causal factors (of Survival Hexagon), e.g. climate policy, combat desertification, cope with water stress.

8.2 Nobel Peace Prize of 2007: IPCC & Al Gore

- **Nobel Peace Prize for 2007 was shared, between the Intergovernmental Panel on Climate Change (IPCC) and Albert Arnold (Al) Gore Jr.** for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.

- **Indications of changes in the earth's future climate must be treated with the utmost seriousness, and with the precautionary principle uppermost in our minds. Extensive climate changes may alter and threaten the living conditions of much of mankind. They may induce large-scale migration and lead to greater competition for the earth's resources. Such changes will place particularly heavy burdens on the world's most vulnerable countries. There may be increased danger of violent conflicts and wars, within and between states.**

- **Through the scientific reports …, the IPCC has created an ever-broader informed consensus about the connection between human activities and global warming. … Whereas in the 1980s global warming seemed to be merely an interesting hypothesis, the 1990s produced firmer evidence in its support. In the last few years, the connections have become even clearer and the consequences still more apparent.**

- **By awarding the Nobel Peace Prize for 2007 to the IPCC and Al Gore, the Norwegian Nobel Committee is seeking to contribute to a sharper focus on the processes and decisions that appear to be necessary to protect the world's future climate, and thereby to reduce the threat to the security of mankind. Action is necessary now, before climate change moves beyond man's control.**

8.3 Policy Response: Proactive Climate Policy: Peace Policy for the 21st Century

- **From Science to Political Strategies & Measures:**
  - **Natural science: knowlege creation**
  - **Social sciences: societal policy discourses**
  - **Peace research: impact of these changes on extreme societal outcomes: human-induced natural hazards, migration, crises and conflicts**
- **Combining: Grassroot activities & wise policies:**
  - **Wangari Muta Maathai** (Kenya, 2004): "for her contribution to sustainable development, democracy and peace„
  - **Albert Gore (USA, 2007):** for his role in awareness creation and agenda setting.
  - Grassroots can translate knowledge to action!

8.4. Towards Proactive Policy Responses

Millennium Ecosystem Assessment (MEA), 2005:

- Over the past 50 years, humans have changed ecosystems more rapidly & extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber & fuel

- The changes that have been made to ecosystems have contributed to **substantial net gains in human well-being** and **economic development**, but these gains have been achieved at growing costs in the form of the **degradation** of many ecosystem services, **increased risks of nonlinear changes**, and the **exacerbation of poverty** for some groups of people.

- **The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals**

- The challenge of reversing the degradation of ecosystems while meeting increasing demands for their services can be partially met under some scenarios that the MEA has considered but these involve significant changes in policies, institutions and practices, that are not currently under way.
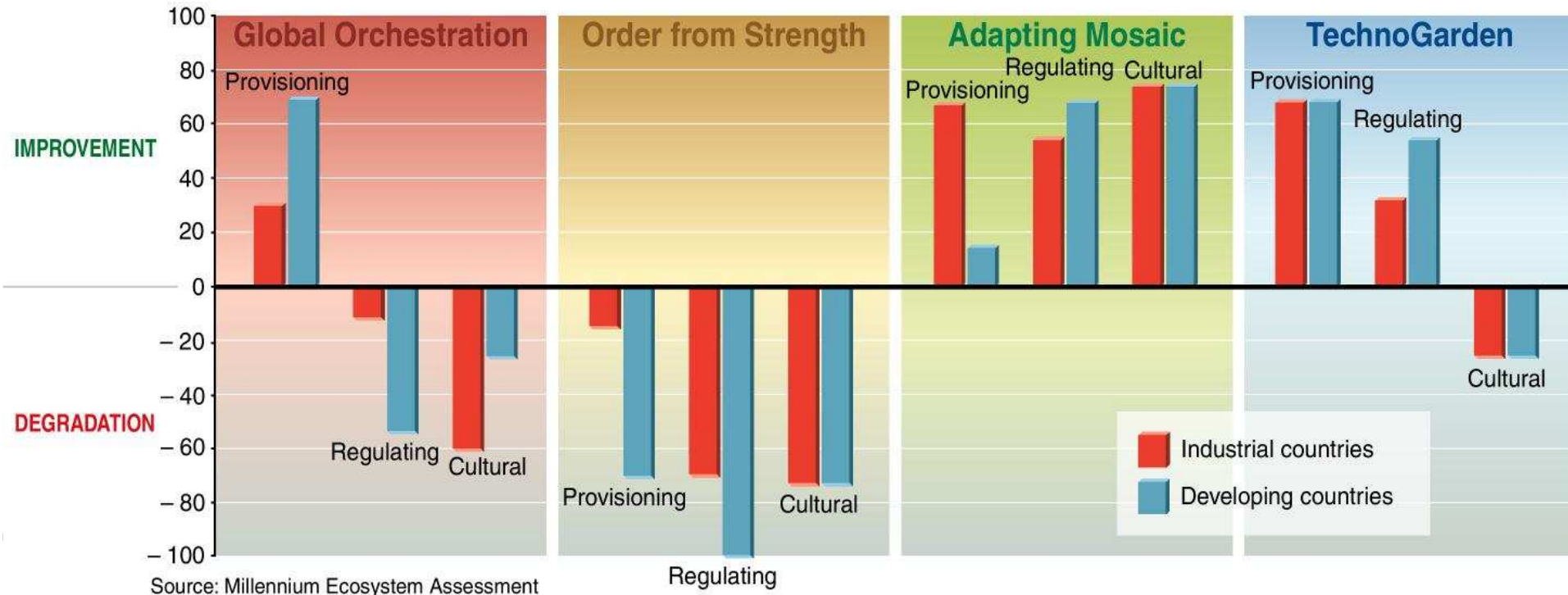
8.5. Millennium Ecosystems Assessment Scenarios

- **No predictions – scenarios are plausible futures**

- Both quantitative models and qualitative analysis used in scenario development
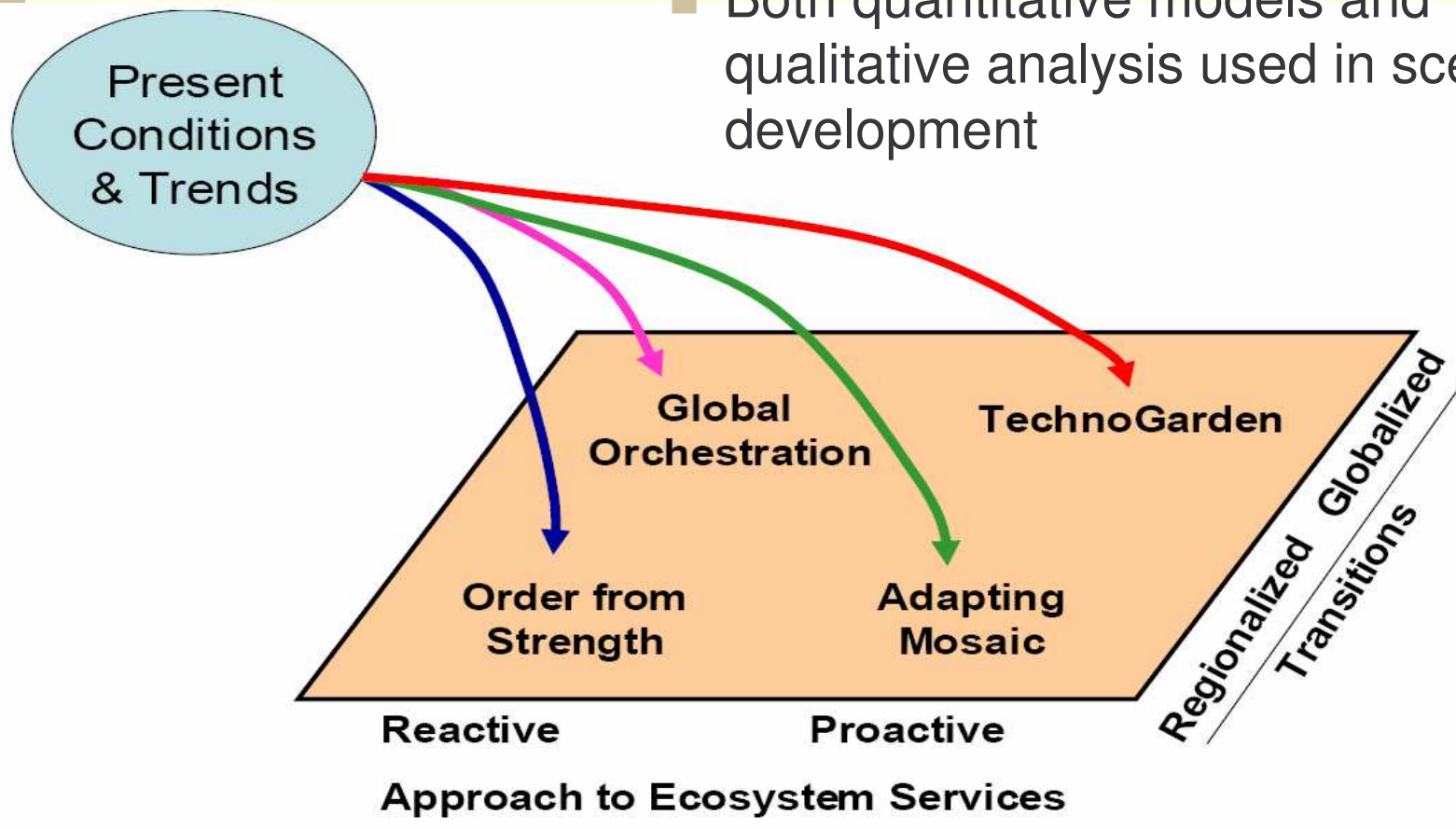
8.6. Improvements in services possible by 2050

Changes in ecosystem services in percentage

Source: Millennium Ecosystem Assessment

- **Three of four scenarios show that significant changes in policy can par-tially mitigate the negative consequences of growing pressures on ecosy-stems, although the changes required are large and not currently under way**

8.7. Responses: Technological

- *Development and diffusion of technologies designed to increase the efficiency of resource use or reduce the impacts of drivers such as climate change and nutrient loading are essential*

- **Promising Responses**

  - **Promotion of technologies that enable increased crop yields without harmful impacts related to water, nutrient, and pesticide use**

  - Restoration of ecosystem services

  - **Promotion of technologies to increase energy efficiency and reduce greenhouse gas emissions**

8.8. Growth in Wind Power (1997-2006)

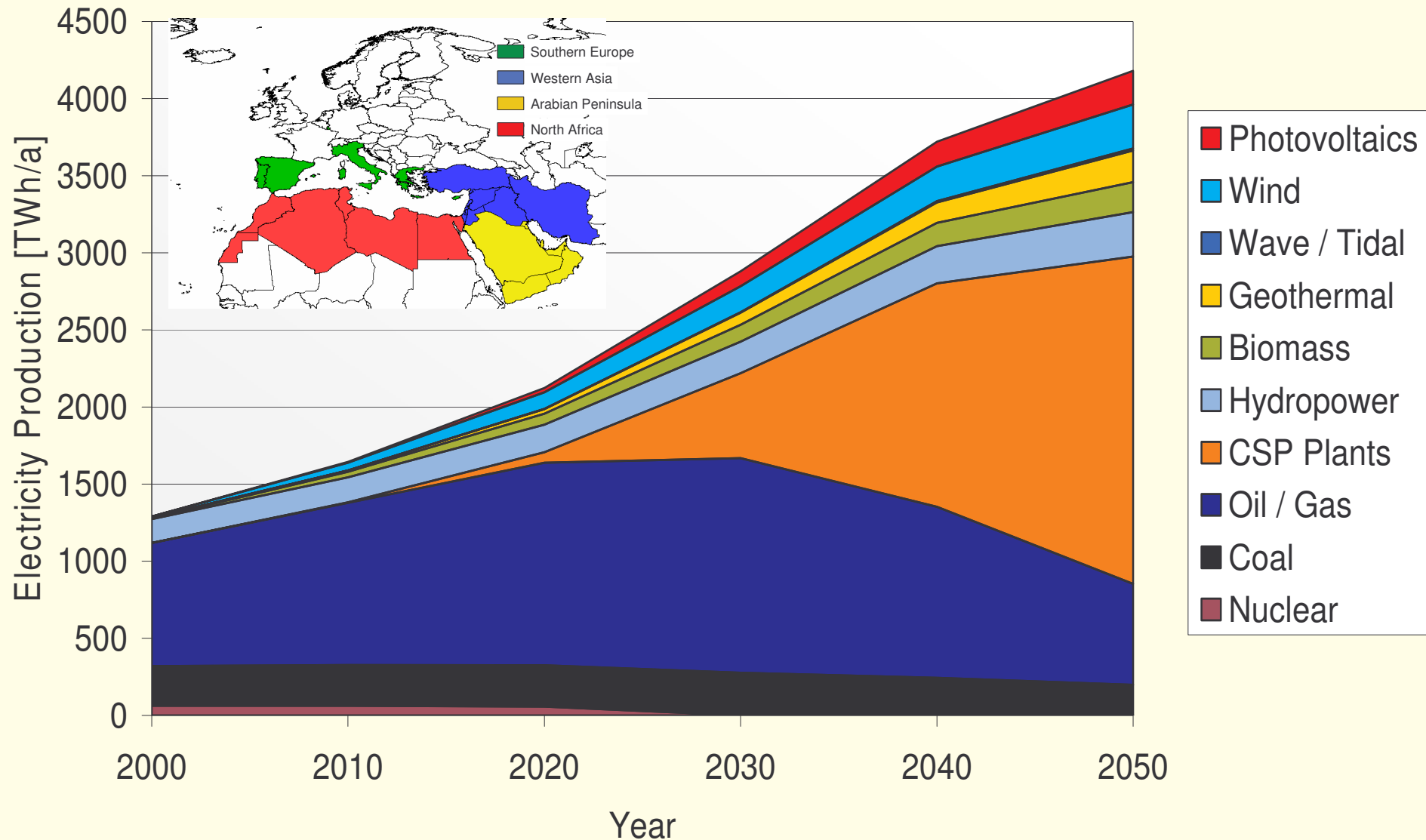World Wind Energy - Total Installed Capacity (MW) and Prediction 1997-2010

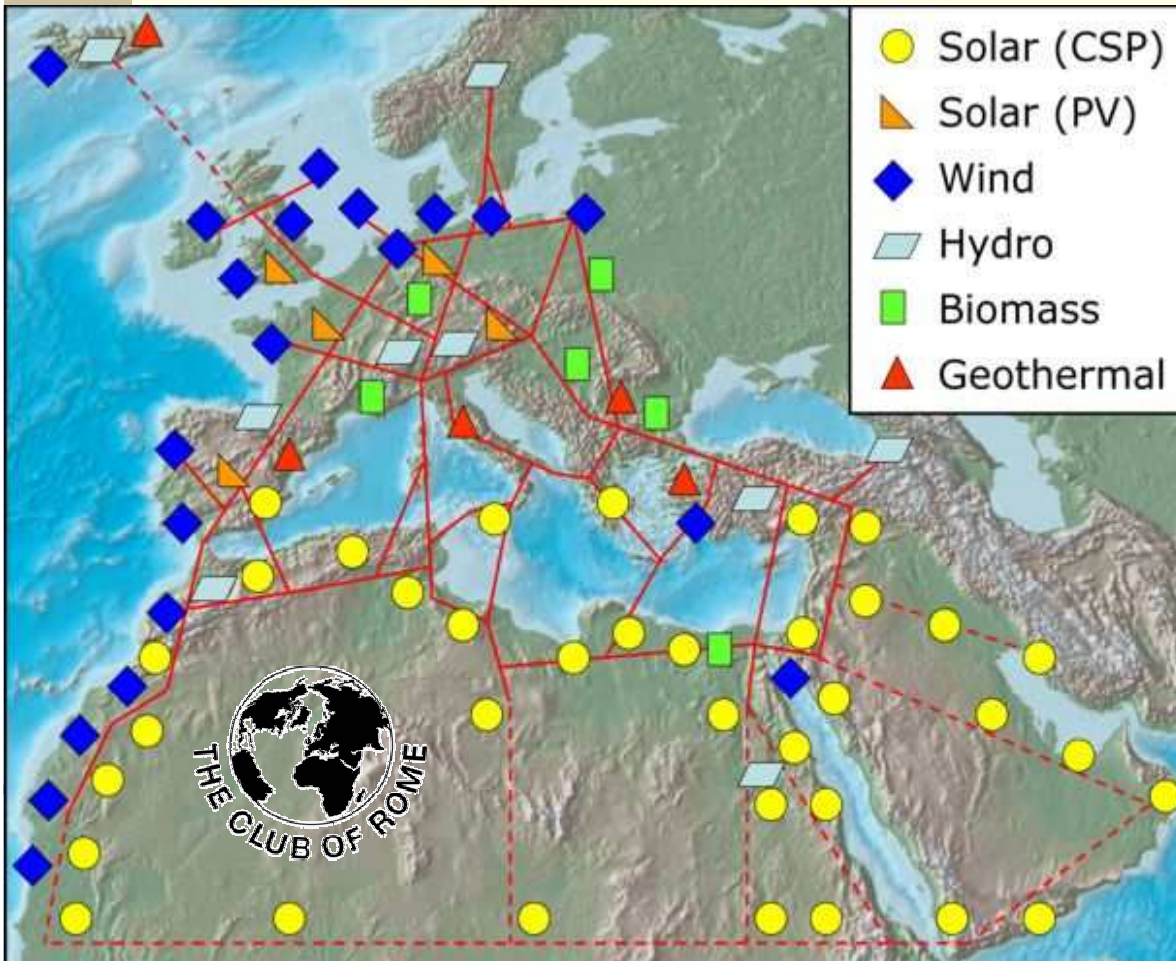# 8.9. Photovoltaic Installations in EU-25

EU - 25 Annual Installations of PV
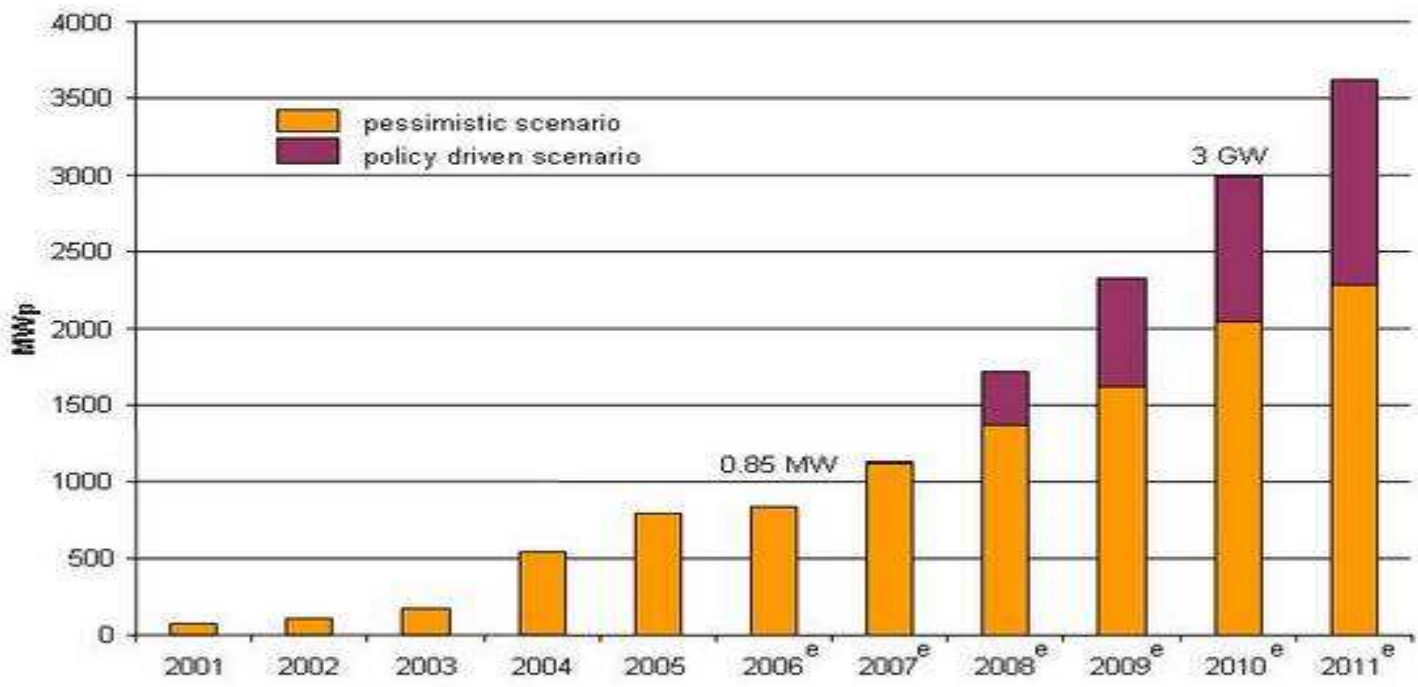
8.10. Annual electricity demand & generation in the countries analyzed in the MED-CSP scenario

8.11. Mediterranean Renewable Energy Potential

Trans-Mediterra-nean **R**enewable **E**nergy **C**ooperation (**TREC**) is an initia-tive that campaigns for the transmission of clean power from deserts to Europe.

Since 2003 TREC has developed the **DESERTEC Con-cept**.

8.12. Solar Thermal Technologies for Electricity Generation in the Deserts

Concentrating Solar Power Technologies:

❖ **alternatives: a) Fresnel concentrators, b) parabolic trough (400-600 °C), c) solar tower concept with surrounding heliostat field (1200 °C, up to 50 MW), d) solar dish (for small applications up to 50 kW).**
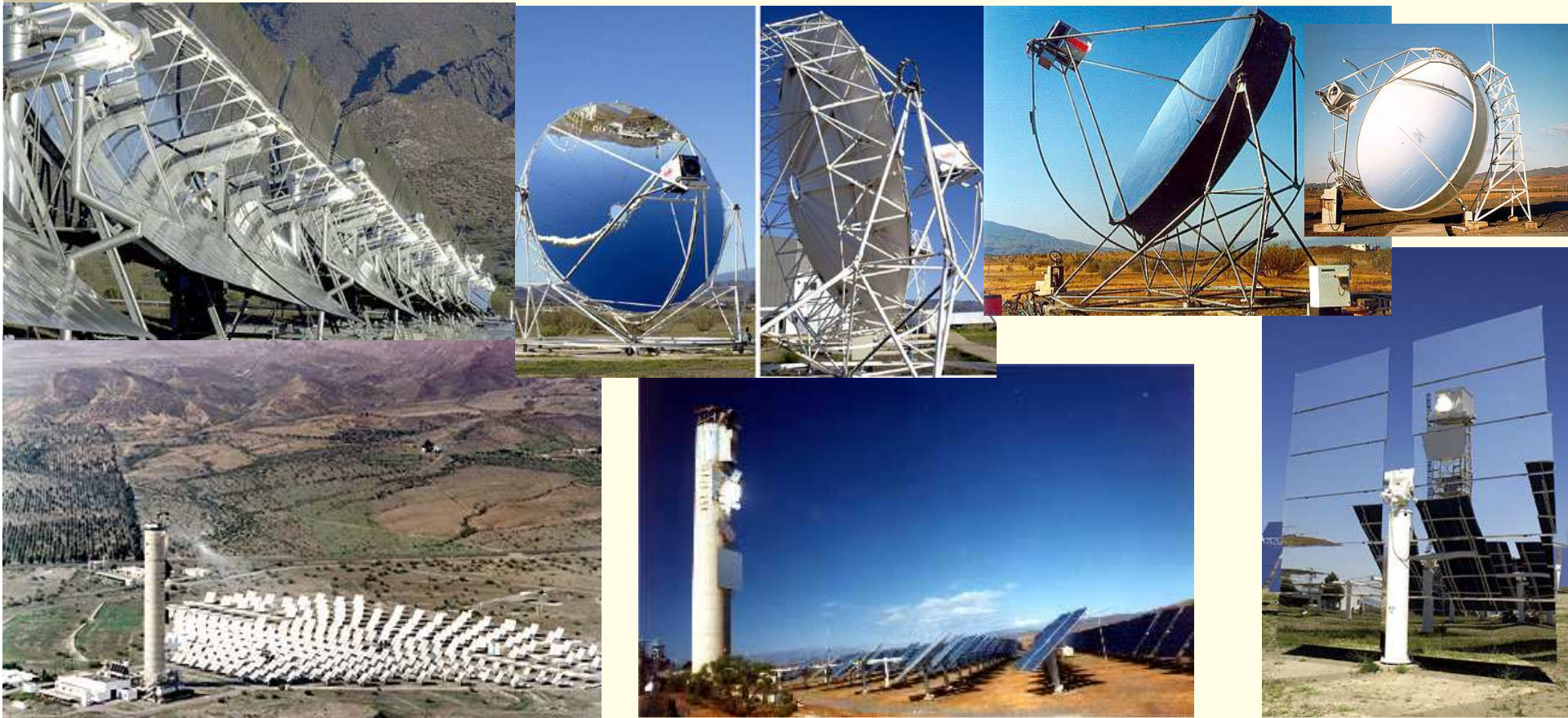
8.13. Photovoltaic Concentrator Technologies in Israel and USA

A large pre-commercial CPV system

under test in Phoenix, AZ, USA, consists of 5760 plastic fresnel lenses, which each focus sunlight onto one of a similar number of individual 1 cm x 1 cm silicon CPV cells.
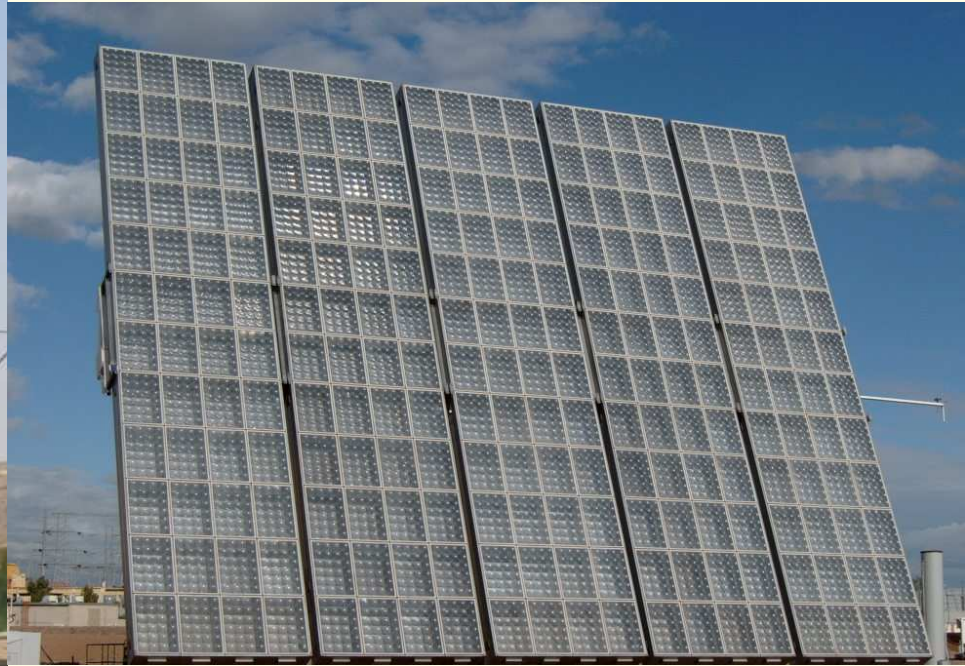
CPV cell module exposed at 1000X at the 400 m2 *PETAL* solar dish test facility in Sede Boqer, Israel.
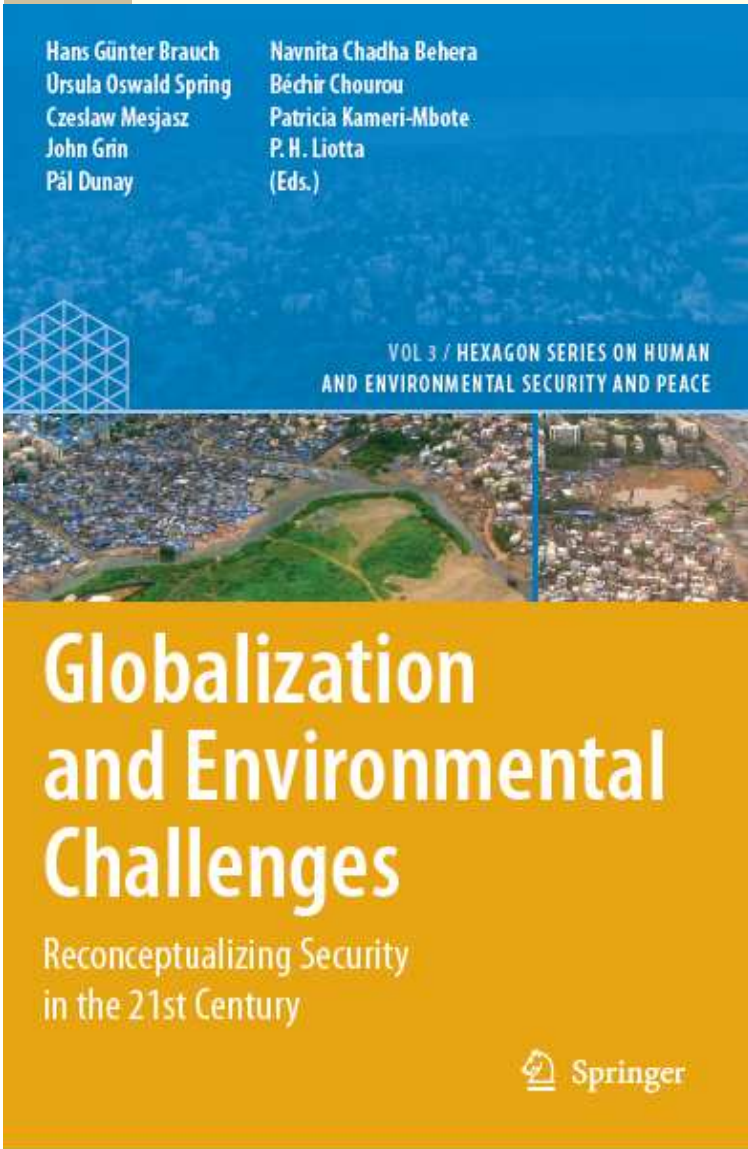
9. Hexagon Book Series on Human and Environmental Security and Peace (HESP)

- This project and book series differs from traditional approaches in international relations of primarily monodisciplinary, often Eurocentric or US-centred books that are also male dominated where authors representing the other five billion people on the globe are in most cases not represented as authors.

- Of the editorial team of volumes III, IV and V: 11 colleagues from 10 countries, three are women from India, Kenya and Mexico and in volume IV half come from the South.

- They address the key new objective security dangers and subjective security concerns primarily posed by the newly perceived security threats, challenges, vulnerabilities and risks that are developing from problems related to global environ-mental change in this new age of earth history, for which the Nobel Laureate in Chemistry, Paul Crutzen, coined the term the 'Anthropocene'.

- These three volumes (III, IV, V) are conceived as a major security handbook for the Anthropocene Age in the 21st century

10. A Global Security Handbook for the Anthropocene Age

- In March 2004, at the ISA Convention in Montreal, Canada, AFES-PRESS launched a global scientific dialogue project on '**Reconceptualizing of Security**' that has involved about 300 scholars from many disciplines in the social and natural sciences from all parts of the world.

- As a result of five workshops (Montreal 2004, Sopron 2004; The Hague 2004; Istanbul 2005, Bonn 2005) three major reference books have emerged (with 175 book chapters in the first two volumes) that are being published in 2008 and

- an approximately 100 chap. in vol. III that will follow in 2009 on linkages of security concepts with globalization, global environmental change and disasters.

10.1 Hexagon Series, vol. III & First volume of the Security Handbook

Hans Günter Brauch
Ursula Oswald Spring
Czeslaw Mesjasz
John Grin
Pál Dunay

Navnita Chadha Behera
Béchir Chourou
Patricia Kameri-Mbote
P. H. Liotta

(Eds.)

VOL 3 / HEXAGON SERIES ON HUMAN AND ENVIRONMENTAL SECURITY AND PEACE

Globalization and Environmental Challenges

Reconceptualizing Security in the 21st Century

Springer

H.G. Brauch, J. Grin, C. Mesjasz, P. Dunay, N. Chadha Behera, B. Chourou, U. Oswald Spring, P.H. Liotta, P. Kameri-Mbote (Eds.): *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century* **(Berlin–New York: Springer-Verl.,2008).**

see at: <http://www.afes-press-books.de/html/hexagon_03.htm>.

Globalization and Environmental Challenges pose new security dangers and concerns. In this reference book on global security thinking, 92 authors from five continents and many disciplines, from science and practice, assess the global reconceptualization of security triggered by the end of the Cold War, globalization and manifold impacts of global environmental change in the early 21st century. In 10 parts, 75 chapters address the theoretical, philosophical, ethical and religious and spatial context of security; discuss the relation-ship between security, peace, development and environment; review the reconceptualization of security in philosophy, international law, economics and political science and for the political, military, economic, social and environmental security dimension and the adaptation of the institutional security concepts of the UN, EU and NATO; analyze the reconceptualization of regional security and alternative security futures and draw conclusions for future research and action.

10.2 Hexagon Series, vol. IV & Second volume of the Security Handbook

Hans Günter Brauch
Úrsula Oswald Spring
John Grin
Czeslaw Mesjasz
(Eds.)

Patricia Kameri-Mbote
Navnita Behera Chadha
Béchir Chourou
Heinz Krummenacher

Hexagon Logo

VOL. 4/HEXAGON SERIES ON HUMAN
AND ENVIROMENTAL SECURITY AND PEACE

Facing Global Environmental Change

Environmental, Human, Energy, Food, Health and Water Security Concepts

Springer

Hans Günter Brauch, Úrsula Oswald Spring, John Grin, Czeslaw Mesjasz, Patricia Kameri-Mbote, Navnita Chadha Behera, Béchir Chourou, Heinz Krummenacher (Eds.): *Facing Global Environmental Change: Environ-men-tal, Human, Energy, Food, Health and Water Security Concepts* (Berlin – Heidelberg – New York: Springer-Verlag, 2008), i.p .

In the second volume of this policy-focused, global and multidisciplinary security handbook on *Facing Global Environmental Change* addresses new security threats of the 21st century posed by climate change, desertification, water stress, population growth and urbanization. These security dangers and concerns lead to migration, crises and conflicts. They are on the agenda of the UN, OECD, OSCE, NATO and EU. In 100 chapters, 132 authors from 49 countries analyze the global debate on environmental, human and gender, energy, food, livelihood, health and water security concepts and policy problems. In 10 parts they discuss the context and the securitization of global environmental change and of extreme natural and societal outcomes. They suggest a new research programme to move from knowledge to action, from reactive to proactive policies and to explore the opportunities of environmental cooperation for a new peace policy.

10.3 Hexagon Series, Vol. IV & Third vol. of Security Handbook

- **Hans Günter Brauch, Úrsula Oswald Spring, Czeslaw Mesjasz, John Grin, Patricia Kameri-Mbote, Béchir Chourou, Pal Dunay, Jörn Birkmann, (Eds.):**

- *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks*

- (Berlin – Heidelberg – New York: Springer-Verlag, 2009).

In the third volume about 100 chapters will address in

- **part I:** Introduction: Concepts of Security Threats, Challenges, Vulnerabilities and Risks;

- **part II:** Military and Political Security Threats, Challenges, Vulnerabilities and Risks;

- **part III:** Economic, Social, Environmental Security and Human Threats, Challenges, Vulnerabilities and Risks in the Near East, North and Sub-Sahara Africa and in Asia;

- **part IV:** Threats, Challenges, Vul-ne-ra-bilities and Risks for Urban Centres in Hazards and Disasters;

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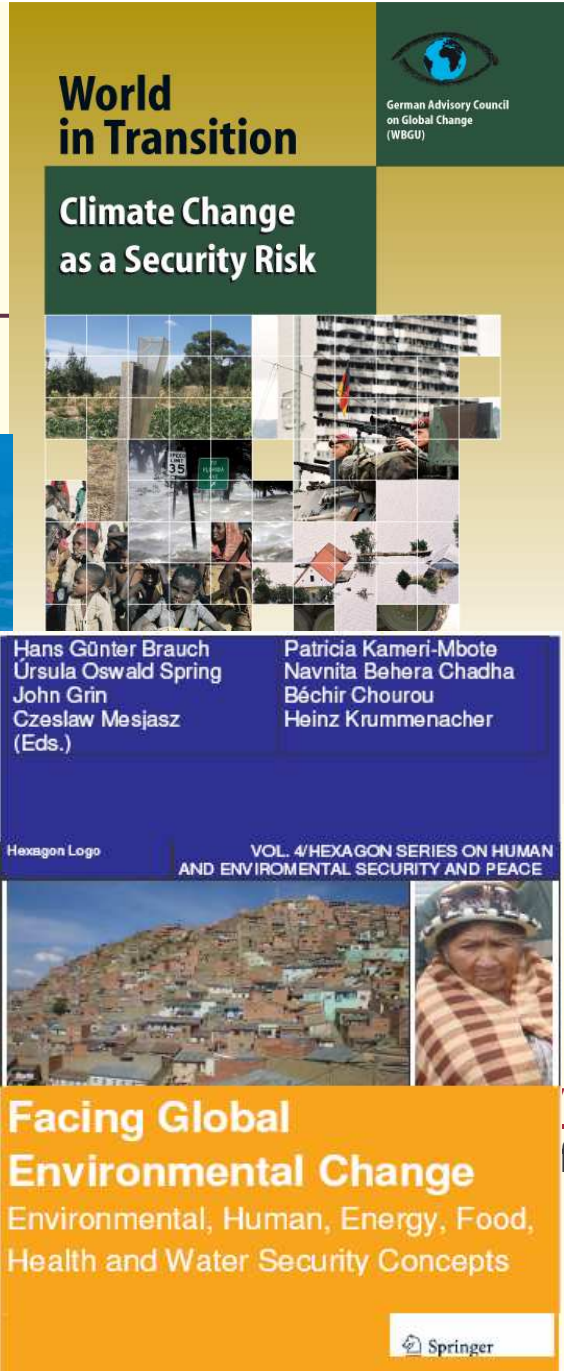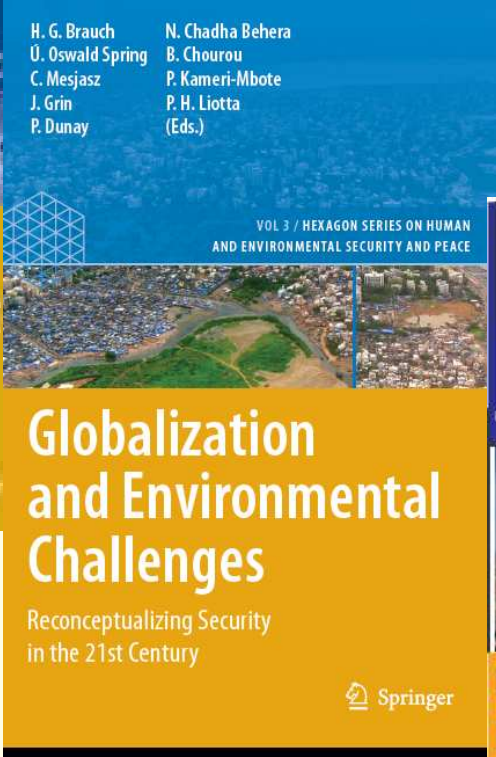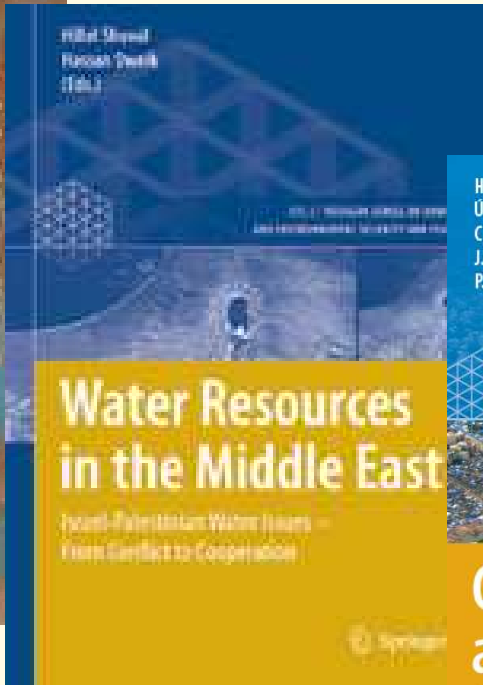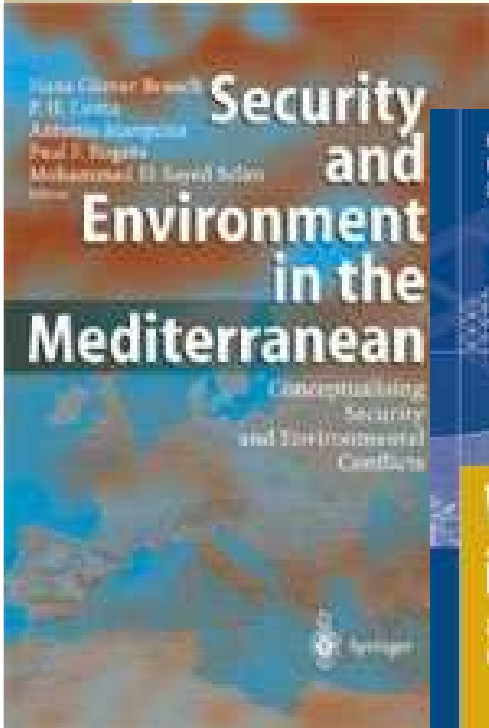
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