

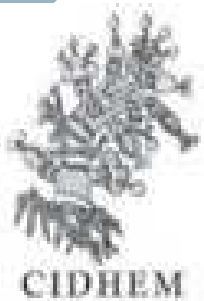
Hans Günter Brauch
Free University of Berlin,
Institute on Environment and Human Security of the
United Nations University (UNU-EHS) in Bonn;
Peace Research and European Security Studies (AFES-PRESS)
Editor, Hexagon Series on Human, Environmental Security and Peace

Global Environmental Change and Security Impacts for Mexico

Cuernavaca, 11 April 2008

Seminario Intedisciplinario Cultura y Sociedad
El hombre y su medioambiente

Segundo ciclo, coordinador: Dr. Luis Tamayo



A large teal circle is partially visible on the left side of the slide, overlapping the content area.

Contents

- 1. Introduction: The Thesis**
- 2. Reasons for Reconceptualization of Security**
- 3. Concepts of Security and Theory of Securitization**
- 4. Global Environmental Change**
- 5. Analyzing GEC: The PEISOR Model**
- 6. Impacts of GEC**
- 7. Security Analysis of GEC**
- 8. Anticipatory Learning and Policy Response: A New Peace Policy for the 21st Century**
- 9. Hexagon Book Series on Human and Environmental Security and Peace (HESP)**
- 10. Global Security Handbook for the Anthropocene Age**

1. Introduction: The Thesis

- **Global environmental change (GEC)** refers to anthropogenic changes in climate, water, soil, population, urbanization and food
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
- **The enemy is us:** our consumption of water, soil and hydrocarbons (use of coal, gas, oil) 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;
- 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 conceptual innovations?**

- Theoretical: social constructivism
- Ulrich Beck: risk society
- Widening, deepening & sectorialization of security

2.1. Two New Security Challenges: Terrorism and Climate Change



11 Sept. 2001

- Terrorist Aggression
- Death toll (31 October 2003): 2752
- Response: war on terror: Iraq
- Iraq death toll: US:3,993
Iraq:1,191,216 (?)
- War costs: ca. \$ 504,458,547,323



- 29 August 2005: Impact of Hurricane Katrina
- 1838 deaths (official) and unofficial death toll 4,081 (?)
- \$81.2 billion (2005 USD)
\$86 billion (2007 USD)
- Policy Response: ??
- Climate Policy: ???

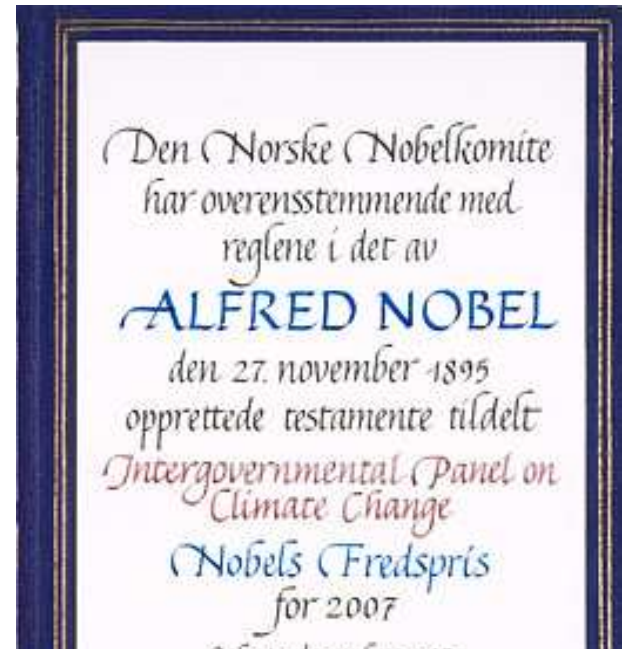
3. Who defines Security Threats?

Two Securitizing Actors

U.S. Department of Defense



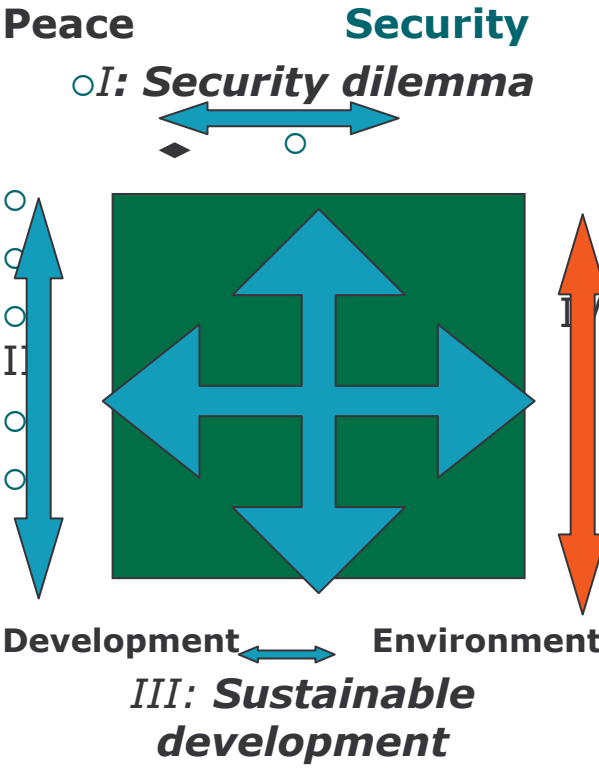
- Intergovernmental Panel on Climate Change (IPCC)
- Fourth Assessment Report of 2007
- IPCC Recipient of Nobel Peace Prize



- The Mexican President
- National security strategy and doctrine of Mexico

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

Programmes, pillars & linkage concepts within the quartet

IR research programmes	Conceptual Quartet	Conceptual Linkages
<ul style="list-style-type: none"> ▪ Peace Research ▪ Security Studies ▪ Development Stud. ▪ Environment Studies <p>4 conceptual pillars</p> <ul style="list-style-type: none"> ▪ I: <i>Security dilemma</i> ▪ II: Survival dilemma ▪ III: <i>Sustainable development</i> ▪ IV: Sustainable peace 	 <p>Peace Security</p> <p>○ I: <i>Security dilemma</i></p> <p>Development Environment</p> <p>III: <i>Sustainable development</i></p>	<p>Political use of concepts & theoretical debates on 6 linkages</p> <ul style="list-style-type: none"> ○ Peace & security ○ Peace & development ○ Peace & environment ○ Devel. & security ○ Devel. & environment <p>Of interest here:</p> <ul style="list-style-type: none"> ○ Security & environment

3.2. 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	

3.3. Environmental & Human Security

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

4. Global Environmental Change and Climate Change

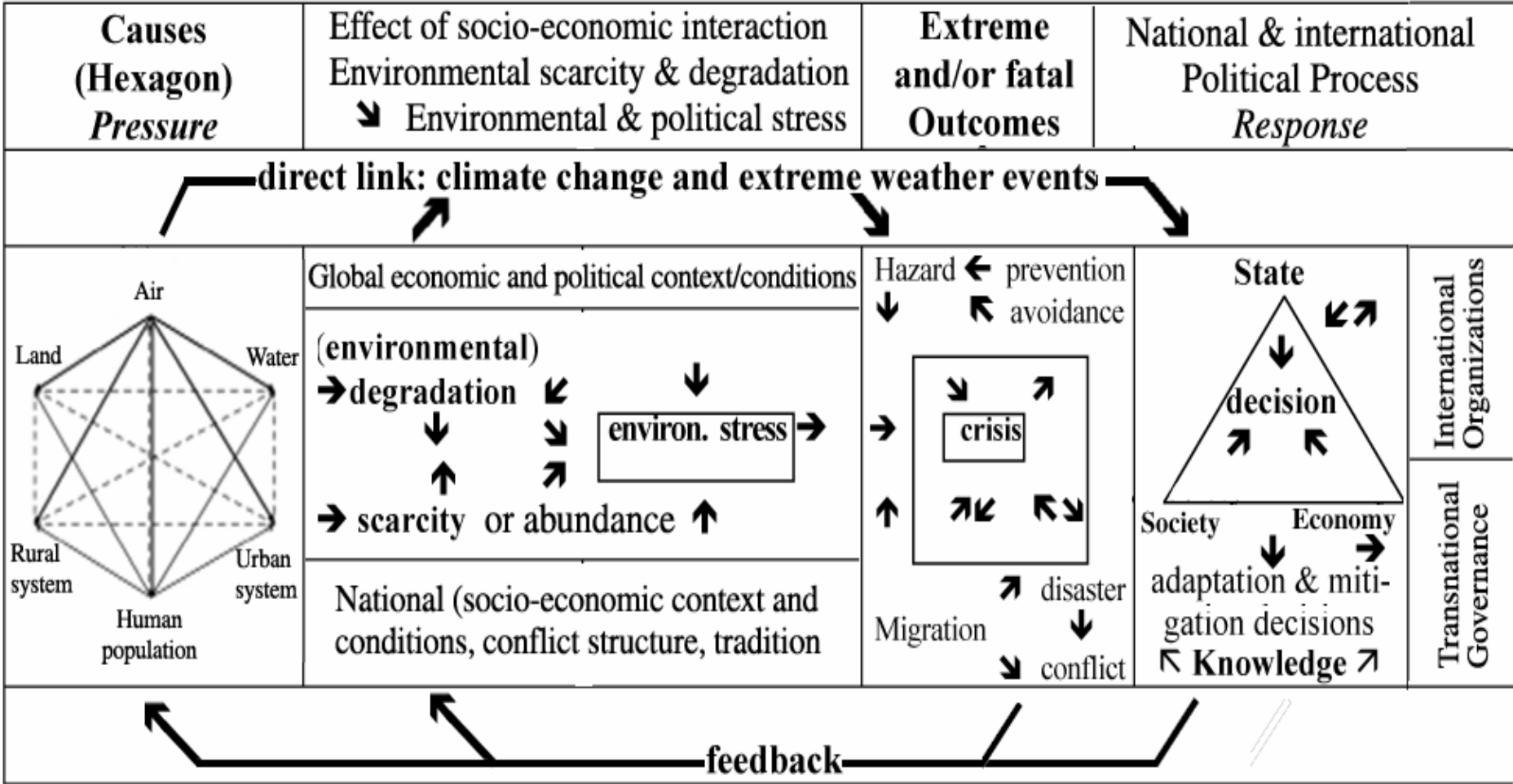
- Since 1970s & 1980s: '*global environmental change*' (GEC) became a topic in the natural & social sciences
- Since the late 1980s and 1990s policy efforts on:
 - **Climate Change**: 1988: issue of G7; 1990: UN GA mandate; 1992: Rio summit: **UNFCCC (1992)** and **Kyoto Protocol (1997)**
 - **Desertification**: **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

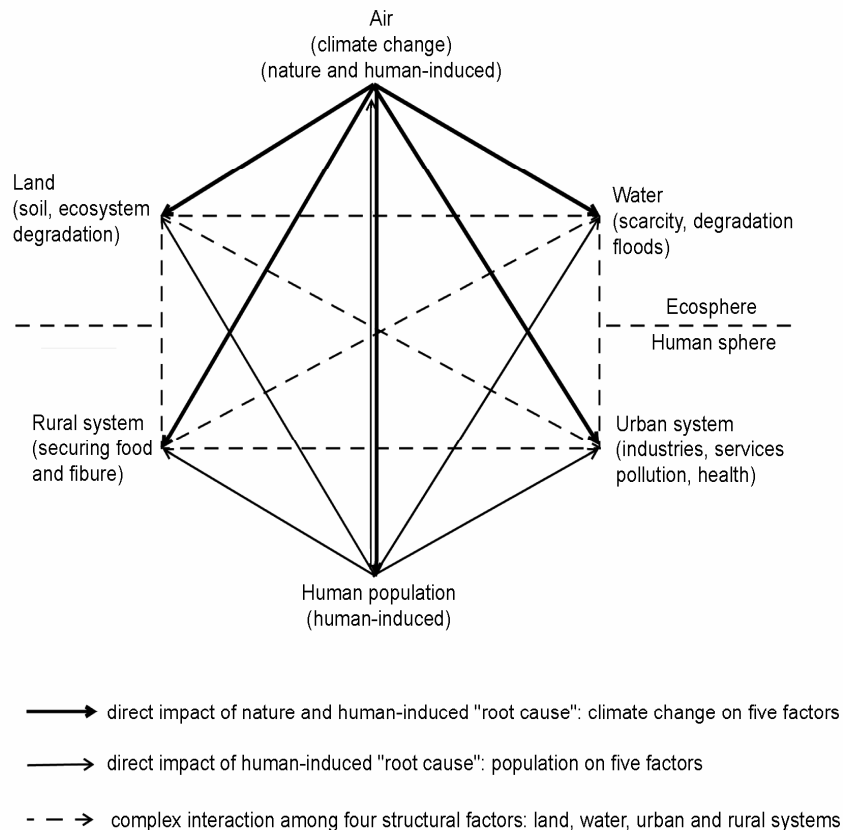
Scenarios on Climate Change Impacts

- Focus: environment \leftrightarrow human interaction
- Other Models: Environment – Policy Response
 - OECD: PSR-Model (pressure, state of the environment, policy response)
- PEISOR model distinguishes 5 stages:
 - **P: Pressure:** Causes of GEC: Survival hexagon
 - **E: Effect:** environm. scarcity, degradation & stress
 - **I: Impact:** Extreme or fatal outcome: hazards
 - **SO: Societal Outcomes:** disaster, migration, crisis, conflict etc.
 - **R: Response** 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



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



Six causes of GEC or pressure factors Nature & human-induced Supply side

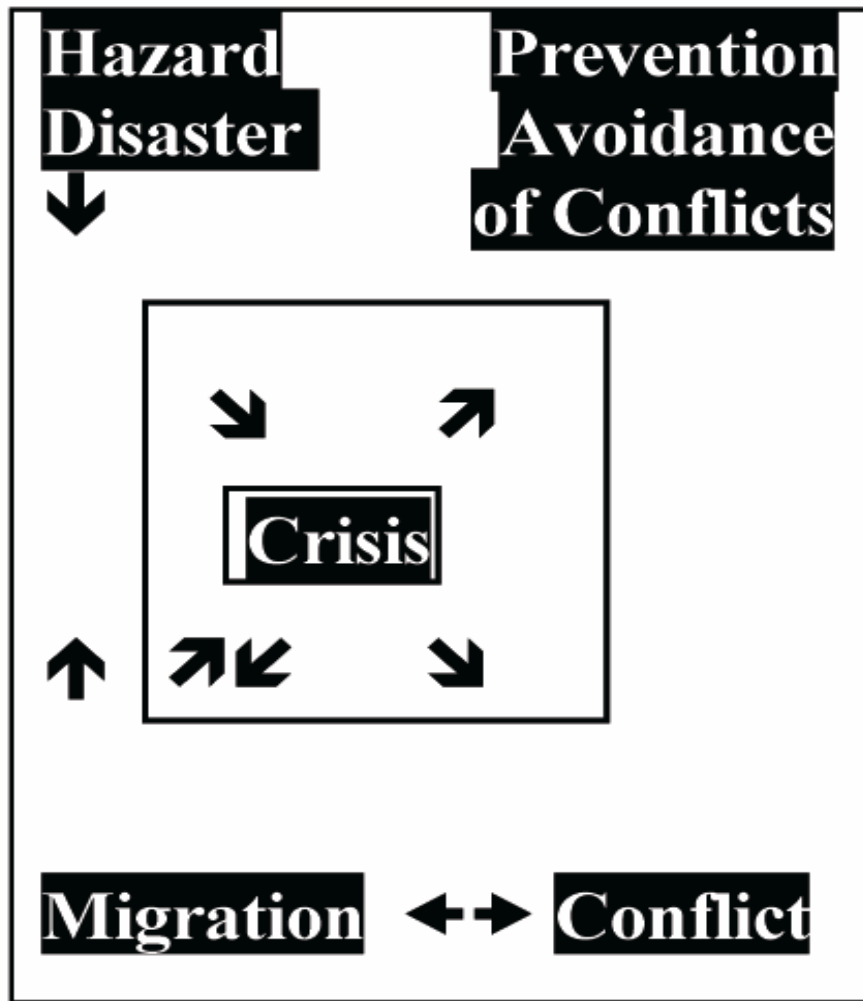
- ❖ **Air:** Global climate change
- ❖ **Soil** degrad., desertification
- ❖ **Water** scarcity, hydrol. cycle

Human-induced factors Demand Side

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

Six Contextual Factors

5.3. PEISOR: Impact (Hazard/Disaster), Societal Outcomes (Migration, Crises & Conflicts) and Policy Response



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

Dual Scientific & Policy Goal

- **Reduce vulnerability and hazard impact**
- **Avoid extreme societal outcomes**
- **Policy response: From reactive to proactive policies**
- **Proactive Policies:** emissions reduction: Shift in consumption, **energy:** from fossil to renewable sources of energy, improved energy efficiency

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**

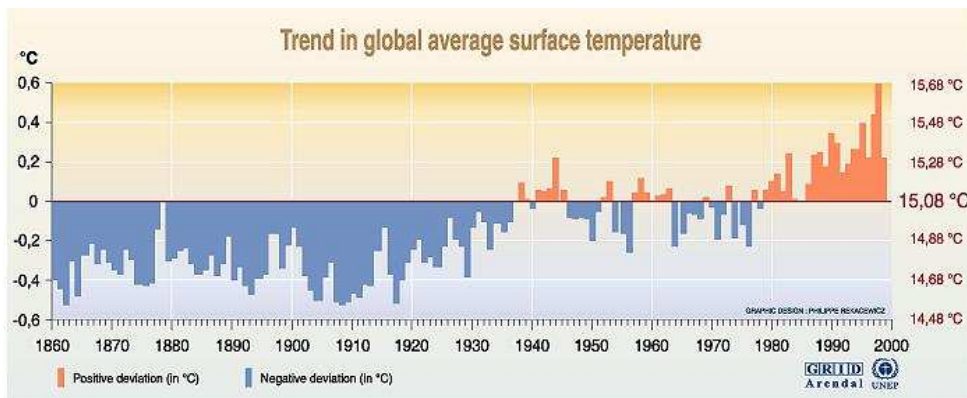
Projected temperature rise:

- ❖ AR4 (07): **+1.1-6.4 (1.8-4)°C**

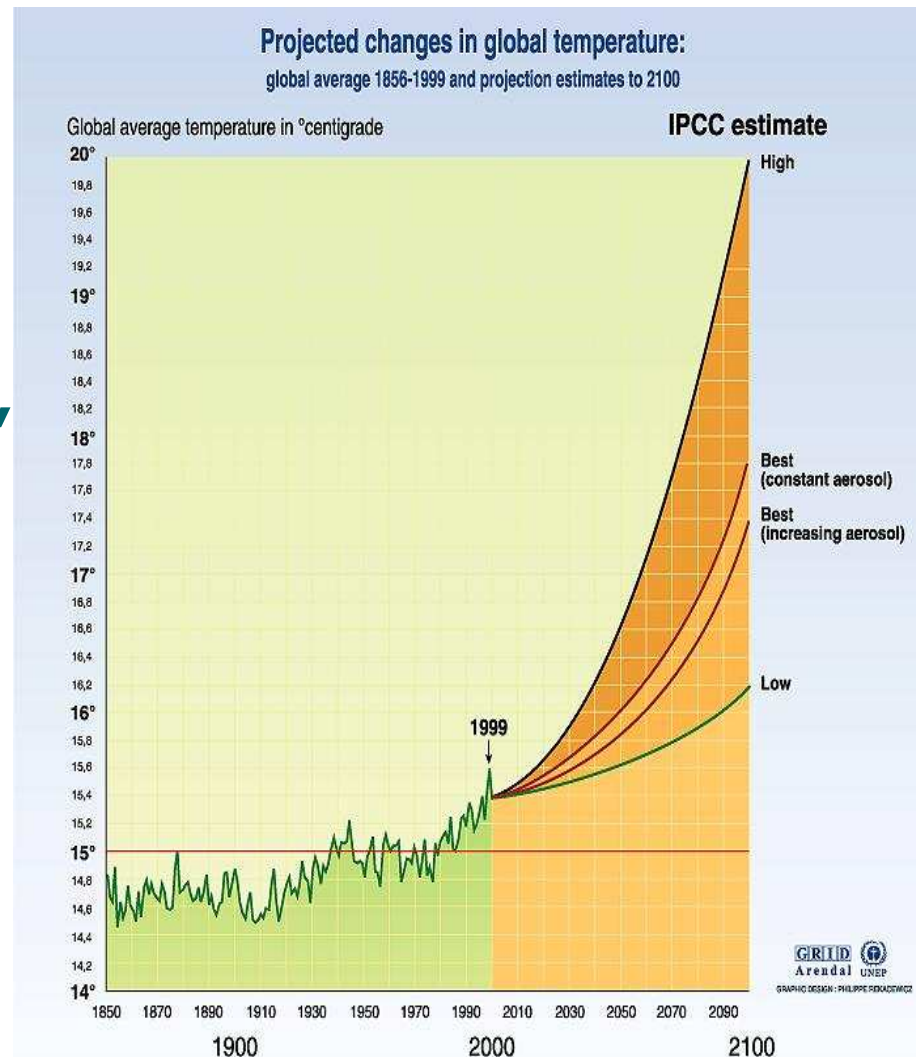
Sources: IPCC 1990,1995,2001,

Sea level Rise:

- ❖ 20th cent.: **+0,1-0,2 metres**
- ❖ AR4 (2000-2100): **18-59 cm**

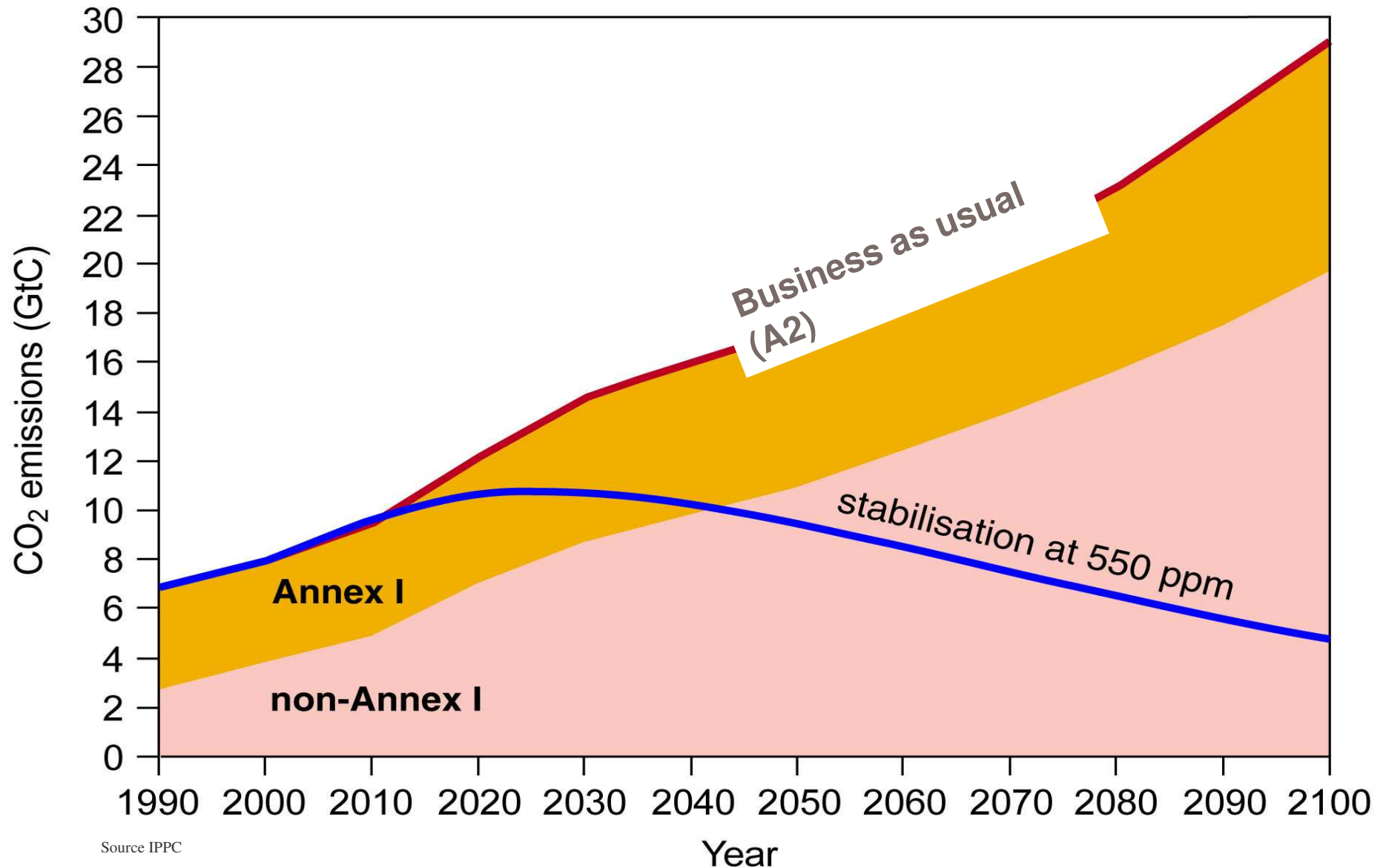


Source: School of environmental sciences, climatic research unit, university of East Anglia, Norwich, United Kingdom, 1999.



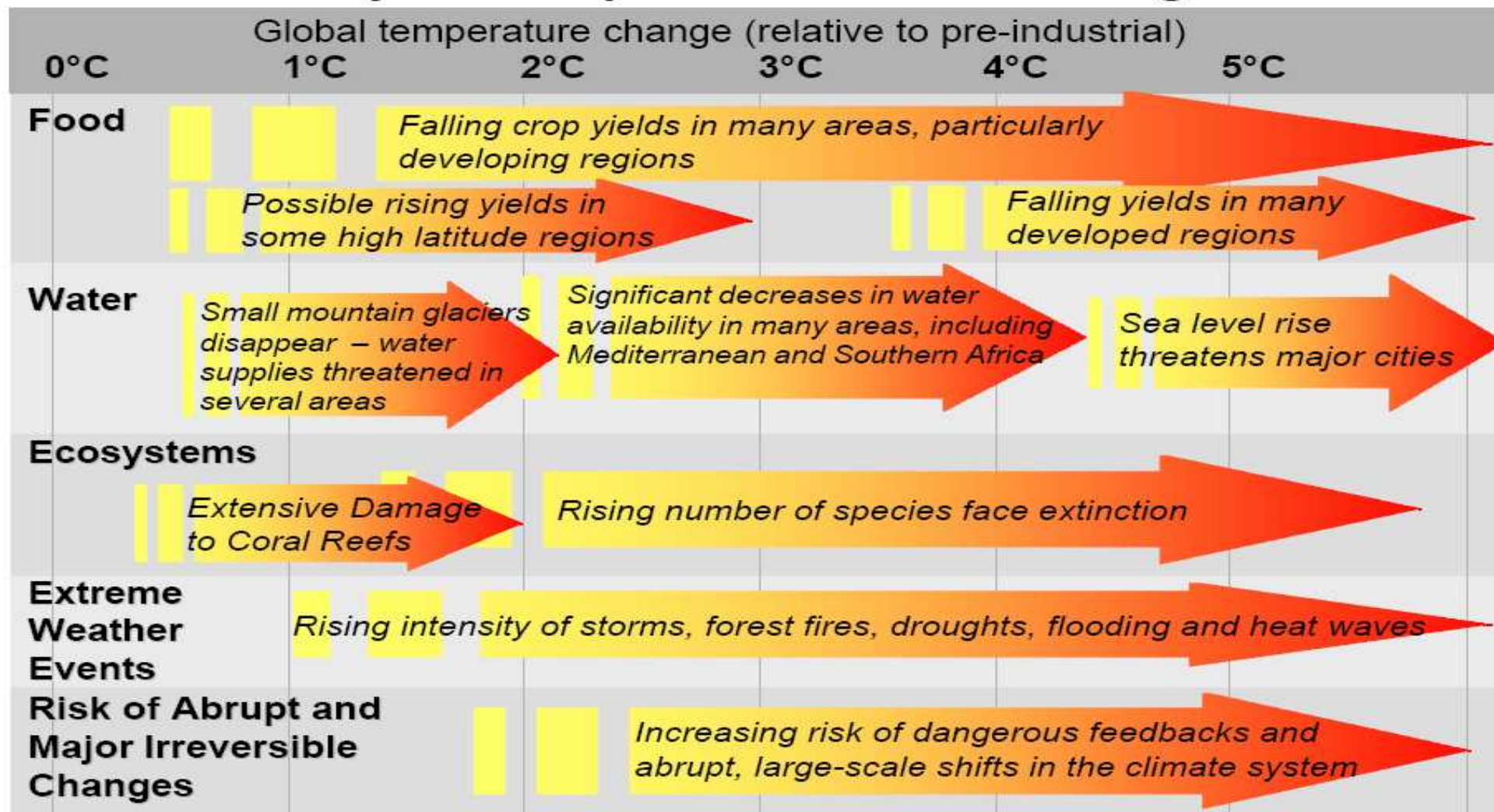
Source: 'Temperatures 1856 - 1999. Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

6.2. Projection: Stabilization at 550 ppm

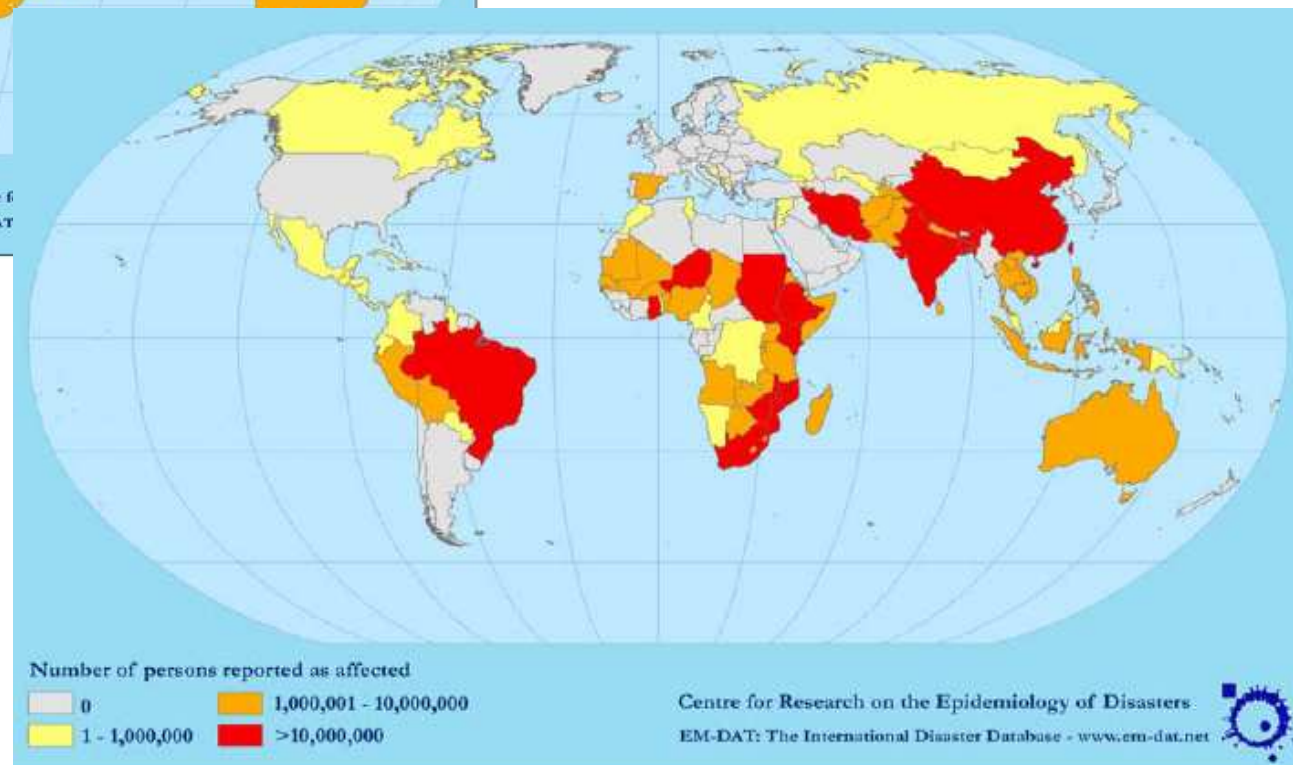
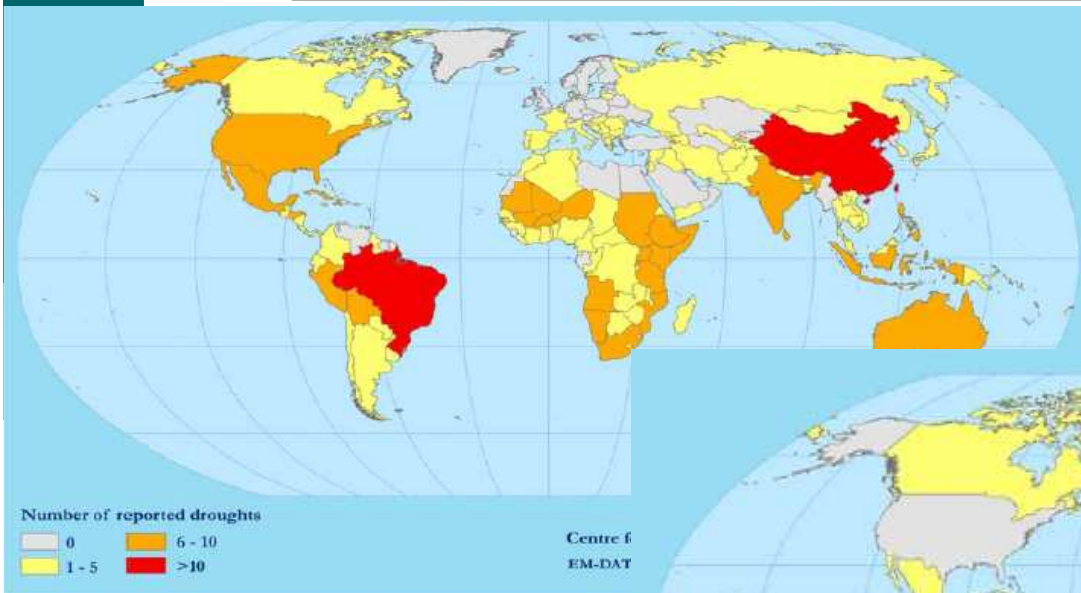


6.3. Projected Impacts of Climate Change

Projected Impacts of Climate Change

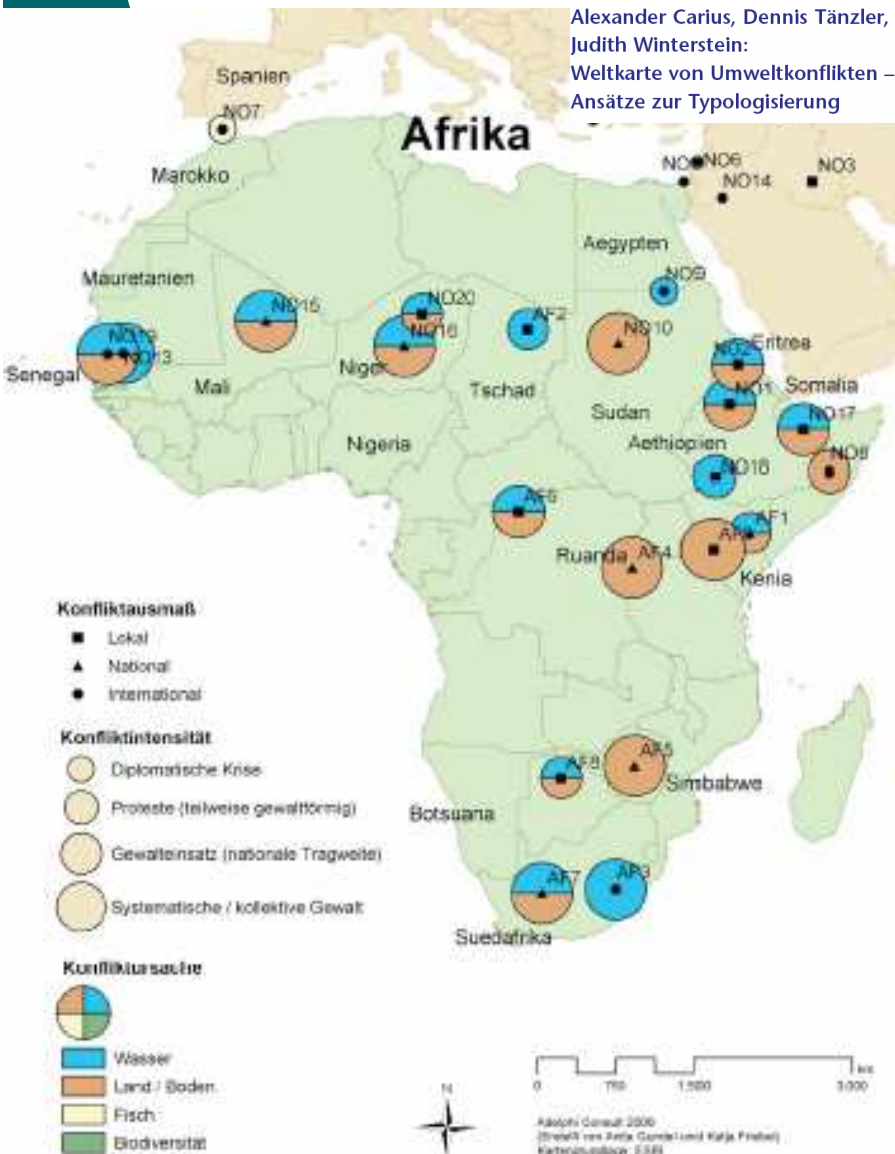


6.4. Number of Drought Disasters by Country & Affected Persons (1970-2006)

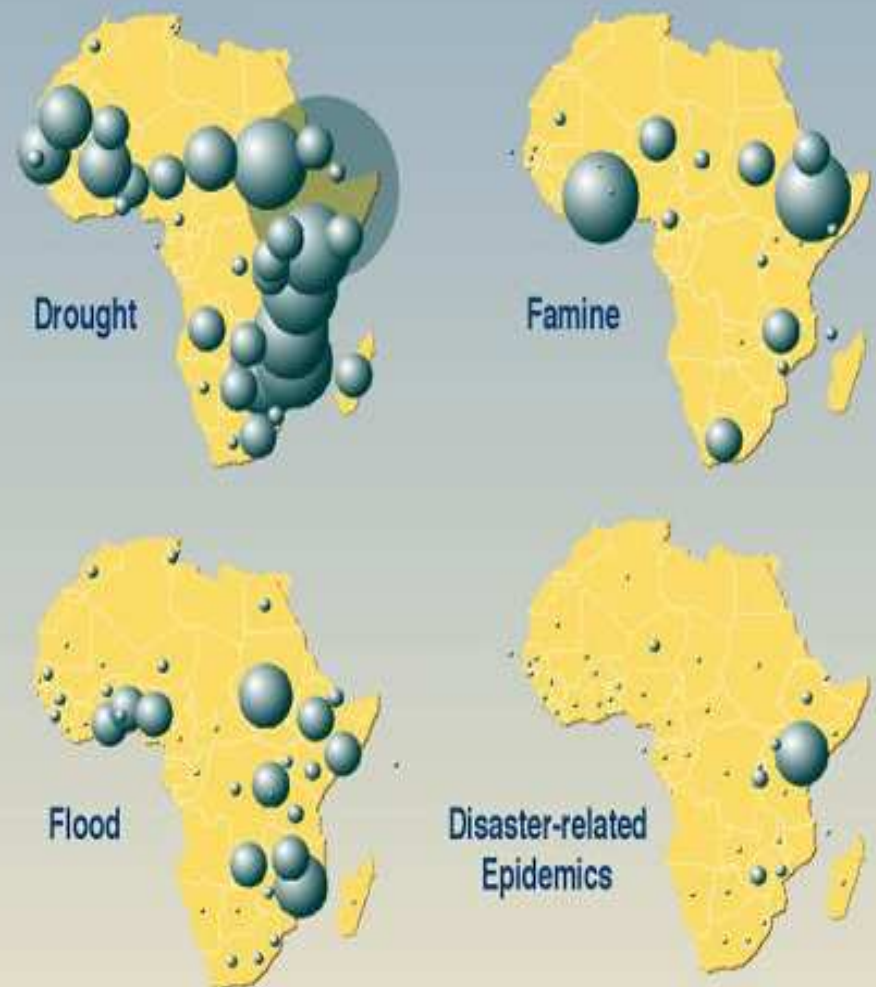


6.5. Drought, Famine and Conflicts in Africa

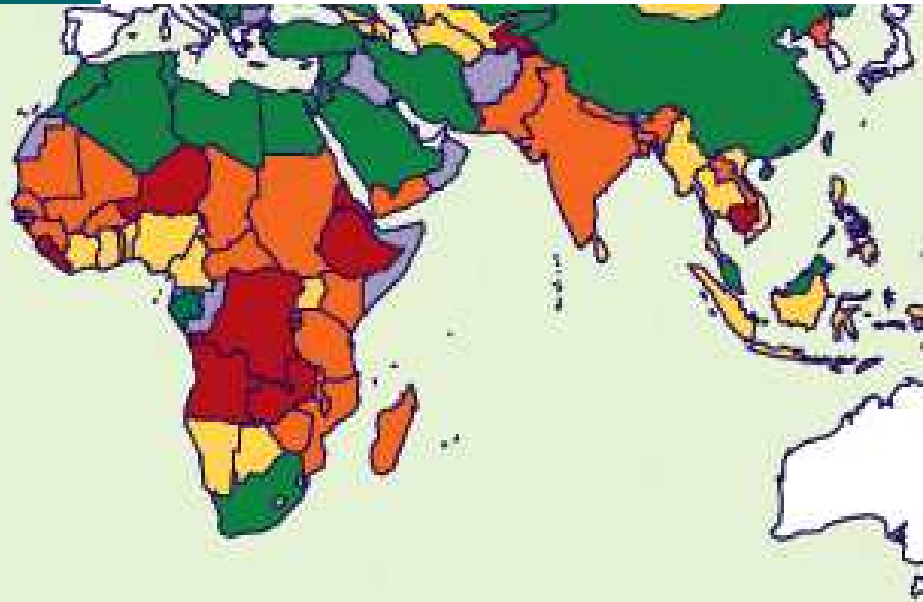
Alexander Carius, Dennis Tänzler,
Judith Winterstein:
Weltkarte von Umweltkonflikten –
Ansätze zur Typologisierung



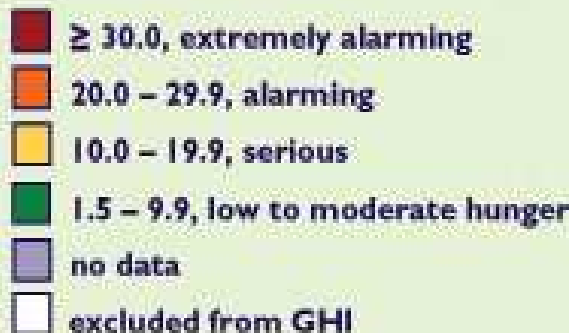
People Affected by Natural Disasters



6.6. IFRI: Global Hunger Index: Oct. 2006



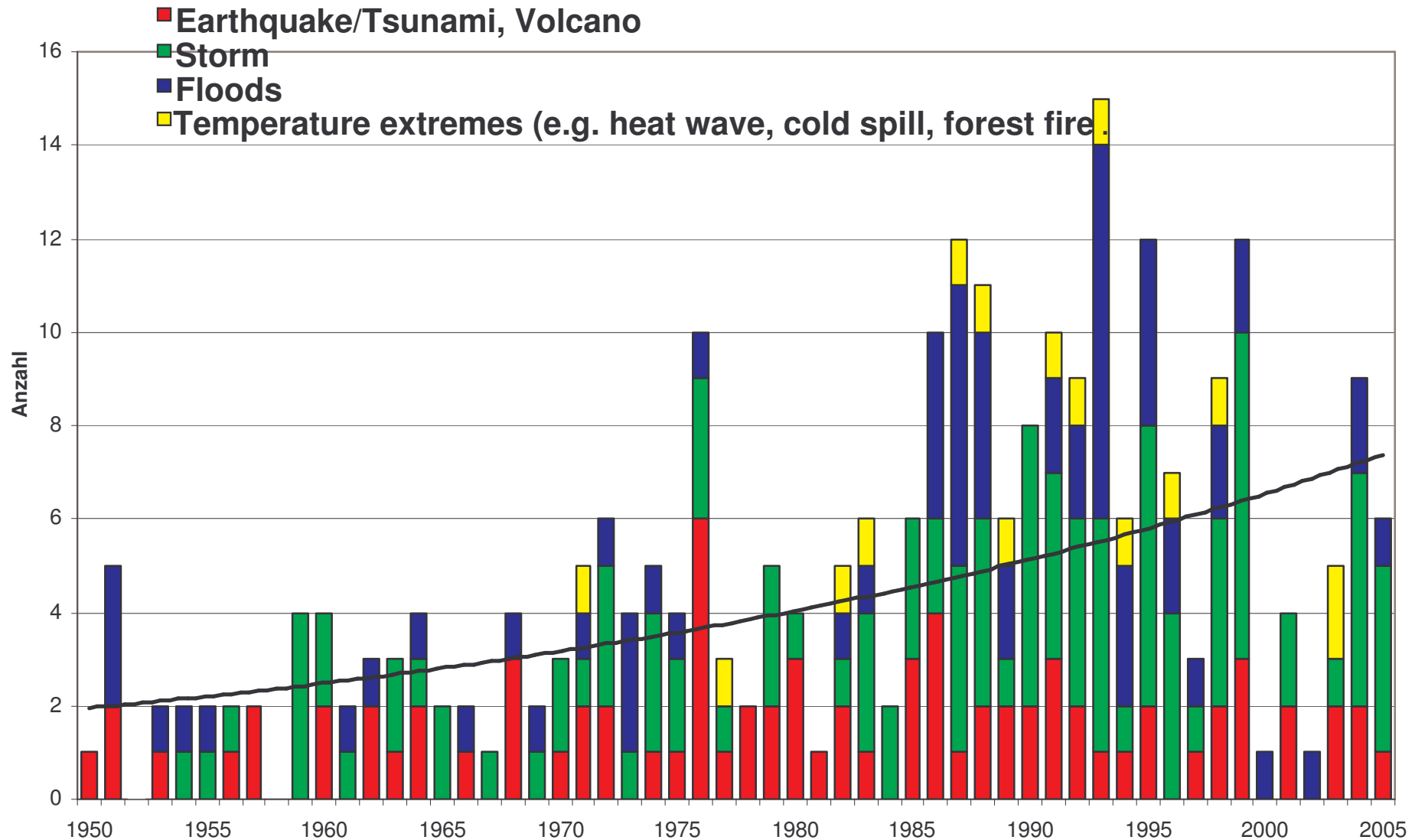
Global Hunger Index



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

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

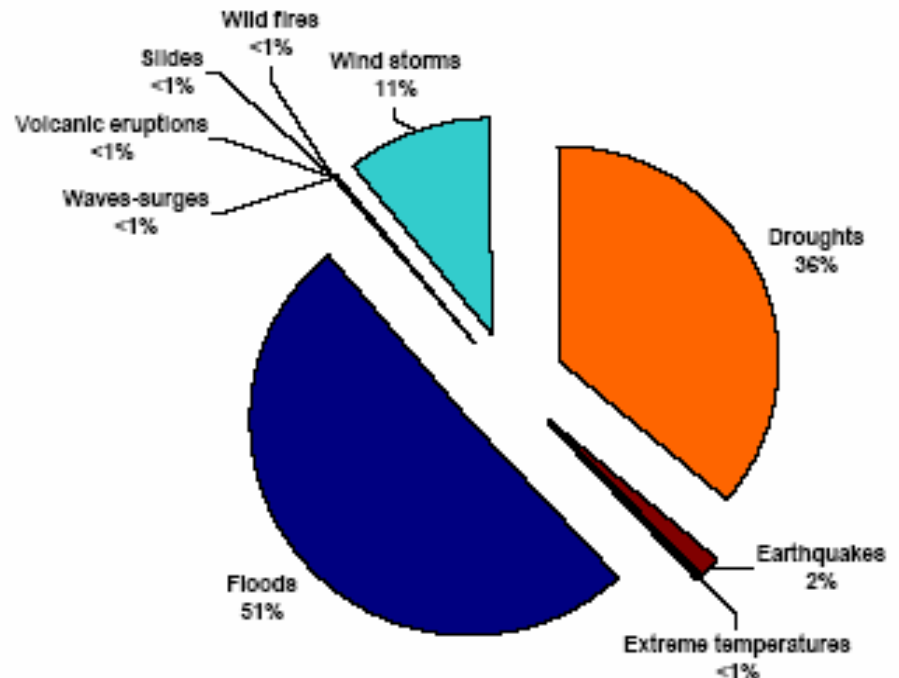
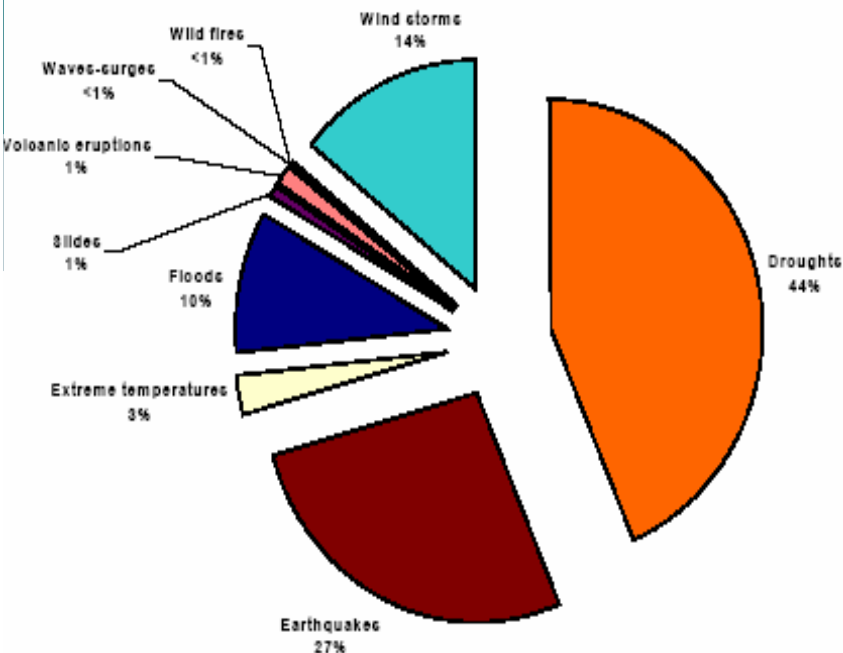
© 2006 NatCatSERVICE, GeoRisikoForschung, Münchener Rück



6.8. Impacts of Drought (1974-2003)

- **Affected persons of Natural Hazards: 5 076 494 541 .**

**Reported Death of Natural Hazards globally:
2.066.273 persons**



Source: Hoyois/Guha-Sapir (2004)

(1) injured + homeless + affected

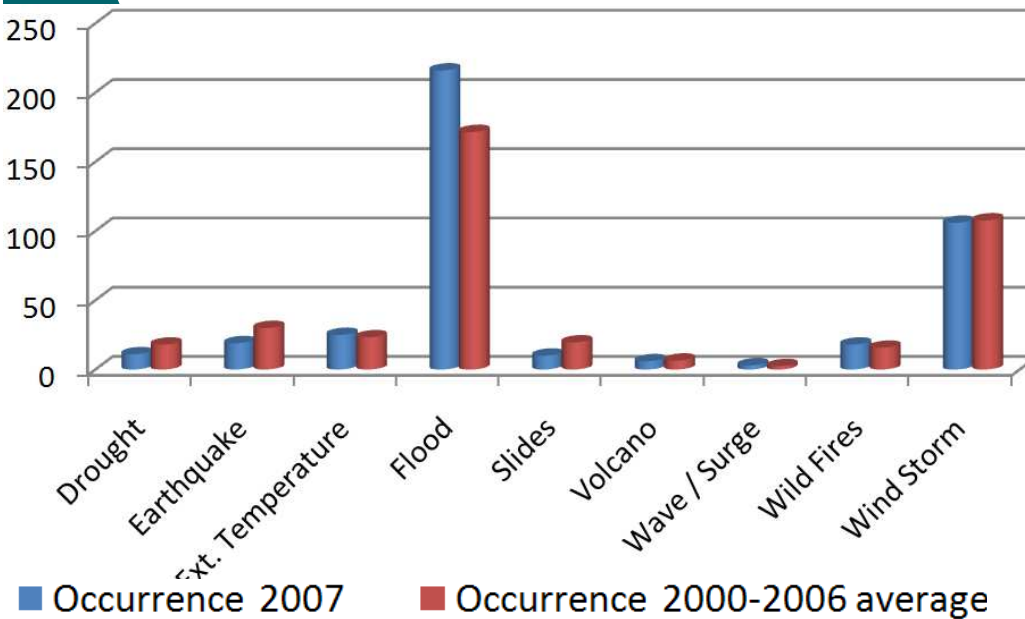
6.9. Natural Hazards in 2007 (CRED)

In 2007, 414 natural disasters by in the EM-DAT database.

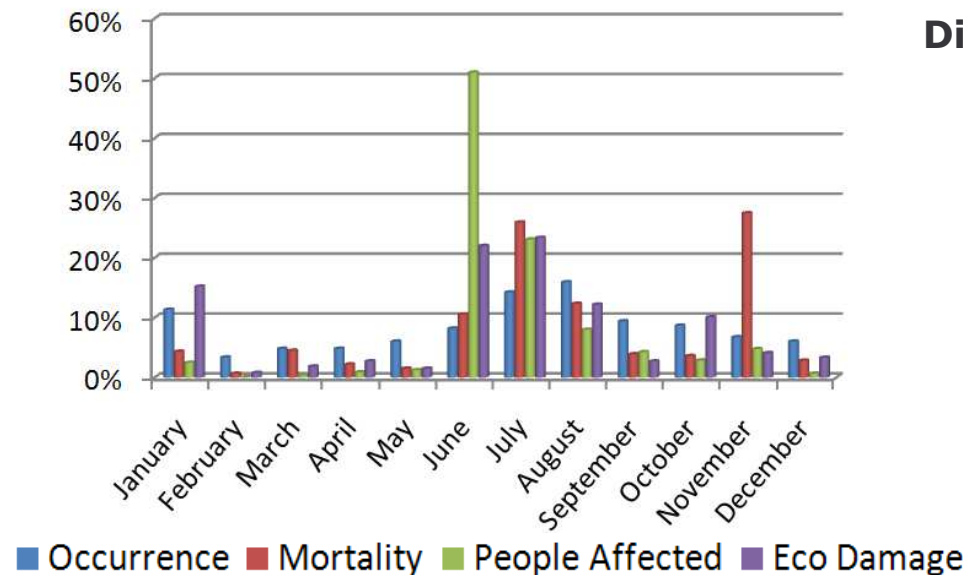
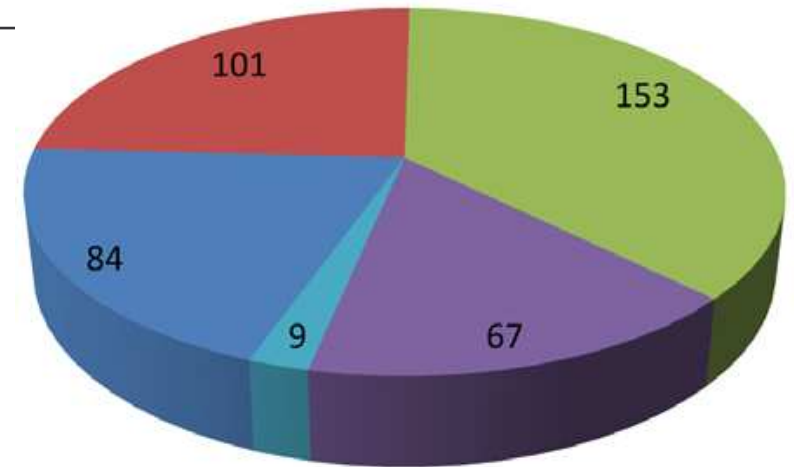
- They killed: 16.000 people, affected over 234 million others
- They caused almost 75 US\$ billion in economic damages.
- Reduction in disaster mortality.
- Floods windstorms: key source of casualties & econ. damages.
- 86% of the overall mortality
- accounted for more than 98% of total affected.

No. of people Affected (million)		Economic impact (US\$ billion)	
China	120.11	Japan	13.,8
India	38,14	UK	9.6
Bangladesh	22,93	US	9.4
Zimbabwe	2,12	China	8.0
Philippines	2.02	Germany	5.5
Mexico	1,86	Oman	3.9
Pakistan	1,65	Mexico	3.6
Vietnam	1,65	Banglad.	2.4
Colombia	1.61	Peru	2.0
zambia	1.55	Pakistan	1.9

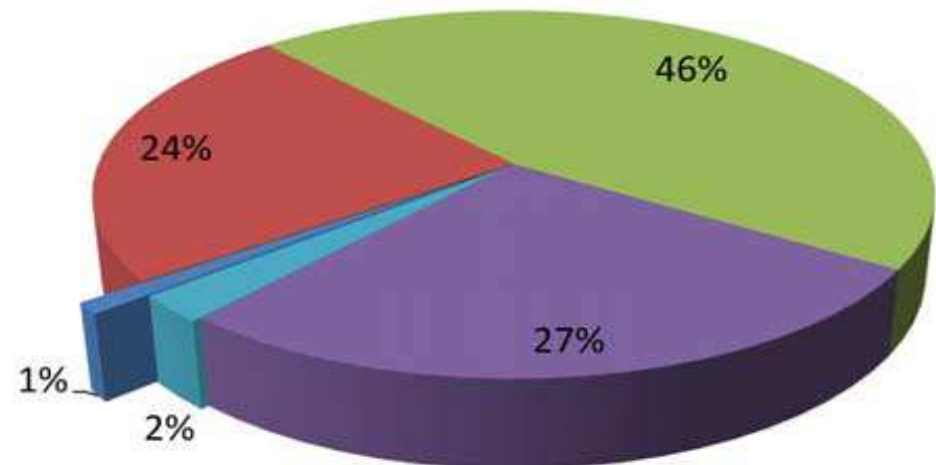
6.10. Natural Hazards in 2007 (CRED)



Disaster occurrence by region, 2007



Disaster economic damages by region, 2007





6.11. 10 Natural Hazards in Mexico (1900-2008) (Source: CRED: number of people killed)

Disaster	Date	Killed
Earthquake	19-Sep-1985	9,500
Flood	1959	2,000
Volcano	1949	1,000
Wind Storm	27-Oct-1959	960
Flood	12-Sep-1999	636
Wind Storm	1-Oct-1976	600
Wind Storm	28-Sep-1955	500
Earthquake	28-Aug-1973	500
Wind Storm	12-Nov-1961	436
Extreme Temperature	30-Apr-1990	380



6.12. Natural Hazards in Mexico

(Source CRED: number of people affected) 11 April 2008

Disaster	Date	Total Affected
Earthquake	19-Sep-1985	2,130,204
Wind Storm: Rita	1-Oct-2005	1,954,571
Flood	28-Oct-2007	1,600,000
Wind Storm: Wilma	19-Oct-2005	1,000,000
Wind Storm	8-Oct-1997	800,200
Flood	12-Sep-1999	616,060
Wind Storm	20-Sep-2002	500,000
Wind Storm	15-Jul-1976	300,000
Wind Storm	1-Oct-1976	276,400
Wind Storm	August 1967	271,000



6.13. Natural Hazards in Mexico

(Source CRED: economic damage costs), 11 April 2008

Disaster	Date	Damage US\$ (000's)
Wind Storm	19-Oct-2005	5,000,000
Earthquake	19-Sep-1985	4,104,000
Flood	28-Oct-2007	3,000,000
Wind Storm	1-Oct-2005	2,500,000
Wind Storm	22-Jun-1993	1,670,000
Wind Storm	10-Oct-1995	1,500,000
Drought	May-1996	1,200,000
Wind Storm	14-Sep-1995	800,000
Wind Storm	20-Sep-2002	640,000
Flood	3-Sep-1998	602,700

6.14. 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



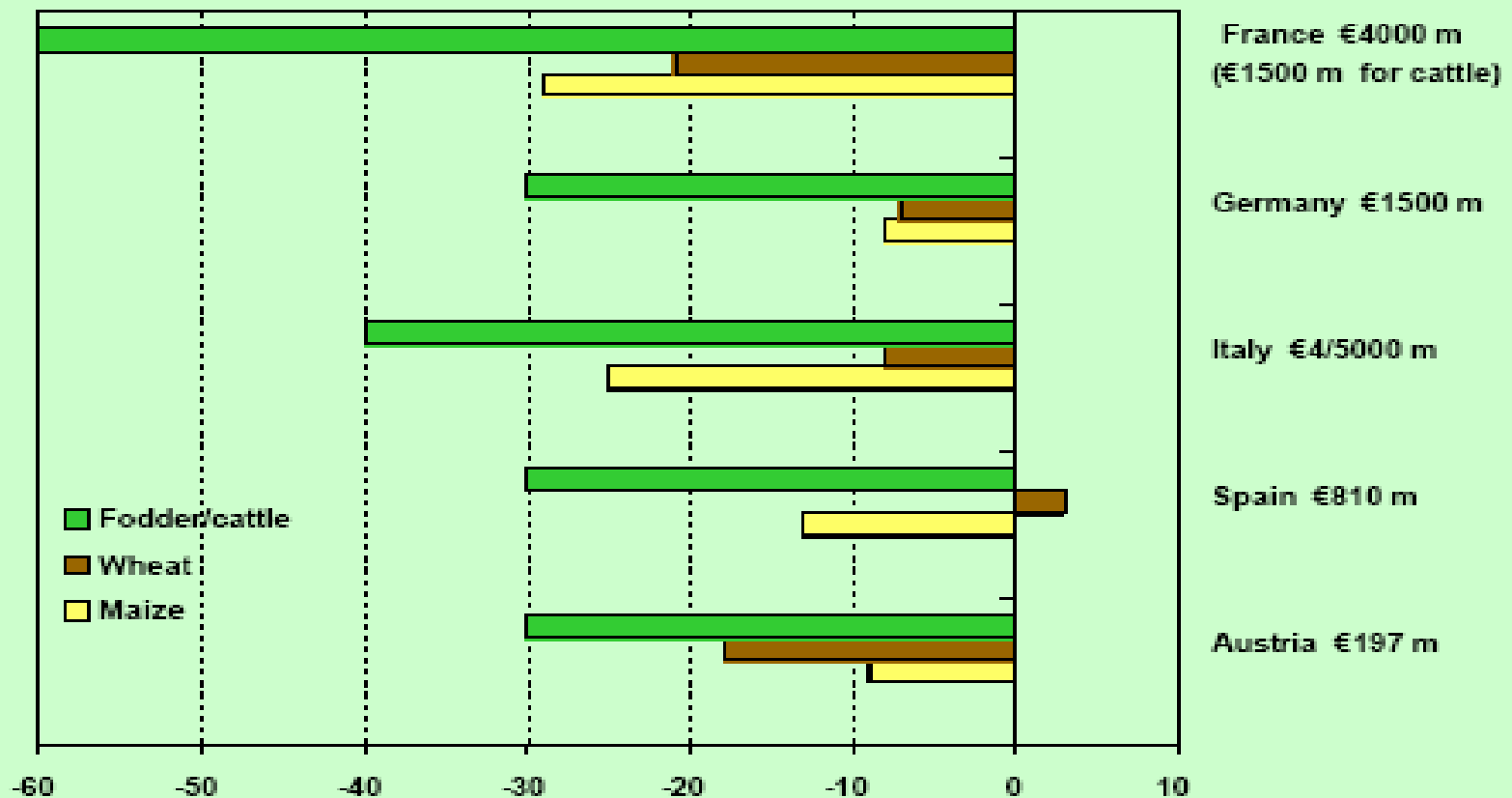
CRED CRUNCH

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

© M. Parry, Meeting of EU Agriculture/ Environment Ministers, 11.9.2005, London

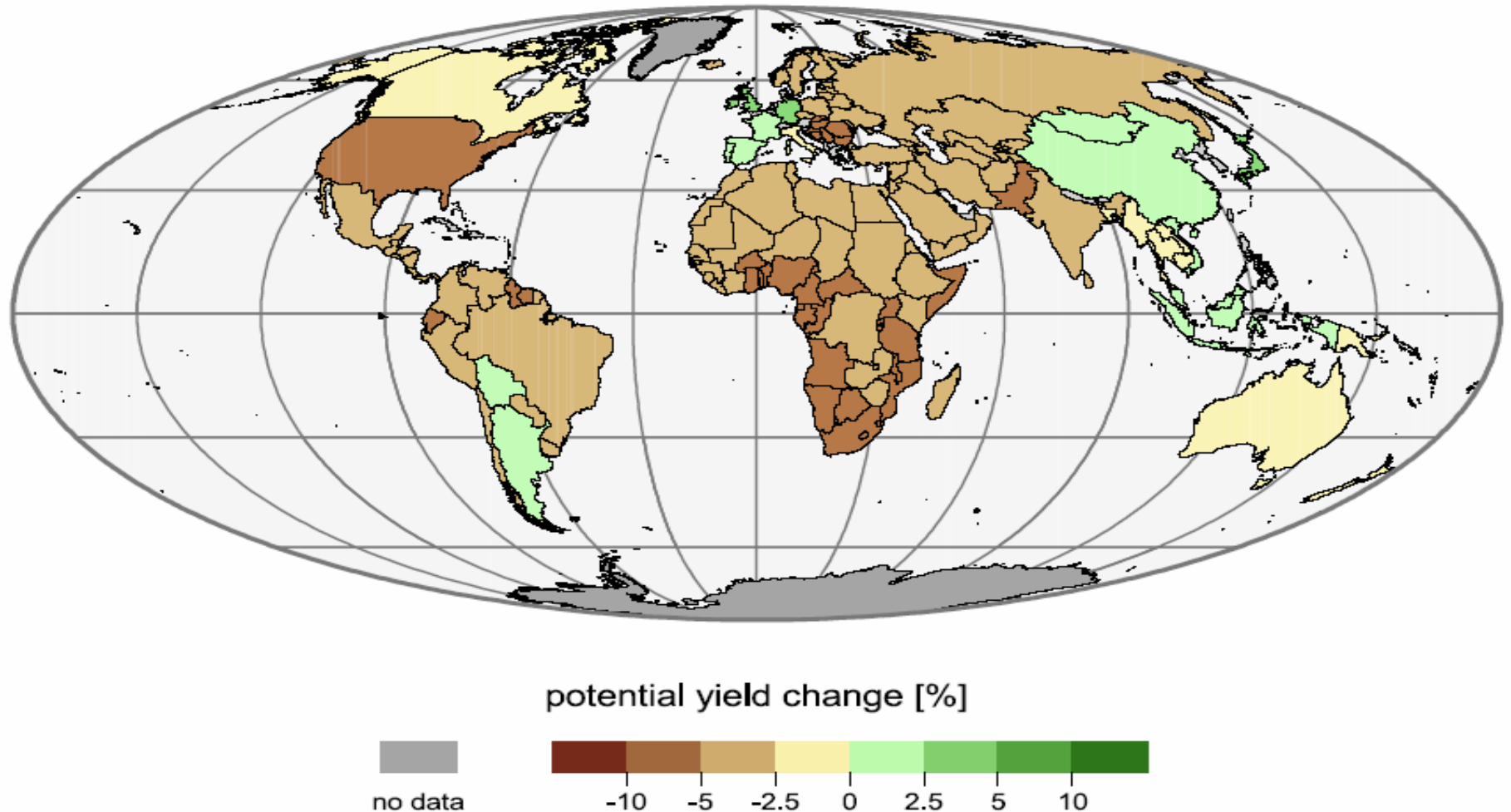
COPA

Effects of 2003 summer heat wave on EU agriculture



6.16. Food Security by 2080: Changes in Crop Yield

Food security 2070 - 2099 (HADCM3 GGa1)

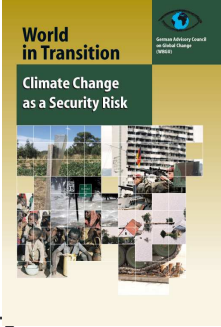


7. Climate Change as a Security Danger and Concern

- 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 (Wilma, Stan, Dean)



7.1. 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-induced migration.**
- **New conflict constellations are likely to occur.**
- **Sea-level rise; storm & floods could threaten cities & industrial regions in China, India, USA, Mediterranean, Gulf of Mex**
- **WBGU identified 4 conflict constellations in 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 due to climate change.
 3. **“Climate-induced increase in storm and flood disasters”.**
 4. **“Environmentally-induced migration”.**

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

Schwartz/. Randall: Contract Study for DoD, Oct. 2003

Goal: *“to imagine the unthinkable – so we may better understand the potential implications on United States national security.”*

- CNA: *National Security & the Threat of Climate Change* (April 2007): Climate change can act as a threat multiplier for instability in some of the most volatile 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*

7.5. Climate Change as a Problem of Human Security

- **Global Environmental Change and 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
- **Policy 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 threat: 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)
- **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 trigger proac-tive policies to face climate change impacts and to cope with them by adaptation and mitigation what requires knowlege and technology sharing.**
- Creation of Knowledge is the task of universities, of research community and students
- Communication of Knowledge: task of universities & media

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 degradation, water pollution & scarcity: develop and implement 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), 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 Al Gore Jr. **for their efforts to build up and disseminate greater knowledge about man-made climate change, lay the foundations for the measures that are needed to counteract such change.**

- Extensive climate changes may alter and threaten the living conditions of much of humankind. 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.
- 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: knowledge 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!

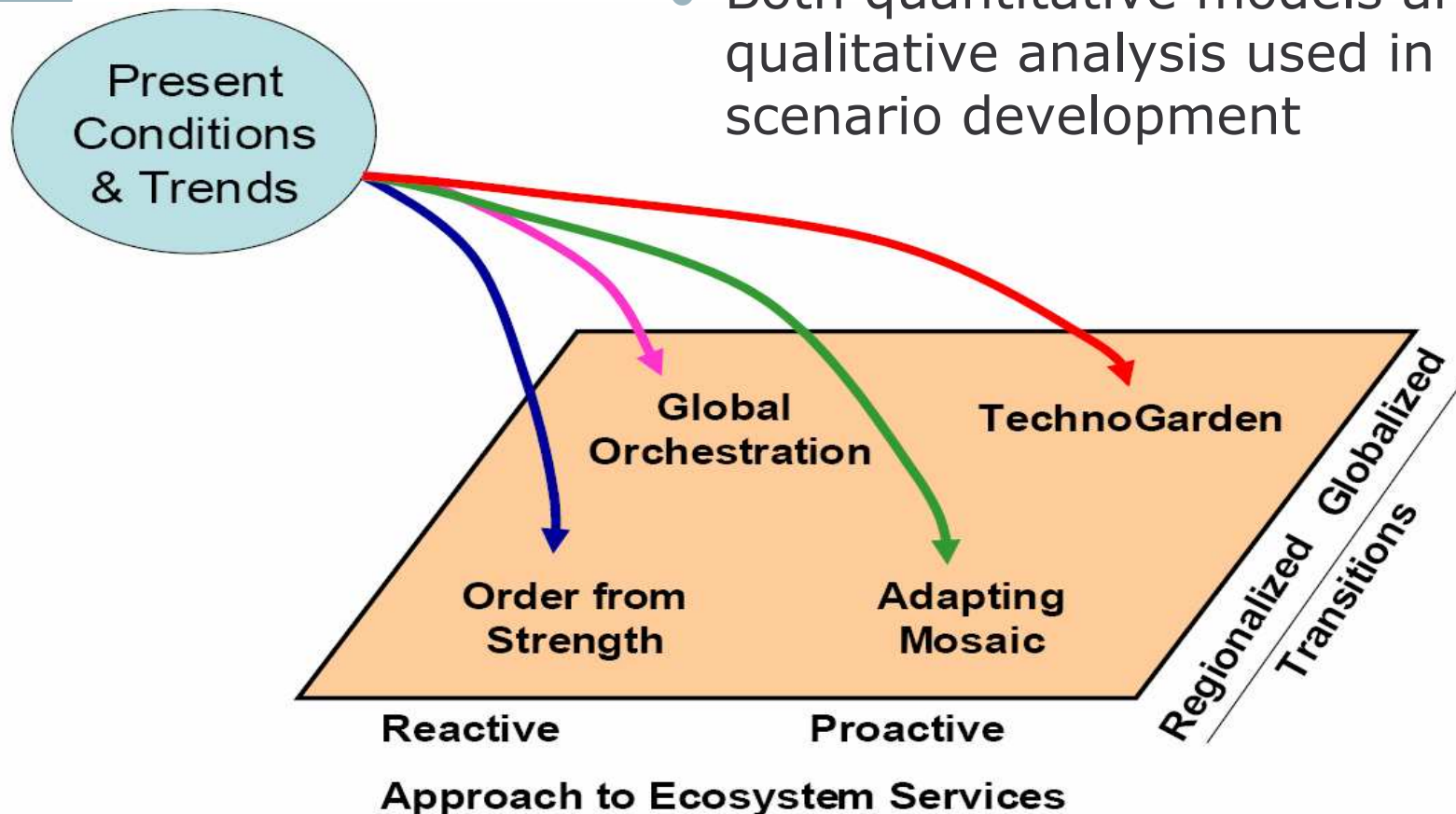
8.4. Towards Proactive Policy Responses

Millennium Ecosystem Assessment (MEA), 2005:

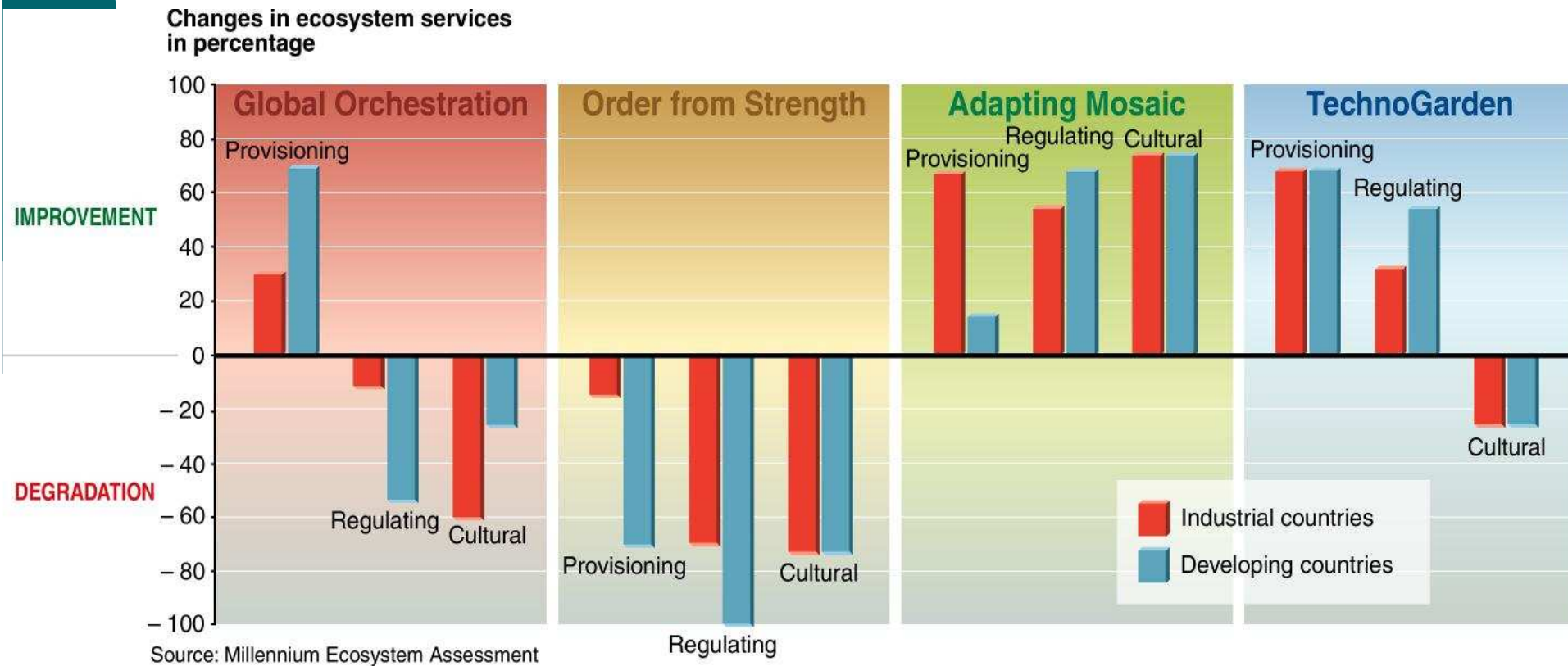
- Over the past 50 years, humans have changed ecosystems more rapidly & extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber & fuel
- The changes that have been made to ecosystems have contributed to **substantial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



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

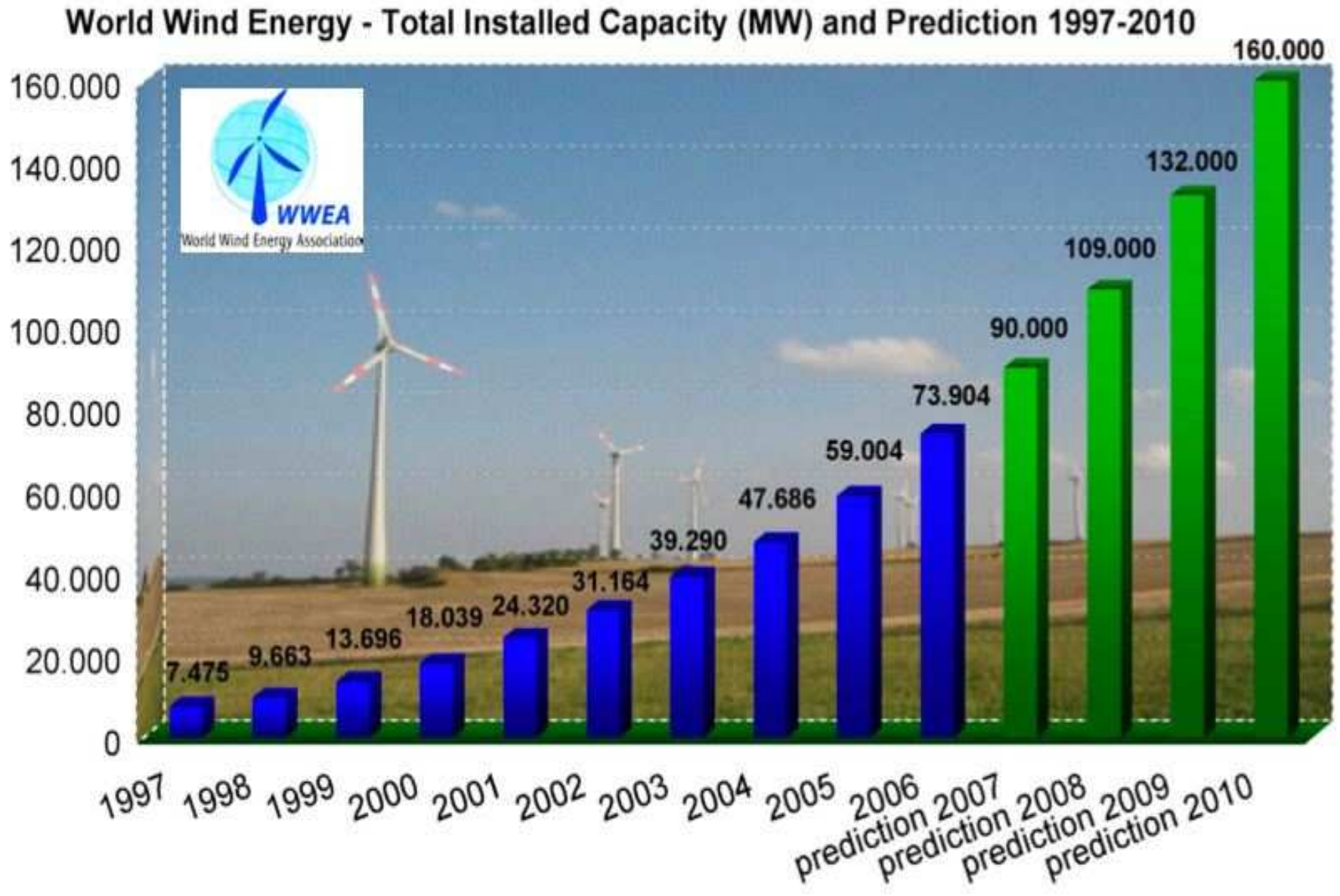
8.7. Responses: Technological

○ *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

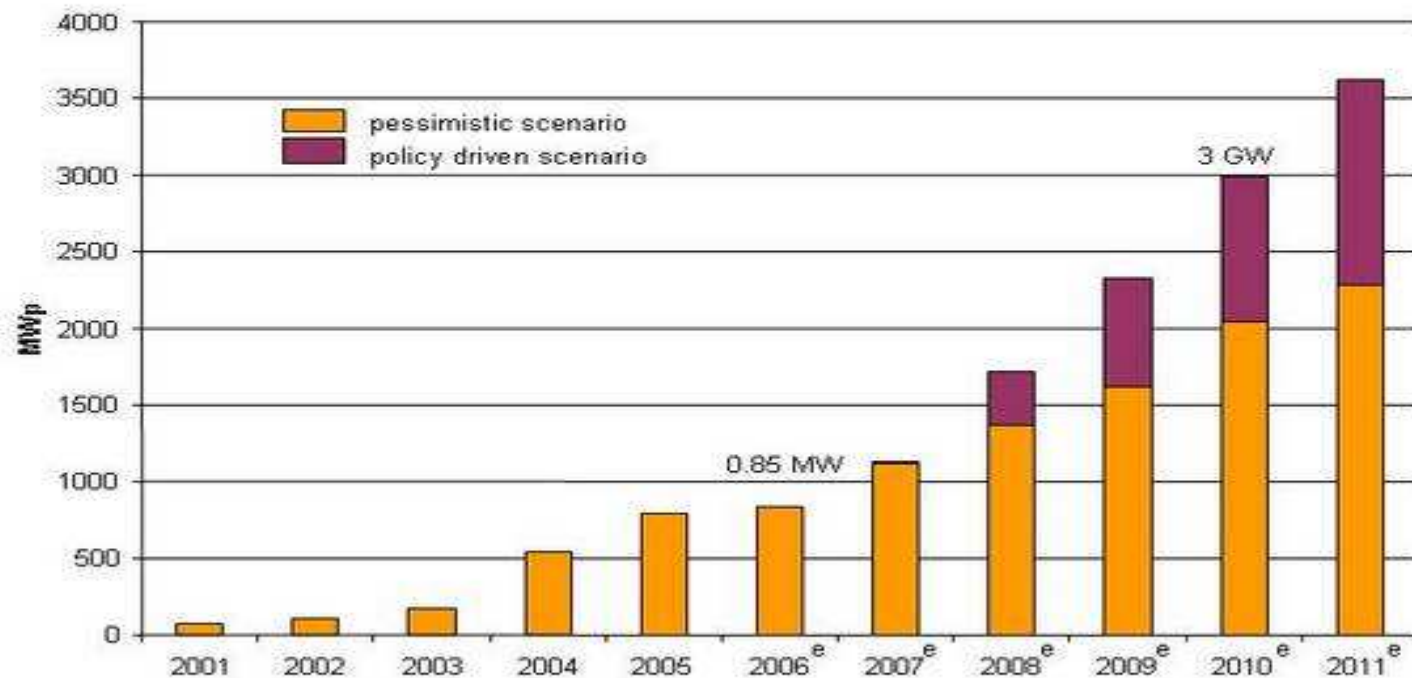
- Promotion of technologies that enable increased crop yields without harmful impacts related to water, nutrient, and pesticide use
- Restoration of ecosystem services
- **Promotion of technologies to increase energy efficiency and reduce greenhouse gas emissions**

8.8. Growth in Wind Power (1997-2006)

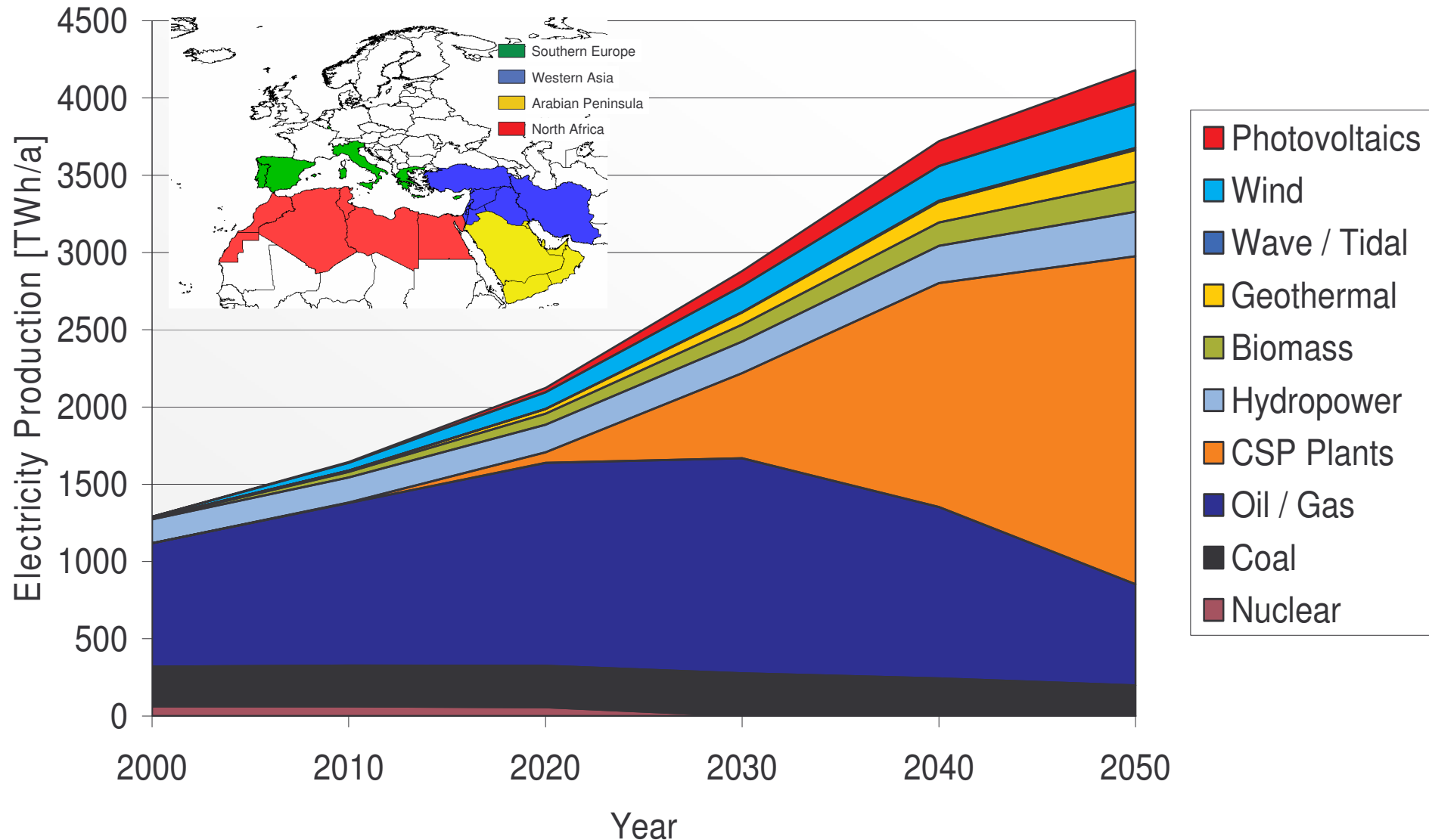


8.9. Photovoltaic Installations in EU-25

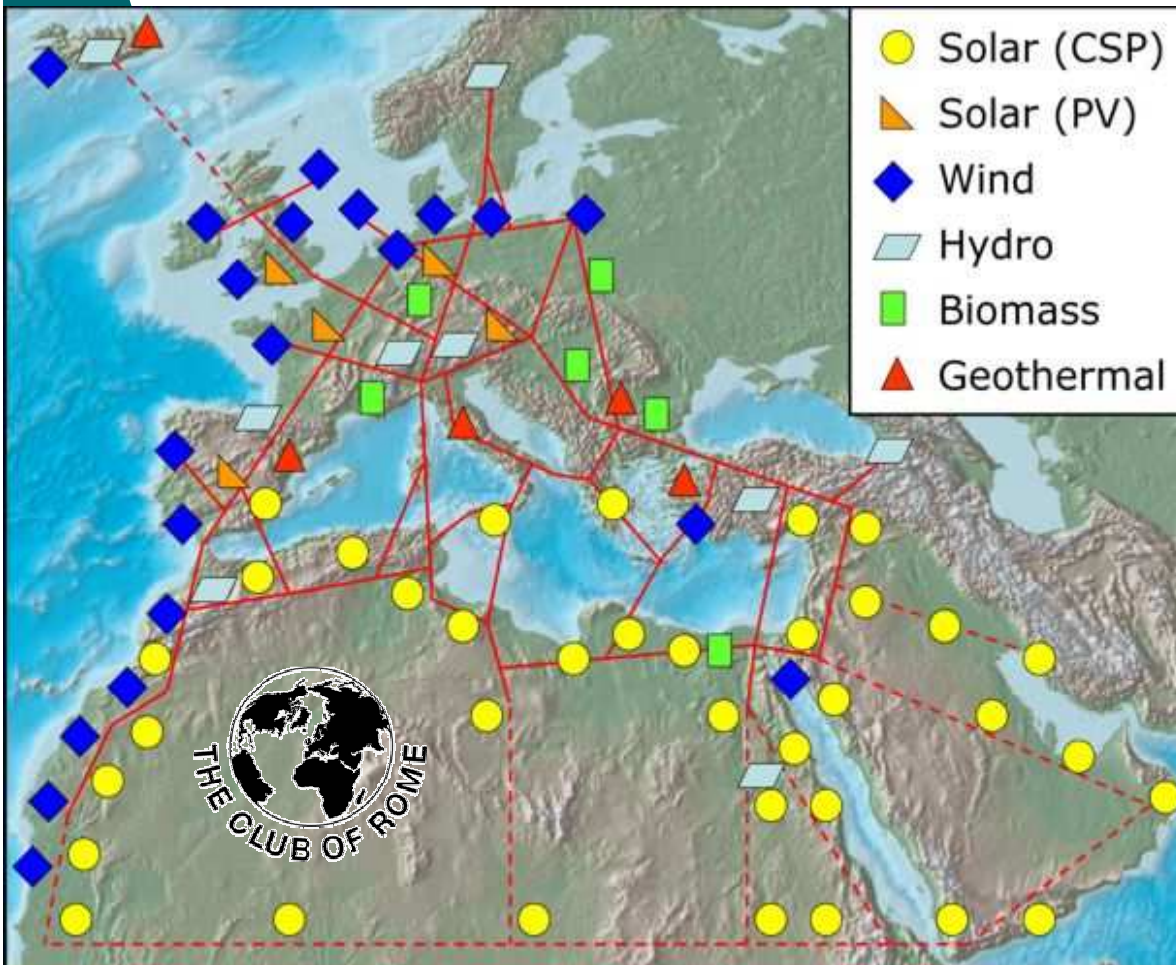
EU - 25 Annual Installations of PV



8.10. Annual electricity demand & generation in the countries analyzed in the MED-CSP scenario



8.11. Mediterranean Renewable Energy Potential



Concentrating Solar Thermal Power (CSP):

- Solar heat storage for day/night operation
- Hybrid operation for secured power
- Power & desalination in cogeneration

Sketch of High-Voltage Direct Current (HVDC) grid: Power transmission losses from the Middle East and North Africa (MENA) to Europe less than 15%.

Power generation with CSP and transmission via future **EU-MENA** grid: 5 - 7 EuroCent/kWh
Various studies and further information at www.DESERTEC.org

Trans-Mediterranean **Renewable Energy Cooperation (TREC)** is an initiative that campaigns for the transmission of clean power from deserts to Europe.

Since 2003 TREC has developed the **DESERTEC Concept**.

8.12. Solar Thermal Technologies for Electricity Generation in the Deserts

Concentrating Solar Power Technologies:

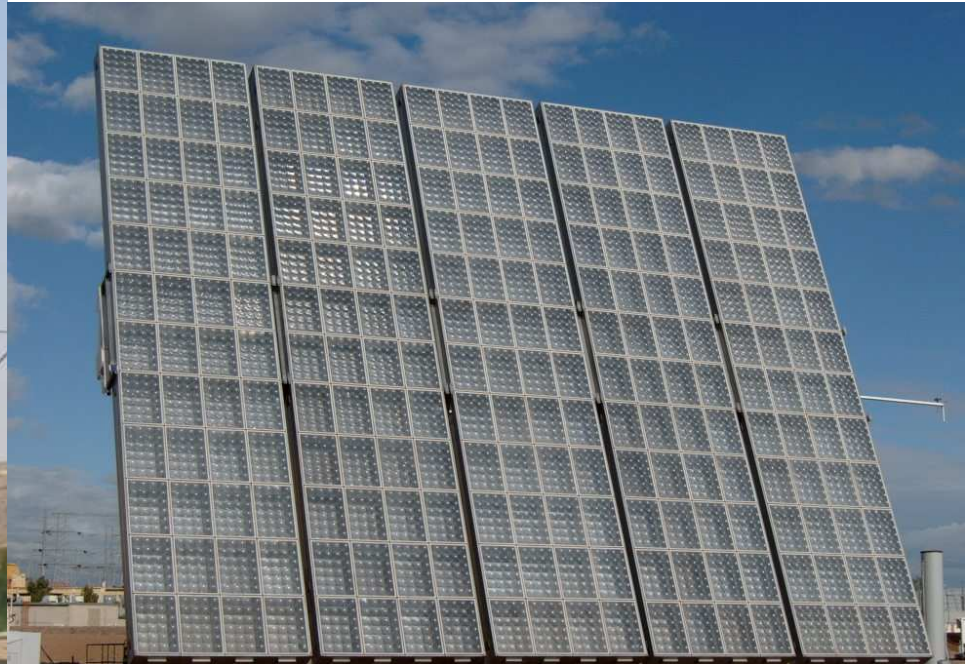
- ❖ alternatives: a) Fresnel concentrators, b) parabolic trough (400-600 °C), c) solar tower concept with surrounding heliostat field (1200 °C, up to 50 MW), d) solar dish (for small applications up to 50 kW).



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.

8.14. Mexico: World Bank Approves \$49.35 Mio. for Solar Thermal Energy (06.10.2006)

The World Bank's Board of Directors approved today a \$49.35 million grant from the Global Environment Facility (GEF) for Mexico to demonstrate the operation of a low-greenhouse-gas-emitting innov. technology.

- The Solar Thermal Project Agua Prieta II seeks to demonstrate the benefits of integrating a solar field with a large conventional thermal facility, contribute to reducing the long-term costs of the technology, and reduce global greenhouse gas emissions. The carbon emissions reduction is estimated in 391,270 tons of carbon dioxide over the 25-year economic life of the plant.
- The project will be located in **Agua Prieta, State of Sonora**, 6.3 km from the Agua Prieta City and 2 km from the borderline with the United States. It includes two components
- 1. Design and construction of a **31 MW (peak) solar field**. The heat transfer fluid is heated as it circulates through the receiver and returns to a series of heat exchangers where the heat transfer fluid is used to generate high-pressure superheated steam.
- 2. Design and construction of a **480 MW (net) gas-based thermal plant**. The superheated steam supplements steam from the heat recovery steam generator to a conventional reheat steam turbine generators to produce electricity.

8.15. Headlines in Mexico during 2008 on renewable energy policy goals

25 Feb. 2008: Energy Ministry: Within four years, Mexico wants to produce 25 percent of its electricity from renewable sources, „By 2012 renewable energy sources will account for more than a quarter of total capacity.“

An important part of that strategy will be the construction of wind farms in the Isthmus of Tehuantepec where installed capacity is expected to exceed 2,500 megawatts in 2012.

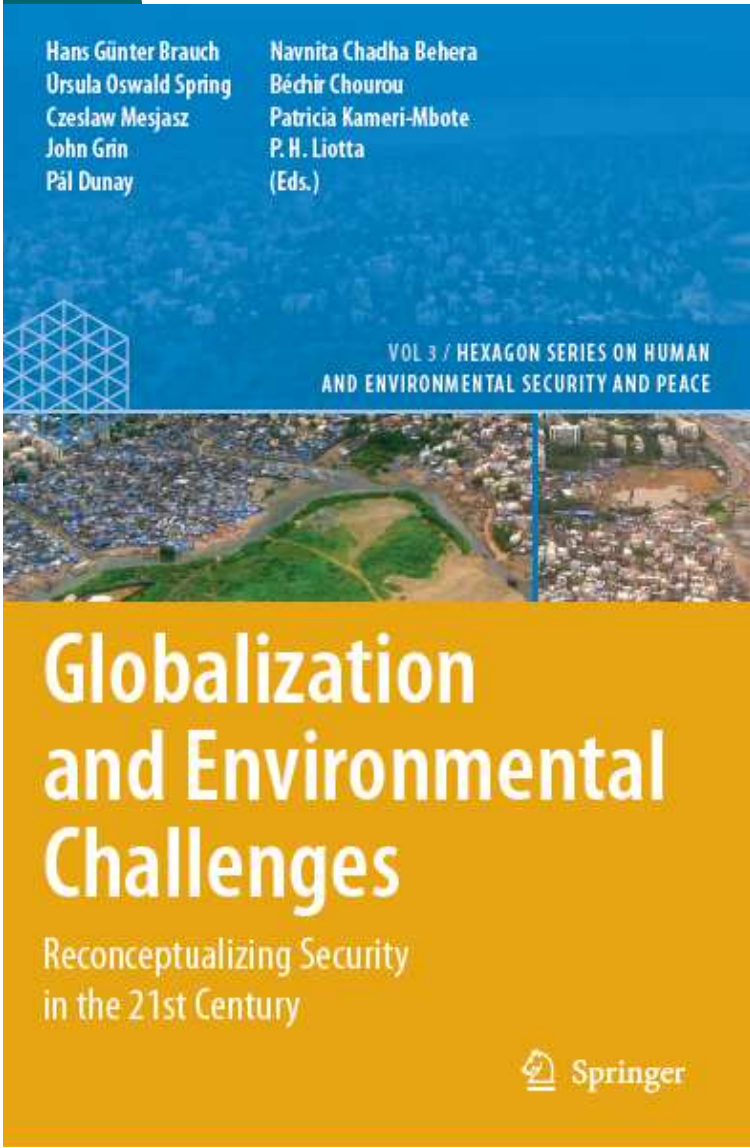
- **Energy friendly homes (12 Feb. 2008)**
 - Mexican environment minister announced that 30,000 environmentally-friendly homes are to be built by 2011. The new housing is to be equipped with smart devices like solar water heating, low-energy lighting, high-efficiency appliances and low-flow plumbing fixtures. This pioneering project is to be rolled out in subsequent years as Mexico's plan for 20 million new homes over the next 20 years starts to unfold, using new building standards to allow energy efficient construction to be applied consistently in each housing development.
- **These policy announcements need future implementation!**

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 mono-disciplinary, 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. Hexagon Series, vol. III & First volume of the Security Handbook



H.G. Brauch, J. Grin, C. Mesjaż, 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-Verlag, 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 relationship 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.

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

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

Patricia Kameri-Mbote
Navnita Chadha Behera
Béchir Chourou
Heinz Krummenacher

VOL 4 / HEXAGON SERIES ON HUMAN
AND ENVIRONMENTAL 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, Czesław 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.

A serene sunset scene over a beach. The sun is low on the horizon, casting a warm orange glow across the sky and reflecting on the wet sand. In the foreground, a large, dark, weathered piece of driftwood lies diagonally across the frame. The ocean waves are visible in the distance, and the overall atmosphere is peaceful and contemplative.

Thank you for your attention and patience.

Text for download at:
http://www.afes-press.de/html/download_hgb.html

Send your comments to:
brauch@onlinehome.de