

Climate Change, Desertification and Environmentally-Induced Migration in the Western Mediterranean: Possible Scenarios for Southern Europe and North Africa by 2020 and 2050



IOM • OIM



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1. Thematic and Regional Focus

- **Thematic focus:**

- 2 factors of Global Env. Change: Climate Change & desertification
- **One of several causes** for internal and international migration

- **Regional Focus: Western Mediterranean:**

- Maghrebian countries: Algeria, Morocco, Tunisia
- European countries; France, Italy, Spain
- Difference: Awareness, coping capacity, source & recipient countries

- **Policy Context:**

- **IPCC: Fourth Assessment Report: Very likely human impact (90%)**
- **WBGU Study (2007); EU Study: Climate Change & Security (March 2008)**
- **Barcelona Process (1995) and Mediterranean Union (2008):** Migration was the major political stimulant

- **Own Work Context:**

- Conceptual work on environmental and human security:
- Keynote Speech in Almeria (2006)
- WBGU Expert Study: Security Risk Climate Change (2006)
- Chapter for: vol. V (2009): Coping with Global Environmental Chang

1.1. Common Environmental Challenges in the Western and Eastern Mediterranean until 2100



Mediterranean coastal zone

- vulnerable to rapid onset hazards: drought & forest fires, storms, flash floods, mudflows;
- vulnerable to slow onset hazards: sea-level rise and temperature increase (climate change)

Ecological Commonality:

- Climate change (extreme weather events: hazards) ↓
- Soil erosion & ↑ desertification ↓
- Water: precipitat. ↑
(scarcity, degradation, drought, forest fire)

Socio-econ. differences

- Population growth
- Urbanisation
- Food needs

North/South difference:

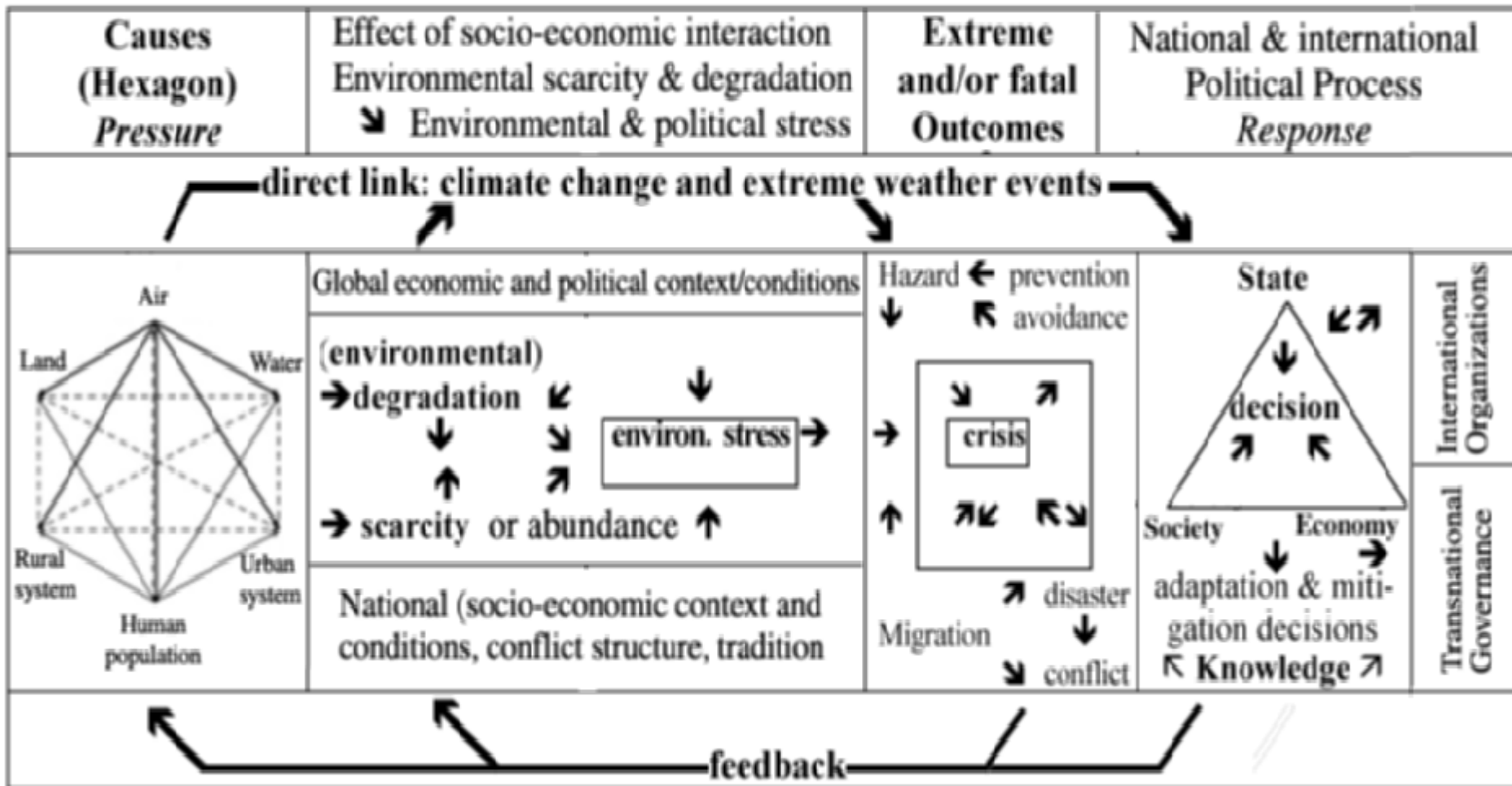
- Social vulnerability
- Resources and
- Coping capacity

Common tasks

2. Environmentally-Induced People's Movements: Internal Displacements & (Inter)national Migration

- **Environmentally-Induced People's Movement**
 - One of several push factors: besides socio-economic & political trigger and pull factors
 - **Environmentally-Induced Internal Displacement**
 - temporary, long-lasting, permanent
 - **Environmentally-Induced Migration**
 - Urbanization (from rural to urban centres)
 - Emigration: within the region or transregional
 - **Causes: Environmental Pollution & Natural Hazards**
 - Rapid: natural hazards: hydro-meteorological: drought & heat waves, floods, land-slides
 - Creeping: 1) climate change, 2) water scarcity, degradation, stress and 3) drought and desertification

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



4. Climate Change

Temperature Increases & Sea Level Rise (IPCC, III: 2001, IV: 2007)

Climate Change Impacts: Temperature & Sea level Rise

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

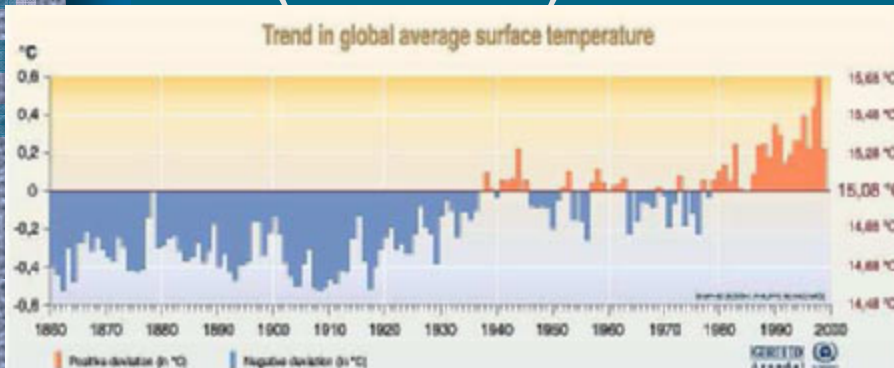
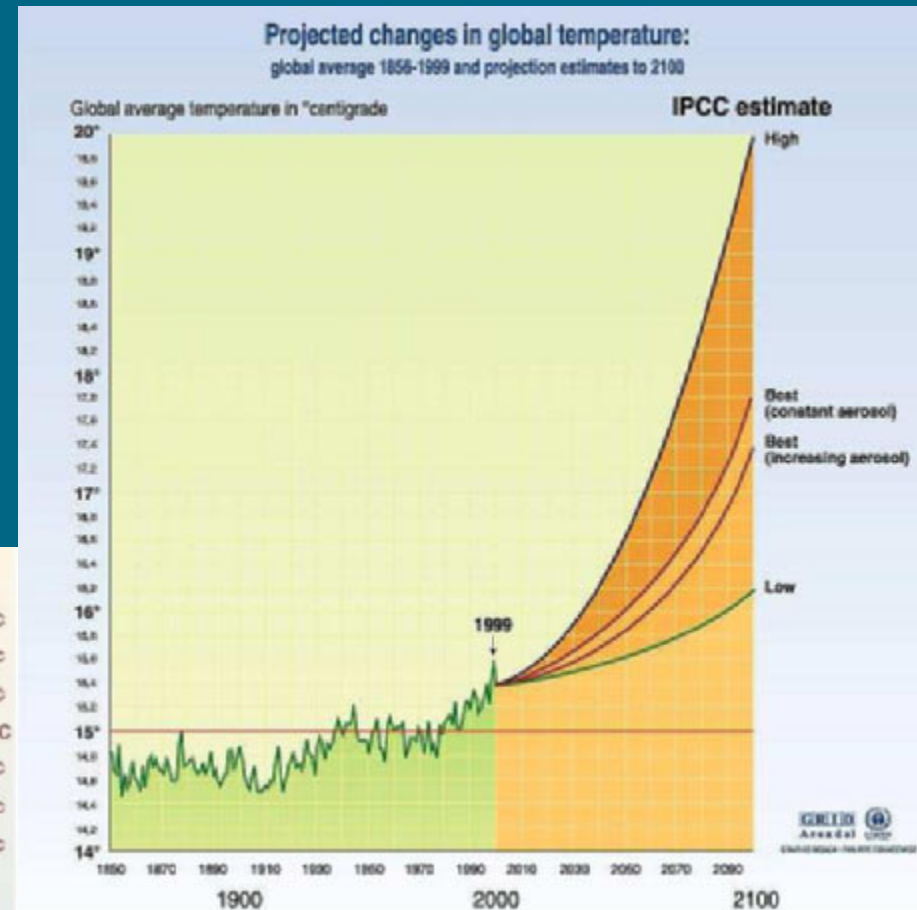
Projected temperature rise:

- ❖ **TAR (1990-2100): +1.4-5.8°C**
- ❖ **AR4 (07): +1.1-6.4 (1.8-4)°C**

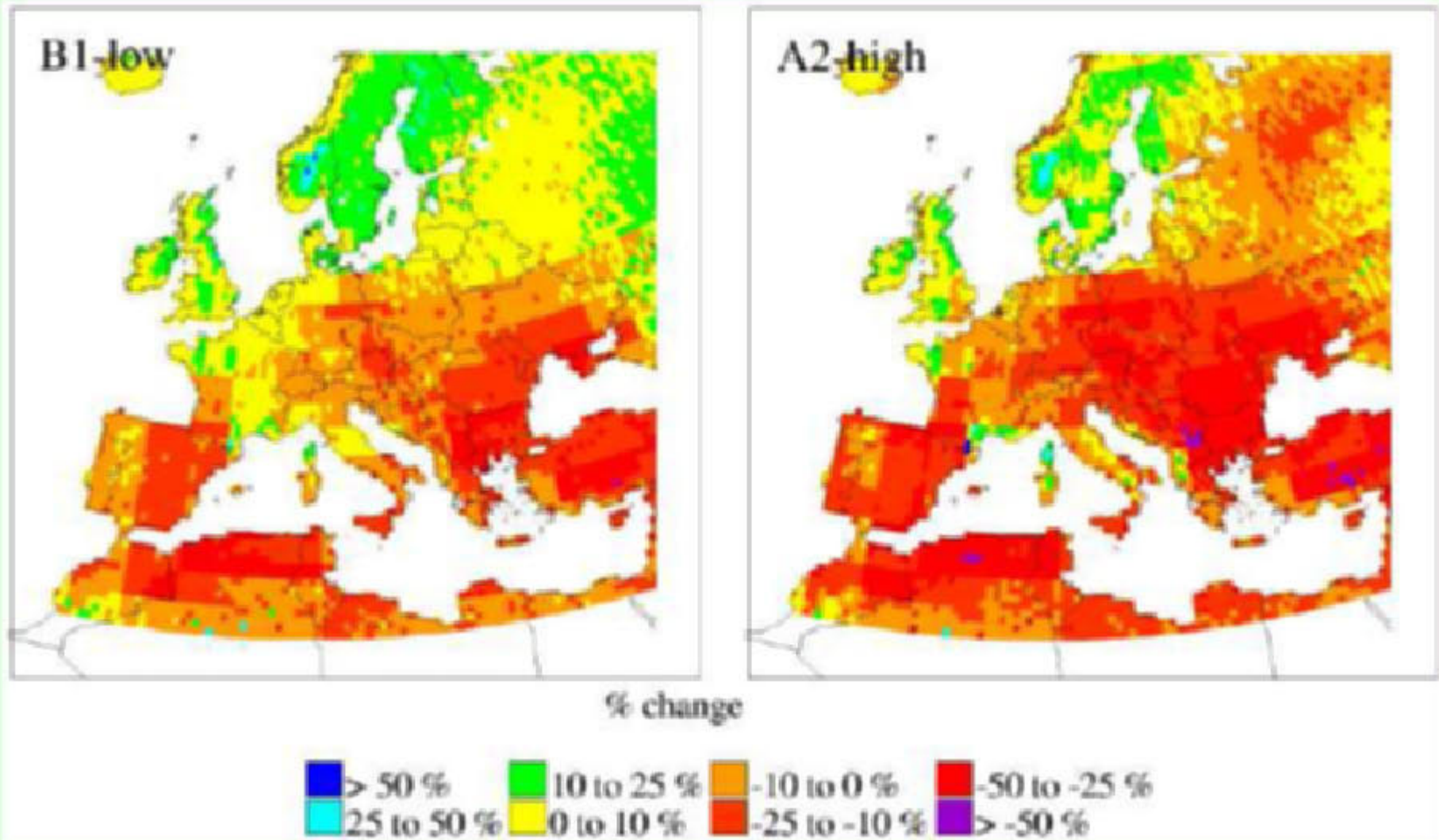
Sources: IPCC 1990, '95, **2001**, '07

Sea level Rise:

- ❖ 20th cent.: **+0,1-0,2 metres**
- ❖ **TAR: 21st century: 9-88 cm**
- ❖ **AR4 (2000-2100): 18-59 cm**



4.1. Water Availability 2050 (M. Parry, IPCC, London, 2005)



4.2. Potential Danger of Drought

Source: WBGU 2006

4A: Potential danger of drought by country, 1975-2004 (observations) (Climatic water balance)



4B: Potential danger of drought by country, 2050 (2040-2069) (Climatic water balance)

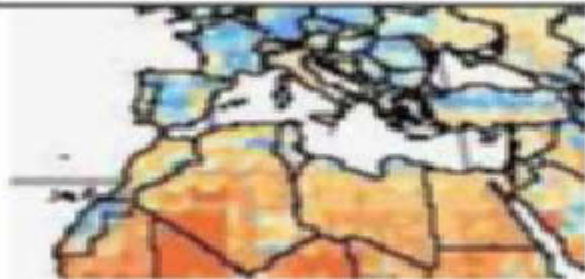


4C: Potential danger of drought by country, 2080 (2070-2099) (Climatic water balance)

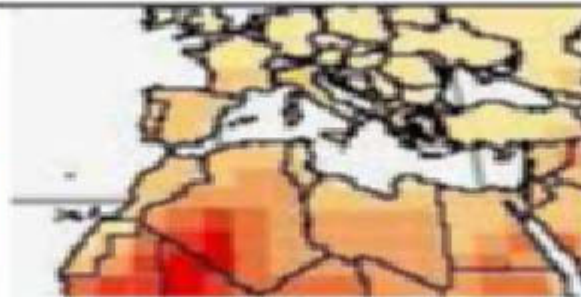


Wasserspeicherung
verändert zu sein

4D: Potential danger of drought by country, difference between 2040/2069 and 1975/2004, changes in climatic water balance



4E: Potential danger of drought by country, difference between 2070/2099 and 2040/2069, changes in climatic water balance



4F: Potential danger of drought by country, trends in the climatic water balance 1975-2004



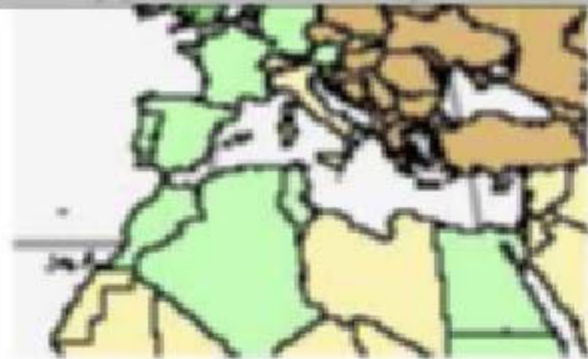
Veränderung der Klimatischen Wasserbilanz [mm]



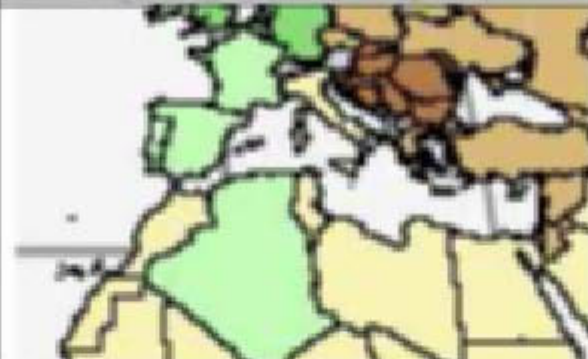
4.3. Climate Change and Food Security

Source: WBGU 2006

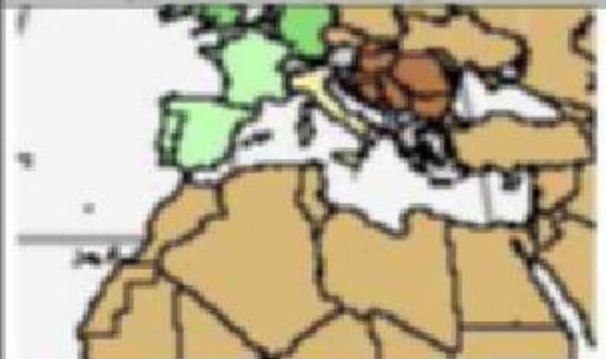
5A: Food security by 2020 (2010-2039) (HADCM3 GGal)



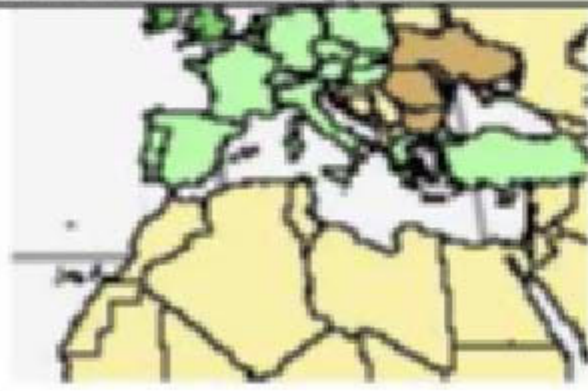
5B: Food security by 2050 2040-2069 (HADCM3 GGal)



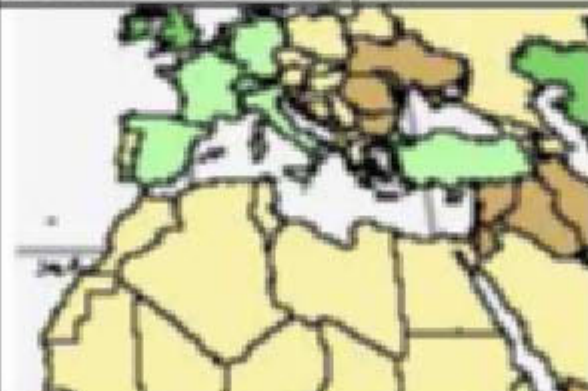
5C: Food security by 2080 2070-2099 (HADCM3 GGal)



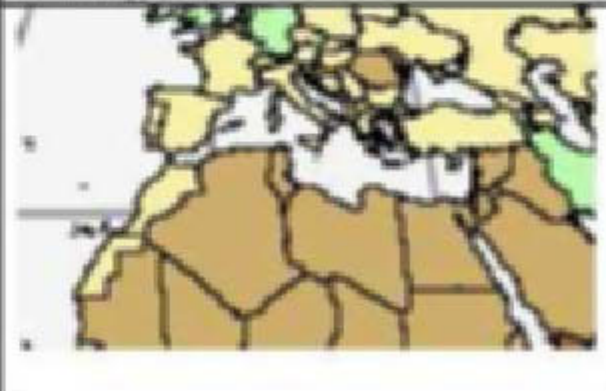
5D: Food security by 2080 2070-2099 (HADCM2), CO₂ Stabilisation at 550ppmv



5E: Food security by 2080: 2070-2099 (HADCM2), CO₂ Stabilisation at 750ppmv



5F: Food security by 2080: 2070-2099 (HADCM2 IS92a), CO₂ unmitigated



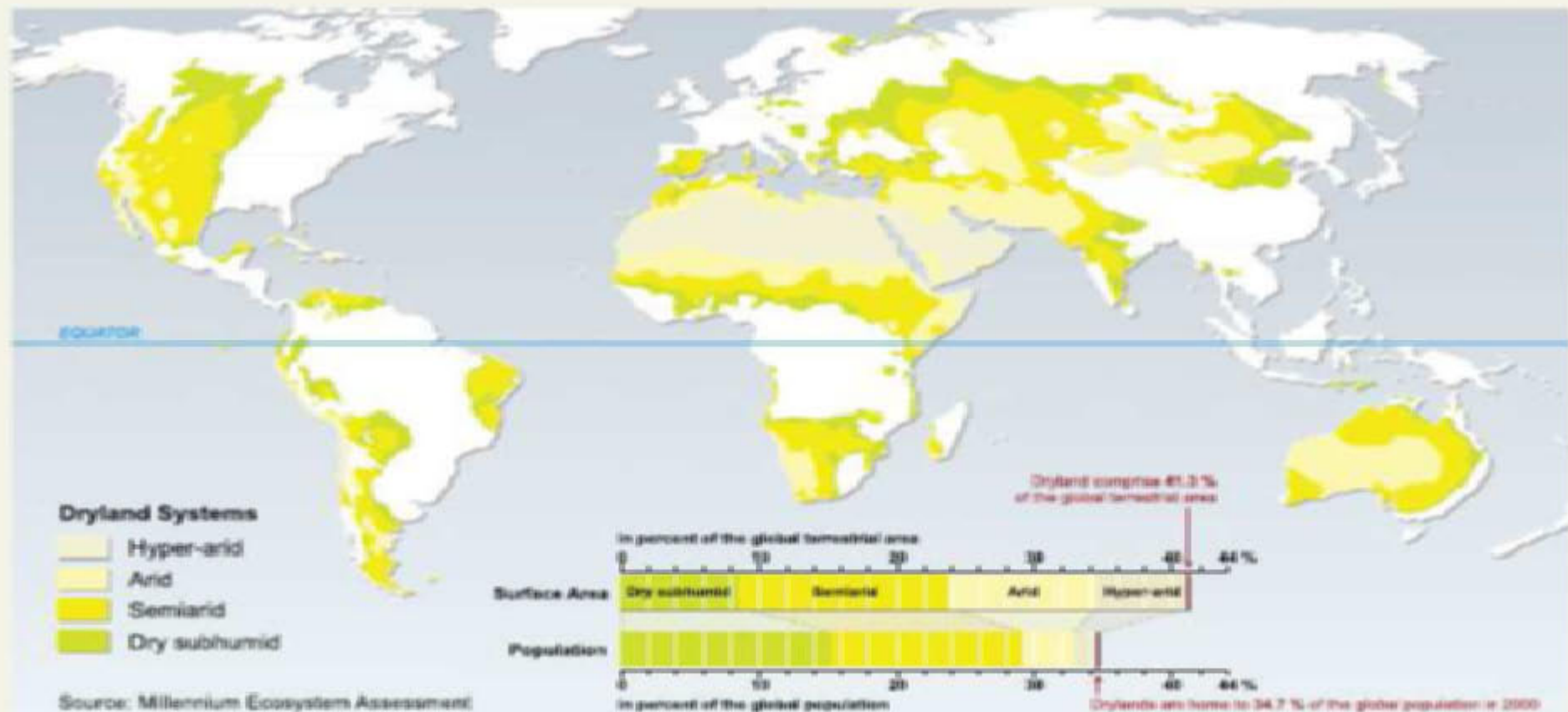
potential yield change [%]



5. 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 values¹.



¹ 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.

5.1. Comparison: Spain & Maghreb

Western Mediterranean: Semiarid region

- Desertification: UNEP & UNCCD Definition: anthropogenic & climatic change causes
 - climate change impact: decline in precipitation, natural process may become irreversible
 - Spain & Maghreb: People's movement: urbanization
- North & South differences:
 - Spain: market-driven desertification process,
 - Maghreb: poverty-driven desertification process
 - Different Coping capacity and resources

6. Population Growth: Southern Europe and Maghreb (2050)

	1850	1900	1950	2000	2025	2050	1950-2050	2000-2050
Algeria	3.0	5.0	8.75	30.29	42.74	51.18	42.43	20.89
Morocco	3.0	5.0	8.95	29.88	42.00	50.36	41.41	20.48
Tunisia	1.0	1.5	3.53	9.46	12.34	14.08	10.55	4.62

UN Population Projection (Rev. /2000 & 2004), mio.

	2000 R 1 2000	2000 R.2 2004	2050 R 1 2000	2050 R.2 2004	1950-2050 R.1	1950-2050 R.2	2000-2050 R.1	2000-2050 R.2
France	59,24	59,28	61,83	63,12	20,00	17,45	2,59	3,84
Spain	39,91	40,7	31,28	42,54	3,27	14.53	-8.63	1,82
Italy	57,53	57.53	42,96	50,91	-4,14	3,81	-14,57	-6,80

7. Migration in Mediterranean (1950-2000)

<i>Region</i>	<i>1950-1960</i>	<i>1960-1970</i>	<i>1970-1980</i>	<i>1980-1990</i>	<i>1990-2000</i>
<i>Net number of migrants per year (thousands)</i>					
Mediterranean	-2,765	-4,097	-2,127	-839	369
North-western Mediterranean	-1,521	-761	1,079	337	2,124
North-eastern Mediterranean	-823	-1,162	-71	-162	-888
Eastern Mediterranean	576	-406	-1,295	-506	921
Southern Mediterranean	-997	-1,769	-1,840	-508	-1,788
<i>Net migration rate</i>					
Mediterranean	-1.1	-1.4	-0.6	-0.2	0.1
North-western Mediterranean	-1.2	-0.5	0.7	0.2	1.3
North-eastern Mediterranean	-2.4	-3.1	-0.2	-0.4	-2.0
Eastern Mediterranean	1.7	-0.9	-2.3	-0.7	1.0
Southern Mediterranean	-2.0	-2.8	-2.3	-0.5	-1.4

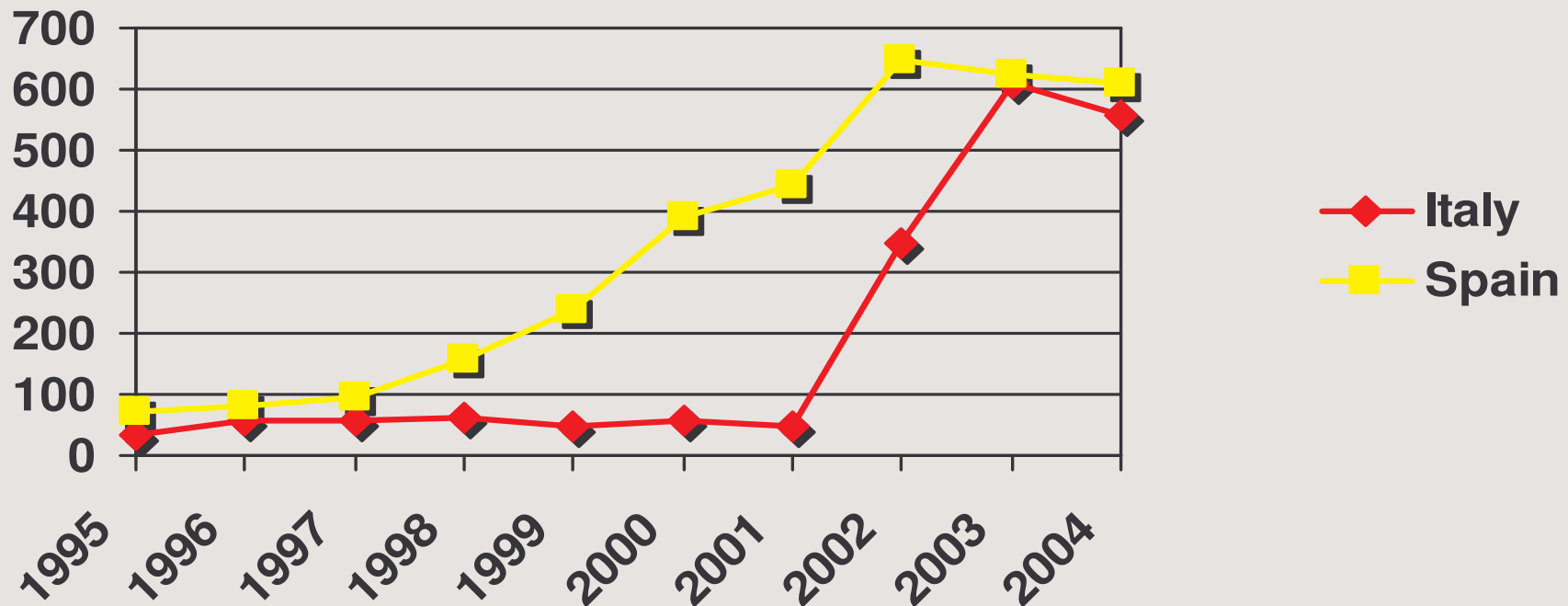
Source: United Nations (2001). *World Population Prospects: The 2000 Revision*. Disk 2: Extensive Set. (United Nations Publication, Sales No. E.01.XIII.13)

7.1. Migration Saldo in Italy & Spain 1995 - 2004 (in 1.000)

Longterm migration trends (1950-2005)

Southern Mediterranean: region of emigration, flow depends on immigration policies of the EU countries

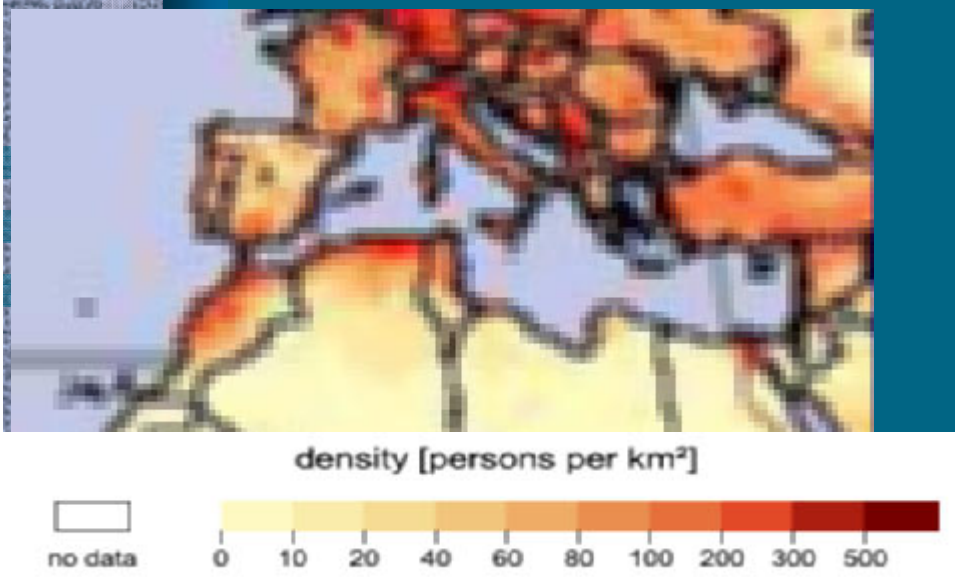
NW Mediterranean (Spain & Italy): from major emigration to immigration countries within 25-50 years. Most dramatic change: 1995- present



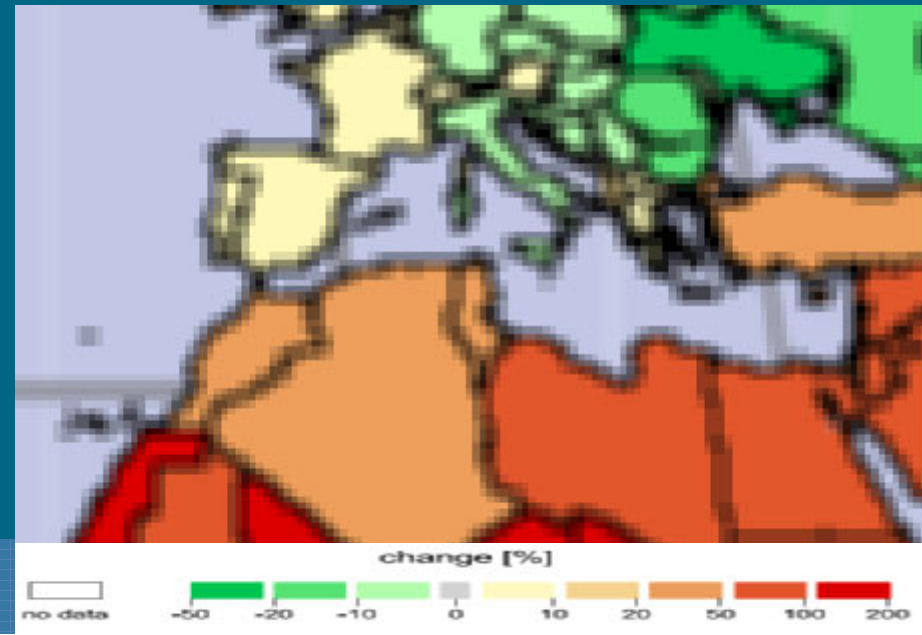
7.2. Changes in population density in North Africa (2000-2050)



Population density by country average and urban concentrations in 2005



- Dramatic population growth
 - **1950**: 42 mio.; **2000**: 142 mio.
 - **2020**: 193 mio. **2050**: 244 mio.
- Rapid urbanization (in %)
 - **1950**: 25; **2000**: 48; **2030**: 63
- High population density in cities: increase:2005 to 2025



7.3. People's Movements

Urbanization Processes (1950-2030)

According to urbanization reports of the UN Population Division (UN 2000, 2002, 2004, 2006) nearly all **population growth will be concentrated in the urban centres** many of them are located in the narrow coastal strip in the MENA region of the Maghreb and Masreq.

	1950	1960	1980	2000	2010	2020	2030
Algeria	22.3	30.4	43.5	57.1	62,7	67,9	72,6
Morocco	26.2	29.2	41.3	55.5	61.9	67.5	72.5
Tunisia	31.2	36.0	51.5	62.8	66.2	70.2	72.5
North Africa	24.7	30.1	40.4	48.4	52.6	57.6	63.4
France	54.3	62.0	73.3	75.7	77.8	80.3	83.0
Spain	51.9	56.6	66.0	76.3	77.3	79.2	81.7
Italy	54.3	59.4	66.6	67.2	68.2	70.6	74.3
S. Europe	44.3	49.4	61.2	65.4	67.2	70.2	74.1

8. EU Paper on Climate Change & Security (14 March 2008)

14 March 2008: EU Council & Comm.: Climate Change & Security:

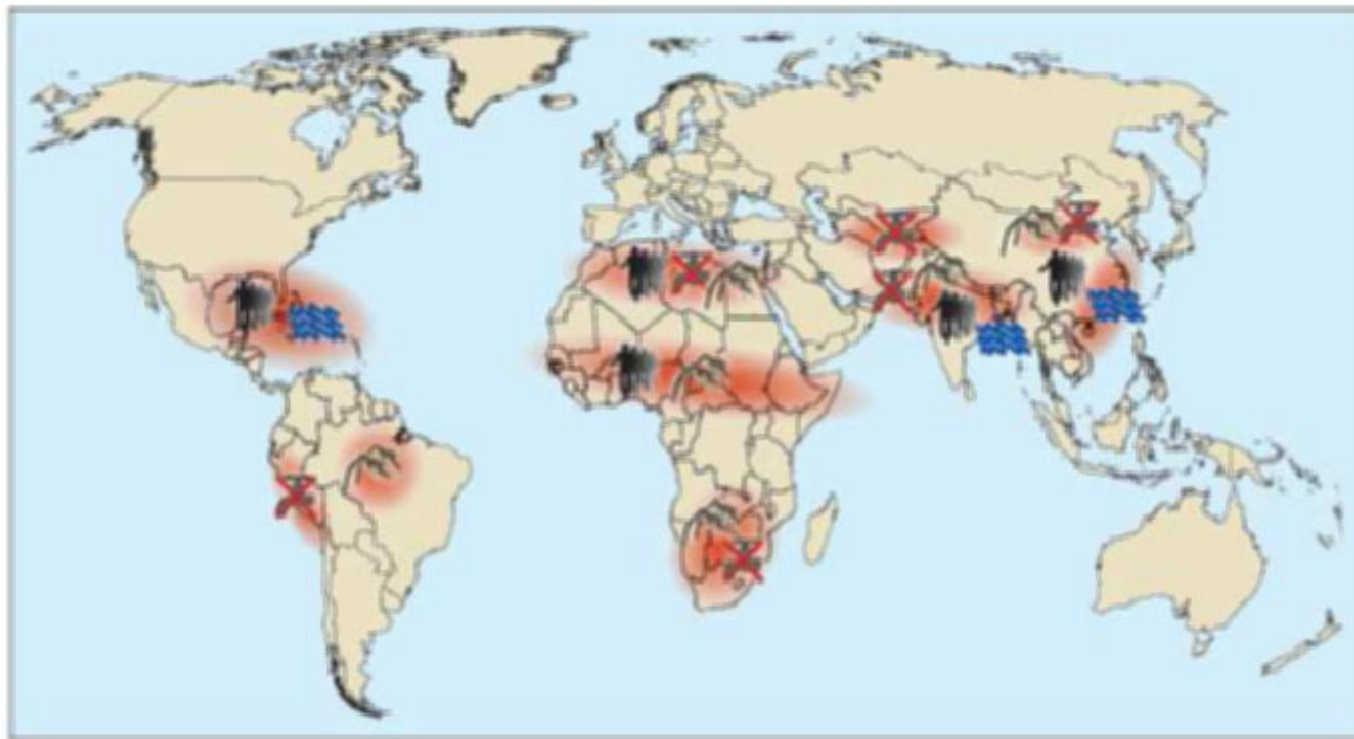
- Climate change ... as a threat multiplier which exacerbates existing trends, tensions and instability” that “threatens to overburden states and regions which are already fragile and conflict prone.”
- Seven international security threats posed by climate change: i) conflict over resources; ii) economic damage and risk to coastal cities and critical infrastructure; iii) loss of territory and border disputes; iv) **environmentally-induced migration**; v) situations of fragility and radicalization; vi) tension over energy supply; and vii) pressure on international governance.
- Examples where these threats may materialize: a) **Africa**, b) **Middle East**, c) South Asia, d) Central Asia, e) Latin America and Caribbean, and f) Arctic.

Climate Change causing Environmentally-induced Migration

- Those parts of the populations that already suffer from poor health conditions, unemployment or social exclusion are rendered more vulnerable to the effects of climate change, which could amplify or trigger migration within and between countries.
- The UN predicts that there will be millions of "environmen-tal" migrants by 2020 with climate change as one of the major drivers of this phenomenon.
- Some countries that are extremely vulnerable to climate change are already calling for international recognition of such environmentally-induced migration.
- Such migration may increase conflicts in transit and destination areas. Europe must expect substantially increased migratory pressure.

8.1. Regional Security Challenges & Risks due to Global Climate Change

Figure 4.7: Regional hotspots and security risks associated with climate change. Source: WBGU (2008: 4). Reprinted with permission.



Conflict constellations in selected hotspots



Climate-induced degradation of freshwater resources



Climate-induced decline in food production



Hotspot



Climate-induced increase in storm and flood disasters



Environmentally-induced migration

Security-related challenges in MENA region:

- Water scarcity to rise due to demand increase and supply decline
- Rising food deficits
- **Rising environmentally induced migration**

8.2. Migration scenarios: Impacts for Human and Societal Security

- **Scenario 1:** During drought periods water and food will be scarce, food prices may rise and survival in the rural areas may become more difficult: force people to leave their homes and livelihoods
- **Scenario 2:** On this survival dilemma for parts of the rural po-pulation many young men react by moving to the urban centres (**urbanization**) and if affordable overseas.
- **Scenario 3:** As in the past (1970s-90s) **food protests** may challenge the governments
- **Scenario 4: Migration:** besides econ. reasons, societal & environmental causes may become key triggers.
- **Scenario 5:** The countries of North Africa have already become the goal of transmigrants from sub-Sahara Africa, many of them try to get to Europe or North America. This has in some cases resulted in violent conflicts with the police & hosts.

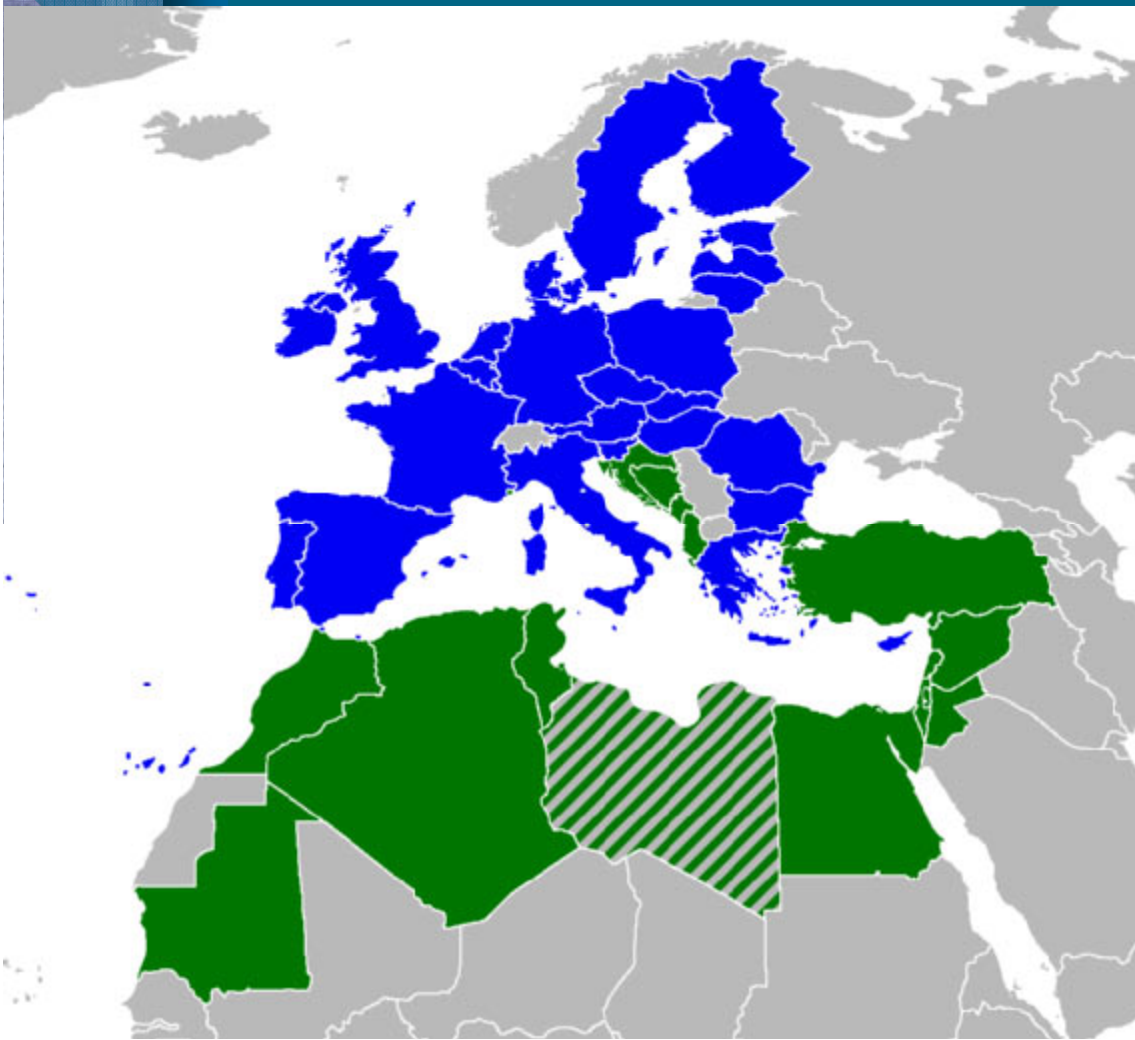
8.3. Migration Scenarios: Impacts for National and International Security

- **Scenario 6:** European counter measures to contain immigration may enhance protest potential in emigrating states.
- **Scenario 7:** Diaspora scenario: uprooted youth that is not integrated in host countries may contribute to internal insecurity and violence in some recipient countries (e.g. France)
- **Scenario 8:** Combating desertification & greening the military: Military forces: major resource for combating desertification. Disaster preparedness and response may become a new mission for military forces in many affected countries.
- **Scenario 9:** Peaceful solution mechanisms for internal conflicts over water and land-use are needed.
- **Scenario 10:** The Nile Basin has been affected by drought, famine and was a victim of many violent internal conflicts.
- **Common migration policy** is needed to address distress migration and to avoid an intensification of humanitarian tragedies: address multiple causes

9. Proposed MEHSEC Initiative for the Mediterranean Union

Mediterranean Environmental & Human Security Initiative

- Address longer-term environmental dimension of human security posed by GEC: water, soil & climate change
- Address causes & regional impacts of GEC
- **Framework of the Mediterranean Union**
- Partners: MU (leader),
- EU, UN, UNEP, UNDP, OSCE, Arab League, WMO, IPCC et al.



9.1. Tasks of MEDENHUMSEC

MEDENHUMSEC should address soft non-military, environmentally-induced security threats, challenges vulnerabilities and risks for the Mediterranean that are projected to evolve by 2025, 2050 and 2100 and that cannot be solved with military means.

They can only be overcome by **forward-looking, proactive, functional cooperation that requires knowledge** (regional climate change scenarios for the Mediterranean: Mediterranean climate impact assessment).

Initiative should **coordinate global & regional organizations**:

- to analyse, assess available research and develop joint cooperative adaptation and mitigation measures
- to develop cooperative measures dealing with societal consequences, including environmentally-induced forced migration that may lead to hunger & food riots, domestic conflicts & only in the worst case in violent conflicts.

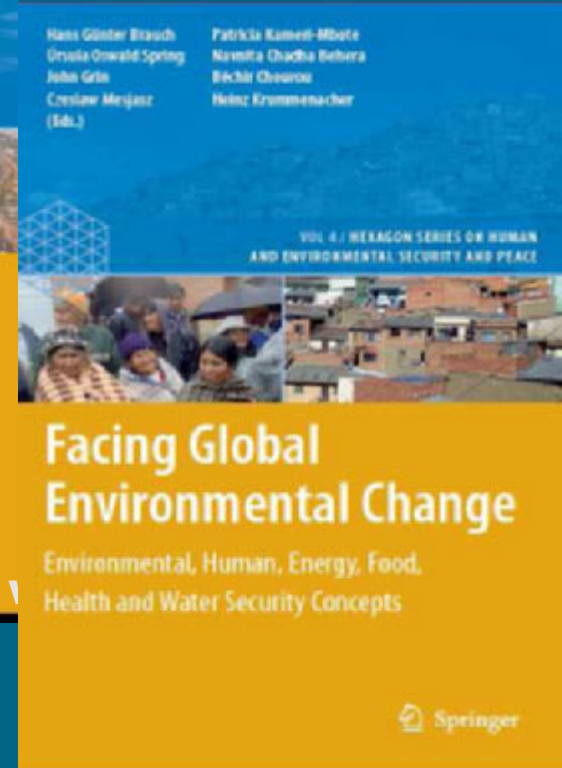
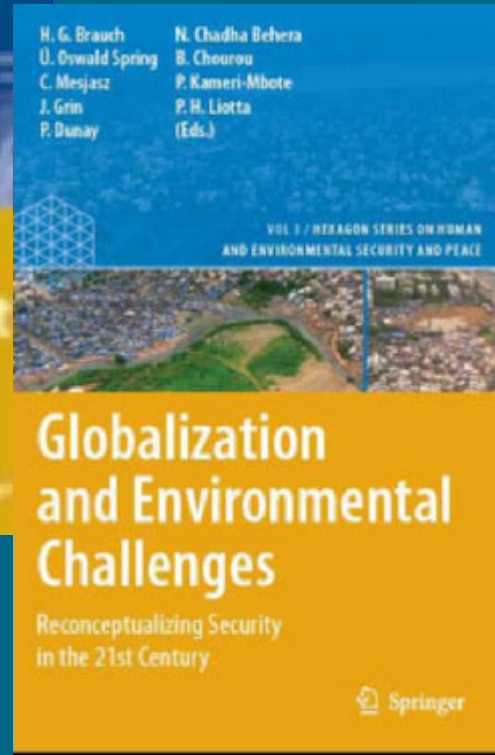
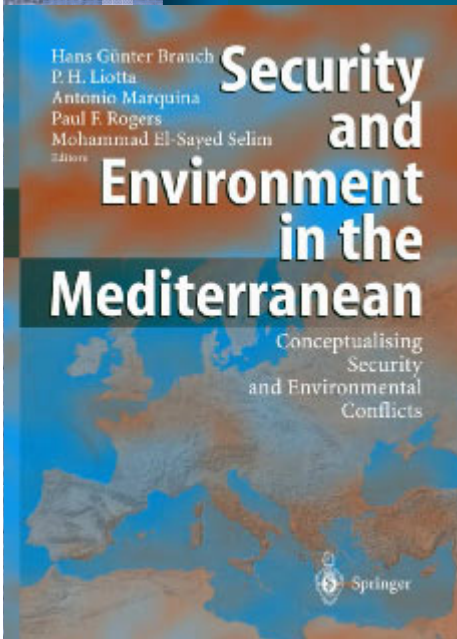
Goal: preventive diplomacy and conflict avoidance by addressing root causes of conflicts:

- **Sustainability first scenario of UNEP's GEO-4 Report (2007)**
- **proactive global and regional scenarios suggested in final report of the Millennium Ecosystem Assessment (2005).**

10. Conclusions

- **Research needs:**
 - Analyses on climate change impacts for Western Mediterranean
 - Comparative analyses on desertification: North/South in West. Med.
 - Statistical and motivation analyses on why people migrate
 - Market-driven vs. poverty-driven desertification processes
- **Policy needs:**
 - Shift: reactive to proactive measures on controlling migration
 - Address the manifold economic, societal, environmental causes:
 - Reduce GHG emissions
 - Stabilize average temperature increase to 2°C by 2100 (EU goal)
 - Combat desertification with traditional and modern knowledge
- **Policy framework:**
 - Mediterranean Union & Barcelona Process
- **MEDENHUMSEC Initiative** for the whole Mediterranean region and specific focus on Western, Eastern, Northwestern and Southeastern Mediterranean subregions.

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