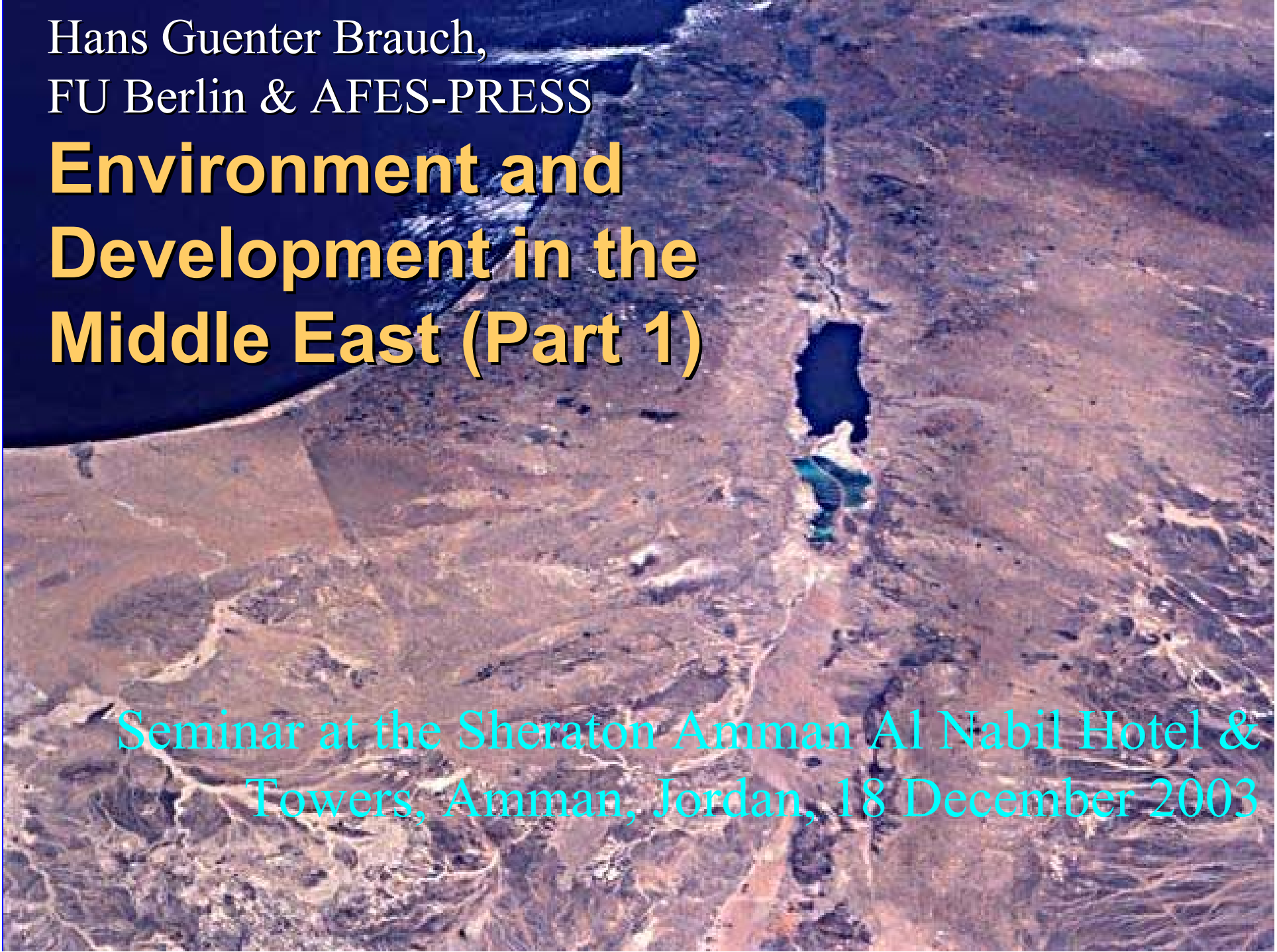
Hans Guenter Brauch,
FU Berlin & AFES-PRESS

Environment and Development in the Middle East (Part 1)



Seminar at the Sheraton Amman Al Nabil Hotel & Towers, Amman, Jordan, 18 December 2003

Hans Guenter Brauch, FU Berlin & AFES-PRESS

Environment and Development in the Middle East

Part 1: Environmental Challenges to Security & Survival

- **Environmental challenges as a human security issue**
- **Global environmental change and fatal outcomes**
- **Six key environmental challenges for the Eastern Mediterranean**

Part 2: Development Opportunities: Addressing the Environmental Security Challenges by Functional Cooperation for Sustainability on Water, Soil, Food and Energy

- **Coping with Non-military Environmental Security Challenges**
- **Proposals for Regional Cooperation on Water, Food and Energy for the Sinai, Gaza, the West Bank and the Gulf of Aqaba**

Hans Günter Brauch, FU Berlin & AFES-PRESS
[http://www.afes-press.de] and [brauch@ afes-press.de]

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Contents of Part 1

1. Basic Concepts and Focus of the Talk

Frank Pfetsch (2003) Mediterranean is a conflict intensive region:

1945-2001: 140 events: 19 wars, 72 violent, 49 nonviolent conflicts

2 of 4 conflict clusters are in the Eastern Mediterranean:

- **Middle East (Israel & Arab neighbours, incl. Palestinians): 35 conflicts (42%)**
- **Cyprus, disputes between Greece & Turkey: 14 conflicts**

National & internat. conflicts prevail, env. & water conflicts minor

- **Israel-Jordan: 2 severe crises (1959-67, 1969-76), latent conflict (1977-94)**
- **Turkey, Syria, Iraq: water crisis on Euphrates & Tigris (1990-1999)**

Environmental impacts of conflicts & Environmental scarcity as a conflict cause

- **UNEP PCAU: Desk Study on Environment in Occupied Palestinian Territories**
- **My Focus: Environment – security linkages as security & survival challenges**
- **Wide security concept: dimensions, referent objects, values at risk**
- **Long-term environmental security challenges, vulnerabilities, and risks for the Eastern Mediterranean countries: 2015–2100**

1.1. Concepts: Security, Environment, Desertification

Arnold Wolfers (1962): objective vs. subjective security:

„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.“

Security perception depends on worldviews or traditions

- **Hobbessian pessimist**: *power* is the key category (narrow concept)
- **Kantian optimist**: *international law* and *human rights* are crucial
- **Grotian pragmatist**: *cooperation* is vital (wide security concept)

Environment, Ecology and Desertification:

Encyclopaedia Britannica (1998) defined ‘environment’: “the complex of physical, chemical, and biotic factors that act upon an organism or an ecological community and ultimately determine its form and survival”.

Encyclopaedia Britannica (1998) defined ‘ecology’ as: „study of the relationship between organisms and their environment“.

UNCED in Rio de Janeiro in 1992 adopted this definition:

“Desertification is land degradation in arid, half-arid and dry sub-humid areas, resulting from various factors, including climatic variations and human activities.”

1.2 Widening of Security Concepts

Table: Dimensions (Sectors) & Levels of a Wide Security Concept

Security dimension⇒ ⇓ Level of interaction	Mili-tary	Political	Economic	Environ-mental ⇓	Societal
Human individual ⇒				victim	
Societal/Community				↓↑	
National	MENA region			↓↑	
International/Regional				↓↑	
Global/Planetary ⇒				GEC	

Table: Expanded Concepts of Security (© Bjørn Møller, 2003)

Label	Reference object	Value at risk	Source(s) of threat
National security	The State	Territ. integrity	State, substate act.
Societal security	Societal groups	Nat. identity	Nations, migrants
Human security	Individ., mankind	Survival	Nature, state, global.
Environmental sec.	Ecosystem	Sustainability	Mankind

1.3. Combing Perspectives on Security & Environment

Table: Ideal type worldviews on security and standpoints on the environment

Worldview/Tradition on security (→) Standpoints on environmental issues (↓)	Machiavelli, Hobbes, Morgenthau, Waltz (pessimist, realist) *Power matters*	Grotius, (pragmatist) *Cooperation is needed, matters*	Kant, neoliberal institutionalist (optimist) *International law matters and prevails (Democratic peace)*
Neomalthusian *Resource scarcity* (pessimist)	I Perspective of many MENA states	II ←	III ↙
Reformer, *Multilateral cooperation solves chall.* (pragmatist)	IV	V UN system most EU states (my position)	VI
Cornucopian *Technological ingenuity solves issues* (neoliberal optimist)	VII George W. Bush-Administration ?	VIII Bill J. Clinton Administration ?	IX Wilsonian liberal optimism

2. Environmental Impacts of Wars and Environmental Stress as Causes of Conflicts

- **Dual Relations between Environment and Conflict:**
  - War as a Cause of Environmental Damage
  - Environmental Change as a Cause of Crises and Conflicts
- **Research on Environmental War Impacts: since 1970s**
  - UNEP supported Research on Environmental Consequences of the Vietnam War of Arthur Westing at SIPRI and PRIO (Oslo)
  - Today: UNEP Post-Conflict Assessment Unit (UNEP-PCAU)
- **Environmental Causes of Conflicts: since 1990s**
  - Environmental Degradation & Scarcity of Ressources as a Cause and Trigger of Conflicts
  - Climate Changes as a Cause for the Decline of Civilisations
  - **Bad harvests and famine prior to 1789 and 1848 contributed to the emergence of revolutionary situations in Europe!**

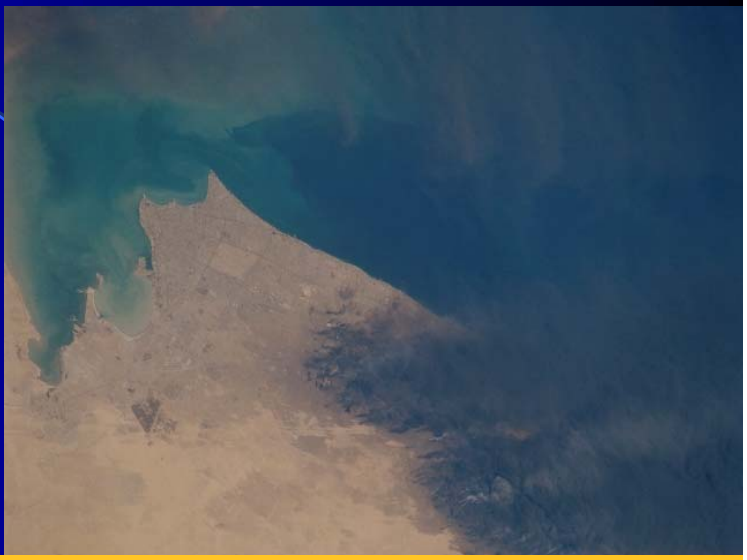
2.1 Impacts of Wars on the Environment

- **Historic Cases: Environment as a Victoím of Warfare**
  - 539 BC, Cyrus II rerouted the river Euphrates during the siege of Babylon.
  - 431-4 BC, War in the Peleponnese, Sparta destroyed wheat harvests of Athens
  - 149-46 BC, 3rd Punic War, Romans salted the soils of Carthege
- **Modern History: First and Second World War, Korean War**
  - WW I: Destruction of forests and of agricultural land; Extensive use of chemical weapons: long-term impacts on humans & fishery, burning oil fields (in Romania)
  - WW II: Tactic of burnt earth, massive use of landmines, aerial bombardment, ecological damages, attack on dams, intrusion of salty water, nuclear weapons
  - Korean War: bombardement of dams in North Korea (1950-1953)
- **2nd Indochina War (Vietnam War) 1965-1975**

  1962-1971, Massive Use of Defoliants (Agent orange, blue) agaisnt forests, fields, humans that affected the food chain
- **Gulf Wars of 1980-1988, 1991 and 2003**
  - Iraq (1980-1988): use of chemicals against Kurds & Iran; 1991: burning oil fields in Kuwait (1991) and in Iraq (2003)
  - Coalition Forces: Employment of 290 tons of Depleted Uranium
- **Wars in the Balkans (1995-1999):** Employment of Depleted Uranium

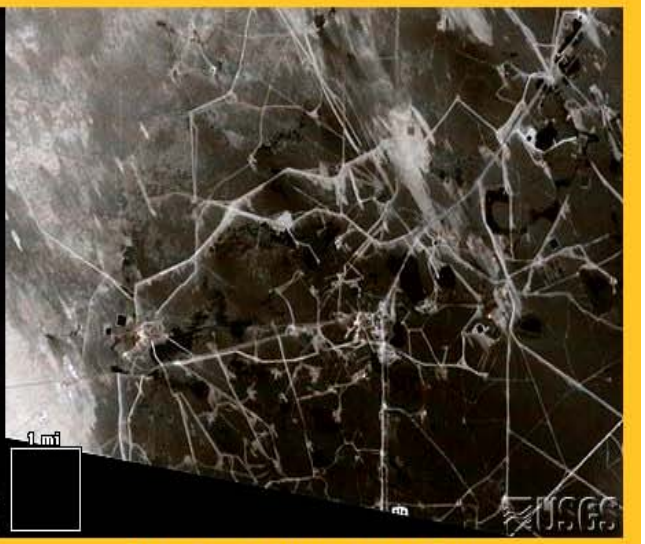
2.2. Burning Oilfields in 2nd Gulf War (Kuwait,1991)

Space Shuttle
← (Nov. 1991)
Space Shuttle
(May 1991) →
Kuwait, 8/1990
23.2.1991
↓ 14.11.1991



Kuwait - 31 August 1990

Kuwait - 23 February 1991



Kuwait - 14 November 1991

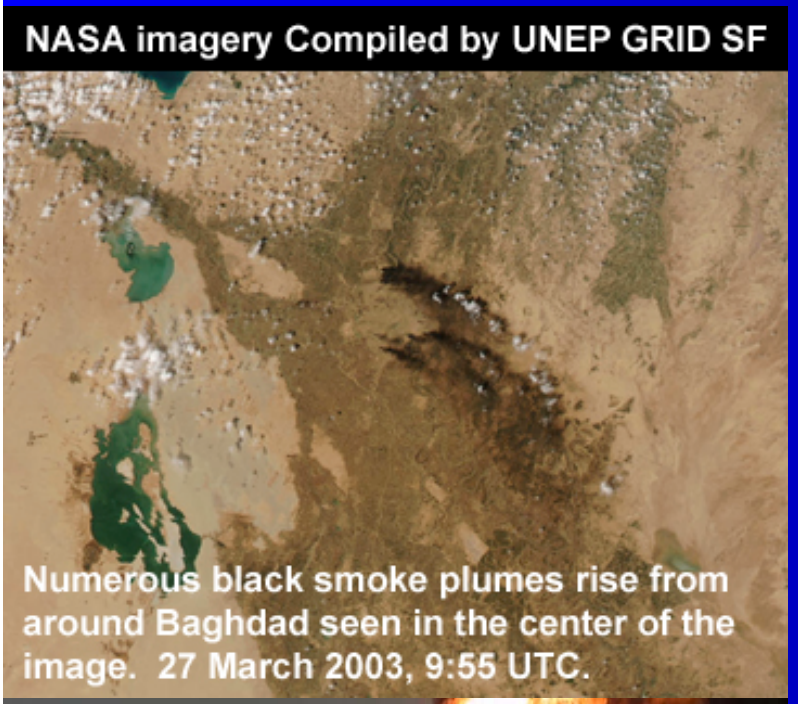
2.3. UNEP Monitoring of Environmental Impacts of Conflicts and Wars: Desk Studies & Field Missions

- **UNEP supported studies by Arthur Westing (SIPRI, PRIO) on Vietnam; launched studies on environmental impacts of wars**
  - **After 2nd Gulf War: UNEP-Studies on Kuwait and Iraq**
  - **Balkan Task Forces**: since 1999 activities on Kosovo, Serbia, Montenegro, Albania, in Bosnia-Herzegovina, on employment of depleted uranium
  - **Since 2001: UNEP-Post-Conflict Assessment Unit (PCAU) in Geneva**
- **UNEP-PCAU: Work in four phases**
  - **Start with a Desk Study: e.g. Environment in Occupied Palestinian Territories**
  - **One or several Field Missions (Phase II)**
  - **Taking and examining samples & strategic recommendations (Phase III)**
  - **Technical support in the implementation of these recommendations (Phase IV).**

Literature:

- ✓ **Internet: [http://postconflict.unep.ch/] all studies, photos for download**
- ✓ **Haavisto: in: Brauch u.a.: *Security & Environment in the Mediterranean***
- ✓ **Chapters: Westing (Gulf War), Kadry Said (El Alamein), Twite (Israel,OPT) in Brauch et al. (Eds.): *Security and Environment in the Meditrranean* (2003)**

2.4. Burning Oilfields in 2nd & 3rd Gulf War (Iraq)



Environmental Impact of 2nd Gulf W.

Greenpeace (1991); Green Cross (98)

- UNEP-ROWA-Studies on Kuwait and Iraq (91)
- Austin/Bruch (2000): Conference (1998)
- Westing, in: Brauch et al. (2003): 523-534
- UNEP: Desk Study on Env. in Iraq (03)

War Activities of Iraq (1991)

- 600 oil wells in Kuwait were set on fire
- Oil contaminated land and maritime areas (Gulf) Environmental damage of Kuwait 40 Bn. $
- Coast in the Gulf area: Air, Soil, Harzard. Waste

War Activites by Coalition Forces

- Attack on nuclear, biological and chemical weapons plants. Release of toxic substances
- Use of ammunitions with depleted uranium (DU): USAF, USA. MC against Iraqi tanks
- UXOs: 10-40.000; 1.6 million Iraqi landmines

2.5. Use of Depleted Uranium in the Balkans & in Gulf Wars

DU Use during 2nd Gulf War (91)

- UNEP: 290 tons (USAF, MC, USA)
- Studies: IAEA (1995); WHO (2001) ?

DU Use during 3rd Gulf War (2003)

- confirmed by US CentCom on 26.3.2003
- Low Contamination of Soils
- Fragments of DU-Penetrator
- Possible: DU in Groundwater

DU in Bosnia (1995)

- 3 tons, UNEP 2003

DU in Kosovo in 1999

Ca. 9 tons UNEP 1999, 2001

http://postconflict.unep.ch/dufact.html

2.6. Constraining Environmental War Impacts

- **Protection of the Environment in wars: Old Testament & Qu'ran**
  - King Hammurabi (1728-1686 BC) Protection of the weak in war
  - Hettites (1269 BC) Respect dwellers in a a city of an enemy
  - Deutoronomy forbids the destruction of food trees during siege of enemy's city
  - Qu'ran enjoins Muslims from harming trees in a jihad
  - Abu Bakr (632 AD) gave this order to his commanders: „The blood of women, children, and old people shall not stain your victory. Do not destroy a palm tree, nor burn houses and cornfields with fire, and do not cut any fruitful tree."
- **In 21st Century: Protection of Environment in International Law**
  - ✓ Humanitarian Law of Wars: Since the Hague Convention (1899)
  - ✓ Arms Control Treaties: Prohibition of Environmental Modification
  - ✓ Human Rights: Continuation in War
  - ✓ Environmental Convention: Continuation in Wartime
  - ✓ Statute of the International Criminal Court of Rome (1999)

2.7. Legal Constraints for War against the Environemnt

- **International Bases of Humanitarian International Law (ius in bello)**
  - St. Petersburg Declaration of 11 December 1868;
  - The Hague Declaration of 29 July 1899 and The Hague Convention on the Law of War (1907);
  - Geneva Protocol for the Prohibition of the Use of chemical Weapons of 1925;
  - Four Geneva Protocols of 1949 & Additional Protocols of 1977 for the protection of the victims of international armed conflicts (ZP I) and on domestic conflicts (ZP II);
  - Convention for the protection of World Cultural (1954) Natural Property (1972);
  - Article 8, 2, b, iv of the Rome Statute of the international Criminal Court of 1998
- **International Arms Control Law (Preventive Measures)**
  - Agreement on Biological Weapons and und Toxin Weapons (BWC) of 1972;
  - Convention on the Prohibition of military and other unfriendly use of techniques to modify the environment (Environmental Modification Convention, ENMOD) of 1977;
  - Convention of 10 October 1980 on the prohibition or limitation of the use of specific conventional weapons that cause unnecessary harms
  - Convention Prohibiting the Use and Possession of Chemical Weapons of 1993 (CWC);
  - Convention on Landmines (1997)
- **International Humanitarian Laws**
  - General Declaration of Human Rights (1948);
  - Convention on the Protection of Human Rights and Basis Freedoms (1950);
  - International Covenant on Civil and Political Rights (1966);
  - International Covenant on Economic, Social and Cultural Rights(1996)

2.8. Environment and Security Linkages: Research

Four Phases of Research since 1983 - 2003

1. Phase: Conceptual Phase: Concept Environmental Security

- Inclusion of environmental factors in US national security agenda
- Ullmann (1983), Myers (1989), Mathews (1989)
- Brundtland-Commission (1987), Gorbachev (1987), NATO (1996-99)

2. Phase: Empirical Phase: Case studies: Scarcity - Conflict

- Toronto: Th. Homer-Dixon: since 1991: 3 Projects (Case: Gaza, conflict)
- Zürich/Bern: Günther Bächler, K.Spillmann (Jordan River, Conflict resolut.)

3. Phase: Manifold Research without Integration (1995 - pres.)

- Resource scarcity or abundance as a cause of conflict

4. Phase: Human & Environment. Security & Peace (HESP)

- ✓ My proposal: focus on linkages between global environmental change and fatal outcomes (hazards, migration, crises and conflicts).
- ✓ Brauch, chapt. 2 & 51 of: *Security & Environment in the Mediterranean.*

2.9. Environmental Security Dimension (Sector)

- **Focus**: **Interactions between ecosystem & humankind**, impact of **global environmental change** (**supply factors**) on **environmental degradation**, and the **increasing demand factors** (population growth, urbanisation, agriculture/food) on **environmental scarcity** that **interact & contribute** to **environmental stress**.
  - **Value at risk:** ***sustainability*** (development).
  - **Major challenges**: ***global environmental change*** **&** ***humankind***, nature- & human-induced (anthropogenic) processes contributing to **environmental stress**.

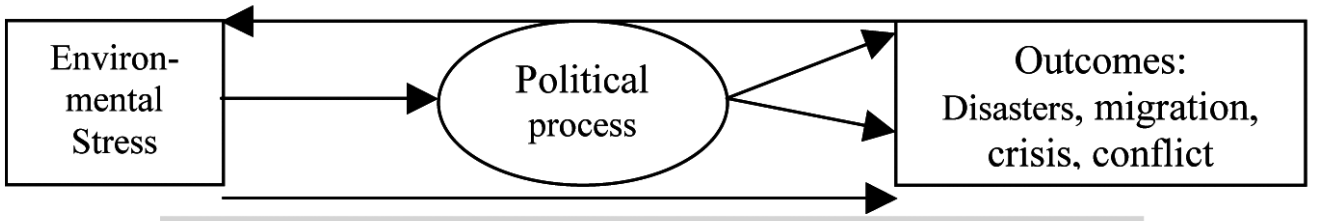
No consensus on definition of environmental or ecological security

- **Buzan et al. (1990):** „Environmental security concerns the **maintenance of the local and the planetary biosphere** as the essential support system."
- **Brock (1991):** a) **environmental depletion** as a cause of violence & social conflict; b) **environmental modification**, c) **ecol. cooperation** building confidence & trust; d) **military means** to enforce **environmental standards**, e) **healthy environment** for comprehensive security.
- **R. Pachauri (2000), chairman of IPCC: Environmental Security aims at: minimisation of environmental damage & promotion of sustainable development**.

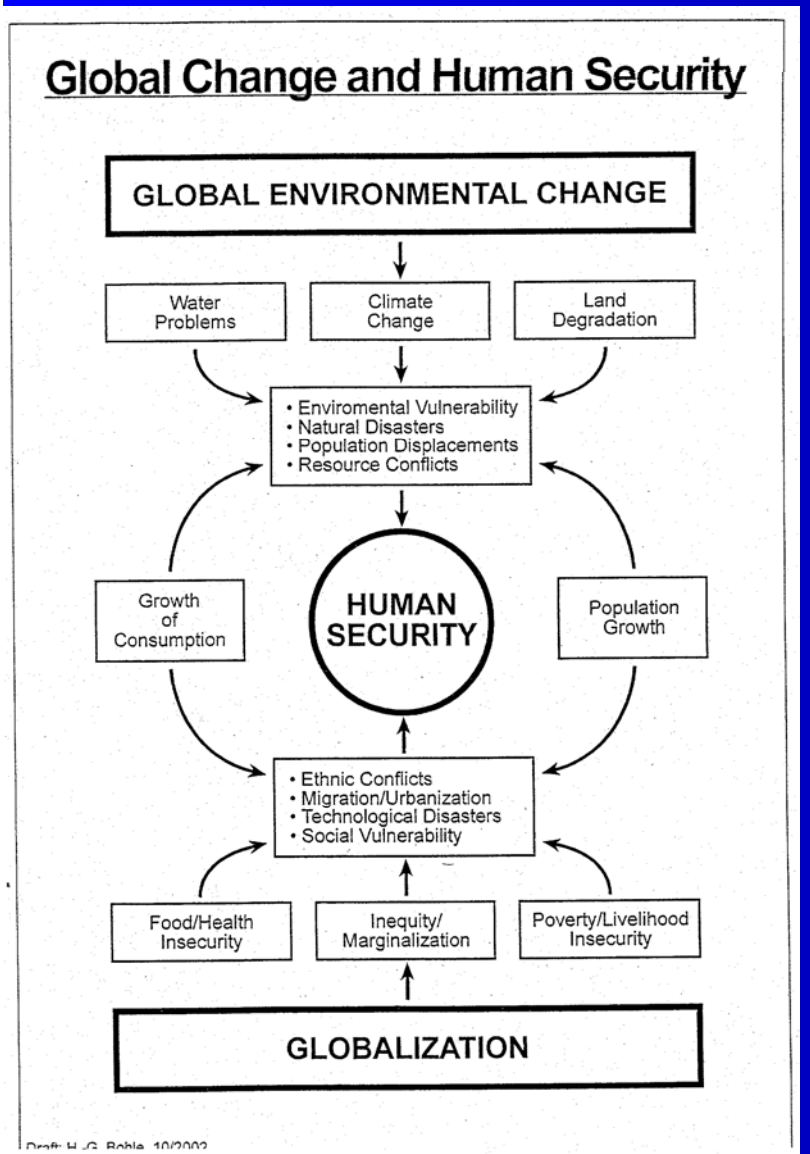
3. Human Security (HS) Perspective

- **Referent of *human security*: individuals and humankind.**
- **Values at risk: survival of human beings and their quality of life.**
- **Major source of threat: nature (*global environmental change*), globalisation processes, nation state with its ability to cope with dual challenge.**
- **Dual meaning: a) perspective of the analyst, and b) outcome of human action (e.g. of risk reduction strategies).**
- **HS encompasses all levels of analysis: individual to global/planetary level.**
- **H.G. Bohle: Human Sec. is desirable outcome for individuals, communities & active concept challenging inequitable structures contributing to insecurity & vulnerabilities.**

Figure: HS Perspective on Environmental Stress & Outcomes

Security dimension ⇒ / Level of analysis⇓		Environmental security dimension: external vulnerability (encompassing food, health and livelihood security)
Individual (human)	H u m a n	
Societal/Community		
National		
International/Regional		
Global/Planetary		
Security perspective		Societal security dimension: internal vulnerability

3.1. Dual Global Challenge: GEC & Globalisation



Human Security Perspective

- ❖ **referent:** individual & mankind
- ❖ **value at risk:** human survival
- ❖ **threat:** nature, GEC & globalisation

- **GEC > environm. vulnerability > disaster > migration > scarcity**
- **Globalisation > inequity > social or societal vulnerability**
- **Key questions for Middle East**
  - ➢ How will GEC & globalisation affect the individual, society, countries?
  - ➢ Is human survival at risk, for whom?
  - ➢ Can the global environmental security challenges (GEC) be solved by hard security concepts and means?

3.2. Food, Health, Livelihood & Energy Security

Food Security (FAO, WFP)

- FAO: access for all people to enough food for active, healthy life.
- (1) the adequacy of food availability (effective supply); (2) the adequacy of food access (effective demand); and (3) the reliability of both.
- Desertification and drought affect the supply side of food security.

Health Security (WHO)

- WHO: guarantee of accessible and affordable health care to all
- WHO: *Global Health Security* (Epidemic Alert & Response) global partnership: a) contain known risks, b) respond to unexpected, c) improve preparedness

Livelihood Security (OECD, Third World countries)

- Livelihood security: used by NGOs, humanitarian aid organisations
- "Missing link" between poverty, environmental degradation & conflict.

Energy Security (IEA)

- North: Supply diversification, source substitution, decoupling of econ. growth from increases of energy consumption due to energy efficiency improvements
- South: Demand and supply security (access to electricity etc.)

3.3. Soil Degradation & Desertification as Security Issues

Desertification as a Food Security Issue

- Desertification (cause) & drought (impact: hydro-meteorological hazard) > famine > migration: force people to leave their home (livelihood);
- Major actors & concept users: FAO, WFP, OCHA, ECHO, human. NGOs
- Solution: short-term: food aid & long-term: sustainable agriculture

Desertification as a Health Security Issue

- Famine: under-nourishment, malnutrition, high vulnerability to disease, higher rate of death among children> becomes as health security issue
- Major actors & concept users: WHO, OCHA, ECHO , humanitarian NGOs
- Solution: short-term: medical aid & long-term: sustainable development

Desertification as a Livelihood Security Issue

- Desertification, drought & famine: force people to leave their livelihoods, homes, villages, provinces, in search for individual & group survival
- Major actors & concept users: in South Asia, UK, US: disaster managers, OCHA, ECHO, humanitarian NGOs
- Solution: enhancement of resilience & sustainable development

3.4. Water and Food Scarcity as Security Issues

- **Water scarcity is a basic human (need &) security issue**
  - Affects the individual, his survival and his family that is at risk
  - In OPT manifold causes for this HS challenge: water access rights & distribution etc. (see: water panel in peace process)
  - Water scarcity affects societal, economic and political security!
- **Water pollution becomes a basic health security issue**
  - Overpumping, salinisation and pollution (contaminated & waste water) is a cause of water related diseases (in OPT)
  - Water degradation has become a major health security issue.
- **Food scarcity is a basic human (need &) security issue**
  - Decline in food production (supply) and demand (lack of access)
- **Food scarcity becomes a basic health security issue**
  - Malnutrition & anaemia, among children & women in OPT is getting worse: has become a health security issue.

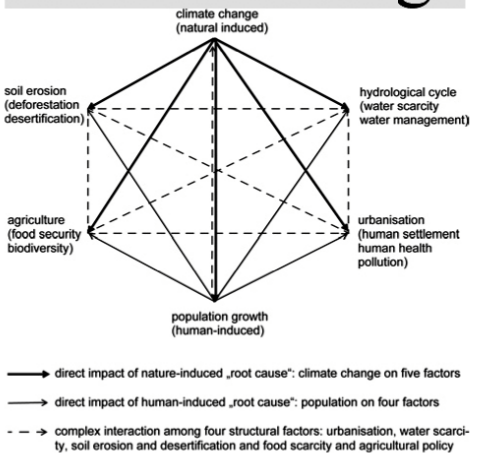
3.5 UN-OCHA Report on Humanitarian Crisis in OPT

- **UN Office for Coordination of Humanitarian Affairs (OCHA), 10.12.2002: Humanitarian Action Plan for Occupied Palestinian Territory 2003**
  - Endorsed by Secretary-General and Quartet (EU, Russia, UN & US), identified priorities: Food Security, Health, Education, Water and Sanitation, Psychosocial Support, Shelter, Emergency Employment, Humanitarian Advocacy, Coordination

Key Features of the Humanitarian Crisis in OPT

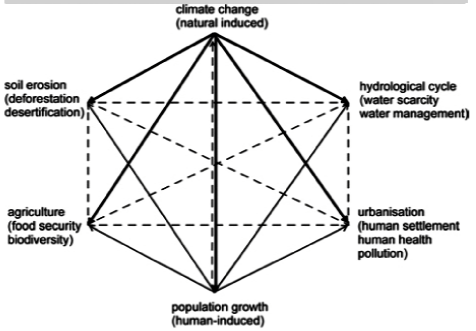
- Shortage of cash, leading self-sustaining households to require assistance; type and level of assistance varies between cities & rural areas, and between the West Bank and Gaza;
- Agricultural production in decline: incursions, expropriation, destruction of farmland;
- Food consumption patterns are changing: increased rates of malnutrition & anaemia, among children & women; 50% of Palestinian population relies on food assistance;
- Movement of health care professionals is limited (75% unable to work regularly): decrease in immunisation levels, care for patients with chronic diseases extremely difficult;
- Teachers cannot reach schools and class schedules are severely disrupted: 170,000 children and over 6,650 teachers are unable to reach their regular classrooms and at least 580 schools have been closed due to curfews, closures and home confinement;
- Private homes have been partly or totally damaged during military operations; damage varies from partial damage to demolition; estimates place affected dwellings at 40%;
- Water shortages are acute; collection and disposal of waste is extremely difficult;
- Psychosocial health of children is precarious; levels of domestic violence are increasing.

4. Model: Global Environmental Change, Environmental Stress & Fatal Outcomes

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

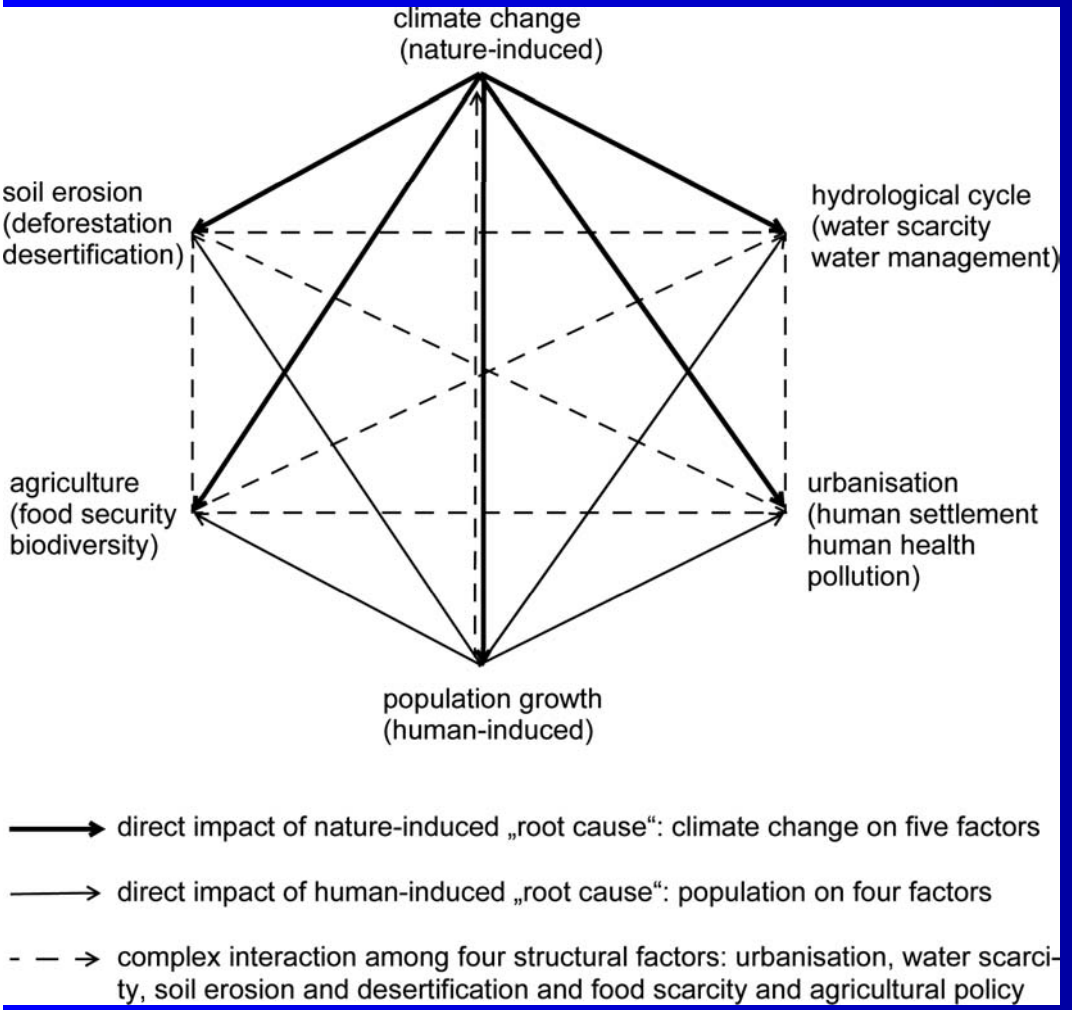
4.1. Model: Desertification and Drought, Famine

Climate Change <> Desertification ➔Extreme Weather Events > Hydro-meteorolog. hazards/disasters (drought & famine)

Causes (Hexagon)	Effect (Interaction)	Environmen-tal Stress	Probable Outcomes
↗➞➞➞➞Extreme Weather Events➞➞➞↘			
Desertification  	**environmental** ➔ **degradation** (soil, water) ↓ ↑ ➔ ➔ **scarcity** (water, food, housing)	global cond. ↓ Environ-mental stress ↑ nation. cond.	**drought & famine** conflict avoidance ↗ ↗ ➔ **Crisis** ↘ ↘ **migration** **conflict**

5. Wider Security Focus: Non-military Challenges

Survival Hexagon: 6 key factors



Environmental security in the Middle East is affected by both Global Environmental Change & by human activities (including economic globalisation)

Nature & human-induced

- Air: Global climate change
- Soil degradation, desertification
- Water: hydrological cycle,

Human-induced factors

- Population growth
- Urbanisation
- Food & Agriculture

➢ Economic production & consumption patterns (impacts of econ. globalisation) on Global Environmental Change (GEC).

6. Supply Side: Nature-induced and Anthropogenic Factors

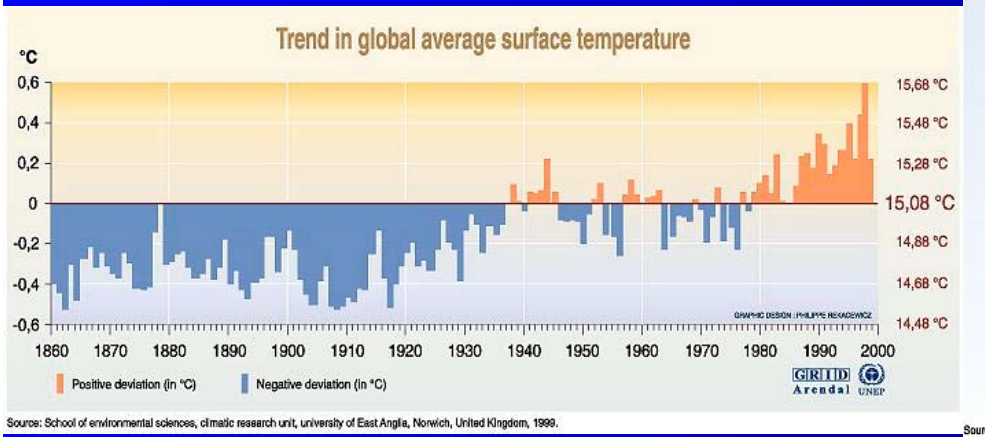
- **Global climate change**: result of both natural variability & of use of hydrocarbons (coal, oil, gas) by humans.
  - Global climate change affects precipitation & contributes to soil erosion (by increase of extreme weather events: e.g. flash floods)
  - Global climate change affects: North and South but especially the poor due to higher environmental and social vulnerability
  - Global climate change affects: yield of agricultural products
- **Soil degradation**: e.g. deforestation, **desertification, salination**, especially in arid & semiarid Middle East region
- **Water**: hydrological cycle, pollution, scarcity
  - Hydrological cycle is affected by climate change & human action
  - Water scarcity: result of demand; quality: overuse, pollution

6.1. Global Climate Change: Temperature Increases

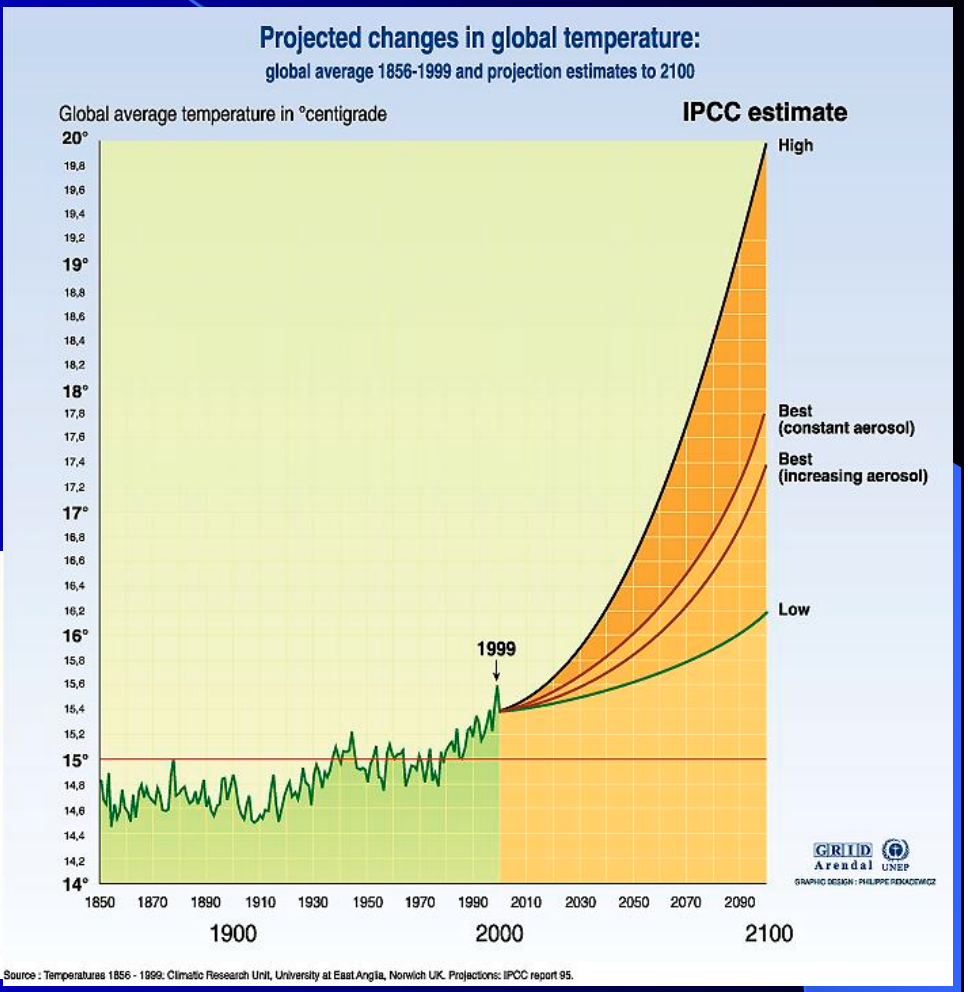
2 Climate Change Impacts: Temperature & Sea level Rise

- Global average temperature rise in 20th century: + 0.6°C
- Proj. temperature rise: 1990-2100: +1.4 – 5. 8°C

Sources: IPCC 1990, 1995, 2001

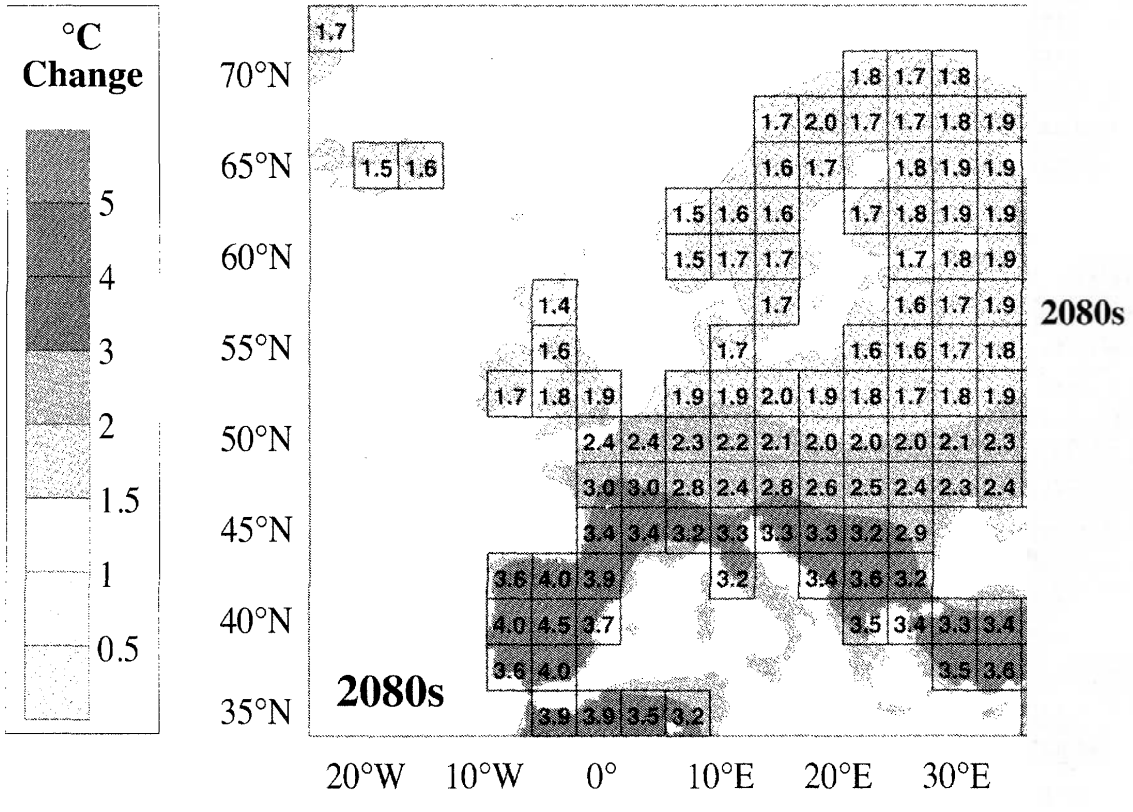


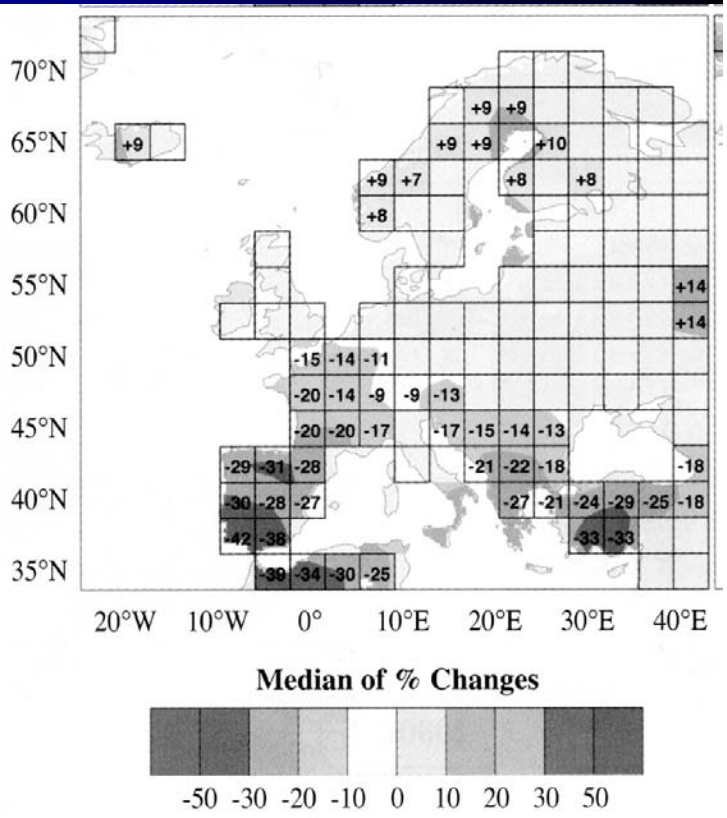
Source: School of environmental sciences, climatic research unit, university of East Anglia, Norwich, United Kingdom, 1999.



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

6.2. Climate Change Impacts in Mediterranean





Mean Temperature Change for Summer in 2080s (WG II, p. 651)

Mean Precipitation Change for Summer in 2080s (WG II, p. 652)

Source: IPCC: Climate Change 2001, WG II: Impacts (p. 651-652)

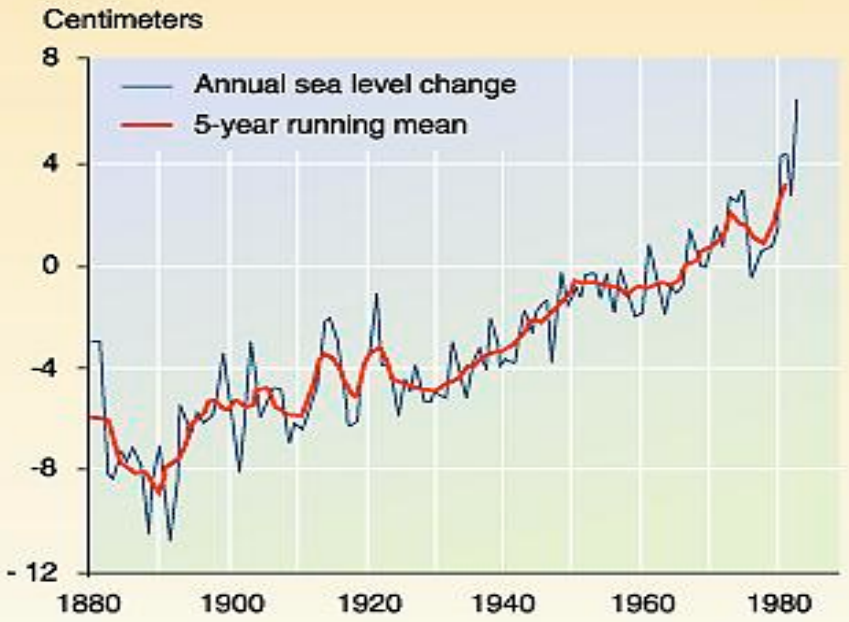
No specific climate change models for Eastern Mediterranean.

6.3.Global Climate Change: Sea level rise: 1860-2100

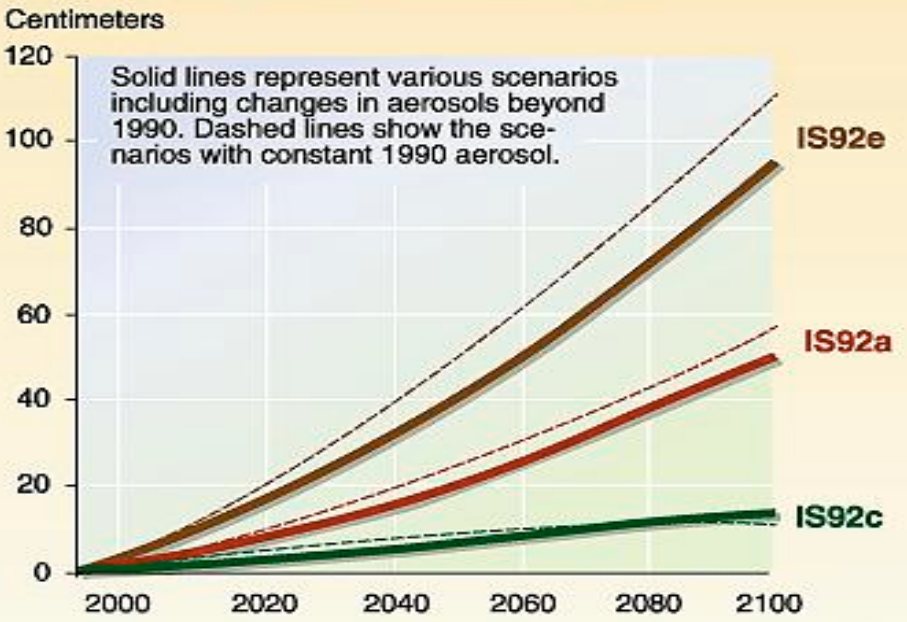
IPCC, TAR, WG 2 (2001): Sea level rise 1860-2000: 0.1 – 0.2 m; sea level rise: 1990-2100: + 0.09 - 0,88 m

Sea level rise due to global warming

Sea level rise over the last century



Sea level rise scenarios for 2100

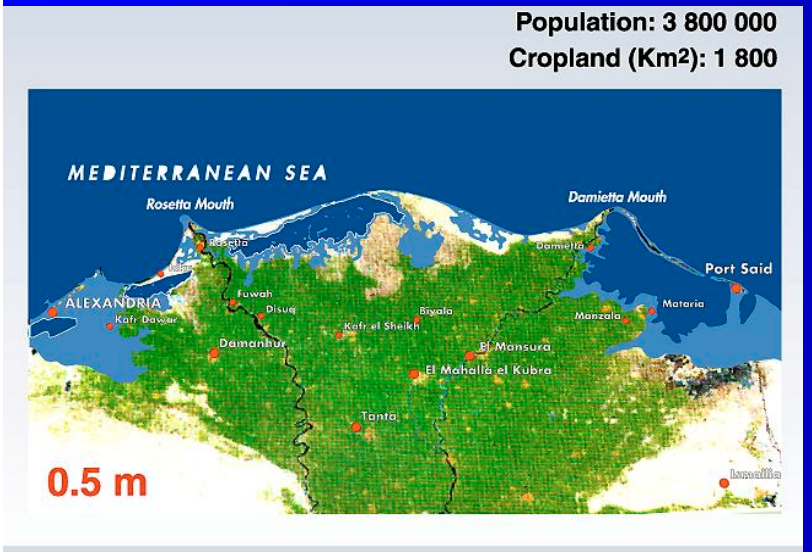


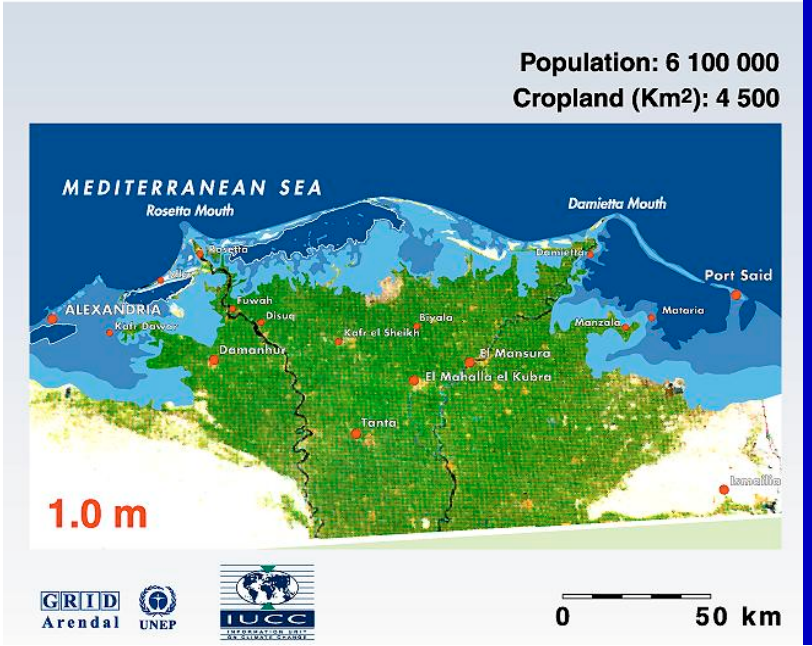
GRID Arendal UNEP

GRAPHIC DESIGN : PHILIPPE REKACEWICZ

Source: Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1995; Sea level rise over the last century, adapted from Gornitz and Lebedeff, 1987.

6.4. Effects of Climate Change for Egypt & Nile Delta





Climate Change Impacts for Egypt:

- Nil Delta: 50cm, 2 mio. persons,214.000 jobs
- Temperature for Cairo to 2060: + 4°C
- SSR (cereals): 1990-2060: 60% → 10%
- Decline in yield of wheat (by 2050: -18%)

Climate trends in Mediterran. by 2080

- Higher temperature increase in summer
- Decline of precipitation in summer.

Population Growth in Med. (2000-2050):

- North (South Europe: P,E,F,I Gr): - 23 Mio.
- South (MENA-Region): + 181 Mio.

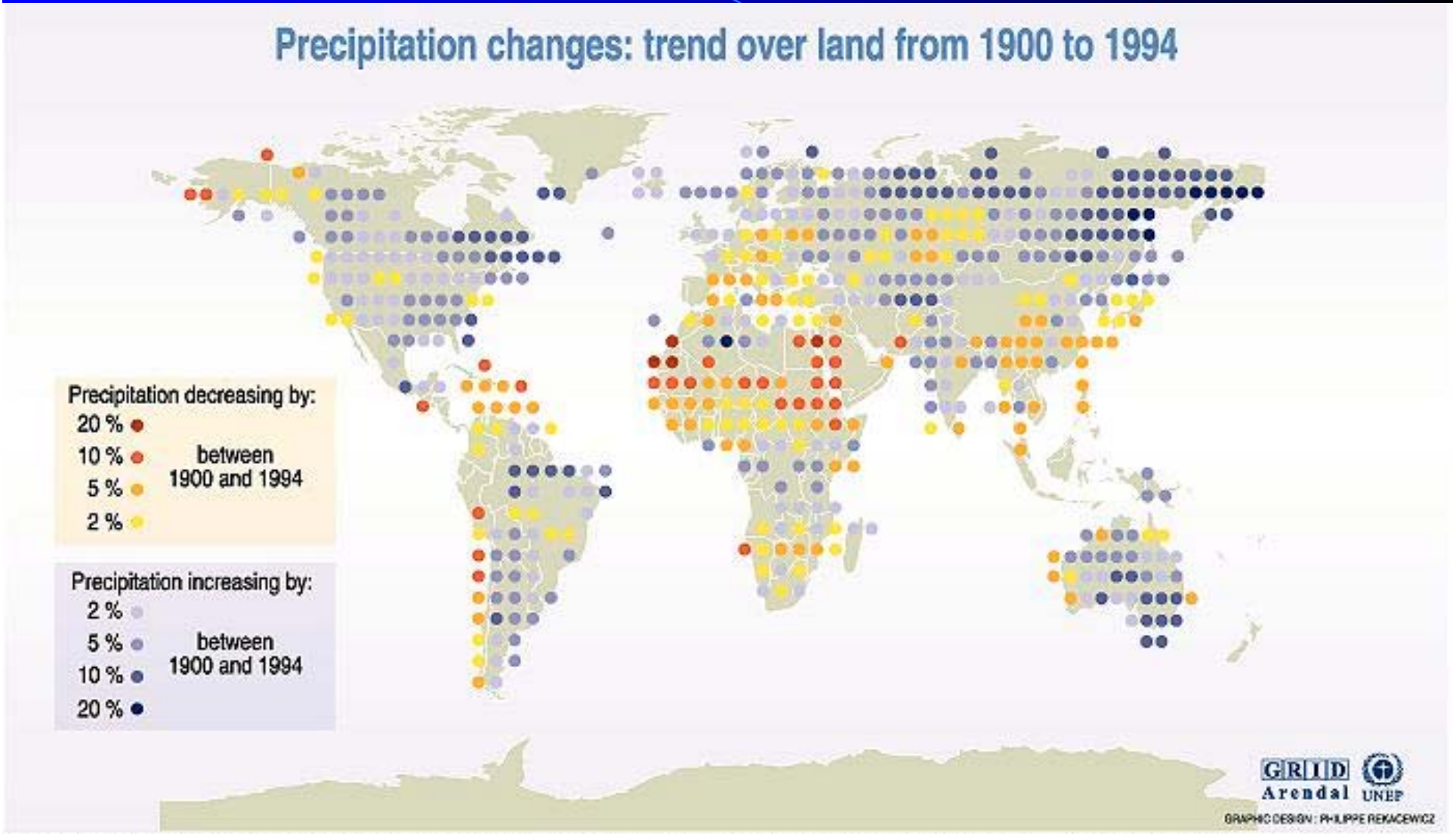
MENA: Increase in Food Insecurity

- FAO 2003: 1995-2030: +150% (42➢116 Mio.t)
- SSR: 1964: 86%, 1995: 65%, 2030: 54%

Dramatic Increase in Cereal Imports

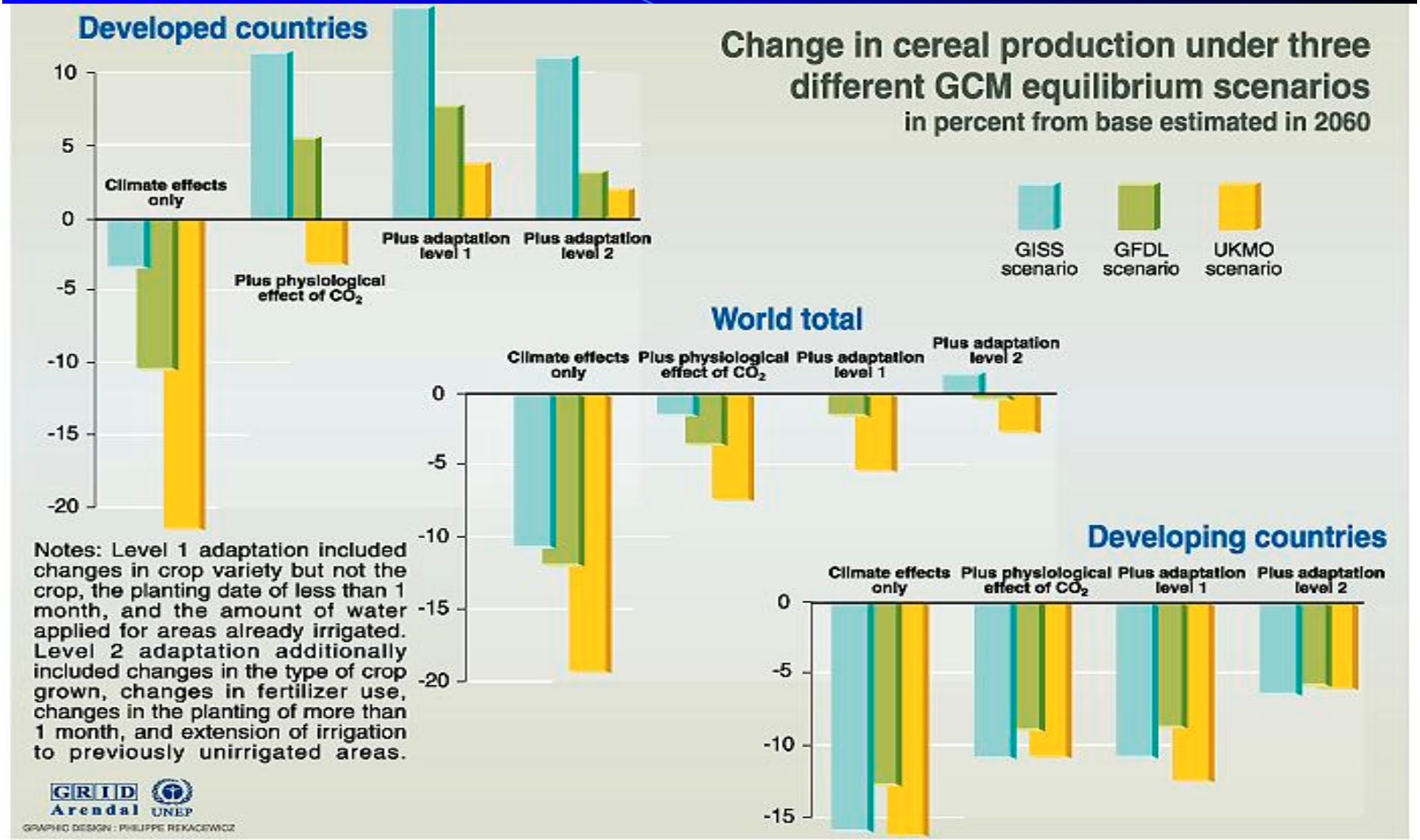
- Due to population growth & climate change

6.5. Climate Change Impacts on Precipitation



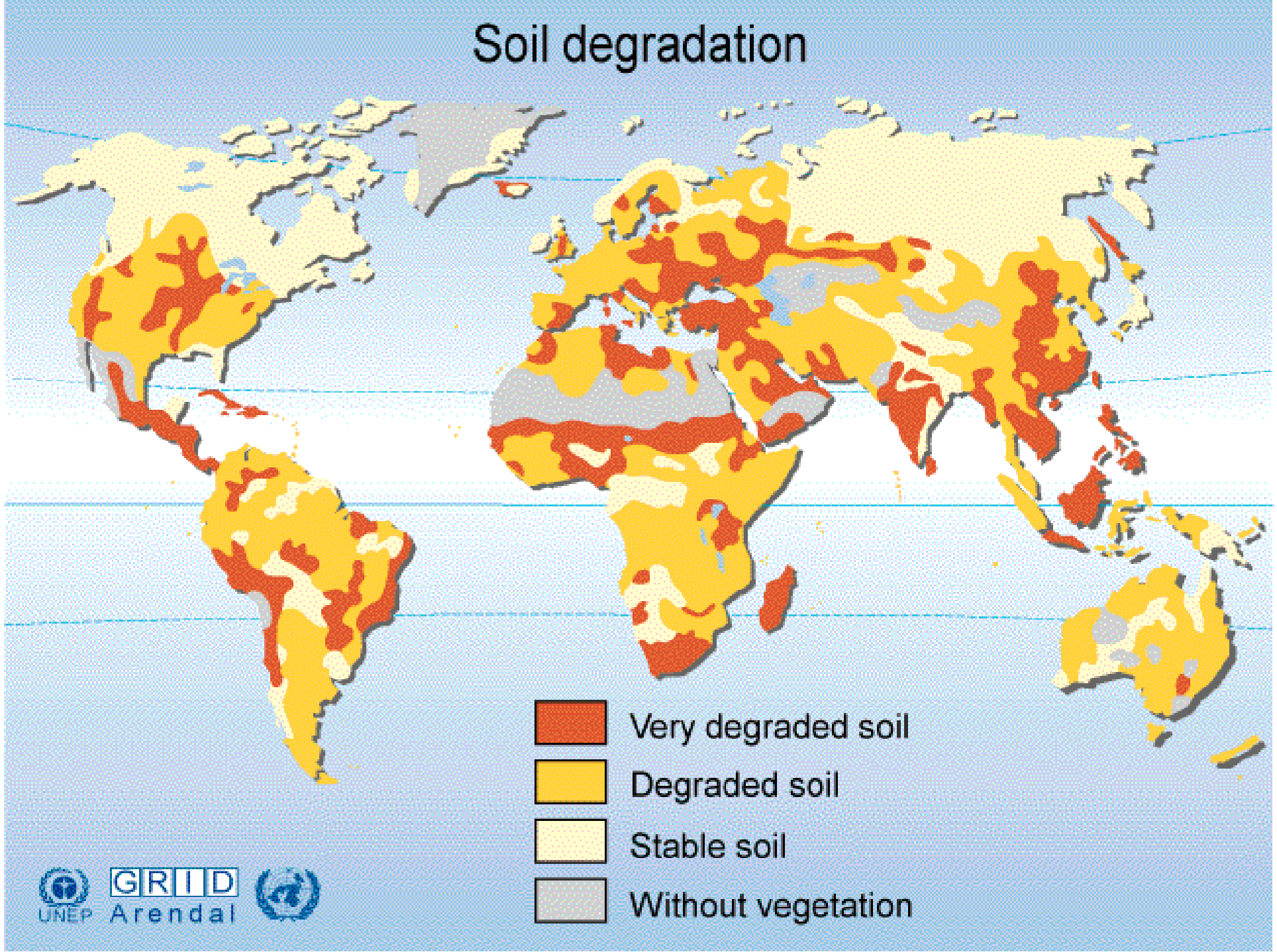
Sources: Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996; Hulme et al., 1991 and 1994; Global Historical Climate Network (GHCN), Vose et al., 1995 and Eischeid et al., 1995)

6.6. Climate Change Impacts on Agriculture



Source: Climate change 1995, Impacts, adaptations and miligation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

Soil degradation



UNEP GRID Arendal

6.8. Soil Erosion and Desertification

Climate change impacts (2100)

- temperature increases (2.5-4.5°C)
- Sea-level rises (SLR)
- uncertainty on precipiatation
- heat waves & droughts increase
- urbanisation increase temp.&SLR
- Desertification increase in max. temperature & reduce precipitation
- climate change impacts may intensify desertification
- decline in agricultural yields (cereals)

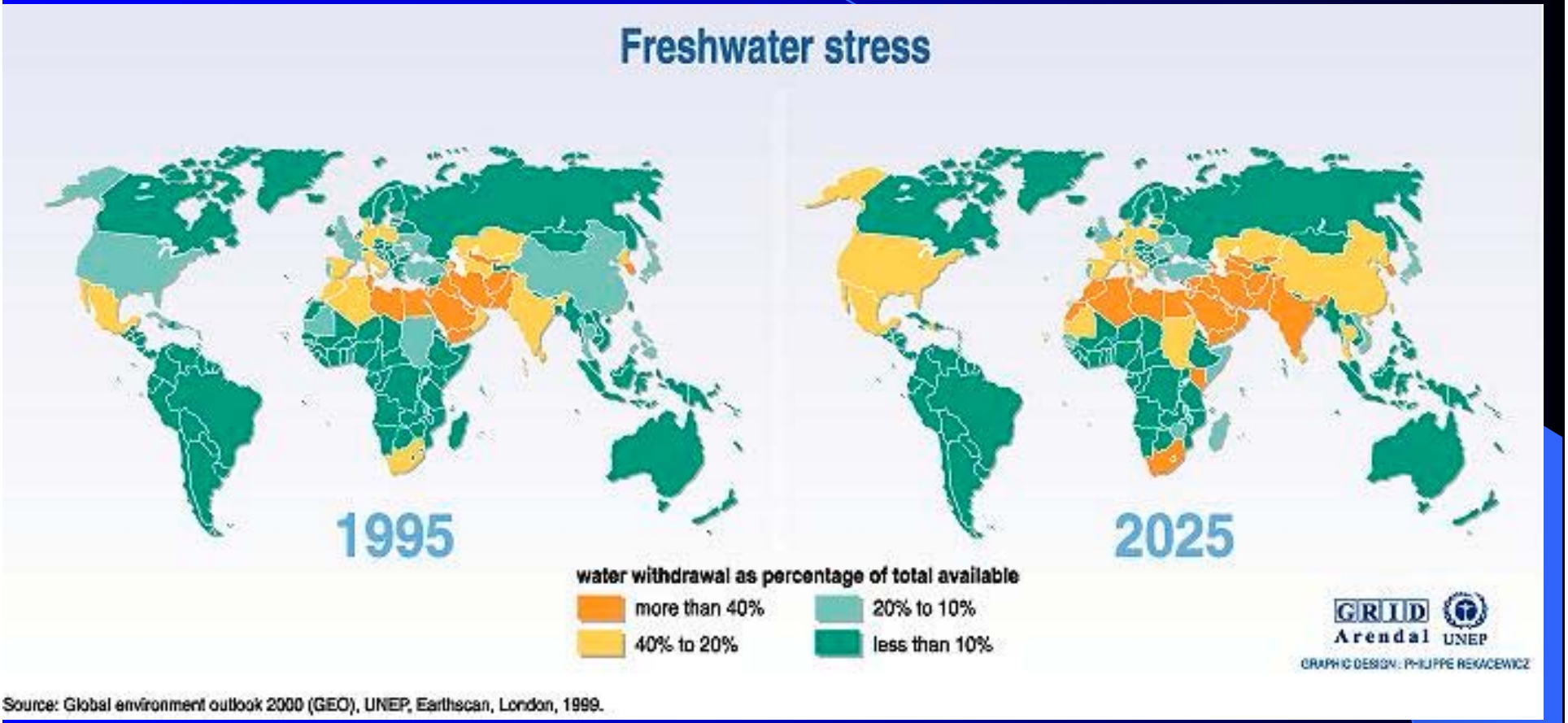
High sensitivity of ecological & social systems to climate change:

„There is clear evidence of potentially serious impacts throughout the Mediterranean region, with the most acute impacts being felt south of the socio-economic divide in Africa and the Near East.“

- High environmental and societal vulnerability of Eastern Med. region
- Low adaptive capacity and limited mitigation efforts (due to ME conflict)

UNEP warned in 1990: "[it] is likely that the impact of climate change will first be felt in the Mediterranean water resource system."

6.9. Global Fresh Water Stress, 1995-2025 (UNEP)



Source: Global environment outlook 2000 (GEO), UNEP, Earthscan, London, 1999.

- **The MENA Region has been and will remain the region with the highest water stress that will become even more severe due to population growth and climate change (temperature rise).**

6.10. Water Scarcity in the Near or Middle East

- **FAO:** of 21 c. water-scarcity, 12 are in NE
- 11 MENA c. fresh water: 220 m3/cap. Jordan, 330 m3/cap. OPT, 2,000 m3/cap. Turkey,Syria.
- *K. Khosh-Chashm*: Most extreme water crisis is Gaza (15 gallons, US: 800 gall. or 1: 53).
- **Estimate**: a drop of 50% in ann. cap. Ren. Water: 1995 and 2025 in MENA countries.

Water	Israel	Jordan	West Bank
Supply	1987-1991 (million c.m)		
Normal	1,950	900	650
drought	1,600	700-750	450-550
Demand	Projected increase		
1987-91	2,100	800	125
2020	2,800	1,800	530

Source: Helena Lindblom 1995; Lowi 1992.

6.11. I.Dombrowsky: Near East Water Resources & Withdrawals, 1994 (GTZ 1998), in: Brauch (2003): 730

	Safe yield	Water withdrawals				
		Israel	Palestine	Jordan	Syria	Total
Jordan River Basin	1320	645	0	350 (incl. wadis)	ca. 200	1195
Mountain Aquifer WB, Israel	679	487	121	-	-	608
Coastal Aquifer Israel	240	240	-	-	-	240
Coastal Aquifer Gaza Strip	55	-	108	-	-	108
Other Aquifers Israel	215	283	-	-	-	283
Aquifers Jordan	275	-	-	507	-	507
Total	2784	1655	229	857	ca. 200	2941

6.12 Water Resources in Israel and in OPT

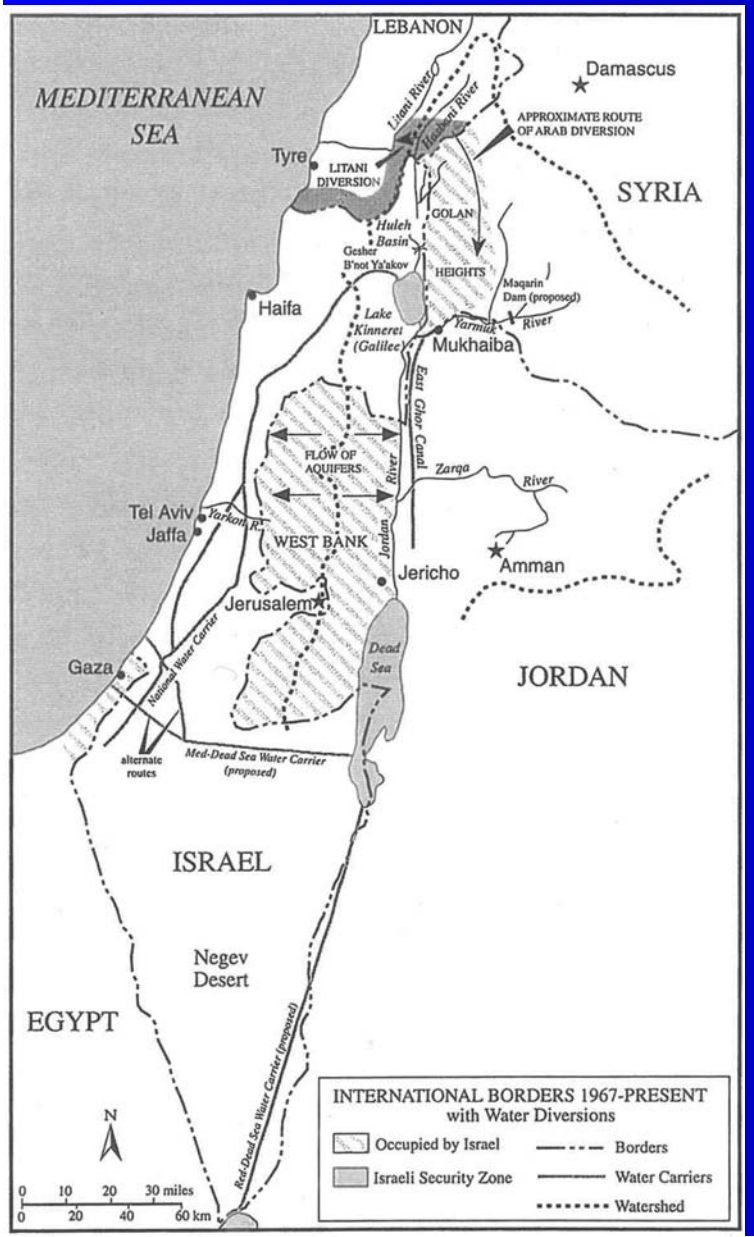
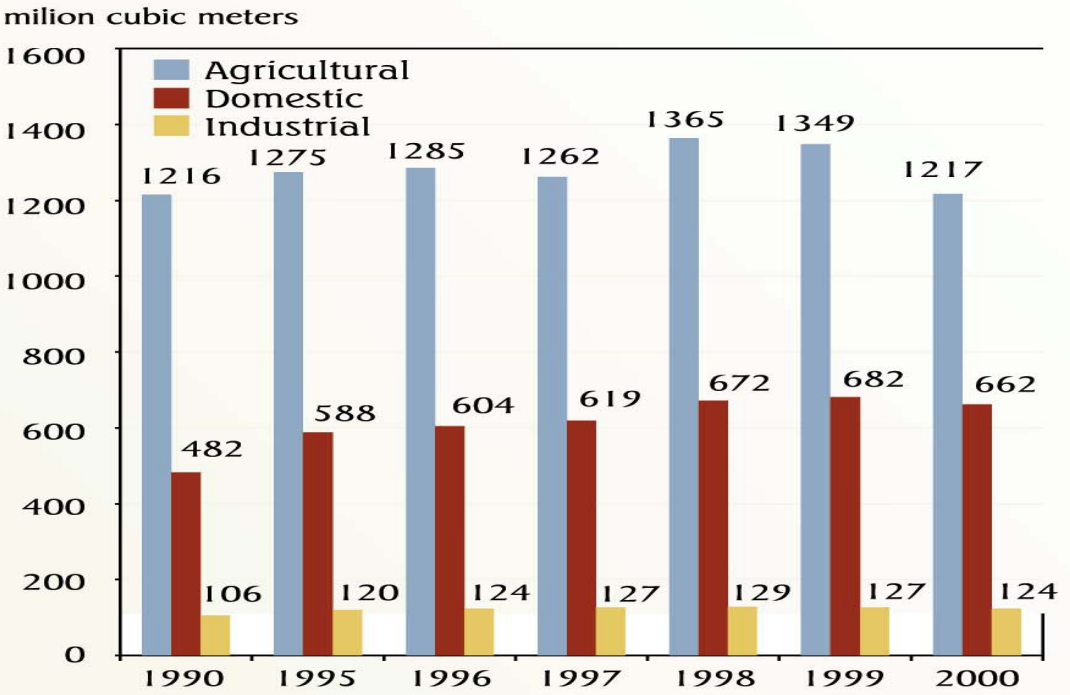


Fig. 11 Water Consumption by Purpose

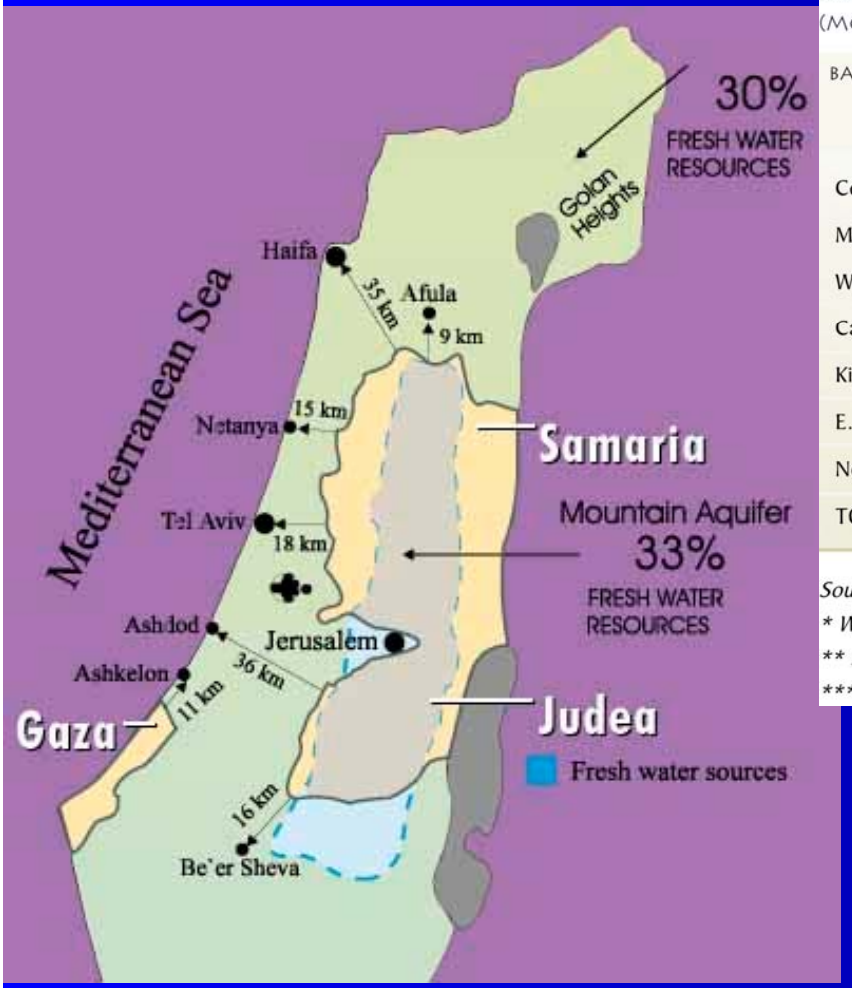


Source: Water Commission

Source: Environment in Israel 2002: 75

- **By 2004: desalination plants should produce at least 250 MCM/yr, Necessary to desalinate at least 375 MCM in 2004,+20 MCM each yr**

6.13. Environment of Israel 2002: Water



PUMPING, YIELD AND REPLENISHMENT OF ISRAEL'S WATER RESOURCES (MCM) (1999/2000)

BASIN	PUMPING TOTAL	SALINE*	INFILTRATION	SPRINGS FLOW TOTAL	SALINE	YIELD	REPLENISHMENT	AVERAGE REPLENISHMENT
Coastal	542	20	128			542	278 **	304
Mountain	399	8	0	28	25	427	301	350
W. Galilee	91	10		24	6	115	173	205
Carmel	37	8		3	3	40	39	41
Kinneret		59		321	18	380	430	580
E. Mountain	149	14		187	125	336	314	367
Negev & Arava	88	59				88	55 ***	55***
TOTAL	1365	119	128	563	177	1928	1590	1902

Source: Hydrological Service, Water Commission

** Water with chloride concentrations exceeding 400 mg/l is defined as saline.*

*** Replenishment in the Coastal Aquifer includes irrigation return flows, leaks, etc. estimated at 59 MCM.*

**** Mostly a one-time reserve.*

Pumping, Yield & Replenishment of Israel's Water Re-Sources (1999/2000)

Fresh & Marginal Water Consump-Tion in 2000 (mcm)

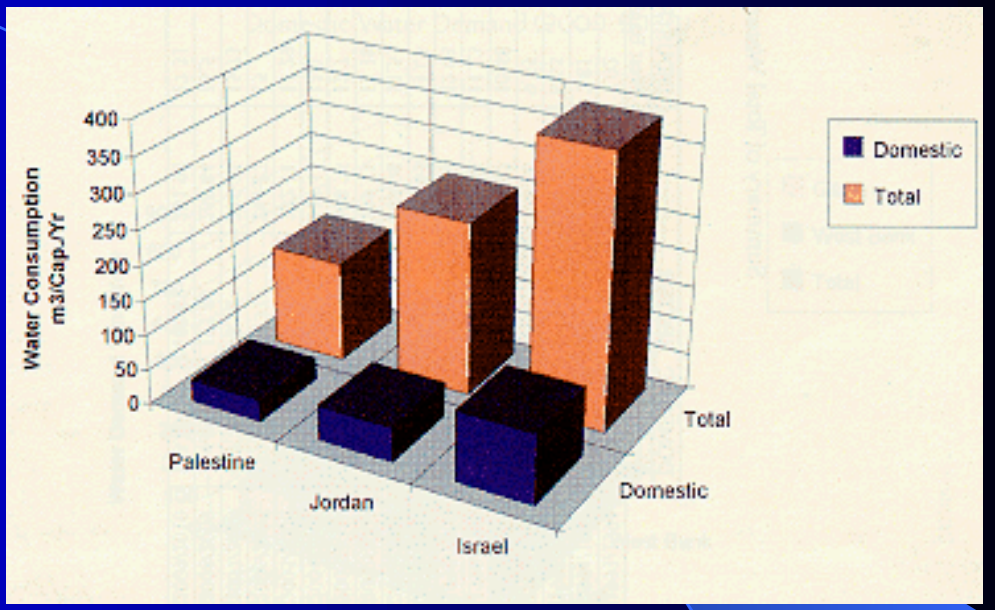
FRESH AND MARGINAL WATER CONSUMPTION IN 2000 (MCM)

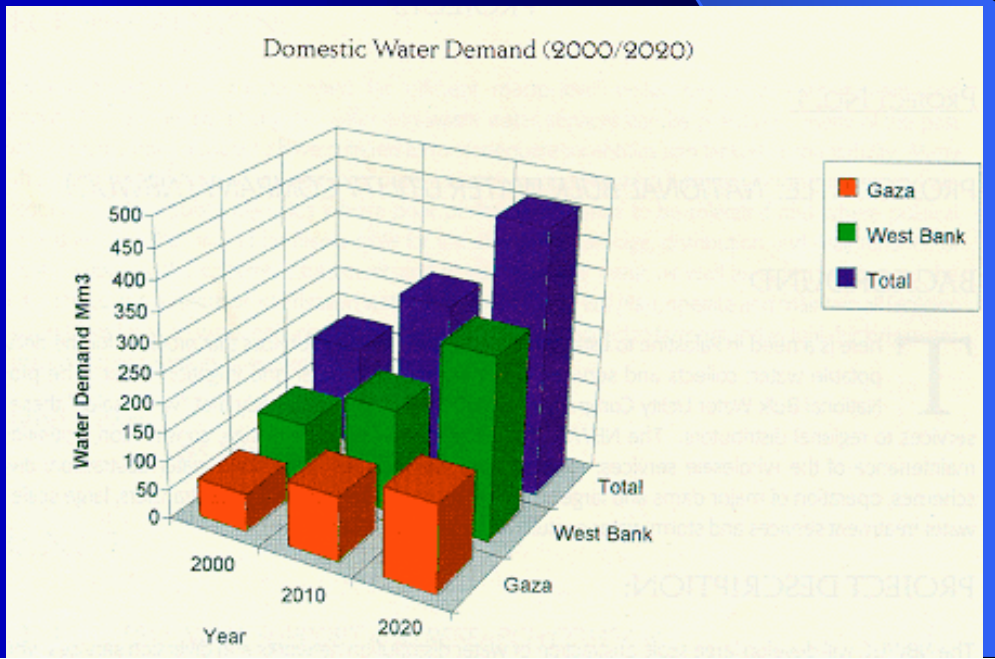
YEAR	FRESH WATER	MARGINAL WATER*	TOTAL
Agricultural	823	393	1216
Domestic	659	3	662
Industrial	90	34	124
Total Consumption	1573	430	2003

* Marginal water includes saline wells, floodwaters and effluents

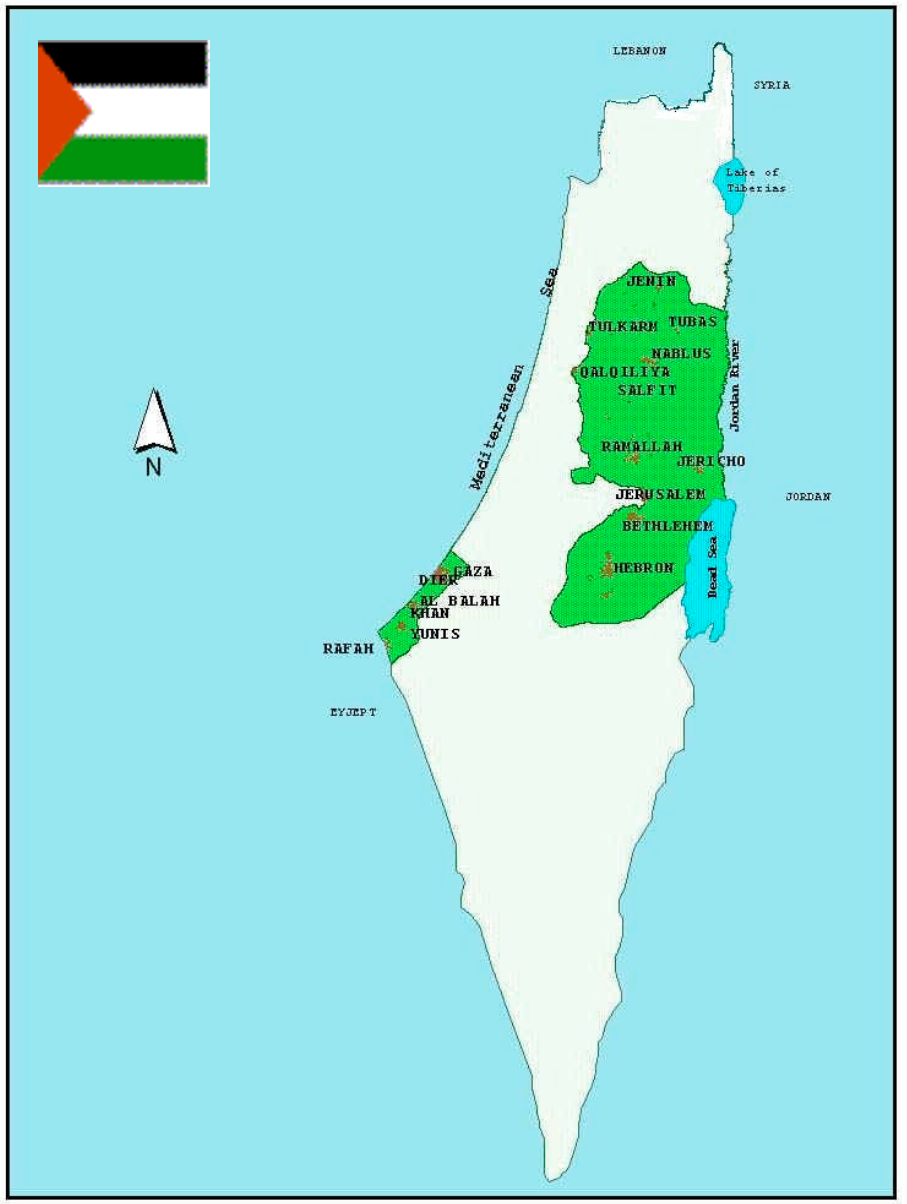
Source: Water Commission

6.14. Water situation in Gaza





6.15. Water Scarcity in the Occupied Palestinian Terr



- Major demand increase due to population growth

2000: 3.19; 2025: 7.15; 2050: 11.82

- Decline in precipitation due to climate change?

Water Dev./mio. m3/year
Source: UNEP Desk Study

	2000	2010	2020
Gaza Strip	114	228	285
Westbank	155	394	584
Desalination (Gaza only)	0	47	57

6.16. Water Demand Forecast: Jordan 1990-2025

Sources of Water Use in Jordan in 1997

Source	Munic	Ind.	Irrig	Live	Total
Surface	58.071	1.893	264.486	4.00	328.450
Ground	177.557	35.343	266.189	7.12	486.207
Waste	0.000	0.000	61.000	0.00	61.000
Total	**235.628**	**37.236**	**591.675**	11.12	**875.657**

Water situation in Jordan

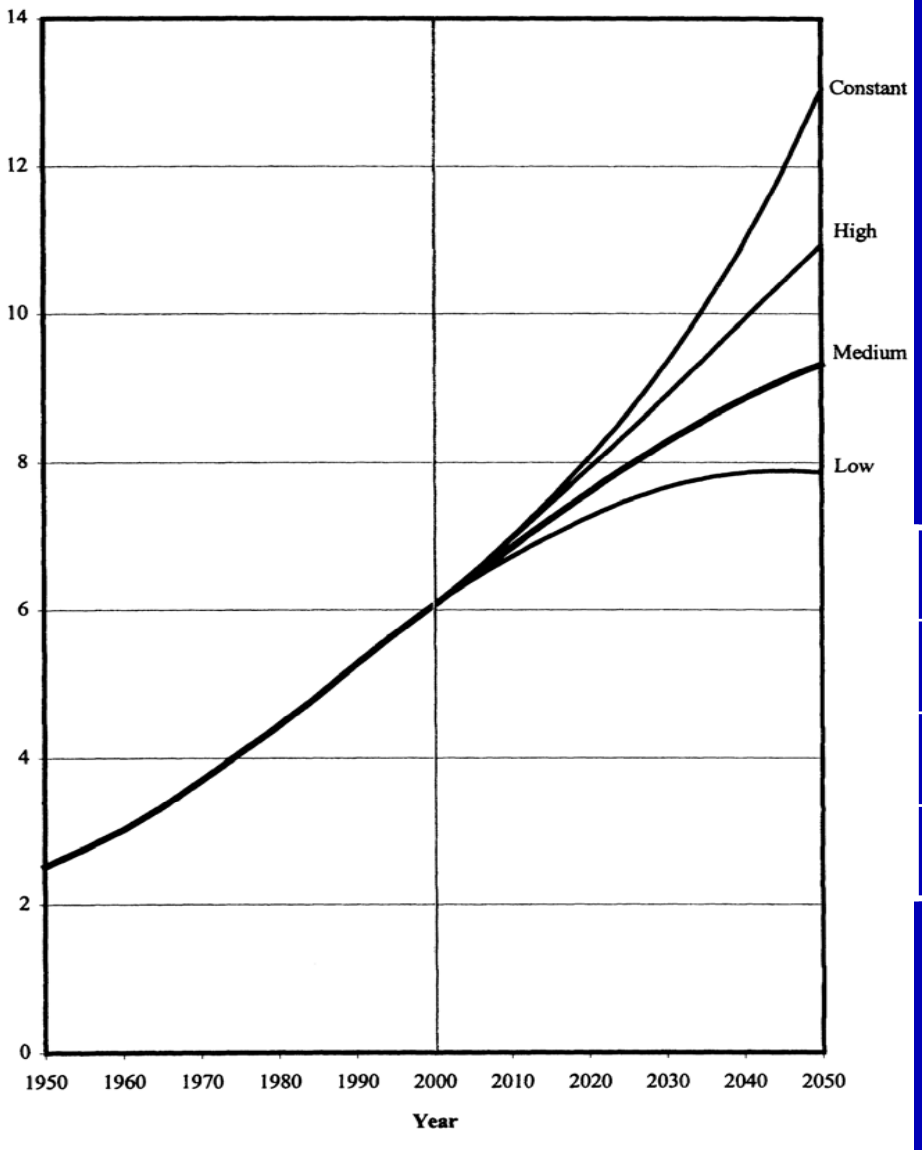
Year	Supply	Demand	Deficit (Mcm/y)
1995	882	1,104	222
2000	960	1,257	297
2005	1,169	1,407	238
2010	1,206	1,457	251
2015	1,225	1,550	325
2020	1,250	1,658	408

Source: Semide: Water in Jordan

Water resourc.: surface w. (Jordan), Groundwater, waste water (for irrig.),

Future solution: desalination

7. Demand Side: Purely Anthropogenic Factors for Eastern Mediterranean



- **Population growth:**

← World Population, Medium Scenario 2000-2150 (UN, 1998 Rev.)

	2000	2050	2100	2150
Total	6,01	8,91	9,50	9,75

World Population in 2300. Highlights (UN, Dec. 2003), Medium Scenario ↓

	2000	2050	2100	2200	2300
World	6,071	8,919	9,064	8,499	8,972
Developed	1,194	1,220	1,131	1,207	1,278
Less Dev.	4,877	7,699	7,933	7,291	7,694

- **Urbanisation:** will increase
- **Food & Agriculture:** Demand will grow due to popul. growth

7.1 Population Growth: Eastern Mediterranean

Table: UN Population Projection (Rev. 2000), mio.

Source: UN Populations Division: World Population Prospects. 2000 Rev.

	1850	1900	1950	2000	2025	2050	1950-2050	2000-2050
Jordan	0.25	0.3	1.24	4.91	7.19	11.71	10.47	6.80
Israel			1.26	6.04	8.49	10.07	8.81	4.03
OPT	0.35	0.5	1.01	3.19	7.15	11.82	10.82	8.63
Lebanon	0.35	0.5	1.44	3.50	4.58	5.02	3.58	1.52
Syria	1.5	1.75	3.50	16.19	27.41	36.35	32.85	20.16
Turkey	10.0	13.0	20.81	55.67	86.61	98,82	78.01	43.15
East. Med.	12.45	16.05	29.25	89.50	141.43	173.88	144.53	84.28
S. Europe	83.0	103.5	132.9	177.3		154.1	+21.2	-23.24

7.2 Population Growth: Eastern Mediterranean

Table: UN World Population 2300 (Dec. 2003), in million

Source: UN Populations Division: Draft World Population in 2030. Highlights

According to the Medium Scenario, 2000 to 2300, maximum population & year

[http://www.un.org/esa/population/publications/longrange2/AnnexTablesB.pdf]

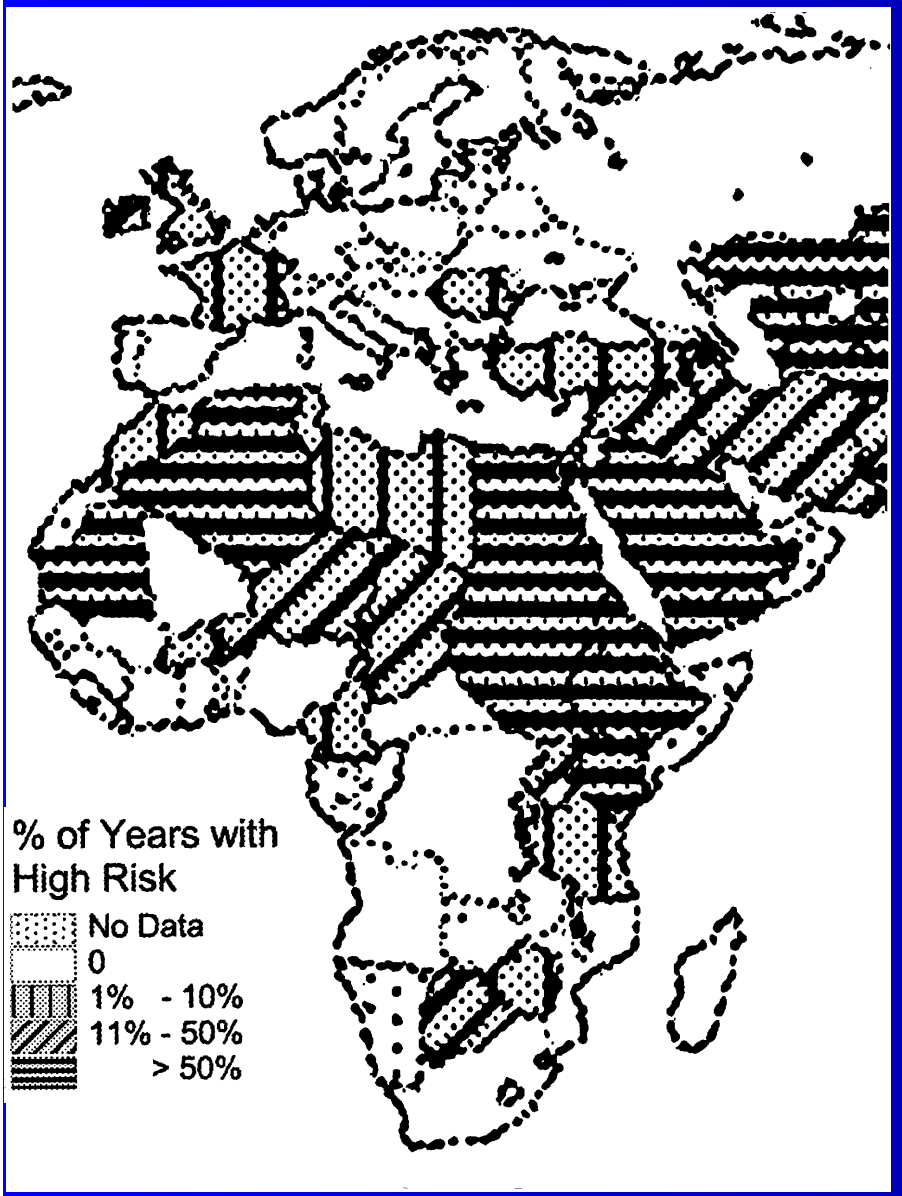
	2000	2050	2100	2200	2300	Year of max. pop.	Max. pop.
Jordan	5.035	10.154	10.664	9.659	10.077	2080	10.902
Israel	6.042	9.989	9.833	8.817	9.370	2070	10.290
OPT	3.191	11.114	14.932	12.856	13.484	2105	14.933
Lebanon	3.478	4.946	4.506	4.420	4.694	2055	4.951
Syria	16.560	34.174	35.012	31.530	33.413	2075	36.316
Turkey	68.281	97.759	90.323	87.452	91.593	2055	98.064
Egypt	67.784	127.407	131.819	117.851	124.715	2075	136.279

7.3 Urbanisation in the Eastern Mediterranean

Table: World Urbanization Prospects (Rev. 2001),% Source: UN Populations Division: World Population Prospects (2002)

	1950	1960	1980	2000	2010	2020	2030
Jordan	35.9	50.9	60.2	78.7	80.1	82.2	84.4
Israel	64.6	77.0	88.6	91.6	93.0	93.9	94.6
Palestine	37.3	44.0	61.1	66.8	70.0	73.5	76.9
Lebanon	22.7	39.6	73.7	89.7	92.1	93.1	93.9
Syria	30.6	36.8	46.7	51.4	55.4	60.6	65.6
Turkey	21.3	29.7	43.8	65.8	69.9	73.7	77.0
West Asia	26.7	35.0	51.7	64.7	67.2	69.8	72.4
Asia	17.4	20.8	26.9	37.5	43.0	48.7	54.1

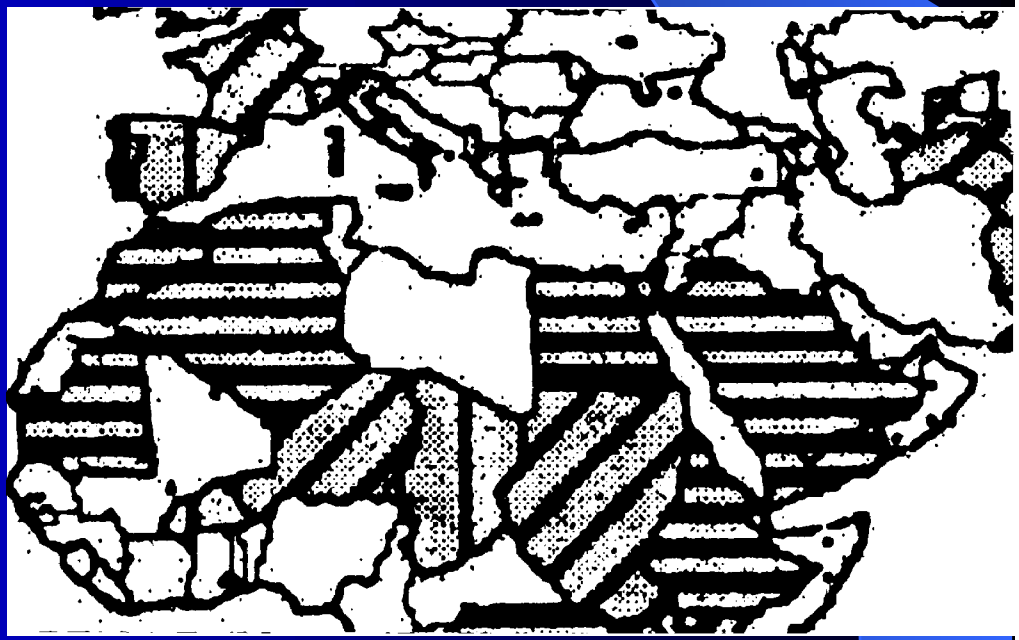
7.4 High Potential for Food Crisis 1990-2050



← **Food Crisis: 1900-1995**

Source:Alcamo/Endejan (2002)

High Potential for Food Crisis 2001-2050 with GDP In-crease & Climate Change ↓

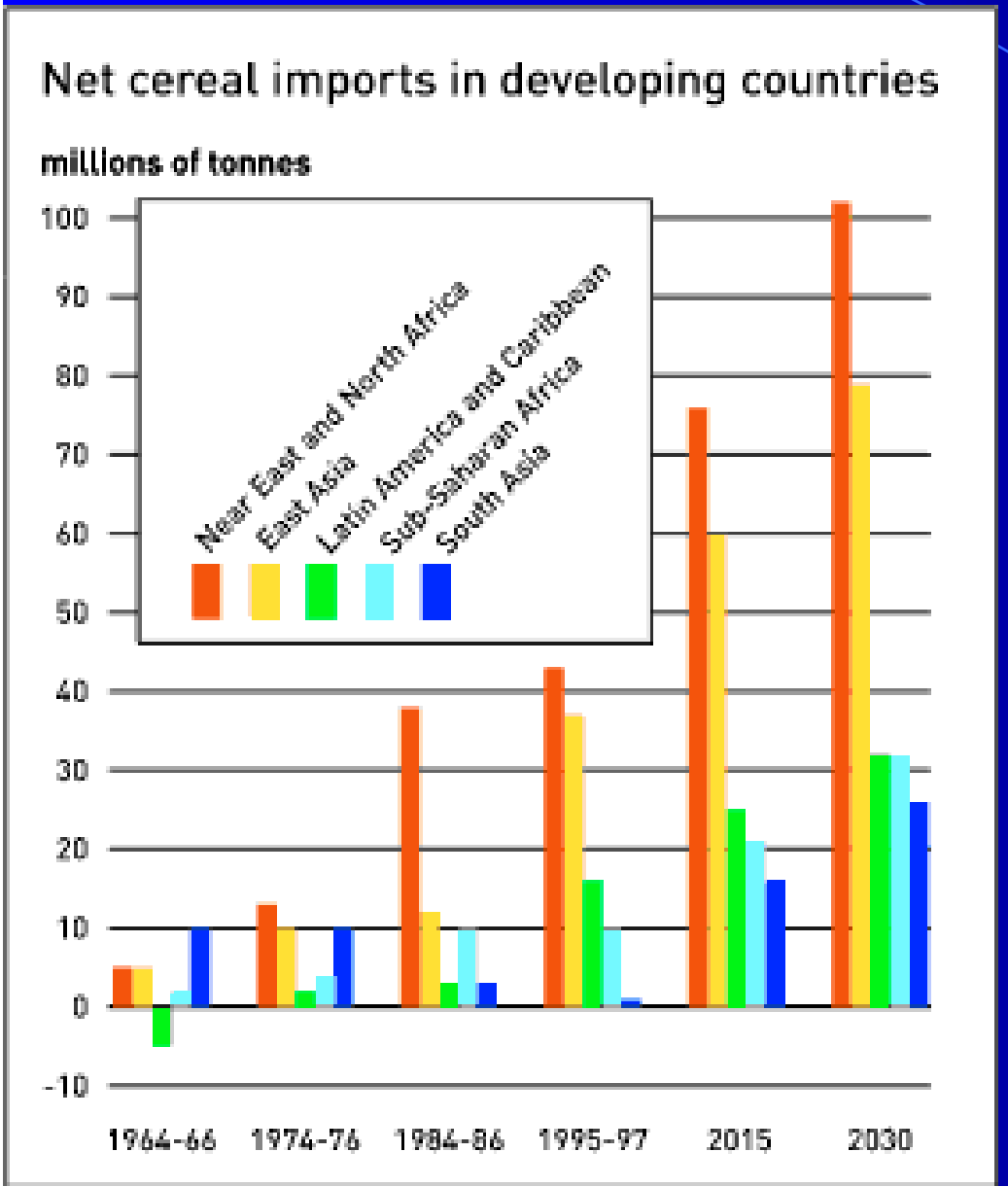


7.5. Food Security in the MENA Region

Table:Cereal balance for the MENA, all cereals (1964-2030).

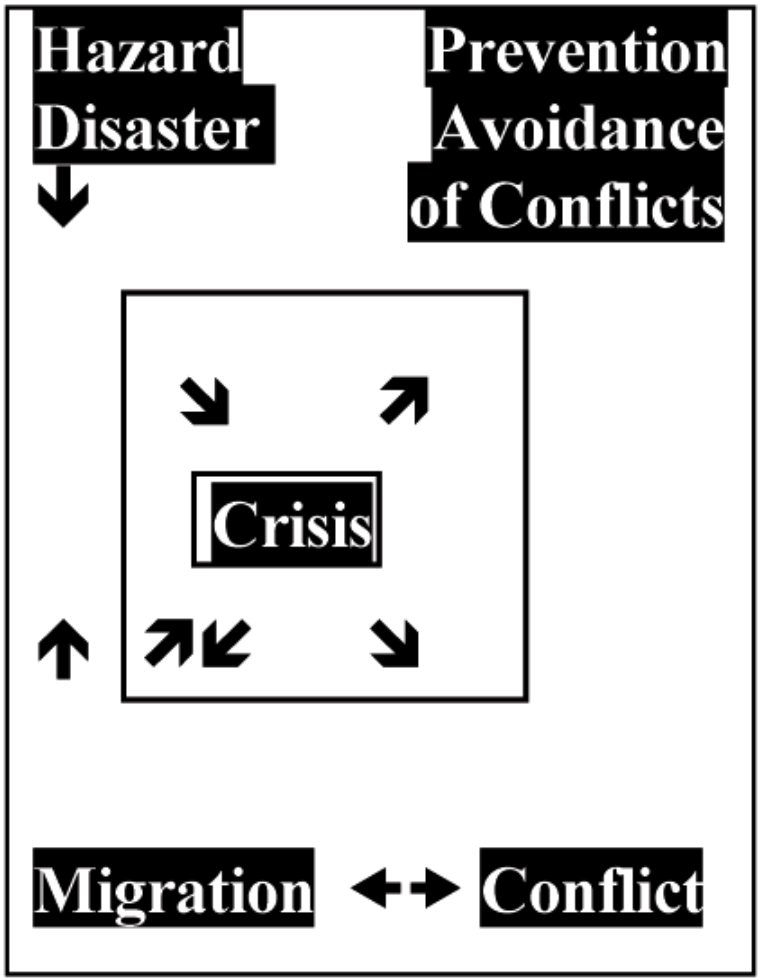
19	Demand				Pro-duc-tion	Net tra-de	Selfs uf-fic. rate %	Growth rates, % p.a			
	Per caput (kg)		Total (mio.tons)					Time 19... /20..	Dem and	Pro-duc-tion	Po-pula tion
	food	All uses	food	All uses							
64/66	174	292	28	47	40	- 5	86	67-97	3.6	2.4	2.7
74/76	190	307	40	64	55	- 13	85	77-97	3.1	2.7	2.7
84/86	203	365	56	100	65	-38	65	87-97	2.1	2.0	2.4
95/97	208	357	75	129	84	-43	65	’95- 15	2.0	1.4	1.9
2015	209	359	108	186	110	-85	56	‘15- 30	1.5	1.2	1.4
2030	205	367	130	232	131	-116	54	‘95-‘30	1.8	1.3	1.7

7.6. FAO (2000) Increase in Cereal Imports



- **FAO: 4 March 2003, Rome** World's population will be better fed by 2030, **but hundreds of millions of people in developing countries will remain chronically hungry**.
- Parts of South Asia may be in a difficult position and **much of sub-Saharan Africa** will not be significantly better off than at present in the absence of concerted action by all concerned.
- Number of hungry people is expected to decline from 800 million today to 440 million in 2030.
- **The target of the World Food Summit (1996) to reduce the number of hungry by half by 2015, will not be met by 2030.**

8. Interactions among Fatal Outcome: Linking Drought & Famine with Societal Consequences



Much knowledge on these factors:

- ✓ Drought, migration, crises, conflicts

Lack of knowledge on linkages among fatal outcomes

- ➢ Drought & drought-ind. migration
- ➢ Famine & environm.-ind. migration
- ➢ Conflicts & conflict-induced migration

Lack of knowledge on societal consequences: crises/conflicts

- ➢ Domestic/international crises/conflicts
- ➢ Environmentally or war-induced migration as a cause or consequence of crises and conflicts

8.1. Bill For Climate-Change Disasters Put At $60 Billion

Natural disasters caused by climate change have cost the world more than $60 billion this year, up from about $55 billion last year, says a report released yesterday by the U.N. Environment Program's Finance Initiative during the U.N. Framework Convention on Climate Change meeting in Milan.

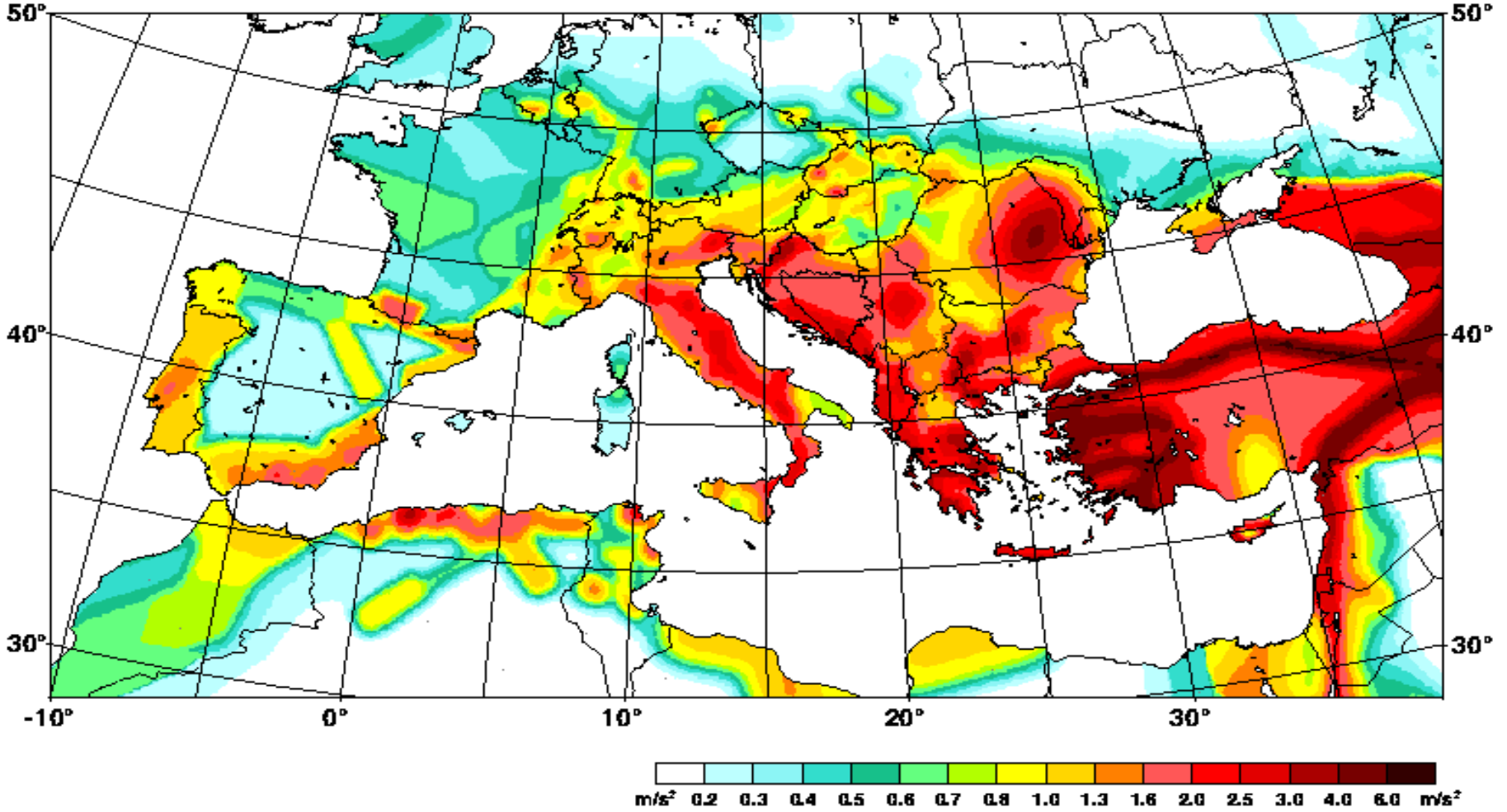
According to the report, compiled by insurance firm Munich Re, Europe's extreme summer heat wave was the biggest climate event of the year, costing more than $10 billion in agricultural losses and killing around 20,000 people.

"We will have to get used to the fact that extreme summers, like the one we had in Europe this year, are to be expected more frequently in the future and that they will become more or less the norm by the middle of the century," said Thomas Loster, head of the UNEP Finance Initiative's climate change working group and Munich Re's head of weather/climate risks research.

UNEP Executive Director Klaus Toepfer added that, "Climate change is not a prognosis, it is a reality that is, and will increasingly bring human suffering and economic hardship."

Toepfer welcomed the $400 million in pledges made in Milan to help developing nations cope with the impact of climate change (UNEP release, Dec. 10).

8.2. Fatal Outcomes: Earthquakes in the Med.



8.3 Fatalities of Disasters in the Eastern Med.

Table: Fatalities of Natural Disasters (1975-2001)

	Total			Drought		Earthquakes		Floods		Storms	
	Ev	Killed	Affect (000)	Kill.	Aff. 000	Killed	Affect (000)	Kill.	Aff. 000	Kil	Aff.
Israel	11	31	2,029	-	-	-	-	11	1	3	410
Jordan	11	47	349,0	-	330	-	-	17	18,0	11	200
Leban.	4	45	105,6	-	-	-	-	-	1,5	25	104,
OPT	1	-	943	-	-	-	-	-	-	-	-
Syria	5	115	662,2	-	658	-	-	27	172	-	-
Turkey	63	27,375	2,580	-	-	26,087	2,377	450	92,2	31	3
East M.	95	27,613	3,700	0	988	26,087	2,377	505	112,9	70	104,
Total M.	485	43,728	22,145	0	10 m	35,735	35,735	4374	2,153,	608	3,697

8.4. Vulnerability of Cities to Earthquakes

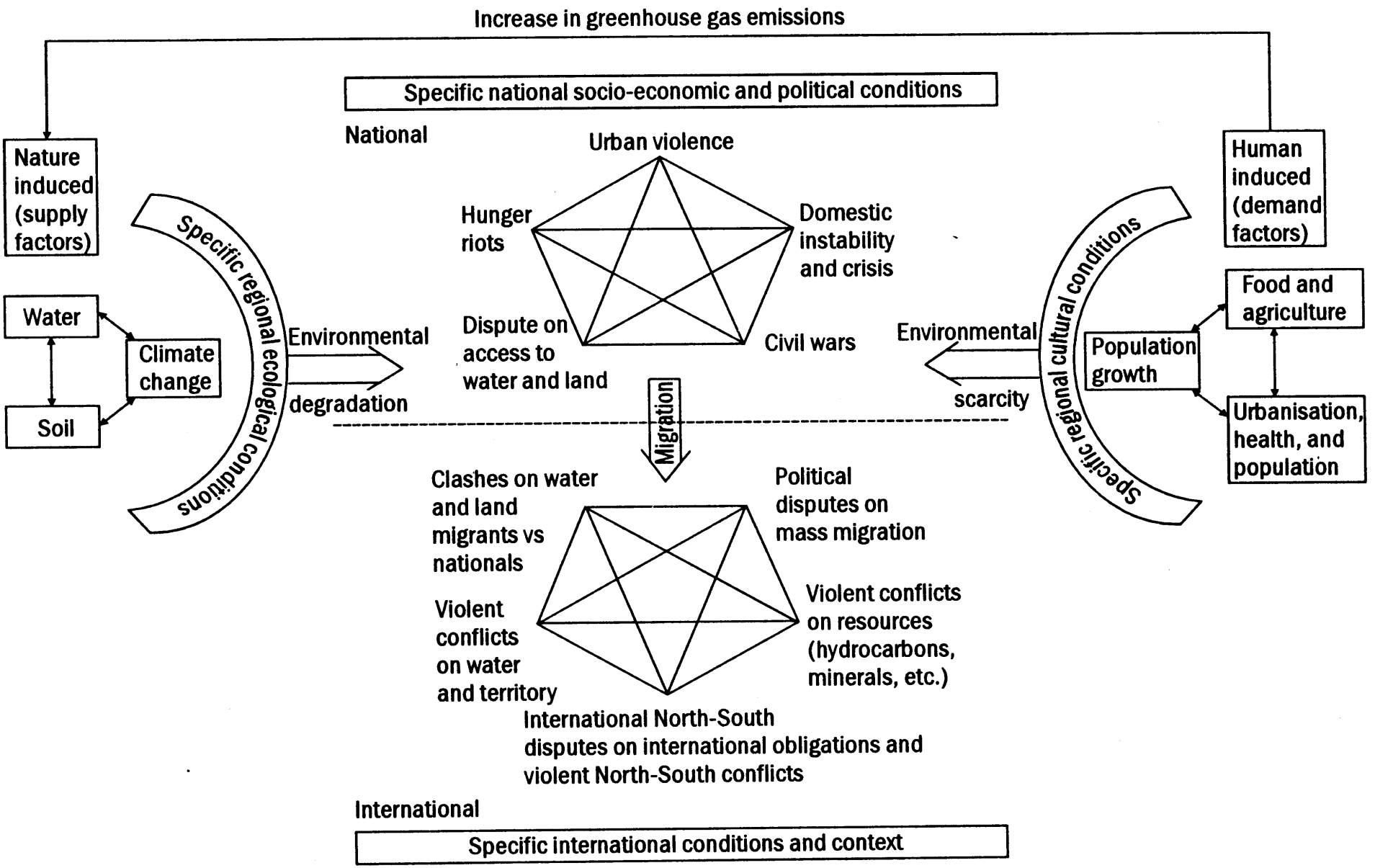
City	1950	1960	1975	1990	2000	2010	2015
Athens	1.8	2.2	2.7	3.0	3.1	3.1	3.1
Istanbul	1.08	1.74	3.60	6.54	9.45	11.84	12.49
Ankara	0.54	0.87	1.71	2.54	3.20	3.85	4.08
Izmir	0.48	0.66	1.05	1.74	2.41	3.01	3.20
Cairo	2.41	3.71	6.08	8.57	10.55	12.66	13.75
Alexandria	1.04	1.50	2.24	3.21	4.11	5.05	5.53
Tel-Aviv	0.42	0.74	1.21	1.80	2.18	2.52	2.63
Gaza	1945: 0.072	??	0.414	??	? 0.800	??	??
Amman	0.09	0.22	0.50	0.96	1.43	1.97	2.21
Beirut	0.34	0.56	1.06	1.58	2.06	2.37	2.47
Damascus	0.37	0.58	1.12	1.80	2.34	3.07	3.50
Aleppo	0.32	0.48	0.88	1.54	2.17	2.92	3.31

8.5. Migration Trends in the Mediterranean

Table: Net migration rates in the Med. (Zlotnik,2003:599)

Region	*1950-60*	*1960-70*	*1970-80*	*1980-90*	*1990-2000*
	Net number of migrants per year (thousands)				
Mediterranean	-2,765	-4,097	-2,127	-839	369
NW Mediter.	-1,521	-761	1,079	337	2,124
NE Mediter.	-823	-1,162	-71	-162	-888
East. Medit.	576	-406	-1,295	-506	921
South. Medit.	-997	-1,769	-1,840	-508	-1,788
	Net migration rate				
Mediterranean	-1.1	-1.4	-0.6	-0.2	0.1
NW Mediter.	-1.2	-0.5	0.7	0.2	1.3
NE Mediter.	-2.4	-3.1	-0.2	-0.4	-2.0
East. Medit.	1.7	-0.9	-2.3	-0.7	1.0
South. Medit.	-2.0	-2.8	-2.3	-0.5	-1.4

8.6. Potential Violent Outcomes of Environm. Stress



8.7. Most Urgent Unresolved Human Security Issue

- Not caused by environm. but with a negative impact on environm.
- Of the 3,400 Palestinians and Israelis killed in violence between September 2000 and July 2003, 549 were under the age of 18.
- The situation of children in the region is like standing in the way of oncoming traffic, and called for increased international involvement to protect the plight of the region's children (12 Dec. 03).
- U.N. Secretary General Kofi Annan said the road map peace plan for the Middle East was "distressed" but far from dead, and that he believed the recent initiative known as the Geneva Accord demonstrated a mood for peace in the region (11 Dec. 2003).
- In unusually sharp criticism of Israel by the U.S. government, U.S. envoy David Satterfield said yesterday that the longtime U.S. ally had "done too little for far too long" to engage in peace negotiation with the Palestinian Authority. His comments came a week after U.S. Secretary of State Colin Powell met with the main authors of the Geneva Accord, despite Israeli objections (UN Wire,12 Dec. 03)

8.8. Addressing Urgent Human Insecurity in the OPT

- **The European Commission on 11 December announced a decision to provide € 13 million in additional support to vulnerable populations in the Middle East.**
- Activities will include the provision of **food, water, emergency health care, and job opportunities** for vulnerable Palestinians in the West Bank and Gaza Strip; health care, water and sanitation services to Palestinian refugees in Lebanon; and health services for refugees from Iraq hosted in camps in Jordan and in the 'no man's land' between Jordan and Iraq. The funds are directed through the European Commission's Humanitarian Aid Office (ECHO).
- More on http://europa.eu.int/news/index_en.htm

Source: EUROMED Synopsis, 11 December 2003

9. Environmental Challenges and Security

- Report: Global Trends 2015 (Dec. 2000) pointed for ME to 2 of these trends: population growth & water scarcity as U.S. national and international security threats, but not climate, desertification.
- Policy relevance depends on worldview & security concept: perceptions in North and South differ
- Hobbessian pessimists and narrow security concept often ignore or downplay these environmental challenges.
- Kantians: point to democratic, human rights deficits.
- Grotian pragmatist: agenda-setting & cooperative strategy.
- Narrow national security perspective: State, power and territorial integrity and ethnic & religious identity matter.
- It makes a difference how one views the threat or challenge to security: as a military threat or as a challenge to survival of humans
- Conclusion: Worldviews & mindsets of elites are a major impediment to perceive these non-military security challenges that cannot be solved by military means, only by cooperation of parties!

9.1. Human Security & Sustainable Development

- ❖ **Task of my talk: problem recognition, awareness creation, anti-cipatory learning, goal: destroy the prophecies by cooperation.**
- ➢ **The humanitarian crisis in the OPT has become a major challenge to human security and survival of individuals, families, villages and towns in Gaza & WB.**
- ➢ **If the problems in the Middle East are addressed as a purely „hard" military security issue from a purely Hobbesian perspective, then power matters.**
- ➢ **But will superiority be able to solve a basically asymmetric conflict?**
- ➢ **The conflict has resulted in major societal, economic, & political security issue, and as long as the conflict continues these other challenges are not addressed.**
- ❖ **I have tried to focus your attention to the other threats, challenges, vulnera-bilities and risks that also affect the security and survival of the whole area.**
- ➢ **From a pragmatic Grotian security perspective and from an equity oriented environmental standpoint only cooperation – also among opponents - matters.**
- ✓ **Gandhi who succeeded to end the British empire and it was those in Leipzig who peacefully demonstrated with candles for the superiority of their course.**
- ✓ **It was „learning" & not military power or violence that overcame the East-West Conflict. The experience of peaceful change made the Berlin Wall to come down without a single person dying, and to reunite a formerly divided Europe.**
- ✓ **I hope and wish that the people in the OPT will soon have the same experience.**

10. Policy Suggestions for the Eastern Mediterranean Region

- **Unresolved conflict in the ME impedes cooperation & delays action on environm.**
- **Hexagon: Six structural early warning indicators**
- **Climate Change**: global task of post-Kyoto regime
- **Population:** national task of reproductive health
- **Urbanisation:** planning
- **Soil, water & food: need reg., nat. & local sustain - able policy efforts!**
- **Outcomes:** Earthquakes, heat waves and drought

10.1. Conclusions

- The problems of Global Environmental Change that will affect the whole region very severely can neither be solved by violence nor with power as „hard“ security threats with military means. They require cooperation among parties!
- From a *Human Security perspective* the basic human need for security and survival of the individual and of his family matter!
- From an *Environmental Security perspective* the challenges of GEC must be perceived & cooperative counterstrategies must be developed to avoid that these future challenges become new Food, Health & Livelihood Security issues.
- But this requires a fundamental shift in the perception of security and of the unresolved conflict from the Hobbesian perspective of a zero-sum game only one side can win but in the long run both sides loose paying a very high price.
- In the second part of my talk I will develop a few conceptual alternatives of functional cooperation that made the difference overcoming hundreds of years of military conflicts in Central Europe between Germany and its neighbours.
- I hope you and your children will experience some day in the near future this basic shift in thinking: from a violent conflict to cooperation based on mutual respect, dignity and based on equity that is emerging across the Rhine & Oder.
- I hope the miracle of the fall of the Berlin Wall will soon reach the Holy Land.

Thank you

for inviting me and giving me an opportunity to share with you these very preliminary and emerging conceptual ideas.

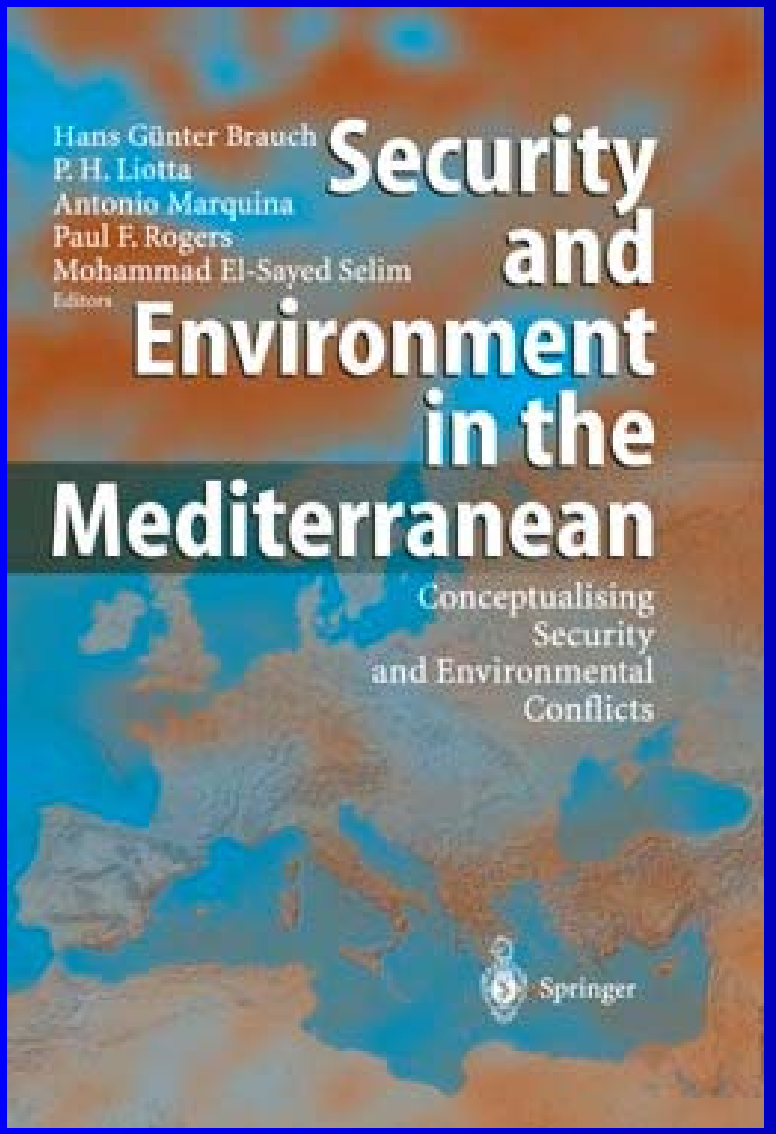
Thank you

for your attention and patience.

Send your comments to:

Brauch@onlinehome.de

Sources (http://www.afes-press.de/html/download_hgb.html)



- **J. Karas:** ***Desertification. Climate Change and the Mediterranean Region*** **(Report for Greenpeace) (http://archive.greenpeace.org/climate/science/reports/fulldesert.html)**
- **Brauch:** ***Climate Change and Con- flics*** **(2002) (http://www.bmu.de/en/800/js/download/b_climges/)**
- **Brauch-Liotta-Marquina-Rogers-Selim (Eds.):** ***Security and Environment in the Mediterranean*** **(Springer 2003) (http://www.afes-press.de/html/ bk_ book_of_year.html)**
- **Download of previous talks by H.G. Brauch: (http://www.afes-press.de/html/download_hgb.html)**