Climate Change, Social Stress and Violent Conflict
State of the Art and Research Needs
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Policy Response to Climate Change in the Middle East and North Africa

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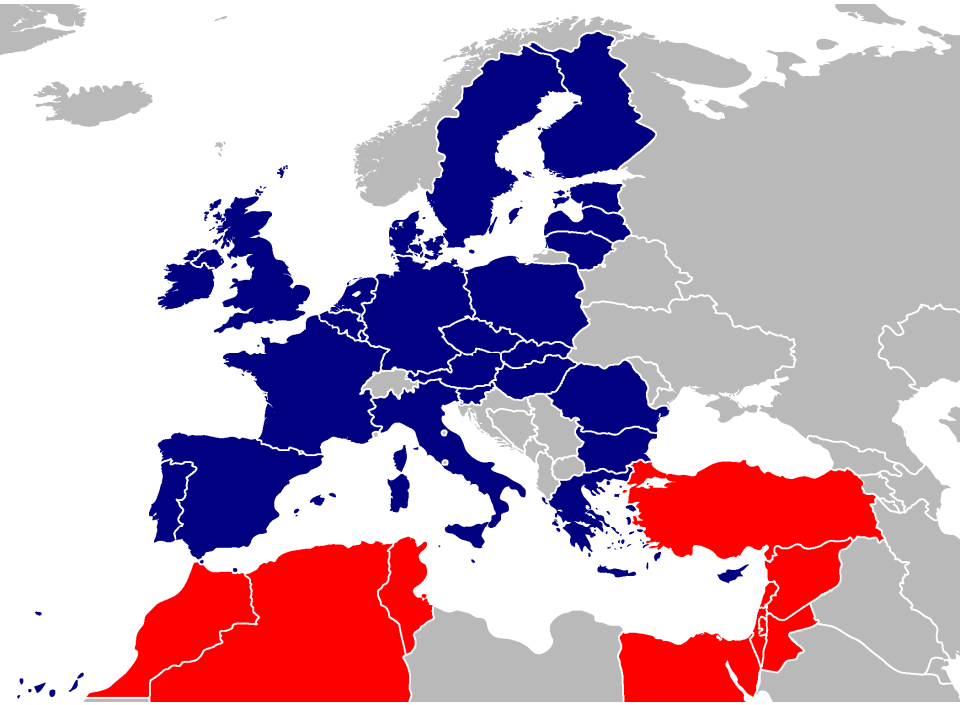
1. Geographical Object of Analysis: Mediterranean and MENA Region

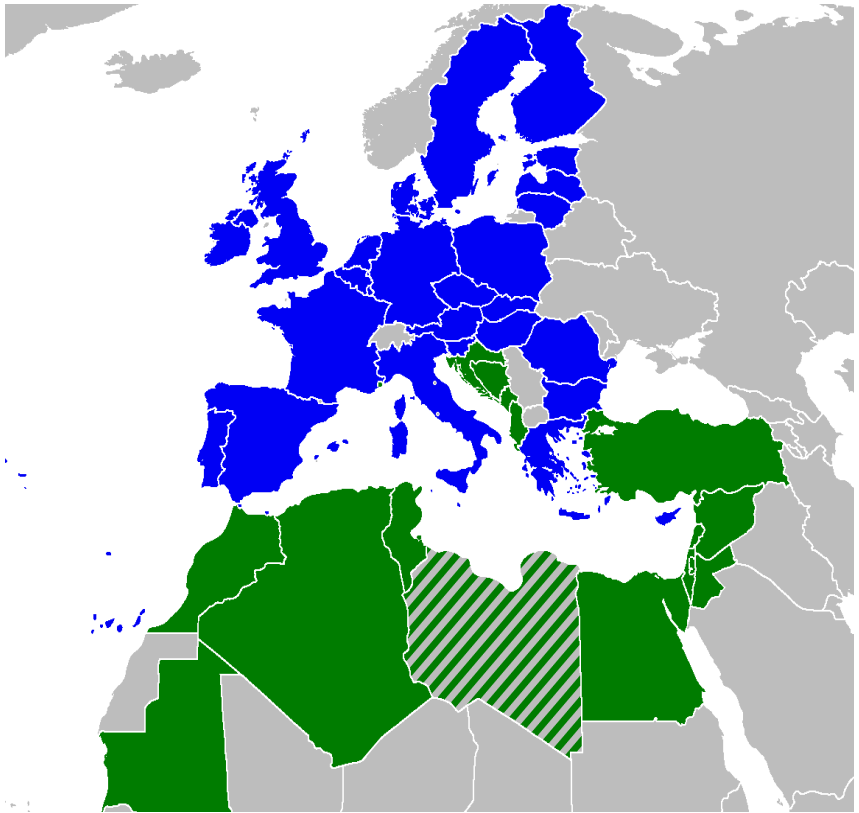
- There is no agreement on the boundaries of the Mediterranean and of the Near and Middle East
- Even for the region of North Africa is unclear whether Mauritania and/or Sudan belong to it
- There is no agreement on the MENA countries.
- The MENA region refers to countries of North Africa and Middle East participating in the UfM with shores to the Mediterranean (plus Jordan)

1.1. Geographic & Political Objective of Analysis: Europe-MENA Region

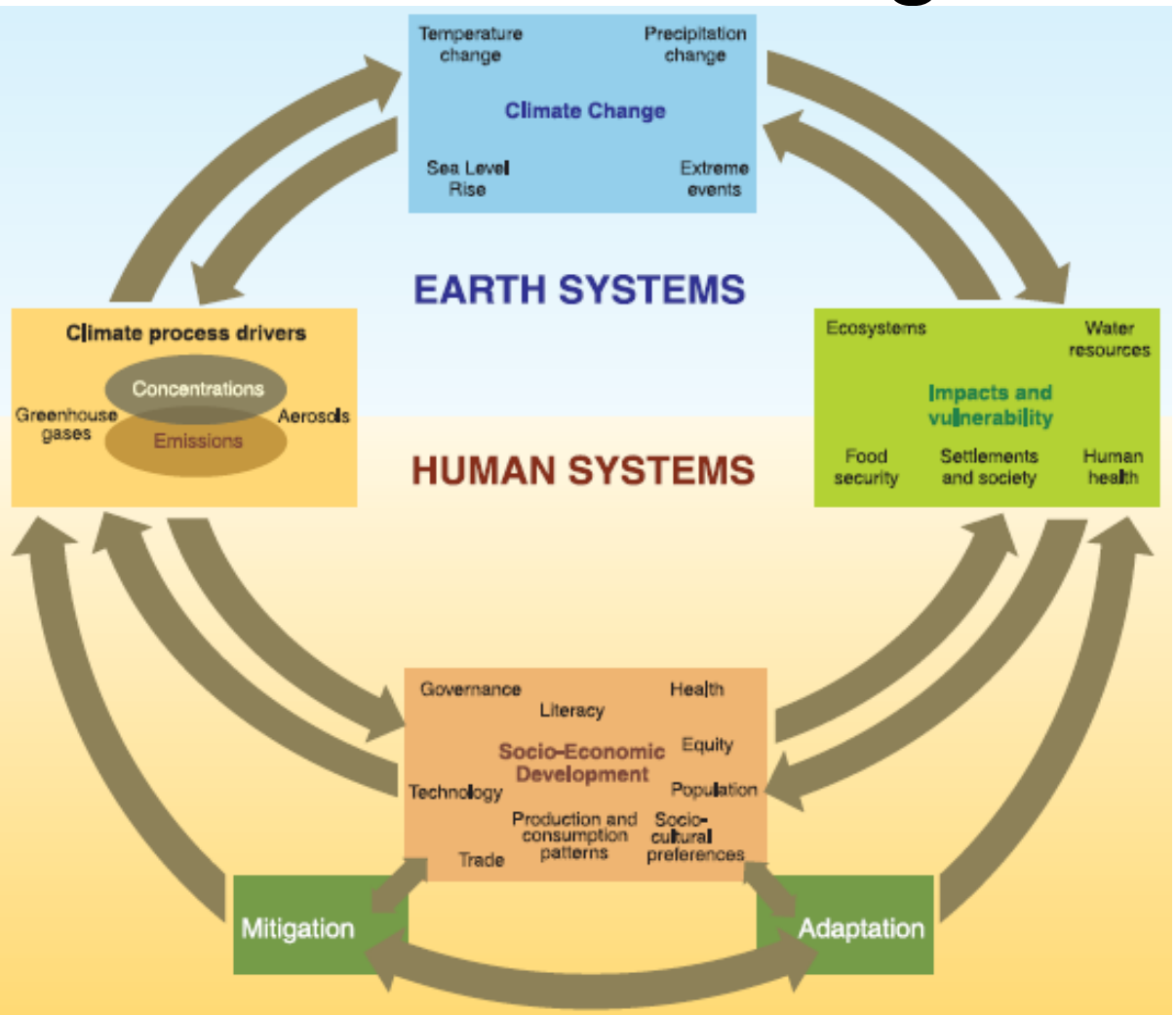


Member States of the Euro-Mediterranean Partnership (1995-2008)

Member States of the Union for the Mediterranean (since July 2008)



2. Addressing Linkages of Global Climate Change and Security



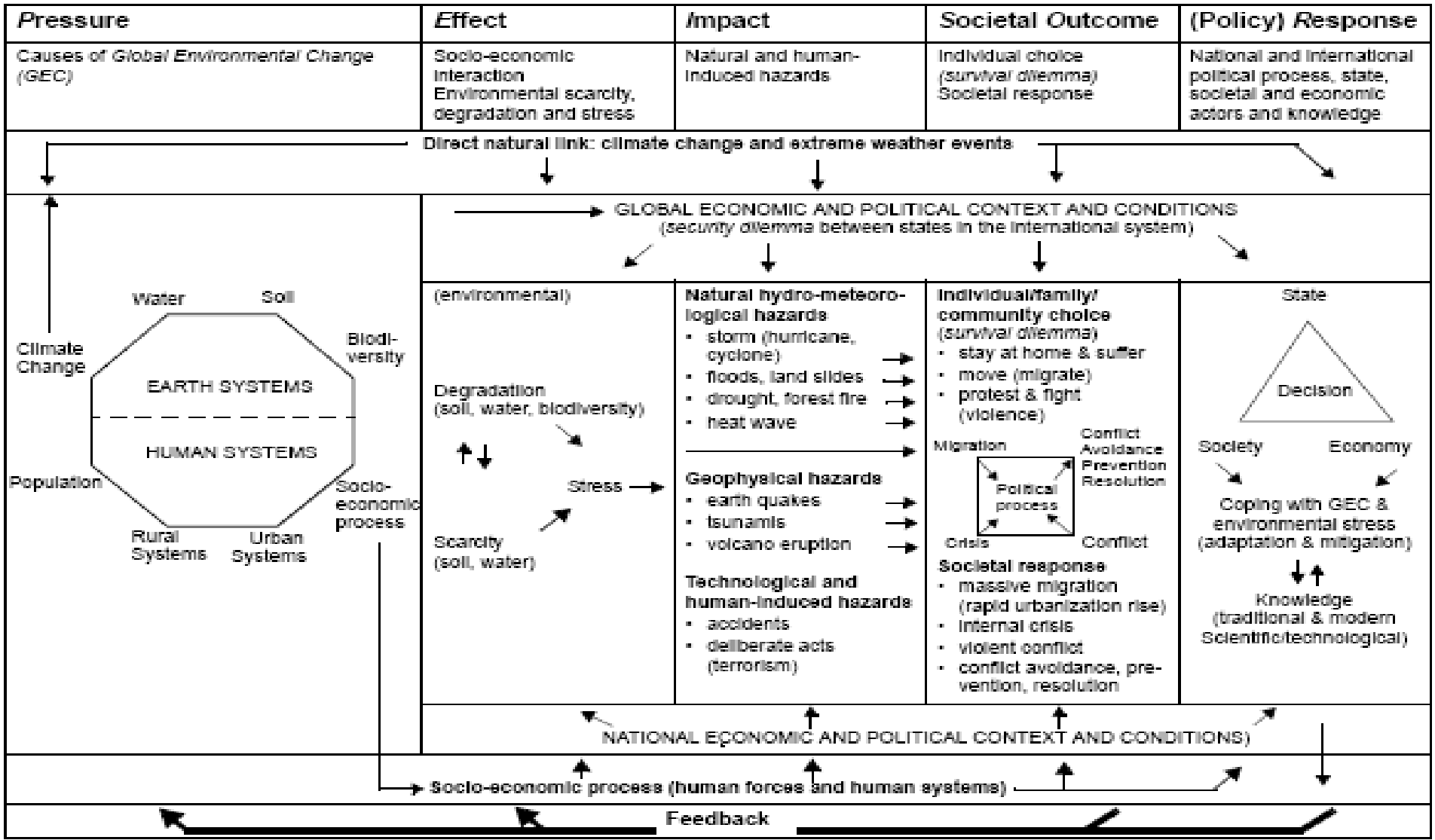
Objects of Security Analysis (Securitization)

- Physical Effects: e.g. temperature rise
- Impacts: Sectors
- Societal Effects

Whether they pose:

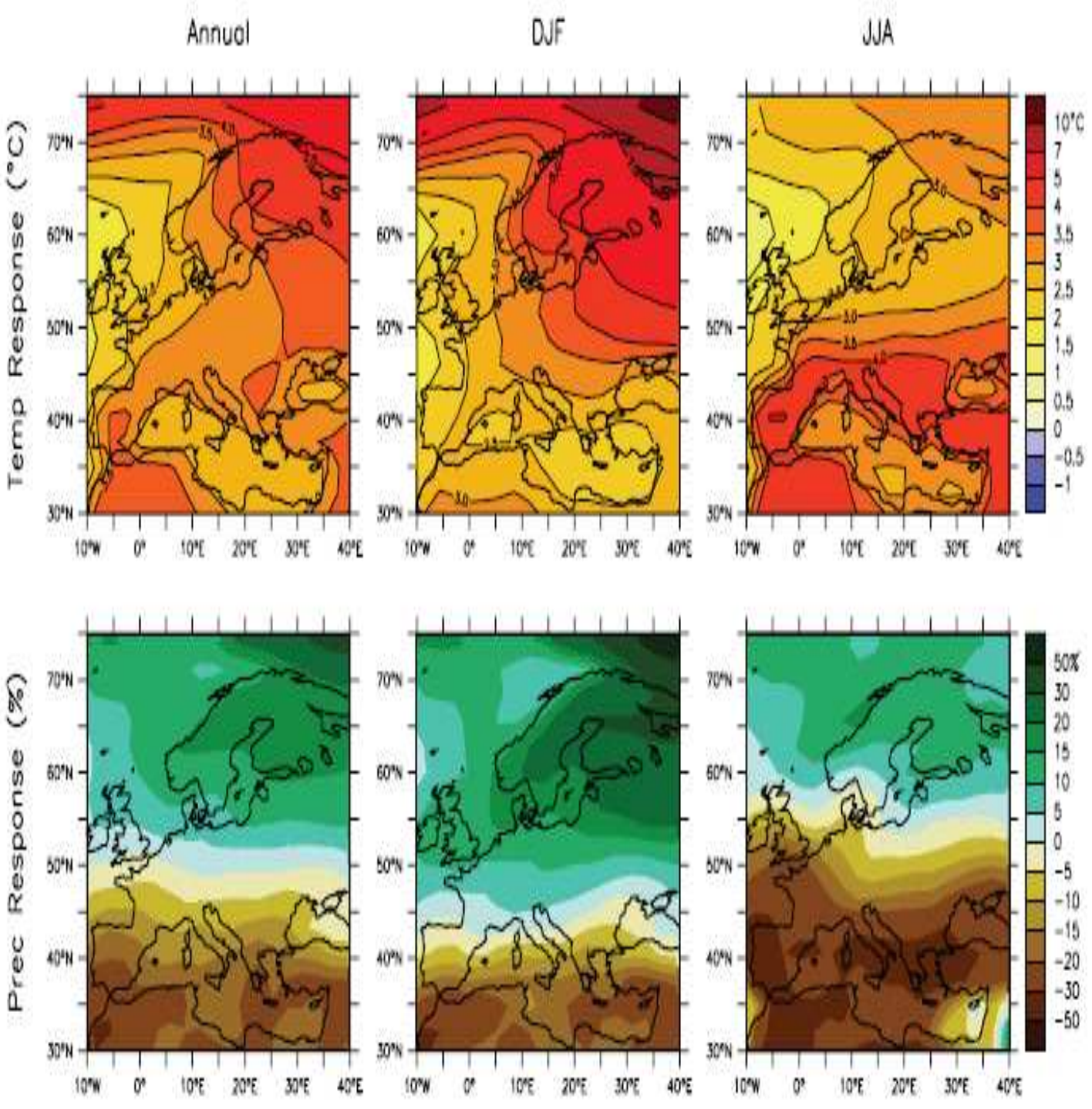
- Objective Security Dangers
- Subjective Security Concerns
- Intersubjective Security: what policymakers make of it

2.1. Global Environmental Change & Impacts: PEISOR Model: Policy Response



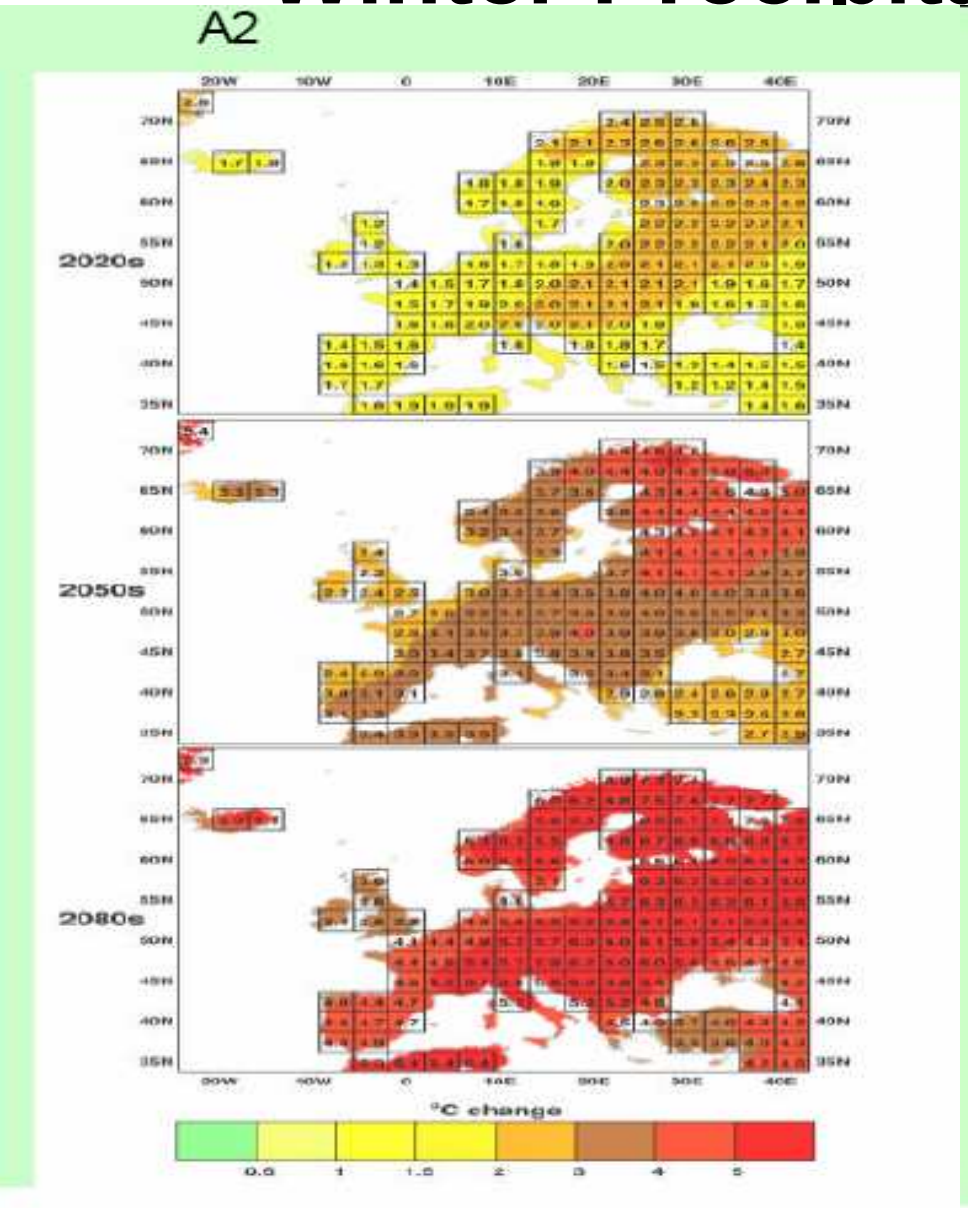
3. IPCC: Physical Effects of Climate Change in the MENA Region

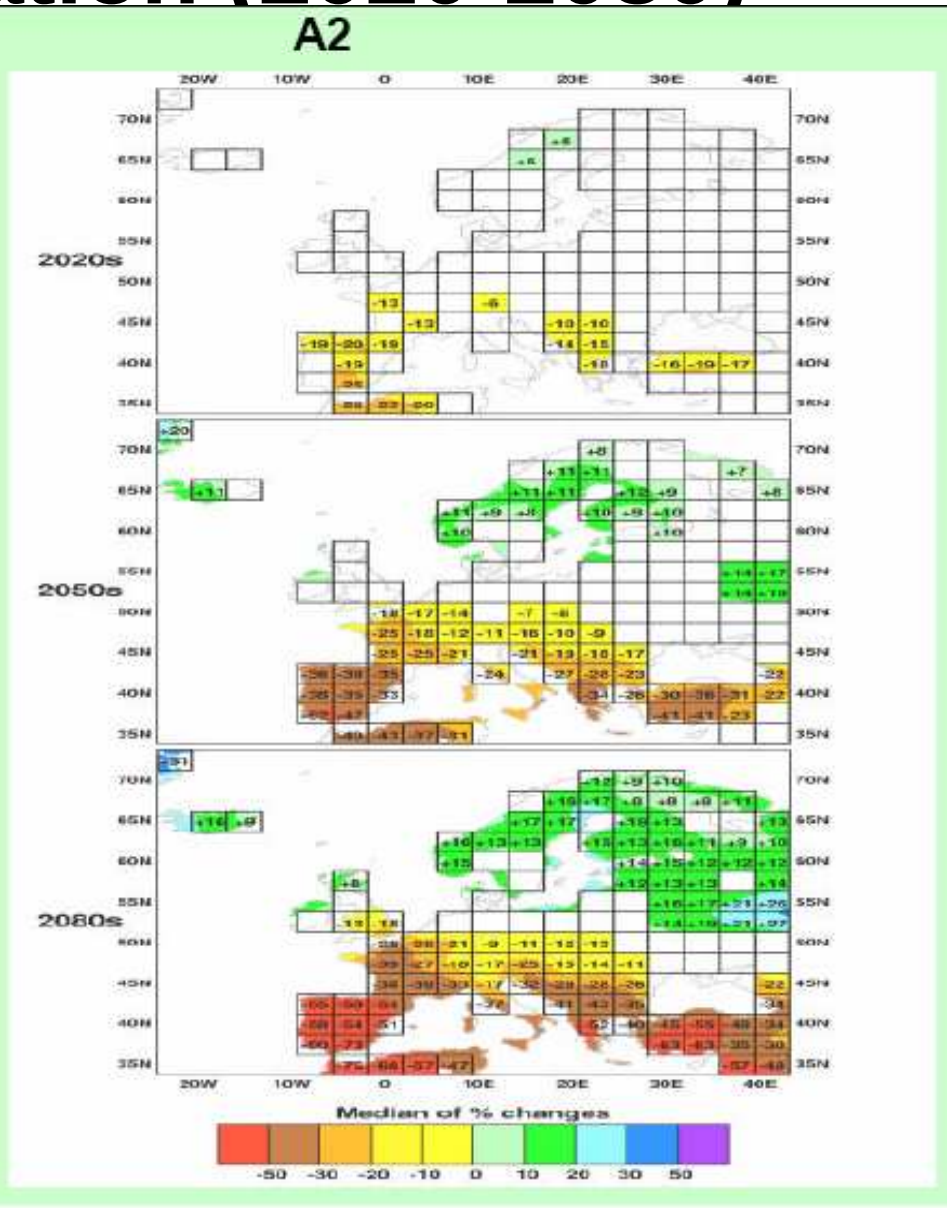
- **No IPCC Assessment of Mediterranean or MENA**
  - **Mediterranean: South Europe, North Africa, West Asia**
  - **Knowledge & Research gap: Europe & MENA region**
  - **UNEP-MAP, Blue Plan: selected sources on Mediterran.**
  - **No MENA country has GHG reduction obligations.**
- **Projected Physical Effects of Climate Change**
  - **Temperature rise**
  - **Sea-level Rise**
  - **Change in Precipitation and Runoff.**
  - **Increase in number and intensity of climate related extreme weather events and hydro-meteorological hazards**



3.1. Comparison of the projected temperature increase (in℃) and change in precipitation from today to that projected for 2100. Sources: IPCC 2007, Blue Plan 2009

3.2. Projected Winter Temperature and Winter Precipitation (2020-2080)



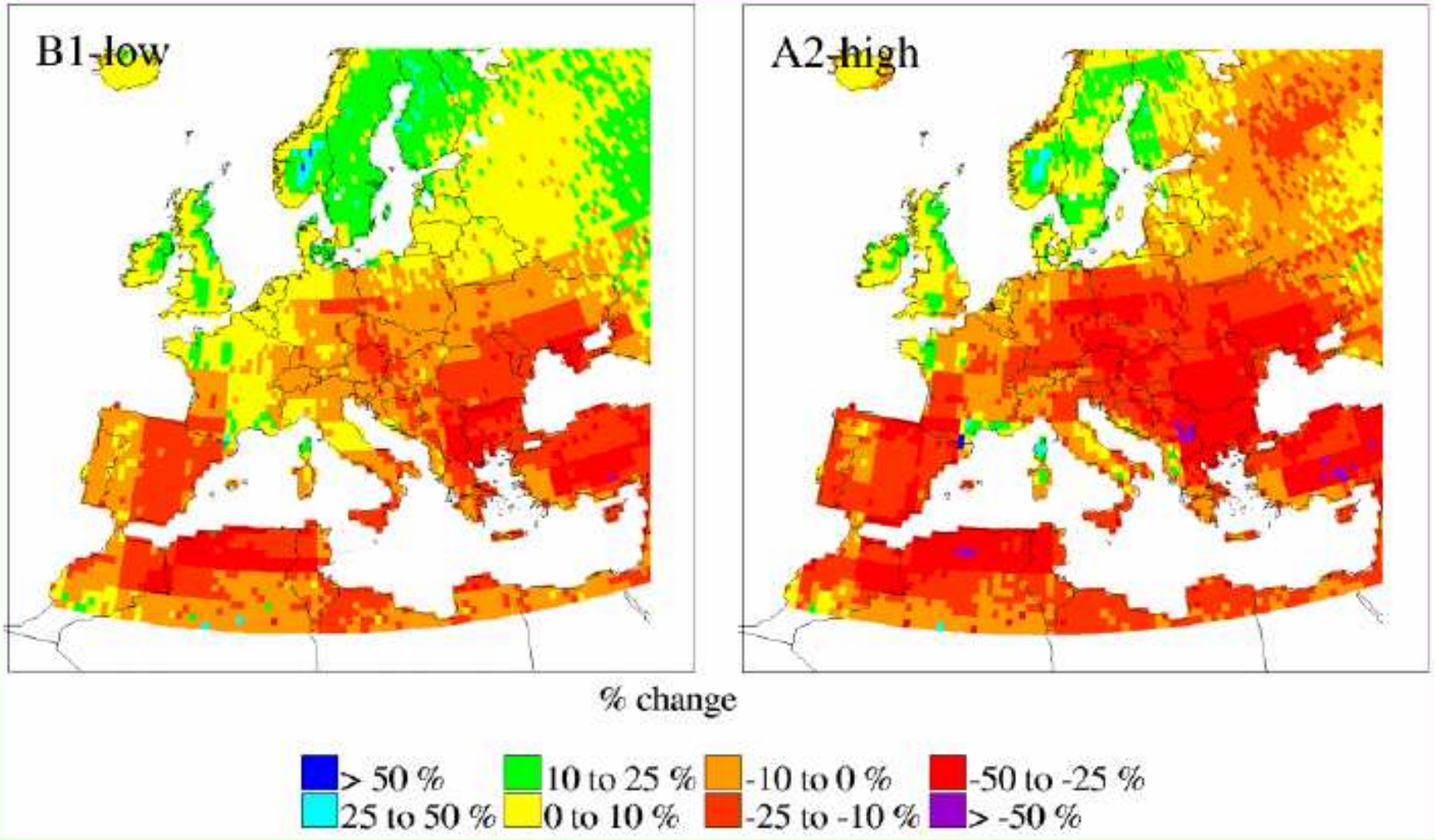


3.3. Projected Sea-level Rise

- Projections on the average sea-level rise have been disputed in the preparation of the IPCC's AR4 which could only agree on an average increase during the 21st century of **18-59 cm.**
- **Rahmstorf (2009) referred** to recent studies of observed average increase of sea level by **1.6 mm/year** between 1961 and 2003 and **2.5 mm/year** between 2003-2008.
- Depending on the achieved GHG stabilization level and an increase of the global mean temperature between 2° C and 4° C according to the **IPCC chairman Pachauri**, the global sea level rise above preindustrial from thermal expansion may rise between **0.4 and 2.4 metres**.
- **In the Nile delta**, according to Sherif und Singh (1999; WBGU 2006: 45) „an increase of 50 cm would imply that the salty water would intrude about 9 km into coastal aquifers."
- **Without protective countermesures a sea-level rise of 50 cm would affect in the administrative districts of Alexandria and Port Said about "1.5 million people"**

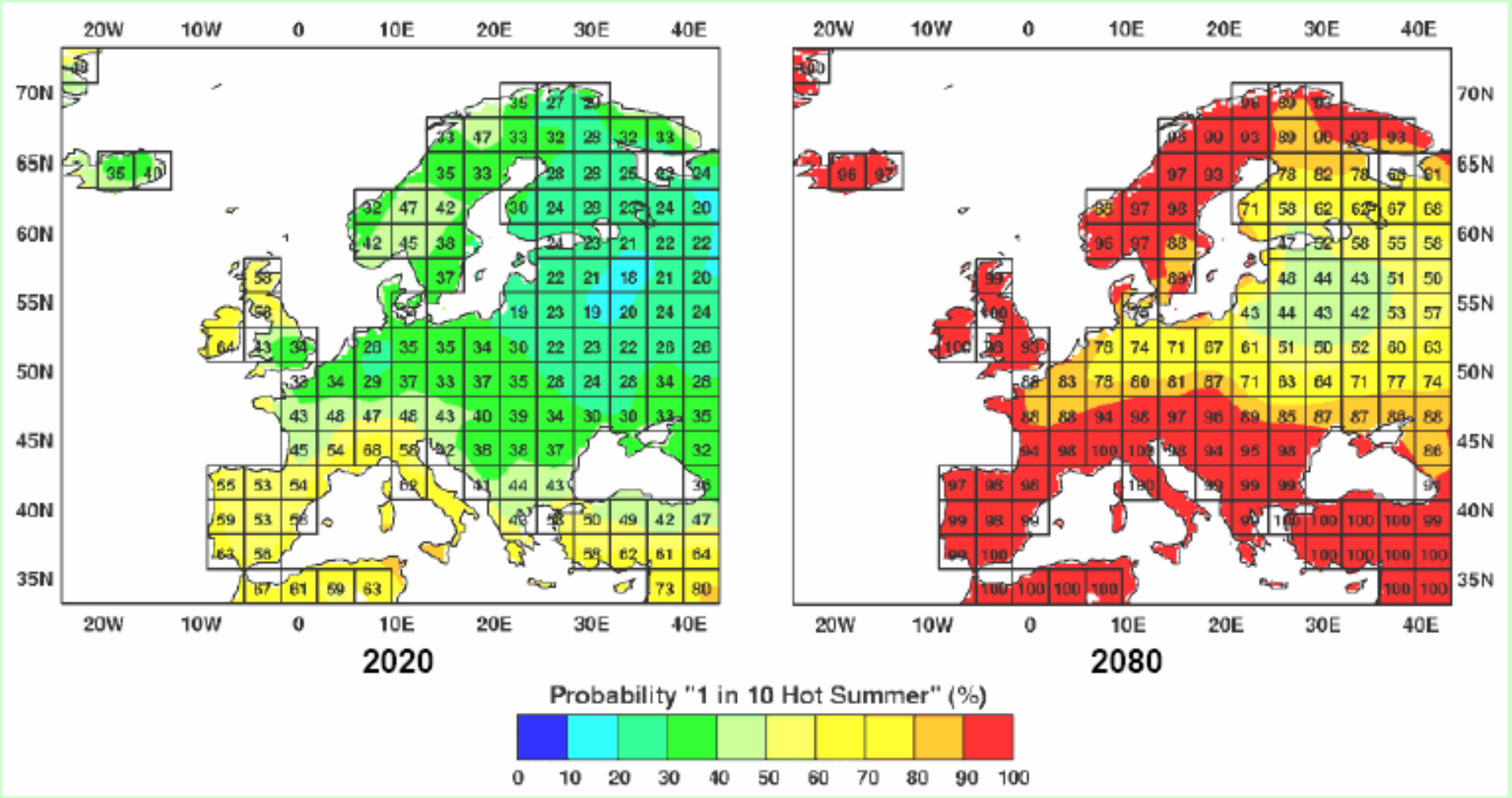
3.4. Water Availability 2050

(M. Parry, IPCC, London, 2005)

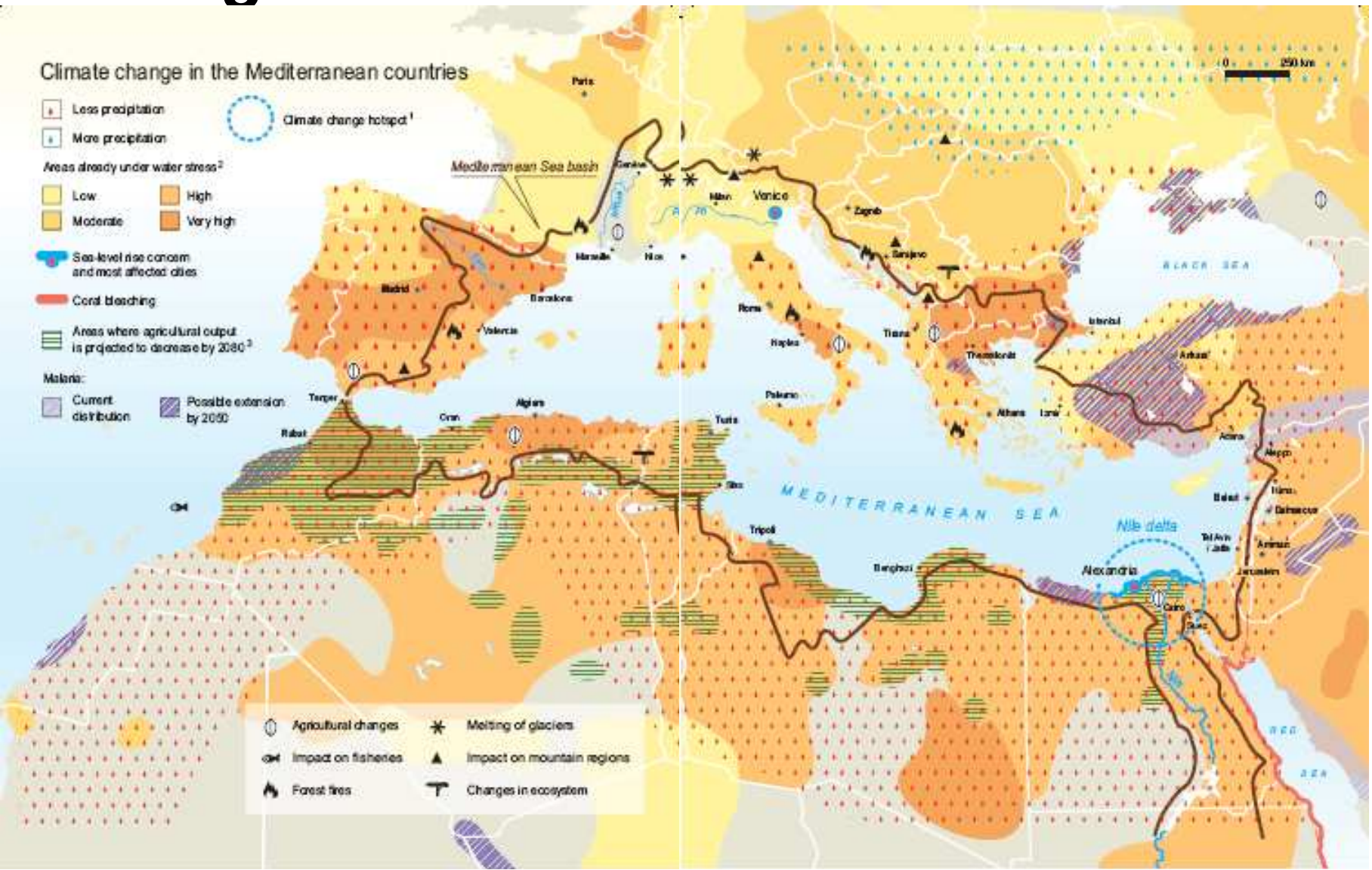


3.5. Probability of Hot Summers (M. Parry, IPCC, London, 2005)

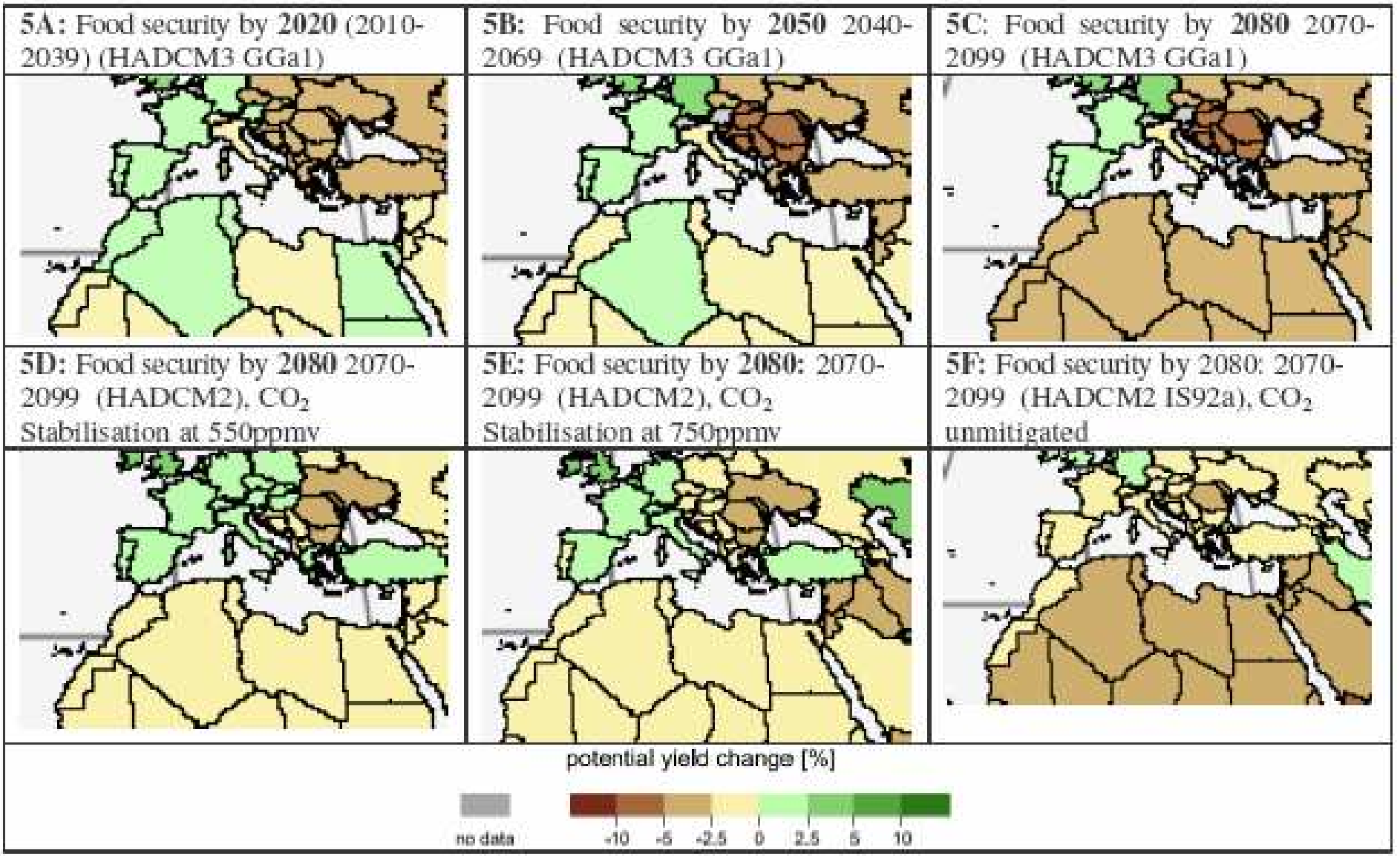
A2



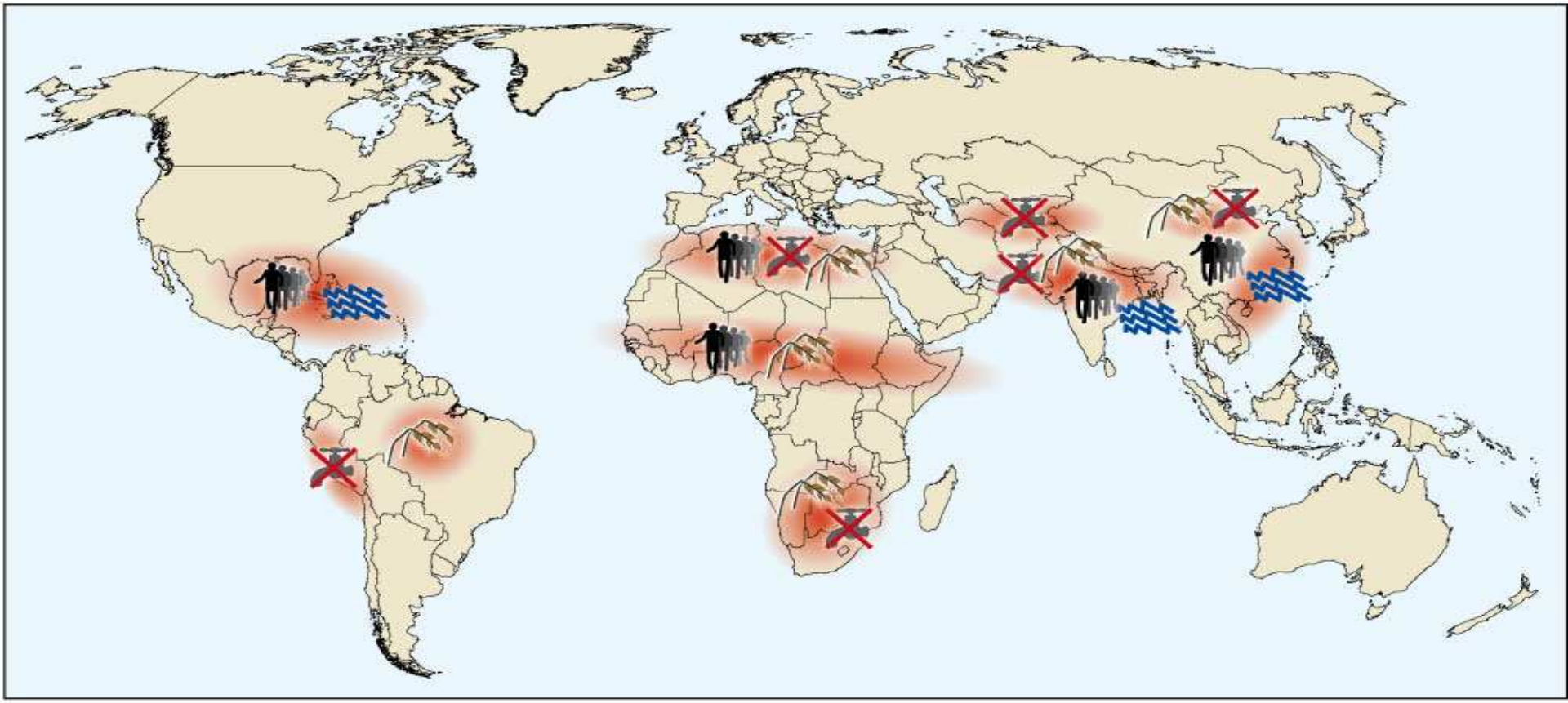
4. Socio-Economic Effects on Agriculture in MENA Countries



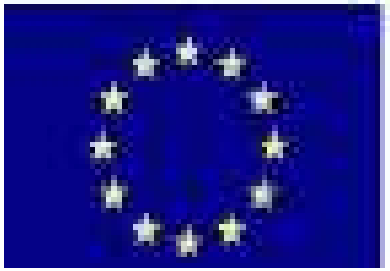
4.1. Climate Change and Food Security
Source: WBGU 2006



5. Impacts on human, national, interna-tional security in the MENA region



5.1. EU Paper: Climate Change & International Security (3/2008)



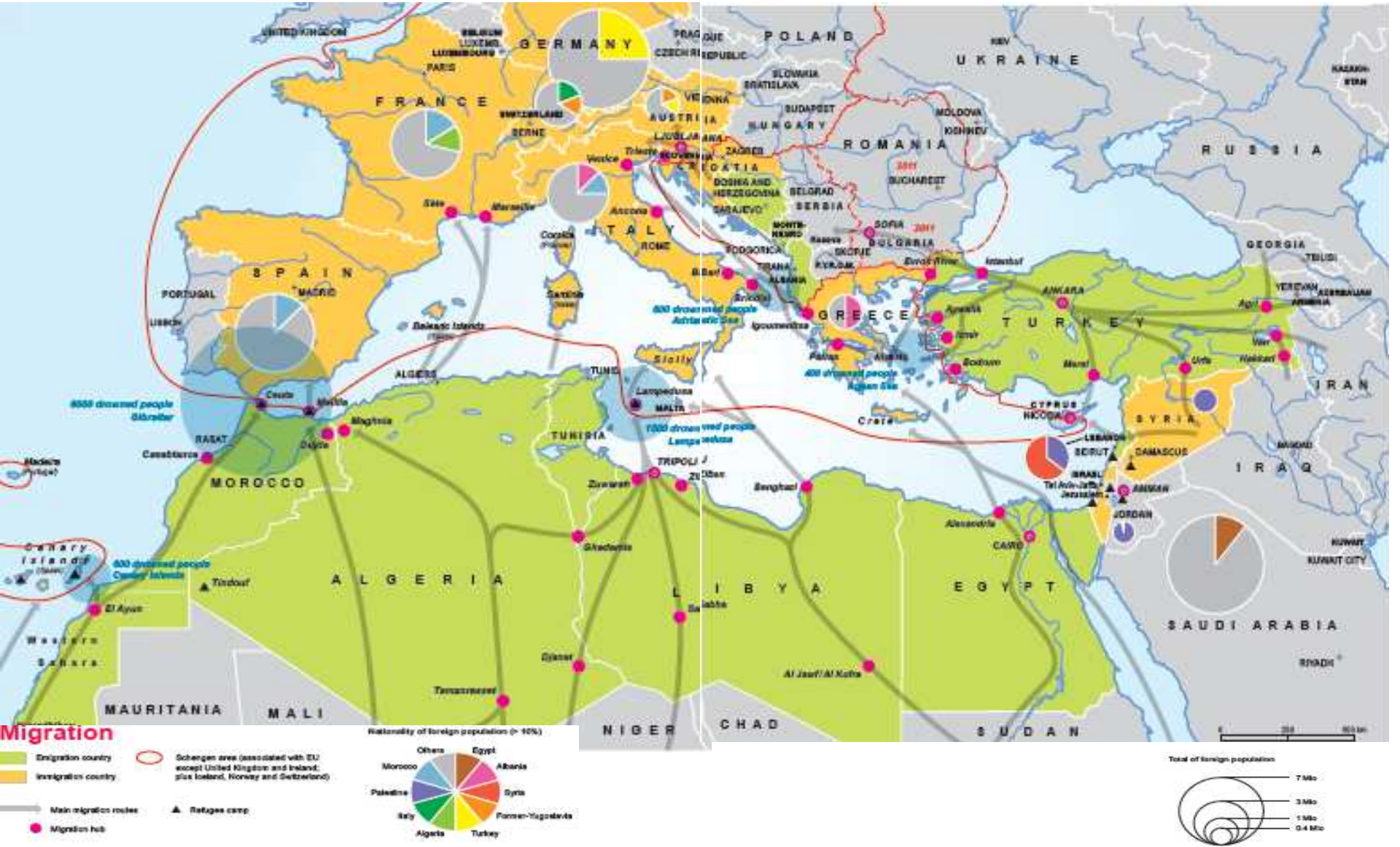
1. Africa:

- … **In North Africa and the Sahel**, increasing drought, water scarcity and land overuse will degrade soils and **could lead to a loss of 75% of arable, rain-fed land**. **The Nile Delta could be at risk from both sea-level rise and salinisation in agricultural areas while 12 to 15% of arable land could be lost through sea-level rise in this century with 5 million people affected by 2050.**. … Migration in this region, but also migration from other regions through Northern Africa to reach Europe (transit migration) is likely to intensify. …

2. Middle East:

- Water systems in the Middle East are already under intense stress. Roughly two-thirds of the Arab world depends on sources outside their borders for water. ... Existing tensions over access to water are almost certain to intensify in this region leading to further political instability with detrimental implications for Europe's energy security and other interests. …. A significant drop in crop yields is projected for an area that is already largely arid or semi-arid. Significant decreases are expected to hit Turkey, Iraq, Syria and Saudi Arabia and thus affect stability in a vitally strategic region for Europe.

5.2. Migration to Europe. Source: MedSec (2009: 16-17).



6. Reactive vs. Proactive Policy Responses to Security Dangers of CC

There are two alternative policy responses:

a) a *reactive short-term crisis management* trying to cope with migration streams by FRONTEX, retransfer of migrants in cooperation with countries in North Africa, Near East (Turkey);

b) a *proactive medium- and long-term strategy* that addresses the climatic, demographic and economic root causes.

While short-term policy responses still prevail in the EU-MENA context, this talk takes up two proactive policy scenarios suggested by the *Millennium Ecosystem Assessment*:

a) a regional adaption fix and

b) a global technology garden scenario for coping with both the effects of climate change and deserti-fication by sustainable development initiatives.

7. Mediterranean Solar Plan of UfM and DESERTEC Industrial Project

- **Proactive scenarios advantageous** (desertification)
  - Global: Technogarden
  - Regional: Adapting Mosaic
  - Major focus: Knowledge creation & technology development
- **Political Context: Union for Mediterranean (UfM)** that emerged from the Barcelona Process (1995-2008) to operate within the framework of the EMP
  - **Mediterranean Solar Plan:** goal to produced by 2020 20 GW from solar technologies;
  - **Desertec Industrial Initiative:** import by 2050 15% of German electricity dedmand from solar thermal plants in Sahars desert.

7.1. Mediterranean Solar Plan (MSP)

Union for the Mediterranean: Launched 13 July 2008

- **Participants: 27 EU- and 16 EUROMED states (43 + KOM)**
- **UfM Co-Presidencies 2008: Initially: France and Egypt**
- **Foreign ministers meeting Nov 3-4, 2008, Marseilles**
- **Priority Project: Mediterranean Solar Plan (MSP)**
- **MSP Goal: 20 GW new RE capacity until 2020**
  - Expansion of renewable energy systems for electricity generation and improvements of the grid infrastructure with perspective of exporting „green electricity“ to Europe
  - Creation of appropriate framework conditions to secure stabile investment and a sustainable development
  - **Master Plan Study and Projects**
    - **Significant increase in energy demand, rising fossil fuel prices**
    - **Reduction of greenhouse gas emissions**

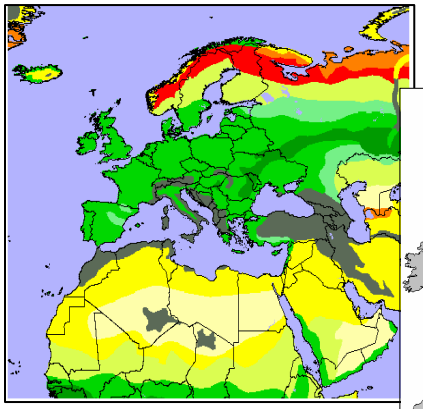
7.2. Solar Electricity Generating System - SEGS, California, USA (354 MW, since 1985) ANDASOL 1, Spain (50 MW, 7 h storage, 2009)

7.3. Renewable Energy Potentials in EU-MENA

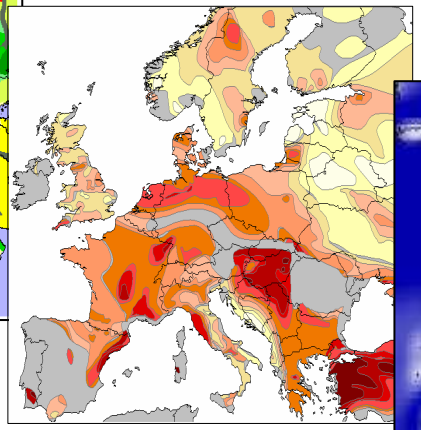
Source: Trieb, Krewitt, May, in: Brauch et al. (2009)

Biomass (0-1)

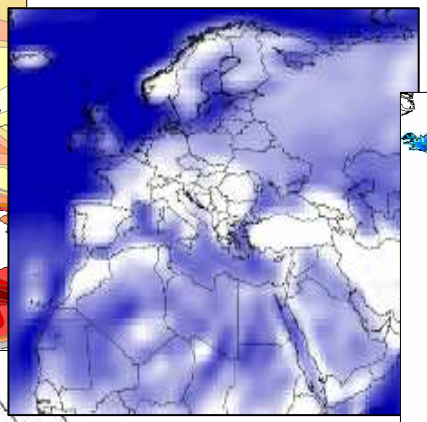
in brackets (Electricity in GWh/km²/a)



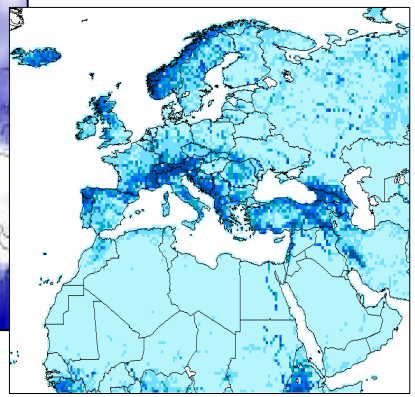
Geothermal (0-1)

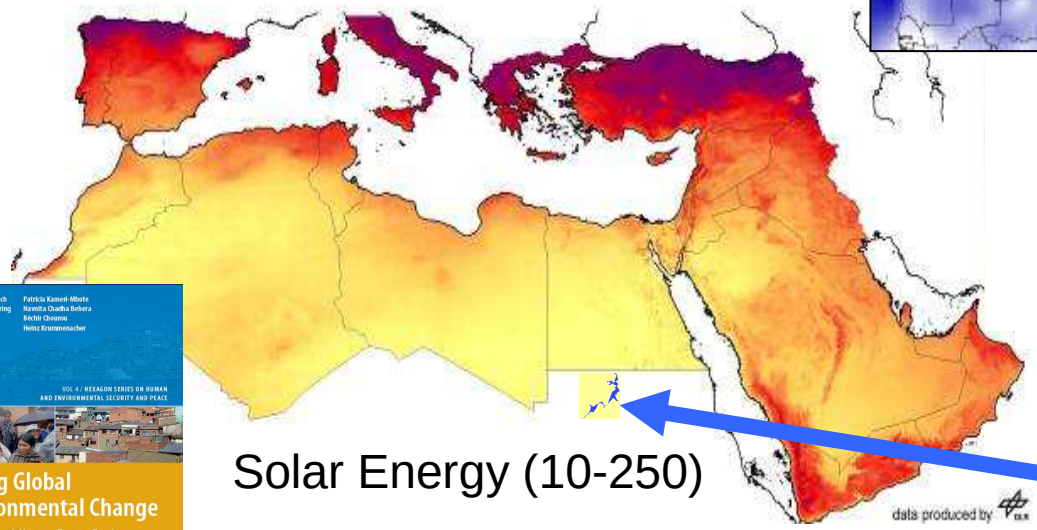


Wind Energy (5-50)



Hydropower (0-50)





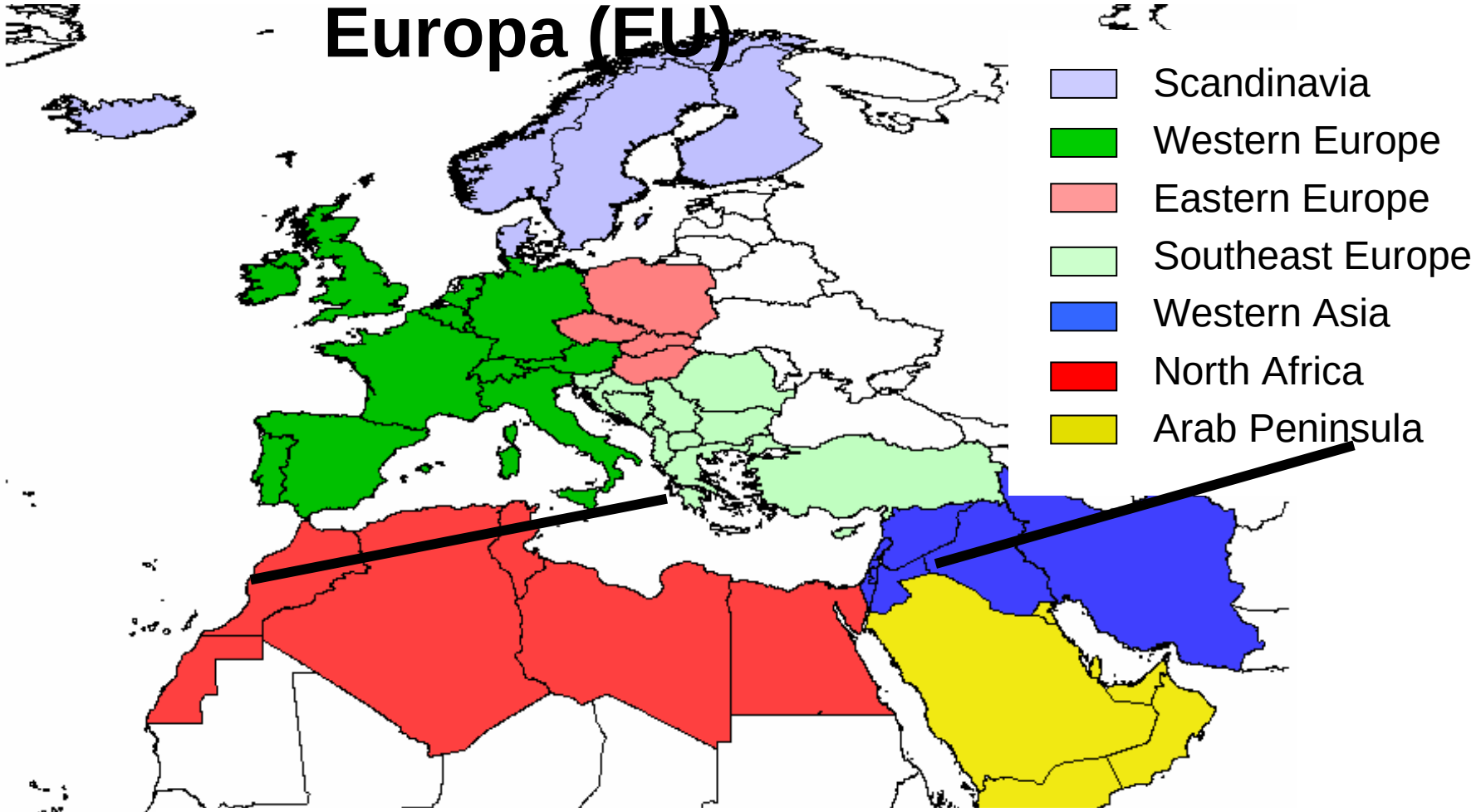
Solar Energy (10-250)

A solar thermal power plant of the size of the Assuan Dam would produced 120 times as much energy, i.e. about 30% of the total European energy demand.

www.dlr.de/tt/med-csp

7.4. TREC studied over 50 countries

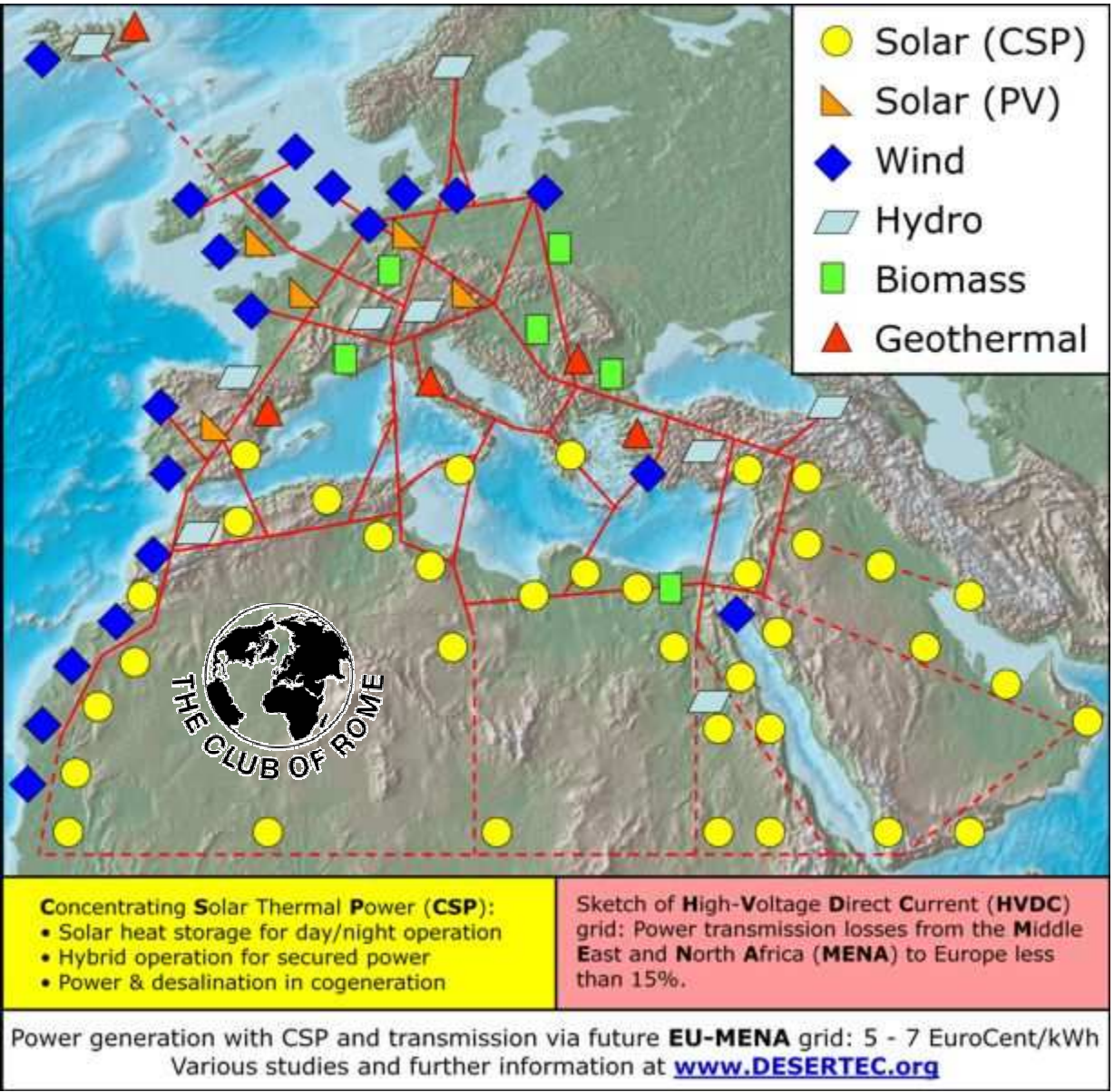
Europa (EU)



Middle East & North Africa (MENA)

T**hree studies were commissioned** by **BMU.** '**MED-CSP'** and '**TRANS-CSP'** studies (2004-2006). '**AQUA-CSP'** study: solar desalination was completed by end of 2007.

7.5. Mediterranean Renewable Energy Potential



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

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

7.6. DESERTEC Concept & Technology

- **DESERTEC concept**: **less than 0.3% of desert** of MENA region, **solar thermal power plants** can generate enough electricity and desalinated seawater for current & future demands in EU-MENA.
- **High solar radiation outweighs transmission losses from MENA to Europe. Solar thermal power plants in MENA are more economic than in South Europe.**
- Solar & wind power can be distributed in MENA and transmitted via **H**igh **V**oltage **D**irect **C**urrent (**HVDC**) transmission lines to Europe with transmission losses of 10-15%. **Loss of power during transmission can be limited to 3% per 1000 km.**
- **Solar thermal power plants (Concentrating Solar Thermal Power, CSP).**
- **Use mirrors to concentrate sunlight and create heat to drive steam turbines and electricity generators. Excess heat from additional collectors can be stored in tanks of molten salt & used to power steam turbines during the night or when there is a peak in demand.**

DESERTEC FOUNDATION

An initiative of

TREC
Clean Power from Deserts

7.7. Desertec Vision: An Intercontinental Mega Project

7.8. DESERTEC Industrial Initiative (DII) Memorandum of Understanding, 13.7.2009

DII – Objectives

- **DII, private companies pursue accelerated implementation of DESER-TEC concept (Club of Rome, DESERTEC Foundation).**
- **Three core objectives:**
  - I. analyse and develop a technical, economic, political, social and ecological framework for implementing the DESERTEC concept;
  - II. initiate industrial preparations for implementing DESERTEC concept;
  - III. develop business plans and associated financing proposals

DII – Principles

- Focus on power generation: sun, wind as renewable sources of energy
- Regional focus will be on EU-MENA, Europe, Middle East North Africa
- Develop viable business & investment plans within 3 years (until 2012)
- Aim to supply electricity to EU and generate sufficient power for producer countries. The aim is to supply around 15% of Europe's electricity by 2050.

30 October 2009: DII GmbH (limited liability company) was set up by the group of founding members of 12 companies and DESERTEC Foundation

8. Survival Pact for the Mediterranean: linking food and renewable energy

- ***Virtual water*** is **water embedded in water intensive commodities as grain (T. Allan). MENA region imported 20% as virtual water by 2000. Proportion will rise to 50% by 2050.**
  - **Virtual water reduces local water deficits by importing virtual water (cereals, food from Europe to MENA region)**
  - **MENA countries need foreign income and must overcome the fear that *food* as a *weapon*.**
  - **Constraint: Thinking in terms of food security and aim of self-sufficiency (not achievable for MENA region)**
- **"*Virtual sun*" is sun embedded in forms of renewable energy that can both solve the energy demand (including for desalination of drinking water) and can be exported to the North as electricity via long-distance cables and as hydrogen (alternative fuels for transport system of the 21st century with low CO2 emission).**
  - **Constraint: Thinking in terms of energy security (supply security) due to the oil shocks of the 1970s, 1980s that energy can be used as a weapon to "strangulate" the economies of the North.**
  - **Energy self-sufficiency totally unrealistic for EU countries.**

8.1. Survival Pact: Component of a Global Partnership for Sustainable Development

- **Pragmatic perspective is needed that multilateral cooperation can solve security challenges posed by GEC impacts.**
- **A Euro-Mediterranean Survival Pact should jointly address the six long-term challenges of the survival hexagon in order to develop cooperative strategies that combine the goals for a sustainable development via**
  - **a sustainable energy policy that contributes to *su-stainable economic development* in South & North**
  - **a sustainable agricultural policy that counters the *poverty* and market *driven* processes of desertification**
- **Such a Euro-Mediterranean Survival Pact requires:**
  - ***Science and knowledge transfer* on renewable energy technologies (e.g. technical training in MENA area)**
  - **Market incentives (Kyoto mechanisms, CDM)**
  - **Financial framework: Desertec Industrial Initiative**
- **Survival Pact: Regional Partnership for Sustainable Devopment Strategies based on mutual comparative advantages, e.g. by linking in this case 2 essential commodities: food (virtual water) and solar energy (virtual sun).**

9. Achieving Environmental, Human, National International, Food and Energy Security

- **Long-tern proactive policy responses to regional climate change impacts are possible and needed.**
- **The vision of a Survival Pact offers a perspective for a sustainable solar co-development of two regions.**
- **UfM and its Solar Plan offer a policy framework for develo-ping the renewable energy potential in the MENA region.**
- **Desertec Industrial Initiative, if implemented, could offer a financial, technological and economic framework.**
- **Linking food (virtual water) and energy (virtual sun) could help to achieve these goals:**
  - **reducing GHG emissions (contributing to environmental security)**
  - **satisfying food import needs (realizing human and food security)**
  - **Reducing the resoruce competition over cokntraol and access to oil and gas (enhancing economic, national & international security.**
- **Realize a policy of sustainable peace with sustainablw development**

10. Proposals for the Spanish EU Presidency (January-June 2010)

- **Proposal 1:** Launching of a Mediterranean Environmental and Human Security Initiative (MEH-SEC) within the Union for the Mediterranean
- **Proposal 2:** Assessment of Climate Change Impacts for the Mediterranean
- **Proposal 3:** Assessment of Environmental and Climate-induced Migration
- **Proposal 4:** Cooperation on Civil Protection in the Euro-Mediterranean Region
- **Proposal 5:** Mediterranean Solar Plan and Desertec Industrial Initiative: From Vision to Reality
- **Proposal 6:** EU-MENA Survival Pact: Linking 'Virtual Water' and 'Virtual Sun'

Thank you

for your attention!

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