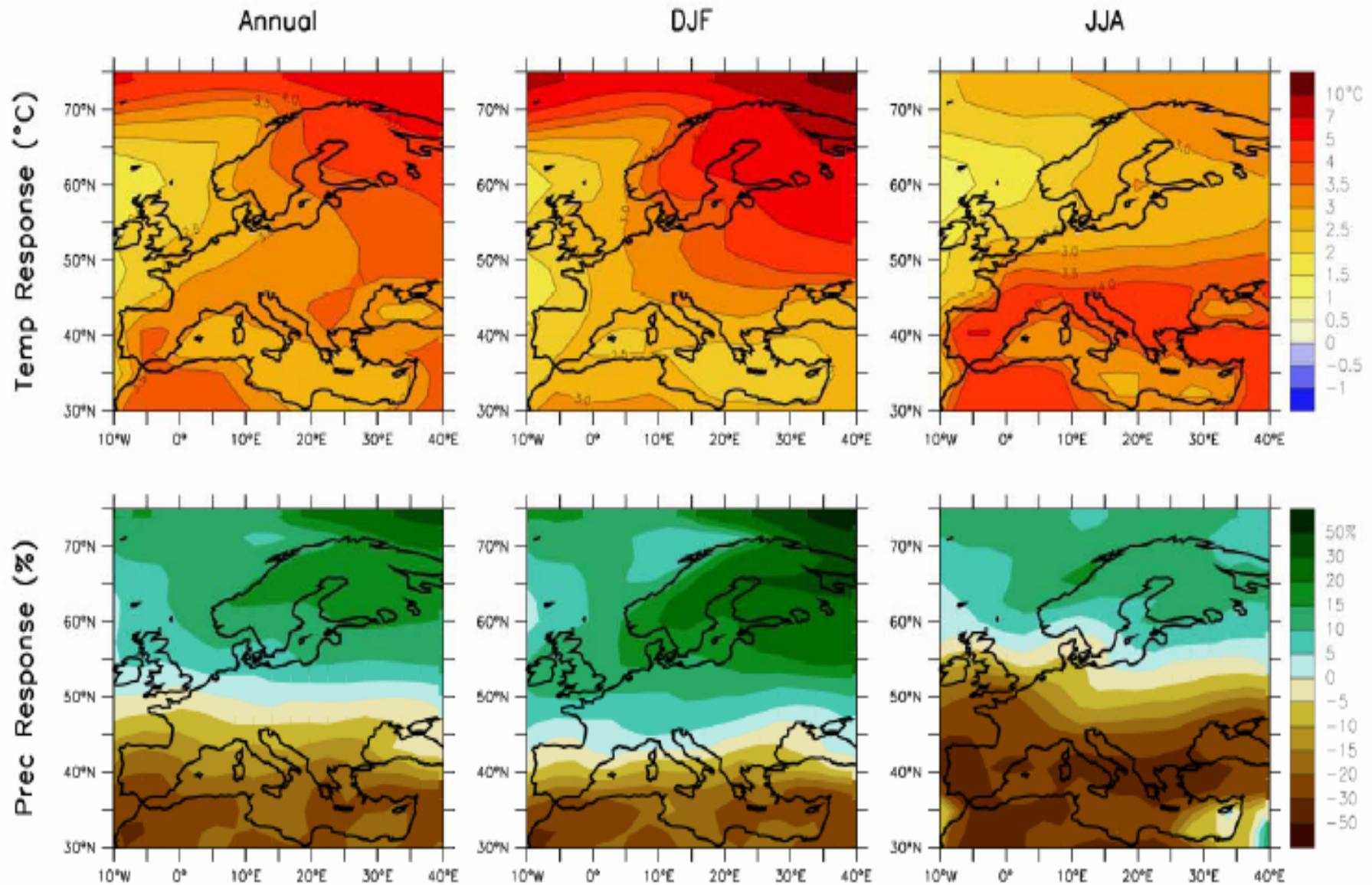


13th International Anti-Corruption Conference
30 October – 2 November 2008

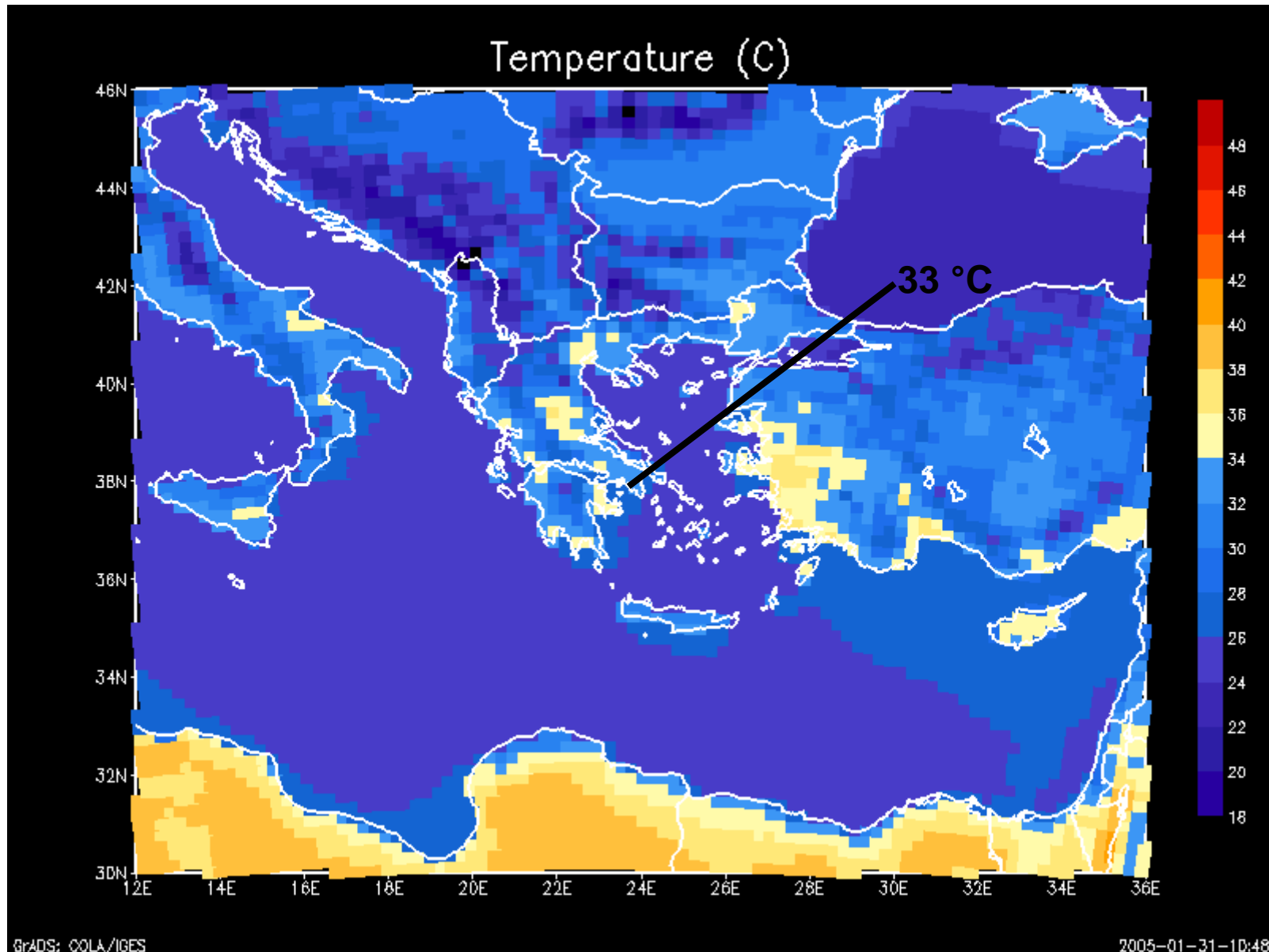
**Climate Change and its
Impact on Society in the
Mediterranean Region**

Dimitri Lalas
FACE³TS, Ltd

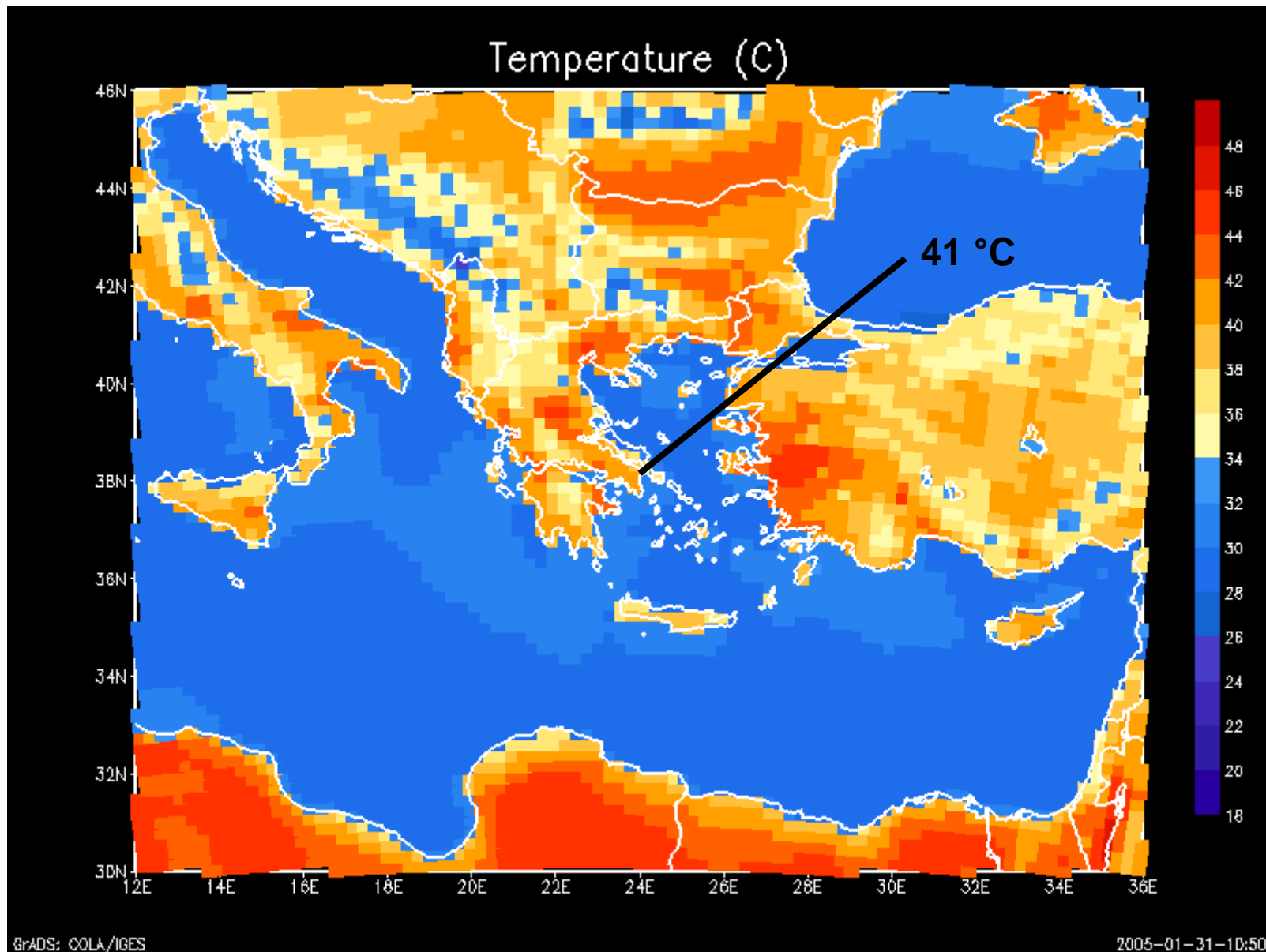
AR4: Temp/rainfall predictions in Europe 1980-99 vs 2080-99 – A1B



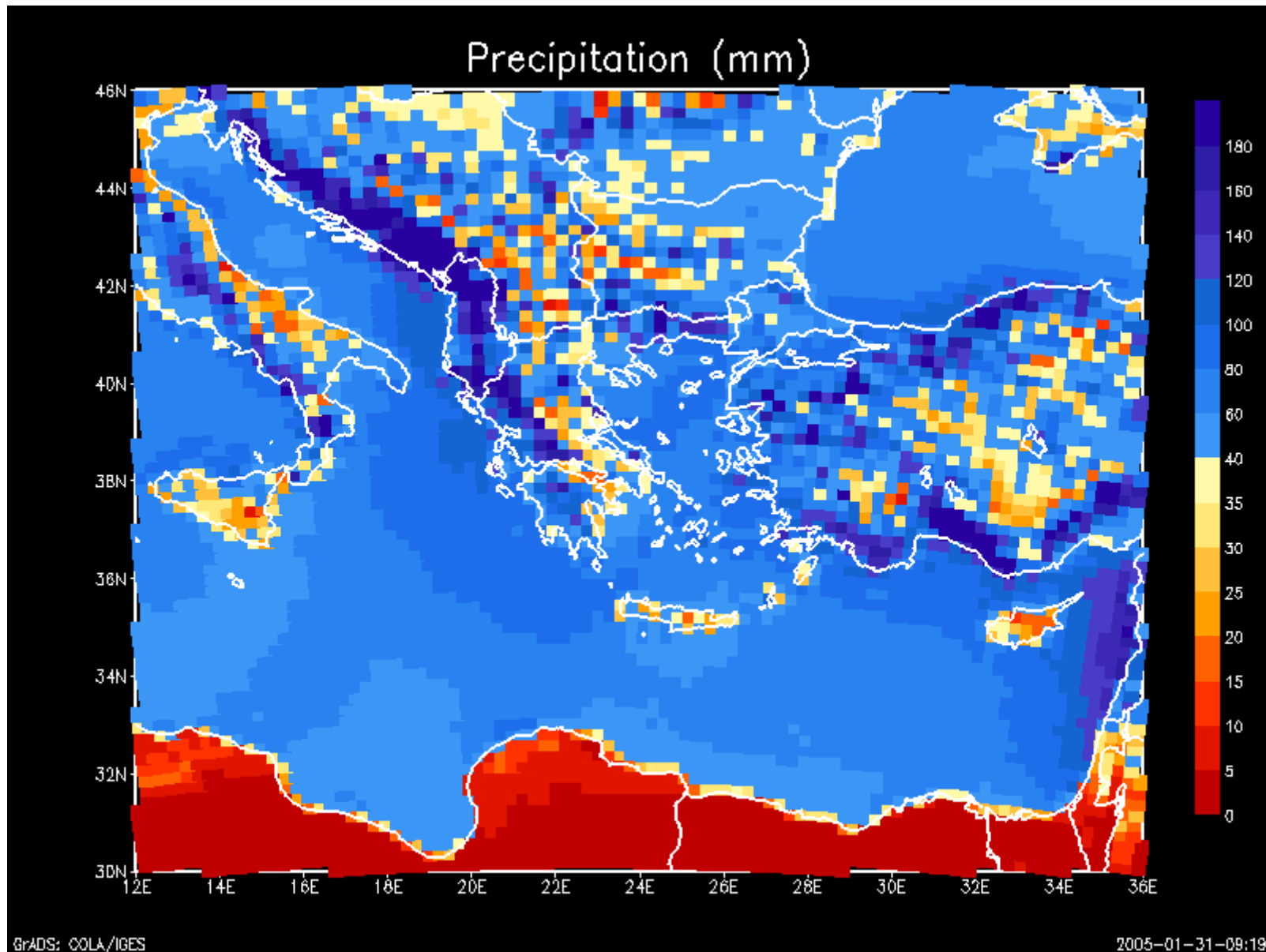
July 1961-1990



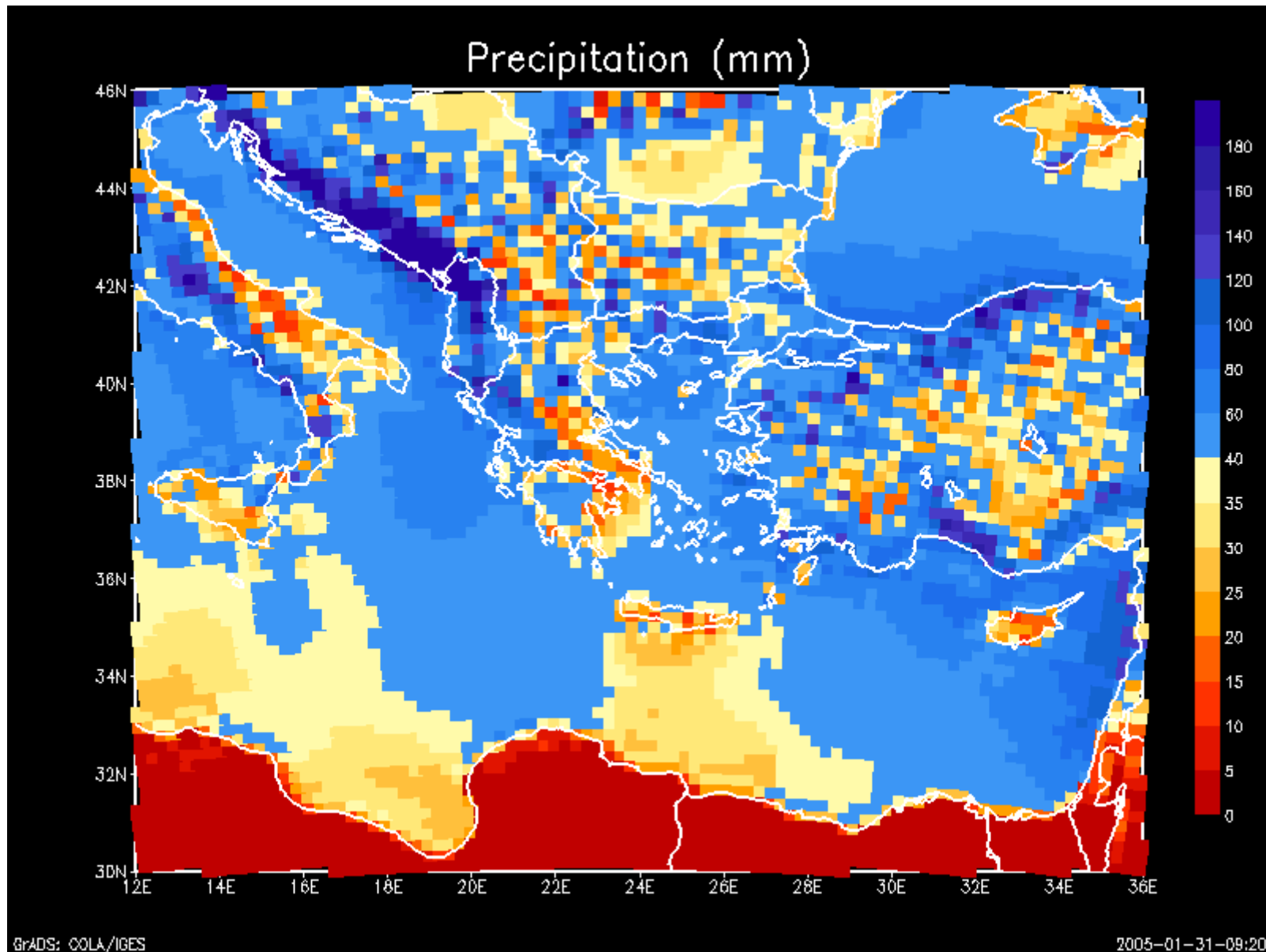
July 2071-2100



December 1961-1990



December 2071-2100



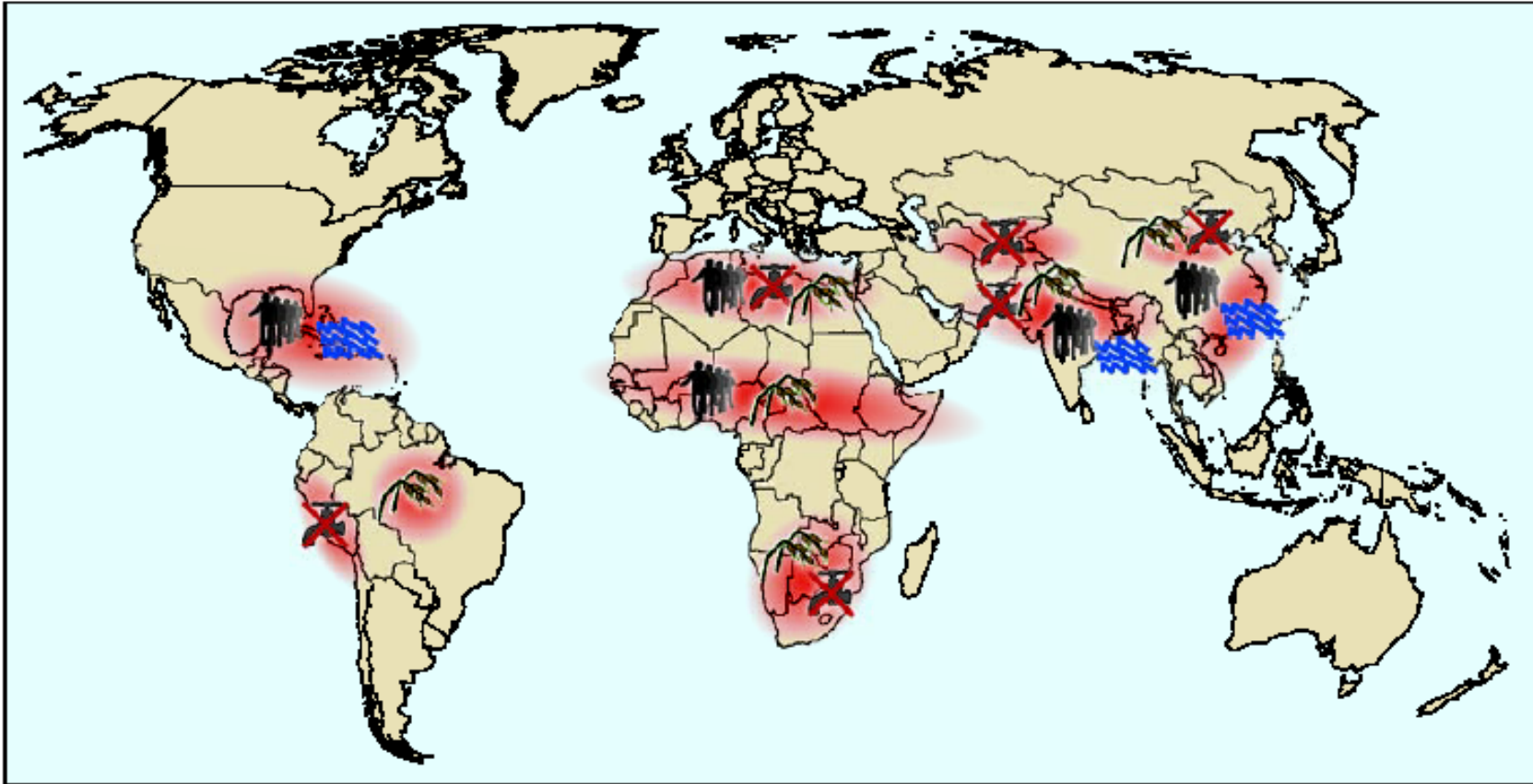
Climate-induced Conflict Constellations

- ❑ Climate-induced degradation of freshwater resources
- ❑ Climate-induced decline in food production
- ❑ Climate-induced increase in storm and flood disasters
- ❑ Environmentally induced migration

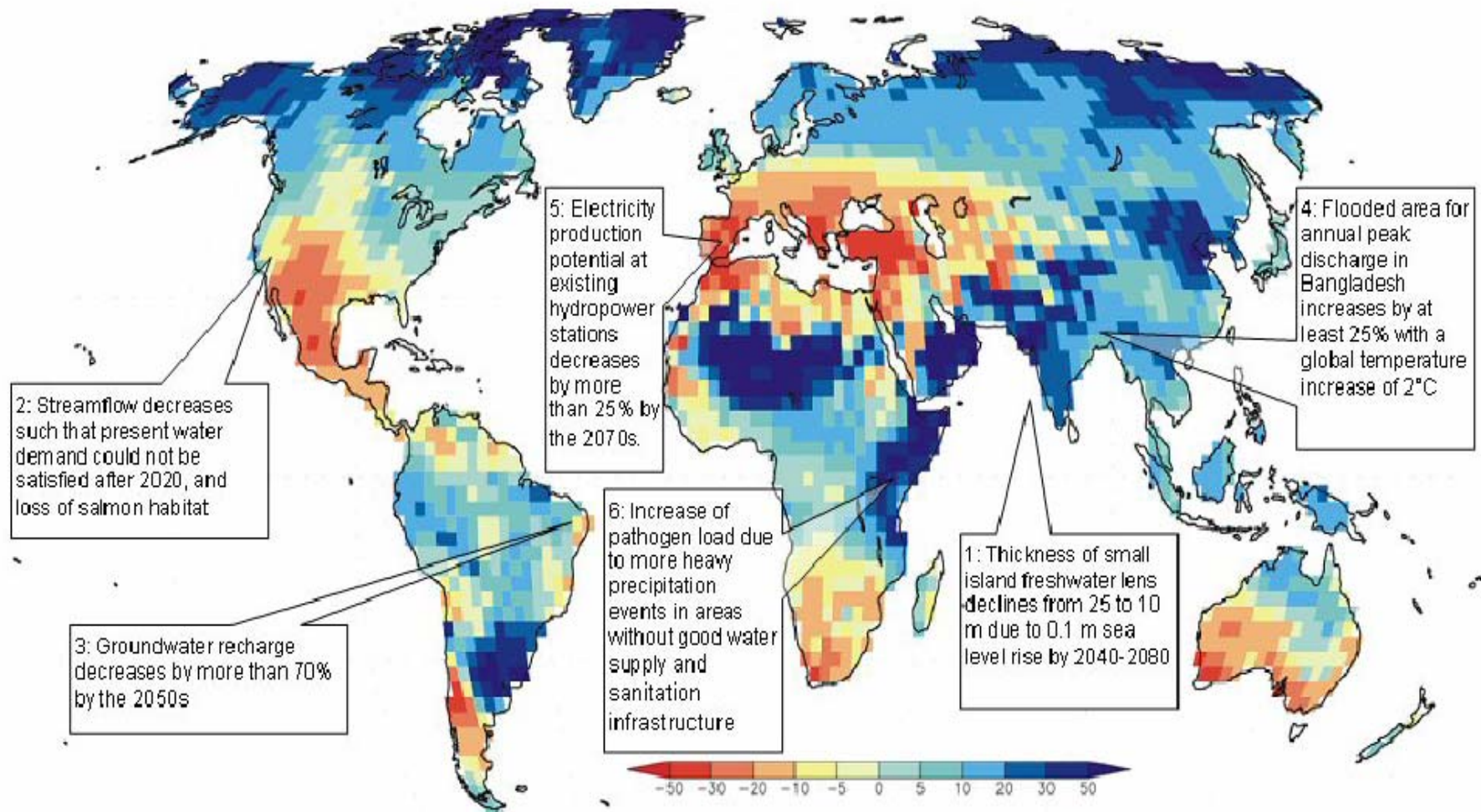
Threats to International Stability and Security

- ❑ Possible increase in the number of weak & fragile states
- ❑ Risks to global economic development
- ❑ Risks of growing international distributional conflicts between main drivers of Climate Change and those most affected
- ❑ Risk to human rights and Developed Countries legitimacy at global governance actors
- ❑ Triggering and intensification of migration
- ❑ Overstretching of classic security policy

Regions with Conflict Constellations



Impacts from changes in rainfall - AR4-



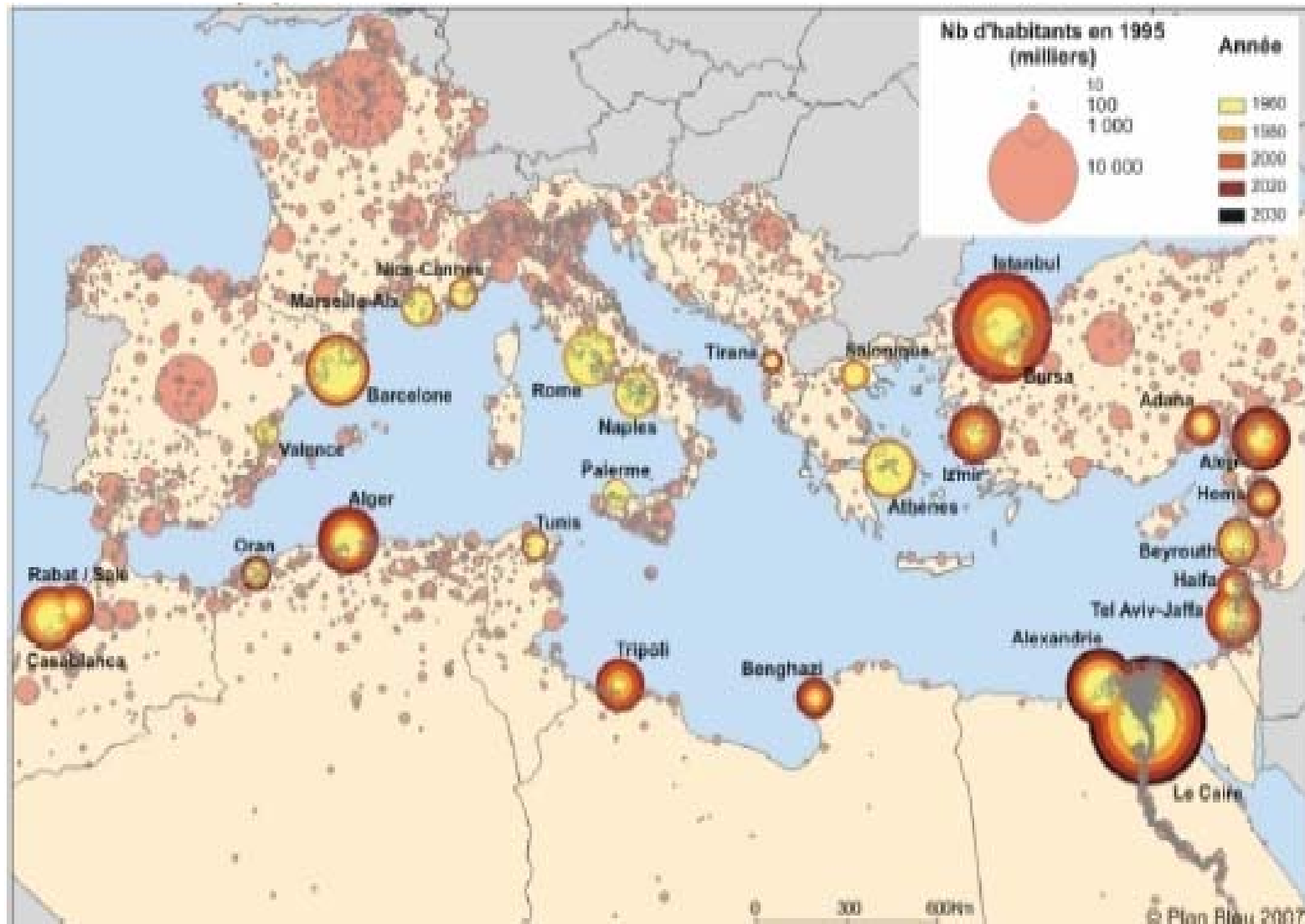
Nile Delta: Potential impact of sea level rise

Nile Delta, potential impact of sea level rise



Source: UNEP/GRID - Arabid Maps and Geophis Library.

Urban population and its future increase



Population growth in the Med area to 2050

	Real population development						Projection Med. var.		Changes	
	1850	1900	1950	1980	2000	2025	2050		1950- 2050	2000- 2050
					2000 Rev.	2000 Rev.	2000 Rev.	2004 Rev.	2000 Rev. [2004 Rev.]	
Egypt	5.5	10.0	21.834	43.749	67.884	94.777	113.840	125.916	92.006	45.956
Jordan	0.25	0.3	1.237	2.923	4.913	8.666	11.709	10.225	10.472	6.796
Israel			1.258	3.879	6.040	8.486	10.065	10.403	8.807	4.025
Palestine	0.35	0.5	1.005	?	3.191	7.145	11.821	10.058	10.816	8.630
Lebanon	0.35	0.5	1.443	2.669	3.496	4.581	5.018	4.702	3.575	1.522
Syria	1.5	1.75	3.495	8.704	16.189	27.410	36.345	35.935	32.850	20.156
Narrow Middle East	7.95	13.05	30.272		101.713	151.065	188.798	197.239	156.566 [166.967]	87.085 [95.526]
Eastern Med.	12.45	16.05	29.247	62.613	89.497	142.899	173.776		144.529	84.279
Only North Africa	13.1	22.3	44.099	91.362	142.802	199.832	239.426	244.293	195.327	96.624
Total (MENA)	25.83	38.77	74.152	154.910	233.473	344.048	414.512		340.360	181.039
South Europe	83.0	103.5	132.913	167.265	177.304	172.492	154.065	178.034	21.152	-23.239

Sectorial impacts and repercussions

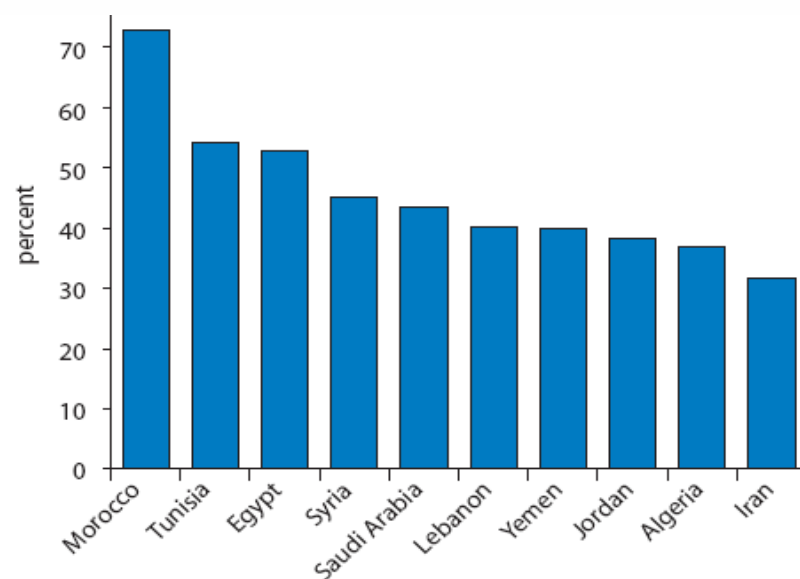
		CROSS SECTORS REPERCUSSIONS							
		Energy	Tourism	Coastal cities	Migration	Agriculture	Health	Water resources	Ecosystem
DIRECT IMPACTS	Energy					Land use (bio-fuel) Biomass	Pollution	Use of energy for water desalination	Degradation Construction of heavy infrastructure
	Tourism	Increasing energy needs		Urbanisation of seaside areas				Drying up of reserves in summer	Degradation of the environment
	Coastal zones	Increasing energy needs					Health-related problems	Depletion of water resources	High urbanisation
	Migration								
	Agriculture				Famine		Famine	High water consumption	
	Health		Decrease in attractiveness (epidemics)		Pollution and epidemics				
	Water resources	Lack of water for energy production	Decrease in attractiveness	Lack of water for city needs	Lack of resources	Decrease in production	Epidemics		More arid areas
	Ecosystem		Degradation of the environment, loss of attractiveness		Depletion of resources	Less fertile soils (Erosion)	Malnutrition		

Water use and efficiency (WRR) in agriculture

Table 4 - Water quantities currently used in the Mediterranean basin

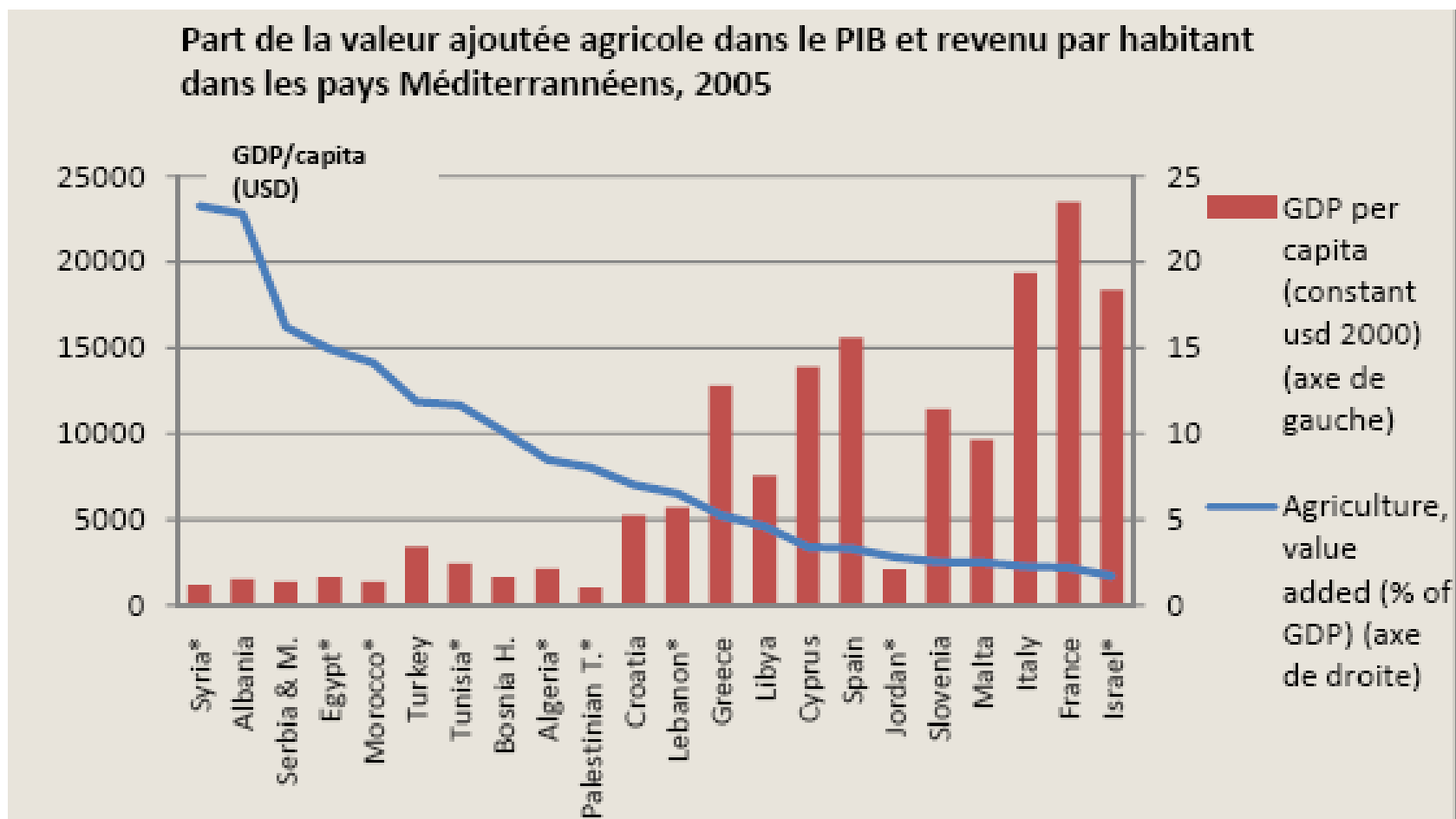
Sous-régions (dans le bassin méditerranéen)	Volume d'eau utilisée par secteur (km ³ /an)				Total km ³ /an
	Collectivités	Agriculture	Industrie non raccordées	Centrales thermiques km ³ /an	
Nord	10	29,6	10,4	21,6	71,6
Est	3,1	10,1	1,2	0	14,4
Sud	3,4	54,1*	8	0,2	65,7
Total	16,5	93,8	19,6	21,8	151,7
%	10,8	61,8	12,9	14,4	100

Source: Plan Bleu 2007

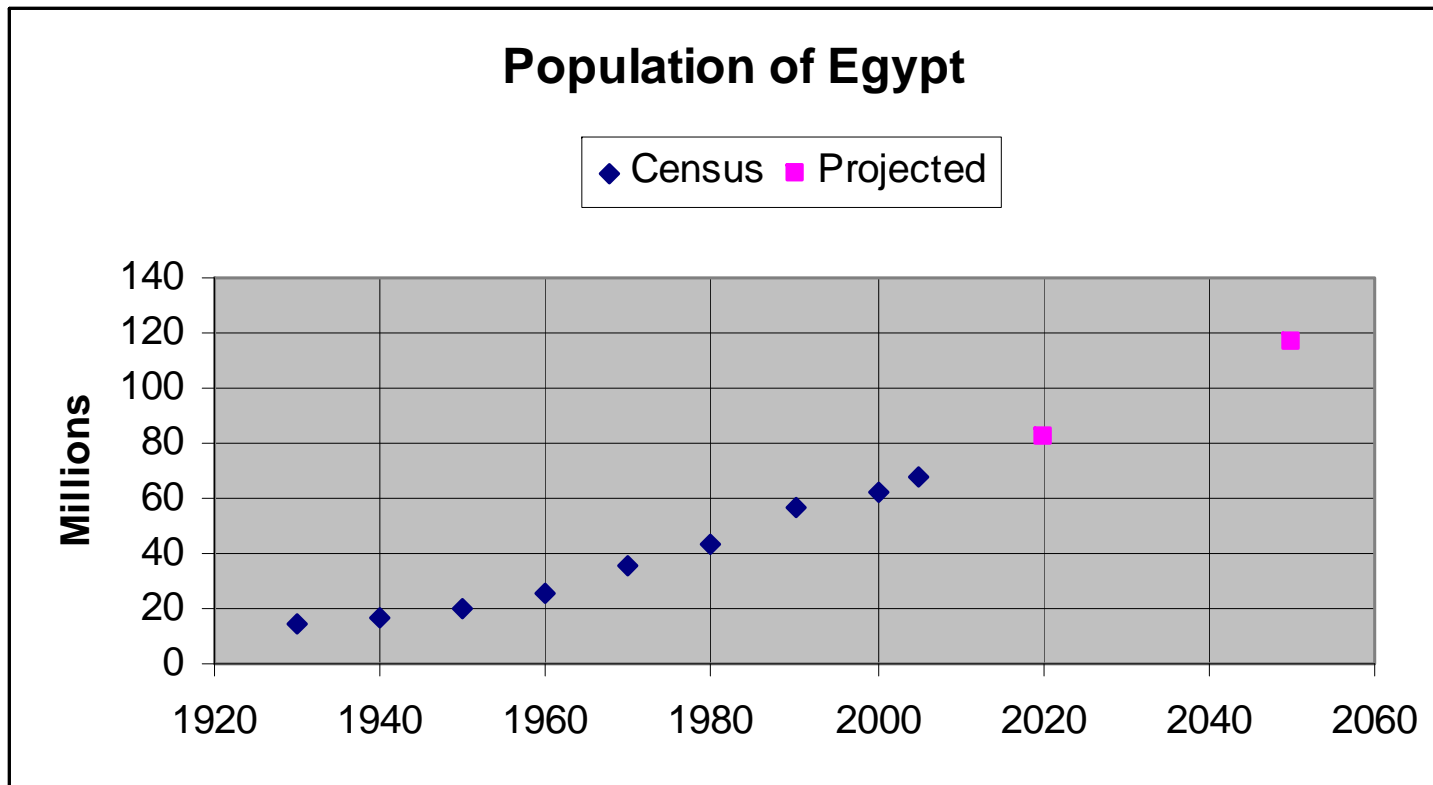


Source: FAO AQUASTAT database.

The importance of agriculture to national economies



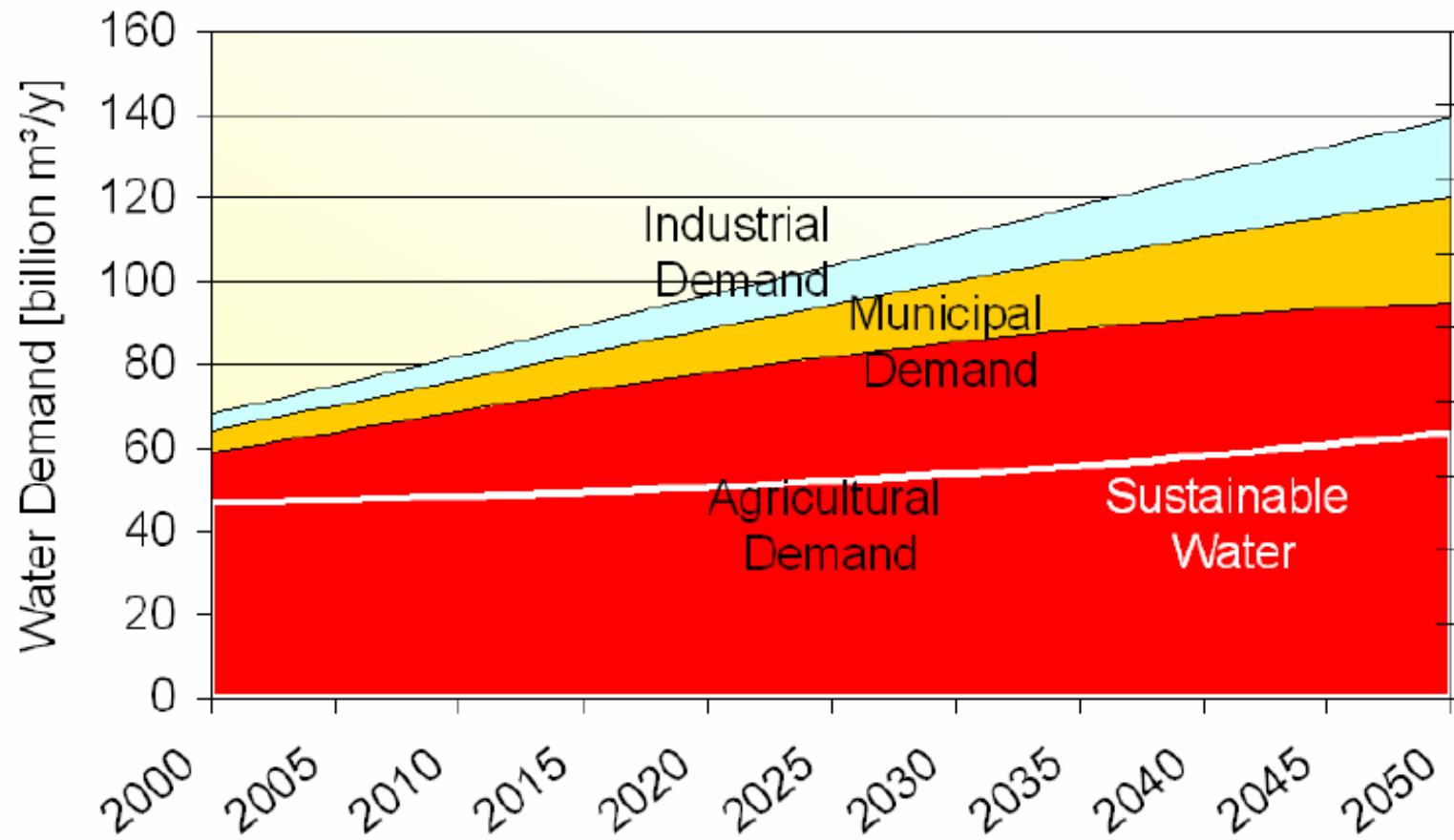
Population Growth - Egypt



Feedstock balance in Egypt 2003 (ktonnes)

Food Groups	Production	Exports	Imports	Stock Change & oth. uses	Consumption
Cereals	17317	567	9316	9064	17002
Veg oils	168	26	401	136	408
Sugar & sw	1565	49	515	-49	2080
Roots & tub	2335	253	56	489	1649
Meat	1328	1	120	0	1446
Milk	4462	33	290	863	3856

Future Water Demand in Egypt



Water use and sources in Egypt today and in 2017

• Irrigated Agriculture	59.0
• Municipal	6.5
• Industrial	7.6
• Evaporation network	2.2
• Evaporation Fisheries	0.3
• Navigation or	
• <u>Environmental needs</u>	0.2
– TOTAL	75.8

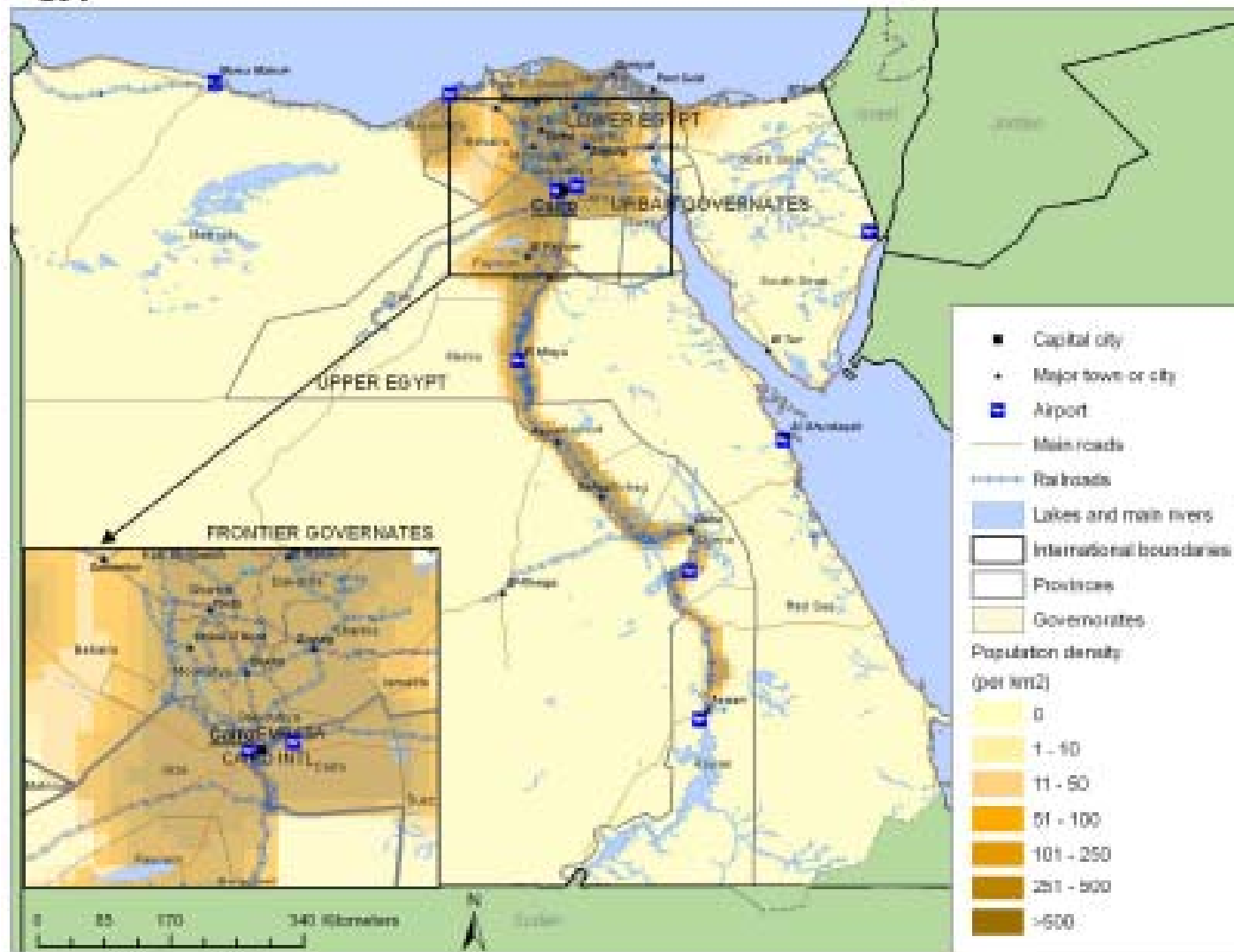
• Nile Water	55.5
• Drainage Reuse	5.5
• Ground water	7.5
• Treated Sewage	0.7
• Jongli Canal	0.0
• Rain Harvesting	1.0
Total	70.2

• Irrigated Agriculture	68.1
• Municipal	6.2
• Industrial	10.5
• Evaporation network	2.1
• Evaporation Fisheries	0.4
• Navigation or	
• <u>Environmental needs</u>	0.2
TOTAL	87.5

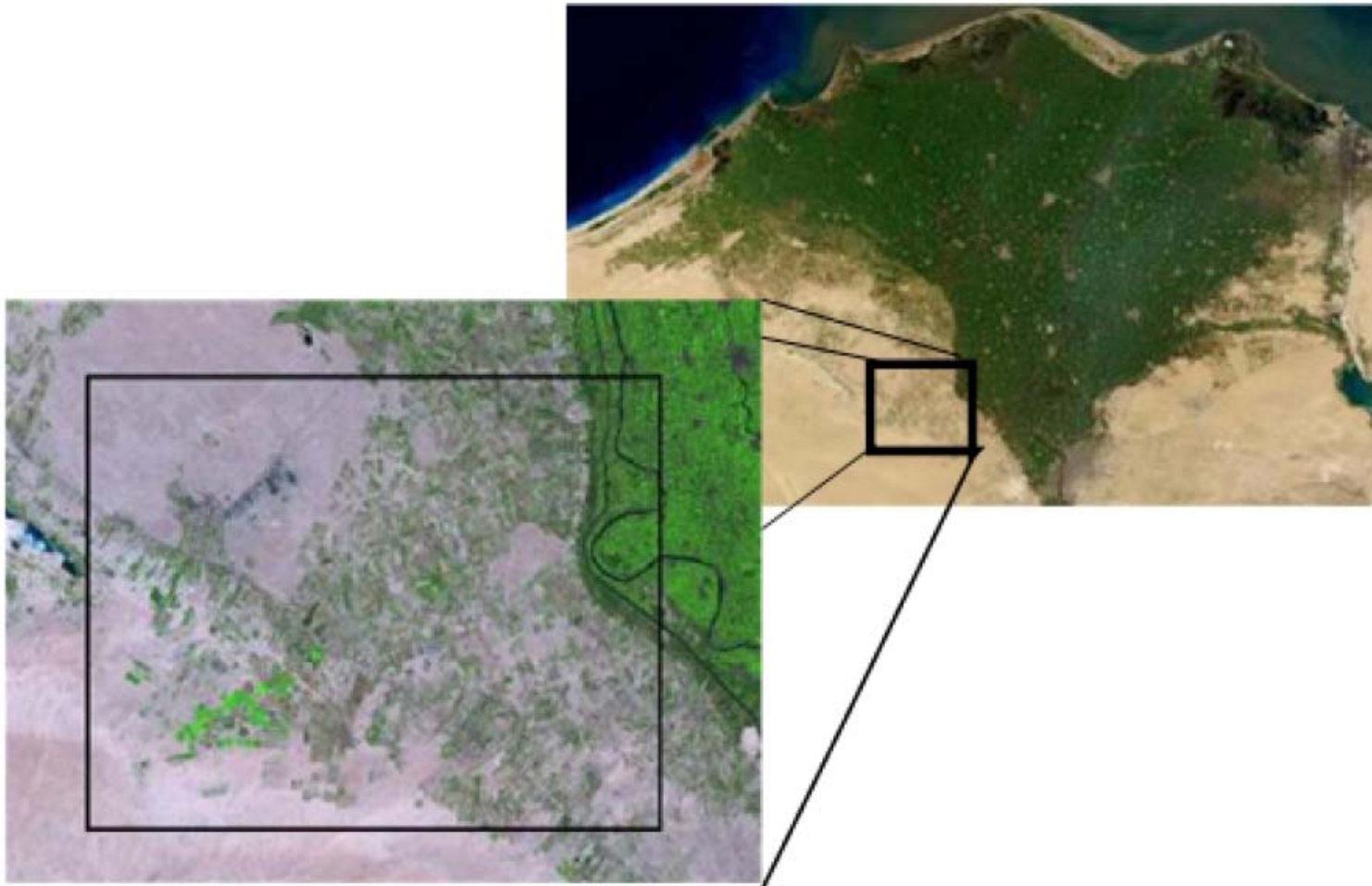
• Nile Water	55.5
• Drainage Reuse	8.5
• Ground water	12.4
• Treated Sewage	2.0
• Jongli Canal	2.0
• Rain Harvesting	1.5
Total	81.9

+ Savings from Irrigation Improvement projects @ 3.0

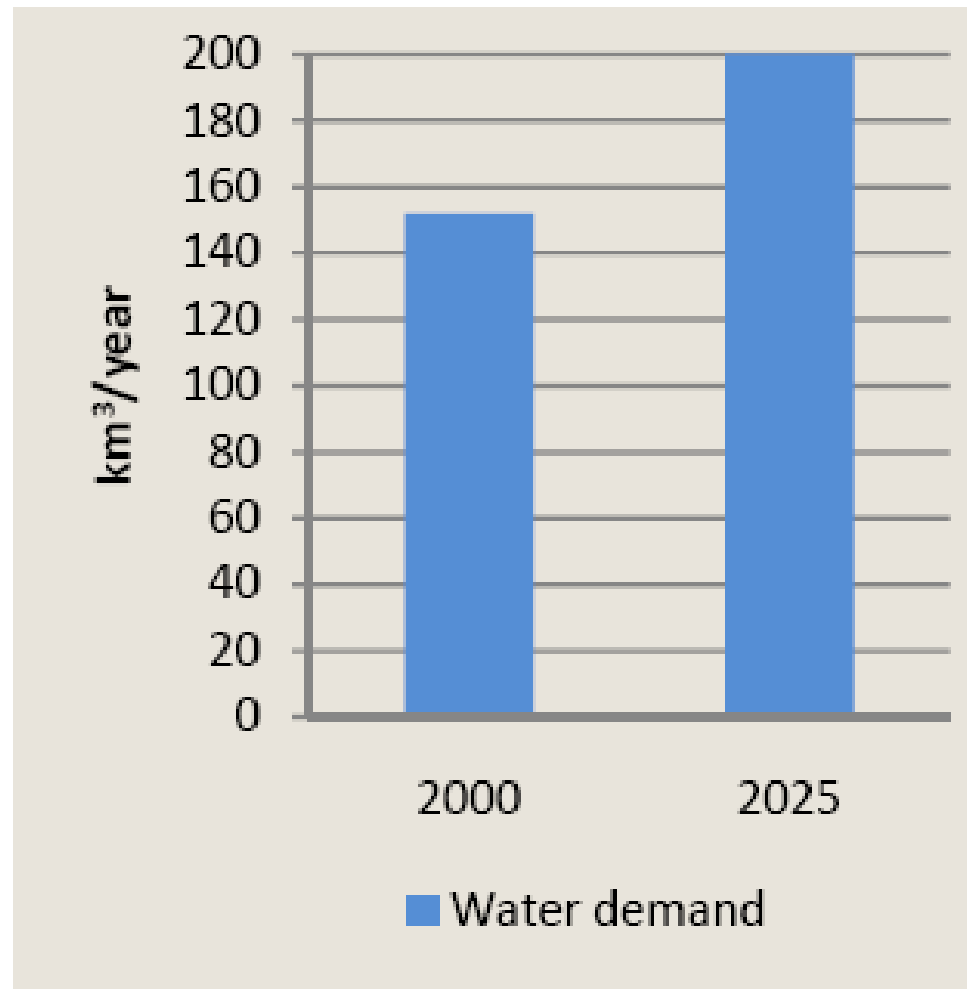
Population density -Egypt



Call for Tenders to provide water for land reclamation in Egypt - 2006

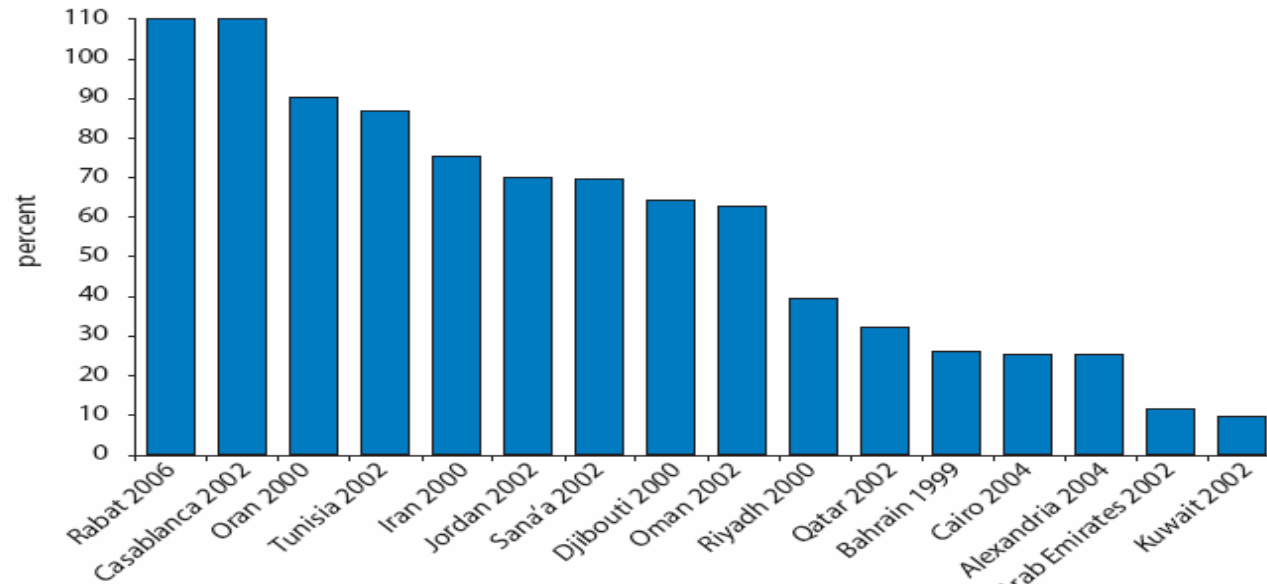


Water demand in the Med to 2025

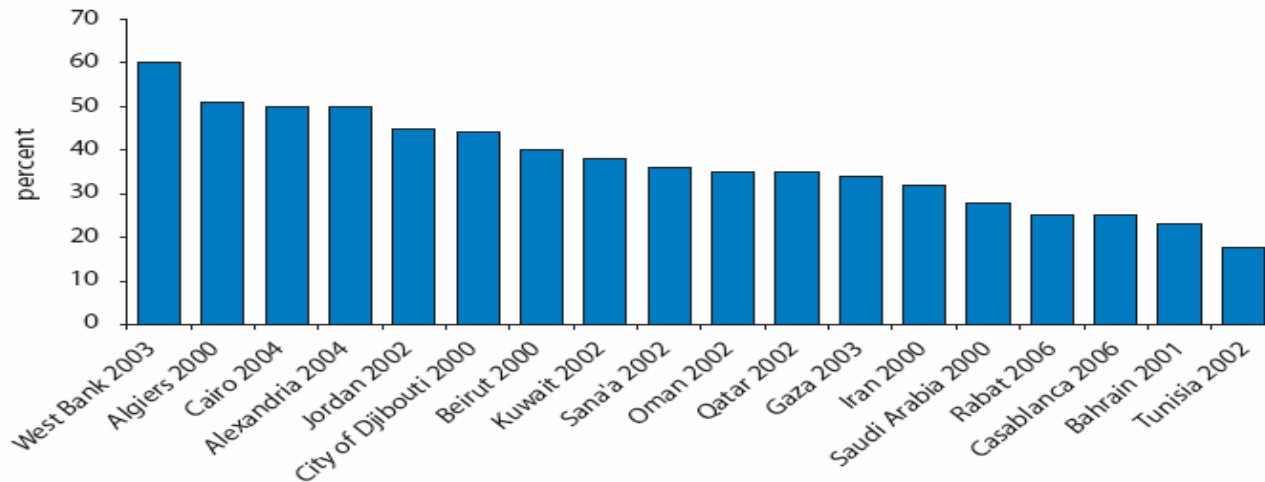


Water costs recovery in MENA countries

Operating Cost Coverage Ratio for Utilities in Selected Countries and Major Cities in MENA



Nonrevenue Water Ratio for Utilities in Selected Countries and Major Cities in MENA



Source: Table A2.2.

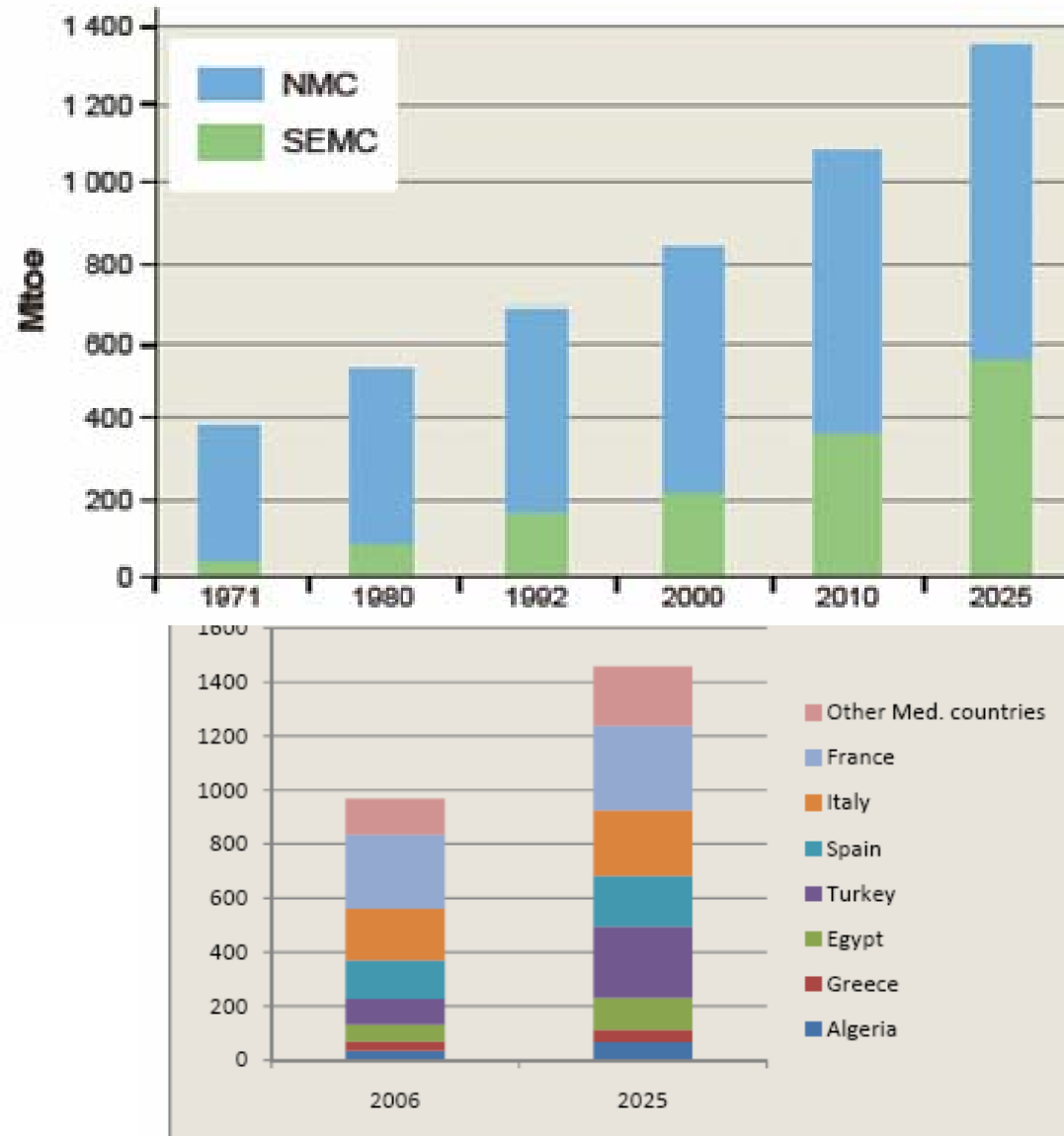
Large-scale Desalination activity in Med countries

Table 2 - Desalination in the Mediterranean countries

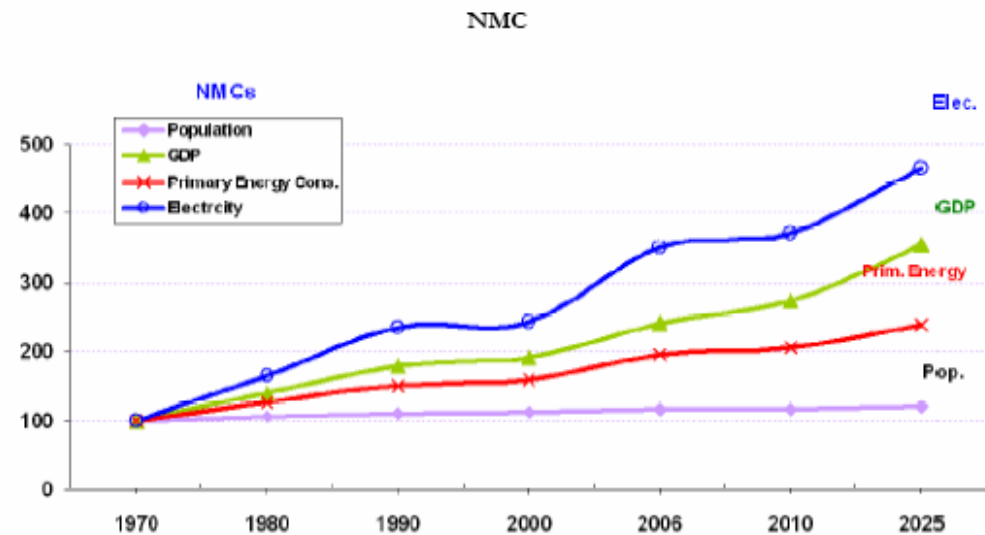
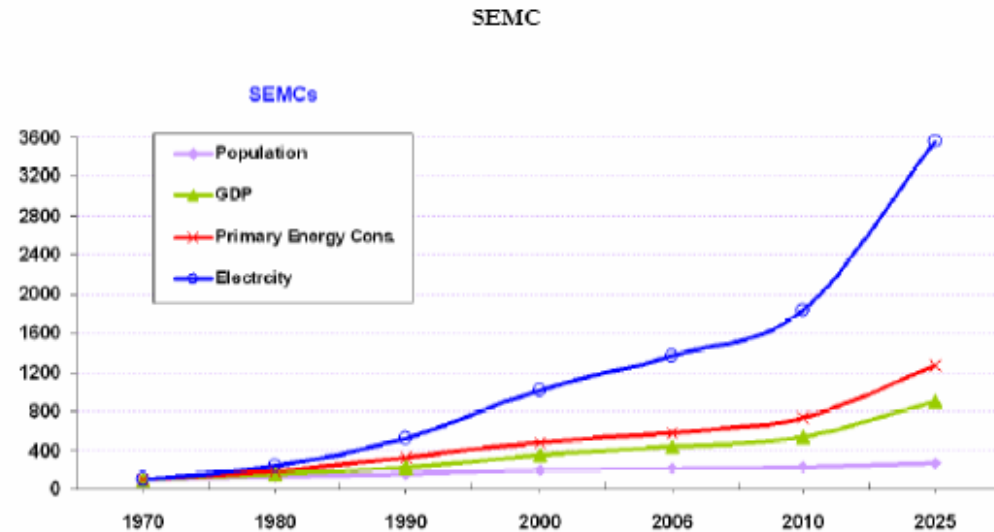
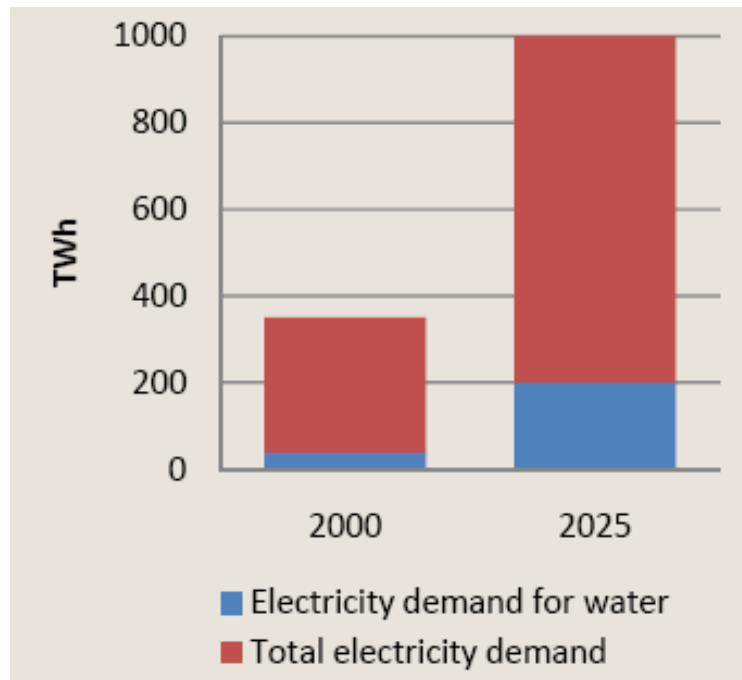
Countries	Installed capacity	Projects scheduled	Remarks
Algeria	600 000 m ³ /d	2 300 000 m ³ /d (2009)	Water supply for major urban centres
Cyprus	10 000 m ³ /d	Ongoing enlargement	
Egypt		Projects in isolated areas (Sinai, Red Sea)	Use of wind energy
Israel	800 000 m ³ /d		320 000 m ³ /d in Ashkelon (reverse osmosis plant)
Libya	1 000 000 m ³ /d (distillation)	Nuclear desalination Project	
Malta	150 000 m ³ /d		60% of drinking water supply
Morocco	20 000 m ³ /d	150 000 m ³ /d (3 plants)	
Spain	2 500 000 m ³ /d	Many ongoing projects for agriculture (greenhouse vegetables)	The only Mediterranean country to use desalinated water for agriculture
Tunisia	100 000 m ³ /d	250 000 m ³ /d (5 plants)	A desalination project with renewable energy

Source : Plan Bleu, Boré, 2008

Primary Energy consumption (Mtoe)

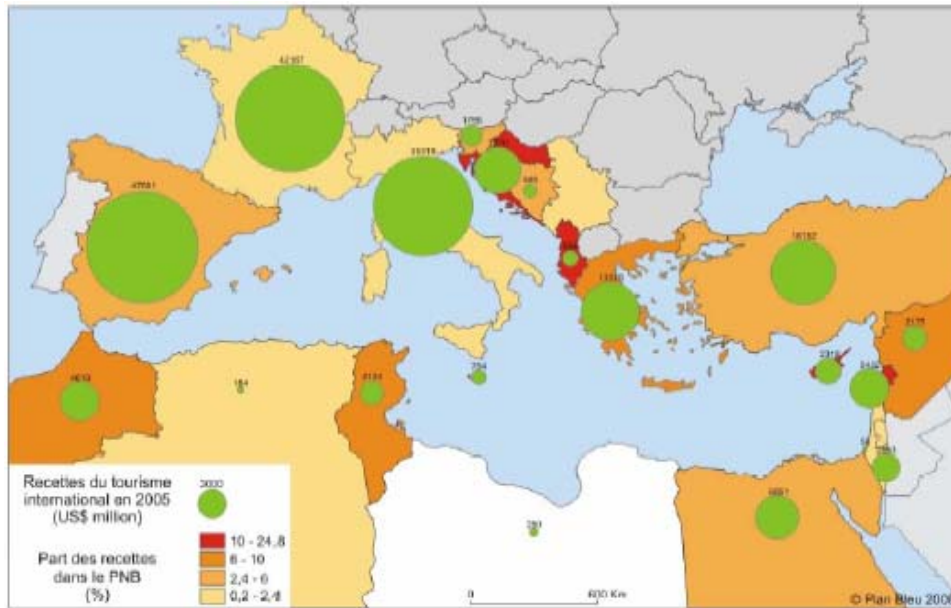


Forecast increases in energy and electricity consumption



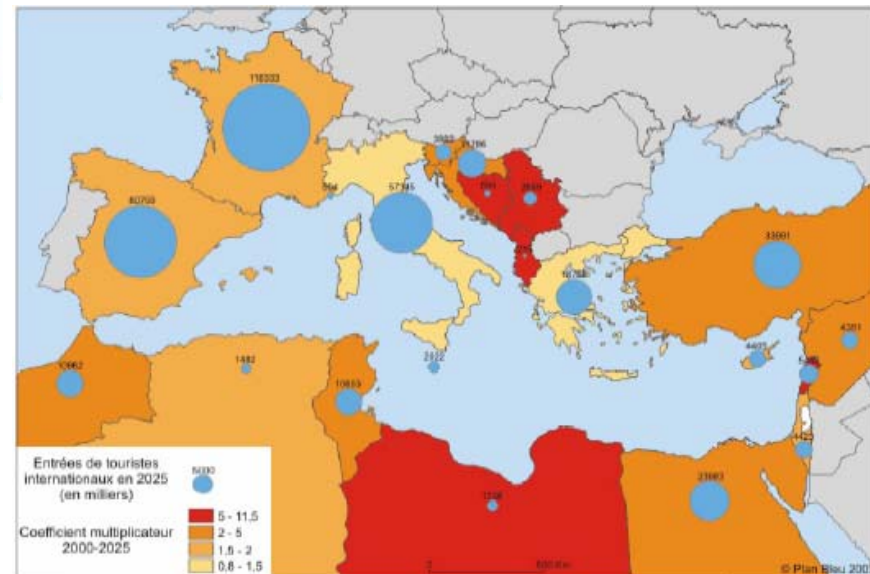
Source: OME

Tourism and its contribution to GDP now and in 2025



← Present day arrivals and contribution to GDP

2025 arrivals and rate of increase →



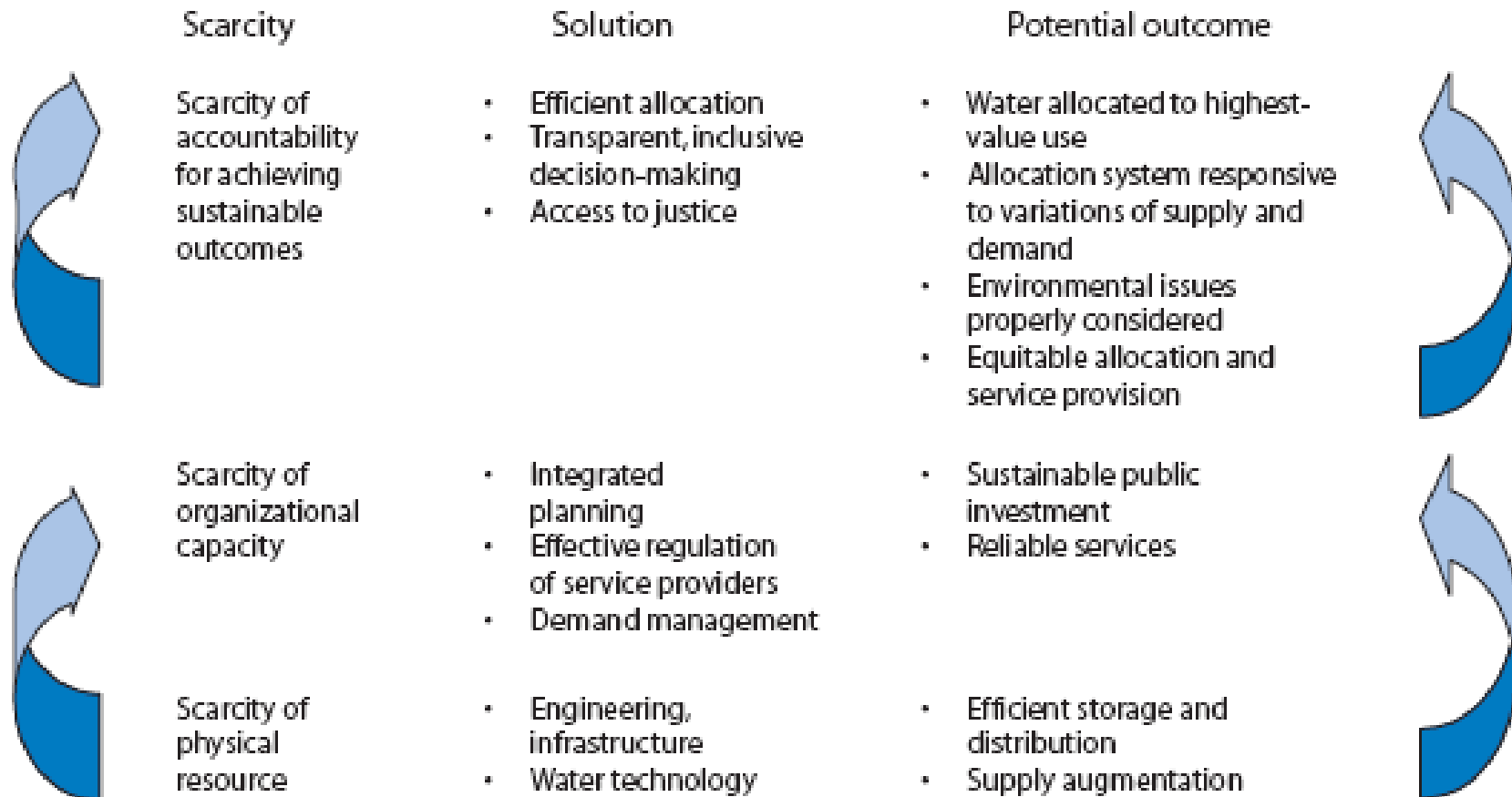
Vulnerability and Adaptation to Climate Change – Huge Task

Adaptation: coping with climatic change, i.e.

taking measures to **reduce the negative effects, or exploit the positive ones**, by making appropriate adjustments.

- ❑ Adaptation is **inevitable**
- ❑ **Developing countries will be most affected.**
- ❑ Strong **adaptation policies and support** need to be **in place very soon**
- ❑ UNFCCC report (2007) indicates that Investment and financial flows needed for adaptation globally are likely to be **tens of billions of dollars per year** several decades from now

Water Scarcity – 3 levels



UNFCCC and Kyoto Protocol obligations, targets & actions

- ❑ Support for Impact, Vulnerability and Adaptation assessment, as **part of National Communications**
- ❑ Further implementation of actions including on data and modelling, vulnerability and adaptation assessment and implementation under the **Buenos Aires Programme of work on adaptation (2004)**
- ❑ Addressing special needs of LDCs through the **NAPAs**
- ❑ Science and technical advice on adaptation: **Nairobi Work Programme** (adopted at COP 12 in Nairobi in 2006)
- ❑ Enhanced Action on adaptation under the **Bali Action Plan (2007)**

National Action Plans for Adaptation (NAPAs)

- ❑ Rationale for NAPA rests on **low adaptive capacity of LDCs**
- ❑ Serves as mechanism for assessment and communication of urgent and immediate adaptation needs in LDCs
- ❑ Steps include information synthesis, assessment of vulnerability to climate variability and extreme events and potential risk areas, identification of key adaptation measures, selection of prioritized set of activities.
- ❑ 32 NAPAs submitted thus far (out of 48 LDC Parties)
- ❑ Rough estimate of total cost of NAPA implementation in all 48 Parties - around US\$1 billion
- ❑ USD 163 million pledged as of COP 13 (2007)

Stern Report: Aggregate estimates of impacts

- ❑ Essential to take account of risk and uncertainty
- ❑ Models do not provide precise forecasts
- ❑ Models embody a relationship between temperature and economic damage
- ❑ Assumptions on discounting and risk aversion affect the results

	Base climate	High Climate
Market impacts	5%	7%
Broad impacts	11%	14%

World GDP \$53.6Tril (2007)

Adjusting for income inequality raises estimates by at least one quarter

Thank you for your attention

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facets

further action on climate, environment, energy, economy, technology & sustainability

Recommendations

- Shaping global political change
- Reforming the UN
- Ambitiously pursuing international climate policy
- Implementing the energy turnaround in the EU
- Developing mitigation strategies through partnerships
- Supporting adaptation strategies for developing countries
- Stabilizing fragile states threatened by CC
- Managing migration through cooperation and international law
- Expanding global information and early warning systems
- Next President is likely to support mandatory action
- Develop worst case strategies??