FASTER

Farmers' Adaptation and Sustainability in Tunisia through Excellence in Research

2nd FASTER SPECIALIZED TRAINING

on Climate change effects on water & land management in the Mediterranean

22-26 March 2021 (ONLINE)

AGENDA

Projections with effects on water availability

FASTER_H2020_2nd Specialized Training Agenda.pdf - Adobe Acrobat Reader DC (32-bit)

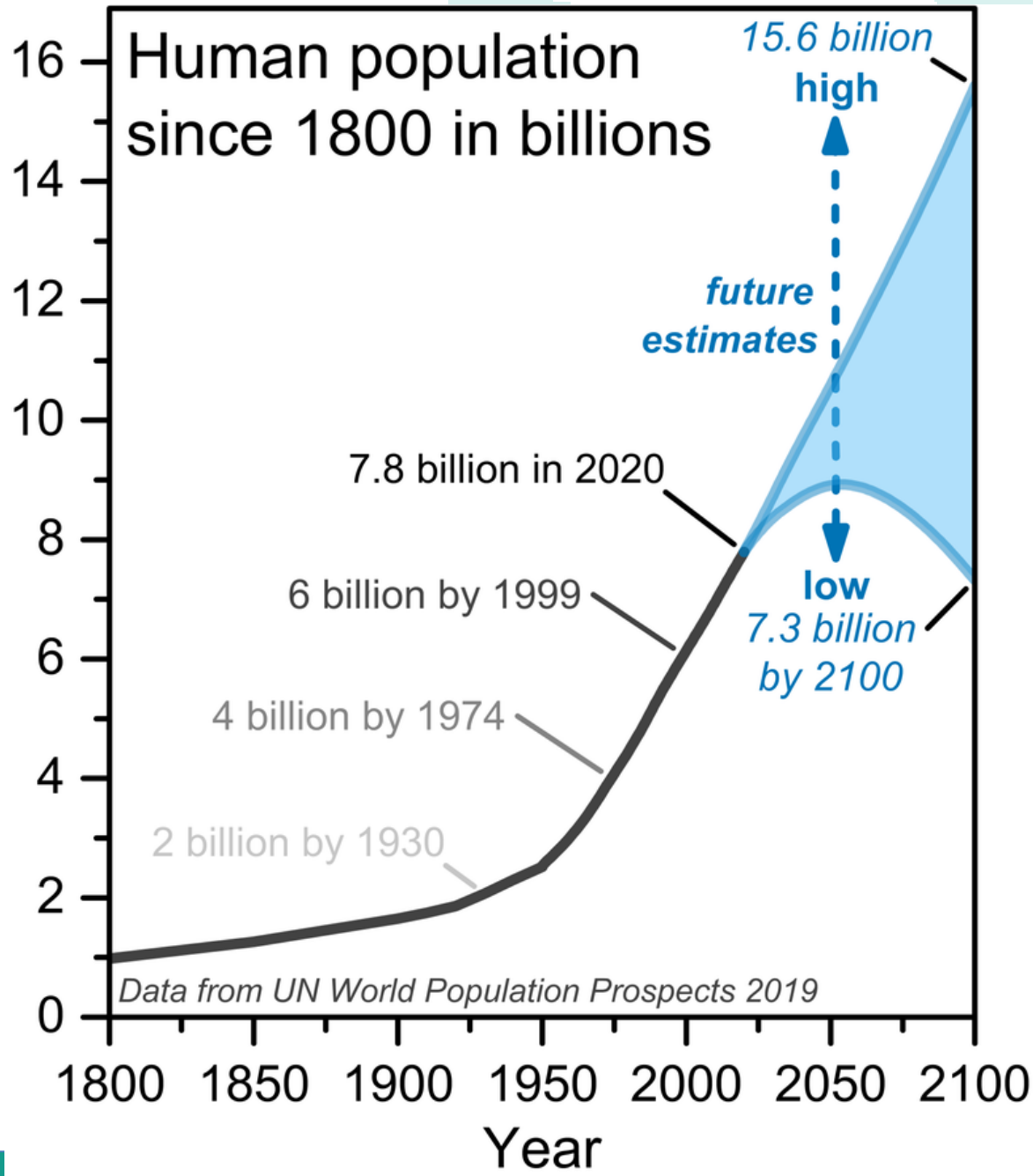
File Edit View Sign Window Help

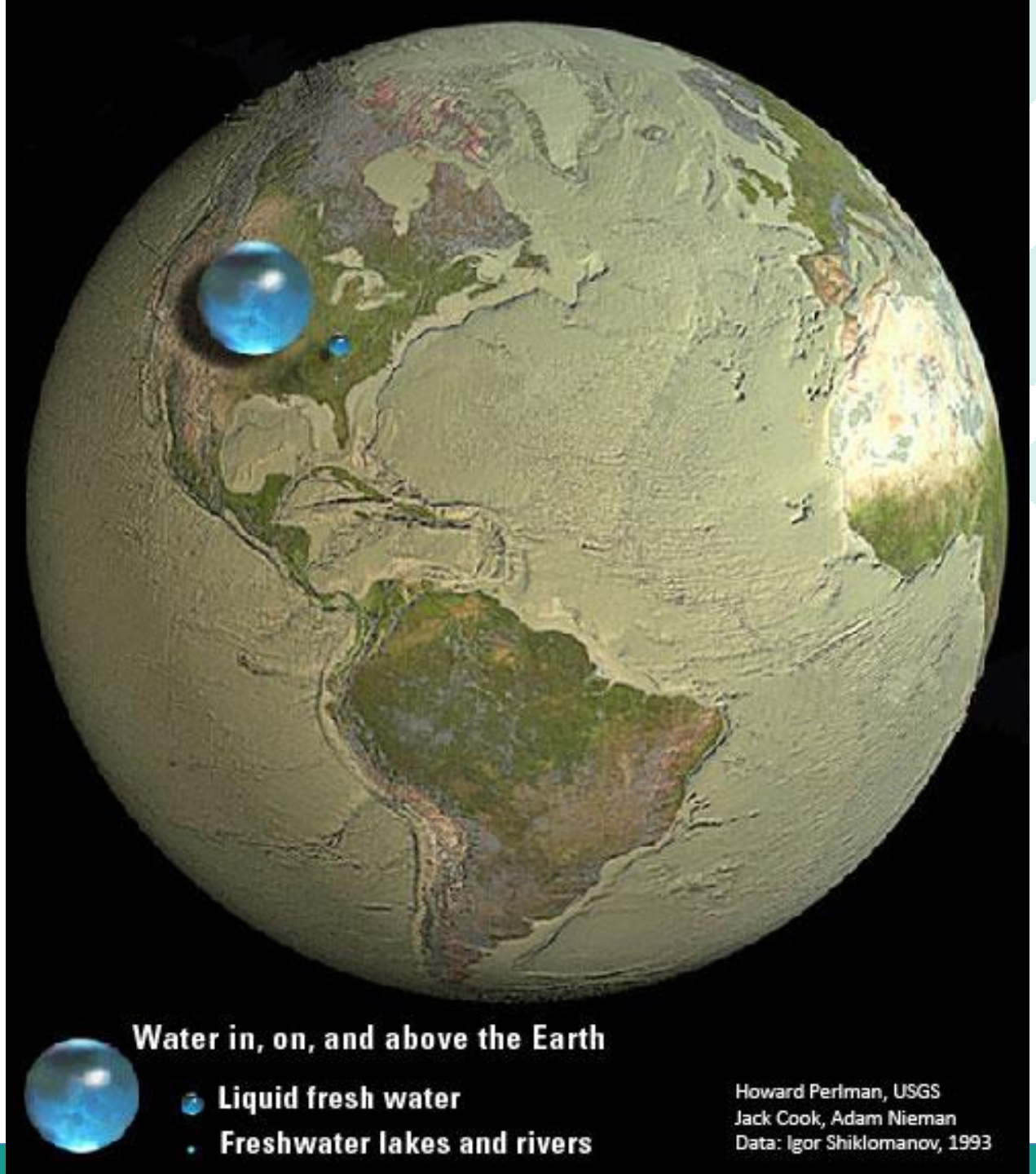
Home Tools FASTER_H2020_2nd... Sign In

5 / 10 120%

Monday 22nd March 2021	
9:30-10:00	Projections with effects on water availability
10:00-10:30	Facilitated debate
10:30-11:00	BREAK
11:00-11:30	Innovative mitigation to climate change and increasing demands
11:30-12:00	Facilitated debate
12:00-12:30	Explanation of tasks to do & Wrap up

The problem


Human population
since 1800 in billions
15.6 billion
high
future
estimates
7.8 billion in 2020
6 billion by 1999
4 billion by 1974
2 billion by 1930
low
7.3 billion
by 2100
Data from UN World Population Prospects 2019
0
2
4
6
8
10
12
14
16
1800
1850
1900
1950
2000
2050
2100
Year


Water in, on, and above the Earth
Liquid fresh water
Freshwater lakes and rivers
Howard Perlman, USGS
Jack Cook, Adam Nieman
Data: Igor Shiklomanov, 1993

Water crisis today and tomorrow

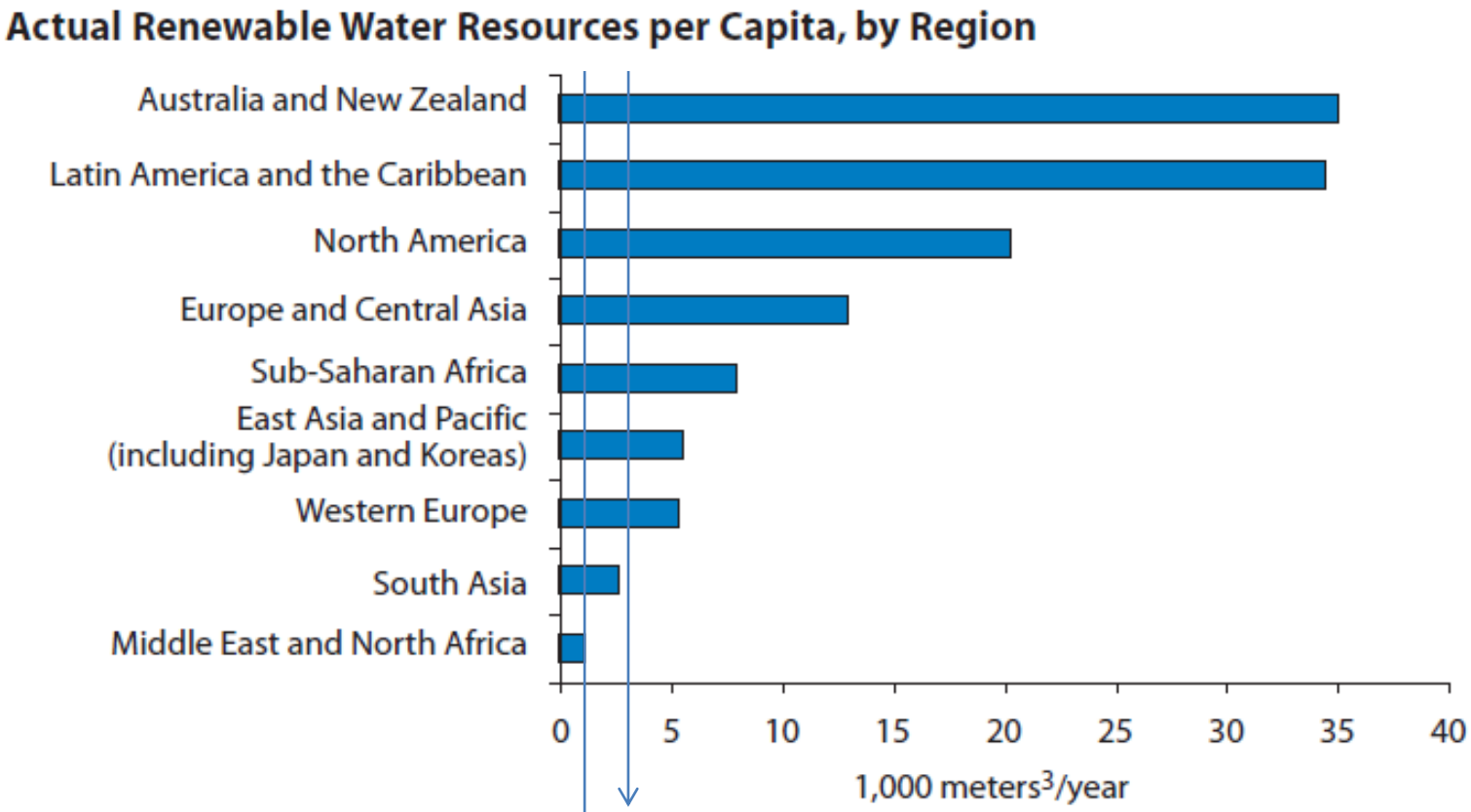
2020, 7.8 bln, 1 bln without safe water supply,
3 bln without safe water sewage,
6 mln deaths/year due to water-related issues.

2050, 10 bln, 30% live in arid areas,
30% more agricultural area,
50% more water needed,
60% more food,
80% more energy.

Population increase in MENA

- 1970 - 128 million
- 2020 - 380 million
- 2050 - 700 million
- 2100 - >1 billion

Renewable water resources

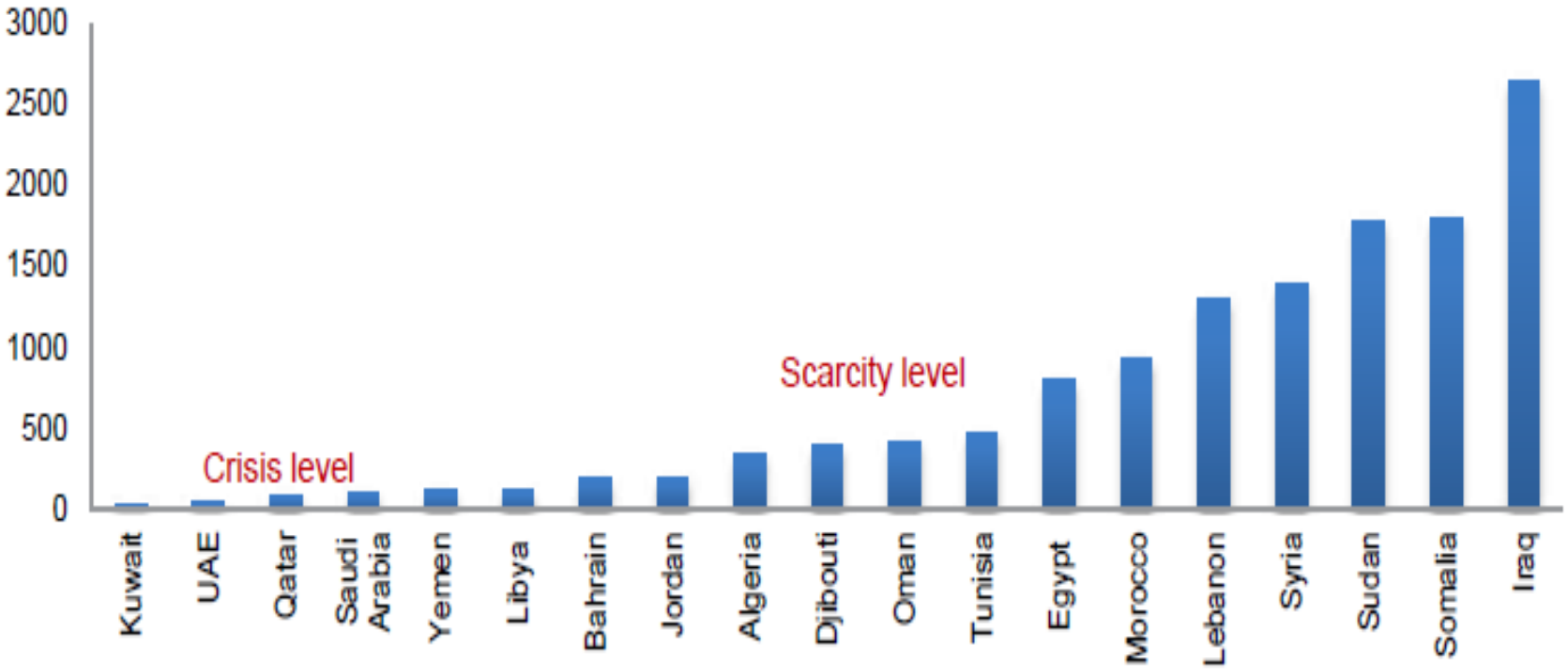


Economic water scarcity (3000 m^3/capita and year)

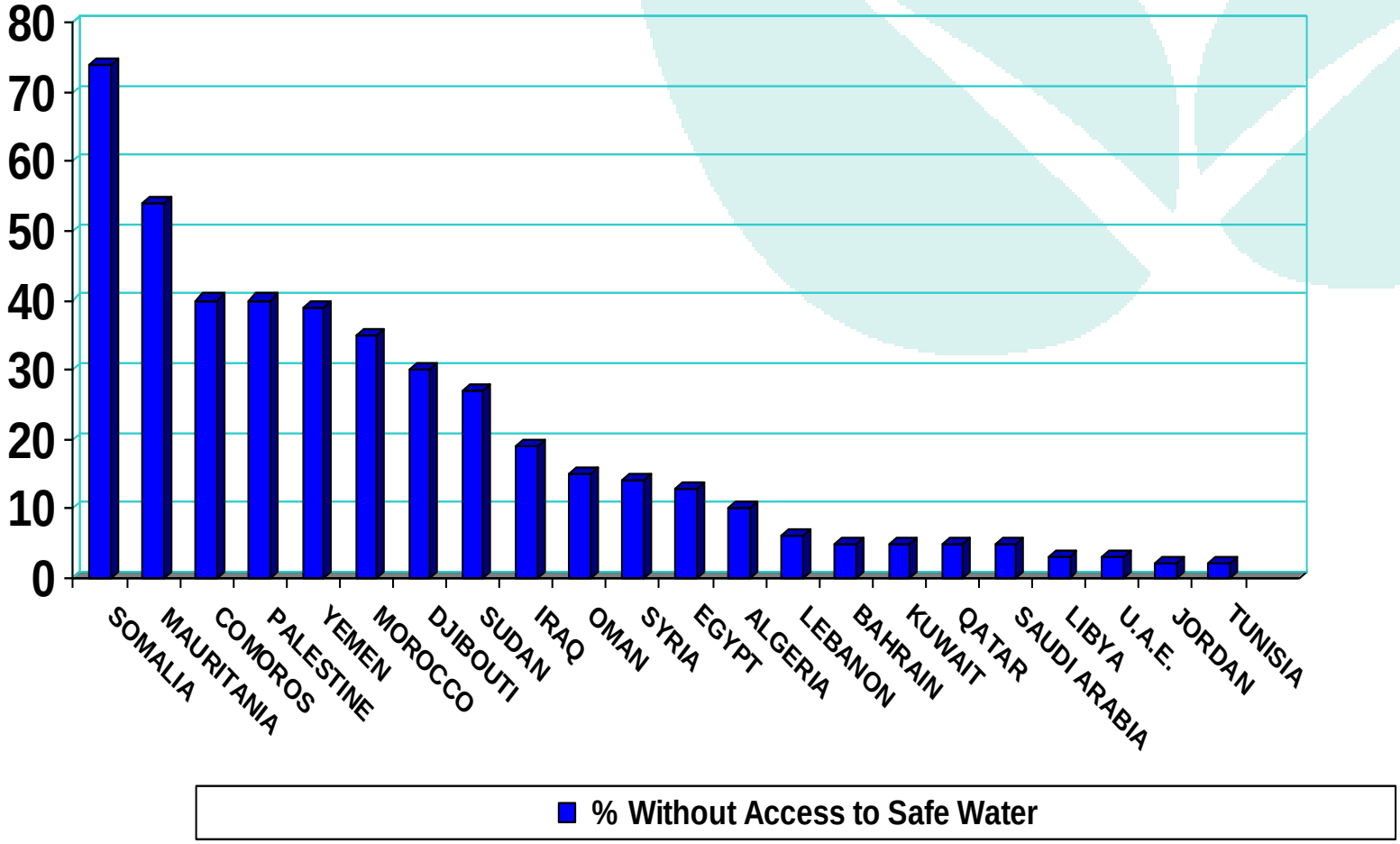
Physical water scarcity (1000 m^3/capita and year)

After: Tolba and Saab (2008)

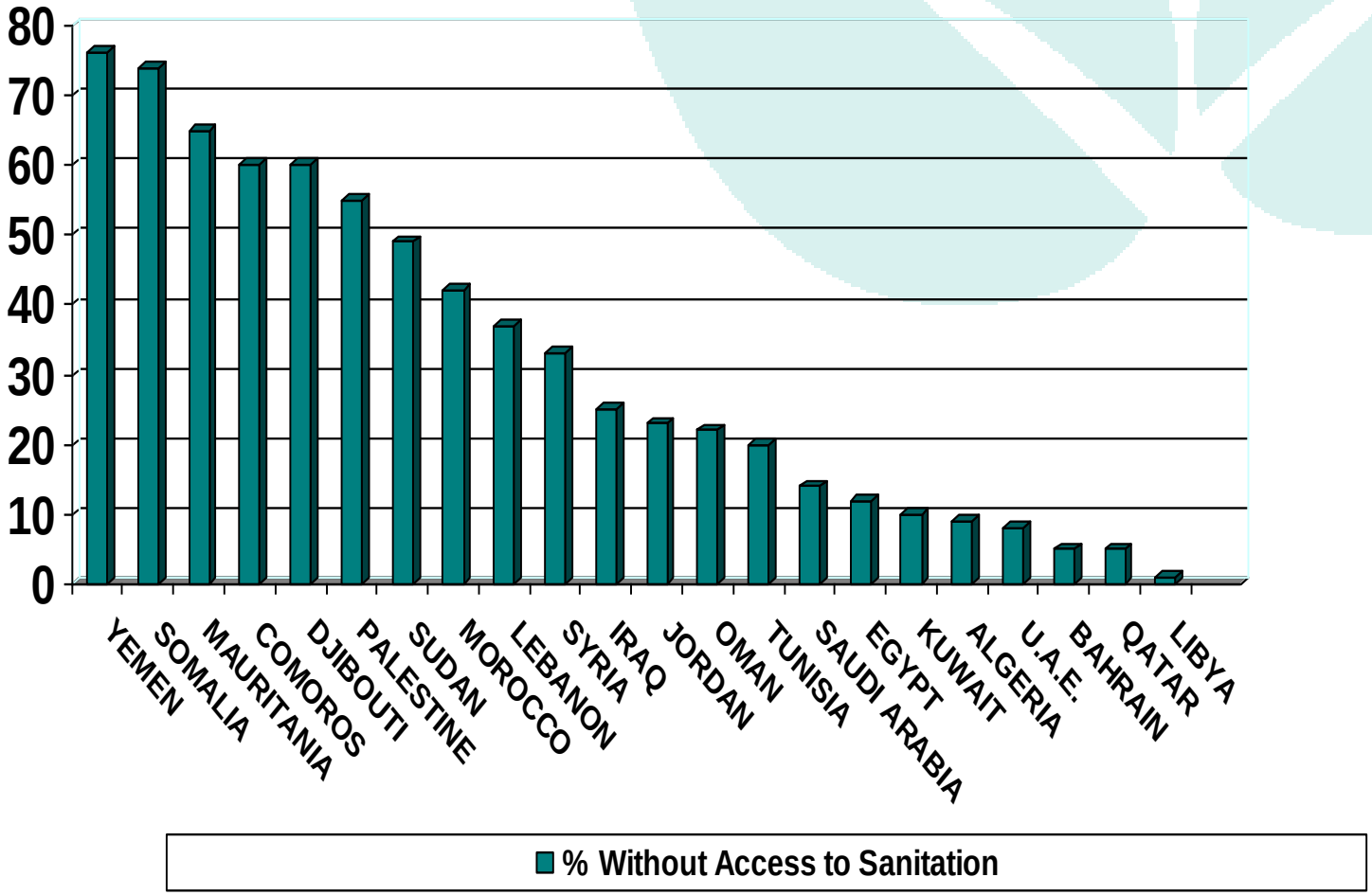
Total renewable water resources per capita in Arab world



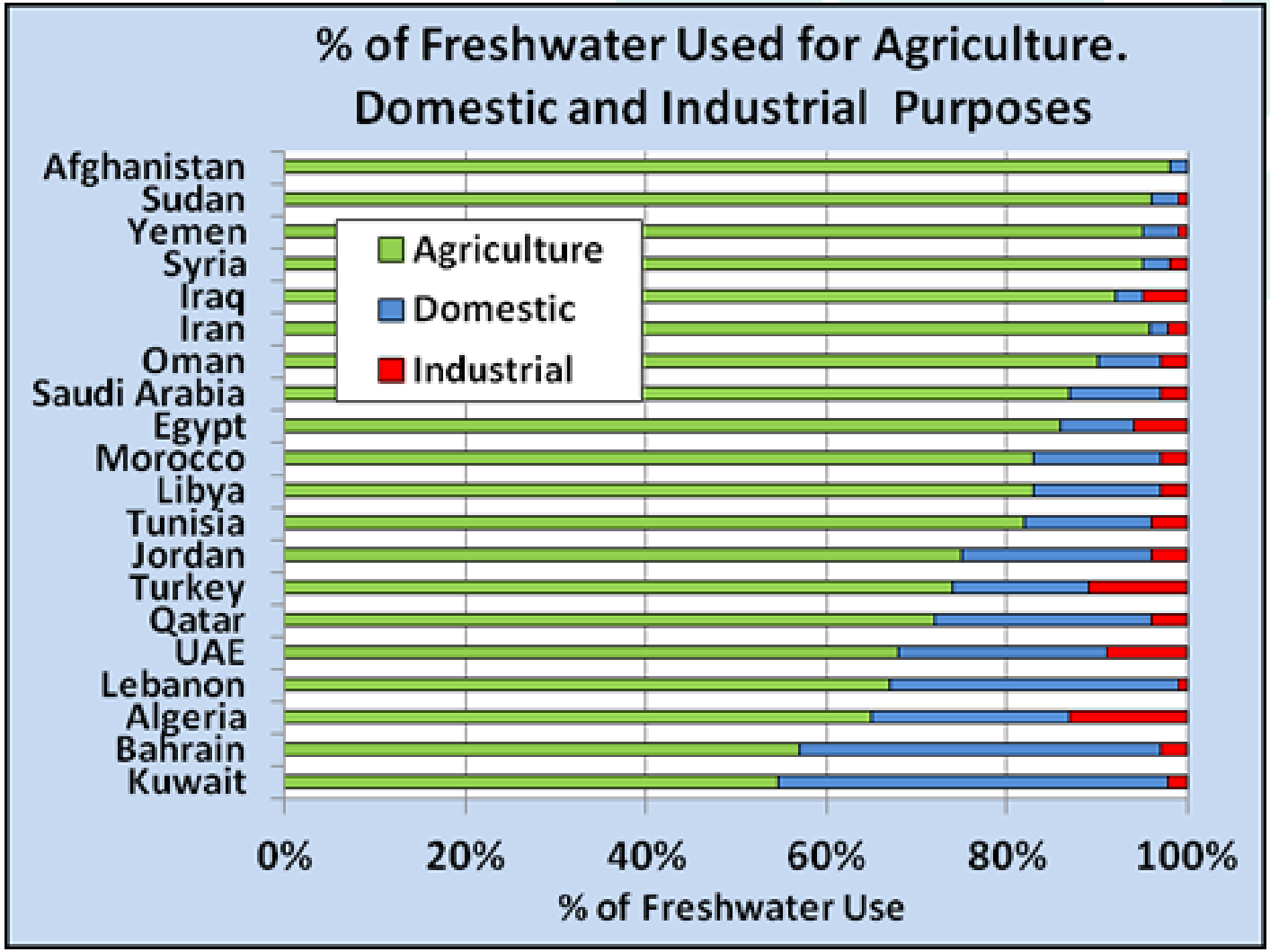
83 million people with no access to safe drinking water in MENA



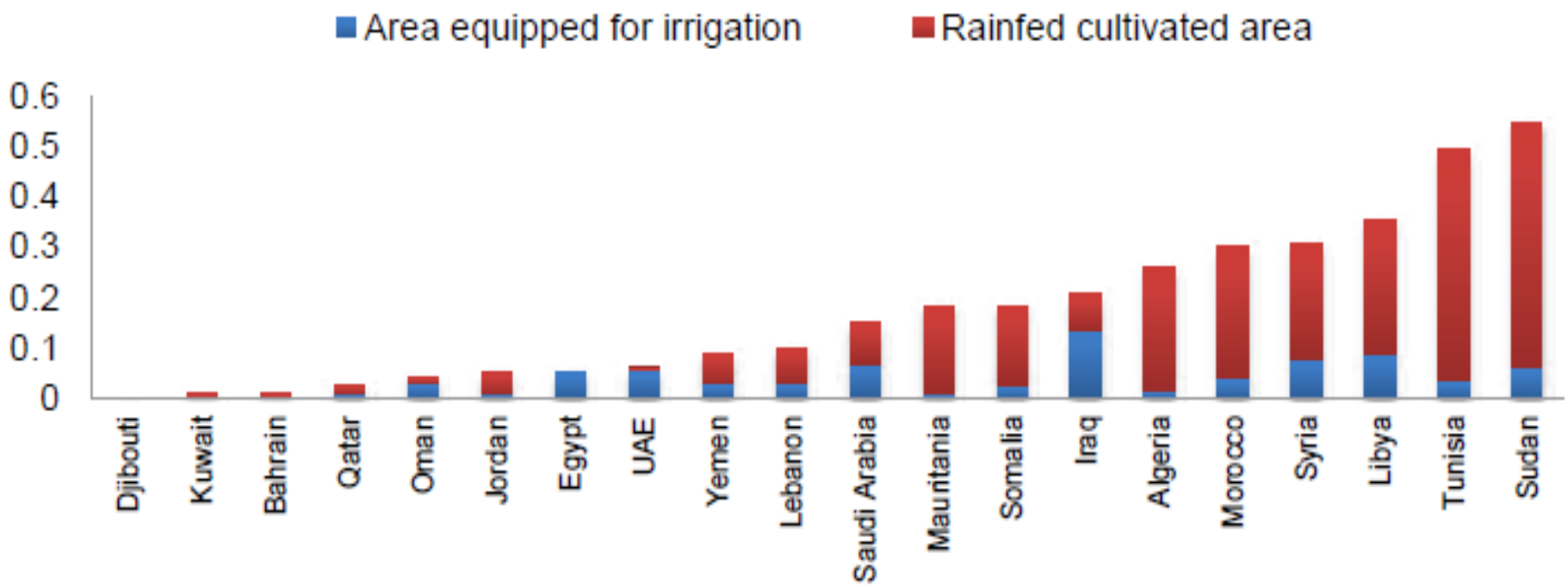
96 million people with no safe sanitation in MENA



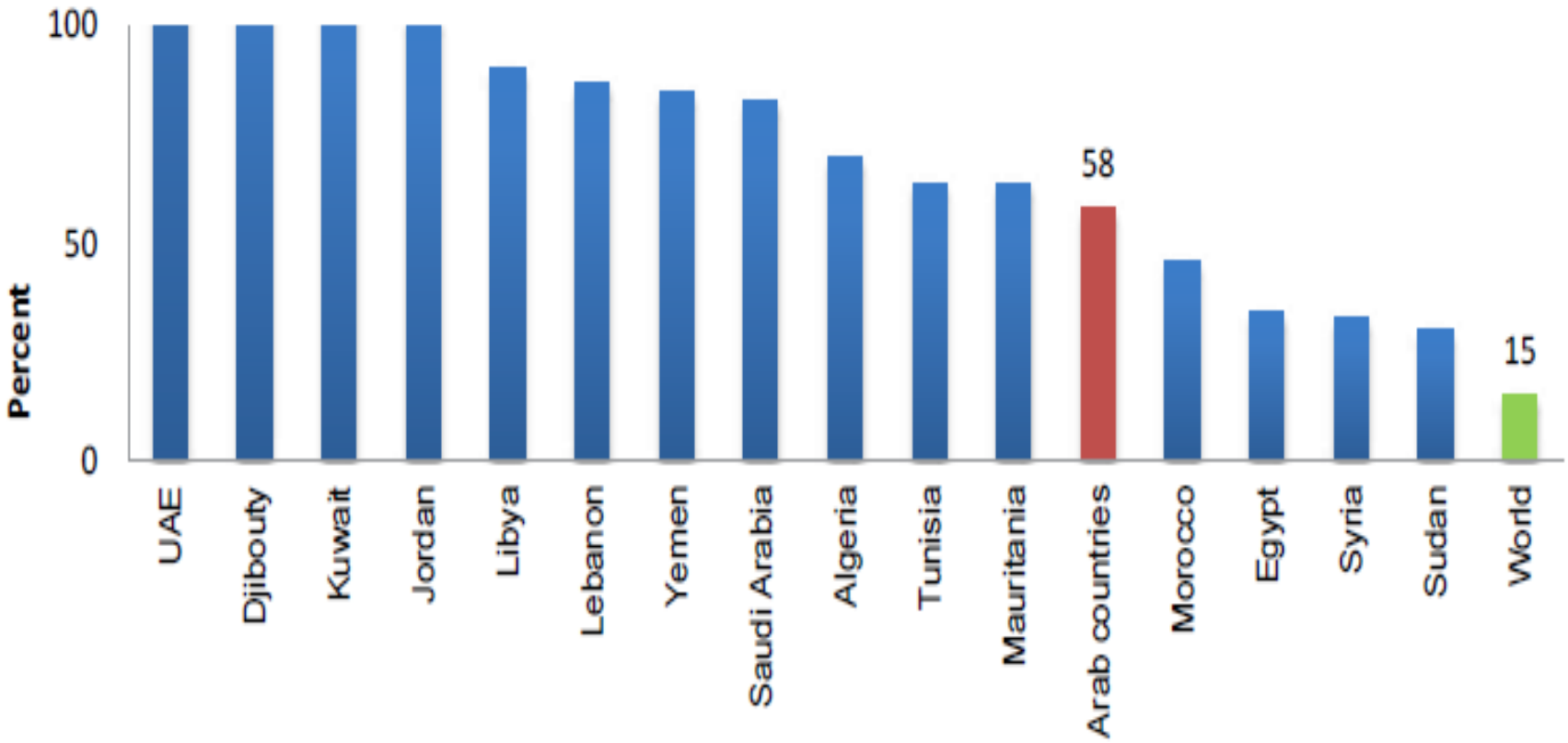
Sectorial water consumption



Cultivated areas per capita (ha) 2007

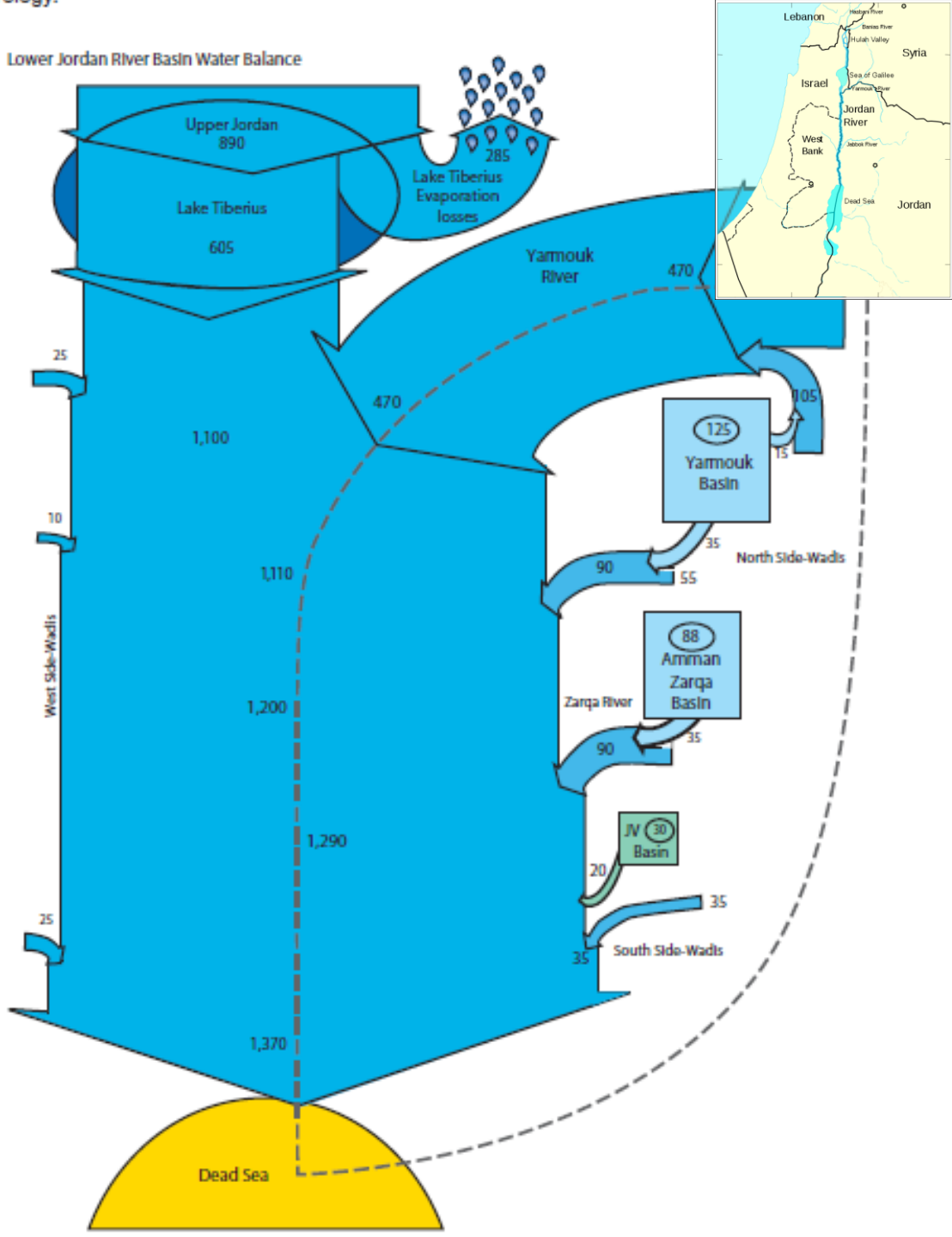


Ratio cereal import to domestic supply 2007



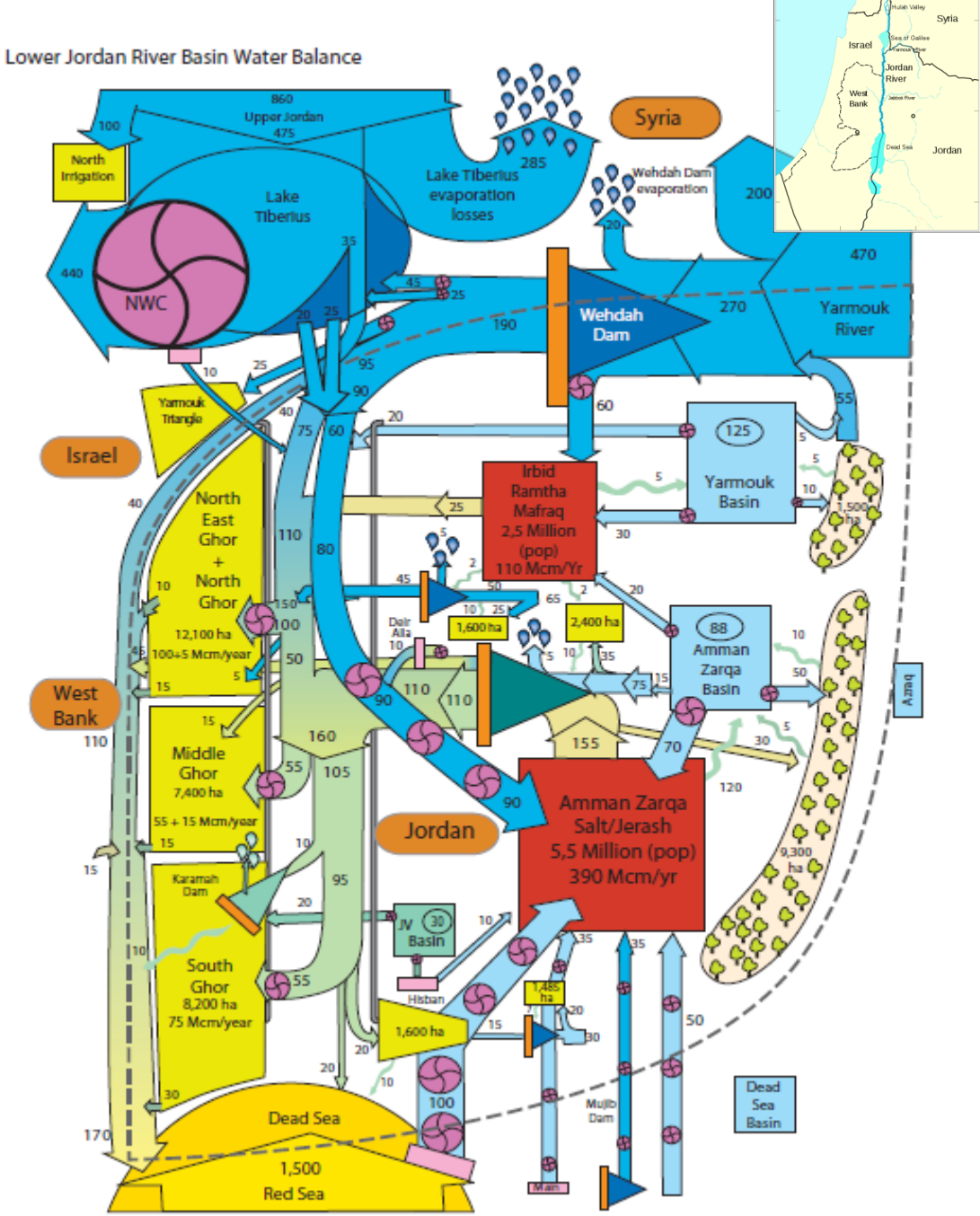
The complexity

Southern Jordan Valley, 1900



After: Suleiman (2003)

Southern Jordan Valley, 2020



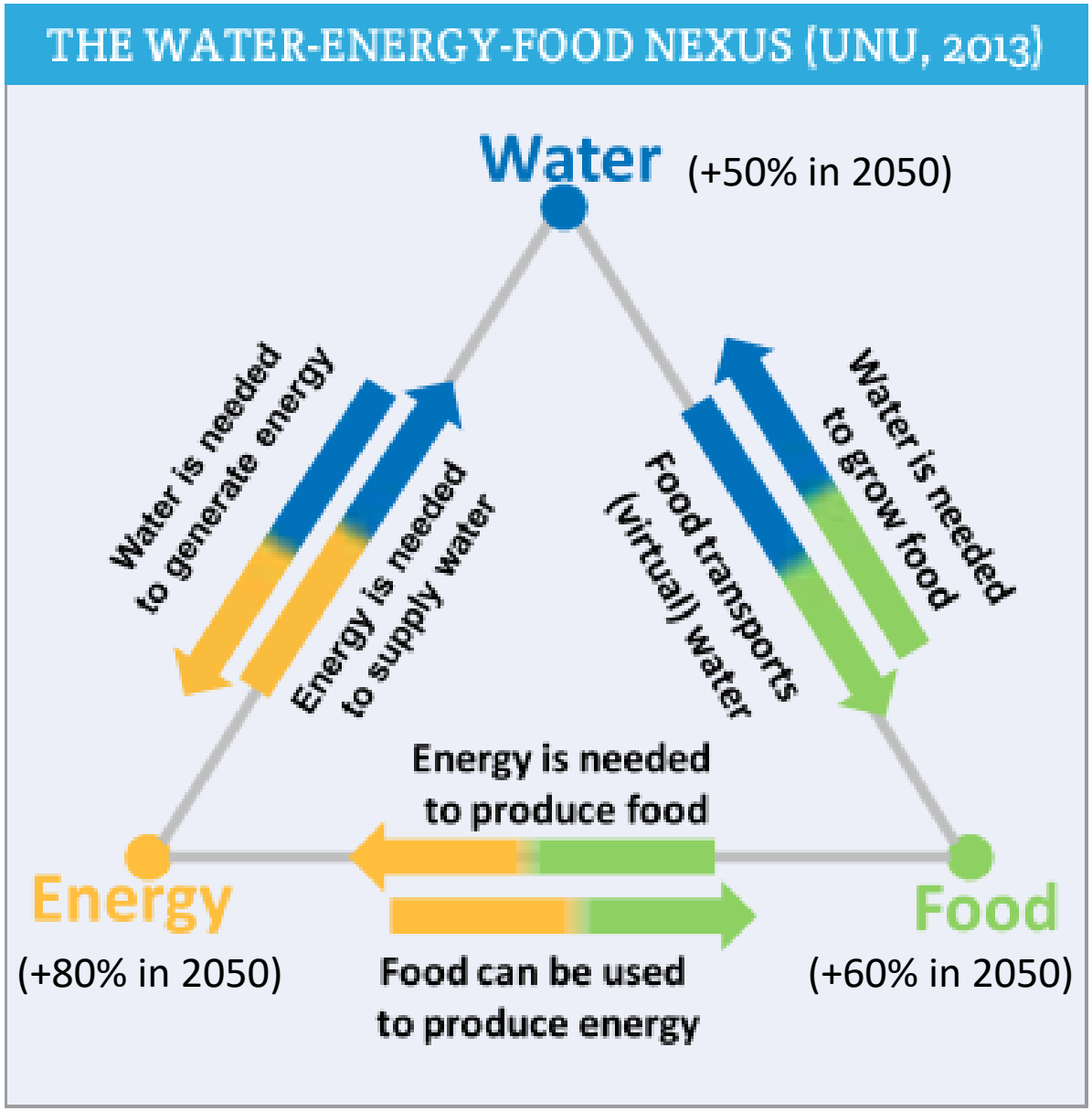
After: Suleiman (2003)

Jordan River flow

Dead Sea shrinking

Dead Sea water level decreasing 1 m/year (Ministry of Water and Irrigation, Jordan)

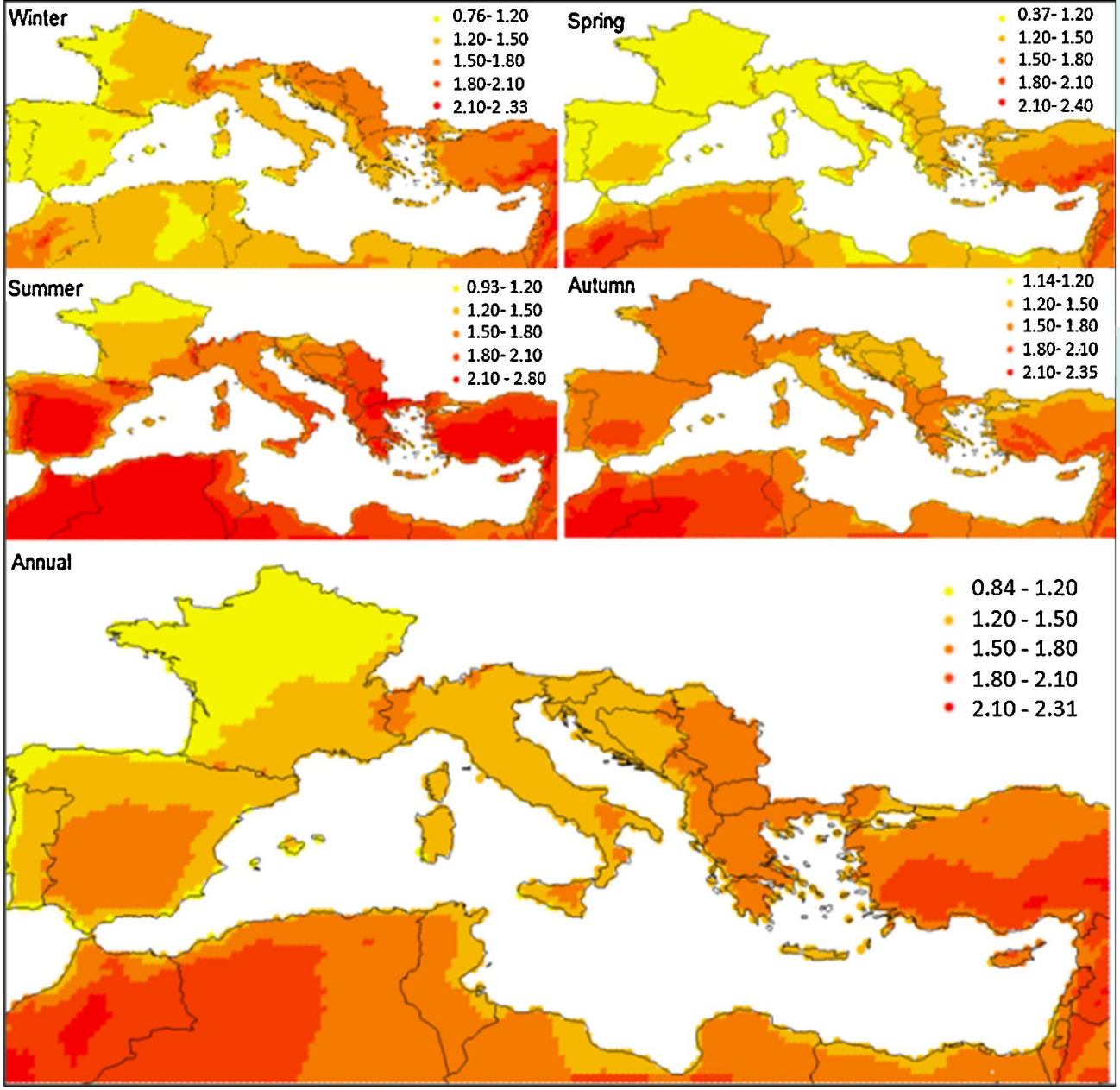
Water-Energy-Food Nexus



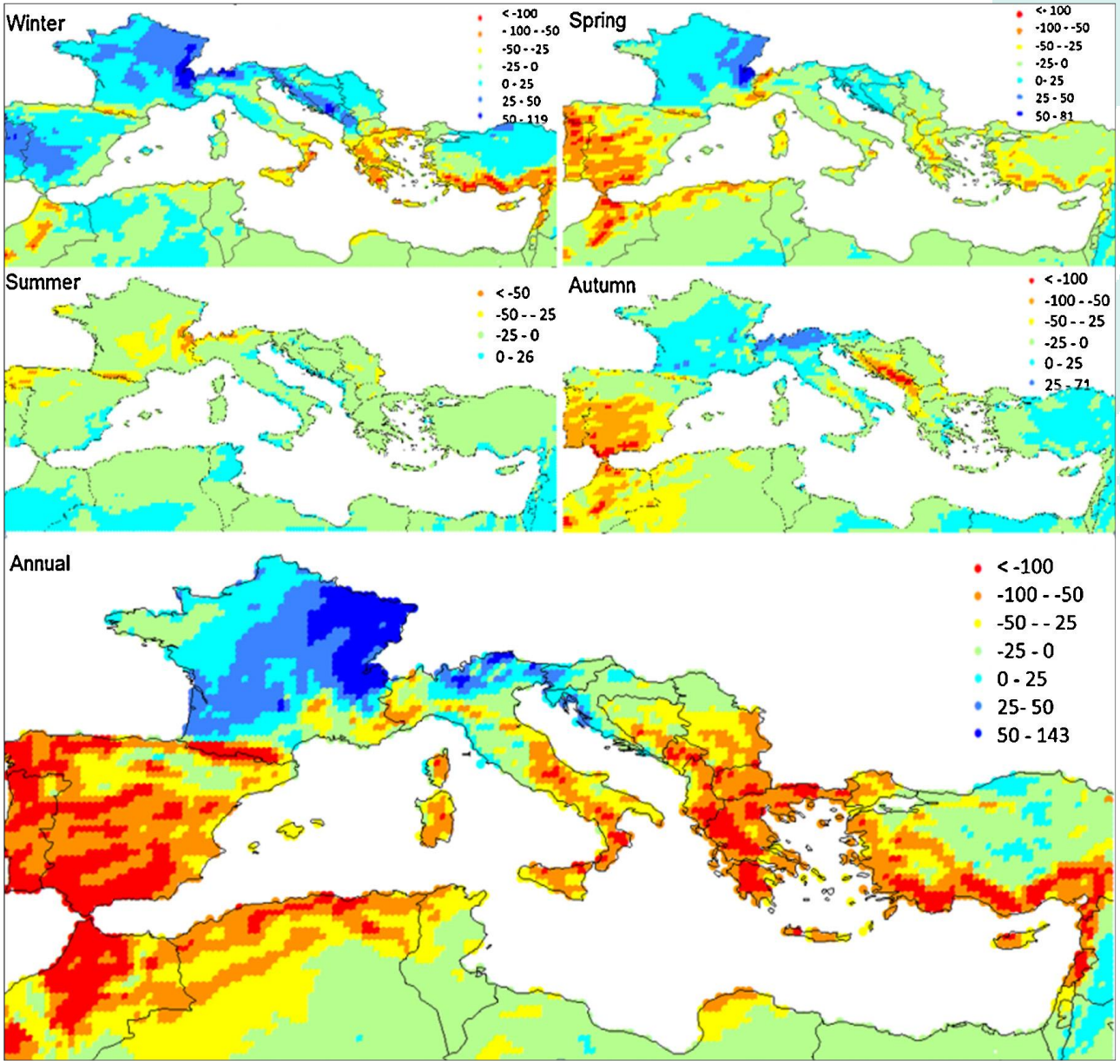
Role of water in Middle East political stability

- Winter 2010-2011 eastern China is affected by extreme drought.
- China increases wheat import, global wheat price doubles, bread price in Egypt triples.
- In Egypt food costs ~40% of income.
- January, 2011, Arabic Spring starts in Tunisia.
- February, 2011, Mubarak resigns.
-
-
-

The future



Spatial pattern of the mean annual and seasonal temperature difference (◦C) between 2050 and 2000 (Saadi et al., 2015).



Spatial pattern of the mean annual and seasonal precipitation differences (mm) between 2050 and 2000 (Saadi et al., 2015).

Temperature increase (2080)

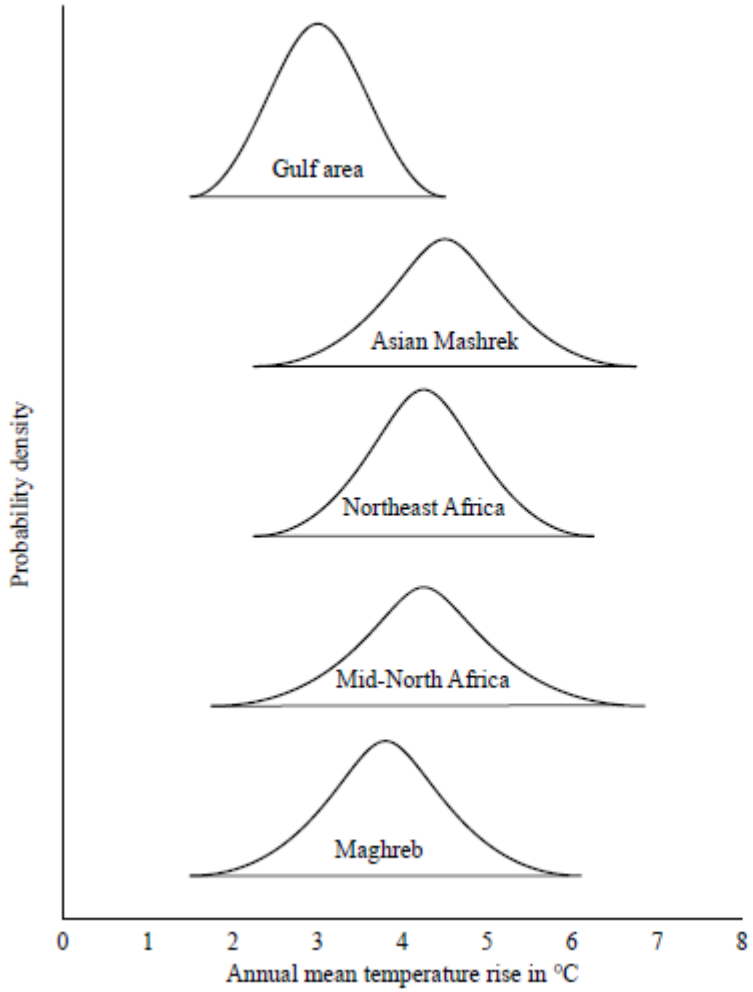
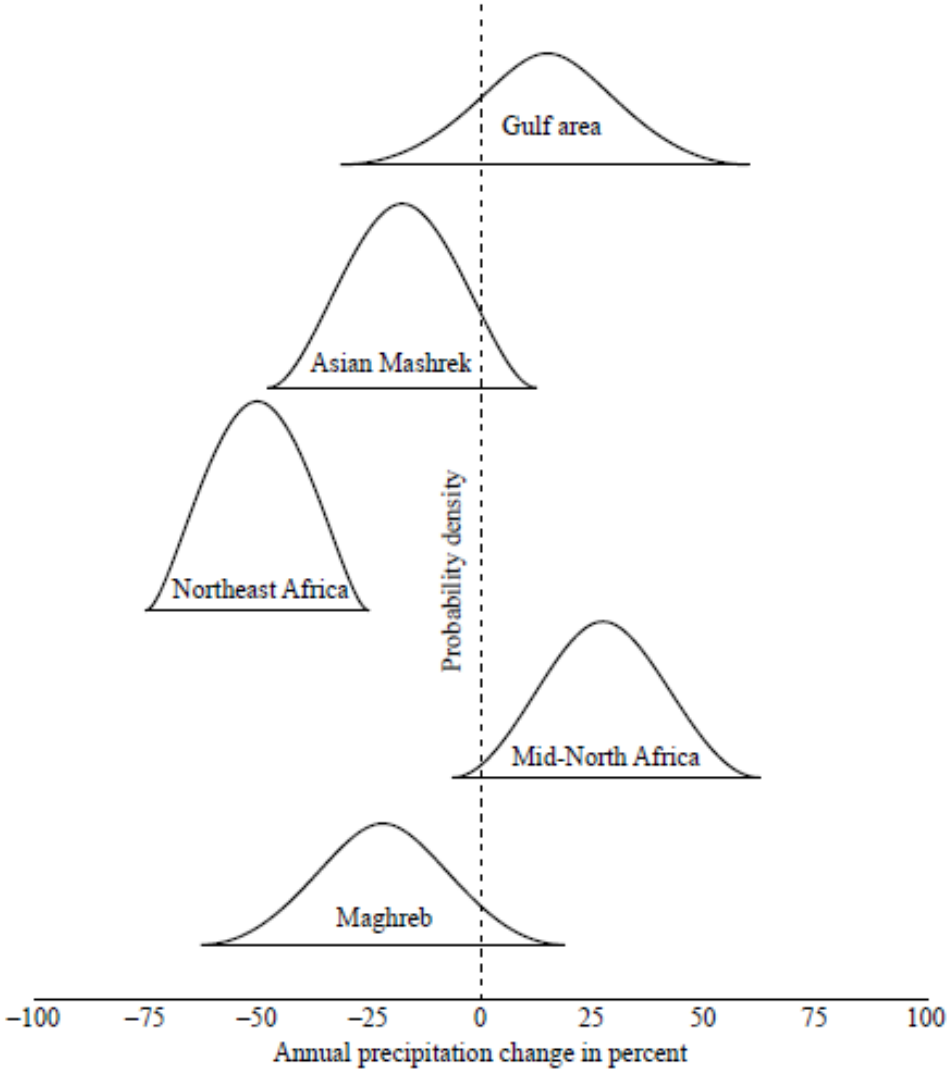


Figure 4.
Probability distribution of annual atmospheric temperature rise from 1980 to 2080 for various regions of MENA using statistical predictions

After: Wasimi, 2010

Precipitation change (2080)



Climate change in the MENA region

313

Figure 5.
Probability distribution of annual precipitation from 1980 to 2080 for various regions of MENA using statistical predictions

After: Wasimi, 2010

Temp and prec change

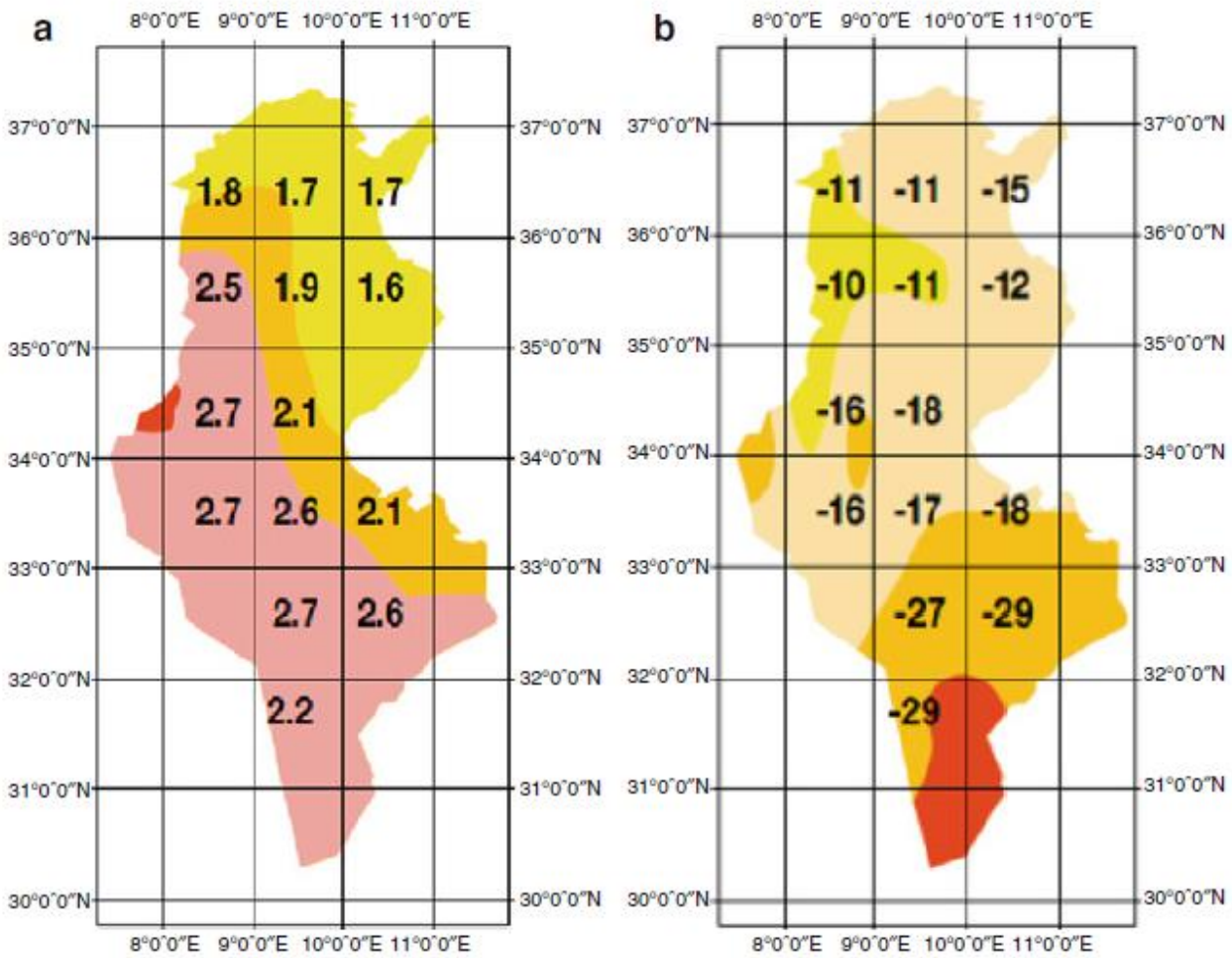
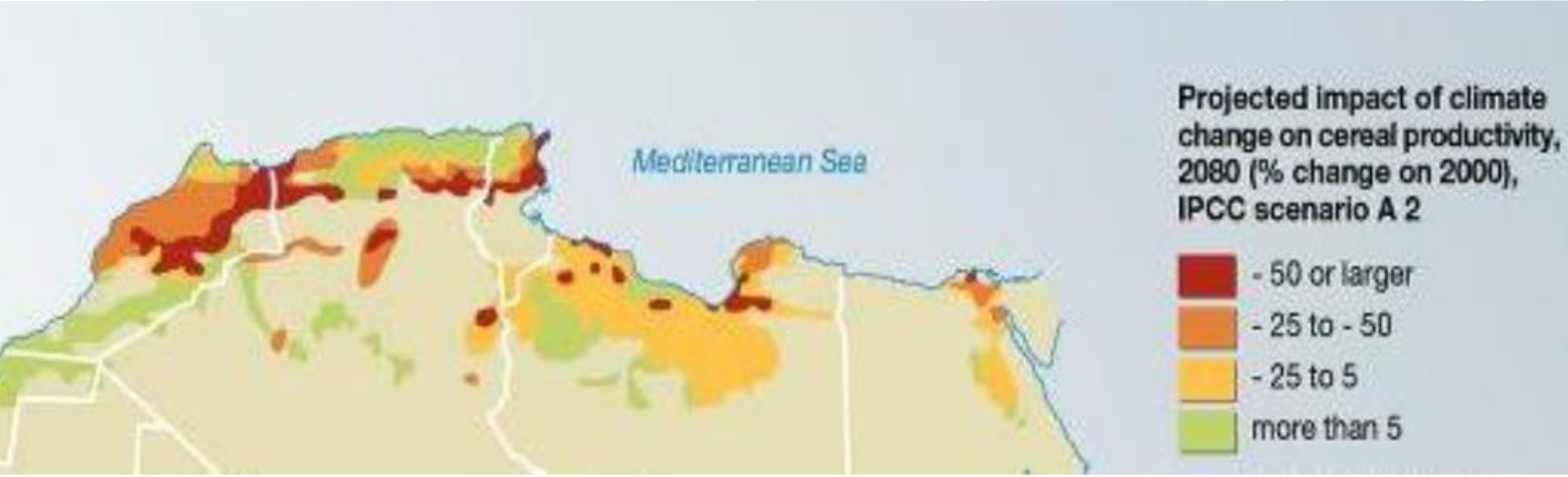


Fig. 4 Scenario of the mean temperature and the annual rainfall evolution in 2050 (GTZ 2007). (**a**) rise in the mean temperature (°C) (**b**) variation in the mean annual rainfall (%)

After: Omrani and Uessar, 2012

Cereal production



Source: GRID-UNEP Vital Graphics; orig. from PNUD Rapport sur le Developpement Humain 2006

Climate Stressors and Climate Risks AGRICULTURE	
Stressors	Risks
Rising temperatures **Sea level rise leading to saline intrusion** **Change in precipitation patterns**	Decrease in crop yields
	Shifts in growing seasons
	Degradation of soil quality and productivity
	Increased salinization of aquifers and decreased availability of water for irrigation
	Increase in food prices/food shortages
	Economic losses (both national and household incomes)

References

- Omrani, N., and M. Ouessar (2012) Intrgrated water management in Tunisia: meeting the climate change challenges, Springer.
- Saadi, S., M. Todorovic, L. Tanasijevic, L.S. Pereira, C. Pizzigalli, and P. Lionello (2015) Climate change and Mediterranean agriculture: Impacts on winter wheat and tomato crop evapotranspiration, irrigation requirements and yield, Agric. Water Manag., 147, 103–115.
- Suleiman, R. (2003) Water Resources Development in the Jordan River Basin in Jordan, KTH, Stockholm.
- Tolba, M.K. and N.W. Saab (2008) Arab Environment: Future Challenges, Arab Forum for Environment and Development (AFED).
- Wasimi, S.A. (2010) Climate change in the Middle East and North Africa (MENA) region and implications for water resources project planning and management, Intern. J. Climate Change Strategies and Manag., 2, 297-320.
- Zittis, G., P. Hadjinicolaou, M. Klangidou, Y. Proestos, and J. Lelieveld (2019) A multi-model, multi-scenario, and multi-domain analysis of regional climate projections for the Mediterranean, Regional Environ. Change, 19, 2621–2635.

Questions for discussion

- Do you have a personal experience of climate change?
- Is water scarcity affecting your personal life in any way?
- Do you work with water scarcity in your profession/studies?

That´s all for now!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 810812.