

ARAB ENVIRONMENT•6
SUSTAINABLE ENERGY
PROSPECTS, CHALLENGES, OPPORTUNITIES

المنتدى العربي للبيئة والتنمية
ARAB FORUM FOR
ENVIRONMENT AND DEVELOPMENT



البيئة 2013
ARAB ENVIRONMENT 2013
Annual Conference of the Arab Forum for Environment and Development (AFED) | Sharjah, 28-29 October 2013

WATER, ENERGY, AND FOOD NEXUS IN THE ARAB REGION

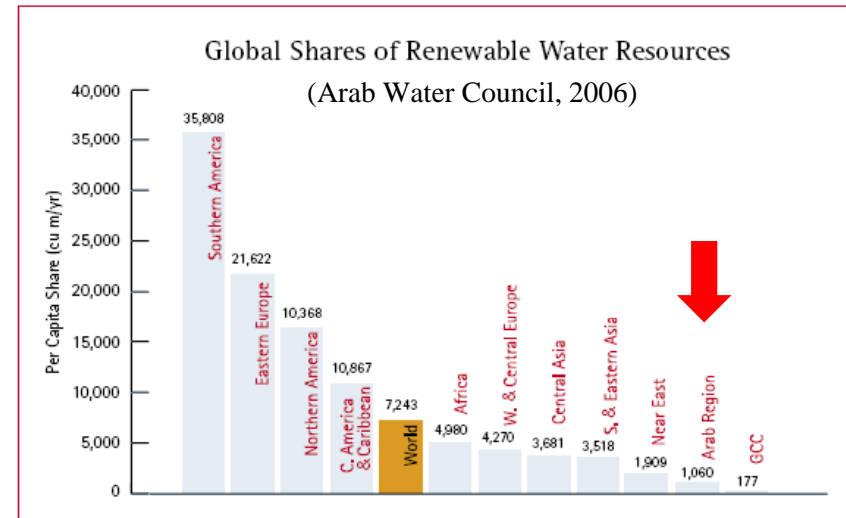
Waleed K. Al-Zubari

Overview

- The Water Scarcity Challenge
- The Water-Energy Nexus
- The Water-Energy-Food Nexus
- Nexus Awareness and Policies
- Nexus Management Initiatives
- Conclusion & Recommendations

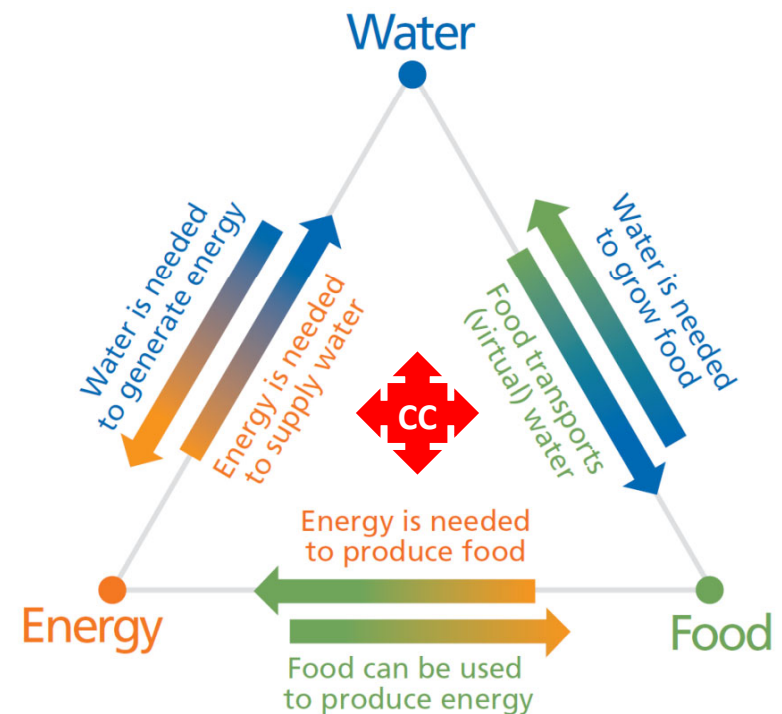
The Water Scarcity Challenge

- Severe water scarcity in majority of the Arab countries
- Expected to grow due to
 - Population growth
 - Food demand
 - Unsettled and politicized shared water resources
 - Consumption patterns
 - Climate change
- Compounded by multiple inter-linkages and nexuses
 - Water-Energy; Water-Food; Water-Health; Water-Environment;
 - ...
- Many cross-cutting issues of human rights, social, economic, political, and security nature



The Need for a Nexus Approach

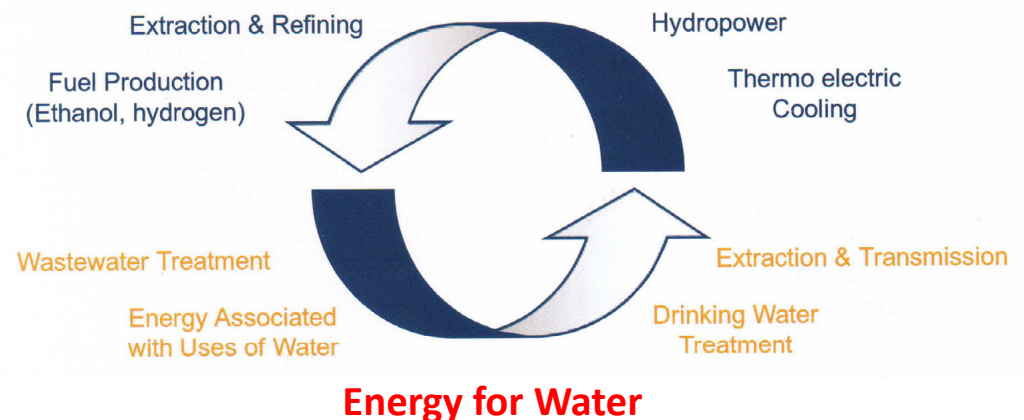
- Water Energy and Food in the Arab region (more than any other region) are strongly inter-linked and are highly inter-dependent
- W-E-F interactions are numerous and substantial
- Importance of the nexus is not always recognized from a planning and management perspective
- There is an urgent need for a “Nexus Approach” that integrates management and governance across the three sectors
- Supports the transition to a “Green Economy”, which aims at resource use efficiency and greater policy coherence



The Water Energy Nexus

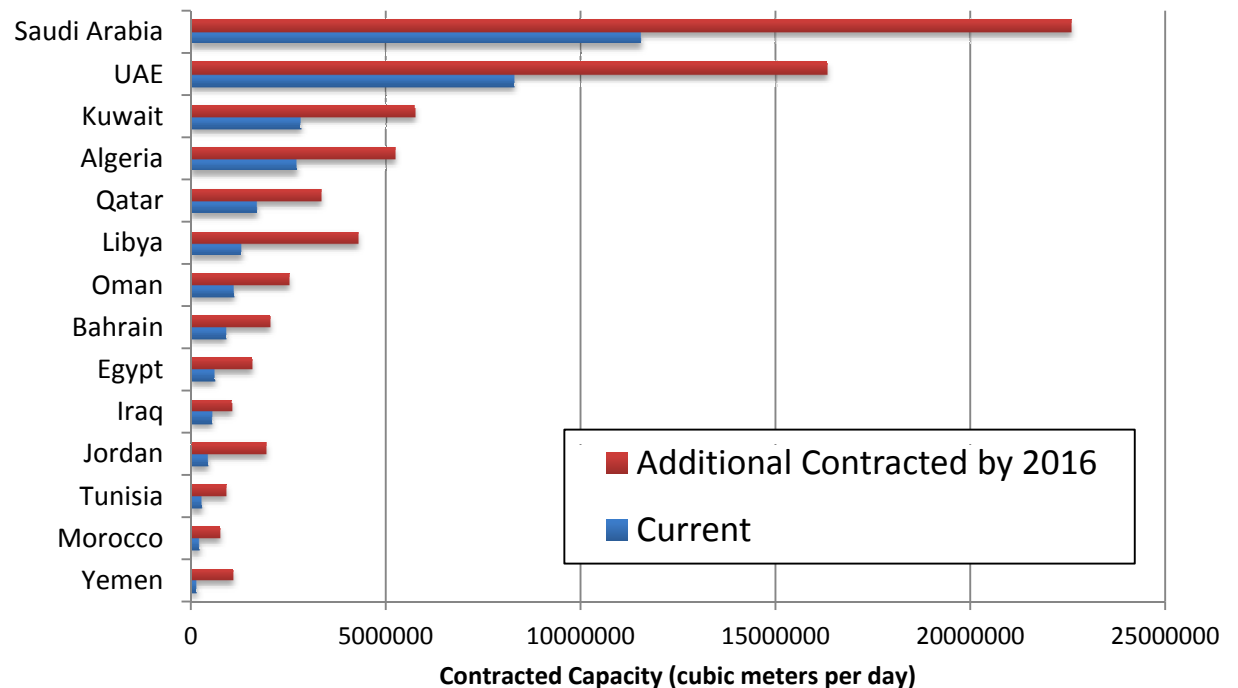
- **Energy Use in Water**
 - Energy is used in every stage of the water cycle: freshwater extraction, production, conveying, distribution, wastewater collection, treatment, and reuse
 - Water cycle demands at least 15% of national electricity consumption, and is continuously increasing
- **Water Use in Energy:** production (CPDPs), cooling, energy exploration & production, refining, EOR, ... **Water for Energy**

Schematic of the Water-Energy Relationships (WCSBD, 2009)



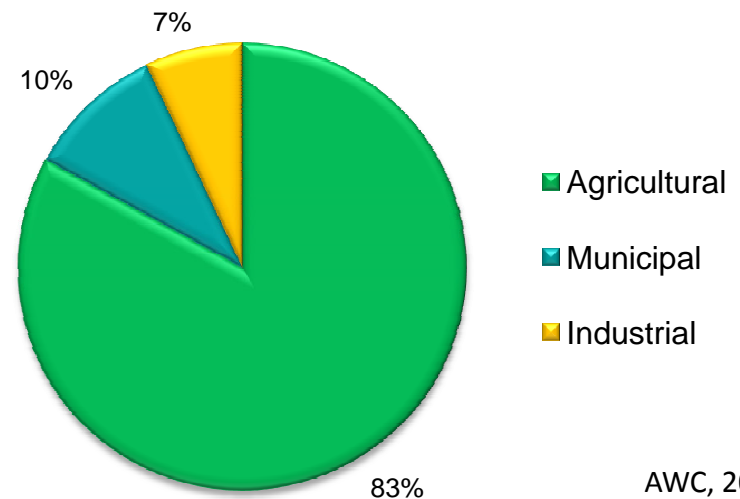
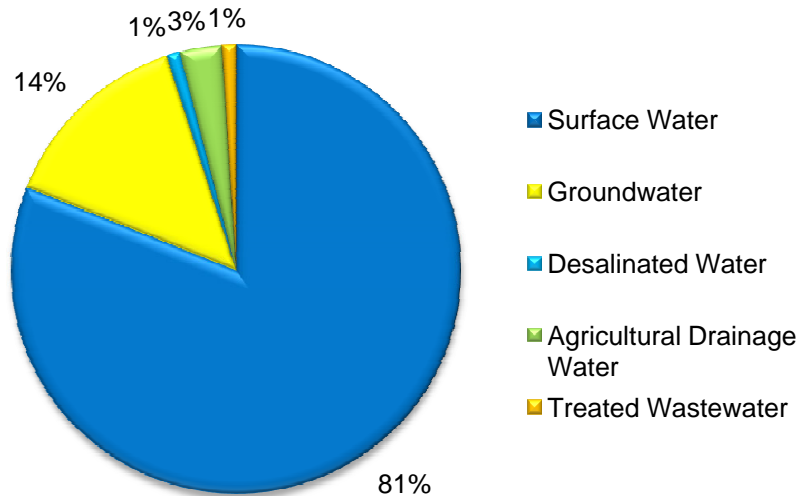
Cont., The Water Energy Nexus

- As water scarcity increases more Arab countries are forced into desalination and treated wastewater reuse to meet demands
- In 2009: desalination cost in Arab region 4BUS\$; 2.5BUS\$ energy
- Desalination is energy-intensive, and causes fast depletion of oil reserves (main source of income in many Arab countries)
- In some countries CPDPs consumes >50% of total energy consumption
- Cost of energy = 87% of the running cost



The Water Energy Food Nexus

- Majority of the water in the region is used in the agricultural sector (83%), with low efficiency (<40% IE), a major cause of water resources overexploitation & quality degradation
- Full food and supply chain consumes about 30% of total energy demand (global figures); In recent years, increases in oil prices lead very quickly to increases in food prices
- Biofuels (energy) impact negatively on food production and water



AWC, 2009

Nexus Awareness and Policies

- **GCC Summit: Abu Dhabi Declaration 2010**
 - Water, Energy, and Food most important issues, and linked water security with energy security as a strategic priority
- **First Amman Cologne Symposium 2011 (W-E Nexus)**
 - More integrated approaches between water and energy and the need for research to understand the nexus & governance
- **WSTA 10th Gulf Water Conference 2012 (W-E-F Nexus)**
 - Knowledge gap on the water-energy nexus, need to be bridged by concentrated research and universities educational programs
- **IGCM on the Water-Energy Nexus in ESCWA 2012**
 - Prioritizing the Water-Energy Nexus issues in the region
- **RIM-CSD 20 2013**
 - Placed the W-E-F Nexus as a priority for the Arab region in SDI

Nexus Management Initiatives

- Many initiatives addressing the W-E Nexus or W-E-F Nexus
 - MEDRC (Water-Energy Nexus)
 - QNFSP, Qatar (Water-Energy-Food Nexus)
 - **MASDAR, Abu Dhabi (Water-Energy)**
 - **King Abdullah Initiative for Solar Water Desalination (2010)**



Masdar City



Al-Khafji RO Desalination



Conclusion & Recommendations

- Important to adopt a nexus approach and perspective in planning and management of water, energy, and food in the region
- Bridging the knowledge gap in the water-energy nexus by concentrated active research to
 - Identify inter-dependencies to influence policies, strategies, investments, and management (e.g., energy use in the water value chain, efficiency relationship)
 - Identify opportunities in both demand side and supply side management (e.g., resources use efficiency, potential of energy capture from wastewater treatment plants, ...)
- A need for an appropriate and effective governance, institutional, and organizational frameworks for the nexus approach

المنتدى العربي للبيئة والتنمية
ARAB FORUM FOR
ENVIRONMENT AND DEVELOPMENT



**“Every unit of Water conserved is a unit
of Energy saved, and vice versa”**

Thank You