


ESCWA

United Nations Economic and Social Commission for Western Asia




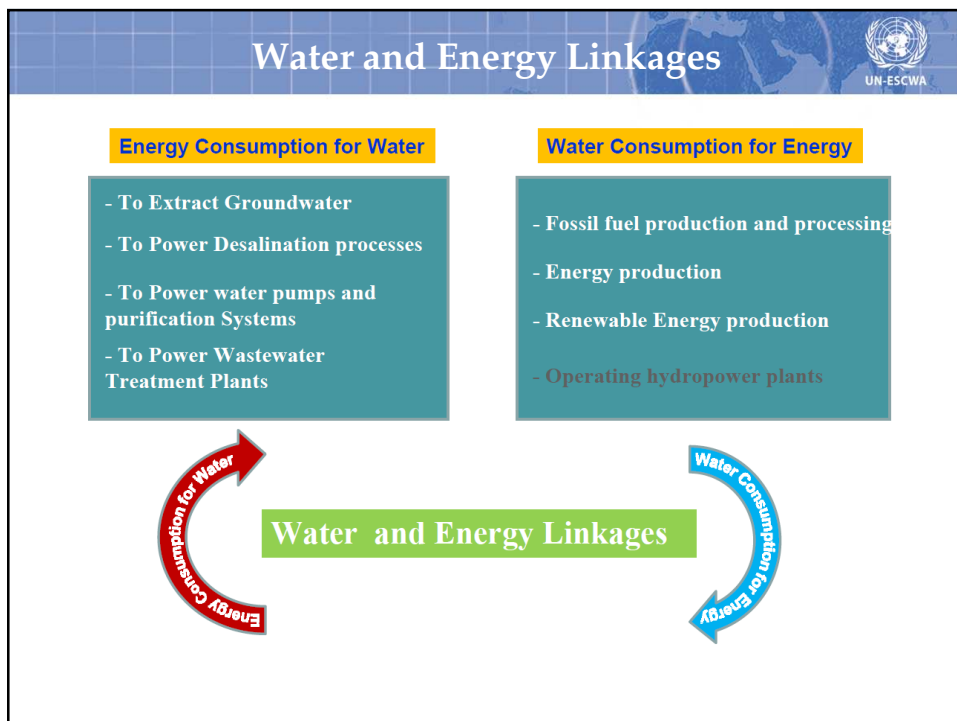
2014
World Water Day
& water & energy
22.03.2014

The Water-Energy Nexus: A Global, Regional and National Perspective for Ensuring Access to Basic Services

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Sustainable Development and Productivity Division (SDPD)

World Water Day Seminar
Beirut, 21 March 2014



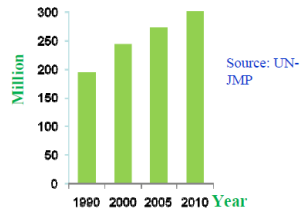


Regional Specificities



Arab countries face mounting challenges in the water and energy sectors because of:

Population pressure



Total population of the ESCWA region

Environmental pressure

Water scarcity

Arid/Semi-arid climate

Pollution and water quality concerns

Climate change and climate variability

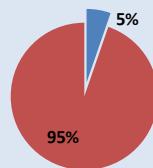


There is a need for a new, comprehensive and systematic methodology to approach the water and energy nexus in a sustainable way.

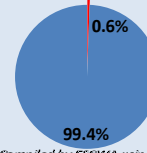
Water Scarcity in the Arab Region



Arab Population (% of global population - 2011)

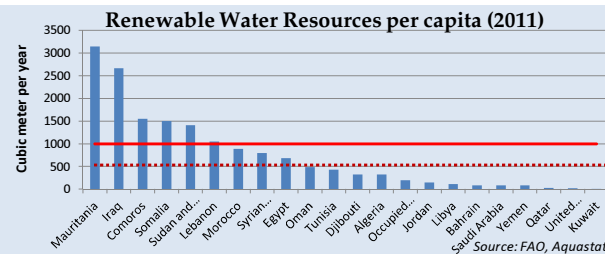


Renewable Water Resources in the Arab Region (% of global resources - 2011)



Source: Compiled by ESCWA using data from FAO - Aquastat

Almost 75% of the Arab population lives under the **water poverty line** (1000 m³ per capita annually) and nearly half of them suffer from **extreme water scarcity** (500 m³ per capita annually)



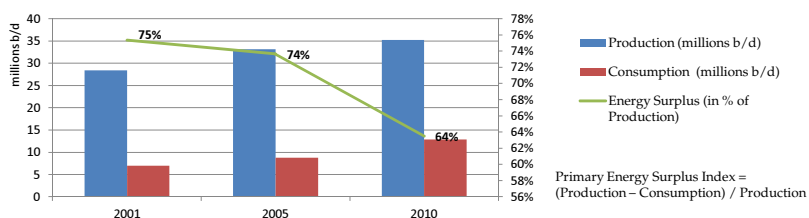
Freshwater Resources are Insufficient to Meet Growing Arab Demand

Energy Context in the Arab Region



- ❑ Total primary energy consumption in the Arab region steadily increased over the last decade
 - Average growth rate = 6.3% from 2001-2010, with a notable acceleration in the last 5 years
- ❑ The Arab Region consumed 36% of its total primary energy production to meet its local energy needs in 2010, compared to only 25% in 2001

Primary Energy Production and Consumption in the Arab Region



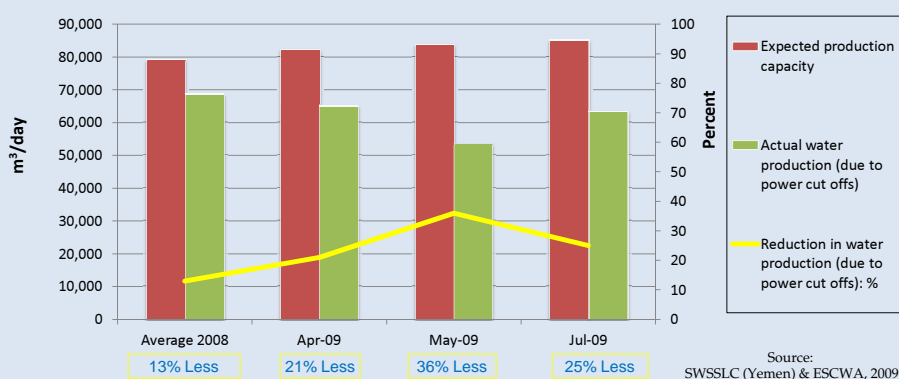
The Primary Energy Surplus Index shows an alarming decrease, indicating a weakened energy security situation

Impact of Energy Cuts on Water Delivery



Water and Energy Linkages affecting Water Supply Service Delivery in Sana'a, Yemen

Reduction of Water Production due to Power Cuts in Sana'a

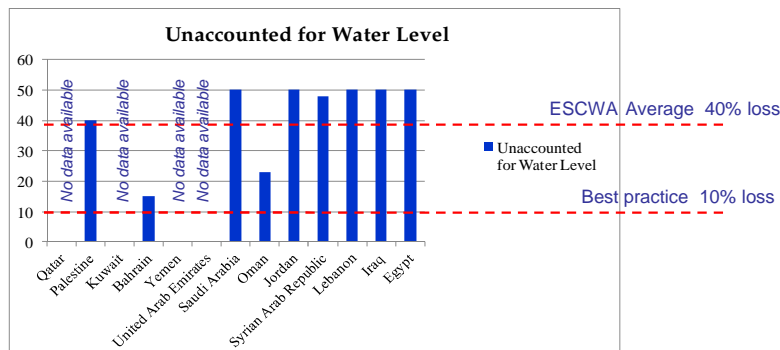


A 30% reduction in service delivery deprived 250,000 people of water in Sana'a

Loss of Water = Loss of Energy



- Unaccounted for Water Levels (UWL) in ESCWA Region average 40%, while the best practice for UWL is 10%
- Water loss during transmission through distribution networks wastes water and energy needed for pumping
- The result is a loss of water and energy resources, shortages, and an increase in the cost of delivering water services



Source: Water Market Middle East

Water and Energy in the Agricultural Sector

Debel, South Lebanon: Zaatar Pilot Project



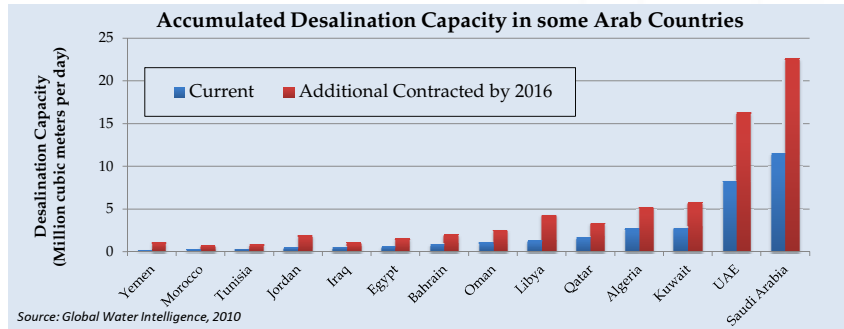
Energy Costs for Groundwater Pumping & Irrigation represent 4-7% of Production Costs for Small Scale Farmers

Groundwater /wells	350 m depth (pumping)
Flow rate	70 m ³ /hour
Diesel use	40 liters/hour
Diesel needs	0.58 liters of diesel/m ³ water
Price of Diesel (Aug 2009)	\$0.58/liter (\$1.29/l Summer 2008 peak)
Irrigation Needs	600 m³ for 1 dunum of zaatar (dunum=1,000 m ³ land)
Zaatar Output	600-1000 kg/dunum
Zaatar Revenue	\$3,400 - \$5,667/dunum
Diesel costs (fixed)	\$202/year/dunum
Share in Revenue	6% - 3.6% (intermittency problem)
Irrigation	\$23.50/dunum for electricity
Energy/Electricity	6.6% - 4% of revenues

Source: ESCWA (2009)



Desalination



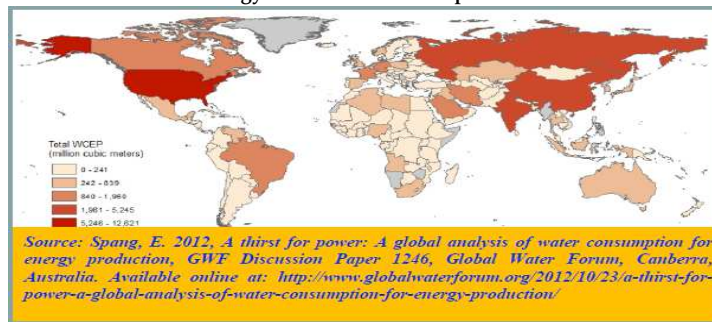
- ❑ The Arab Region accounts for nearly **half of the global desalination production capacity** (mainly in the GCC countries)
- ❑ **Increasing trend in production is expected** to continue in the future
- ❑ **Desalination is a significant consumer of fossil fuel energy.**
- ❑ **Greater efforts are needed in R&D for desalination using renewable energy technologies (solar, wind).** Pilots already underway in Morocco, Qatar, KSA, Tunisia, UAE.

Water Consumption in the Energy Sector



- ❑ Understanding the **water demand of energy systems** is essential to **national water security** since the extraction, production and refining of energy requires considerable quantities of freshwater
- ❑ The Arab region accounted for approximately 33% and 16% of the global Oil and Gas production respectively in 2012
- ❑ **Water shortages** in the already strained Arab countries **will be exacerbated**

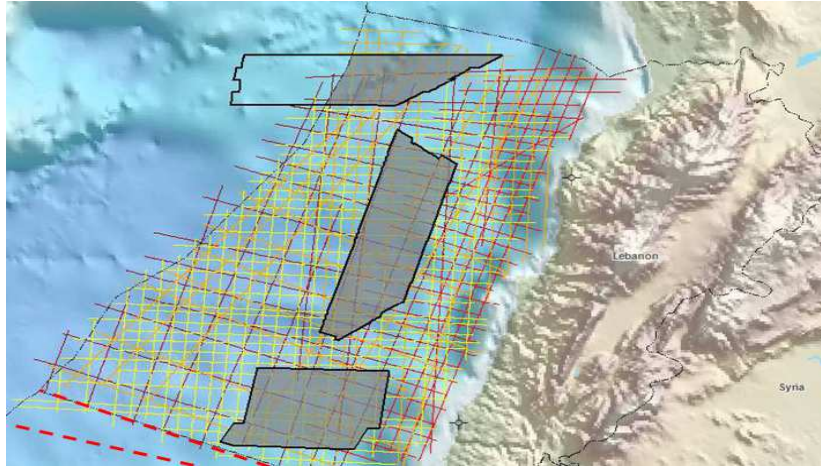
Large producers of fossil fuels (and biofuels) demonstrate higher intensity of energy-based water consumption



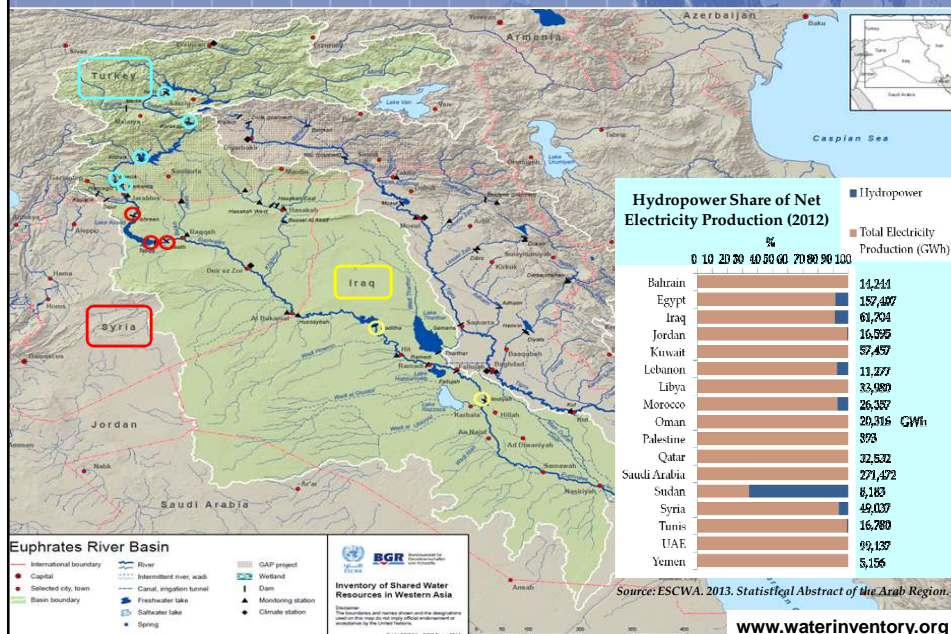
Off-Shore Oil and Gas Management in Lebanon

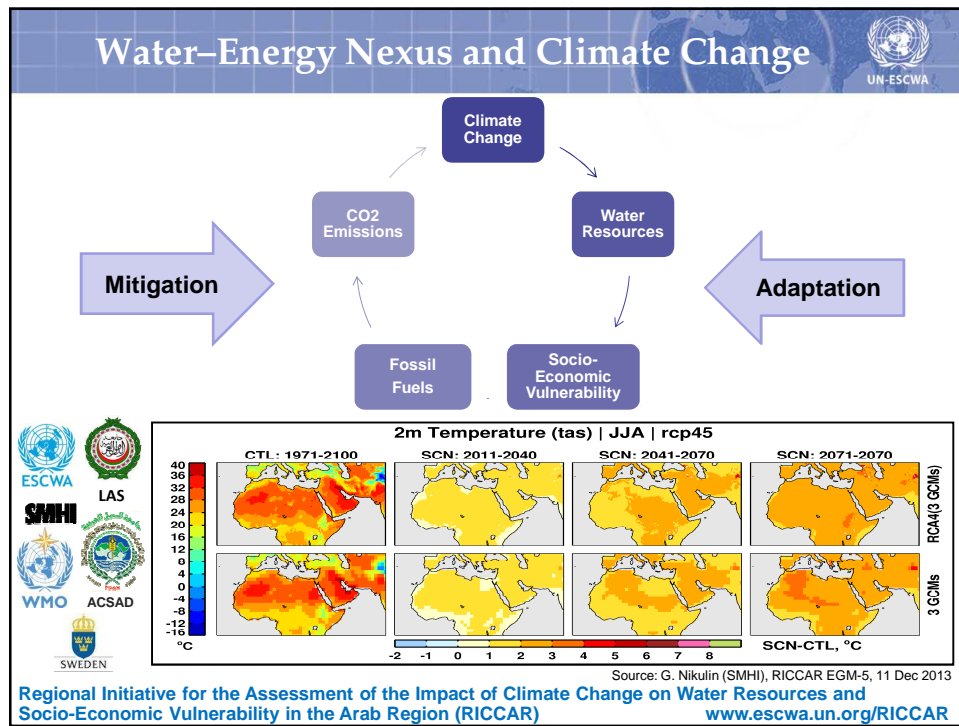


An Integrated Approach for the Management of Oil and Gas Reserves is needed that takes into account marine and coastal resources, and national socio-economic priorities in plans for the use of these new energy resources.



Hydropower and Shared Water Resources





ESCWA Inter-Governmental Activities on the Water-Energy Nexus


ESCWA Committee on Water Resources & ESCWA Committee on Energy convened an **Inter-Governmental Consultative Meeting** (Beirut, 27-28 June 2012)

□ Aim was to identify priority topics on the water-energy nexus to inform work to be pursued at the regional level.

The consultation identified **seven priority areas for future work**:

- 1) Raising awareness and disseminating knowledge
- 2) Improving the harmonization of public policies
- 3) Examining the link between water security and energy security
- 4) Improving efficiency
- 5) Increasing the knowledge of technological choices
- 6) Promoting renewable energy
- 7) Integrating climate change and natural disasters as factors in decision-making

Arab Ministerial Water Council: MDG+ Initiative



MDG+ Indicators	
Water Supply	Sanitation
<ul style="list-style-type: none"> Water consumption Continuity of supply Water quality Distance to source Tariff structure Affordability 	<ul style="list-style-type: none"> Treated quantity Treatment type Reuse utilization Reuse type Tariff structure Affordability
<p>➤ LAS with ESCWA support is also addressing ways to measure access to water services</p> <p>➤ Purpose is to consider not only <i>accessibility</i> to improved infrastructure, but also <i>reliability, affordability, sustainability</i> and <i>quality of service provided</i>, which is dependent on also ensuring adequate access to energy for water service delivery.</p>	

MDG+ Initiative: Regional Mechanism for Improved Monitoring and Reporting
on Access to Water Supply and Sanitation Services in the Arab Region

Arab Regional Consultations on the post-2015 Agenda & the Sustainable Development Goals (SDGs)



<h3 style="text-align: center; background-color: #ADD8E6; margin: 0;">Member Countries</h3> <ul style="list-style-type: none"> SDGs consultative session during the Regional Rio+20 Implementation Meeting (May 2013, Dubai) Arab Social Affairs Council / MDG report launch (June 2013, Cairo) Council of Arab Ministers Responsible for the Environment (Nov 2013, Cairo) 8th ESCWA Technical Committee (Dec 2013, Amman) 	<h3 style="text-align: center; background-color: #ADD8E6; margin: 0;">Experts</h3> <ul style="list-style-type: none"> SDGs discussions during the updating of the Sustainable Development Initiative in the Arab Region (August 2013, Amman); Consultations on the development of a Green Economy Investment Roadmap (August 2013, Amman); Arab Expert Consultation Meeting on SDGs (November 2013, Tunis)
<h3 style="text-align: center; background-color: #ADD8E6; margin: 0;">Civil Society</h3> <ul style="list-style-type: none"> Arab Regional CSO Consultative Meeting on Post-2015 Agenda (March 2013, Beirut) UNDG Arab Development Forum (April 2013, Amman) Youth Empowerment in Post-2015 Agenda (Dec 2013, Tunis) 	<h3 style="text-align: center; background-color: #ADD8E6; margin: 0;">Inter-agency (UN)</h3> <ul style="list-style-type: none"> 19th RCM (November 2013, Cairo)
<div style="background-color: #90EE90; padding: 10px; border: 1px solid black;"> <h3 style="margin: 0;">Arab High Level Forum on Sustainable Development</h3> <p style="margin: 0;">Amman, 2-4 April 2014</p> </div>	

Open Working Group on Sustainable Development Goals

Focus Area Document – 18 March 2014 (Draft for Discussion)



Focus area 6. Water and sanitation

For a water-secure world and for the realization of the right to safe drinking water and sanitation, the whole water cycle has to be taken into consideration to tackle water-related challenges. Some areas that could be considered include:

- ensuring access to safe and affordable drinking water and adequate sanitation for all, especially for women and girls, including in households, schools, health facilities, workplaces and refugee camps;
- providing adequate facilities and infrastructure, both built and natural, for safe drinking water and sanitation systems in all areas;
- extending wastewater treatment, recycling and reuse;
- improving water-use efficiency;
- bringing fresh water extraction in line with sustainable supply;
- enhancing effective water governance including catchment area based integrated water resources management and appropriate trans-boundary co-operation;
- expanding water-related vocational training at all levels;
- protecting and restoring water-linked ecosystems like mountains, watersheds and wetlands;
- eliminating the pollution and dumping of toxic materials in water bodies, and protecting aquifers;
- eliminating of invasive alien species in water bodies;
- investing in water harvesting technologies;
- reducing risks and impacts of water-related disasters;
- appropriate means of implementation.

Focus area 7. Energy

Energy plays a critical role in economic growth and social development. Ensuring access to affordable, modern and reliable energy resources for all is also important for poverty eradication, women's empowerment, and provision of basic services. Some areas that could be considered include:

- ensuring universal access, for both women and men, to modern energy services;
- deployment of cleaner, including low- or zero-emissions energy technologies;
- increasing the share of renewable energy in the global energy mix, including by providing policy space and necessary incentives for renewable energy;
- improving energy efficiency in buildings, industry, agriculture and transport;
- phasing out inefficient fossil fuel subsidies that encourage wasteful consumption;
- building capacity and transferring modern energy technologies;
- mobilizing finance to invest in modern energy infrastructure;
- sharing knowledge and experience on appropriate regulatory frameworks and enabling environments;
- promoting partnerships on sustainable energy; and
- appropriate means of implementation/

Sustainable Development Goals and Targets:

An Arab Regional Perspective



Proposed SDG 6:

Secure access to water, sanitation and energy for all and promote the sustainable use and management of natural resources

An Integrated Natural Resources Management approach is proposed that will allow greater linkages between Water and Energy Resources.

Arab Vision on the SDGs will be discussed at the Arab High Level Forum on Sustainable Development (April 2014)

Proposed Targets (preliminary)

- **Increase** access to safe drinking water, sanitation and energy
- **Reduce** amounts of pollutants seeping into water bodies
- **Increase** domestic and industrial waste water treatment
- **Increase** investments in research and innovation for renewable energy technologies
- **Increase** the share of solar and wind energy in the energy mix
- **Reduce** rate of water and energy losses
- **Improve** water and energy efficiency indicators in all activities and uses
- **Increase** public expenditure on modern energy and water and sanitation infrastructure
- **Develop and implement** climate change adaptation policies

Reflections



❑ Escalating Demand for Water and Energy

- Demographic factors
- Supply-side traditional approach
- Demand management needed

❑ Knowledge and Know-how Needed

- Education quality (all levels, basic to university)
- Research and Development (R&D)
- Appropriate Technologies

❑ Good Governance

- Integrated policies (sector, cross-sectoral, national, regional)
- Institutional arrangements
- Enabling environments (legal, financial, etc.)

THANK YOU!

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