THE MIDDLE EAST WATER REPORT

With emphasis on the Arab countries

The 4th World Water Forum
March 20, 2006, Mexico City
THE PREPARATORY PROCESS

Dr. Mahmoud Abou Zeid
A Consultative Process

• The Decision, Jan 2005
• The 1st Regional Consultation Workshop, June 2005
• Preparation of Regional and thematic Inputs
• Networking
• The 2nd Regional Consultation Workshop, Dec. 2005
• Audio and Video Conferences
The Deliverables

- Regional Document
- 12 Thematic Session
- 46 Local Actions
- Arab Water Mega Session
  - “A Thirsty Region”; Multi- A Media Presentation
  - Dialogue Between Generations
  - Children Performance “a cultural Show“
INTRODUCTION TO THE REGION

Mr. Boushaib El Zaitouni
“Rainfed” ; “Riverine” and “Pastoral nomadic” civilizations flourished in the region since more than 8000 years ago.
Water resources development and management in the MNA Region have been driven by the highly specific characteristics of climate, geography and the resource itself.
CLIMATE

- **Hyper Arid to Arid Conditions**
- **Average precipitation 56 mm/year**
- **Evaporation may exceed 4,000 mm/year**
GEOGRAPHY

• Land area about 15.5 million km\(^2\)
• Desert land prevail over 85 % of the region land area
• Total population exceeds 385 million inhabitants
• About 5% of world population with only 1% of the world’s renewable water resources
WATER RESOURCES

• Renewable water resources are about 335 km³/year
• Fragile fossil groundwater aquifers with estimated total reserves about 143.8 km³
• Main groundwater aquifers are shared between several countries
**WATER WITHDRAWALS**

(2004)

<table>
<thead>
<tr>
<th>Sector</th>
<th>km³/yr</th>
<th>%</th>
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<tbody>
<tr>
<td>Agricultural Water</td>
<td>205.657</td>
<td>89.5</td>
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<tr>
<td>Domestic Water</td>
<td>15.661</td>
<td>6.8</td>
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<tr>
<td>Industrial Water</td>
<td>8.585</td>
<td>3.7</td>
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<tr>
<td><strong>Total withdrawal</strong></td>
<td><strong>229.905</strong></td>
<td><strong>100.0</strong></td>
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A REGION WITH MULTIBLE WATER CHALLENGES

Engineer Kamal Hassan Ali

“Water in the MNA Region and the way it is managed have far-reaching impacts beyond the water sector more than in any part of the world”
MAJOR CHALLENGES

- Water Scarcity
- Vulnerability of water resources
- Food insecurity
- Access to safe water and sanitation
- Mounting environmental problems
- Inefficiencies in the governance structure
Water Scarcity
“The least per capita share in the World”

Global Shares of Renewable Water Resources (2000)

Per Capita Share (cu m/yr)

<table>
<thead>
<tr>
<th>Region</th>
<th>Per Capita Share</th>
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<tbody>
<tr>
<td>Southern America</td>
<td>35808</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>21622</td>
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<tr>
<td>Northern America</td>
<td>16368</td>
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<tr>
<td>World</td>
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<tr>
<td>Africa</td>
<td>7243</td>
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<tr>
<td>W. &amp; Central Europe</td>
<td>4980</td>
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<tr>
<td>Central Asia</td>
<td>4270</td>
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<tr>
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<td>3681</td>
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<tr>
<td>Near East</td>
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<tr>
<td>Arab Region</td>
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<td>GCC</td>
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<td>GCC</td>
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</tbody>
</table>

GCC = Gulf Cooperation Council
Features of Water Scarcity

“Declining per Capita Share”

Rapidly growing population and diminishing per capita share

IRWR = Internal Renewable Water Resources
ARWR = Actual (total) Renewable Water Resources
Absolute Water Scarcity by 2025

Source: The World Vision Report
Water Resources Vulnerability

- More than 50% of renewable water resources generated outside the region (188.5 km\(^3\) out of 355 km\(^3\))
- Growing demands and uses increase pressure on already fragile and scarce water resources and their ecosystems
- Physical and environmental destructions caused by conflicts and wars in the region
Food Insecurity

- About 80% of food production depends on erratic rainfall
- Irrigated agriculture share is 90% of the available water resources
- The region is net importer of food with an average 80 million tons per year, and import bill about US$ 23.5 billion annually
- Agriculture directly employs about 33 million person; half of them are females and perhaps similar number in non-farm activities
Access to Clean Water and Sanitation

With distinct differences from one country to the other in the Region, further 83 million persons (27%) need to be supplied with safe water and 96 million (30%) with sanitation services in order to meet the MDGs.
Country Specific Lack of Access to Safe Water

% Without Access to Safe Water
Country Specific Lack of Access to Sanitation

% Without Access to Sanitation
Mounting Environmental Problems

- Environmental degradation including deteriorated water quality and salinization
- Pollution caused by fast growing cities and industries
- Insufficient wastewater treatment facilities
- Poor or non-existing solid-waste management
- Weak pollution control and abatement programs
Governance of Water Resources

- Dominance of centralized sectoral water management
- Reliability and accountability problems in service provision
- Insufficient financing of recurrent costs of water control and distribution systems.
Averages Hide Realities

Examples:

• *Egypt and Mauritania depend on more than 97% renewable water originating outside the country*

• *Saudi Arabia groundwater abstraction is 4-times the annual recharge*

• *Per-capita share of water resources in Palestine, Kuwait, and Jordan is 93, 180, and 190 m³/person/year*

• *More than 50% Mauritania and Somalia population lack access to clean water*
RESPONSES AND LOCAL ACTIONS IN THE REGION

Dr. Adel El-Beltagy

“Regional responses include broad poverty targeted interventions to improve resource management and service provision”
“Varied between countries in the Region but occurred in three levels depending on water scarcity degree and extent of water resources development in each country”

- **First Level**: Supply management
- **Second Level**: Demand management
- **Third Level**: Improvements in overall sector governance
Supply Management

• Massive investments to store and divert water and to provide WS&S and irrigation services
• Egypt spent US$ 10 billion on potable water and US$ 16 on sanitation services in 1982-2004; and US$ 2.5 in irrigation infrastructure during 2000-04
• Iran has invested considerably in dams and diversion infrastructure, harnessing over half of the total resources available (some 73 km³)
Demand Management

- Almost all countries in the Region are engaged in the development of appropriate instruments and institutions to manage water demands including:
  - Investing in technology that minimize demands
  - Improving reliability and accountability in service delivery
  - Involvement of stakeholders at all levels of planning and management
Improving Overall Sector Governance

• *Where institutional reforms led to enhanced water management .......But modern economy continue to press on scarce water resources .....Improvements in overall sector governance required moving towards IWRM*

• *This implies difficult political tradeoffs, accountability, effective capacity building, awareness campaigns, applied research, and innovative technology*
Dynamics of Reform in the Water Sector

- Most countries of the region already have developed policies, plans, or strategies towards IWRM
- Level of preparation of specific national IWRM plans varies from one country to the other
- Egypt, Jordan, Yemen and Palestine have approved national water resources plans
- In the case of Egypt and Yemen, these plans are fully integrated
- Saudi Arabia is currently preparing national water sector strategy and action plan
- The GCC Countries are engaged in discussing a regional water strategy
Institutional Innovations

• Several countries created a unified institutional structure for integrated resource management

• For example; in the GCC Countries and in Yemen, an independent ministry is responsible of managing their water resources

• In Egypt; a Cabinet level Ministerial Committee is responsible of inter-sectoral coordination of water resources management
Institutional Innovations

Decentralization:

- Yemen decentralized water supply and sanitation to self-accounting autonomous corporations
- Syria established independent water directorates at the basin level and decentralized water supply and sanitation services
- Egypt established Integrated Water Management Districts at the local level
Institutional Innovations ...

Participation:

- Egypt established WUAs at tertiary canal level, and Water Boards at the District level.

- Similarly, Morocco, Tunisia, and Yemen established WUAs.
Shared Water Resources

“Regional experience has proved that in shared water resources cooperation, partnerships for management or investment, or just technical cooperation on a fair and equitable basis can improve benefits for all concerned and contribute to a peaceful environment on a broader scale.”
Cooperative Management of Shared Water Resources

- Agreement on the Tigris-Euphrates River Basin between Iraq and Syria
- Agreements between Lebanon and Syria over the waters of the Orontes and Nahr El Kabir Rivers
- Bilateral water-sharing agreements over the Jordan River
- Major progress in regional cooperation on the sustainable utilization of the Nubian Sand Stone Aquifer between Egypt, Libya, Sudan, and Chad
- Algeria, Tunisia, and Libya have reached prosperous cooperation for the North Western Sahara Aquifer
- The Nile initiative involving 10 riparian countries opened the door for regional cooperation beyond the water sector including power trade, transportation, environment, etc
Water Conservation and Water Productivity

Interventions include:

- Land Drainage
- Bio-Saline Agriculture
- Supplementary Irrigation
- Water Harvesting
Agricultural Land Drainage

- Egypt invested heavily in agricultural land Drainage during the past 35 years. The net annual farm income increased by 25 -40 %. Gross production values improved by US$500-$550 per hectare. The annual GDP contribution is about 1.3 percent.

- Syria and Iraq also invested in land drainage though at a smaller scale.
Bio-Saline Agriculture

- **Impressive progress in developing sustainable management systems to irrigate with saline water**
- **Similar advances in developing salt-tolerant plants**
- **Several successful projects have been conducted in Oman, Saudi Arabia, and the UAE**
Supplementary Irrigation

- Supplementary irrigation, i.e. application of limited amounts of irrigation water at critical periods improves and stabilizes yields at low cost
- Many MNA Countries have innovated in this area
- Research work at ICARDA in Aleppo, Syria showed great potential for this technique throughout the region
Water Harvesting

- The first water harvesting system in history was built in the MNA Region over 9000 years ago.
- In Morocco; over 360,000 cisterns still supply domestic water to 10% of the population.
- Terraces are used in Yemen, Lebanon, and Jordan to increase rainfall effectiveness.
- Contour-ridge terracing in Libya, Syria, and Tunisia is used to conserve water and soil.
- Cisterns and micro-catchments in Egypt, Libya, and Yemen are used to store harvested water for domestic uses.
- Harvesting techniques have been used effectively to control desertification and rehabilitate land.
MORE RESPONSES ...... MORE LOCAL ACTIONS....

Dr. Adel Bushnak
Innovations in Non-conventional Water Resources Development

Interventions to narrow the gap between supply and demand in the Region included:

– Desalination of sea water
– Municipal wastewater and drainage reuse
– Groundwater Development for Wadi-Systems
Desalination

About two-thirds of the world's total desalination capacity is installed in the GCC Countries (about 3.2 billion m³/yr).

- **Saudi Arabia alone accounts for 25-30% of the world’s capacity**
- **all GCC Countries supply the bulk of municipal and industrial water from desalination**
- **Reliance on desalination is expected to increase as the population grows**
Wastewater Reuse

- Kuwait, Saudi Arabia, Oman, UAE, Syria, and Egypt practice municipal wastewater treatment and reuse
- In Tunisia, the volume of treated wastewater available in the year 2000 exceeded 125 million m³, and by 2002 had reached 170 million m³
- In the Arabian Peninsula (GCC Countries), about 0.4 km³ are being reused for irrigating
M&I = Municipalities and industries
Brackish Groundwater and Drainage Water

- Brackish groundwater abstraction for irrigation is practiced in several countries in the Region.
- Planned agricultural drainage water reuse is practiced on a very large scale in Egypt; currently about 5,000 million m³ per year.
- The National Water Resources Management Plan of Egypt envisage the increase of drainage water reuse to 8,000 million m³ by 2017.
Wadi Systems Groundwater Development

• *Periodic flash flood events in ephemeral wadi-systems, common in many Arab Countries, have potential for recharge the shallow aquifers*

• *New technology is developed in Egypt for assessing and estimating groundwater utilization in the wadi-systems. The methodology has good potential for replication in many countries in MNA Region*
Shares of Non-conventional Water Use in the Region

Non Renewable Water Abstraction for the Arab Region

23.041 bcm, 91%

0.984 bcm, 4%

1.364 bcm, 5%

- Desalination
- Waste Water Reuse
- Groundwater Depletion
Financial Sustainability

Sustainable financial arrangement is being promoted through:

• Securing public investments
• Effective cost recovery schemes
• Private sector involvement
Public Investments

Expenditures in the Water Sector of total government capital expenditures are:

- 20% in Egypt
- 23% in Algeria
- 26% in Yemen
Cost Recovery

- Tunisia and Jordan developed more effective cost recovery schemes for both irrigation and potable water supply.
- In Egypt, cost recovery has been introduced for a variety of water services including irrigation and drainage (about 50% of the capital investments), and for new massive investments like the Toshka project.
- WUAs have been empowered to collect operation and maintenance fees at the tertiary canal level in Egypt.
Private Sector Involvement in WS&S

- Qatar has been applying private sector service in water supply provision for a decade
- The UAE; developed long-term partnerships for water supply between various international companies and the local water authorities
- In Morocco; the provision of water supply, sanitation and electricity in four big cities (Casablanca, Rabat, Tangier and Tetouan) is under the management of private sector companies
- In Jordan; a four year water and wastewater management contract for the capital city Amman has been awarded to a private operator
Private Sector Involvement in Irrigation

1. The Guerdane Project in Morocco:

- Will irrigate 10,000 ha serving 600 citrus farmers where the groundwater source was running out
- Government will allocate water and co-finance the development of the 60 mile conveyance pipe and distribution structure
- Project costs $85 million of which the government will provide $50 million, half as loan and half as grant
- The water tariff agreed by the private operator is towards the lower limit of the existing cost range of groundwater supply, so farmers will benefit from a cost saving
Private Sector Involvement in Irrigation

2. The West Delta Irrigation Project in Egypt:
A major PPP project to provide surface water to irrigate an area of 100,000 ha of high-value commercial crops where also groundwater source was running out.

- **Project will be designed, constructed and operated by a private operator**
- **Capital investments will be covered by participating farmers**
- **Water charges will include a flat fee to cover infrastructure cost and a variable fee to cover operation and maintenance costs**
LESSONS FROM THE REGION

Dr. Mahmoud Abu-Zeid
Lessons

1. Water supply management, water use efficiency and demand-oriented water management must be balanced within a sustainable development perspective.

2. Food security are rather in improving returns to scarce water through efficiency gains, and in developing trade in agricultural products.
Lessons  … continued

3. Applied and targeted research and replicating successful experiences across the region are essential for sustainable development.

4. Governance should be improved to allow full participation of all stakeholders, decentralized service provision and application of IWRM.

5. Water management under scarcity conditions depends more and more on the generation and transparent exchange of information and data.
Tapping More Benefits

Driven by the realities of scarce resources and associated social, economic and environmental challenges; the countries in the Region have to continue on:

- Promoting regional cooperation
- Further improvement of the quality of water services
- Realizing better governance in water resources management
The Arab Water Council
An Opportunity for Regional Cooperation

• The Arab Water Council was launched in Cairo (April 2004) as a non-governmental organization

• Its task is to deal with the water challenges facing the Arab world in the 21st century and develop ways and means to resolve them effectively and efficiently for the benefits of the inhabitants in the Region

• The AWC is mandated to represent the views of the Arab States at international and global fora dealing with all aspects of water management in the Region
Agenda for Improving the Quality of Water Services

• More predictable and reliable irrigation water services to augment value added from irrigation

• Enhancing water quality through more investments in sanitation and solid waste, and by controlling industrial pollution

• Improving services supplied by water supply and sanitation utilities, and making them less dependent on governments
Agenda for Improving the Governance in Water Resources

• Clarifying irrigation water tenure rules and implementing dispute resolution mechanisms
• Increasing the capacity of institutions at all levels, and providing essential training for integrated water management
• Further decentralization of responsibilities to water users and further involvement of multiple stakeholders in planning and decision making
• Increasing public awareness and disclose information
• Measures to increase transparency, such as development and release of information and measures to empower stakeholders
• Initiate a regional macro program similar to the Marshal Plan
You are cordially invited to attend the several Thematic Sessions organized by the Arab Region through the Forum days, elaborating on many of the issues presented in this document as well as the “Arab Water Day” today’s afternoon celebrating a mix of technical, social, and cultural features of the water sector in the Arab Countries.
Thank You