Water Sector of Saudi Arabia

by

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Facts & figures for the Kingdom of Saudi Arabia

Water consumption 2009

- Desalinated seawater: 1.2 BCM/a
- Renewable water resources: 2.4 BCM/a
- Non-renewable groundwater resources: 15.1 BCM/a
- Total water consumption: 18.7 BCM/a
Facts & figures for the Kingdom of Saudi Arabia

- The Kingdom of Saudi Arabia (KSA) covers 2.24 Million sq km
- Population of around 27 million with a growth of 2.5%
- Per capita consumption (lpcd) is high
- UFW is in the range of 20%
- Demand growth is about 7%
Major Water Provinces in the KSA

- **RED SEA COAST:** The water resources of this area are made up by desalinated seawater and renewable water resources.

- **NORTHERN SHIELD:** Renewable water resources are the only water resource in this area. Rainfall is much lower than the Southern Shield.

- **SOUTHERN SHIELD:** Significant amounts of rainfall (up to 500 mm/a) in this area enable a water supply that is based on renewable water resources.

- **EAST COAST:** Desalinated seawater and, to much lesser extent, non-renewable groundwater resources make up the water resources of this area.

- **PLATTFORM:** In this area, only non-renewable groundwater resources exist. Remote supply from desalinated seawater from the East Coast takes place.
Responsibilities of MOWE

- Ownership of water resources and infrastructure
- Protection and sustainability of water
- Water sector management
- Regulation and licenses on water uses
- Regulation and licenses of water services
- Quality and pollution control
- Settlement of water conflicts
- Development of water legislation and monitoring
- Breaches and Sanctions
- Transitions and Final Provisions

The Water Act provides the foundation for the rule and law in managing water resources across the Kingdom of Saudi Arabia.
Current State Water Delivery Sector in KSA

- MOWE
  - Potable Groundwater
  - Brackish Groundwater
  - Treatment

- SWCC
  - Seawater Desalination
  - Potable Water Pipelines

- Electricity and Co-Generation Regulatory Authority
  - IWPP Companies (Private Sector)

- WEC

- Marafiq Jubail and Yanbu (desalination & distribution)

- Agriculture
  - Regional Water & Sewage Directorates
  - National Water Company

- Urban
  - Emergency Water
  - Industrial Cities

- 80% to Agriculture
- 20% to Urban
Regional Directorates of MOWE

Regional directorates are organized according to the 13 Regions.
Water & Wastewater Coverage in KSA
(per Region)

![Bar chart showing the number of water and wastewater connections per region in KSA. The chart compares the number of connections in different regions, with bars representing water connections and red bars representing wastewater connections. The regions include Riyadh, Makkah, Madinah, Qassim, Eastern, Aseer, Tabouk, Hail, North Border, Jazan, Najran, Baha, and Jidf. The chart indicates varying levels of coverage across different regions.](image)
Current Initiatives in Water Management

- Development and launch of a new Comprehensive Water Act
- Reengineering of the Ministry of Water & Electricity
- Staff training to enhance water sector management
- Implement treated sewage effluent (TSE) reuse policy
- Introduce demand and supply management
- Introduce Integrated Water Resources Management (IWRM)
- Initiated programs for National Water Conservation Campaigns
Introduction of Demand and Supply Management

Fundamental Inputs (Demand)
- National Agenda
- Land use plan
- GDP forecast
- Population growth
- Inputs from Industries
- Inputs from Agriculture
- Demand Management
- Public Education & Awareness
- Tariff Development

Fundamental Inputs (Supply)
- Water Quality
- Reliability
- Drought Resilience

Demand Projection
- Domestic
- Industry
- Agriculture

Supply to Industry
- Industrial Development
- Plant Capacity
- Desalination
- Supply Network

Supply to Agriculture
- Agriculture Development
- Well capacity
- Irrigation Infrastructure
- Aquifers, dams
- Treated Effluent

Supply to Domestic
- Aquifers
- Local Catchments
- Desalination
- Plant Capacity
- Supply Network

Wastewater collection/Treatment
- Sewer Connections
- Collection System
- Treatment Plant Capacity

Groundwater & Runoff Collection
- Aquifers
- Well-fields, dams
- Desalination Infrastructure
- Treatment Capacity
- Supply Network

Treated Effluent Reuse Projection

Raw Water Resources Projection

Water Supply

Other Factors
- Legislation
- Water laws & Regulation
- Technical Innovation
- Climate Change
- Environmental Impact

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Aquifer Studies

Collection and interpretation of data

Development of aquifer model

Application of aquifer model as a management tool
Locations of Desalination Plants
Enhancement of Renewable Water Resources through Dam Construction

- Number of Dams build: 350
- Total Storage capacity: 1640MCM
- Dams under construction: 80

Purposes of construction:
- provide potable water
- provide irrigation water
- groundwater recharge
- flood control
TSE Reuse Potential in the KSA

Current wastewater reuse: 241 MCM/a
Present wastewater reuse potential: 494 MCM/a
Future Reuse potential: 1,701 MCM/a

Wastewater treatment:
Collected, but untreated: 384 MCM/a
Septic Tanks: 1,250 MCM/a

Volume [1,000 m³/d]
Closing the Water Loop through introduction of TSE Reuse

Supply of potable Water to domestic and industry

Wastewater in Sewer

Process water recycling

Recycling gray water

Collection and proper treatment of waste water

Collection and proper treatment of raw water

Yield maximization and diversification of water resources

Reuse cycle in Greenhouses

Supply of TSE to agriculture for irrigation

Reuse of Treated Effluent

Recharge

Dams, aquifers, sea

Seawater

Groundwater

Rainwater

Potable Water

Reuse of Filter back wash water
Introduction of Hydromanager as an Information Management Tool

The 2nd JAEF 2010
GIS Data access
Per Capita Water Consumption in Major Cities

[Diagram showing consumption levels for Riyadh, Jeddah, Madinah, Dammam, and Khobar, with categories: Public, Commercial, Domestic, and Losses]
Infrastructure Development Program

- Provide 100% coverage of water & wastewater services until 2020
- Provide 100% sewage treatment plant capacity in all major cities
- Implement drought and flood disaster management.

Policy Developments
- Monitor policy for TSE for agricultural and industrial use
- Enforcement of National Water Law (NWL) and by-laws to NWL.

Administrative Development
- Continue with PPP process
- Establishment of water sector regulative body.

Water Resources Management
- Continue with water resources inventory for the KSA
- Implement IWRM
- Establish environment for the creation of water protection zones

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Financial Requirements of the Water Sector
(for the 9th Development Plan)

8th Development Plan Allocation
(2005 – 2009)

9th Development Plan Requirements
(2010 – 2014)

€ 13 Billion

+ 156%

€ 33 Billion

Financial Requirements of the Water Sector
(for the 9th Development Plan)
Value Proposition

• Cooperation in the field of well drilling and well rehabilitation
• Training courses for Integrated Water Resources Management (IWRM)
• Hydrological studies for aquifer information update
• Wastewater treatment and –recycling technologies
• Water & wastewater sector regulations and -management
• Strategic planning and water networks efficiency upgrade
• Performance (KPIs) and quality control systems
• Crisis management and contingency planning
• Water & wastewater knowledge and technology transfer
Achievements

- Finalization of Memorandum of Understanding between MOWE and the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT)
- Draft Memorandum of Understanding between MOWE and Japanese Ministry of Economy, Trade and Industry (METI)
- Finalization of master plan study in the southwest regions of the Kingdom (JICA)
- Technical cooperation between MOWE and JICA based on a shared cost model
- Research and development activities intensified
Thank you for your kind Attention
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