



منظمة الأغذية والزراعة
للأمم المتحدة



The Use of Non-conventional Water Resources for Agriculture in the Arab Region

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Objective

Identify opportunities, and future challenges in the management and sustainable use of non-conventional water resources in the Arab region.



Non-conventional Water

Non-conventional water refers to such part of water resources, which require a treatment process to transfer it from a non-beneficial (or polluted) form into a beneficially extractable form

Reclaimed wastewater
(from cities, industry)

Brackish water (drainage
water & saline
Groundwater)

Desalinated water



Non Conventional Water Practices In The Arab Region

- The total non-conventional water resources 73.55 BCM/y.
- Agricultural drainage 28.5 BCM/y (39%)
- Municipal & industrial wastewater 24.84 BCM/y (34%)
- Municipal wastewater 18.4 BCM/y of (10%)
- Produced desalinated water 7.09 BCM/y (9%).
- The total exploitable brackish water, 5.73 BCM/y (8%)

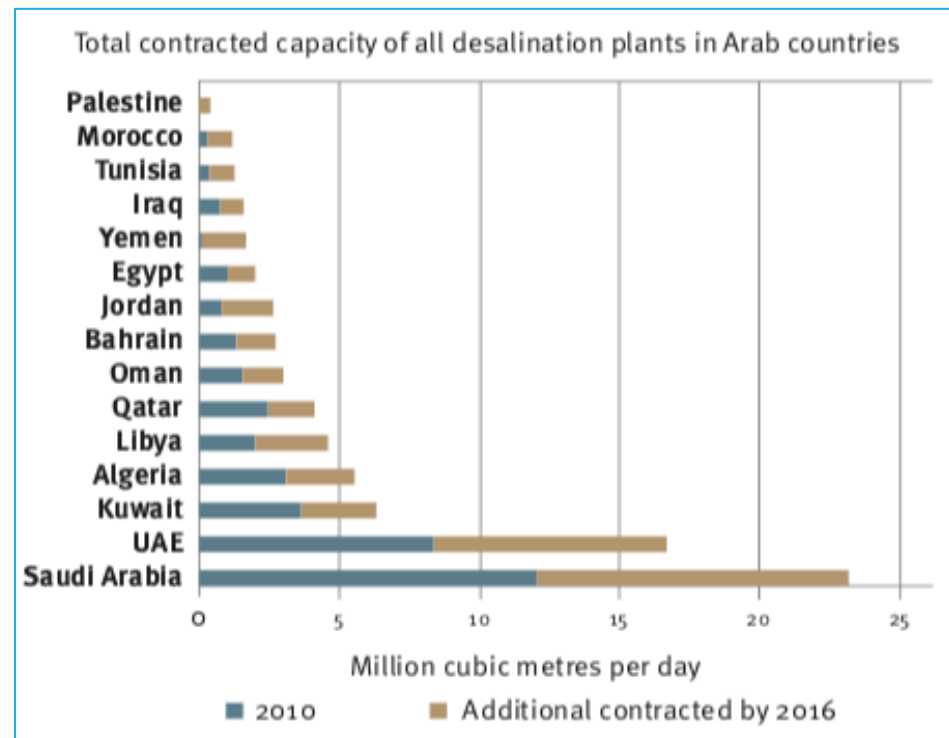


Source: 3rd State of the Water Report for the Arab Region 2015.

Desalination

Some facts:

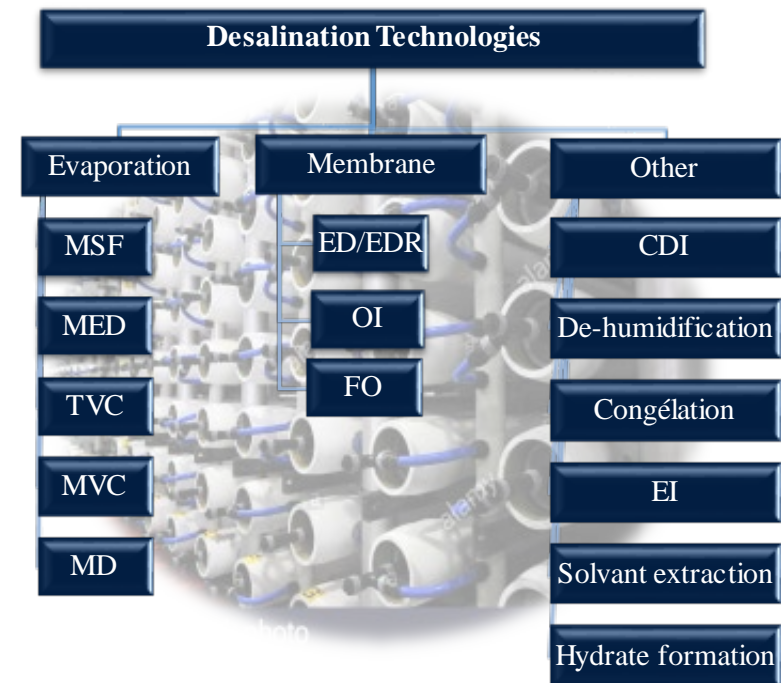
- Even without drought, water scarcity is limiting both economic and social development in most Arab countries,
- Renewable and fossil groundwater resources are being over-exploited at an increasing rate.
- The GCC countries were relying, since long time, on desalinated water.
- The use of sea water and brackish water will continue to grow during the next five years. 72% of production capacity will be provided by the GCC countries, of which 40% by Saudi Arabia and 15% by UAE.



Desalination (cont.)

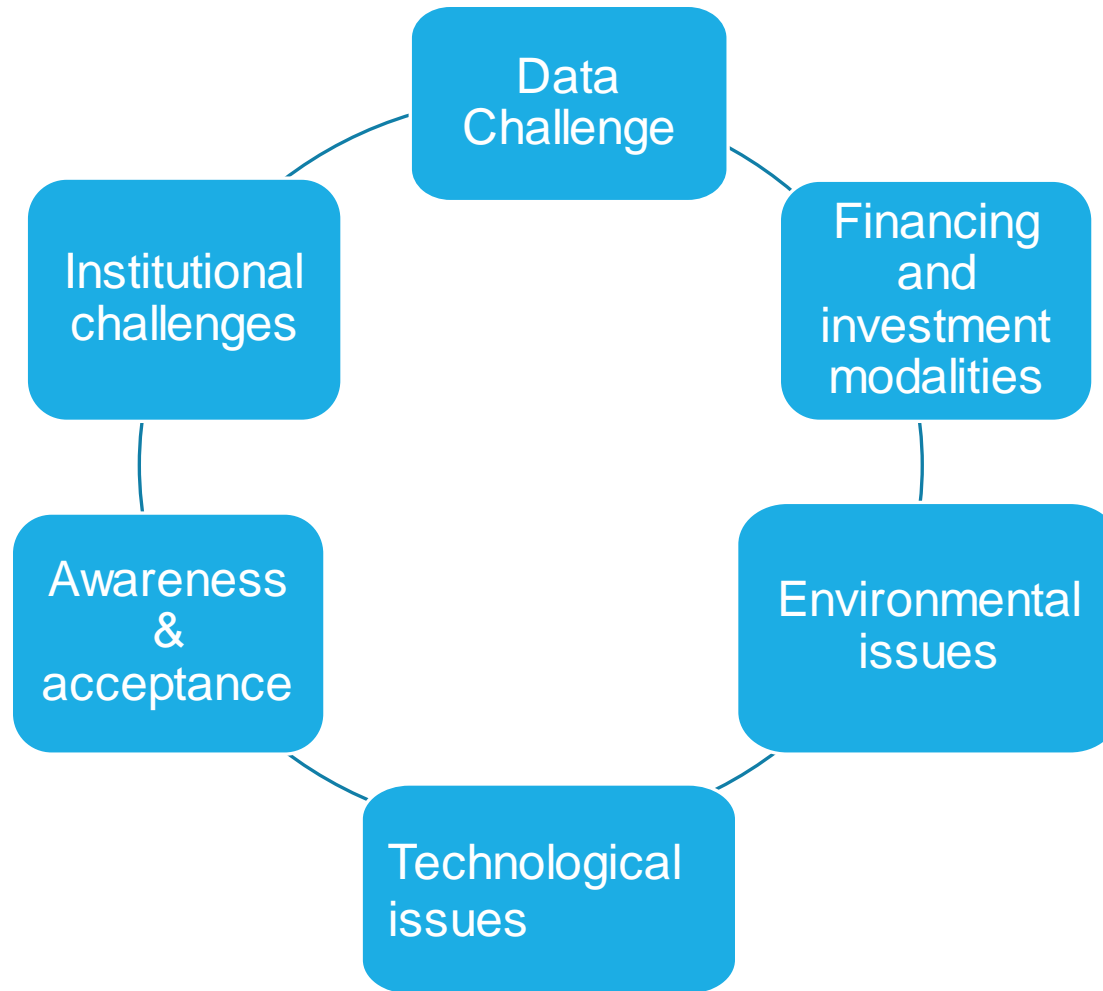
Some facts:

- Advances in technology and desalination systems components have resulted in a reduction of almost 80 % of the energy used to produce freshwater over the last 20 years, particularly reverse osmosis systems.
- The combination of renewable energy with desalination systems will contribute to decrease the cost of desalinated water.
- Different types of saline water reuse exist (agricultural drainage water, and groundwater) and are widely used (FAO, AWC, 2018). However, the potential negative impacts of such waters, that include increases in soil salinity, yield reductions, deterioration of soil quality and costs associated with these negative impacts should be considered.
- Adoption of the most adapted technology will improve the yield of using non-conventional water resources.





Different challenges to be addressed.



Data Challenge

Why there is a need for technical data availability to be collected ?

DATA

Governments
Water agencies
NGOs
Private companies
Users

Data collection and production

Integrated and shared data management

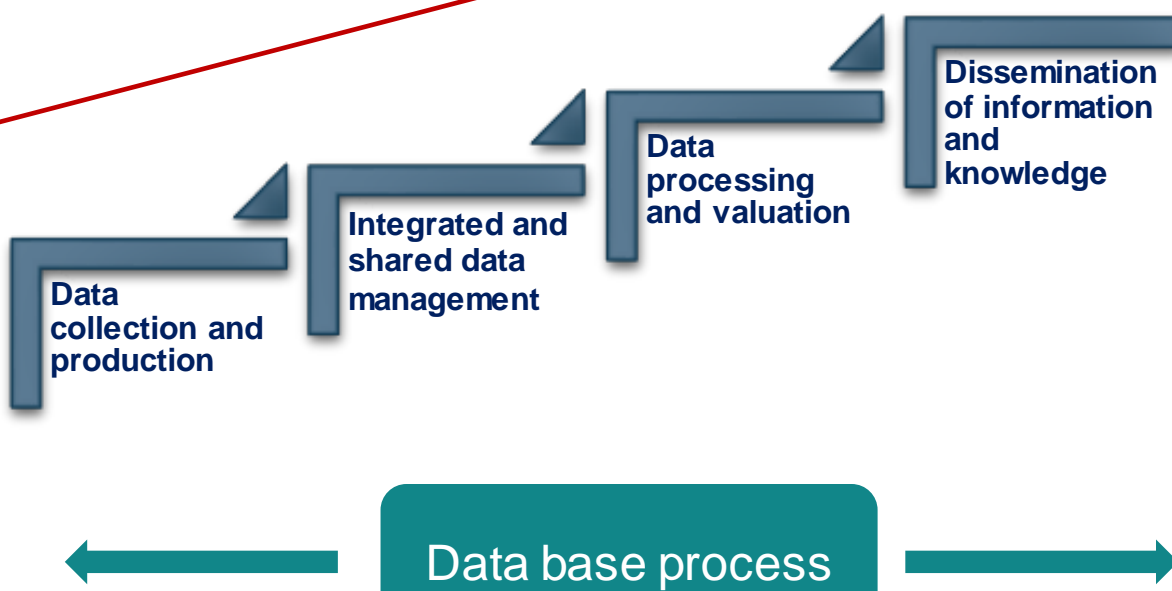
Data processing and valuation

Dissemination of information and knowledge

Data base process

KNOWLEDGE

Governments
(policy makers, technicians)
Water agencies
Private companies
Users



Technological issues

- It is necessary to develop and adapt the use of appropriate and affordable technologies for intended water reuse.
- There is need to develop competencies and proficiencies to achieve the quality target.
- A much more proactive approach should be initiated in order to benefit from the potential of all existing technologies and their coupling with renewable energies.
- It is necessary to enhance and upgrade the technical qualifications of operators, to improve their performances in the use of non-conventional water resources?
- It is necessary to enhance the role to R&D at the university and research centers to strengthen the development of non-conventional water resources in the Arab region?



Institutional challenges

In many Arab countries, legislation is insufficiently implemented because of various factors, most commonly lack of enforcement, insufficient resources (human, structural, financial), and inefficient or slow application procedures.



There is a need for:

- **Developing regularity framework with clear definition of responsibility, accountability and enforcement**
- **Developing both policy and planning frameworks**
- **Developing an enabling environment through policies and regulations.**
- **uncapping the challenge of social acceptance and awareness for the economic benefits of non-conventional water resources**



Financing and investment modalities

- Water tariffs in the Arab countries do not reflect true economical values and opportunity costs. Waste water treatment and reuse are subsidized and, in most countries, there is no full cost recovery yet.
- Very limited economic or financial incentives are in place to encourage waste water reuse including the reuse in aquifer recharge

- Arab governments should provide concrete financial mechanisms to support upscaling of sustainable use of non-conventional water related technologies.
- Public-private partnership is essential in attenuating the risks of investments and share the complementary human, financial and technical resources to implement long-term non-conventional water projects.
- Cost benefit and cost recovery should be integrated for sustainability of any reuse project

Agadir desalination plant

The overall cost of Agadir desalination plant project is 4.41 billion dirhams, including 2.35 billion dirhams for its irrigation component and 2.06 billion dirhams for its drinking water component. Production capacity (Phase 1) is 275,000 m³ / d at a rate of 150,000 m³ / d to meet the drinking water needs of the city of Agadir and a flow rate of 125,000 m³ / d to meet to the irrigation water needs of an area of 15,000 ha.

In a second phase, the desalination plant will reach its ultimate capacity of 400,000 m³ / d.

The project is financed by public-private partnership (PPP):

- **The private sector** with 2.42 billion Moroccan Dirhams
- **The public sector** with 1.86 billion Moroccan Dirhams
- **Farmers** with 120 million Moroccan Dirhams

The contribution of farmers was based on the ratio of 10 000 Moroccan Dirhams /Ha.

Environmental issues

To enable the use of treated wastewater, and desalination to support agriculture , there is a need to:

- Evaluate water quality criteria, potential environmental impacts to promote best practices and the implementation of non-conventional water resources.
- Create standards (mainly water quality) for the use of treated wastewater to recharge aquifers, which can then be used for irrigated agriculture.
- Consider non-conventional water sources from the perspective of multiple uses and the circular economy, which can address all environmental, social and economic outcomes.
- To use successfully saline or sodic water in crop irrigation requires careful management to prevent near-term reductions in crop yield and long-term reductions in productivity.
- Reduce and value the brine rejected by desalination plants



Keys to success

- Government and civil society support
- Coherent institutional and regulatory framework
- Matching treatment with reuse
- Public acceptance and outreach
- Partnership with the private sector which could play a key role in resource recovery and reuse
- Smart subsidies supporting resource recovery and enhancing the viability of reuse businesses

Conclusion

- The use of non-conventional waters should be promoted by Arab government to set policies that enable farmers to maximize the values generated with non-conventional water resources while protecting public health and the environment.
- Sea water reverse osmosis (SWRO) desalination technology is one of the most common technologies used in the GCC countries, its expansion will be boosted by the use of renewable energy.
- There is a strong government support for wastewater reclamation and reuse, however, this support has yet to trigger its widespread use
- There are a number of issues related to social acceptance, regulations concerning crop choices, and other agronomic considerations that affect these decisions
- Enabling environment entails legislative change, regulation and political commitment there is a need to understand the economic cost of providing new sources of water



*Thank you
for your attention*



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