

WEBINAR SERIES 2026

“INTEGRATING UNCONVENTIONAL WATERS INTO THE WATER MIX : CHALLENGES AND OPPORTUNITIES FOR IWRM AT BASIN LEVEL ”

1st Webinar : Strengths and weaknesses of seawater desalination as part of the water mix for integrated water resources management



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REMOC Red Mediterránea de Organismos de Cuenca



Scientific and Technical Committee

Institut Méditerranéen de l'Eau



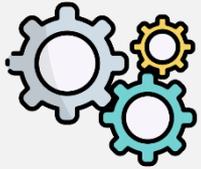
INDEX

- 1) prior concepts
- 2) strengths and weaknesses
- 3) conclusions



prior concepts

Water Mix for Integrated Water Resources Management at Basin Level



Integrated



MIX

Water Resources

- natural (conventional)
 - surface
 - groundwater
- artificial (non-conventional ??)
 - desalination
 - reuse



Water Demands



water supply



irrigation



energy



industry



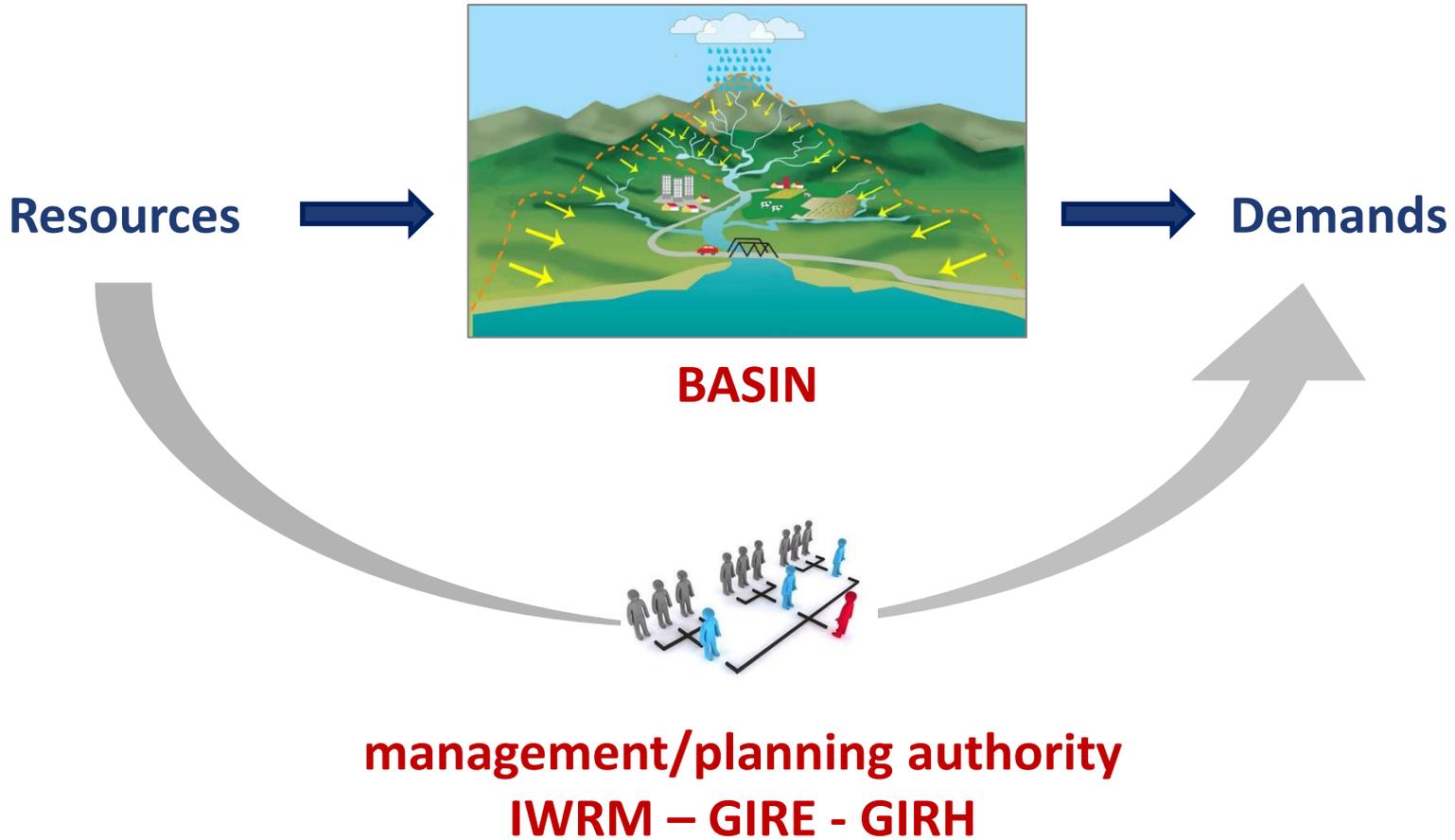
recreational ..



Strengths and weaknesses of seawater desalination as part of the water mix for integrated water resources management at basin level

prior concepts

Water Mix for
Integrated Water Resources Management at
Basin Level





prior concepts

Water Mix for
Integrated Water Resources Management at
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MIX **→** **RESOURCES**



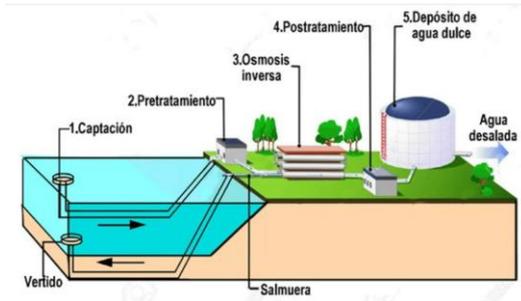
**Integrated
Water
Resources
Management**

basin level



strengths and weaknesses

SEAWATER DESALINATION



- 1) Production costs
- 2) Energy consumption
- 3) Environmental impact
- 4) Technological expertise
- 5) Potential uses
- 6) Water quality
- 7) Toxicity of discharges
- 8) CO2 emissions
- 9) Scarcity, droughts, and climate change

Spanish Desalination and Reuse Association (AEDyR)



strengths and weaknesses seawater desalination

1) Production costs



Today: 0,5 – 1,00 €/m³ (**30%** less than in 1990)

0,0010 €/lit. (≈ **1000** times cheaper than bottled water)

- much greater than regulated surface water : 0,1-0,2 €/m³
- of the same order as pumped groundwater

➤ **Integrated management can facilitate the distribution of costs resulting from the incorporation of these new resources**

The most expensive water is the water that doesn't exist



strengths and weaknesses seawater desalination

2) Energy consumption



Today: 2,5 to 3 kWh to produce 1 m³ of desalinated water
explains the **cost reduction** of desalination
reduced by **90%** in 50 years



- energy recovery in membranes and evaporation systems
- renewable energies

ENERGY ↔ DESALINATION

Energy consumption to supply desalinated water to a family of 4 = energy consumption of their refrigerator

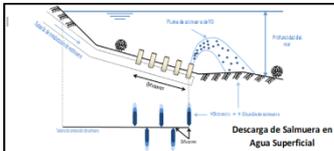
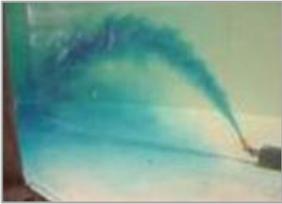


strengths and weaknesses seawater desalination

3) Environmental impact



From every 100 liters of seawater (35 gr/l), 45 liters of desalinated water and 55 liters of **brine** (65-70 gr/l) are obtained.



- Evidences and scientific studies
- Environmental impact studies and monitoring
- Closed circuit
- Renewable and biodegradable polymers to desalination membrane materials.

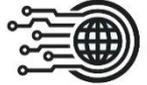
Just a few meters from the brine discharge point, the concentrate is indistinguishable from seawater in terms of salinity and water quality

The environmental impact is not caused by the solution adopted, but by the need to be satisfied.

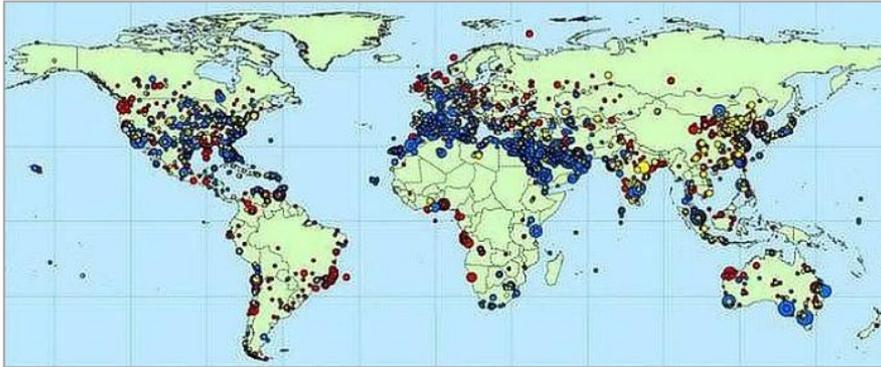


strengths and weaknesses seawater desalination

4) Technological expertise



20.000 desalination plants worldwide (177 countries)
producing 100 million m³ per day



- Saudi Arabia, USA, Israel, Spain...
- Gulf and Mediterranean countries

Non-conventional ???



strengths and weaknesses seawater desalination

5) Potential uses



Suitable for any use

Cost as a barrier



urban supply

- acceptable cost (service)
- reuse



industry

- acceptable cost
- recirculation



agriculture

- mixed
- high-value crops



strengths and weaknesses seawater desalination

6) Water quality



Equivalent to drinking water



- filtration of all types of physical, chemical and bacteriological contaminants
- same salts as drinking water: post-treatment

Remineralization options: water on demand

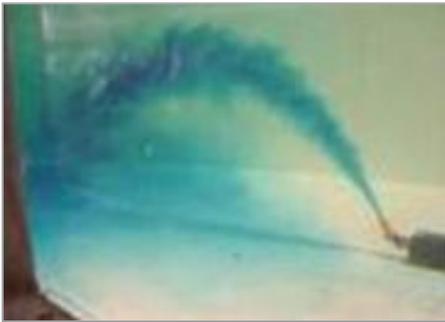


strengths and weaknesses seawater desalination

7) Toxicity of discharges



The brine concentrate does not contain any component that does not already exist in seawater



- Studies and projects for the economic and energy valorization of brine concentrate



strengths and weaknesses seawater desalination

8) CO₂ emissions



Desalination plants have **no direct emissions** of CO₂ gases into the atmosphere



- indirectly associated with the emissions from the electricity generation systems they consume

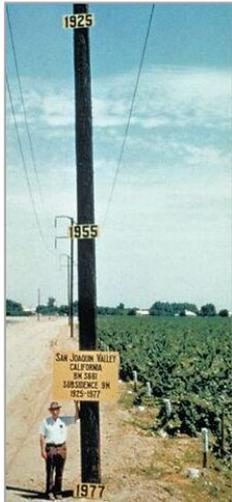


strengths and weaknesses seawater desalination

9) Scarcity, droughts, and climate change



extremely important in regions suffering from chronic
water scarcity



- Water security guarantee
- Independent of weather conditions
- Reduction of stress in traditional renewable water resources
- Recovery of piezometric levels and terrestrial ecosystems (impacts + - ?)
- Almost the only option in arid and semi-arid countries, and on many islands



MAIN CONCLUSIONS

- It's not about **being for or against** desalination.
- Desalination, with its strengths and weaknesses, **is another alternative** that must be considered alongside all other available resources.
- It has achieved **very competitive production** costs and generates environmental impacts that can be very well controlled.
- It is very appropriate in combination with the use of **renewable energies**.
- In environments subjected to greater **water stress**, desalination is a highly advisable alternative – often the only one – to achieve water security.
- The key will be, at any given time, to choose the most appropriate combination (**mix**) to ensure that demands are met with the least possible impact.
- That decision must be made within a framework of **integrated** planning and management, capable of ensuring a fair **distribution of costs and benefits**.

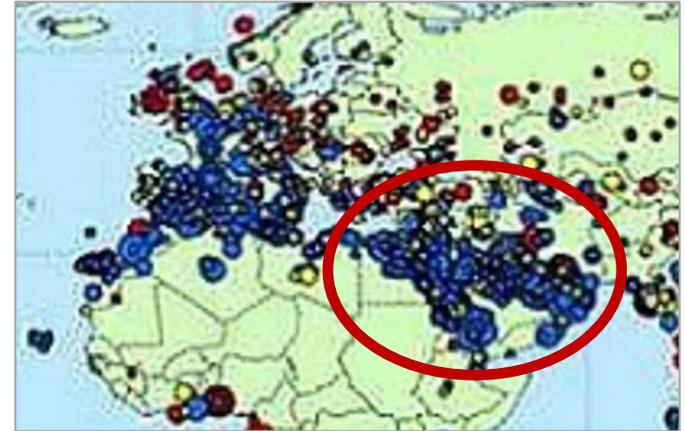


MAIN CONCLUSIONS ++ : **MIDEAST WAR (& GAZA)**

ENERGY ↔ DESALINATION

40% of the world's desalinated water production

- 70% of Saudi Arabia's drinking water
- 90% in Kuwait
- 86% in Oman
- 50% in Israel



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thank you so much



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