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Foundation proposal of a

# Mediterranean Desalination Observatory

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WATER INFORMATION SEMINAR  
Nicosia, Cyprus  
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## TURIN ACTION PLAN vs. EMMIS

- The Turin Action Plan is the result of the 2nd Euro-Mediterranean Conference on Local Water Management (Turin, 1999) (EC+27 countries)
- EMWIS is a **strategic tool** for exchange of information and know-how
- EMWIS needs to be **extended to all** Euro-Med Partners
- EMWIS should be a tool (**channel**) for **information exchange on projects or programs** in any approved action plan
- EMWIS should disseminate **information on success stories** on integrated local water management in the Mediterranean



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## TURIN ACTION PLAN

### Use of non-conventional water resources (5th Priority area of action)

#### ■ Background:

- It includes water recycling and **desalination (brackish water, seawater)**
- Technology for desalination is available. **Operating costs** may be a problem

#### ■ Tools:

- **Reducing the obstacles to desalination** (preferential energy rates, power-desalination, dual plants)
- Further **research** on water recycling and desalination



# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ The problem. World population and Water (I).

**“9.500 children a day die** either because of **lack of water** or, more frequently, because of diseases caused by **polluted water.**”

UNICEF (conservative figure: UN Environmental Programme places the figure at **25.000** a day, and an article in Foreign Policy places it at **40.000**)

**“In Africa 40% of the population** (300 of 750 million people) is expected to suffer serious **illnesses** over the next decade (frequently fatal) because of **water-related problems.**”

(Simon, P., *“Tapped Out. The coming world crisis in water and what we can do about it”*, 1998)

**“In the Middle East and throughout the world, water is increasingly becoming the central political issue, and a matter of survival for literally billions of people”**

(Postel, S., *“Global Water Shortages”*, Congressional Quarterly Researcher, 1995)



# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ The problem. World population and Water (II).

“Within one lifetime (1960 to 2025), per capita **renewable (water) supplies** will have fallen (annually) **from 3.430 m<sup>3</sup> to 667 m<sup>3</sup>**”

(Berkoff, J. “A strategy for managing water in the Middle East and North Africa”, Washington, World Bank, 1994)

“It is foreseen that in 2050 the **75% of the worldwide population** will live near the seashore, at less than **100 Km of the sea.**”

(Castilla, L., “Desalination plants. Open debate.” Cauce, Magazine of the Civil Engineering, number 122, Spain, 2004)

“Lack of water can have profound **economic and military consequences.**”

(Simon, P., “Tapped Out. The coming world crisis in water and what we can do about it”, 1998)



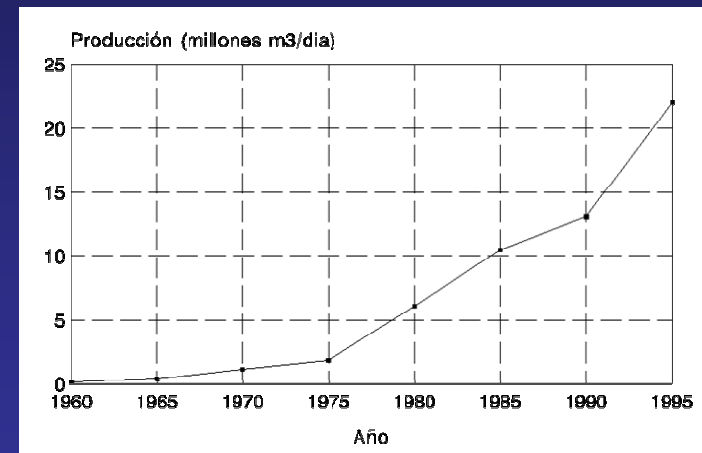
# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ The answer: desalination in numbers (II).

• According to the latest study of Wangnick Consulting (august, 2004) on the sales and construction of brackish and seawater desalination plants worldwide for the years 2002 and 2003, the worldwide desalination capacity is:

- contracted: 37.500.000 m<sup>3</sup>/d
- in operation: 27.500.000 m<sup>3</sup>/d



• 27,5 million m<sup>3</sup>/day is enough to supply a population greater than 137 million people.

## ■ Desalination in numbers (II).

### Desalination capacity in Spain Installed (year 2000) and in project (2000-2003).

	Uses	Installed (2000) (hm <sup>3</sup> /y)	Projects (2000-2003) (hm <sup>3</sup> /y)
<b>Seawater</b>	Urban supply	148,7	107,4
	Agriculture	18,9	94,5
	Industry	3,9	-
	subtotal	<b>171,5</b>	<b>201,9</b>
<b>Brackishwater</b>	Urban supply	75,4	25
	Agriculture	78,9	20
	Industry	66,0	34
	subtotal	<b>220,3</b>	<b>79</b>
<b>Total</b>		<b>391,8</b>	<b>280,9</b>



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## ■ Why a Mediterranean Desalination Observatory?

- **Water scarcity and recurrent droughts** in wide Mediterranean areas, including islands.
- **Over exploitation of underground water and growing demand of water**, that leads to:
  - Water supply cuts, affecting cities and industries, especially during summer.
  - Insufficient irrigation flows, endangering important agricultural areas.
  - Growing dependence on desalination and other non-conventional water resources.
- The **water deficit** in the Mediterranean areas is mainly due to **structural** reasons.





# MEDITERRANEAN DESALINATION OBSERVATORY

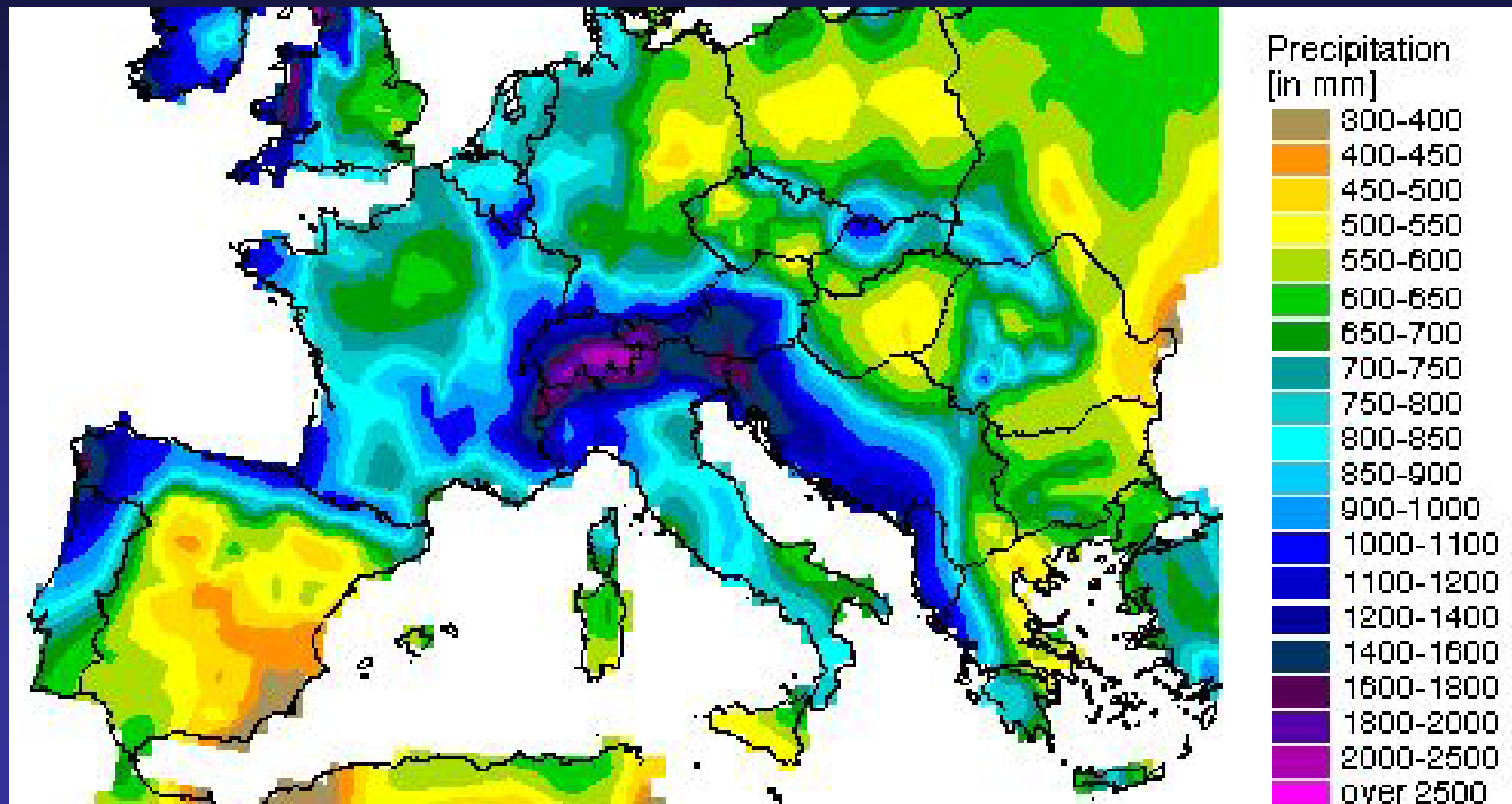


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# MEDITERRANEAN DESALINATION OBSERVATORY

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# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ Feasible solutions:

(with associated socio-political controversies and heterogeneous info)

- Inter basins transferences of conventional water resources.
- Non-conventional resources: Sea water and brackish water **Desalination**.

## ■ What is the Desalination Observatory?

• An **integrated information system**: documentation, analysis, thinking and debate.

• An **essential reference** in:

- **DESALINATION TECHNOLOGIES:** Evaporation systems: MSF, MED, CV  
Membranes: RO, ED, EDR
- **USES OF DESALTED WATER:** Agriculture  
Urban supply  
Industrial
- **ENVIRONMENTAL IMPACT:** Posidonia oceanica (Fanerogamae)  
Fishing banks  
Energy consumption (CO<sub>2</sub> emission)



# MEDITERRANEAN DESALINATION OBSERVATORY

- An **essential reference** in:
  - DESALINATION TECHNOLOGIES (Evaporation systems: MSF, MED, CV)



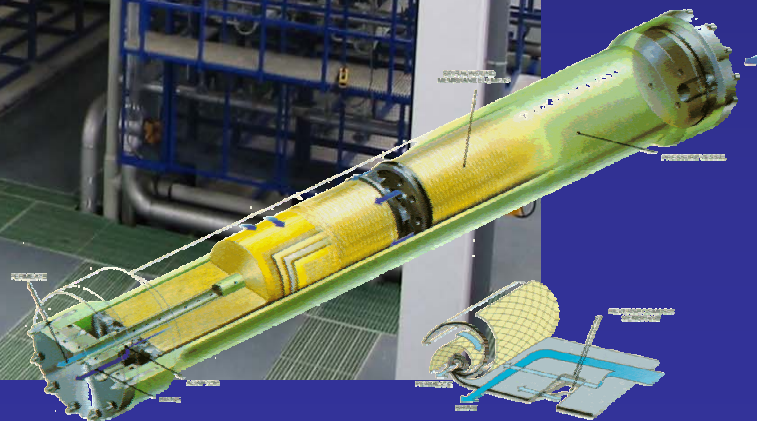
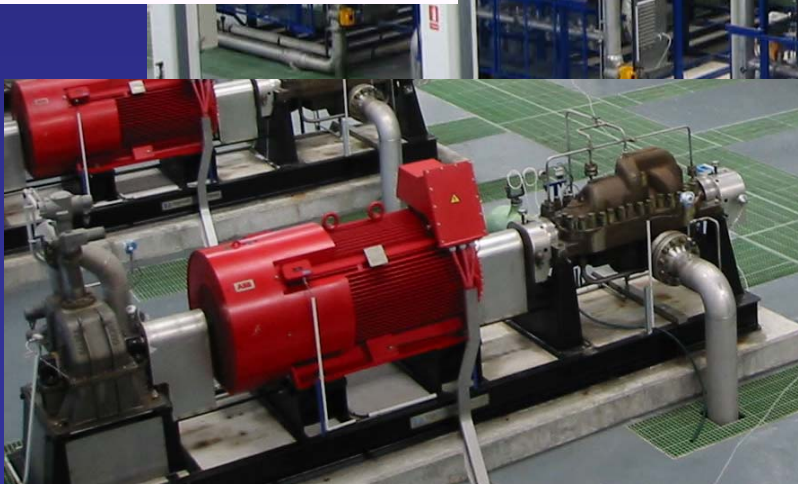
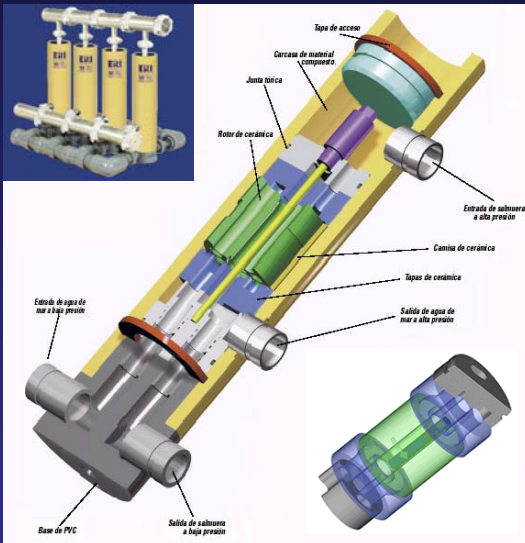


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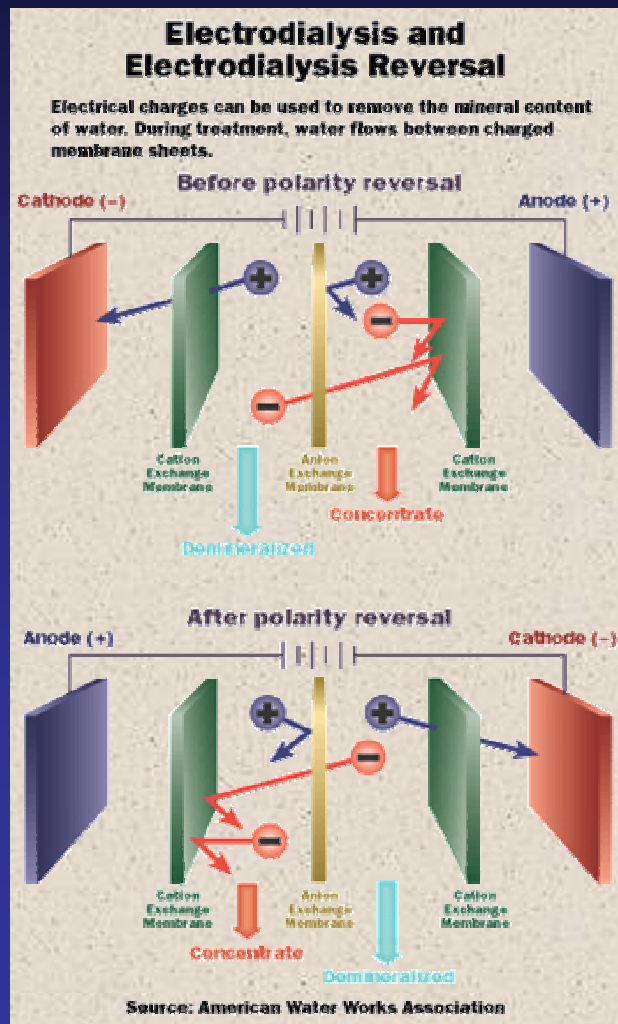


# MEDITERRANEAN DESALINATION OBSERVATORY

- An **essential reference** in:  
- DESALINATION TECHNOLOGIES (Membrane systems: RO)



- An **essential reference** in:
  - DESALINATION TECHNOLOGIES (Membrane systems: ED, EDR)





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# MEDITERRANEAN DESALINATION OBSERVATORY



• An **essential reference** in: **USES OF DESALTED WATER**





# MEDITERRANEAN DESALINATION OBSERVATORY



• An **essential reference** in:

- ENVIRONMENTAL IMPACT:

Posidonia oceanica (Fanerogamae)







# MEDITERRANEAN DESALINATION OBSERVATORY



- An **essential reference** in:
  - ENVIRONMENTAL IMPACT:

Fishing banks





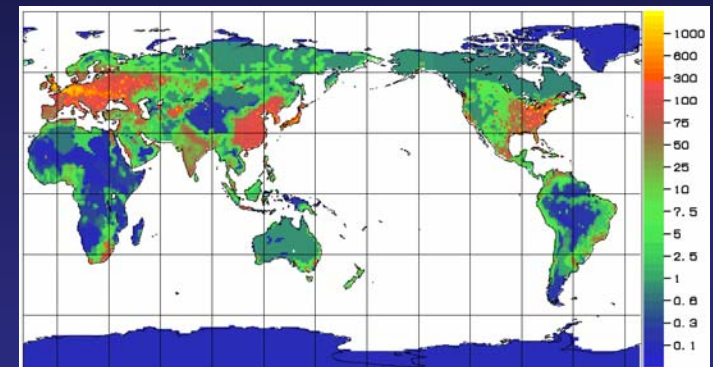
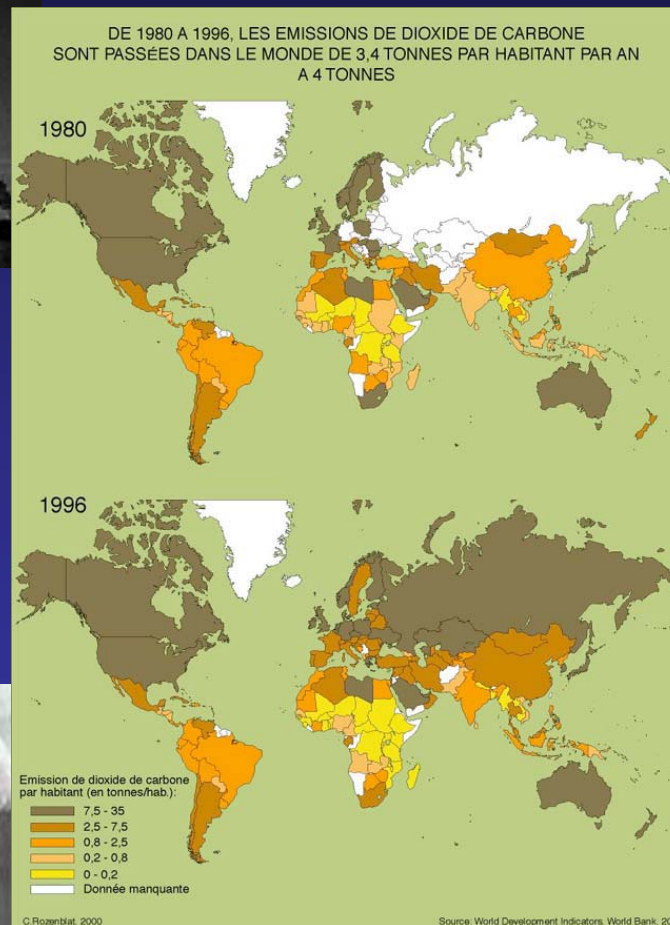
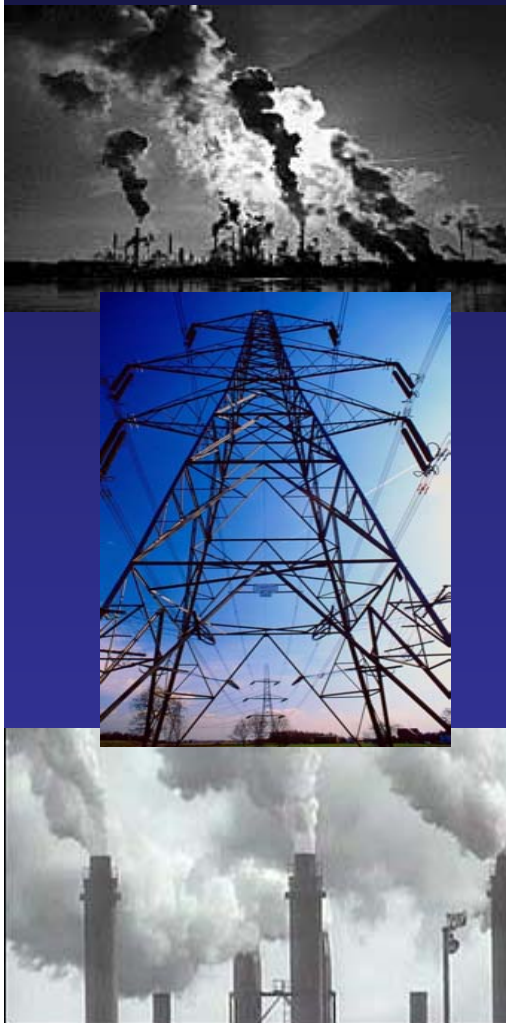
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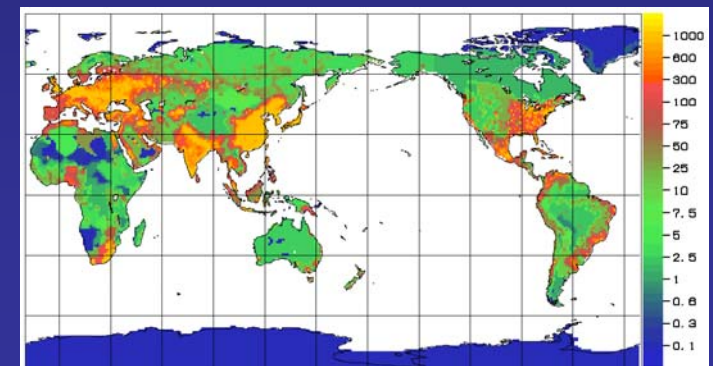
• An **essential reference** in:

- **ENVIRONMENTAL IMPACT:**

**Energy Consumption (CO<sub>2</sub> emission)**



CO<sub>2</sub> emission (tC/km<sup>2</sup>) from fuel consumption, BaU, 1986



CO<sub>2</sub> emission (tC/km<sup>2</sup>) from fuel consumption, BaU, 2100



# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ What are the Desalination Observatory objectives?

- To **compile** every **information** about desalination in the Mediterranean areas.
- To **coordinate the information flow** through conferences, meetings, courses, etc.
- To invite to everyone involved in desalination (universities, professionals, consumers, state institutions, manufacturers, etc.) to **collaborate** with the Observatory.
- To favor the **information analysis, thinking and debate**.
- To establish **indicators** to help making **homogeneous diagnosis**, trough an **exhaustive desalination plants inventory**.
- **Definition of research areas**, in order to establish solutions for any arising problems, avoiding duplication of efforts and improving their efficiency.
- To delivery to public opinion in order to **propitiate the share of knowledge**.



# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ Areas of action (I):

- The **setting up of a work team**, according to the project's needs.
- Compiling a **documentary base** about desalination, including essential bibliography, major technical magazines, applicable legislation, summaries of conferences, software, newspapers' news, etc.
- **Inviting collaborators** to take part in the project, including in a first phase:
  - Desalination concerned state institutions (ministries...).
  - Desalination related research groups or Universities' Departments.
  - Professional Associations.
  - Major companies, manufacturers.
  - Prestigious professionals.
  - Desalination plants' managers.
  - Specialised journalists.
  - Banks or any other financial sources.



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## ■ Areas of action (II):

- Including an **Observatory** sub-section at the **EMWIS web**, including the following specific contents:
  - Information about the Observatory and its purposes, work teams and collaborators.
  - Documentary centre, offering online information from the Observatory's bibliography database.
  - Announcements about activities like conferences, courses, etc.
  - Observatory's publications and reports.
  - Significant news.
  - Recommended website links (Ministries, Universities, AEDyR, International Desalination Association, etc.).
- Organizing a **first congress** from which a report will be published through EMWIS. The topic will be to discuss in order to define the actual knowledge of the desalination technologies and its problems (technology, use of desalted water and environmental impact).



# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ Areas of action (III):

- Making an **exhaustive inventory** of existing and future desalination plants and its monitoring. This inventory will gather the main characteristics of the desalination plants:
  - plant and brine disposal location
  - technical data
  - uses of the produced water
  - energy consumption
  - costs, etc.
- Definition of the **Observatory's research areas**, which will be focused on three main aspects very important at present:
  - Energy cost decrease (new technologies development and renewable resources use).
  - Desalted water uses, with special attention to agricultural uses (Boron removal, desalted water post-treatments, hydroponic crops...)
  - Environmental control and protection (brine disposal).



# MEDITERRANEAN DESALINATION OBSERVATORY



## ■ Conclusion:

Wide areas of the **Mediterranean** regions, included Mediterranean islands, have analogous **water** problems **scarcity**. Those areas will become more and more **dependent on desalination** resources due, mainly, to the over exploitation of underground water and the increase of the demands.

Moreover, the existing **information** is very **heterogeneous**, so it is difficult to achieve agreed solutions.

So it is proposed the **creation of a main work link on desalination as Observatory from Cyprus to Spain** which centre must be located where the dependence of water desalination, the technical experience and the collaboration sense is recognised.

The Mediterranean Desalination Observatory accomplishes all the **main purposes of EMWIS/SEMIDE** (compiling information, sharing knowledge, open to Euro-Med partners, etc.). So, it will be an **useful tool** in a near future, in order to improve the desalination technologies and to obtain important innovations in this field.



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