
Autonomous Desalination System Concepts for Sea Water and Brackish Water in Rural Areas with Renewable Energies - ADIRA

Potentials, Technologies, Field Experience, Socio-technical and Socio-economic Impacts



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Monday, 26th September 2005

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Context of the Project

- Financed by the European Commission under the Euro-Mediterranean Partnership and Regional Programme for Local Water Management
- Contract N° ME8/AIDCO/2001/0515/59610
- Additional Consulting Support as a contribution in kind from MEDREC (Middle East Desalination Research Centre)
- Duration: 4 years (2003-2007)

Main Objectives of the ADIRA Project

Problem

- Clean drinking water is becoming scarce or never has been available in certain areas
 - especially rural areas of the South Mediterranean and Middle East Region!

Approach

- Decentralised water treatment systems, powered by renewable energy are a sustainable solution to overcome this problem
- taking into account technical, economical, environmental, legal and social aspects
- Multidisciplinary, participative and integrated problem solving approach

Objective

- Field investigation of ADS concepts for fresh water supply in rural areas

Participating Partners



AGRICULTURAL UNIVERSITY OF ATHENS
Laboratory of Agribusiness Management

Agriculture
University of
Athens (**AUA**) -
Greece



Egyptian Energy &
Water Association
(**EWE**) -Egypt



FONDATION
MARRAKECH
21 (**FM21**) -
Morocco



Fraunhofer
Institut
Solare Energiesysteme

Fraunhofer
Institute for Solar
Energy Systems
(**ISE**) -Germany



Technological
Institute of the
Canary Islands
(**ITC**) -
Spain



Istanbul
Technical
University
(**ITU**)- Turkey



The Middle East
Desalination Research
Center (**MEDRC**) -
Oman



National Center for
Scientific
Research (**NCSR**),
DEMOKRITOS -
Greece



Jordan
University of
Science and
Technology
(**JUST**) - Jordan



(**WIP**), Germany

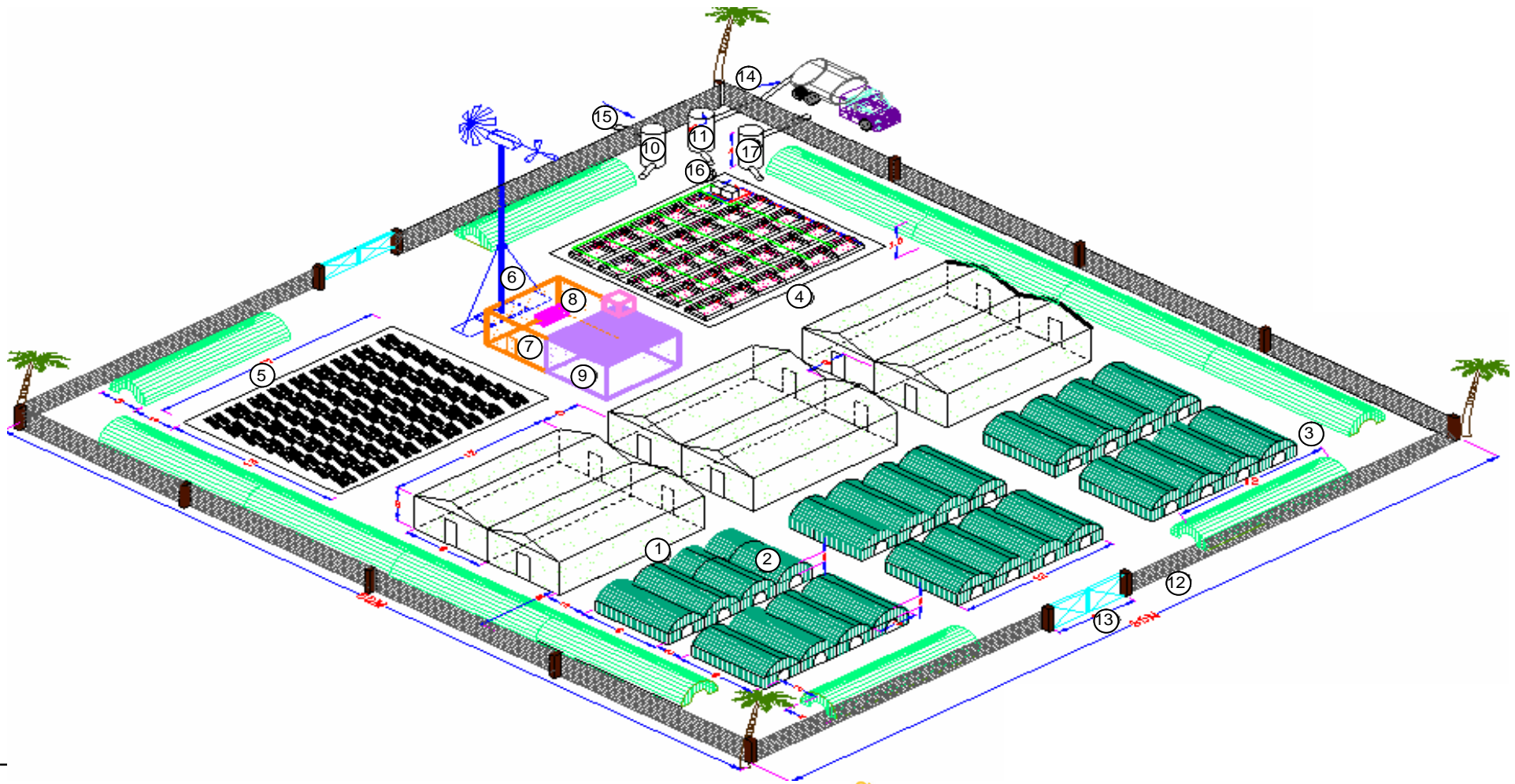
ADS Installations

Country	System design	Use
Cyprus	Humidification/Dehumidification	Eco-tourism
Cyprus	PV-RO	Agriculture
Turkey	PV-RO	Eco-tourism
Turkey	PV-NF	Primary school
Jordan	Solar stills	Education center
Egypt	Greenhouse integrated solar still	Agriculture
Morocco	PV-RO	Rural village
Morocco	Wind-RO	Rural village
Morocco	PV-Wind-RO	Rural village
Morocco	Not decided yet!!!	Rural village
Morocco	Not decided yet!!!	Rural village
Morocco	Not decided yet!!!	Rural village

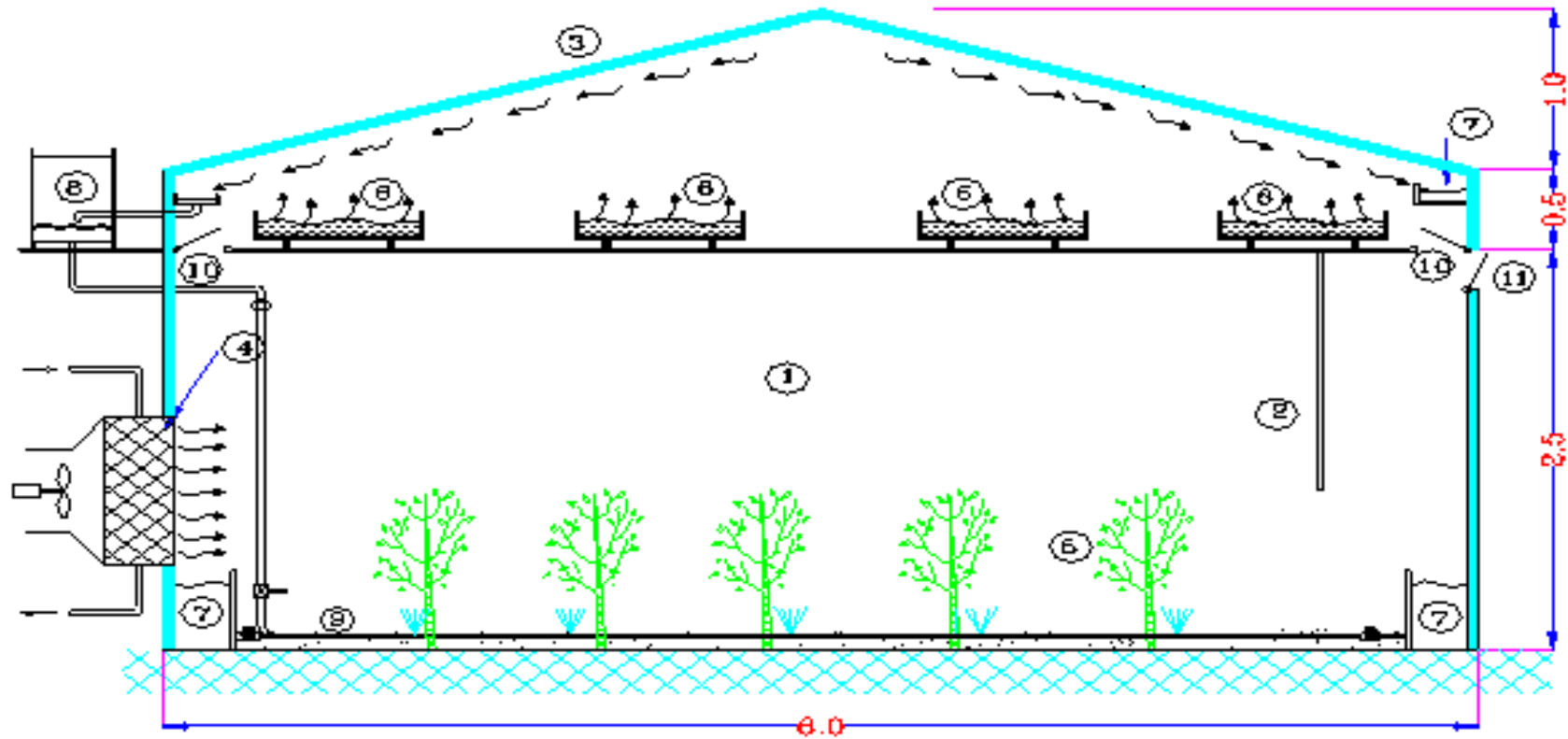
Purpose of the System to be installed in Egypt

- Production of drinking water
- Production of water for irrigation
- Growing vegetables in the desert
- Production of salts
- Generation of electrical energy for the basic community needs

Conceptual configuration of the complex in Egypt



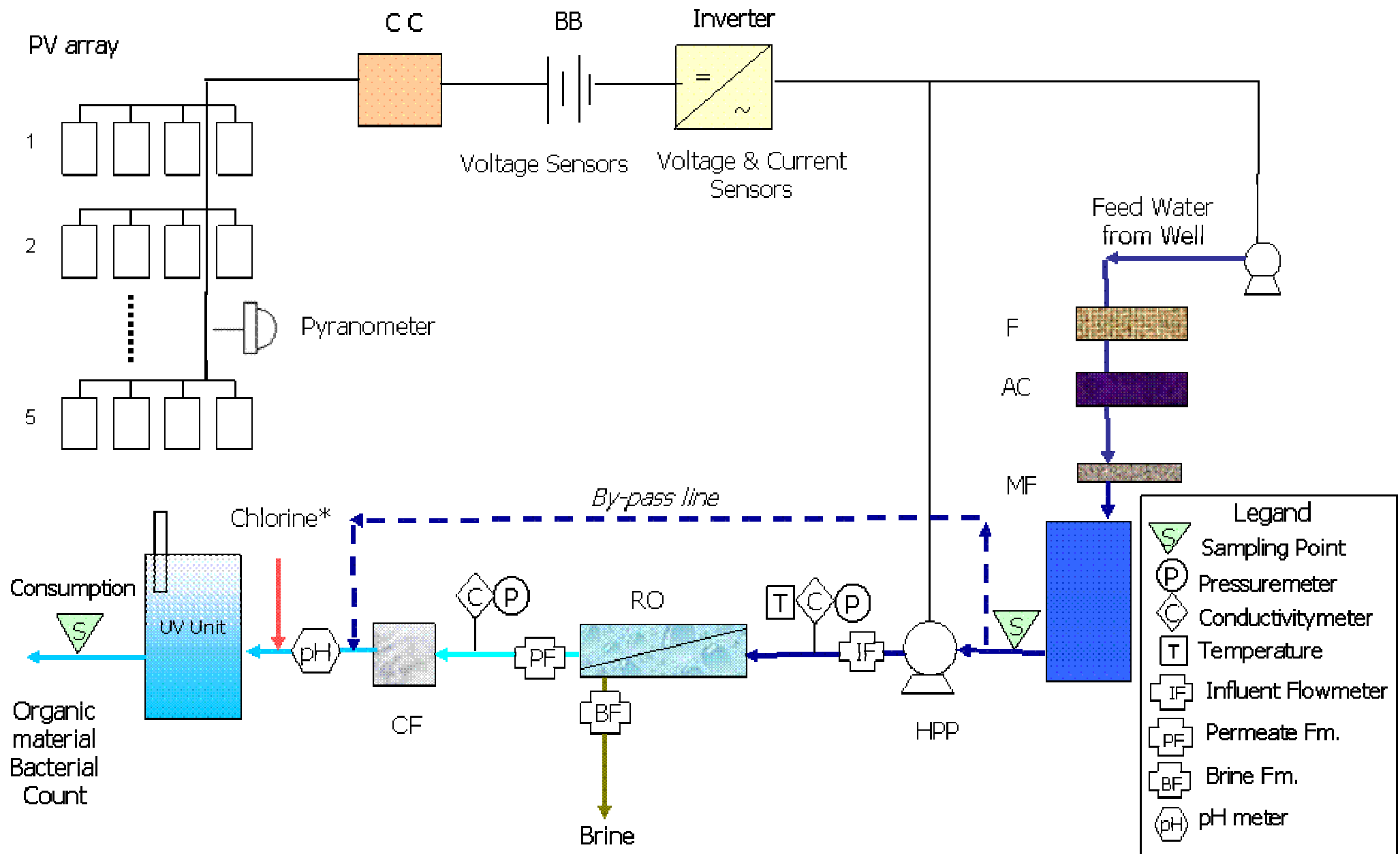
Greenhouse Integrated Solar Still



Site of one installation in Turkey



Conceptual configuration of the complex in Turkey



Site of one complex in Morocco

Global view of the village.



View of the water point



Used corroded metal pipes

Site of one complex in Morocco



- Population: 50 households (400 inh)
- Water infrastructure
 - Well (conductivity: 6950 mS/cm)
 - Pumping system (diesel generator and pump)
 - 25 m³ storage reservoir
 - Distribution network
- Average daily global solar irradiance is more than 5 kWh/m²
- Village is not grid connected
- Brackish Water cost: 0.5 €/m³ (fee paid by each household!!!)

Site of one complex in Morocco

- Water demand:
 - Drinking water: 6 m³/d (15 l/inh./day)
 - Livestock: 10m³/day
- Contributions to the project:
 - Province: administrative support contact with populations
 - Population: donation of land for PV panels
 - Commune: operation and maintenance

Expected results and achievements of ADIRA

The following achievements of ADIRA will be available and support everybody working in the field of desalination:



1. Full description of the different small-scale desalination installations including a monitoring system
2. Data of this monitoring system are available on the ADIRA web-site (www.adira.info)
3. Detailed business plans for each installation to guarantee the sustainability
4. Installation / operation / maintenance guidelines
5. Monitoring guidelines

Expected results and achievements of ADIRA



6. Decision Support Tool
7. Data base (with data from market and country surveys)
8. Proposal to the national and regional government on how to support the rural water supply infrastructure (master plans)
9. Workshop for stakeholders in each participating country
10. Training of the users
11. Handbook for users, decision makers and installers

... to conclude

- To boost small scale ADS
- To proof its reliability under real conditions
- To generate proofed data about investment- and maintenance costs, maintenance needs, education needs for the users,

- At the moment we are in the tender procedure!

Thank you for your attention!



Interested?

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www.adira.info