Development and application of integrated technological and management solutions for wastewater treatment and efficient reuse in agriculture tailored to the needs of Mediterranean African Countries: the MADFORWATER project

Why

Mediterranean African Countries (MACs) face a relevant water crisis, due to low water availability per capita, insufficient rate of wastewater treatment, overexploitation of renewable water resources, high demand of water for agriculture and non-optimized irrigation practices.

In the next decades, population and economic growth combined with climate change will make the situation even more dramatic, unless significant and rapid actions are taken.

Aims of MADFORWATER

General goal

to develop integrated technological and management solutions to boost wastewater treatment and treated wastewater efficient reuse for irrigation in selected hydrological basins in Egypt, Morocco and Tunisia.

Specific goals

- improved analysis of water vulnerabilities in Egypt, Morocco and Tunisia
- development of technologies for wastewater treatment and agricultural reuse
- development of integrated water & land management strategies
- increased capacity building in relation to water management
- promotion of business opportunities for water & irrigation enterprises.

The MADFORWATER concept

- Madforwater is based on 2 pillars: **water supply (wastewater treatment)** and **water demand (irrigation)**
- Transversal key concepts:
  - **adaptation** to the local conditions of the 3 target MACs
  - **integration** (i) within each pillar, between technologies, water management strategies and economic instruments; (ii) transversally, between wastewater treatment and wastewater reuse for irrigation

The MADFORWATER technologies

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<th>Wastewater treatment technologies</th>
<th>Irrigation technologies</th>
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<td>Low-pressure micro-sprinklers and calibrated nozzles adapted to treated WW</td>
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<td>Nitrifying trickling filters</td>
<td>Re-engineered surface irrigation systems</td>
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<td>Constructed wetlands with plant growth promoting bacteria</td>
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<td>Granulated sludge bioreactor</td>
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<td>Dyes adsorption with innovative resins</td>
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The MADFORWATER strategy

The project is articulated into 3 main phases:

- **Analytical phase**
  Evaluation of the water vulnerabilities in the 3 target countries.

- **Technological phase**
  Lab-scale development and adaptation of technologies; implementation of the best technologies in 4 demonstrator plants of wastewater treatment and agricultural reuse.

- **Implementation phase**
  Decision support tools, basin-scale water management strategies, policy recommendations, capacity building, industrial exploitation.

The MADFORWATER consortium

Coordinator: Dario Frascari (dario.frascari@unibo.it); co-coordinator: Giulio Zanaroli (giulio.zanaroli@unibo.it); www.madforwater.eu