

4th SmallWat21v

CONGRESO INTERNACIONAL

Capitalización de Resultados del Proyecto IDiAqua. I+D+i sobre Depuración de Aguas Residuales en Pequeñas Aglomeraciones Urbanas.

ENTORNO VIRTUAL

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MEDITERRANEAN LIVING LABS FOR NON-CONVENTIONAL WATER REUSE AT LOCAL SCALE: MENAWARA PROJECT

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The Mediterranean Region (MR) is considered as one of the world's most water-stressed areas where some countries have less than 1000 m³ /capita/year.

**Jordan, Palestine and Tunisia face a "structural shortage" of water, with less than 500 m³/per capita/year.

In MPCs more than 70 % of total water withdrawals are allocated to irrigated agriculture and water losses and leaks during conveyance and distribution, combined with inefficiency and waste in both irrigation and domestic use, are estimated at 45 % of total water demand for these two sectors.



Mediterranean countries are torn between old and new water policies, and specifically the agriculture sector has to adapt to the new political and institutional framework, both at the national and international level, where the **synergy between Agricultural Policies together with Environmental Policies and Conservation of natural resources** is taking place.



GENERAL FRAMEWORK

More specifically, the above-mentioned situation is aggravated in those **rural areas** where **irrigated agriculture** represents the **driving force of the economic activity** and the **backbone of the social growth**.



GENERAL FRAMEWORK

Under the above context, re-use of **Non-Conventional Water (NCW)**, as **drainage water and treated wastewater**, represents one of the most sustainable alternatives to manage imbalances between resource availability and demand also contributing to the promotion and implementation of the **circular economy concept**, not only from the point of view of water availability, but also from that one of nutrient and energy recovery.





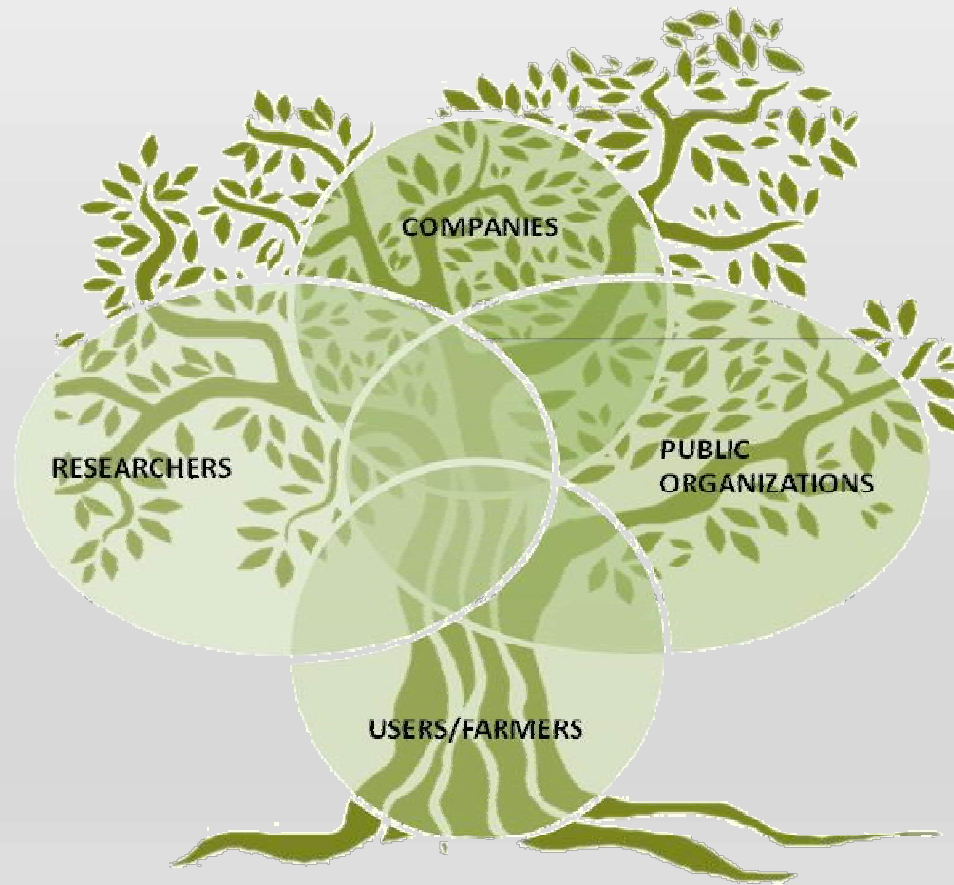
NON-CONVENTIONAL WATER REUSE IN AGRICULTURE IN MEDITERRANEAN COUNTRIES

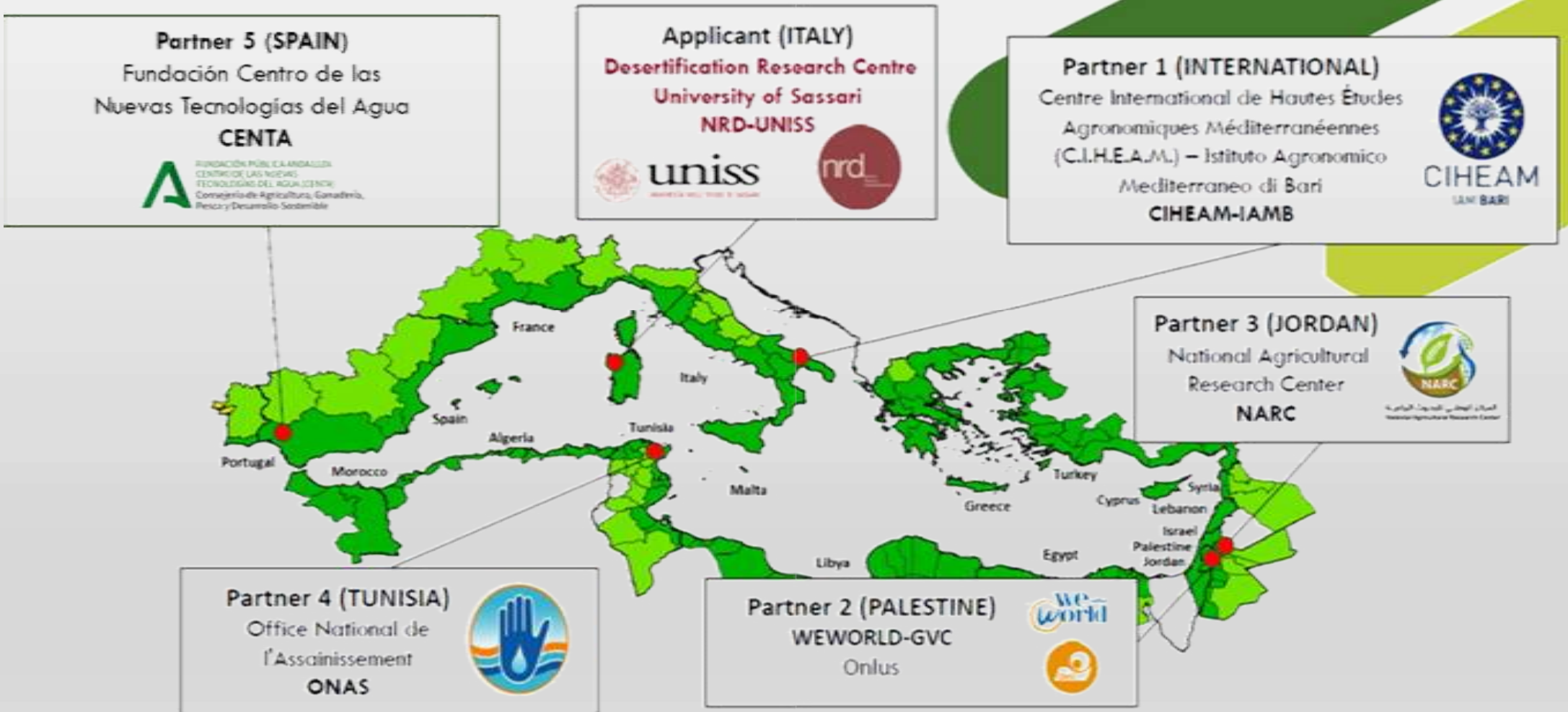


<http://www.enicbcmed.eu/projects/menawara>



NAWARA is designed to enhance access to water through the treatment of wastewater reused as complementary irrigation and to strengthen the operational capacity stakeholders of the quadruple helix, **including local farmers.**





OBJECTIVES

OVERALL OBJECTIVE:

Contribute to increase the water availability for agricultural purposes through the use of non conventional water in order to reduce the pressure on conventional water resource

SPECIFIC OBJECTIVES:

- Improve water use efficiency of non conventional water for irrigation
- Improve the quality of non conventional water to reuse in agriculture
- Strengthen the non conventional water governance by disseminating and capitalizing innovative and technological solutions



PROPOSED OPTIONS

Efficient infrastructures

Through the implementation of minor interventions in the WWTPs

Low cost Pre and Post treatment system

Realized in the WWTPs

AR systems

Realized by Forested Infiltration Areas (FIA) technique

Sustainable and effective irrigation systems

Adopted to improve water use efficiency and crop yields by using TWW

INTERVENTION SITES

3 Intervention areas:

❖ Interventions in WWTP and irrigation systems

Tunisia (4)

Jordan (1)

Palestine (1)

Spain (1)

❖ MAR system realized by Forested Infiltration Areas (FIA) technique

Italy (1)



LIVING LABS

intervention sites of MENAWARA project are foreseen to turn in open living labs, a peer learning space where youths, technicians, water users' associations, local farmers and local authorities will be trained on capitalizing on innovative and user-oriented wastewater treatment, reuse and irrigation technologies.



the engagement of stakeholders, based on a model of the quadruple helix will facilitate knowledge transfer regarding sustainable use of water resource and circular economy, fostering the dialogue, and developing national planning more responsive to the community's needs.



Finally, MENAWARA project is expected to provide “field labs” to develop, test, and validate a combination of solutions for sustainable wastewater treatment and reuse.

FIELD LABS

TUNISIA (4)



LIBIA-TUNISIA



FIELD LABS

The treatment system and interventions are based on rehabilitation of the existing pump chamber, implementation of irrigation pond, pressure group and subsequent filtration by pressurized sand filters.



KORBA-TUNISIA



FIELD LABS

The treated wastewater from Korba plant is used for:

groundwater recharge (3 basins with sand and gravel layers),

and to supply water to the Korba lake (UNESCO protected) for the maintenance of ecological flow and improvement of lake water quality.



FIELD LABS

KORBA-TUNISIA



A tertiary treatment line has been designed for the reclamation of the secondary treated wastewater from the WWTP Korba, composed by a filtration treatment through pressurised sand filters, after passing the previously treated wastewater through an existing maturation pond.

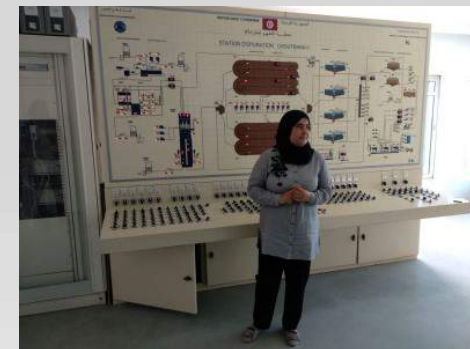
CHOUTRANA II- TUNISIA



FIELD LABS

The treatment system to be implemented is a post-treatment train to the existing secondary clarifiers and a control basin, based on a filtration process using pressurised sand filter and a subsequent disinfection stage by application of ultraviolet radiation.

Living lab



FIELD LABS

BORJ TOUIL-TUNISIA

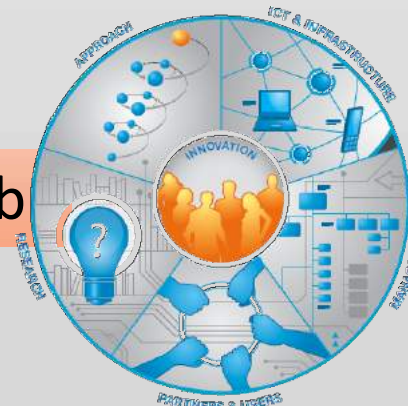


The WWTP in Borj Touil receives by gravity 500- m^3/day from an upstream accumulation tank (160- m^3).

❖ 2 Horizontal flow CWs of 750 m^2 each, working parallel

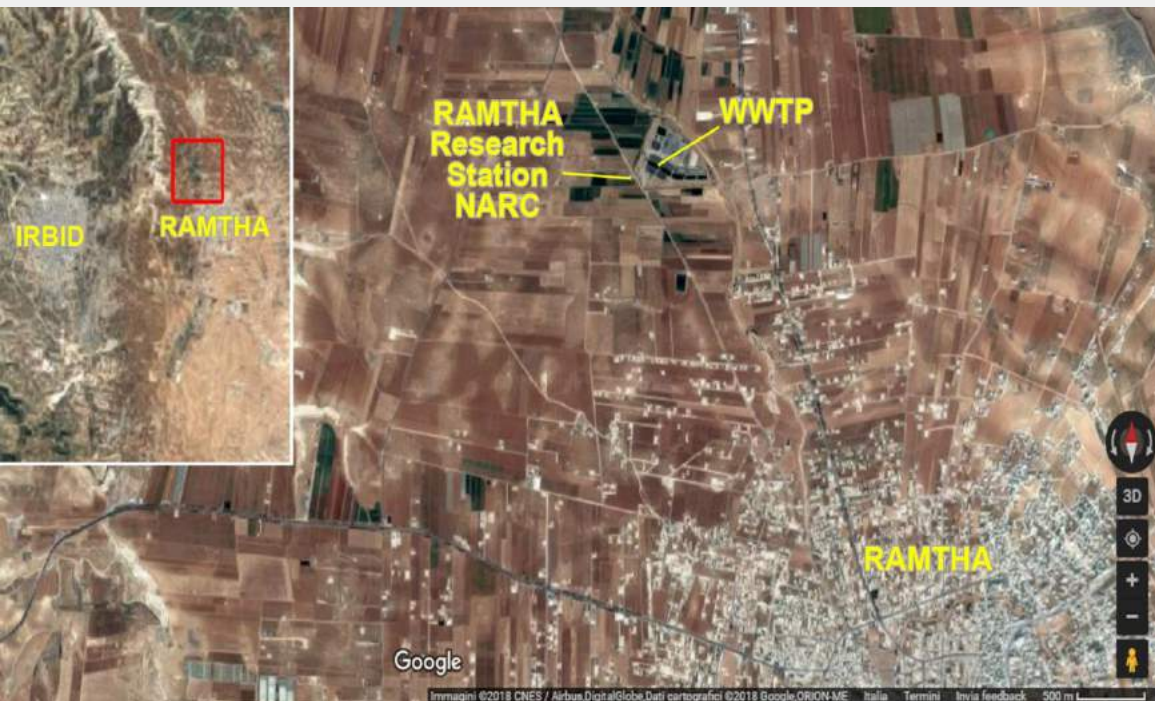
❖ Maturation pond ($V = 1000 \text{ m}^3$; depth = 1 m)

Living lab



FIELD LABS

RDAN (1)



Living lab



AMTHA-JORDAN



Aeration tanks



Polishing ponds



Sludge drying beds



Rock filters-microalgae removal



Disinfection- Chlorination channel

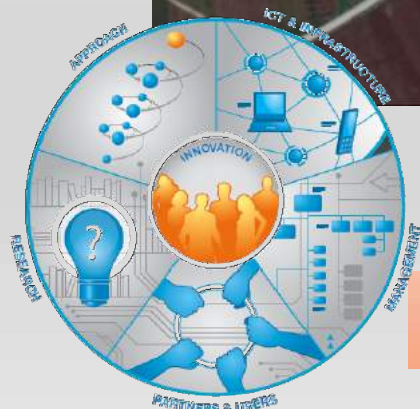
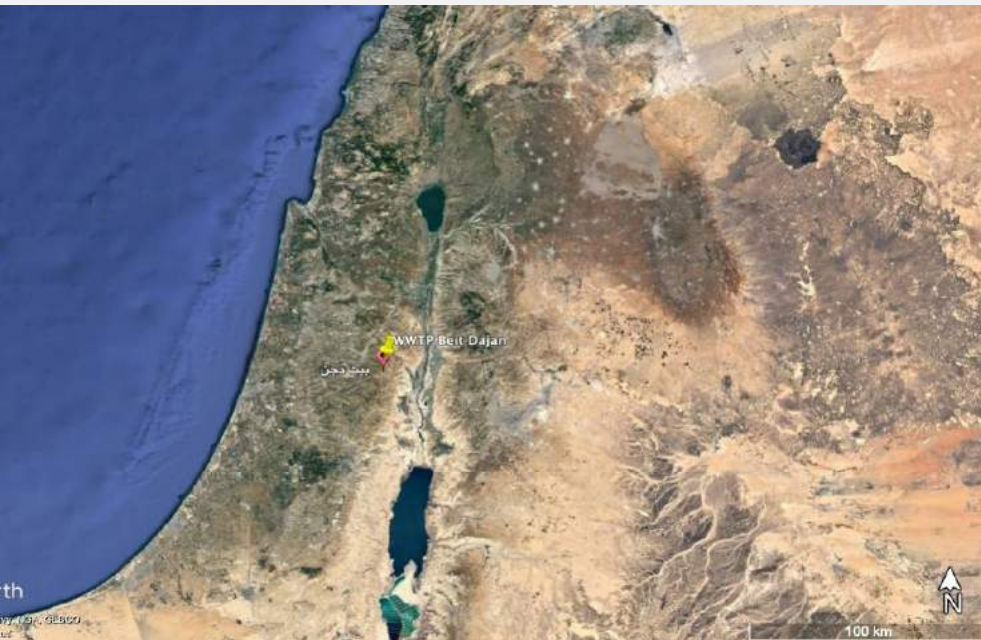
AMTHA-JORDAN

The treatment system to be implemented is a post-treatment train to the existing storage tank, based on filtration process using pressurised sand filters, subsequent disinfection stage by application of ultraviolet radiation and maintenance disinfection by sodium hypochlorite.



FIELD LABS

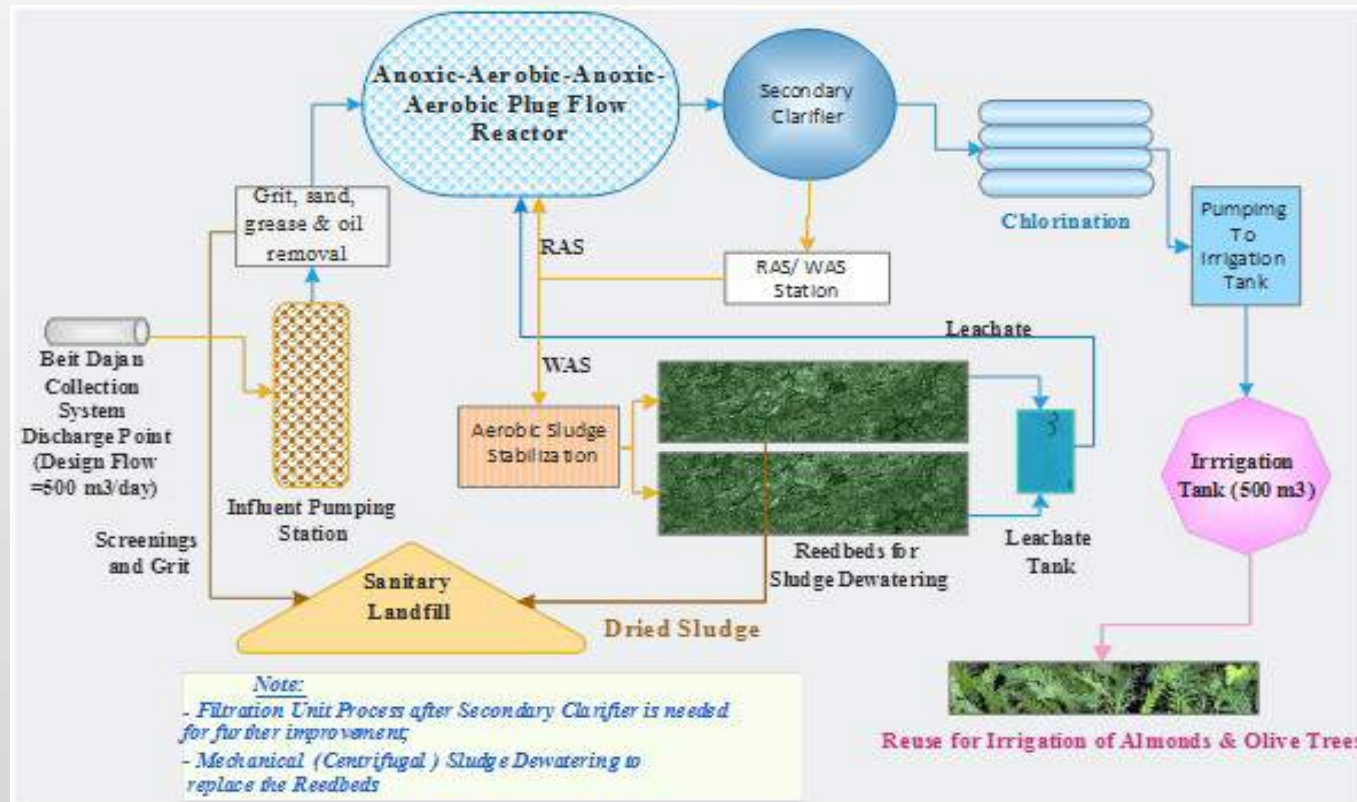
PALESTINE (1)



Living lab

FIELD LABS

BIT DAJAN- PALESTINE



- Conventional activated sludge
- Reed beds for sludge dewatering, and
- Disinfection by sodium hypochlorite



activated sludge tank



chlorination



Reed beds for sludge dewatering

IT DAJAN- PALESTINE

The treatment system to be implemented is a post-treatment train to the existing storage tank, based on filtration process using pressurised sand filters, subsequent disinfection stage by application of ultraviolet radiation and maintenance disinfection by adding sodium hypochlorite.

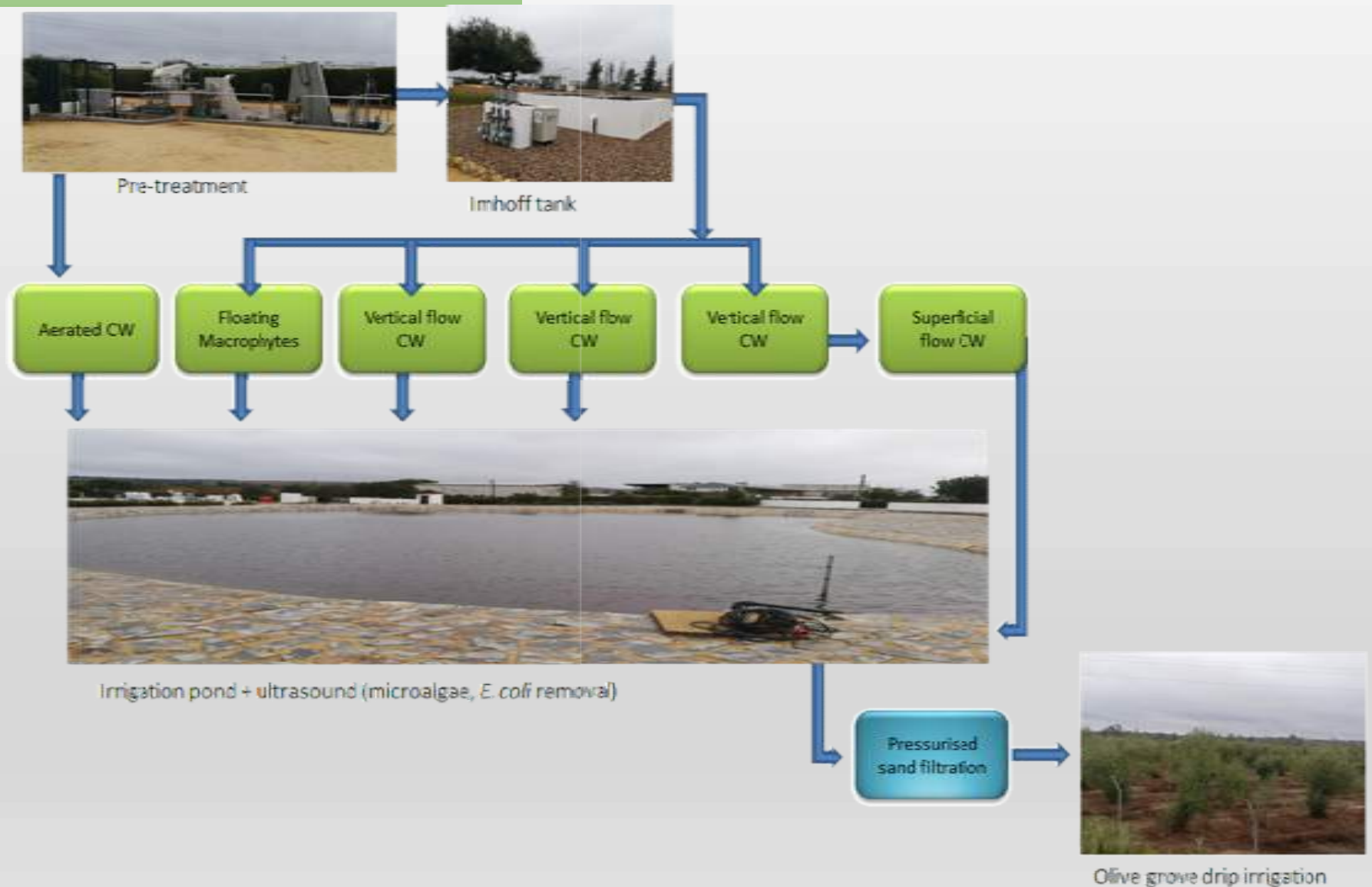


CARRIÓN DE LOS CÉSPEDES-SPAIN

- Location: Experimental Center of Carrión de los Céspedes- Seville
- Low-cost treatment train for olive trees irrigation



ARRIÓN DE LOS CÉSPEDES-SPAIN



FIELD LABS

ARBOREA-ITALY



Living lab



Managed Aquifer Recharge (MAR) technique based on Forested Infiltration Areas (FIA) will be tested as best practice to mitigate the groundwater nitrate contamination for the sandy phreatic aquifer of Arborea (central-western Sardinia, Italy).

The designed FIA system will be implemented in an area of around 0.4 ha and supplied with MAR (drainage water), pumped from an existing dewatering pumping station.

Six parallel recharge trenches placed between rows of white poplar trees (*Populus alba*) and equipped with an innovative Passive Treatment System consisting of a mixture of inert and organic materials to attenuate organic and inorganic contamination and to prevent clogging processes at the infiltration surface.

TARGET GROUPS OF MENAWARA

- ❖ Farmer households living in the different intervention areas using TWW to irrigate olives trees, fodders and ornamental and fruits plants
- ❖ Technicians from local institutions
- ❖ Relevant local and national authorities involved in inter --/regional Roundtables

“Women are the most vulnerable in fragile agricultural systems. Building women resilience through the proper reuse of better quality treated wastewater is one of MENAWARA challenging objectives”

Alessandra Paulotto

Project manager of MENAWARA - Italy

#IWD2021

#WOMED



Thank you!

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