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INTRODUCTION

The Mediterranean region is characterised by limited and irregular availability of water resources in both time and space. Climate change and drought events, in a context where water consumption in some places already exceeds the depletion of renewable water resources (WWAP, 2017), will make the region, and its agricultural sector, that already accounts for more than 80% of the total consumption (Masia et al, 2018), even more vulnerable in the near future (Bucak et al, 2017).

Non-conventional water resources (treated wastewater and desalted water) can contribute to compensate the gap between available and needed water, and provide regular water supply throughout the year (Damanía et al, 2017). Exploitation of these water resources in a safe and sustainable manner could bring significant benefits for the whole Mediterranean region. However, high treatment costs, possible negative effects on human health and the environment, and low public acceptance can hinder and restrict the safe usage of both treated wastewater and desalted water. FIT4REUSE will contribute to tackle these challenges by providing sustainable solutions that are fit for the local scenarios. This 3-year project was funded by the Prima foundation and started on 1st July 2019.

OBJECTIVE

The main objective of FIT4REUSE is to provide safe, locally sustainable and accepted ways of water supply for the Mediterranean agricultural sector by exploiting non-conventional water resources, namely treated wastewater and desalted water. In particular, FIT4REUSE will focus on innovative treatment technologies and on the use of non-conventional water resources in agriculture and for aquifer recharge.

PARTNERS

Inclusion of partners from different areas of the Mediterranean region (Figure 1) will enable FIT4REUSE to conduct high-quality collaborative research and to produce substantial results on a regional scale that fit local scenarios. The FIT4REUSE consortium members are representative of the different realities in the Mediterranean area - 5 research partners (UNIBO, UNIVPM, NTUA, ISSBAT, ITUNOVA) will be complemented with 3 SMEs/industrial partners (MEKOROT, BIOAZUL, ECOFIALE) and one governmental organisation (ISPRA).

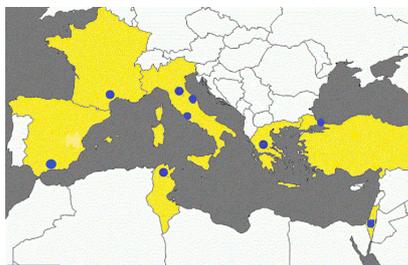


Figure 1 - FIT4REUSE partners and participating countries.

CONCEPT

The overall concept and rationale of FIT4REUSE (Figure 2) are identified with the three main pillars of the project: i) innovation of treatment technologies, ii) application of non-conventional water resources in simulated/relevant environment, and iii) assessment and regulation. The entire project will be divided into nine interrelated Work Packages (WPs).

The innovation pillar will concentrate on enhancement of nature-based solutions (NBSs) [WP2], intensive wastewater treatment technologies integrated with the use of nanotechnology [WP3] and optimisation of desalination and brine treatment technology that will reduce treatment costs and energy consumption [WP4]. WP5 will represent an umbrella that will incorporate developments of WP2, WP3 and WP4 into a unique and integrated strategy in order to achieve the required quality of non-conventional water resources for agricultural reuse and aquifer recharge. The data obtained for both wastewater treatment and desalination will be used to provide a simple and easy-to-use modelling platform in order to cover a wider range of scenarios and conditions than those relative to the experimental part.

Once a suitable water quality is achieved, the application pillar will study its use in irrigation, fertigation and aquifer recharge, as direct and indirect water reuse schemes [WP6]. Different drip irrigation systems and practices will be tested to prevent and decrease emitter clogging, avoid any adverse health effect on farmers and consumers, and reduce soil degradation and nutrient leaching.

The application pillar will also concentrate on aquifer recharge with treated municipal wastewater, in order to find the best way to preserve aquifer quality and its ecological balance. Moreover, considering the potential danger that non-conventional water resources can present, guidelines for water reuse safety (risk management) planning in the Mediterranean area will also be developed.

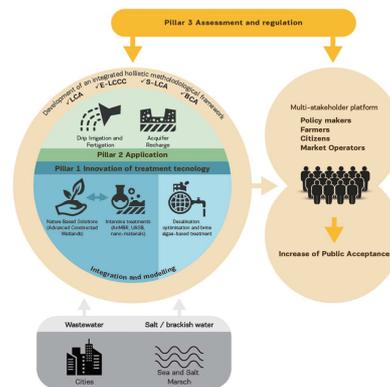


Figure 2 – Overall FIT4REUSE concept.

The assessment and regulation pillar will assess the sustainability of the entire water reuse value chain to identify hotspots and different scenarios to improve the sustainability of the diverse treatment and application systems. In addition, it will identify and evaluate the relevance of the factors driving community to alternative water resources application. This activity will be performed by a specific holistic methodological framework, taking into account environmental, social, and economic aspects [WP7]. A special focus will be given to the exploitation of FIT4REUSE results to develop scenarios that will inform and actively involve different stakeholders, and increase public acceptance of non-conventional water resources [WP8].

The project will be supported by the project management and coordination plan [WP1] and a strong dissemination and communication strategy [WP9].

IMPACT

Overall, since FIT4REUSE aims to provide regular, sustainable and safe water supply in agriculture, it will have a tangible positive impact on society, economy and environment.

- Assessed and validated FIT4REUSE treatment prototypes fit for the increasing quantity, quality and safety of non-conventional water resources
- Production of reclaimed water through FIT4REUSE technologies in the Med area
- Increase of SAT system overall efficiency
- Demo-sites in consortium countries with FIT4REUSE technologies up-scaled
- The Guidelines for practitioners diffused in the Med area
- Water Reuse (Risk Management) Safety Plan for regions of the Mediterranean basin
- Wastewater use agreements among the most important stakeholders
- New/updated policies or regulatory instruments on wastewater reuse in the Med area

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CONTACT

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