

DESERT

Low-cost water DEsalination and SEnsor Technology compact Module

Irrigated agriculture is the primary user of water in Europe and is a very competitive economic sector of the European Union. Almost the 46% of the region's population lives in places (almost nine European countries), which are water-stressed. Moreover, in Europe also the problem of water quality degradation of surface and groundwater bodies has received great interest because of the excessive use of mineral fertilizers in agriculture. Nowadays, water scarcity regions require innovative and sustainable research approaches, to enhance the use of non-conventional water sources in agriculture as a component of effective water conservation strategies. Nevertheless, irrigated agriculture in many areas in the world operates with complete disregard to the basic principles of resource conservation and sustainability practices. In this contest, implementing such a strategy is a key factor for sustainable use of limited water resources.

The use of non-conventional water resources means that it is necessary to take into account some critical aspects. In the Mediterranean Region, these sources usually may contain essential nutrients, beneficial for crop growth, but also salts, toxics ions and compounds, which can accumulate in soil and crops over time, compromising soil quality and reducing yields. Effective technologies for reducing salt concentrations in these water sources and for monitoring of nutrient concentrations, to be taken into account into fertilizer plans, represent crucial points to enable the reuse in agriculture.

The present project proposal, with participating partners from Italy, Spain and Belgium, addresses these issues and is in line with the topics of this call, by proposing an innovative water desalination and sensor technology compact module for continuously monitoring water quality and nutrient content. The effectiveness of these solutions will be tested by means of sustainability assessment, energy and cost efficiency of the system. DESERT technology, in order to contrast water scarcity and increase the water quality, looks for increase energy savings keeping part of the nutrients and using solar energy to treat the non-conventional water. The water value as a scarce resource will be evaluated by combining water characteristics, soil and climate features with environmental impacts and energy efficiency indicators in the crop-water function model.