

Thematic area

Water Management



Section II

Topic - Management of low quality waters under water scarcity and climate change conditions



Budget

991,800,00 €



Duration

36 months



Coordinating country

Germany

Participating countries/ 4



Research Units/ 6



Project 5/ Section II

SmaCuMed

Smart irrigation cube for sustainable agriculture in the Mediterranean region

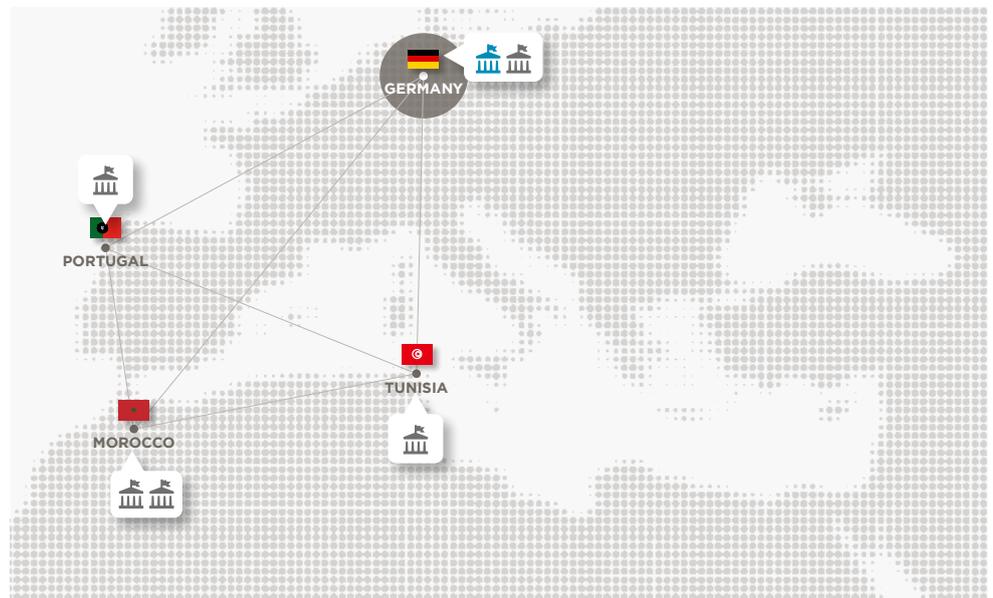
Context

Morocco, as many other Mediterranean countries, is facing severe water scarcity which is aggravated in near future by climate change. The country is a typical representative of other North African countries, where the agricultural sector is of particular strategic importance. In Morocco it accounts for 14 to 20% of the GDP and represents 78% of rural employment. In water-scarce Morocco, irrigation in agriculture plays a fundamental economic and social role. However, water scarcity represents a growing challenge for farmers since conventional water resources such as surface and non-saline groundwater cannot supply sufficient water for future agriculture. Therefore, alternative water sources such as saline groundwater have to be addressed to ensure sufficient water for irrigation. Morocco now has a known yearly potential of 497 million m³ brackish groundwater resources with salinity up to 16 g/L which could be tapped and turned into irrigation water by desalination.

Objectives

SmaCuMed will follow an integrated approach by providing a sustainable, innovative, cost effective and robust solution for groundwater desalination in the field of smart irrigation, which represents an important economic sector for the future of the Mediterranean region. It will contribute to raising awareness and create acceptance among the population, local and regional authorities on the urgency of tackling the environmental impacts of climate change on future crop productivity. The innovative core of the project is to develop and test on pilot-scale in rural Morocco an all-in-one smart irrigation cube system based on novel desalination technology (capacitive deionisation, CDI) combined with low-pressure reverse osmosis (RO).

The use of solar power allows the energy autonomous treatment of brackish groundwater, while supplying smart-sensor controlled irrigation in remote agri-



Coordinating institution

Karlsruhe University of Applied Sciences - PU



Hochschule Karlsruhe
Technik und Wirtschaft
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cultural Mediterranean regions using the example of date palms, olives and argan trees. The project will start at TRL 4 and achieve a TRL 7 by the end of the project.

Expected impacts

The SmaCuMed project will:

- increases agricultural area compared to current area due to tapping and desalination of brackish groundwater;
- reduces the irrigation rate and avoids over-extraction and over-salinization by using real-time water metering as well as IoT based soil moisture and conductivity sensors;
- contributes to reduced CO₂ emission compared to current fossil fuel powered water pumps due to use of solar energy to drive the process;
- contributes to capacity building through training, workshops and exchange of best practices, lessons learned and experiences;
- helps particularly female farmers engaged in growing cash crops to increase production and potentially enhance economic security and to make significant improvements in the social, economic and political conditions;
- support to launch spin-off technology companies run by graduates from University partners.

