Thematic area

Farming Systems

Section I

Topic - Sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture

Type of Action

IA - Innovation Action

Budget

1.556.500,00 €

Duration

48 months

Coordinating country

Spain

Participating countries/ 3

Research Units/ 4

of which **1 SME**

Project 9/ Section I

HortiMED

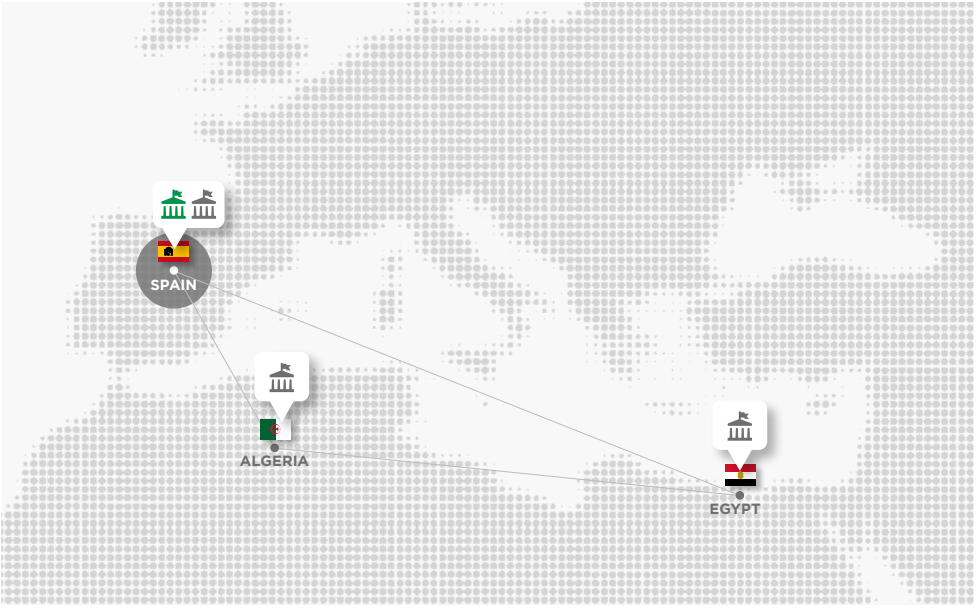
Towards circular horticulture: closing the loop on Mediterranean greenhouses

Context

In the Mediterranean Basin, the world's most important vegetable production area, the area under protected cultivation has been rapidly developed in the last decades. Nevertheless, there is an urgent need for technological updating of greenhouse industry to face the increasing competition arising from globalisation of both production and marketing; and to minimize the environmental impacts reported by intensive horticulture (discharge of nutrients and growing eutrophication trends, intensive water & energy use, excessive pesticide use, etc.)

Objectives

HortiMED is driven by the requirements of the Mediterranean horticultural communities, the increased competition and urgent need for technological update, climate-related constrains and the ever-growing food demand. The aim of HortiMED is to provide farmers with innovative tools to enable resource efficient year round greenhouse cultivation by harnessing the potential of both simple and advanced technologies for smart nutrient, irrigation and climate control, and integrated pest management taking into account their feasibility and cost-effectiveness at individual greenhouse level. HortiMED's approach pivots around 2 main axes: 1 - enabling smart greenhouse management through a Decision Support System (DSS) that integrates sensors, smart algorithms, efficient greenhouse control procedures and applies artificial intelligence techniques for enhanced adaptive greenhouse management; and 2 - increasing circularity of horticulture by using biological agro-ecological technologies to close the loop in Mediterranean greenhouses through aquaponics. The core of HortiMED will be a user-friendly and flexible DSS capable of delivering: Expert advisory services to help farmers in intensive knowledge tasks where climatic, crop and nutrient variables decisively influence crop growth and productivity (i.e. integrated pest management, precise water and fertilisers' needs); and Efficient and cost-effective partial or full automation of greenhouse systems. HortiMED DSS will handle a wide range of heterogeneous data and will apply Artificial Intelligence techniques to continuously learn



Coordinating institution

INKOA SISTEMAS S.L. - SME

Scientific Coordinator:
IBAÑEZ, Nora

from historical databases to forecast production yields and expected greenhouse conditions, allowing to develop enhanced adaptive smart algorithms for climate, irrigation and nutrient control and automation. HortiMED technologies will be validated in low, medium and high technology greenhouses from Egypt, Algeria and Spain to demonstrate their economic feasibility and environmental sustainability.

Expected impacts

HortiMED will equip farmers with innovative and cost-effective tools for year round resource efficient production of high quality horticultural and fish products, contributing to the rational management of water and to the development of sustainable farming systems in the Mediterranean area, thereby helping Mediterranean countries in the implementation of Agenda 2030 by contributing to several Sustainable Development Goals (SDG), like increasing the proportion of agricultural area under productive and sustainable agriculture (SDG#2-2.4.1), and fighting eutrophication trends and associated Biochemical oxygen demands in rivers (SDG#6 - 06.21), among others.
TRL- Starting point: TRL 5 Final point: TRL 7

SPECIFIC OBJECTIVES

- To develop and test a user-friendly and flexible Decision Support System allowing smart nutrient, irrigation & climate control, and IPM in greenhouses through: i) Expert advisory services to help farmers in intensive knowledge tasks where climatic, crop and nutrient variables decisively influence crop growth and productivity (precise water & fertilisers' needs, efficient climate control...); and ii) Efficient and cost-effective partial or full automation of greenhouses.
- To demonstrate the potential of biological agro-ecological technologies to close the loop in Mediterranean greenhouses by validating aquaponics systems based on the combination of Integrated MultiTrophic Aquaculture and hydroponics to deliver high quality Mediterranean horticultural and fish products with improved water and nutrient use efficiency.
- To provide farmers with tools for environmentally friendly IPM by testing bio-based pest management tactics for effective pest control in horticultural greenhouses.
- To validate HortiMED technologies in low, medium and high technology greenhouses from Egypt, Algeria and Spain and conduct a socioeconomic and environmental analysis of the technologies.
- To achieve an effective transfer of the project results and to successfully embed HortiMED results into local farming systems.