



HortiMED Towards circular horticulture

Closing the loop on Mediterranean greenhouses



HortiMED Project (Grant Number 1915) is part of the PRIMA programme supported by the European Union



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GENERAL INFORMATION



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| Title | Towards circular horticulture: closing the loop on Mediterranean greenhouses |
| Location | Spain, Egypt and Algeria |
| Duration | 48 months |
| Start date | 01/03/2020 |
| End date | 29/02/2024 |
| Total budget | 1.750.000 EUR |
| PRIMA contribution | 1.556.500 EUR |
| Grant Agreement | 1915 |
| Programme | PRIMA H2020-Section 1 |
| Website | www.hortimed-prima.eu |
| Social media | @hortimedPRIMA |



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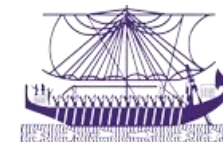
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BACKGROUND



- ✓ **Irrigation demands in the Mediterranean region are projected to increase** between 4 and 18% by the end of the century due to climate change alone; while population growth and increased demand, may escalate these numbers to 22-74%.
- ✓ **Food products, crop and fish yields are projected to decline** in many Mediterranean areas due to climatic and other stress factors.
- ✓ **Urgent need for technological updating of greenhouse industry** to:
 - face the increasing competition arising from globalisation
 - minimize the environmental impacts (e.g. discharge of nutrients and growing eutrophication trends, intensive water use, excessive pesticide use...)

Optimal greenhouse management is required **to ensure unrestricted growth** at a yield close to the maximum potential, **while minimizing unsustainable exploitation of resources**, especially energy, soil & water.



OVERALL OBJECTIVE

To provide the Mediterranean horticultural community 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 & climate control, and integrated pest management taking into account their feasibility and cost-effectiveness at individual greenhouse level.

SPECIFIC OBJECTIVES

SO1- To develop and test a user-friendly and flexible Decision Support System (DSS) allowing **smart nutrient, irrigation & climate control, and integrated pest management** in greenhouses through:

- ✓ 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...)
- ✓ Efficient and cost-effective partial or full automation of greenhouses (fertigation, ventilation, heating, etc.)

HORTIMED OBJECTIVES



SO2- 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 IMTA and hydroponics to deliver high quality Mediterranean horticultural and fish products with improved WUE and NUE.

SO3- To provide farmers with tools for **environmentally friendly integrated pest management** in horticultural greenhouses by testing bio-based pest management tactics for effective pest control in horticultural greenhouses.

SO4- 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 through Life Cycle Assessment and Cost-Benefit analyses.

SO5- To achieve well-targeted communication and **effective transfer of the project results** to stakeholders to successfully embed the HortiMED results into local horticultural community systems



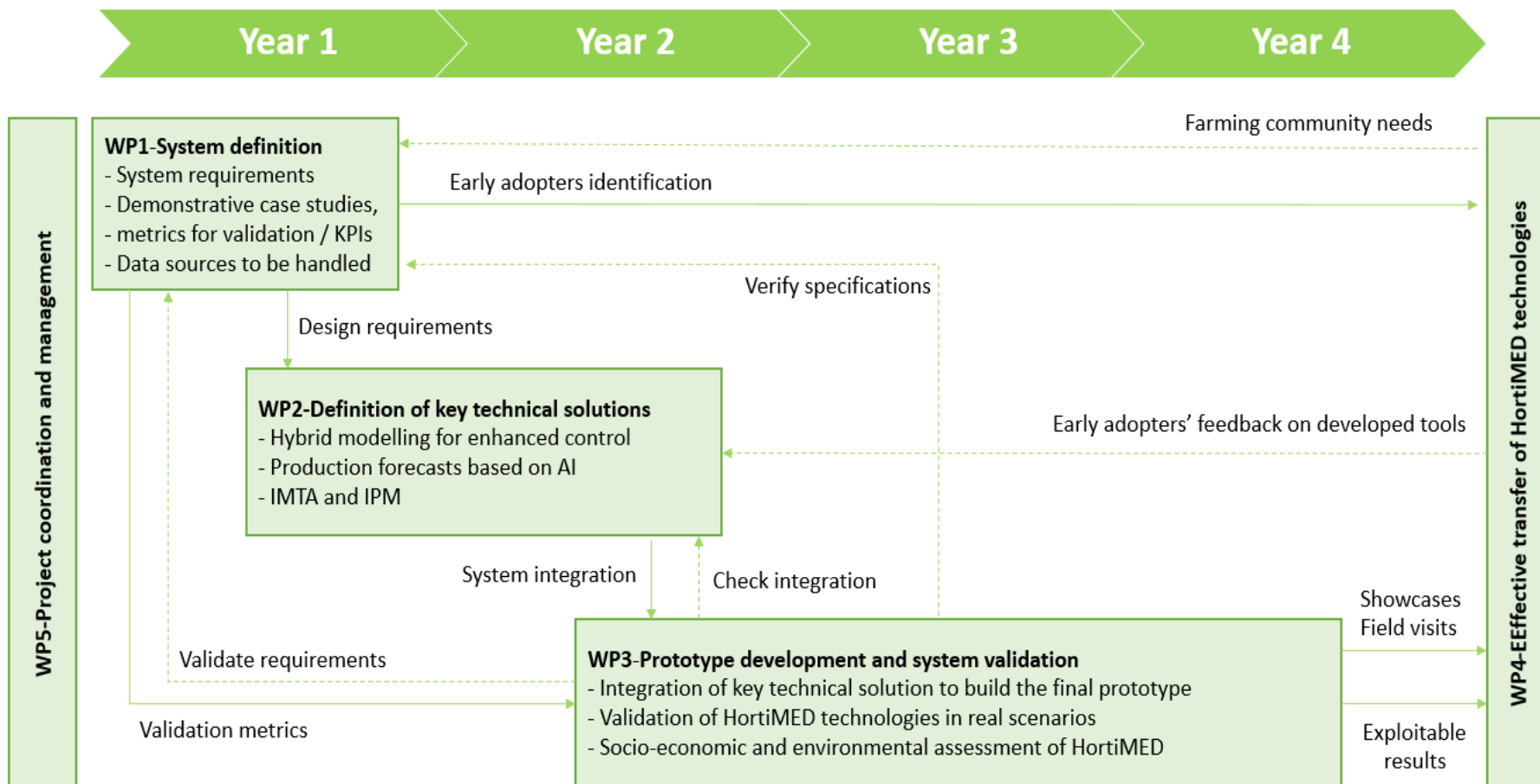
HORTIMED TARGET AUDIENCE



| | |
|--|---|
| Agricultural & aquaculture producers | This group represents the potential end-users of the developed systems. |
| Intermediate Users – Agricultural Associations | They act as a bridge to farmers and to R&D and to Governmental Institutions and have a key role as essential enablers to scale up corporate action on sustainable development and to transfer technology to industry. |
| Scientific and research groups | This group will allow the further exploitation of the obtained results for scientific and societal purposes |
| Greenhouse technology providers & environmental service providers | The successful promotion of the sustainability and natural resources savings requires experts that provide advice and technical assistance to companies for the implementation of the necessary methodologies and technologies. |
| Legislators / Standardization bodies | By legislators reference is made to the agencies supporting the implementation of management of water, land, ecosystem protection and food production in the Mediterranean area. |
| Consumers / Civil Society | The Sustainable Development provides principles for communicating environmental performance, such as transparency, reliability, and clarity. This will enable general public to take better informed purchasing decisions. |



HORTIMED WORKPLAN



HORTIMED-EXPECTED IMPACTS



INNOVATIONS DEVELOPED ENABLING SUSTAINABLE AND EFFICIENT AGRICULTURE AND FOOD SYSTEMS

- ✓ Automatic control system for the management of aquaponics and hydroponics
- ✓ AI-based software platform for smart monitoring of greenhouses
- ✓ IMTA aquaponics for water and nutrient efficient fish and crop production
- ✓ Hybrid modelling for smart greenhouse control

INCREASED COMPETITIVENESS OF MEDITERRANEAN FARMERS

- ✓ Reduction of production costs by 5% thanks to improved WUE, NUE and EUE
- ✓ 200 agricultural stakeholders trained in resource efficient practices to integrate Resource Efficiency & Circular Economy principles into their businesses



HORTIMED-EXPECTED IMPACTS



IMPROVED RESOURCE EFFICIENCY AND INCREASED CIRCULARITY

- ✓ Water Use Efficiency-WUE ($m^3/m^2/kg$) improved by 15%
- ✓ Nutrient Use Efficiency-NUE (kg of fertilizer/ m^2/kg) improved by 10%
- ✓ Energy Use Efficiency-EUE (Kwh/ m^2/kg) improved by 10%
- ✓ Reduction of chemical pesticides use by 5%
- ✓ Feed Conversion Ratio improved by 10% in IMTA system
- ✓ Net aquatic species biomass production in IMTA system increased by 15%

REDUCTION OF ENVIRONMENTAL IMPACTS

- ✓ Reduced pollution from nitrate and phosphorus leaching thanks to precise fertiliser applications
- ✓ Minimized greenhouse gas emissions thanks to optimized fertiliser applications and minimised energy use
- ✓ Reduction of chemical pesticides residues in food, soil & water



THANK YOU!

شكرا Shukraan

Merci Gracias



<http://hortimed-prima.eu>



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