



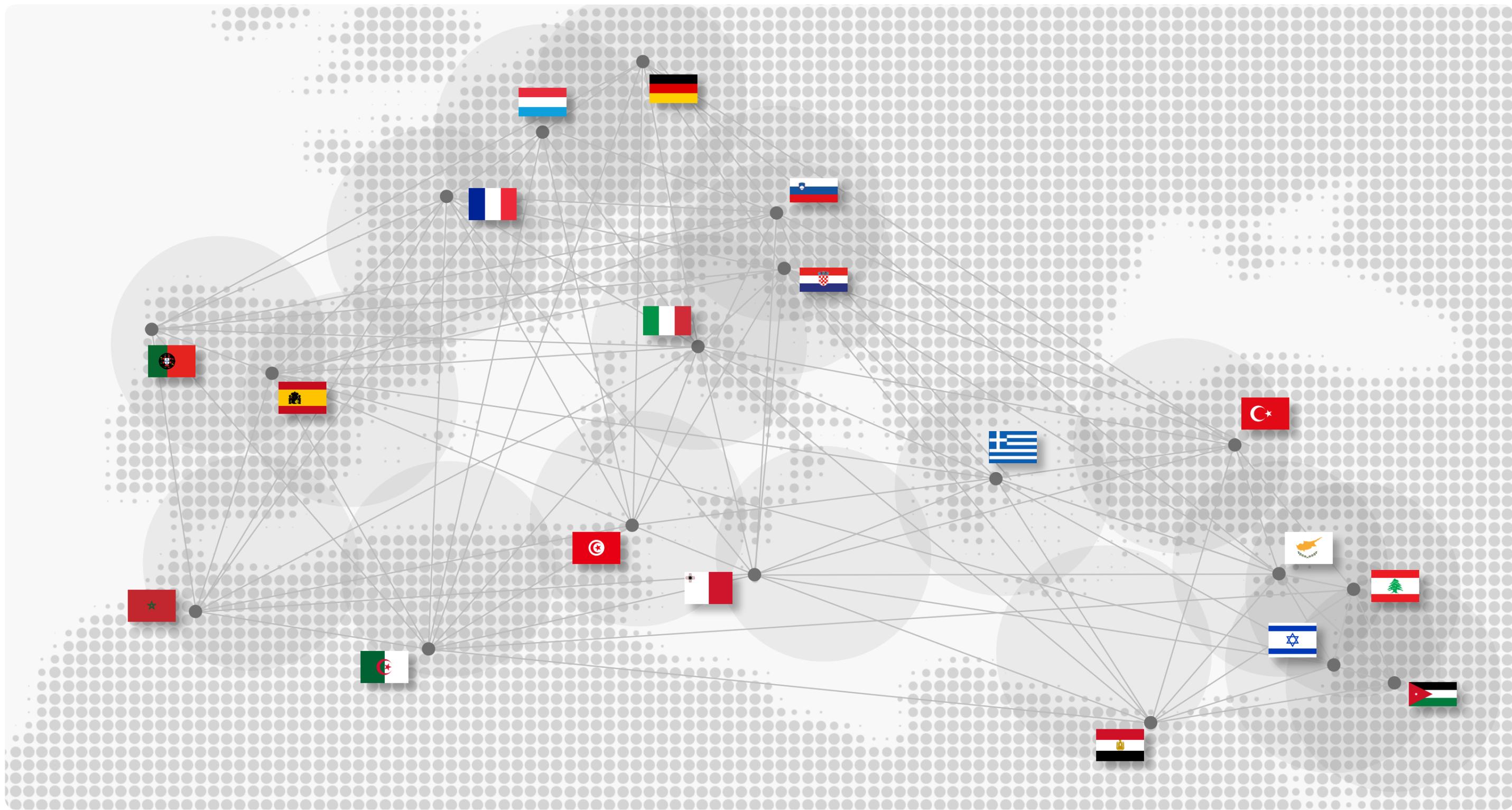
**PRIMA**

PARTNERSHIP FOR RESEARCH AND INNOVATION  
IN THE MEDITERRANEAN AREA

Funded Projects 2018



Funded Projects 2018



**Portugal**

FCT  
Fundação para a Ciência e a Tecnologia

**Spain**

CDTI  
Centro para el Desarrollo Tecnológico Industrial  
@CDTIoficial

**France**

ANR  
AGENCE NATIONALE DE LA RECHERCHE

**Luxembourg**

Luxembourg National Research Fund

**Germany**

Federal Ministry of Education and Research

**Slovenia**

REPUBLIC OF SLOVENIA  
MINISTRY OF EDUCATION, SCIENCE AND SPORT

**Greece**

GSRT  
GENERAL SECRETARIAT FOR RESEARCH AND TECHNOLOGY

**Turkey**

TÜBİTAK

**Lebanon**

CNRS  
National Council for Scientific Research

**Cyprus**

RESEARCH & INNOVATION FOUNDATION

**Morocco**

Royaume du Maroc  
Ministère de l'Éducation Nationale, de la Formation Professionnelle, de l'Enseignement Supérieur et de la Recherche Scientifique

**Algeria**

RSdT  
Ministère de l'Enseignement Supérieur et de la Recherche Scientifique  
البحث العلمي في خدمة المواطن

**Tunisia**

Tunisian Republic  
Ministry of Higher Education and Scientific Research  
Directorate General of Scientific Research

**Italy**

MINISTERO DELL'ISTRUZIONE DELL'UNIVERSITÀ E DELLA RICERCA

**Malta**

Xjenza  
The Malta Council for Science & Technology

**Croatia**

REPUBLIC OF CROATIA  
Ministry of Science and Education

**Egypt**

Academy of Scientific Research and Technology  
STDF  
مركز تطوير العلوم والتكنولوجيا  
Science and Technology Development Fund

**Israel**

רשות החדשנות  
Israel Innovation Authority  
ISEARD  
מסגרת ישראל-אירופה ל-B&I  
Israel-Europe R&I Directorate

**Jordan**

Ministry of Higher Education and Scientific Research  
Scientific Research Support Fund

The current document has been prepared and realized by the PRIMA Foundation, which is the ad-hoc legal entity responsible for the implementation of the PRIMA Initiative.

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*“The large participation of researchers from across the Mediterranean in the PRIMA Calls for Proposals 2018 – **Angelo Riccaboni** Chair PRIMA Foundation – proves the very promising start of the initiative and confirms the relevance of such partnership in enhancing the alignment of national and regional research and fostering the adoption of sustainable solutions also in the frame of Agenda 2030. A special thank shall be addressed to the 19 States Representatives, the European Commission and those that have worked so intensely to achieve such remarkable result.”*



*“The European Union and the Mediterranean Partner countries have been cooperating closely for many years as partners in the areas of education, science and research. The pillars for the success of this long-standing scientific cooperation are mutual respect, common goals and values and the ramifications are immense. PRIMA, as a long-term initiative and of one the fruits of this cooperation, also plays a significant role in terms of Scientific Diplomacy and socio-economic development for the Mediterranean area. We should be proud of the progress we have made so far while reminding ourselves that we need to further enhance our partnership to address current and future challenges in a rapidly changing world”, adds **Mohamed El-Shinawi** Co-Chair PRIMA Foundation.*

## Foreword

The PRIMA Programme, characterized by a strong strategic dimension, the principle of equal footing among participating States and a distinctive geographical focus on the Mediterranean region, has recently completed the selection of the funding beneficiaries 2018. The first year of calls constituted a crucial achievement and, at the same time, the ideal starting point for a positive continuation.

In 2018, the PRIMA Foundation launched its first calls for a total budget of around 48 million, targeting three main thematic areas: efficient management of water resources, farming systems and agro-food value chain. More than 840 applications were received, involving 5.400 both private and public partners from 23 different Countries. Each proposal were presented by a partnership composed by at least one research unit from both the Northern and Southern Med Countries, thus confirming the role of PRIMA in terms of Scientific Diplomacy.

After two stages of evaluation, conducted following the rigorous criteria of Horizon 2020 rules, 36 projects have been selected and the final beneficiaries will soon sign the grant agreements. Data show a significant participation of the private sector (up to 43% of the total funded projects), an encouraging percentage in terms of gender participation (30%), and a positive share of funds targeting South-East Med Countries (30%). The total budget for the calls of 2019 is 63 million. Besides, the Annual Work Plan 2020 is being prepared in view of boosting research and innovation as a driver for concrete solutions expected to generate direct impacts in an area - the MED region - heavily distressed by climate change, urbanization and population growth.

The purpose of the current document is to provide for an accurate overview of the results of PRIMA calls 2018, so to facilitate the communication and dissemination of the outcomes of the PRIMA funding activity. The document also proves how research and innovation can positively affect our societies. In its first part, the current booklet shows data related to the funded projects for each thematic area, the participating countries and the partners involved. In the second part, the different funded projects are illustrated with one-page detailed description.

The 36 PRIMA projects funded in 2018 and the ones that will follow in the coming years will contribute to build research and innovation capacities, strengthen innovation potentials and develop concrete solutions, to the benefit of communities, businesses and citizens and with the ultimate goal of creating sustainable and prosperous Mediterranean societies.

# **Calls Report PRIMA 2018**



# 36

## Funded Projects



# 18

## Participating Countries



**48,2 M€**  
Total funds



## Section I

### 9 Funded Projects

**17,9 M€** Funds



**Topic 1**  
Water reuse and water desalination for agricultural and food production



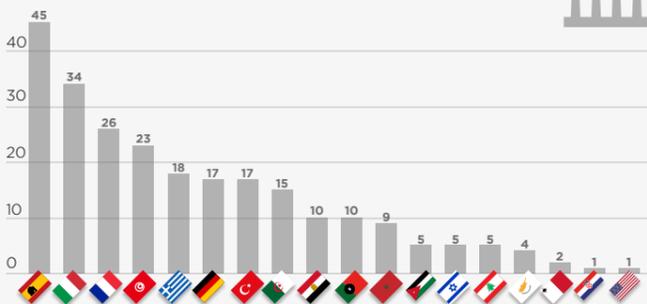
**Topic 2**  
Improving the sustainability of Mediterranean agro-ecosystems



**Topic 3**  
Implementing innovation in Mediterranean Agro-food Chains by smallholders and SMEs



## 247 Partners



## Section II

### 27 Funded Projects

**30,3 M€** Funds



**Topics**  
1.1 Water resources availability and quality within catments and aquifers  
1.2 Sustainable, integrated water management  
1.3 Irrigation technologies and practices



**Topics**  
2.1 Adaptation of agriculture to climate change  
2.2 Preventing and controlling emergence of animal and plant pests and diseases  
2.3 Developing farming systems able to generate income, to create employment and to contribute to a balanced territorial development



**Topics**  
3.1 Valorising food products from traditional Mediterranean diet  
3.2 Food safety in local food chains  
3.3 Implications of dietary shifts and sustainable diets for the Med populations and food industry



## Calls Report PRIMA 2018

## Funded projects per Section and Thematic area



**Section I** includes calls for proposals centrally organised by the PRIMA Foundation. The projects are evaluated, selected and funded according to the Rules for Participation of Horizon 2020 and are centrally managed by the PRIMA Foundation. Grant agreements are to be signed with the Foundation on the basis of the H2020 Model Grant Agreement. For 2018, EU funds amounted to 17,9 million euro.

Funded Projects	Countries	Partners	Funds
1/ <b>DSWAP</b> Decision support-based approach for sustainable water reuse application in agricultural production	Israel	2	
	Cyprus	2	
	Spain	2	2.000.000,00 €
	France	1	
	Germany	1	
	Italy	1	
	Portugal	1	
2/ <b>FIT4REUSE</b> SaFe and sustainable soluTIONS FOR the integRatEd USE of non-conventional water resources in the Mediterranean agricultural sector	Italy	3	
	France	1	2.020.000,00 €
	Greece	1	
	Israel	1	
	Spain	1	
	Tunisia	1	
3/ <b>WATERMED 4.0</b> Efficient use and management of conventional and non-conventional water resources through smart technologies applied to improve the quality and safety of Mediterranean agriculture in semi-arid areas	Spain	3	1.862.042,50 €
	Algeria	2	
	Germany	1	
	Turkey	1	
4/ <b>PLANT-B</b> A sustainable mixed cropping-beekeeping system in the Mediterranean basin	Greece	2	2.082.675,73 €
	Algeria	2	
	Egypt	2	
	Italy	2	
	France	1	
Spain	1		

**5/ SUPROMED**  
Sustainable production in water limited environments of Mediterranean agro-Ecosystem

Spain		2.030.000,00 €
Greece		
Lebanon		
Tunisia		
France		

**6/ SUSTAINOLIVE**  
Novel approaches to promote the SUSTAINability of OLIVE groves in the Mediterranean

Spain		1.913.450,00 €
Italy		
Greece		
Morocco		
Portugal		
Tunisia		

**7/ CAMELMILK**  
Boost the production, transformation and consumption of camel milk in the Mediterranean

France		2.000.000,00 €
Turkey		
Spain		
Algeria		
Germany		
Croatia		
Italy		

**8/ DAINME-SME**  
Dairy Innovation for Mediterranean SME

Spain		1.956.857,00 €
Italy		
Turkey		
Egypt		
France		
Tunisia		

**9/ MEDITOMATO**  
Bringing innovation and durability throughout the value chain of the Mediterranean tomato industry

Spain		1.999.380,50 €
Greece		
Germany		
Italy		
Tunisia		
Turkey		

**Section II** includes calls for proposals centrally organised by the PRIMA Foundation. Projects are evaluated and selected based on rules which are analogous to the Rules for Participation of Horizon 2020. Such activities are funded by the national funding bodies of Participating States. Grant agreements will be signed between participants and by relevant national funding bodies in accordance with national rules. For 2018, funds of Participating States amounted to 30,5 million euro.

Funded Projects	Countries	Partners	Funds
<b>10/ ALTOS</b> Managing water resources within Mediterranean agrosystems by accounting for spatial structures and connectivities	Tunisia France Lebanon Spain Italy Morocco	     	1.042.491,00 €  
<b>11/ CONSIRS</b> A novel Condensation Supported Greenhouse Irrigation System	Germany Algeria Egypt Tunisia	   	690.000,00 €  
<b>12/ INWAT</b> Quality and management of intermittent rivers and associated groundwaters in the Mediterranean basins	Spain Algeria Germany France Italy Jordan Tunisia Turkey	       	1.510.439,00 €    
<b>13/ KARMA</b> Karst Aquifer Resources availability and quality in the Mediterranean Area	Germany Spain France Italy Lebanon Tunisia	     	1.457.224,00 €    
<b>14/ MEDSAL</b> Salinization of critical groundwater reserves in coastal Mediterranean areas	Greece Germany Algeria Cyprus Italy Tunisia Turkey	      	1.268.000,00 €    



### 15/ MEDWATERICE

Precision Irrigation Management to Improve Water Use Efficiency in the Mediterranean Region



Italy				
Spain				
Portugal				1.426.208,00 €
Egypt				
Israel				
Turkey				



### 16/ PRECIMED

Precision Irrigation Management to Improve Water Use Efficiency in the Mediterranean Region



Spain				
Algeria				757.499,00 €
Greece				
Tunisia				



### 17/ Sustain-COAST

Sustainable coastal groundwater management and pollution reduction through innovative governance in a changing climate



France				
Greece				1.107.208,00 €
Germany				
Italy				
Tunisia				
Turkey				



### 18/ SWATCH

Strategies for increasing the WATER use efficiency of semi-arid Mediterranean watersheds and agrosilvopastoral systems under climate CHange



Italy				
Spain				
Algeria				1.390.397,00 €
Cyprus				
Egypt				
France				
Tunisia				



### 19/ ADAPT-HERD

Management strategies to improve herd resilience and efficiency by harnessing the adaptive capacities of small ruminants



France					
Tunisia					634.945,00 €
Egypt					
Spain					



### 20/ Blue-Med

A novel integrated and sustainable approach to monitor and control Bluetongue in the Mediterranean Region



Italy				
Egypt				687.283,00 €
France				
Tunisia				



### 21/ FREECLIMB

Fruit crops adaptation to climate change in the Mediterranean basin



Italy					
Algeria					
France					
Greece					1.680.950,00 €
Egypt					
Spain					
Morocco					
Tunisia					
Turkey					



### 22/ GeMed

Prevention and control of new and invasive geminiviruses infecting vegetables in the Mediterranean



France				
Italy				916.545,00 €
Jordan				
Morocco				
Tunisia				



### 23/ GENDIBAR

Utilization of local genetic diversity to understand and exploit barley adaptation to harsh environments and for pre-breeding



Italy				
Spain				
Algeria				1.266.367,00 €
Germany				
Egypt				
Tunisia				
Turkey				



### 24/ IMPRESA

IMProving RESilience to Abiotic stresses in durum wheat



Italy				
Algeria				715.238,00 €
Tunisia				
Turkey				



### 25/ INTOMED

Innovative tools to combat crop pests in the Mediterranean



Greece				
Tunisia				
France				812.338,00 €
Spain				
Morocco				
Portugal				



### 26/ LAGMED

Improvement of preventive Actions to emerging LAGoviruses in the MEDiterranean basin



France				
Spain				
Portugal				832.988,00 €
Algeria				
Italy				
Tunisia				

 <b>27/ Med-Berry</b> Developing new strategies to protect strawberry crop in Mediterranean countries		Italy 	1.264.011,00 € 
		France 	
		Spain 	
		Morocco 	
		Turkey 	
 <b>28/ SIMTAP</b> Self-sufficient Integrated Multi-Trophic AquaPonic systems for improving food production sustainability and brackish water use and recycling		Italy 	985.331,00 € 
		France 	
		Germany 	
		Malta 	
		Turkey 	
 <b>29/ VEG-ADAPT</b> Adapting Mediterranean vegetable crops to climate change-induced multiple stress		Spain 	2.016.695,00 € 
		France 	
		Greece 	
		Turkey 	
		Italy 	
		Germany 	
		Jordan 	
		Morocco 	
 <b>30/ ZeroParasitic</b> SaFe and sustainable soluTions FOR the integRatEd USE of non-conventional water resources in the Mediterranean agricultural sector		Greece 	1.322.500,00 € 
		Germany 	
		Egypt 	
		Spain 	
		Jordan 	
		Malta 	
		Morocco 	
		Tunisia 	
 <b>31/ ArtiSaneFood</b> Innovative Bio-interventions and Risk Modelling Approaches for Ensuring Microbial Safety and Quality of Mediterranean Artisanal Fermented Foods		France 	1.353.817,00 € 
		Portugal 	
		Algeria 	
		Greece 	
		Italy 	
		Morocco 	
		Spain 	
		United States 	
		Tunisia 	

 <b>32/ Boomerang</b> Healthier bio-fortified Mediterranean grains		Spain 	1.120.009,00 € 
		Egypt 	
		Italy 	
		Tunisia 	
		Algeria 	
 <b>33/ MED4YOUTH</b> Mediterranean Enriched Diet for tackling Youth Obesity		Spain 	1.028.480,00 € 
		Israel 	
		Italy 	
		Jordan 	
		Portugal 	
 <b>34/ MILKQUA</b> Milk quality all along the dairy chain for a sustainable MILK		Tunisia 	872.973,00 € 
		France 	
		Italy 	
		Spain 	
		Portugal 	
 <b>35/ SAFFRONFOOD</b> Valorisation of saffron and its floral by-products as sustainable innovative sources for the development of high added-value food products		Spain 	1.292.780,00 € 
		Algeria 	
		France 	
		Germany 	
		Italy 	
 <b>36/ VEGGIE-MED-CHEESES</b> Valorisation of thistle-curdled cheeses in mediterranean marginal areas		Italy 	959.750,00 € 
		Spain 	
		Greece 	
		Tunisia 	



 **12**
 **15**
 **9**

**Projects**  
per Thematic area





## ALGERIA

Funds/ 2.643.680,00 €



Partners	Projects	Section I	Section II
1 Institut National de la Recherche Agronomique d'Algerie		4/ <b>PLANT-B</b>	16/ <b>PRECIMED</b> 32/ <b>Boomerang</b>
2 Centre de Recherche Scientifique et Technique sur les Régions Arides			11/ <b>CONSIRS</b> 24/ <b>IMPRESA</b> 35/ <b>SAFFROMFOOD</b>
3 Ecole Nationale Supérieure Agronomique			21/ <b>FREECLIMB</b> 23/ <b>GENDIBAR</b>
4 University Oran 1		3/ <b>WATERMED 4.0</b>	31/ <b>ArtiSaneFood</b>
5 University of M'Hamed Bougara		4/ <b>PLANT-B</b>	
6 University of Djilali Bounaama Khemis Miliana		3/ <b>WATERMED 4.0</b>	
7 Université Freres Mentouri Constantine I			21/ <b>FREECLIMB</b>
8 University Batna 2			14/ <b>MEDSAL</b>
9 Université Ferhat Abbas Sétif 1			24/ <b>IMPRESA</b>
10 Université Mohamed Seddik Benyahia - Jijel, Univ-jijel			12/ <b>INWAT</b>
11 Université Abderrahmane Mira de Béjaia			35/ <b>SAFFROMFOOD</b>
12 Ministère de l'Agriculture et du Développement Rural - NARI		7/ <b>CAMELMILK</b>	
13 Ecole Nationale Supérieure Vétérinaire			26/ <b>LAGMED</b>
14 Ecole Nationale Supérieure d'Hydraulique			18/ <b>SWATCH</b>
15 Sarl Tedjane Laitiers		7/ <b>CAMELMILK</b>	

**15 Partners**

**6** **5** **4**



**15 Projects**  
involve one or more  
Algerian Partners



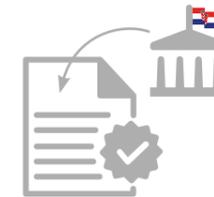
## CROATIA

Funds/ 125.000,00 €



Partners	Projects	Section I	Section II
1 Genius Consulting		7/ <b>CAMELMILK</b>	

**1 Partner**



**1 Project**  
involves 1 Croatian  
Partner



**Project**  
per Thematic area



## CYPRUS

Funds/ 504.918,00 €



Partners	Projects	Section I	Section II
1 Cyprus University of Technology			14/ <b>MEDSAL</b>
2 University of Cyprus		1/ <b>DSWAP</b>	
The Energy, Environment and Water Research Center - The Cyprus Institute			18/ <b>SWATCH</b>
4 S.K. Euromarket Ltd		1/ <b>DSWAP</b>	

**4 Partners**

**3**

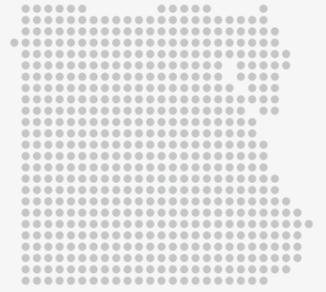


**3 Projects**  
involve one or more  
Cypriot Partners



## EGYPT

Funds/ 1.646.613,00 €



Partners	Projects	Section I	Section II
1 Agricultural Research Centre		4/ <b>PLANT-B</b>	15/ <b>MEDWATERICE</b> 21/ <b>FREECLIMB</b>
2 Ain Shams University			18/ <b>SWATCH</b> 23/ <b>GENDIBAR</b>
3 Heliopolis University			32/ <b>Boomerang</b>
4 Alexandria University			30/ <b>ZeroParasitic</b>
5 Cairo University			11/ <b>CONSIRS</b>
6 National Research Center			20/ <b>Blue-Med</b>
7 Animal Production Research Institute			19/ <b>ADAPT-HERD</b>
8 Food and Agro Industries Technology Center - FAITC		8/ <b>DAINME-SME</b>	
9 German-Arab Chamber of Industry & Commerce			32/ <b>Boomerang</b>
10 North South Consultants Exchange		4/ <b>PLANT-B</b>	

**10 Partners**

**3**

**6**

**2**

**Projects**  
per Thematic area



**11 Projects**  
involve one or more  
Egyptian Partners



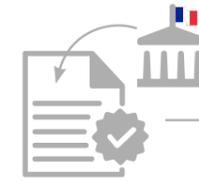
# FRANCE

Funds/ 5.227.264,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Institut National de la Recherche Agronomique - INRA	4/ <b>PLANT-B</b>		18/ <b>SWATCH</b> 21/ <b>FREECLIMB</b> 26/ <b>LAGMED</b> 27/ <b>Med-Berry</b> 29/ <b>VEG-ADAPT</b> 34/ <b>MILKQUA</b> 35/ <b>SAFFROMFOOD</b>
2 ANSES - Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail			20/ <b>Blue-Med</b> 26/ <b>LAGMED</b> 31/ <b>ArtiSaneFood</b>
3 Université de Montpellier			12/ <b>INWAT</b> 13/ <b>KARMA</b>
4 SEMIDE - Euro-Mediterranean Information System on know-how in the Water sector	5/ <b>SUPROMED</b>		17/ <b>Sustain-COAST</b>
5 Gautier Semences			22/ <b>GeMed</b> 29/ <b>VEG-ADAPT</b>
6 UMR Modélisation Systémique Appliquée aux Ruminants			19/ <b>ADAPT-HERD*</b>
7 UMR Laboratoire d'étude des Interactions Sol, Agrosystème, Hydrosystème - LISAH			10/ <b>ALTOS*</b>
8 Centre de Coopération Internationale en Recherche Agronomique pour le Développement - CIRAD			22/ <b>GeMed*</b>
9 Institut de l'élevage			34/ <b>MILKQUA*</b>
10 UMR Systèmes d'Élevage Méditerranéens et Tropicaux			19/ <b>ADAPT-HERD</b>
11 UMR Centre d'études spatiales de la biosphère			10/ <b>ALTOS</b>
12 Centre National Interprofessionnel de l'Economie Laitière			31/ <b>ArtiSaneFood</b>
13 International Camel Expertise, FAYE	7/ <b>CAMELMILK</b>		
14 Camel Idee	7/ <b>CAMELMILK</b>		
15 Chiffe Agro Industrie	7/ <b>CAMELMILK</b>		
16 APEXAGRI	7/ <b>CAMELMILK</b> 8/ <b>DAINME-SME</b>		
17 Ecofilae	2/ <b>FIT4REUSE</b>		
18 Office national de la chasse et de la faune sauvage			26/ <b>LAGMED</b>
19 UMR Laboratoire d'hydrologie et de géochimie de Strasbourg			17/ <b>Sustain-COAST</b>



of which



## 23 Projects

involve one or more French Partners

## 4 Projects

are coordinated by a French Partner

20	Activ'Inside		35/ <b>SAFFROMFOOD</b>
21	UMR - Sol Agro et hydrosystème Spatialisation		28/ <b>SIMTAP</b>
22	Lycée de la Mer et du Littoral à Bourcefranc le Chapus		28/ <b>SIMTAP</b>
23	UMR Génétique Physiologie et Systèmes d'Élevage		19/ <b>ADAPT-HERD</b>
24	CIREF Création Variétale Fraises Fruits Rouges		27/ <b>Med-Berry</b>
25	UMR PVBMT Peuplements Végétaux et Bio-agresseurs en Milieu Tropical		25/ <b>INTOMED</b>
26	UMR Laboratoire de Chimie Physique et Microbiologie pour l'Environnement		1/ <b>DSWAP</b>

**26**  
Partners

**7** **11** **5**  
Projects  
per Thematic area



# GERMANY

Funds/ 3.454.900,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Technische Universität Berlin			11/ <b>CONSIRS*</b>
2 Karlsruhe Institute of Technology			13/ <b>KARMA*</b>
3 Technical University Dresden		1/ <b>DSWAP</b>	
4 Universität Duisburg-Essen			12/ <b>INWAT</b>
5 University of Tübingen			30/ <b>ZeroParasitic</b>
6 University of Applied Sciences, Lübeck			14/ <b>MEDSAL</b>
7 German Institute of Food Technologies		7/ <b>CAMELMILK</b>	
8 Wuppertal Institute for Climate, Environment and Energy		9/ <b>MEDITOMATO</b>	
9 Fraunhofer Institute for Solar Energy Systems		3/ <b>WATERMED 4.0</b>	
10 Max Planck Institut für Pflanzenzüchtungsforschung			23/ <b>GENDIBAR</b>
11 GIRAF PM Services GmbH			32/ <b>Boomerang</b>
12 Leibniz Institute of Vegetable and Ornamental Crops			29/ <b>VEG-ADAPT</b>
13 Environment and Information Technology Centre			14/ <b>MEDSAL</b>
14 Max Rubner-Institut			35/ <b>SAFFROMFOOD</b>
15 Korolev GmbH			28/ <b>SIMTAP</b>
16 Helmholtz Centre for Environmental Research			17/ <b>Sustain-COAST</b>
17 Bundesanstalt für Geowissenschaften und Rohstoffe			13/ <b>KARMA</b>

**17 Partners**

**7** **4** **4**

Projects per Thematic area



of which



**15 Projects**  
involve one or more German Partners

**2 Projects**  
are coordinated by a German Partner



# GREECE

Funds/ 4.228.883,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Hellenic Agricultural Organization "Demeter"		6/ <b>SUSTAINOLIVE</b>	14/ <b>MEDSAL*</b> 21/ <b>FREECLIMB</b> 36/ <b>VEGGIE-MED-CHEESES</b>
2 University of Thessaly		5/ <b>SUPROMED</b>	16/ <b>PRECIMED</b> 25/ <b>INTOMED*</b>
3 Agricultural University of Athens			29/ <b>VEG-ADAPT</b> 30/ <b>ZeroParasitic</b> 31/ <b>ArtiSaneFood</b>
4 Benaki Phytopathological Institute - BPI		4/ <b>PLANT-B*</b>	30/ <b>ZeroParasitic*</b>
5 Technical University of Crete			17/ <b>Sustain-COAST*</b>
6 National Technical University of Athens - NTUA		2/ <b>FIT4REUSE</b>	
7 Democritus University of Thrace			24/ <b>INTOMED</b>
8 Center for Research and Technology-HELLAS, Information Technologies Institute			14/ <b>MEDSAL</b>
9 Future Intelligence Ltd		9/ <b>MEDITOMATO</b>	
10 Diadikasia Business Consulting S.A.		9/ <b>MEDITOMATO</b>	
11 Stayia Farm		4/ <b>PLANT-B</b>	
12 3DSA		5/ <b>SUPROMED</b>	
13 Institute of Plant Breeding and Genetic Resources, Dep of Deciduous Fruit Trees			21/ <b>FREECLIMB</b>
14 Agricultural Cooperative of Kalamata		6/ <b>SUSTAINOLIVE</b>	
15 Nileas Producers Group Company A.C.		6/ <b>SUSTAINOLIVE</b>	
16 Agroland SA			30/ <b>ZeroParasitic</b>
17 Agricultural Cooperative Notos			29/ <b>VEG-ADAPT</b>
18 Phytotheraptiki			25/ <b>INTOMED</b>

**18 Partners**

**4** **7** **3**

Projects per Thematic area



of which



**14 Projects**  
involve one or more Greek Partners

**5 Projects**  
are coordinated by a Greek Partner



# ISRAEL

Funds/ 977.989,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Agricultural Research Organization		1/ <b>DSWAP*</b>	
2 Fluence Corp.		1/ <b>DSWAP</b>	
3 Mekorot		2/ <b>FIT4REUSE</b>	
4 Shikma Field Crops			33/ <b>MED4YOUTH</b>
5 Netafim			15/ <b>MEDWATERICE</b>

**5 Partners**

**3** **1**

**Projects**  
per Thematic area



of which



**4 Projects**  
involve one or more  
Israeli Partners

**1 Project**  
is coordinated by  
a Israeli Partner



# ITALY

Funds/ 10.131.683,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Università degli Studi di Milano "La Statale"			15/ <b>MEDWATERICE*</b> 21/ <b>FREECLIMB*</b> 23/ <b>GENDIBAR</b> 27/ <b>Med-Berry</b> 28/ <b>SIMTAP</b> 34/ <b>MILKQUA</b>
2 Università di Bologna		2/ <b>FIT4REUSE*</b> 6/ <b>SUSTAINOLIVE</b>	27/ <b>Med-Berry*</b> 28/ <b>SIMTAP</b> 31/ <b>ArtiSaneFood</b>
3 Università Politecnica delle Marche		2/ <b>FIT4REUSE</b>	27/ <b>Med-Berry</b> 36/ <b>VEGGIE-MED-CHEESES*</b>
4 Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria - CREA			21/ <b>FREECLIMB</b> 23/ <b>GENDIBAR*</b> 36/ <b>VEGGIE-MED-CHEESES</b>
5 Università di Parma		6/ <b>SUSTAINOLIVE</b>	33/ <b>MED4YOUTH</b> 35/ <b>SAFFROMFOOD</b>
6 Consiglio Nazionale delle Ricerche - CNR			21/ <b>FREECLIMB</b> 22/ <b>GeMed</b> 32/ <b>Boomerang</b>
7 Università di Cagliari			10/ <b>ALTOS</b> 18/ <b>SWATCH*</b>
8 Università della Tuscia		4/ <b>PLANT-B</b>	24/ <b>IMPRESA*</b>
9 Università di Pisa			28/ <b>SIMTAP*</b>
10 Università degli Studi di Torino			29/ <b>VEG-ADAPT*</b>
11 Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise			20/ <b>Blue-Med*</b>
12 Università di Bari "Aldo Moro"			12/ <b>INWAT</b>
13 Università di Catania			21/ <b>FREECLIMB</b>
14 Università Cattolica del Sacro Cuore			15/ <b>MEDWATERICE</b>
15 Università Mediterranea di Reggio Calabria		6/ <b>SUSTAINOLIVE</b>	
16 Università degli Studi di Perugia (Centro di Eccellenza per la Ricerca sulla Birra)			32/ <b>Boomerang</b>
17 Università Politecnica di Bari			14/ <b>MEDSAL</b>
18 Università di Roma "La Sapienza"			13/ <b>KARMA</b>
19 Università di Salerno		1/ <b>DSWAP</b>	
20 Università di Sassari			17/ <b>Sustain-COAST</b>
21 Istituto Superiore per la Protezione e la Ricerca Ambientale - ISPRA		2/ <b>FIT4REUSE</b>	
22 Associazione Italyna per l'Agricoltura Biologica - AIAB		6/ <b>SUSTAINOLIVE</b>	
23 COLDIRETTI		6/ <b>SUSTAINOLIVE</b>	



of which



## 29 Projects

involve one or more Italian Partners

## 11 Projects

are coordinated by a Italian Partner

Partners	Projects	Section I	Section II
24 CoNaProA Consorzio Nazionale Produttori Apistici		4/ <b>PLANT-B</b>	
25 Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile - ENEA			24/ <b>IMPRESA</b>
26 Agenzia forestale regionale per lo sviluppo del territorio e dell'ambiente della Sardegna - FoReSTAS			18/ <b>SWATCH</b>
27 Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna "Bruno Ubertini"			26/ <b>LAGMED</b>
28 Ente Nazionale Risi (Azienda sperimentale del Centro Ricerche sul Riso)			15/ <b>MEDWATERICE</b>
29 Ente Acque della Sardegna - ENAS			18/ <b>SWATCH</b>
30 ESASEM spa			22/ <b>GeMed</b>
31 Alimenta s.r.l.		8/ <b>DAINME-SME</b>	
32 ARCA 2010 scarl società cooperativa		9/ <b>MEDITOMATO</b>	
33 SPES - Spread European Safety Geie		8/ <b>DAINME-SME</b>	
34 Food and Agriculture Requirements - FARE		7/ <b>CAMELMILK</b>	



### 34 Partners



### 9



### 11



### 9

### Projects

per Thematic area



## JORDAN

Funds/ 596.875,00 €



Partners	Projects	Section I	Section II
1 Al-Balqa' Applied University			22/ <b>GeMed</b>
2 University of Jordan			12/ <b>INWAT</b>
3 National Agricultural Research Center			29/ <b>VEG-ADAPT</b>
4 National Centre for Agricultural Research and Extension			30/ <b>ZeroParasitic</b>
5 M. Scientific Food Center			33/ <b>MED4YOUTH</b>



### 5 Partners



## 5 Projects

involve one or more Jordanian Partners



### 1



### 3



### 1

### Projects

per Thematic area



# LEBANON

Funds/ 401.846,00 €



Partners	Projects	Section I	Section II
1 Lebanese University, Faculty of Agronomy		5/ <b>SUPROMED</b>	
2 American University of Beirut			13/ <b>KARMA</b>
3 National Council for Scientific Research - Lebanon			10/ <b>ALTOS</b>
4 Lebanese Agricultural Research Institute			10/ <b>ALTOS</b>
5 DIFAF		5/ <b>SUPROMED</b>	

**5 Partners**



**3 Projects**  
involve one or more  
Lebanese Partners



**Projects**  
per Thematic area



# MALTA

Funds/ 262.500,00 €



Partners	Projects	Section I	Section II
Ministry for the Environment, 1 Sustainable Development and Climate Change			28/ <b>SIMTAP</b>
2 EPSILON SA			30/ <b>ZeroParasitic</b>

**2 Partners**



**2 Projects**  
involve one or more  
Maltese Partners



**Projects**  
per Thematic area



# MOROCCO

Funds/ 1.134.840,00 €



Partners	Projects	Section I	Section II
1 Institut National de la Recherche Agronomique			21/ <b>FREECLIMB</b> 22/ <b>GeMed</b> 25/ <b>INTOMED</b> 29/ <b>VEG-ADAPT</b>
2 Institut Agronomique et Vétérinaire Hassan II			27/ <b>Med-Berry</b> 30/ <b>ZeroParasitic</b>
3 University of Abdelmalek Essaâdi		6/ <b>SUSTAINOLIVE</b>	
4 University Ibn Zohr			31/ <b>ArtiSaneFood</b>
5 Unverisité Caddi Ayyad			10/ <b>ALTOS</b>
6 Association Tismonine		6/ <b>SUSTAINOLIVE</b>	
7 EL Cooperative Oumnia Bellota		6/ <b>SUSTAINOLIVE</b>	

**7 Partners**

**1** **7** **1**

**Projects**  
per Thematic area

**9 Projects**  
involve one or more Moroccan Partners



# PORTUGAL

Funds/ 1.284.226,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Instituto Politécnico de Bragança			25/ <b>INTOMED</b> 31/ <b>ArtiSaneFood*</b>
2 Universidad de Coimbra			15/ <b>MEDWATERICE</b> 33/ <b>MED4YOUTH</b>
3 CIBIO/InBIO-UP, Rede de Investigação em Biodiversidade e Biologia Evolutiva			26/ <b>LAGMED</b>
4 University of Évora		6/ <b>SUSTAINOLIVE</b>	
5 University of Porto			34/ <b>MILKQUA</b>
6 Catholic University of Portugal		1/ <b>DSWAP</b>	
7 Centro de Estudos e Promoção do Azeite do Alentejo - CEPAAL		6/ <b>SUSTAINOLIVE</b>	
8 Instituto Politécnico de Coimbra			15/ <b>MEDWATERICE</b>
9 Instituto de Biologia Experimental e Tecnológica			35/ <b>SAFFROMFOOD</b>
10 Esporão, SA		6/ <b>SUSTAINOLIVE</b>	

**10 Partners**

**2** **3** **4**

**Projects**  
per Thematic area

**9 Projects**  
involve one or more Portuguese Partners

of which

**2 Projects**  
are coordinated by a Portuguese Partner



# SPAIN

Funds/ 10.817.115,00 €



\* COORDINATED PROJECT

Partners	Projects	Section I	Section II
1 Consejo Superior de Investigaciones Científicas		1/ <b>DSWAP</b> 3/ <b>WATERMED 4.0</b>	12/ <b>INWAT*</b> 15/ <b>MEDWATERICE</b> 16/ <b>PRECIMED*</b> 23/ <b>GENDIBAR</b> 34/ <b>MILKQUA</b>
2 Universidad de Cordoba		2/ <b>FIT4REUSE</b>	26/ <b>LAGMED</b> 27/ <b>Med-Berry</b> 31/ <b>ArtiSaneFood</b>
3 Institut de Recerca i Tecnologia Agroalimentàries, IRTA		6/ <b>SUSTAINOLIVE</b> 7/ <b>CAMELMILK*</b> 8/ <b>DAINME-SME*</b>	10/ <b>ALTOS</b>
4 Universidad de Murcia		3/ <b>WATERMED 4.0*</b>	35/ <b>SAFFROMFOOD</b>
5 Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria			26/ <b>LAGMED</b> 29/ <b>VEG-ADAPT</b>
6 Universitat Jaume I		4/ <b>PLANT-B</b>	25/ <b>INTOMED</b>
7 Ingeniería y Control Electrónico S.L., INGE		9/ <b>MEDITOMATO*</b>	
8 Universidad de Castilla-La Mancha		5/ <b>SUPROMED*</b>	
9 University of Jaén		6/ <b>SUSTAINOLIVE*</b>	
10 Universitat Autònoma de Barcelona			32/ <b>Boomerang*</b>
11 Fundacio Eurecat			33/ <b>MED4YOUTH*</b>
12 Universidad Miguel Hernandez			35/ <b>SAFFROMFOOD*</b>
13 OASIS Park Fuerteventura		7/ <b>CAMELMILK</b>	
14 Universidad Catolica San Antonio de Murcia			36/ <b>VEGGIE-MED-CHEESES</b>
15 Universidad de Lleida			23/ <b>GENDIBAR</b>
16 Universitat de les Illes Balears			29/ <b>VEG-ADAPT</b>
17 Universidad de Granada		6/ <b>SUSTAINOLIVE</b>	
18 Universitat de Girona			15/ <b>MEDWATERICE</b>
19 Universidad de Malaga			13/ <b>KARMA</b>
20 Universitat Politècnica de València			18/ <b>SWATCH</b>
21 Centre de Recerca de Agrigenòmica			21/ <b>FREECLIMB</b>
22 Centro de Edafologia y Biologia Aplicada del Segura			30/ <b>ZeroParasitic</b>
23 Centro Nacional de Tecnología y Seguridad Alimentaria		9/ <b>MEDITOMATO</b>	
24 Centro de Investigación y Tecnología Agroalimentaria			19/ <b>ADAPT-HERD</b>



of which



**29 Projects**  
involve one or more  
Spanish Partners

**11 Projects**  
are coordinated by  
a Spanish Partner

25 Instituto Técnico Agronómico Provincial		5/ <b>SUPROMED</b>
26 Central Board of Users of Vinalopó Basin, L'Alacantí and Water Consortium of Low Marina		3/ <b>WATERMED 4.0</b>
27 APRIA Systems		1/ <b>DSWAP</b>
28 Grupo Empresarial La Caña		9/ <b>MEDITOMATO</b>
29 Fundacion Tekniker		9/ <b>MEDITOMATO</b>
30 Bioazul S.L.		2/ <b>FIT4REUSE</b>
31 Unión de Productores de Caprino		8/ <b>DAINME-SME</b>
32 Ekonek S.L.		8/ <b>DAINME-SME</b>
33 Andalusian Institute for Research and Training in Agriculture, Fisheries, Food and Ecological Production, IFAPA		6/ <b>SUSTAINOLIVE</b>
34 Laboratorio de Historia de los Agroecosistemas. University of Pablo de Olavide, LHA (UPO)		6/ <b>SUSTAINOLIVE</b>
35 Alejandro Gallego Barrera S.L.U (Tekieroverde)		6/ <b>SUSTAINOLIVE</b>
36 Denomination of Estepa Origen		6/ <b>SUSTAINOLIVE</b>
37 Grupo Hispatec Informatica Empresarial S.A.		5/ <b>SUPROMED</b>
38 Arrossaires del Delta de l'Ebre SCCL		32/ <b>Boomerang</b>
39 Institut catala de recerca del aigua		12/ <b>INWAT</b>
40 NOVAPAN S.L.		33/ <b>MED4YOUTH</b>
41 Tepro Consultores Agrícolas S.L.		15/ <b>MEDWATERICE</b>
42 Odin Solutins		15/ <b>PRECIMED</b>
43 Abiopep S.L.		29/ <b>VEG-ADAPT</b>
44 Conselleria de Agricultura, Medio Ambiente, Cambio Climático y Desarrollo Rural, D.G. Medio Natural, Evaluación Ambiental		18/ <b>SWATCH</b>
45 Viveros California		27/ <b>Med-Berry</b>

**45**  
**Partners**

**9** **11** **9**  
**Projects**  
per Thematic area



**26 Projects**  
involve one or more  
Tunisian Partners



## TUNISIA

Funds/ 2.330.125,00 €



Partners	Projects	Section I	Section II
1 Institut National de la Recherche Agronomique de Tunisie			10/ <b>ALTOS</b> 19/ <b>ADAPT-HERD</b> 22/ <b>GeMed</b> 30/ <b>ZeroParasitic</b>
2 University of Tunis El Manar		2/ <b>FIT4REUSE</b>	13/ <b>KARMA</b> 14/ <b>MEDSAL</b> 18/ <b>SWATCH</b>
3 Institut National de Recherches en Génie Rural, Eaux et Forêts		5/ <b>SUPROMED</b> 9/ <b>MEDITOMATO</b>	10/ <b>ALTOS</b> 11/ <b>CONSIRS</b>
4 University of Sfax			16/ <b>PRECIMED</b> 23/ <b>GENDIBAR</b> 24/ <b>IMPRESA</b>
5 École Nationale de Médecine Vétérinaire de Sidi Thabet - ENMV			20/ <b>Blue-Med</b> 26/ <b>LAGMED</b> 34/ <b>MILKQUA</b>
6 Centre des Recherches et des Technologies des Eaux			10/ <b>ALTOS</b> 12/ <b>INWAT</b>
7 National Institute of Field Crops, INGC		5/ <b>SUPROMED</b>	
8 MIHOUBI University of Manouba			31/ <b>ArtiSaneFood</b>
9 Centre Technique Agroalimentaire Tunisien		8/ <b>DAINME-SME</b>	
10 Centre Technique des Agrumes			25/ <b>INTOMED</b>
11 Centre National des Sciences et Technologies Nucléaires			25/ <b>INTOMED</b>
12 Olive Institute		6/ <b>SUSTAINOLIVE</b>	
13 Rose Blanche Group			32/ <b>Boomerang</b>
14 Chamber of Commerce and Industry of the Center			32/ <b>Boomerang</b>
15 Ecole supérieure des communications de Tunis			10/ <b>ALTOS</b>
16 Institut de l'olivier			21/ <b>FREECLIMB</b>
17 Water Researches and Technologies Center - CERTE			17/ <b>Sustain-COAST</b>
18 Laboratoire des Productions Animales & Fourragères			34/ <b>MILKQUA</b>
19 Laboratoire des plantes médicinales			34/ <b>MILKQUA</b>
20 Office de l'Elevage et des Pâturages			34/ <b>MILKQUA</b>
21 Délice Danone			34/ <b>MILKQUA</b>
22 Ecole Supérieure d'Agriculture du Kef			19/ <b>ADAPT-HERD</b>
23 High Institute of Agronomy of Chott-Mariem Sousse University			36/ <b>VEGGIE-MED-CHEESES</b>

**23 Partners**



**16 Projects**  
involve one or more  
Turkish Partners



## TURKEY

Funds/ 2.689.960,00 €



Partners	Projects	Section I	Section II
1 Ege University		8/ <b>DAINME-SME</b>	29/ <b>VEG-ADAPT</b>
2 Mersin University			14/ <b>MEDSAL</b> 17/ <b>Sustain-COAST</b>
3 Cukurova University			21/ <b>FREECLIMB</b> 27/ <b>Med-Berry</b>
4 Adnan Menderes University		7/ <b>CAMELMILK</b>	
5 Giresun University			32/ <b>Boomerang</b>
6 Istanbul Technical University - ITÜ		2/ <b>FIT4REUSE</b>	
7 Uludag University		9/ <b>MEDITOMATO</b>	
8 University of Harran			24/ <b>IMPRESA</b>
9 Kendirli Çiftligi		7/ <b>CAMELMILK</b>	
10 Kaya Kardesler Deve Çiftligi		7/ <b>CAMELMILK</b>	
11 Enka Süt Ve Gıda Mamülleri Sanayi Ve Ticaret A.S.		8/ <b>DAINME-SME</b>	
12 Turkish Water Institute		3/ <b>WATERMED 4.0</b>	
13 Black Sea Agricultural Research Institute			15/ <b>MEDWATERICE</b>
14 Mediterranean Fisheries Research Production and Training Institute			28/ <b>SIMTAP</b>
15 Menemen Chamber of Agriculture			29/ <b>VEG-ADAPT</b>
16 TEKFEN Tarim			23/ <b>GENDIBAR</b>
17 Namik Kemal University			12/ <b>INWAT</b>

**17 Partners**



**1 Project**  
involves one  
US Partner



## UNITED STATES



Partners	Projects	Section I	Section II
1 USDA Agricultural Research Service			31/ <b>ArtiSaneFood</b>

## **Project abstracts**



## Thematic area

### Water Management



## Section I

**Topic 1** - Water reuse and water desalination for agricultural and food production



## Budget

2,000,000 €



## Duration

36 months



## Project

### 1/DSWAP

Decision support-based approach for sustainable water reuse application in agricultural production

## Context

Wastewater treatment requirements for effluents used for irrigation are considerably different from those of effluents discharged to aquatic environments. For example, nitrogen and phosphorus are essential elements for plant cultivation and therefore exhaustive processes for reducing nutrients (i.e. denitrification and phosphate removal) are not imperative in wastewater reuse for irrigation. Conversely, the potential association between chemical and microbial contaminants in effluents and irrigated crops, makes them a potential public health hazard, and the detrimental long-term effects of soil salinity on soil structure and crop yield in treated wastewater irrigated fields (especially in clay-rich soils) suggests that salt removal may be crucial when irrigating with effluents. This project adopts a circular economy approach that aims for the safe and sustainable valorisation of sewage for irrigation with minimal ecological and agronomic impacts.

## Objective

The overall objective of this project is to develop modular, de-centralized wastewater treatment/irrigation networks coupled to a decision support tool that enable coupling/decoupling of modules for microbial/chemicals of emerging concern/salinity removal as a function of measured parameters to ensure cost-effective optimal water quality for irrigation and long-term sustainability of irrigated soils. Individual modules within these networks (compiled based on specific requirements) will be coupled to alternative energy sources to reduce costs and greenhouse gas emissions.

## Expected impacts

The project is expected to result in a paradigm shift from conventional wastewater treatment approaches that are specifically designed for ef-

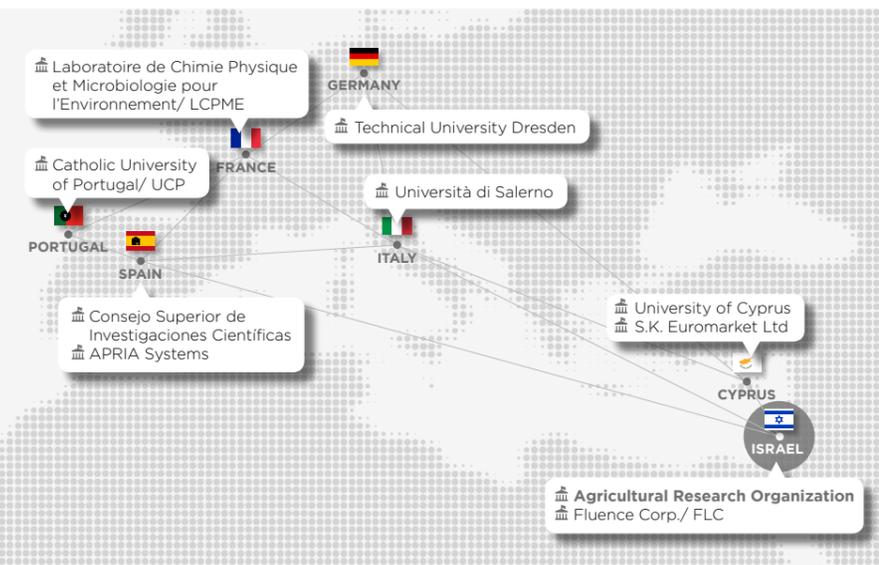
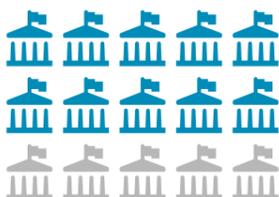
## Coordinating country

Israel

## Participating countries/ 7



## Partners/ 10



## Coordinating institution

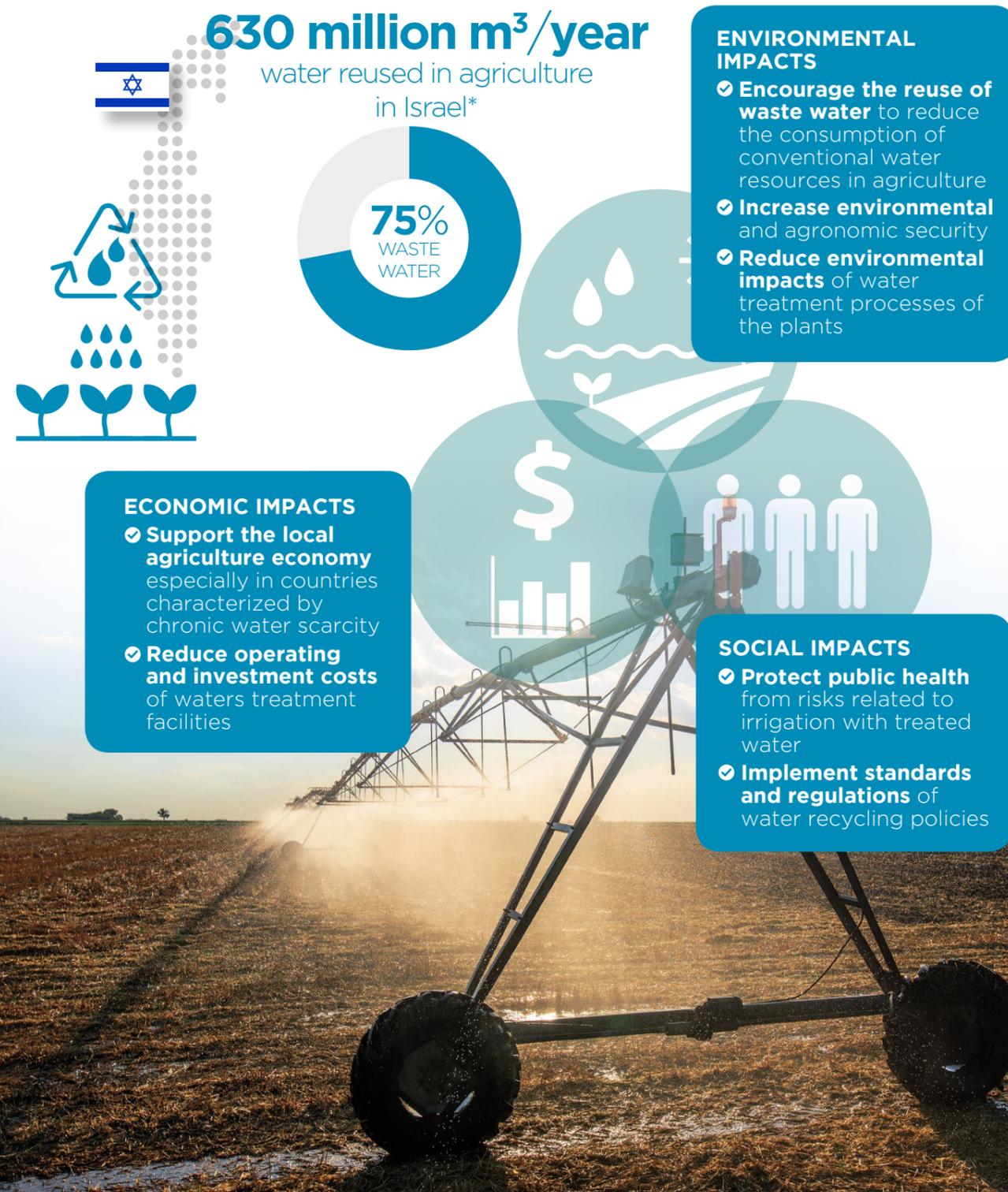
### Agricultural Research Organization - ARO



Institute of Soil, Water and Environmental Sciences Volcani Center

Scientific Coordinator:  
CYTRYN, Eddie  
eddie@volcani.agri.gov.il

fluent discharge to aquatic environments, to systems designed for wastewater reuse. DSWAP will overcome the sanitary doubts associated with wastewater reuse practices and will bring innovative technological solutions to societal challenges relating to water shortages and demand for irrigation, and the need for safe and sustainable agricultural production. By providing safe (for the public and environment) crop irrigation water at lower operational costs and investments, DSWAP will help support local agriculture and the regional implementation of water recycling policies / regulations, which will have a significant added value in the economy of countries trying to establish solid water balances.



## Thematic area

### Water Management



## Section I

**Topic 1** - Water reuse and water desalination for agricultural and food production



## Budget

2.020.000,00 €



## Duration

36 months



## Project

### 2/FIT4REUSE

SaFe and sustanable soluTions FOR the integRatEd USE of non-conventional water resources in the Mediterranean agricultural sector

## Context

High treatment costs, possible negative effects and actual low public acceptance can hinder and restrict the safe usage of non-conventional water resources (NCWR, i.e. treated wastewater and desalinated water) that can help the Mediterranean region to overcome water scarcity in agriculture.

## Objective

FIT4REUSE aims to tackle these challenges through three main pillars of the project: i) innovation of treatment technology, ii) application in simulated/relevant environment and iii) assessment and regulation, insured by the inclusion of research, governmental and industrial partners from different parts of the Mediterranean region. The first pillar will concentrate on the wastewater treatment and desalination to optimize the treatment technologies and to offer sustainable solutions. In particular, nature-based solutions and intensive wastewater treatment will be tested singularly or combined to provide the best possible quality of alternative water resources that can later be safely used in agriculture. Once water of suitable quality is obtained, the second pillar will study direct and indirect water reuse schemes. Different irrigation technologies and practices, together with the effects that NCWR have on soil and food safety will be studied. In the case of aquifer recharge with treated wastewater, the application pillar will aim to find the best way to preserve aquifer water quality and its ecological balance, improving also the soil treatment and the infiltration processes. The third pillar will study the results obtained and analyse economic, social and environmental impacts of the solutions proposed. Moreover, the reasons for low public acceptance of NCWR will be analysed and solutions offered to overcome problems connected to it within the actual policies and regulatory framework.

## Coordinating institution

### University of Bologna



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

Agricultural and Food Sciences  
DISTAL

Scientific Coordinator:  
TOSCANO, Attilio  
attilio.toscano@unibo.it

## Expected impacts

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. The most affected players in the FIT4REUSE field are agricultural farmers, operators of water/wastewater treatment facilities, agricultural advisors, technology developers and consultants SMEs. Finally, guidelines to standardise water reuse safety planning will be developed to minimise the threats and support regulation and water policies in Mediterranean regions.

## Integrated reuse in agriculture of treated waste water and desalination of marine and brackish waters



FIT4REUSE contributes directly and indirectly to the achievement of the Objectives of Sustainable Development



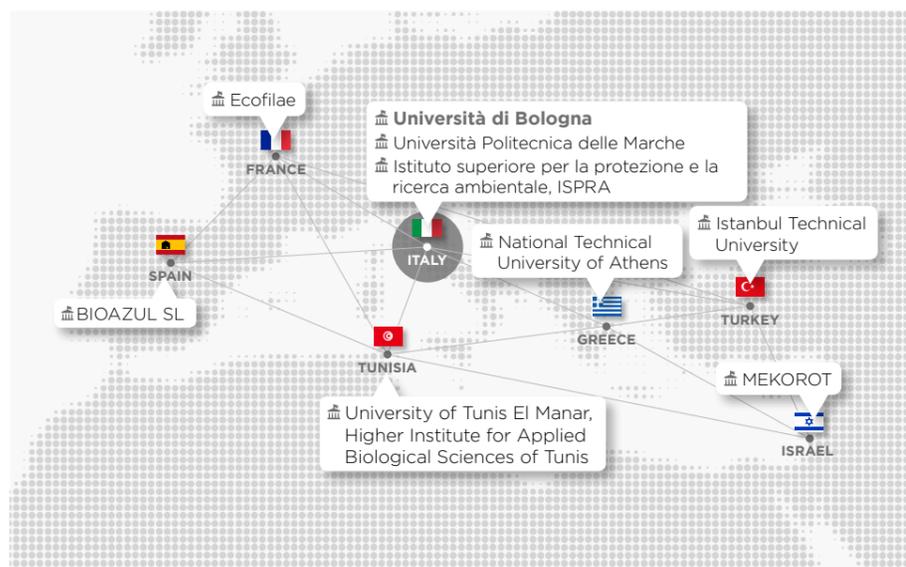
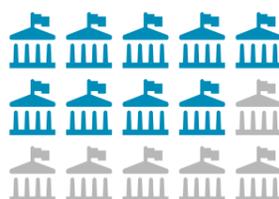
## Coordinating country

Italy

## Participating countries/ 7



## Partners/ 9



## Thematic area

### Water Management



## Section I

**Topic 1** - Water reuse and water desalination for agricultural and food production



## Budget

1.862.042,50 €



## Duration

36 months



## Project

### 3/WATERMED 4.0

Efficient use and management of conventional and non-conventional water resources through smart technologies applied to improve the quality and safety of Mediterranean agriculture in semi-arid areas

## Context

WATERMED 4.0 main vision is to develop and to apply an integrated decision support system based on the Internet of Things, for managing the whole water cycle in agriculture, monitoring water resources (conventional and non-conventional) and water demands including the measure of economic, energy, social and governance factors that influence the water use efficiency in Mediterranean agricultural production areas.

## Objective

WATERMED will design and develop an IoT-based platform based on a layered architecture that considers several types of services to ensure its replication and adaptability to different crops and locations. Entirely replicable services deal with IoT services, virtual entities and storage services, and data analytics and machine learning, respectively. Fully customizable services deal with water data management issues that specialize generic analytic services into particular techniques for different types of irrigation and water distribution. Those services may require being customized whenever a new pilot is designed, developed and deployed. Finally, application specific services require higher development effort since they serve particular farms. The architecture may be implemented in a range of deployment configurations involving the use of smart algorithms and analytics in the cloud, fog-based smart decisions located on the farm premises and possibly mobile fog.

## Expected impacts

The overall approach of this proposal is increasing the efficiency in the management of conventional and non-conventional water resources applied to agriculture from an integral perspective. The new perspective comes from the assumption that technology development, societal en-

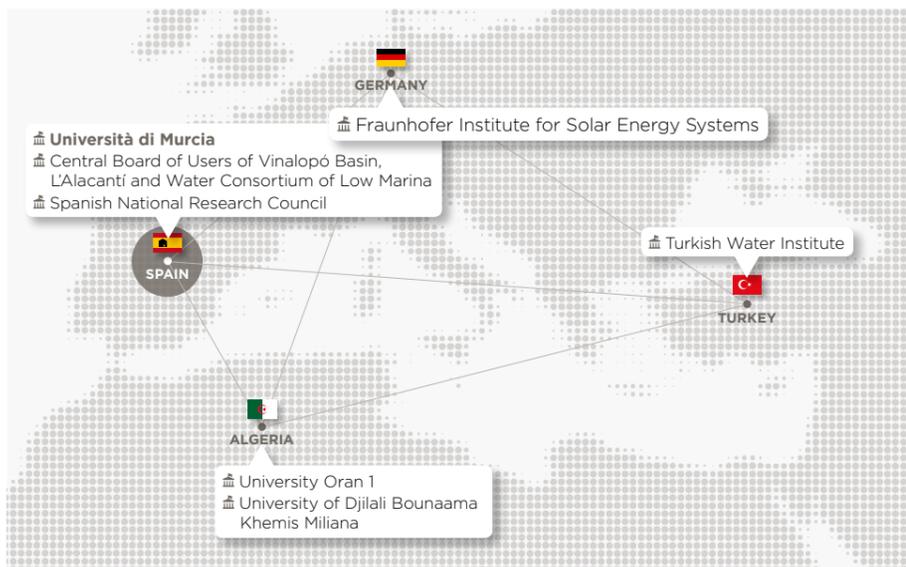
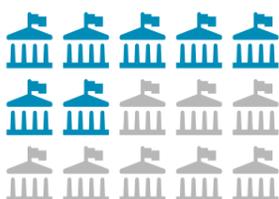
## Coordinating country

Spain

## Participating countries/ 4



## Partners/ 7



## Coordinating institution

### Universidad De Murcia



Information and Communication Technologies Department

Scientific Coordinator:  
SKARMETA GOMEZ, Antonio  
skarmeta@um.es

agement, governance and transferring knowledge will be enhanced by the new possibilities of digitalisation through an open platform, in a form that best fits the needs of end-users and the associated supply chain, from high waters (water management authorities, water planning organisations, wastewater treatment plants, technology SME's) to the plot (irrigation communities, farmers and technology SME's). The expected impacts will be easily monitored all along the water cycle for agriculture, real-time controlled by the Internet of Things and Services, helping to increase quantity and quality of water available for agriculture and to save water and nutrients.

## 3 demo-sites in the Mediterranean Region

### SPAIN



### ALGERIA



### TURKEY



## Thematic area

### Farming Systems



## Section I

**Topic 2** - Improving the sustainability of Mediterranean agro-ecosystems



## Budget

2.082.675,73 €



## Duration

36 months



## Project

### 4/PLANT-B

A sustainable mixed cropping-beekeeping system in the Mediterranean basin

## Context

The impact of pesticide use in intensive agriculture and beekeeping on food safety but also on the environmental sustainability of these production systems is currently subject to scrutiny. Indeed, the numerous honeybee (HB) mortality cases, linked to contaminant residues found in dead bees and beehives, is a clear indicator of the high pressure affecting agro-ecosystems. A transition to modern IPM tools, technologies and practices that enable low pesticide inputs, is considered necessary to alleviate this pressure, while supporting food security and food safety. Furthermore, the adaptation of a mixed farming system in the Mediterranean region that combines citrus-AMPs-beekeeping could facilitate a more efficient use of land, optimize pollination services by HBs and benefit both the crop and beehive products. Such a farming system could also provide habitats for HBs and other insect pollinators during the off-flowering crop season, increasing the sustainability and biodiversity of the system and subsequently its resistance against climatic changes. Last but not least, valorisation from a productive point of view of endemic HB sub-species is very important because to date the worldwide beekeeping industry relies on a very few HB subspecies historically bred for aims that do not take into rightful account several emerging challenges which are seriously threatening this economically-relevant insect species.

## Objectives

PLANT-B proposal aspires to improve sustainability and agronomic return of Mediterranean citrus agroecosystem and beekeeping combining them in a mixed farming system 'citrus-aromatic/medicinal plants-HBs', through certain objectives: a) provide new IPM tools against crop & HB pests, b) valorisation of well-adapted endemic HB subspecies to Mediterranean conditions with potential of resistance to major HB pests, c) development and optimization of the proposed farming system in the Mediterranean region,

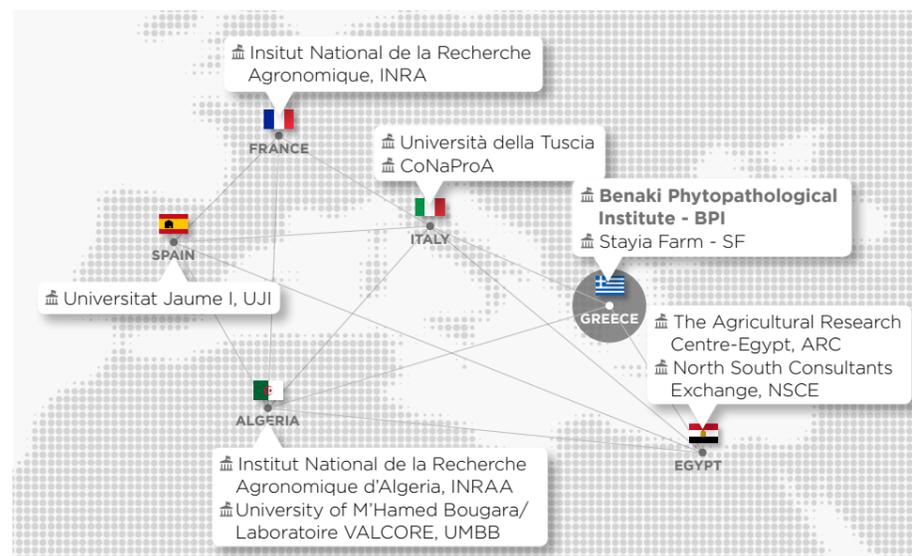
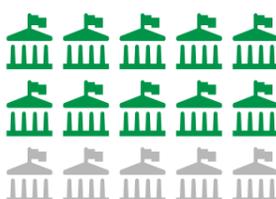
## Coordinating country

Greece

## Participating countries/ 6



## Partners/ 10



## Coordinating institution

Benaki Phytopathological Institute - BPI



BENAKI  
PHYTOPATHOLOGICAL  
INSTITUTE

Scientific Coordinator:  
KASIOTIS, Konstantinos  
k.kasiotis@bpi.gr

d) improvement of quality/safety traceability in honey produce, e) ascertain environmental and socio-economic sustainability of the new farming system, f) promotion of the new product(s).

## Expected impacts

PLANT-B aims to produce concrete and positive impacts on the Mediterranean citrus-bee productive system by obtaining the following results: 1. will stand on low pesticide input in Citrus crop and associated beehives, succeeding productivity and economic return to farmers and beekeepers alike; 2. is expected to improve the present resources management of two stand-alone farming systems, citrus cropping and beekeeping, making them compatible in the same farm unit with mutual benefit (pollination, honey quality); 3. will integrate new ecological, agronomical and socio-economic knowledge to accredit qualities of an innovative sustainable and efficient farming system; 4. will develop a sustainable use of genetic resources of well adopted endemic HB races/ecotypes fitting the actual needs of beekeepers in different geographical and climatic contexts at present and in future.

# Integrated management of agricultural and livestock system

## Citrus Farming System



## Apiculture



## BIOTECH INNOVATION FOR PATHOGENIC AGENTS CONTROL

- ✓ Development of tools and strategies for the control of adversity in the citrus and beekeeping (IPM) sector
- ✓ Development and validation of a system of environmental impact assessment (IAP) for the protection of plants and bees pronuba activities in citrus orchards
- ✓ Enhancement of endemic subspecies of the western bee (*Apis mellifera* L.)
- ✓ Development of quality markers/traceability of citrus and aromatic honey

## Thematic area

### Farming Systems



## Section I

**Topic 2** - Improving the sustainability of Mediterranean agro-ecosystems



## Budget

2.030.000,00 €



## Duration

36 months



## Project

### 5/SUPROMED

Sustainable production in water limited environments of Mediterranean agro-Ecosystem

## Context

The Mediterranean region is one of the most vulnerable zones due to water scarcity caused by drought periods and the irregular distribution of rainfall during the year. Agriculture remains the most water demanding sector, where the economy of the region has been growing by relying increasingly in specialized and irrigated agriculture. The lack of water resources, the progressive increase of energy prices as well as the low price of harvests, are conditioning the profitability of farms. Consequently, there is a progressive abandonment of rural areas in which the economy is based on the agricultural sector. This situation may get worse due to global warming. Thus, climate change will affect the production of crops, which may decrease the food security and the agricultural income of certain areas, and may also cause an excessive use of natural resources and energy to compensate these shortages.

## Objectives

The main objective of SUPROMED is to provide a holistic crop-livestock water management system resilient to climate change. To reach this, the project proposes the following partial objectives: 1) Development of an end-user IT (Information Technology) platform; 2) Integration of several models (i.e. MOPECO) and tools in the end-user's platform; 3) Application and promotion of regulated deficit irrigation techniques on vines, fruit trees and annual crops; 4) Validation of the end-user IT platform; 5) Design of a set of good agricultural practices and management techniques to farmers; 6) Integration of SUPROMED results into water and agricultural policies for large scale deployment.

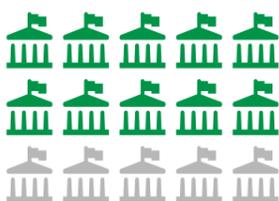
## Coordinating country

Spain

## Participating countries/ 5



## Partners/ 10



## Coordinating institution

Universidad de Castilla - La Mancha UCLM



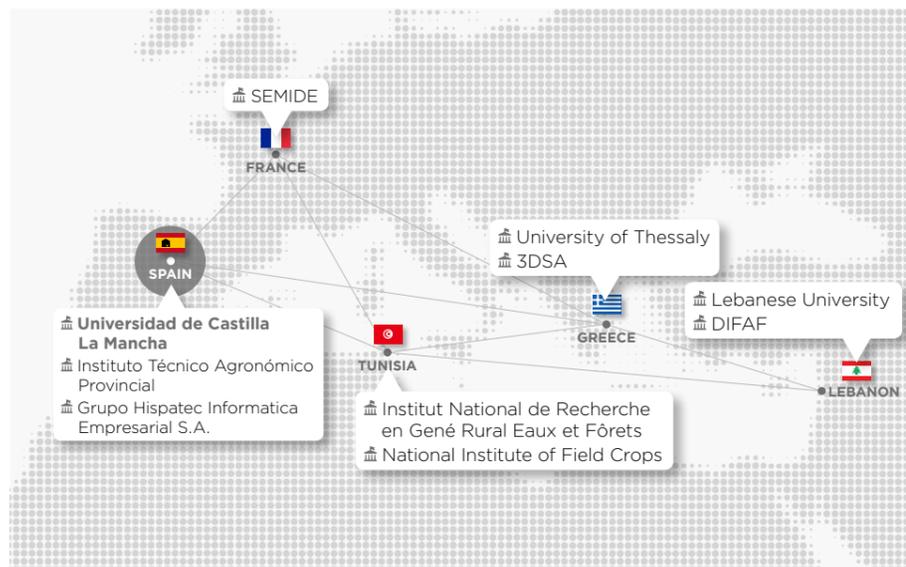
Universidad de Castilla-La Mancha

CAMPUS DE EXCELENCIA INTERNACIONAL

Scientific Coordinator:  
DOMINGUEZ PADILLA, Alfonso  
alfonso.dominguez@uclm.es

## Expected impacts

The expected impacts are: 1) to advise farmers and technicians on the optimal design and management of farming systems infrastructures for improving their resilience to climate change, by embracing the real-time management of water, fertilizers and energy, and the use of energy audits and benchmarking techniques to optimize the management of production means; 2) to maximize farm's profitability by guaranteeing a more efficient use of available water and irrigable area, including a better linkage between livestock and crop production, the fertilization management, pests identification, and the use of low quality irrigation water; 3) to demonstrate the convenience of using the end-user IT platform instead of traditional methods; 5) to decrease the impact of agriculture on the environment; 6) to advise policy managers in the definition of national agricultural and water strategic objectives.



## Thematic area

### Farming Systems



## Section I

**Topic 2** - Improving the sustainability of Mediterranean agro-ecosystems



## Budget

1.913.450,00 €



## Duration

48 months



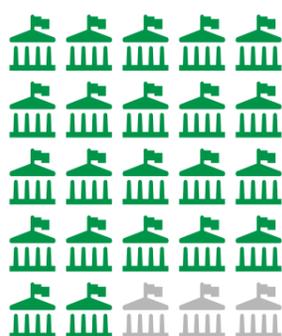
## Coordinating country

Spain

## Participating countries/ 6



## Partners/ 22



## Project

# 6/SUSTAINOLIVE

Novel approaches to promote the SUSTAINability of OLIVE groves in the Mediterranean

## Context

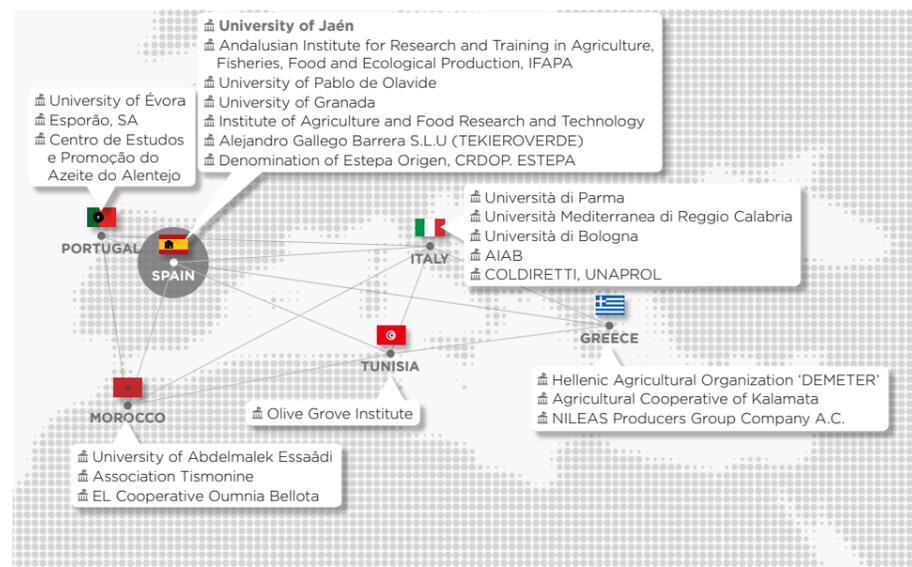
Olive grove cultivation is a key socio-economic asset, and is the dominant landscape, for a large fraction of the Mediterranean rural regions. Additionally, the olive oil sector represents an important source of healthy food and is highly appreciated worldwide, designated as UNESCO Intangible cultural heritage, becoming an imprint for Southern European and Mediterranean countries. Increased olive oil demand has acted as a catalyst for the intensification and expansion of olive groves. The intensification of low-input traditional olive groves implies systematic use of chemical fertilizers and pesticides with more aggressive weed control and soil management practices. Such intensification has resulted in simplified landscapes with olive groves with low-nature-value, driving greater negative environmental impacts such as soil erosion, run-offs to water bodies, soil fertility loss, degradation of habitats, and over-exploitation of water resources.

## Objectives

The overall objective of SUSTAINOLIVE is to enhance the sustainability of the olive oil farming sector throughout the implementation and promotion of a set of innovative sustainable management solutions that are based on agro-ecological concepts, and on the exchange of knowledge and co-creation involving multiple actors and end-users.

## Expected impacts

SUSTAINOLIVE will foster the following targets: i) Development of low-input systems with high productivity and reduced environmental impacts. The design of novel olive cultivation methods based on the integration of concepts from agro-ecology, economics and the social sciences, geography and land-use management, and agronomy, and the subsequent adoption of sustainable technological solutions (STs) will improve the system's



## Coordinating institution

Universidad de Jaén



Universidad de Jaén

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capacity to deliver multiple ecosystems functions and services, ii) A more diversified olive oil land-use system, which supports the delivery of multiple ecosystems services. The implementation and demonstration activities for various STs within SUSTAINOLIVE is expected to underpin the delivery of multiple ecosystems services at farm and landscape levels, iii) Integration of ecological, agronomical, territorial and socio-economic knowledge to design and assess efficient productive systems that are based on agro-ecological principles. SUSTAINOLIVE aims to integrate ecological, agronomic, territorial, socio-economic and lay knowledge to design a set of STs that are adapted to each major type of olive groves, and that help tackle existing technical and socio-economic challenges, and iv) Promote and develop the sustainable use of rare and new species and improved local species/products and farming systems that were best suited to Mediterranean conditions. SUSTAINOLIVE will make use of underexploited herbaceous species and plant communities of cover crops (including local varieties and landraces of legumes, cruciferous, grasses and other wild species) in the inter-rows of olive groves that are best adapted to local conditions and may provide specific ecosystem services.

# 7,7 million ha

of olive groves in the Mediterranean area



# 2,5 M t

of olive oil produced in the Mediterranean area

Olive oil production data (Harvest 2015/16)



Source: UNAPROL - [http://www.unaprol.it/images/stories/Scenario%20di%20economici/Filiera%20olivicola\\_Analisi%20di%20scenario%202015-2016.pdf](http://www.unaprol.it/images/stories/Scenario%20di%20economici/Filiera%20olivicola_Analisi%20di%20scenario%202015-2016.pdf)



## Thematic area

### Agro-food Value Chain



## Section I

**Topic 3** - Improving the sustainability of Mediterranean agro-ecosystems



## Budget

2.000.000,00 €



## Duration

36 months



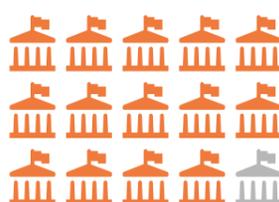
## Coordinating country

Spain

## Participating countries/ 7



## Partners/ 14



## Project

# 7/CAMELMILK

Boost the production, transformation and consumption of camel milk in the Mediterranean basin

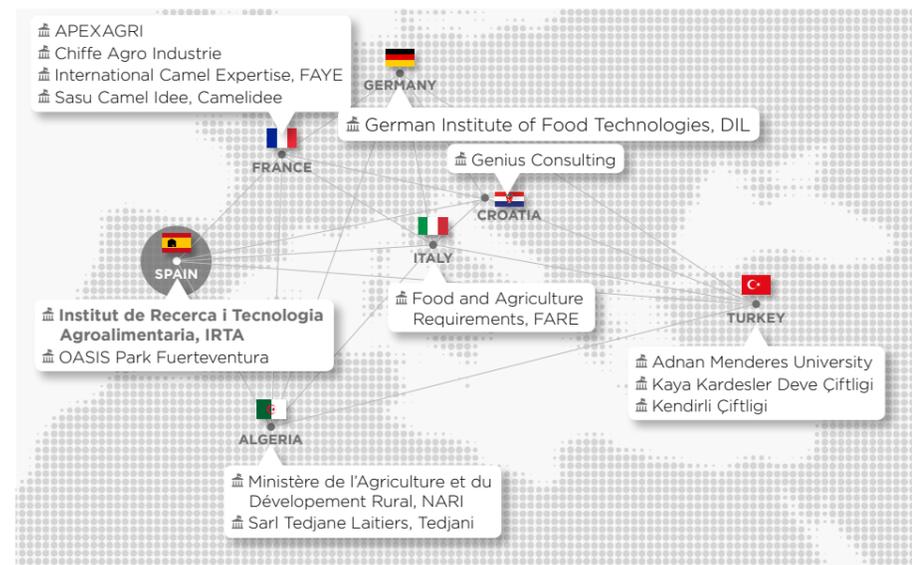
## Context

The aim of the CAMELMILK project is to strengthen the competitiveness, growth and interaction of the actors of the camel milk value-chain in the Mediterranean basin, including producers, processors, distributors and consumers. CAMELMILK will support smallholders and small SMEs in adopting technological and organizational innovations for a sustainable and efficient camel milk production and processing complying with EU food standards to boost commercial interaction, facilitate cooperation and create bridges between the two shores of the Mediterranean.

A multi-perspective approach to improve the camel milk value-chain will be taken into account to enable smallholders and small SMEs involved in the project to occupy a new market niche with a high potential in the coming years. CAMELMILK solutions will meet the increasing consumer's nutritional demands by delivering innovative products with significant nutritional benefits: anti-allergic, antimicrobial and antidiabetic properties; no bovine milk allergic respond; high vitamin C and mineral content; might support treatment of autism, cancer, diabetes, and hepatitis. CAMELMILK will demonstrate benefits for end-users by validating the technical and economic feasibility, prepare market uptake, determine consumer acceptance and disseminate project results to relevant stakeholders. The purpose is to make local productions sustainable and self-sufficient by taking advantage of Mediterranean values, knowledge and heritage.

## Objectives

1. Improve camel milk production systems;
2. Produce innovative, nutritional and high-quality camel dairy products;
3. Determine regulatory issues and legislation to commercialise camel dairy products;
4. Analyse and improve the camel milk value-chain in EU member states, Turkey and Algeria;



## Coordinating institution

Institut de Recerca i Tecnologia Agroalimentàries - IRTA



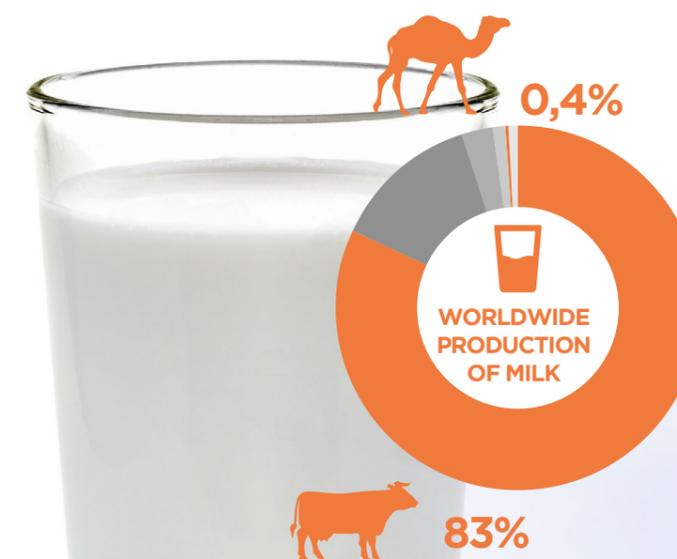
Generalitat de Catalunya  
Government of Catalonia

Scientific Coordinator:  
GARRON, Marta  
marta.garron@irta.cat

5. Prepare for a successful market implementation and exploitation;
6. Define consumer acceptance of innovative camel milk and camel dairy products in EU, Turkey and Algeria;
7. Devise a dissemination and communication plan for maximum outreach to all relevant stakeholders.

## Expected impacts

1. Deployment of wider, faster and profitable innovative solutions by smallholders and SMEs, overcoming the barriers to market uptake;
2. Strengthen the food processing sector in line with Mediterranean values and heritage improving competitiveness;
3. Create opportunities to growth, diversification and job creation particularly for smallholders and agro-SMEs;
4. Strengthen Mediterranean food value chains, supporting product quality, healthy food consumption and consumer trust;
5. Reduce the negative impacts of food value chains on the environment with particular reference to water;
6. Support the transition from a linear to a circular economy;
7. Impact on the economy of the Mediterranean area;
8. Impact on consumer's health.



Cattle produce 83% of the world milk production, followed by buffaloes 13%, goats 2% and sheep 1%. Camels produce only 0.4% and the remaining 0.6% is produced by dairy animals like yaks, horses, reindeers and donkeys.

Source: FAO, Gateway to dairy production and products - Dairy animals  
<http://www.fao.org/dairy-production-products/production/dairy-animals/en/>

# +20-30%

estimate of camel milk consumption increase in the Mediterranean area

## SPECIFIC OBJECTIVES

- ✓ Improve the camel milk production systems in Algeria and Turkey and bring them closer to European standards in order to improve their efficiency, quality and safety and lay the foundations for export to the EU within a short time.
- ✓ Adapt processing technologies to the properties of camel milk to produce pasteurized milk, fermented products and different types of cheese in Spain, France, Turkey and Algeria.



## Thematic area

### Agro-food Value Chain



## Section I

**Topic 3** - Improving the sustainability of Mediterranean agro-ecosystems



## Budget

1.956.857,00 €



## Duration

36 months



## Project

### 8/DAINME-SME

Dairy Innovation for Mediterranean SME

## Context

Dairy market on Mediterranean countries is substantially different from east/north European countries. At the Mediterranean area, cow's milk is mainly transformed to UHT milk and yogurts, but the other dairy production (principally ewe, but also goat and buffalo's milk), is processed and transformed into cheeses (Manchego, Pecorino, Beyaz Peynir, Mozzarella, Feta). The milk production is scattered, with smaller dairies than in east/north European countries. Moreover, some territories are marine islands, which increase the transport difficulties for milk and whey. Smaller dairies and fragmented milk production results in smaller and less automatized factories, and in a minor whey valorisation, which is destined mainly to feed, or even discharged to rivers. With these circumstances, dairies have a low competitive behaviour, and they are unable to pay appropriately to dairy farmers.

## Objectives

Technologies like Pulse Drying Combustion (use of 25% less energy and investment), the development of dLA-enriched dairy powders from cheese whey, and the development of new dairy products from whey protein, will be developed and validated for its immediate application.

## Expected impacts

The proposed innovations are addressed to reduce: energy use and environmental impact and waste, especially by the valorisation of cheese whey. The proposal will boost the deployment of wider, faster and profitable innovative solutions developed by smallholders and SMEs, and will create opportunities for growth, diversification and job creation particularly for smallholders and agro-food SMEs.

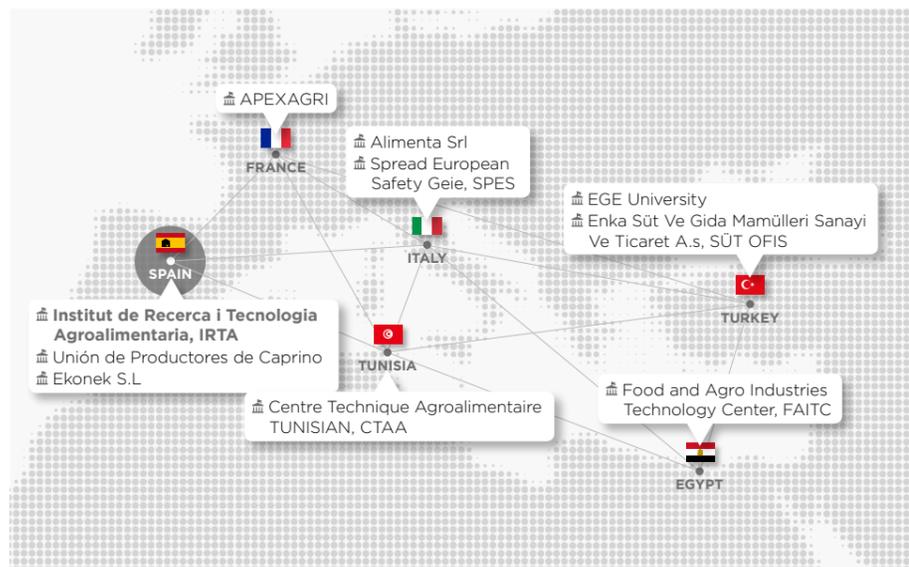
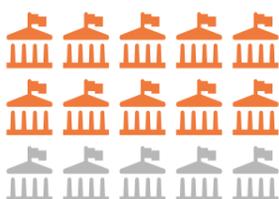
## Coordinating country

Spain

## Participating countries/ 6



## Partners/ 10



## Coordinating institution

Institut de Recerca i Tecnologia Agroalimentàries - IRTA



Generalitat de Catalunya Government of Catalonia

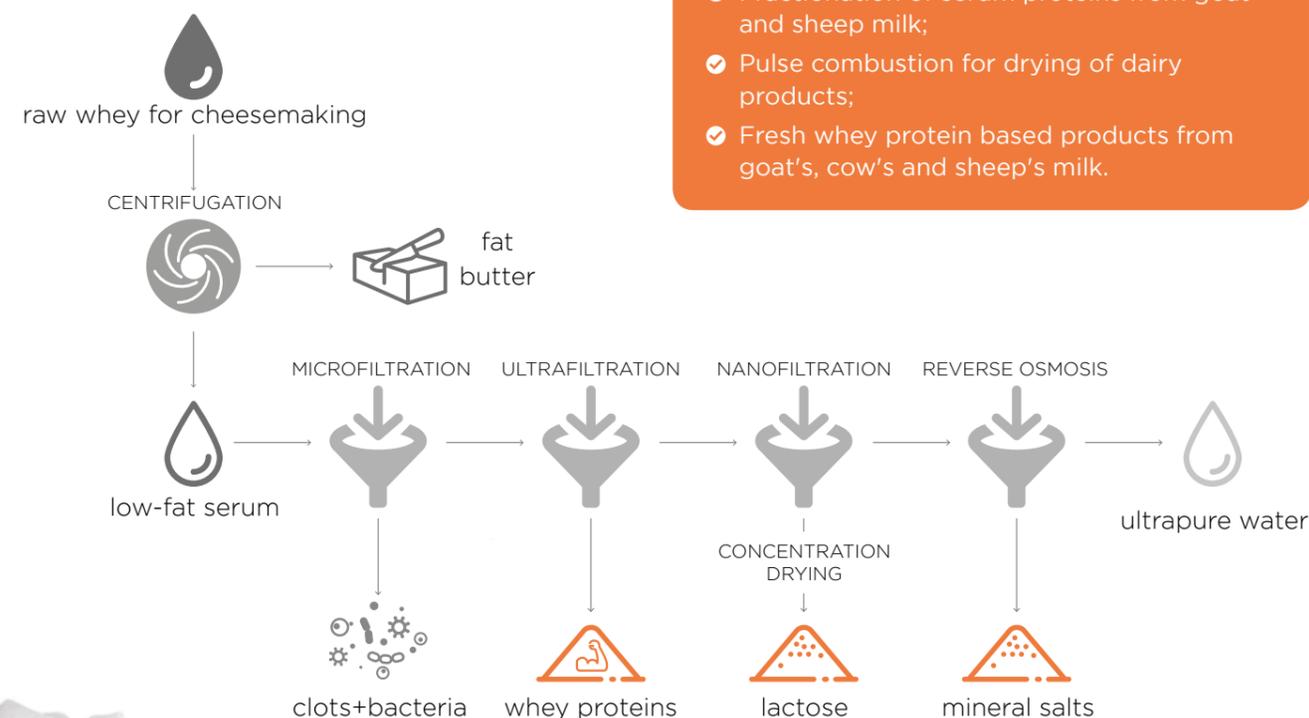
Scientific Coordinator: FELIPE, Xavier xavier.felipe@irta.cat

# Circular economy of SMEs in the dairy sector

## Enhancement of whey

### SPECIFIC OBJECTIVES

- ✓ Fractionation of serum proteins from goat and sheep milk;
- ✓ Pulse combustion for drying of dairy products;
- ✓ Fresh whey protein based products from goat's, cow's and sheep's milk.



## Thematic area

### Agro-food Value Chain



## Section I

**Topic 3** - Implications of dietary shifts and sustainable diets for the Med populations and food industry



## Budget

1.999.380,50 €



## Duration

36 months



## Project

# 9/MEDITOMATO

Bringing innovation and durability throughout the value chain of the Mediterranean tomato industry

## Context

The socio-economic and environmental sustainability of intensive horticultural farms is an essential requirement that the Mediterranean society and agricultural policies are demanding. This requires the use of technologies for the preservation of the environment under sustainable criteria that allow the production of high-quality products with food security.

## Objectives

The main goal of MEDITOMATO is to demonstrate innovative technology solutions along the whole tomato value chain enabling this Mediterranean sector to bring improvements at different levels (environmental, food quality & safety, sustainability, traceability, efficiency and water management) that will contribute to a consistent rural and social development of the Mediterranean agri-food sector.

To this end, particular objectives will be pursued: prototype assembly of in/on-line as well as portable system based on Vis-NIR spectroscopy for non-destructive quality monitoring; development of IoT-enabled irrigation systems to obtain water and energy savings; application of IoT to soil fertilization; microbiological Risk Analysis for food safety; on-site deployment of other IoT sensors for traceability and data analysis to optimize production rates; integration and demonstration of the proposed innovations in 3 locations (Spain, Italy and Turkey); quantified analysis of the status of the food supply chains benefits of the deployed solutions and study of the feasibility for replication in other Mediterranean countries.

## Expected impacts

The implementation of MEDITOMATO innovations will enable the provision of high quality products, making smallholders and SMEs more efficient, sustainable and competitive against large companies. This will result in the

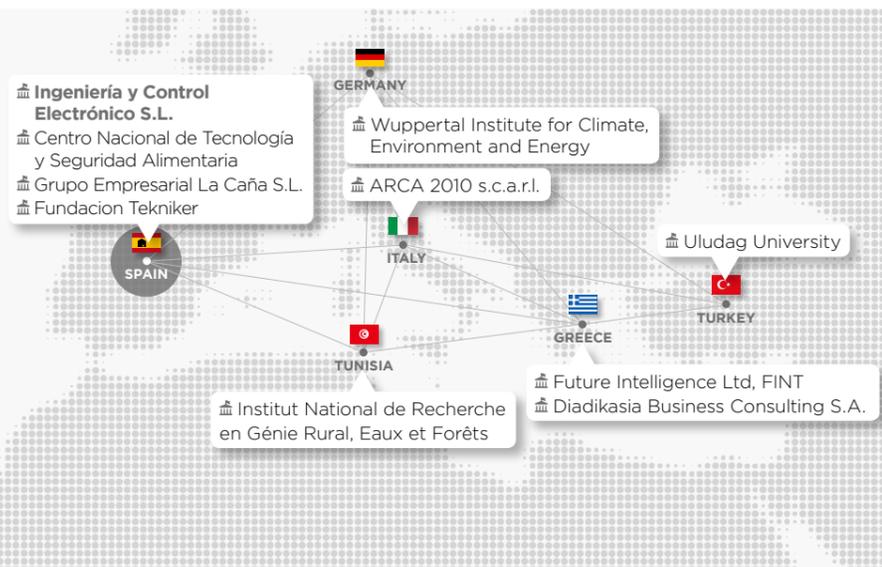
## Coordinating country

Spain

## Participating countries/ 6



## Partners/ 10



## Coordinating institution

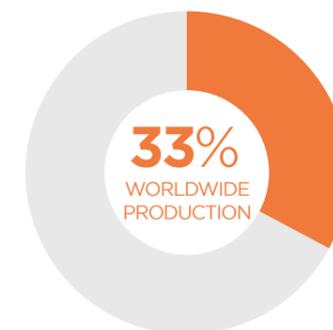
Ingeniería y Control Electrónico S.A. - INGE



Ingeniería y Control Electrónico, S.A.

Scientific Coordinator:  
MATUTE, Guillermo  
gmatute@inge-con.es

strengthening of the robustness and the competitiveness of the tomato value chain by both reducing operation costs and increasing product quality. Besides, the expected increase in product quality, efficiency, productivity and costs savings will boost rural economy in terms of growth, diversification and job creation. Additionally, it is expected that MEDITOMATO project will also give rise to the strengthening of the Mediterranean food value chains through the assurance of healthy food consumption by avoiding microbiological risks and increasing consumer trust by implementing food traceability systems. Finally, the enhancement of the efficiency of the irrigation and fertilization systems thanks to the introduction of easy to use digital technology will contribute to the environmental sustainability of the sector regarding resources management.



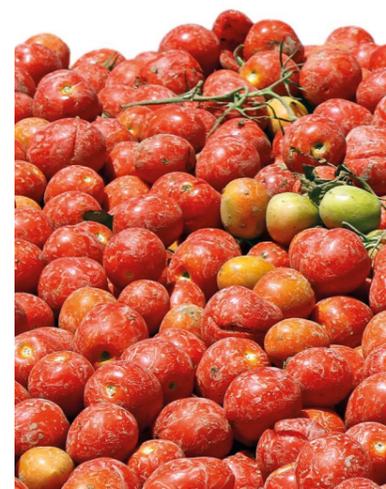
~12ML t  
of processed tomatoes



Sources:\*WPTC World Processing Tomato Council - dati 2017

## SPECIFIC OBJECTIVES OF THE PROJECT

- ✓ Prototype assembly of in/on-line as well as **portable system based on Vis-NIR spectroscopy** for non-destructive quality monitoring;
- ✓ Development of **IoT-enabled irrigation and fertilization systems** to optimize the use of water and reduce the use of fertilizers;
- ✓ Microbiological Risk Analysis and development of **protocols for food safety** during production and the transformation process;
- ✓ On-site deployment of other IoT sensors for **traceability** and the related centralized data analysis to optimize production rates;
- ✓ Integration and demonstration in 2 locations (Spain, Italy);
- ✓ Quantified analysis of the benefits and study of the feasibility for other Mediterranean countries;
- ✓ Dissemination and awareness raising across the PRIMA countries and exploitation of results to maximize impacts.



## Thematic area

### Water Management



## Section II

**Topic 1.1** - Water resources availability and quality within catchments and aquifers



## Budget

1.042.491,00 €



## Duration

36 months



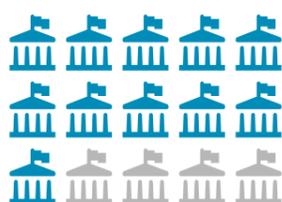
## Coordinating country

France

## Participating countries/ 6



## Partners/ 11



## Project

### 10/ALTOS

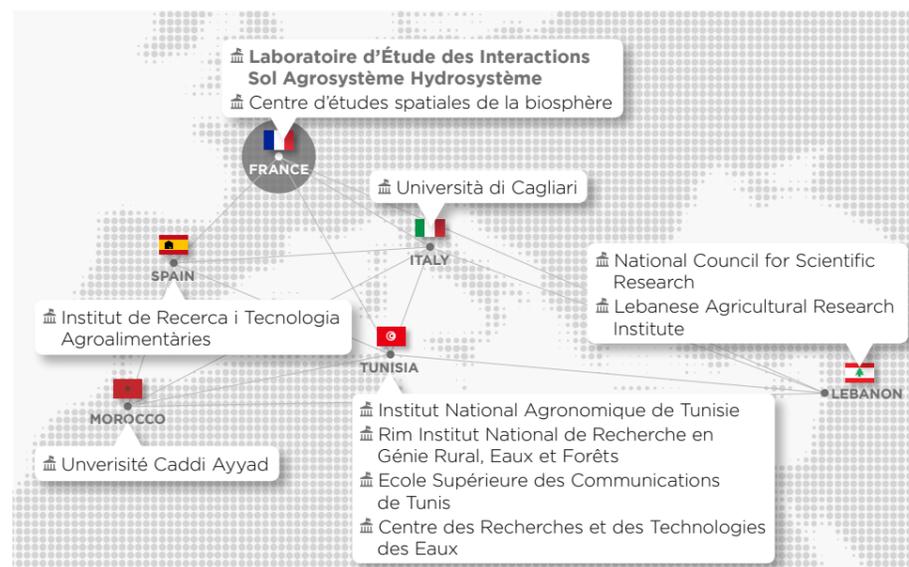
Managing water resources within Mediterranean agrosystems by accounting for spatial structures and connectivities

## Context

The modulation of spatial structures and connectivities, related to hydro-agricultural infrastructures and practices, has been long recognized as a promising lever by water resource managers and think-tanks, since it drives matter fluxes and storages within agro-ecosystem compartments. However, this topic has received moderate attention due to the limited capacities of monitoring and modelling tools when analysing the impacts of modulation scenarios on matter fluxes and storages at both sub-hectometric resolution and catchment extent, since several methodological challenges have to be tackled.

## Objectives

The ALTOS project aims to improve water management models for rainfed and irrigated agriculture, by modulating spatial structures and connectivities induced by hydro-agricultural infrastructures and practices (e.g., modulating land use to drive upstream/downstream water repartition). Four study sites are considered for integrated analysis in Morocco, Lebanon and Tunisia; and two study sites are considered for methodological developments in Spain and Italy. WP1 deals with monitoring and modelling tools for characterizing spatial structures. WP2 addresses innovative monitoring tools for characterizing processes induced by spatial structures. WP3 addresses innovative modelling for simulating individual and combined processes. WP4 simulates matter fluxes and storages for possible structure modulations, and conducts an integrated analysis with end-users on the basis of participative seminars. WP5 deals with (1) the sharing of data and methods, and (2) the results dissemination and exploitation.



## Coordinating institution

Laboratoire d'Etude des Interactions entre Sol, Agrosystème, Hydrosystème - LISAH

**LISAH**

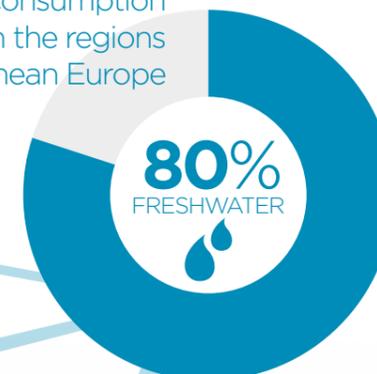
Scientific Coordinator:  
JACOB, Frédéric  
frederic.jacob@ird.fr

## Expected impacts

ALTOS is interlinked with sustainable development goals (SDG) #2 (sustainable agriculture), #6 (water supply services), and #12 (responsible production). By providing simulated indicators, it contributes to PRIMA KPI, including surface occurrence of productive and sustainable agriculture (SDG #2), water exploitation index (SDG #6), and global food loss index (SDG #12). It also contributes to PRIMA outcome indicators, including (1) newly modelling routines for water cycle, (2) new irrigation technologies with the modulation of irrigation techniques, and (3) innovative farming system with improved crop water use efficiency and water resource quality. Result dissemination relies on long-term collaborations with several stakeholders (farmer associations, resource managers, engineering offices).

## agricultural sector

water consumption percentage in the regions of Mediterranean Europe



hydrological cycle modelling

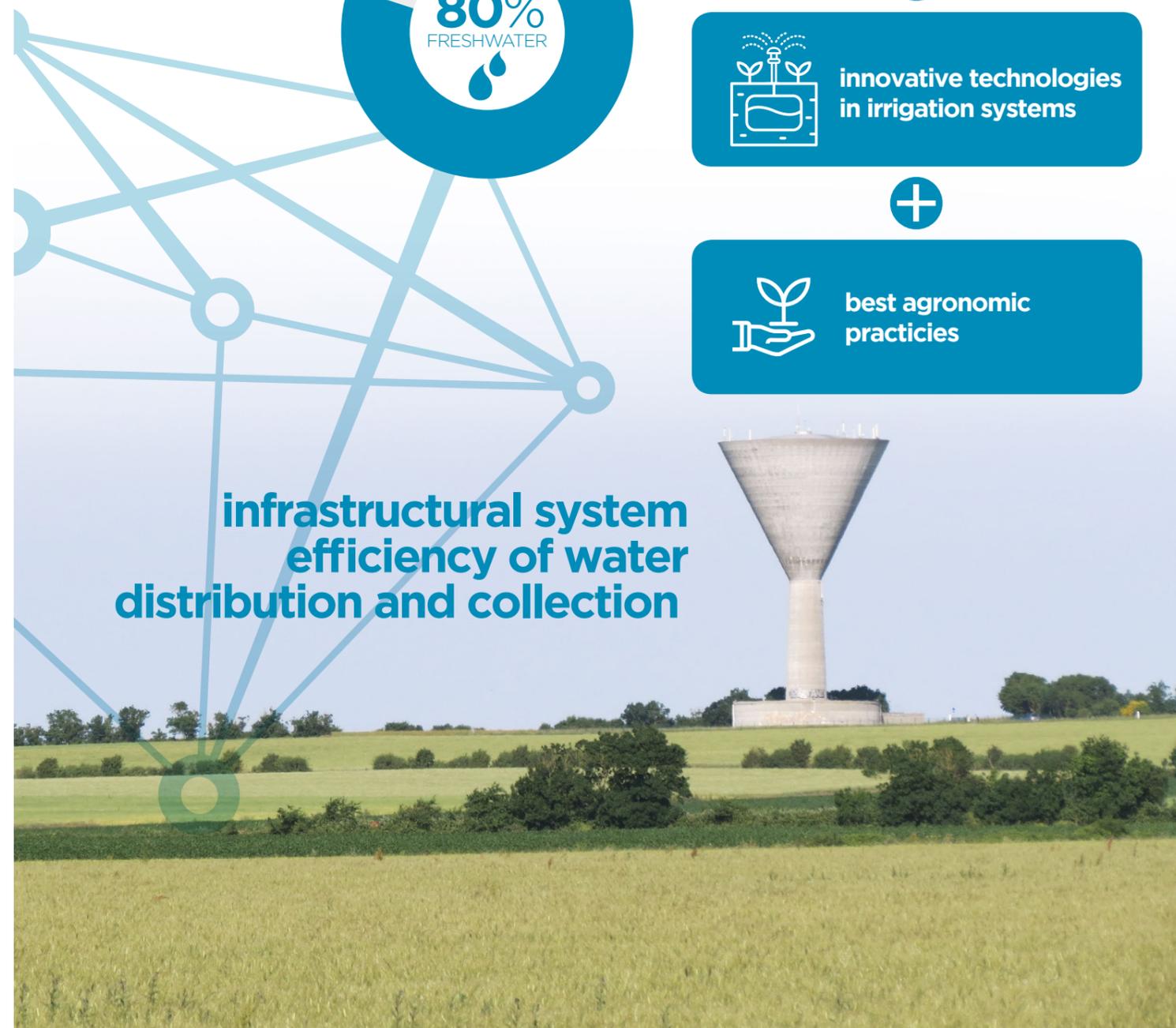


innovative technologies in irrigation systems



best agronomic practices

## infrastructural system efficiency of water distribution and collection



## Thematic area

### Water Management



## Section II

Topic 1.3 - Irrigation technologies and practices



## Budget

690.000,00 €



## Duration

36 months



## Project

### 11/CONSIRS

## A novel Condensation Supported Greenhouse Irrigation System

### Context

A new approach for irrigation water management is proposed as a combination of irrigation scheduling and water recycling using techniques of combined evapo-condensation in closed loop greenhouses applicable for countries in Northern Africa.

### Objectives

The system allows to solve the problem of increased salinity content in water supply by dilution with produced condensed water. Also, low quality water like pre treated waste water can be converted through the condensation process into save fresh water, thus going beyond the problems of biological crop contamination and excess salination. The project is based on results from successful precursor projects and will mainly focus on the further development of the system in direction of market readiness by improving the technology in terms of (1) adaptation to the level of farm management in MENA countries and (2) proper functioning within hot/ arid climate conditions by advanced methods of greenhouse climate control. The main new technological level is provided by a combination of two methods of air humidity condensation, with (1) condensation yields directly into cooling water from a thermal storage and (2) absorption of water vapour into a liquid desiccant (a hygroscopic salt solution). During the regeneration of desiccant further condensation is gained and collected on the internal surface of the greenhouse. The system will be approved within several greenhouse prototypes at locations of the North African partner countries. Based on the results, feasibility studies and regional water balances for different prototype regions will be addressed. The European partners will provide scientific and practical knowledge of the involved systems as well as conceptualisation, calculation, modelling, planning as well as monitoring and analysis of the system.

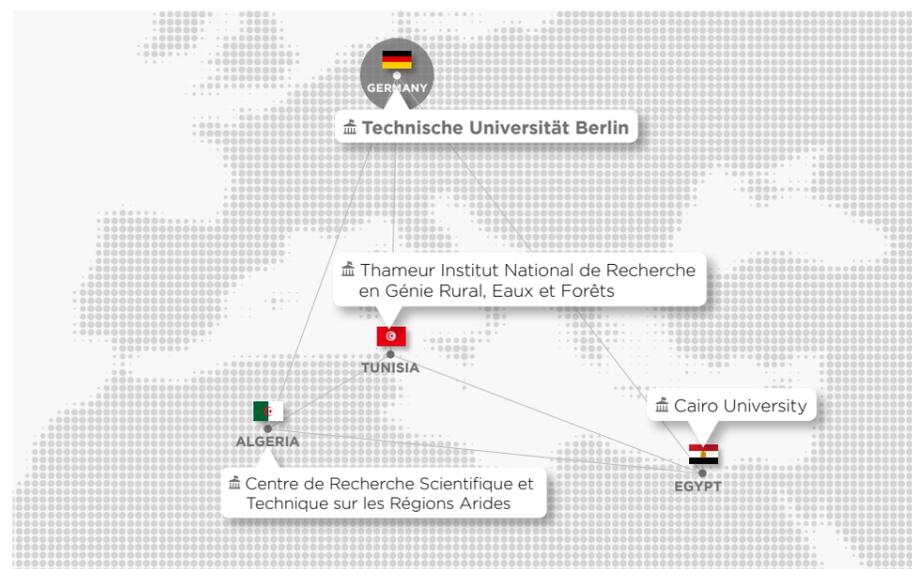
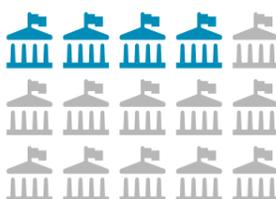
## Coordinating country

Germany

## Participating countries/ 4



## Partners/ 4



## Coordinating institution

Technische Universität Berlin



Scientific Coordinator:  
BUCHHOLZ, Martin  
martin-buchholz@web.de

## Expected impacts

The concept of closed greenhouse systems shall provide a water recovery of up to 80% of irrigation water by condensation, assumed that the project goal of a sufficiently cooled closed atmosphere well be reached according to the objectives. The use of water with higher salinity will be applicable if being blended with condensed water. Add on benefits will relate to improved productivity due to CO<sub>2</sub> accumulation as well as improved pest control due to the higher tightness of the envelope.



## Thematic area

### Water Management



## Section II

Topic 1.2 - Sustainable and integrated water management



## Budget

1.510.439,00 €



## Duration

36 months



## Project

# 12/INWAT

Quality and management of intermittent rivers and associated groundwaters in the Mediterranean basins

## Background and context

Water scarcity in the Mediterranean (MED) region caused by both natural and anthropogenic factors leads to an increasing dominance of intermittent rivers and depleted aquifers. Water scarcity has a dramatic impact on ecosystem health, hydrology, river chemistry and those economic sectors that strongly rely on water availability such as agriculture and tourism (70% of available freshwater is used in irrigated agriculture). The worst-case scenario is encountered in the regions of south MED area, which are characterized by high spatial and temporal imbalances of water demand and supply, seasonal water uses, inadequate water resources and poor institutional water management. Therefore, in order to supply water to human settlements in arid or semi-arid countries the over-exploitation of water resources is common. Non-sustainable practices are globally widespread and manifest themselves in the over pumping of aquifers, seawater intrusion, river flows composed mainly by wastewater, and the salinization of irrigated soils.

## Objectives

The INWAT studies 6 Mediterranean basins: Riera de Llançà (Spain), Vidourle (France), Canale d'Aiedda (Italy), Amman Zarqa (Jordan), Wadi El Bey (Tunisia), Nil Wadi (Algeria). I casi studio sono caratterizzati dalla presenza di corsi d'acqua temporanei e falde acquifere la cui qualità risulta compromessa da fonti di inquinamento antropico (in particolare impianti di depurazione e attività agricole). The INWAT project aims to study water quality and management of intermittent river and aquifers in Mediterranean basins. The main objectives are: (i) to develop innovative methods and tools for hydrological monitoring for intermittent rivers representing the widest possible diversity of management scenarios under water scarcity conditions, such as sea intrusion and groundwater recharge, groundwater

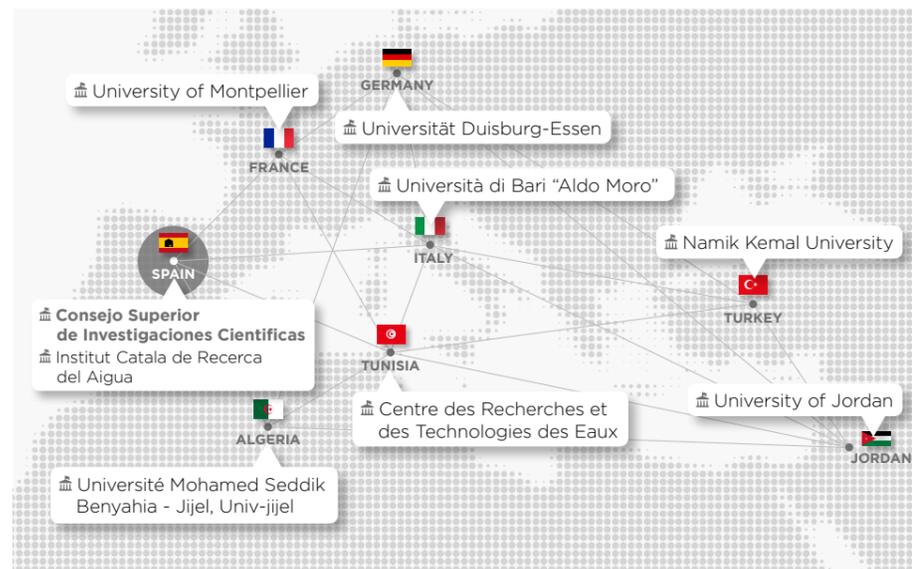
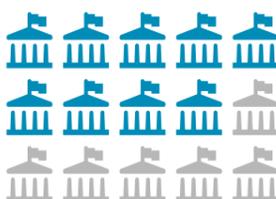
## Coordinating country

Spain

## Participating countries/ 8



## Partners/ 9



## Coordinating institution

Consejo Superior de Investigaciones Cientificas CSIC



Scientific Coordinator:  
PEREZ, Sandra  
spsqam@idaea.csic.es

water quality issues (UNIBA, Univ-Jijel, UJ). (ii) to improve the knowledge about pollution sources (CERTE, CSIC and UM) and processes that naturally attenuate contamination by chemicals (UM, CSIC). This includes the standardization of analytical methods, the analysis of organic pollutants in wastewaters, rivers and aquifers and also the investigation of abiotic and biotic transformation processes in rivers, hyporheic zone and in aquifers. (iii) to develop novel methodologies for monitoring and assessing the ecological status of intermittent rivers (UDE). This addresses specifically the development and refinement of biological indicators and biomonitoring programs. (iv) to co-develop a decision-support system with stakeholders involved in water management (i.e. public water agencies, private operators of the sanitation and potabilization sectors) for the design of management actions to counter-act the effects of global change in water-scarce regions (ICRA).

## Expected impacts

Il progetto INWAT consentirà di migliorare le attuali pratiche e politiche gestionali dei corsi d'acqua temporanei e risulta pertanto strategico ai fini della implementazione della Direttiva Quadro sulle Acque 2000/60/CE. Sarà incrementato lo stato delle conoscenze relativo ai fenomeni di diffusione, biodegradazione, fotodegradazione e trasporto di contaminanti organici, quali pesticidi e prodotti farmaceutici e dei relativi impatti nelle acque superficiali.



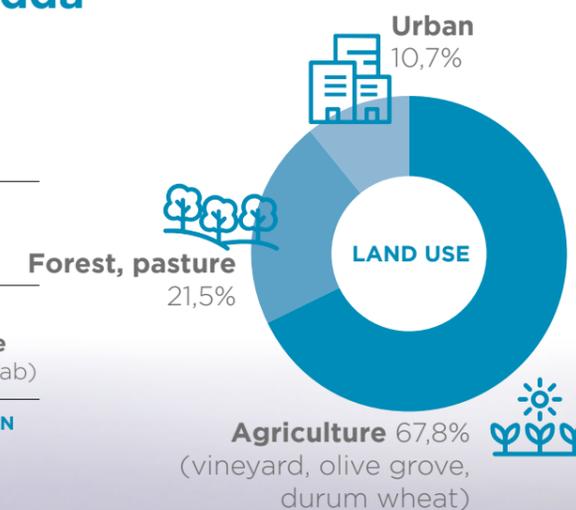
## Canale d'Aiedda Taranto, Italy

CATCHMENT SIZE  
408km<sup>2</sup>

DISCHARGE  
70l/s

CITIES SUPPLIED  
Taranto province  
(up to 586.000 hab)

WATER UTILIZATION  
Agricultural  
Domestic



## MAJOR CHALLENGES

- Hydrological regime alteration due to treated wastewater discharges
- Variability of stream water quality due to urban wastewater treatment efficiency
- Biodiversity hot spot



## Thematic area

### Water Management



## Section II

**Topic 1.1** - Water resources availability and quality within catchments and aquifers



## Budget

1.457.224,00 €



## Duration

36 months



## Project

# 13/KARMA

### Karst Aquifer Resources availability and quality in the Mediterranean Area

## Context

Karstified carbonate rocks constitute 21.6 % of the European land surface and contain abundant groundwater resources. These karst aquifers contribute substantially to the freshwater supply of most Mediterranean countries and many large cities, such as Rome and Beirut. However, karst aquifers are highly variable in terms of water availability and quality, and vulnerable to contamination and climate change. Therefore, they require specific investigation and management approaches.

## Objectives

The main objective of KARMA is to achieve substantial progress in the hydrogeological understanding and sustainable management of karst water resources across several scales. Based on our recently accomplished World Karst Aquifer Map, the project will deliver a detailed karst aquifer map and database at the scale of the entire Mediterranean area with valuable information, noticeably for stakeholders, on recharge, groundwater vulnerability and groundwater-dependent ecosystems. At catchment scale, five karst systems in the Mediterranean region will serve as field observatories. Tracer tests, hydrologic monitoring and isotopes will be applied to better quantify recharge and dynamic water balances of these aquifer systems. New generic models will allow a better understanding of karst hydrodynamic processes and thus better predictions concerning climatic and human impacts. At local scale, novel early-warning systems for microbial and chemical contamination will be developed, based on water-quality monitoring at springs.

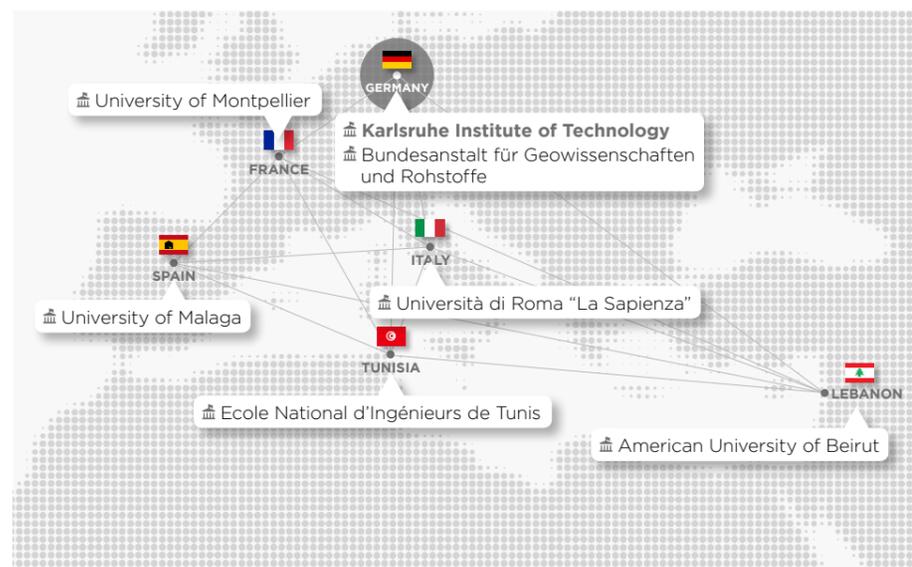
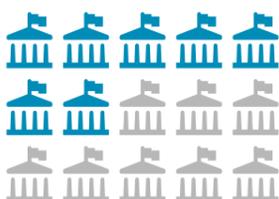
## Coordinating country

### Germany

## Participating countries/ 6



## Partners/ 7



## Coordinating institution

### Karlsruhe Institute of Technology



Karlsruher Institut für Technologie

Scientific Coordinator:  
GOLDSCHIEDER, Nico  
nico.goldscheider@kit.edu

## Expected impacts

The resulting karst aquifer map and database will be a major tool for stakeholders and governments for transboundary water resources management in the Mediterranean region. The new generation of modeling tools proposed in this project will allow better long-term predictions of climate-change impacts and improved management decisions. Monitoring and early-warning systems will be useful for water suppliers to identify short-term contamination events and long-term water quality trends at springs.

## Mediterranean Karst Aquifer: 5 case-studies of KARMA



### Jebel Zaghouan Tunis - Tunisia

**CITIES SUPPLIED**  
Zaghouan  
(up to 21.000 hab)

**LAND USE**

**WATER UTILIZATION**

**DISCHARGE**  
no data

**CATCHMENT SIZE**  
19km<sup>2</sup>

**MAJOR CHALLENGES**

- ☑ Climatic and anthropogenic impact on water availability
- ☑ Groundwater quality and vulnerability to contamination



### Gachqouch spring catchment Beirut - Lebanon

**CITIES SUPPLIED**  
Beirut  
(up to 1.500.000 hab)

**LAND USE**

**WATER UTILIZATION**

**DISCHARGE**  
2.000l/s

**CATCHMENT SIZE**  
56km<sup>2</sup>

**MAJOR CHALLENGES**

- ☑ Heavy and highly variable spring pollution
- ☑ Wastewater discharge into river and karst aquifer
- ☑ Impact of climate change (e.g decrease of snow cover)
- ☑ Floods and droughts

**43km<sup>2</sup>**  
**CATCHMENT SIZE**

**374l/s**  
**DISCHARGE**

**WATER UTILIZATION**

**LAND USE**

(up to 569.000 hab)  
**Malaga**  
**CITIES SUPPLIED**  
**Eastern Ronda Mountains**  
**Malaga - Spain**



### Gran Sasso aquifer Abruzzo - Italy

**CITIES SUPPLIED**  
L'Aquila, Pescara  
(up to 190.000 hab)

**LAND USE**

**WATER UTILIZATION**

**DISCHARGE**  
12.000l/s

**CATCHMENT SIZE**  
700km<sup>2</sup>

**MAJOR CHALLENGES**

- ☑ Pollution risk of groundwater
- ☑ Water resources assessment and hydrological functioning
- ☑ Climatic and anthropogenic impacts on hydrodynamics
- ☑ Flash floods and droughts

**150km<sup>2</sup>**  
**CATCHMENT SIZE**

**2.200l/s**  
**DISCHARGE**

**WATER UTILIZATION**

**LAND USE**

(up to 250.000 hab)  
**Montpellier**  
**CITIES SUPPLIED**  
**Lez spring catchment**  
**Montpellier - France**



## Thematic area

### Water Management



## Section II

**Topic 1.1** - Water resources availability and quality within catchments and aquifers



## Budget

1.268.000,00 €



## Duration

36 months



## Project

### 14/MEDSAL

Salinization of critical groundwater reserves in coastal Mediterranean areas

## Context

The salinization limits and menaces the availability of groundwater resources in the most populated and productive coastal areas of the Mediterranean. As a phenomenon, salinization is a complex process often related to multiple causes such as lack of internal drainage, seawater intrusion, increased evaporation of water-logged areas, upconing of deep-brines by over-abstraction, geogenic factors (e.g. evaporite dissolution, etc) and pollution.

## Objectives

The MEDSAL Project aims to secure availability and quality of groundwater reserves in Mediterranean coastal areas, which are amongst the most vulnerable regions in the world to water scarcity and quality degradation. This will be addressed by providing a novel holistic approach, towards the sustainable management of coastal aquifers, which are affected by increased (single or multi-source) groundwater salinization risk, especially under the variable meteo-climatic conditions of the Mediterranean and the rapidly changing socio-economic context.

MEDSAL aims at developing innovative methods to identify various sources and processes of salinization and at providing an integrated set of modelling tools that capture the dynamics and risks of salinization. In this context, MEDSAL will provide a classification of groundwater salinization types for Mediterranean coasts and innovative methods to detect these types, also in complex karstic and data-scarce environments. These outcomes will be reached by a better integration of hydrogeochemical and environmental isotope data with physical-based groundwater flow and transport models and advance geostatistics. Artificial intelligence and deep learning methods will be also used to improve detection of patterns in multi-dimensional hydrogeochemical and isotope data.

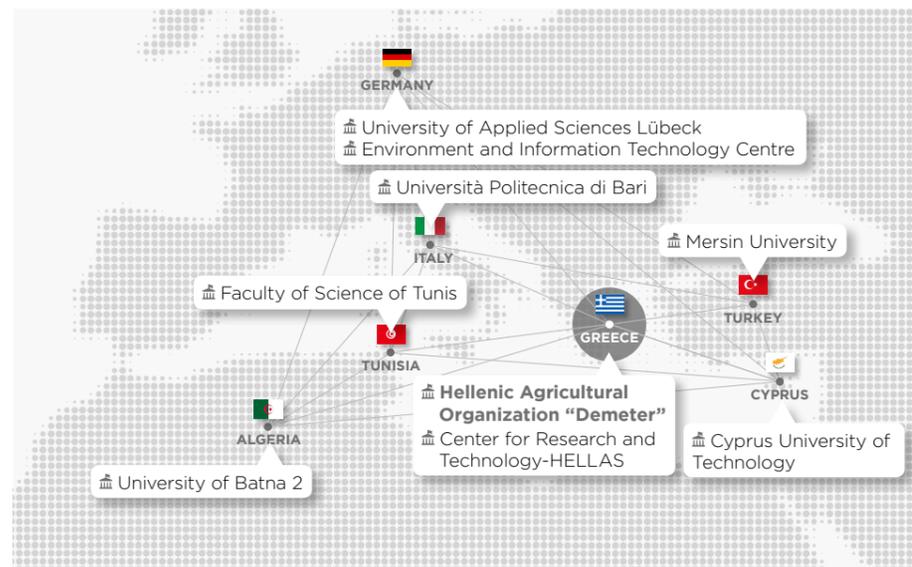
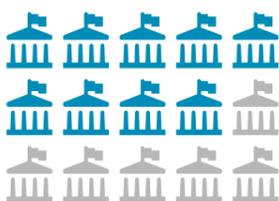
## Coordinating country

Greece

## Participating countries/ 7



## Partners/ 9



## Coordinating institution

Hellenic Agricultural Organization "Demeter" - HAO



HELLENIC AGRICULTURAL ORGANIZATION "DEMETER"

Scientific Coordinator:  
TZIRITIS, Evangelos  
tziritis@gmail.com  
e.tziritis@swri.gr

## Expected impacts

MEDSAL is expected to have significant impact on water resources availability and quality by improving the identification and definition of adequate strategies and measures for the protection and management of salinization in coastal aquifers.

## Mediterranean Coastal Aquifer: 6 case-studies of MEDSAL



## SPECIFIC OBJECTIVES OF THE PROJECT

- ✓ Deliver new tools for the identification of variable (multi-induced) and often cascading salinization sources and processes
- ✓ Identify new patterns and develop new proxies for monitoring, assessment and forecasting of groundwater salinization in areas with scarce data and/or limited financial and human resources
- ✓ Elaborate tailor-made risk assessment and management plans by coupling salinization forecasts with climate change impacts and future scenarios
- ✓ Develop a public domain web-GIS Observatory for monitoring, alerting, decision support and management of coastal groundwater reserves around Mediterranean



## Thematic area

### Water Management



## Section II

Topic 1.3 - Irrigation technologies and practice



## Budget

1.426.208,00 €



## Duration

36 months



## Project

# 15/MEDWATERICE

Towards a sustainable water use in Mediterranean rice-based agro-ecosystems

## Context

In the Mediterranean basin, rice is cultivated over an area of 1,300,000 hectares. The most important rice-producing countries are Italy and Spain in Europe (72% of the EU production; 345,000 ha), and Egypt and Turkey among the extra-EU countries (almost totality of the production; 789,000 ha). Traditionally, rice is grown under continuous flooding; thus, it requires much more irrigation than non-ponded crops. On the other hand, rice is strategic for food security in some countries (Egypt), and human consumption in the whole Mediterranean is steadily increasing.

## Objectives

The project aims at exploring sustainability of innovative irrigation options, in order to reduce rice water consumption and environmental impacts, and to extend rice cultivation outside of traditional paddy areas to meet the escalating demand. The MEDWATERICE consortium includes universities, research centres and private companies operating in the Mediterranean area (IT, ES, PT, EG, TR, IL). Case studies will be conducted in pilot farms of the countries involved in the project. Alternative irrigation methods to be tested will be tailored to local conditions using a participatory action research approach through the establishment of Stake-Holder Panels (SHPs) in each country, which will include regional authorities, water managers, farmers' associations and consultants, and private companies of the rice production chain. For each irrigation solution, innovative technologies and the most appropriate rice varieties and agronomic practices will be adopted to minimize impacts on yield quantity and quality. Data collected at the farm level will be extrapolated to the irrigation district level to support water management decisions and policies. Indicators for quantitative assessment of environmental, economic and social sustainability of the irrigation options will be defined.

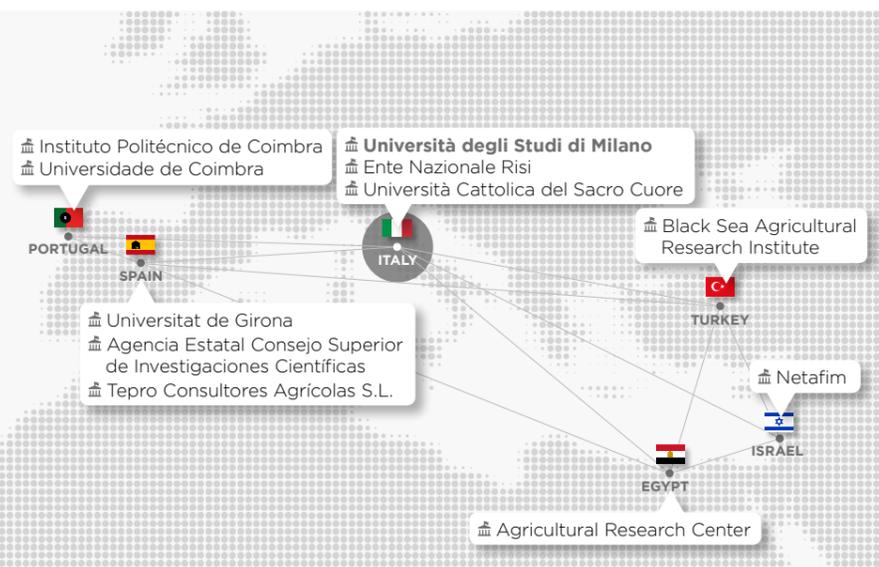
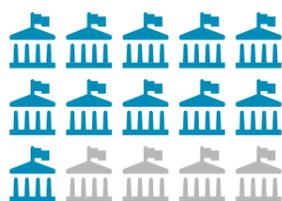
## Coordinating country

Italy

## Participating countries/ 6



## Partners/ 11



## Coordinating institution

Università degli Studi di Milano



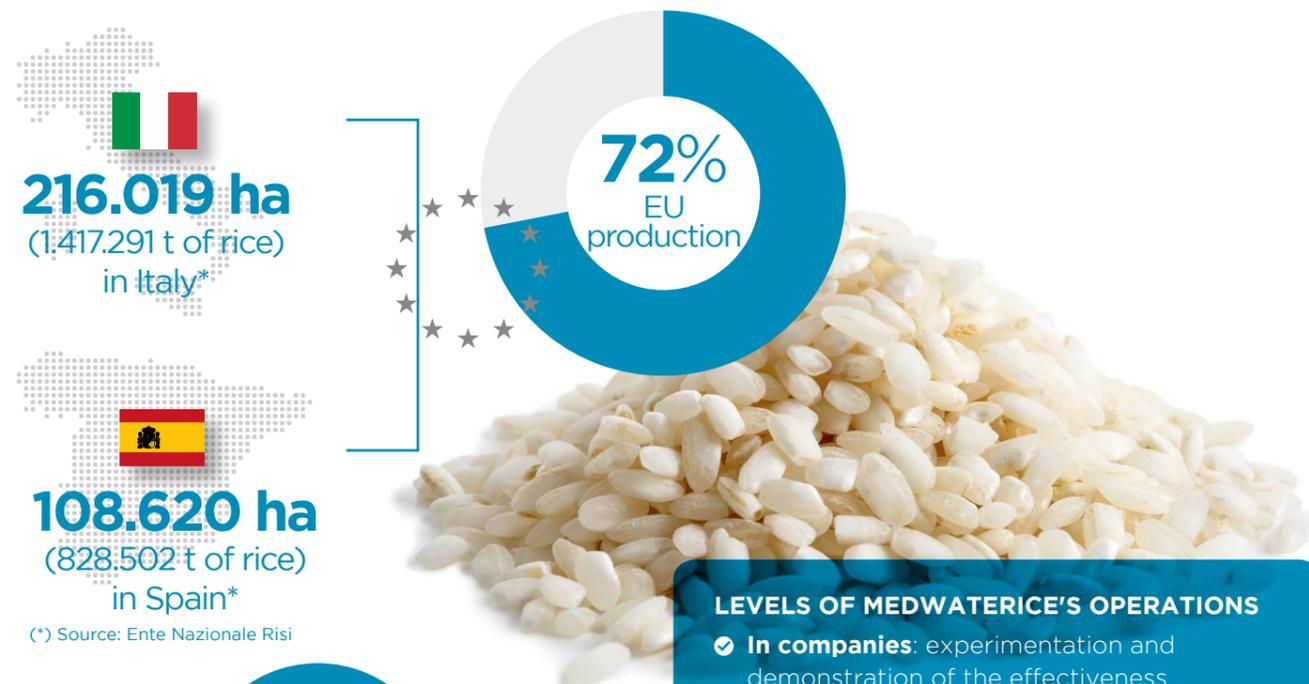
UNIVERSITÀ  
DEGLI STUDI  
DI MILANO

Dipartimento di Scienze Agrarie e Ambientali - Produzione, Territorio, Agroenergia  
Dipartimento di Scienze e Politiche Ambientali

Scientific Coordinator:  
FACCHI, Arianna  
arianna.facchi@unimi.it

## Expected impacts

Outcomes generated by MEDWATERICE are aimed at injecting tailored and updated knowledge to improve the sustainability of rice production in the countries of the Mediterranean area, with particular attention to the adoption of water-saving techniques. The MEDWATERICE consortium believes that the main barriers/obstacles to the achievement of the expected impacts are the economic sustainability of the proposed innovations and their social acceptance. For this reason, the project will: carry out an overall sustainability assessment of the irrigation solutions (including the economic dimension); be developed in close cooperation with the SHPs in all the project's phases, to improve the communication among all the actors involved and the transfer of project's results to the agricultural sector and decision makers; include the preparation and dissemination of technical best practice documents to support the effective implementation of irrigation solutions.



## LEVELS OF MEDWATERICE'S OPERATIONS

- ✓ **In companies:** experimentation and demonstration of the effectiveness of irrigation alternatives to continued submersion, also through the development of new methodological approaches and technologies. Guidelines with good practices for the implementation by rice farmers will be also defined;
- ✓ **Concerning irrigation:** development of an agro-hydrological simulation system which will allow to simulate the irrigation efficiency of scenarios of specific irrigation solutions, also considering territorial water recoveries. This tool could be really interesting for decision makers and managers of water resources for irrigation purposes.

1.3ML ha  
area planted with rice in the Mediterranean area

## Thematic area

### Water Management



## Section II

Topic 1.3 - Irrigation technologies and practices



## Budget

757.499,00 €



## Duration

36 months



## Project

# 16/ PRECIMED

Precision Irrigation Management to Improve Water Use Efficiency in the Mediterranean Region

## Context

In the 21st century, some problems like water quality degradation, underground water depletion, demographic unbalances between rural and urban areas or soil salinization process, has become evident in arid and semiarid areas. Some of these problems are especially relevant in the Mediterranean Region, where agriculture is one of the most dynamic and productive sectors, but also the most vulnerable to water scarcity. In this sense, there is a need to look for technologies that increase water use efficiency and make available additional (non-conventional) water sources for fertirrigation, decreasing water scarcity and the discharge of water and nutrients to the environment.

## Objectives

The general objective of PRECIMED will be the development, validation and transfer of a data driven irrigation management system, in order to improve Water and Nutrient Use Efficiency in the Mediterranean Region, by integrating the knowledge about fertilizers and irrigation water management with Information Communication Technologies (ICTs), which will be respectful with the environment and socioeconomically profitable. The solution provided by PRECIMED is a system that can be easily accessed and handled by the end-user through customer-friendly interfaces. This system will be comprised of several subsystems; Data Acquisition, DSS and User Interaction subsystems, each of them composed of different sources of information and component like state-of-the-art agronomical sensor, soil and crop databases, etc. PRECIMED will be able to collect large amount of crop data, which will be processed and analyzed by the system, after which it will provide feedback about crop needs and real time recommendations to the farmers with respect to irrigation and fertilization best practices.

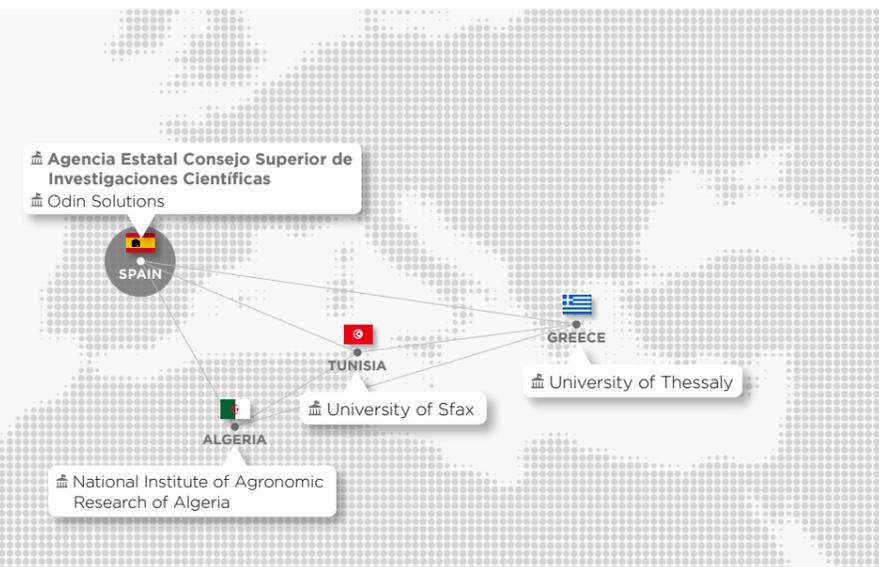
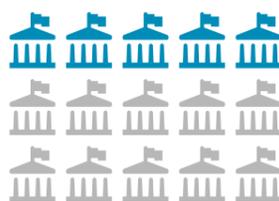
## Coordinating country

Spain

## Participating countries/ 4



## Partners/ 5



## Coordinating institution

Consejo Superior de Investigaciones Científicas CSIC



Scientific Coordinator:  
ORTUÑO, María Fernanda  
mfortuno@cebas.csic.es

## Expected impacts

The main impact foreseen by PRECIMED is to improve the farm productivity through the reduction of costs and the increase of the crop yield with a solution that minimises the environmental impact due to the sustainable use of resources, and to reduce the human laborious tasks while feasible business models are generated for the different farming scenarios. PRECIMED will allow the consortium to reach a useful system, tested and validated by supporting farmers in the different participating countries, and therefore to reduce the gap between application developers and agricultural player. PRECIMED will also create stronger bridges between the two shores of the Mediterranean basin, which is composed of EU and non-EU countries.



## Thematic area

### Water Management



## Section I

Topic 1.2 - Sustainable, integrated water management



## Budget

1.107.208,00 €



## Duration

36 months



## Project

### 17/Sustain-COAST

Sustainable coastal groundwater management and pollution reduction through innovative governance in a changing climate

## Context

The need for the implementation of innovative governance of coastal aquifers taking into account the technological development as well as socio-economic factors, has become a worldwide necessity. In compliance with the challenges and scope of the PRIMA call topic 1.2 "Sustainable, integrated water management", Sustain-COAST was designed to explore innovative governance approaches of coastal aquifers among multiple water users and beneficiaries, under the uncertainties posed by the changing climate conditions, in four Mediterranean countries.

## Objectives

Sustain-COAST intends to develop a calibrated multi-criteria decision supporting system (DSS) and a web Geographical Information System platform accessible for water stakeholders and policy makers. The DSS and platform, combined with a specific animation activity will allow: i) the engagement of social actors in a learning process around water issues at catchment scale based on visualization of interactive thematic maps, ii) the use of advanced technologies and tools, such as optical sensors and remote sensing capacities for a participatory monitoring of water, iii) the use of calibrated numerical models for the time-space simulation of water quantity and quality progress. Sustain-COAST will explore new governance approaches to effectively support the coastal aquifer conservation against anthropogenic and climatic pressures, through the promotion of innovative water management concepts based on the 4R principles: Reduce; Recycle; Reuse and Recover. The overall objective of Sustain-COAST is to design and test innovative governance approaches to MED coastal water resources to improve their management and mitigate their pollution by creating new long-lasting spaces for social learning among multiple interdependent stakeholders, people, NGOs, and scientific researchers at four case studies located along the shores of the MED Sea (Greece, Turkey, Tunisia and

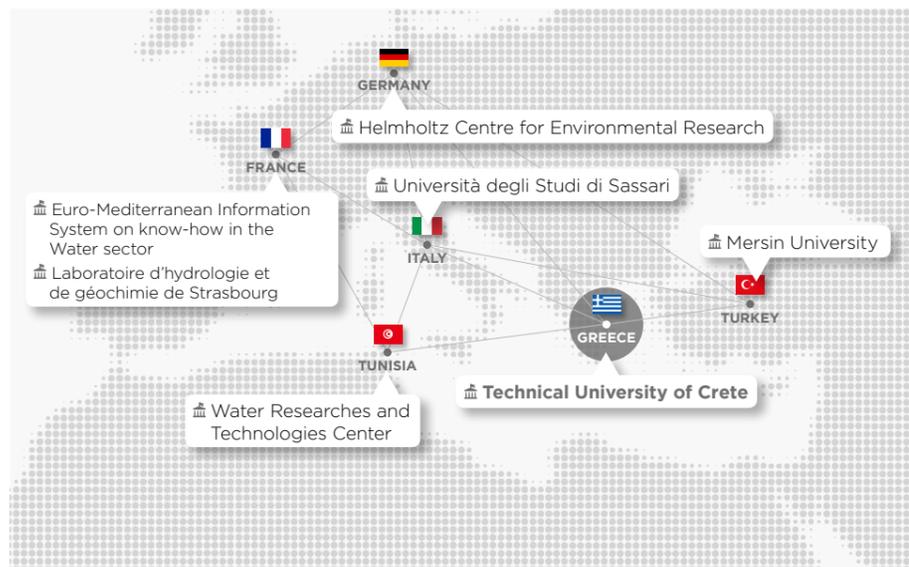
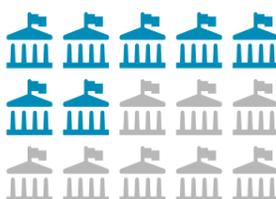
## Coordinating country

Greece

## Participating countries/ 6

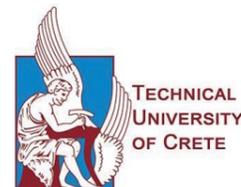


## Partners/ 7



## Coordinating institution

### Technical University of Crete



Scientific Coordinator: KARATZAS, Georgios karatzas@mred.tuc.gr

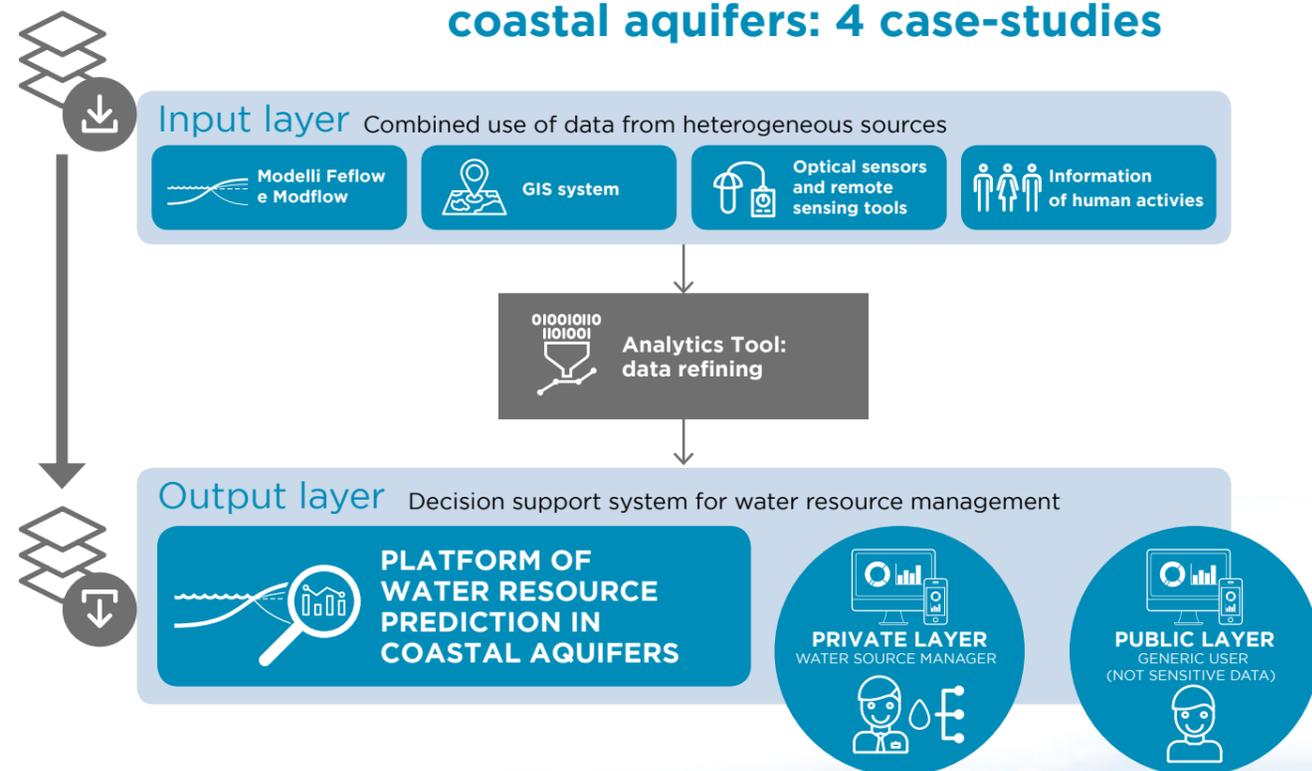


Italy). This inclusive process will provide evidence for the identification of new configurations for governance (conceptual, institutional and practice based) to improve the integrated water management of the coastal aquifers in the MED region considering both the quantitative and qualitative aspects. Within Sustain-COAST, the application of the common principles of good governance such as: equity, legitimacy, efficiency, transparency and accountability, will be implemented in order to shift towards: i) decentralization, ii) systematic civil society engagement in decision-making processes about water management, and iii) engagement of the private sector in solid public-private partnerships. For these aims, Sustain-COAST will be based on innovative actions and plans aiming to multiple win-win situations to the set of diverse stakeholders that acknowledge the need for an integrated approach to water users as a novel governance approach (see Section 3). These actions and plans will emerge from socio-economic assessments supported by interactive decision supporting tools (DSS) that will allow stakeholders to conceptualize complex interactions and to take the informed decisions regarding the water resources management.

## Expected impacts

The dissemination strategy of the main outcomes of this project will be tailored on the targeted audiences, including scientific communities, decision makers, local stakeholders and other public audiences. Thanks to this project, new options will be available to private and public bodies for sustainable Mediterranean coastal groundwater management based on an improved response-ability of all concerned actors taking into account the local environmental and socio-economic context.

## Innovative governance of the MED coastal aquifers: 4 case-studies



## Thematic area

### Water Management



## Section II

**Topic 1.2** - Sustainable, integrated water management



## Budget

1.390.397,00 €



## Duration

36 months



## Project

### 18/SWATCH

Strategies for increasing the WATER use efficiency of semi-arid Mediterranean watersheds and agrosilvopastoral systems under climate CHANGE

## Context

The Mediterranean regions are subjected to a large variety of climates, ranging from arid to semi-arid with summers characterized by high temperatures and low precipitation. At the same time the water scarcity highlights the need for careful water resources management and planning in Mediterranean regions. Over the past century, climate change has been affecting precipitation regimes across the world. In the Mediterranean regions there is a persistent declining trend of precipitation and runoff decreases, contributing to a desertification process with dramatic consequences for agricultural and water resources sustainability. Climate change projections point to an amplification of changes in global precipitation patterns and trends, with further drier trends for the Mediterranean area. These trends will have dramatic consequences on water resources for both managed (e.g., agricultural) and natural systems.

## Objectives

The overarching goal of this research project is to develop and apply innovative methodologies to increase the social-ecological water use efficiency of managed ecosystems along the Mediterranean biome and climate types, in the face of drier and more extremes climates. We will focus on a diverse set of seasonally dry ecosystems, spanning a large gradient of mean annual rainfall (from 35 to 935 mm/y) across the Mediterranean biome. Case studies will examine the Mediterranean Sea basin from west to east and north to south providing the exceptional opportunity to develop, identify and compare water resources management and planning strategies for contrasting climate conditions in the Mediterranean region.

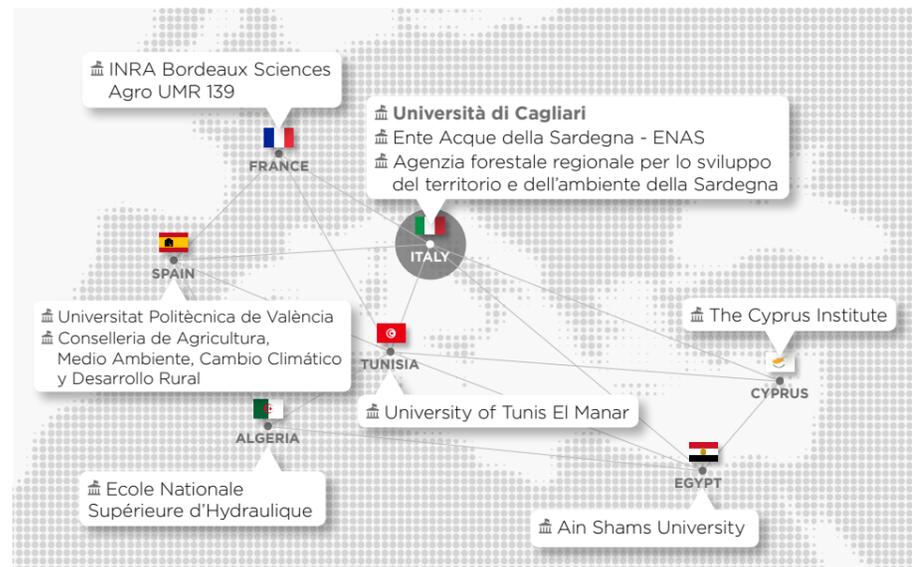
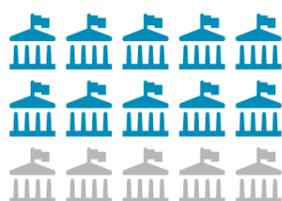
## Coordinating country

Italy

## Participating countries/ 7



## Partners/ 10



PRIMA - Funded Projects 2018 | 70

## Coordinating institution

Università degli Studi di Cagliari



Università degli Studi di Cagliari

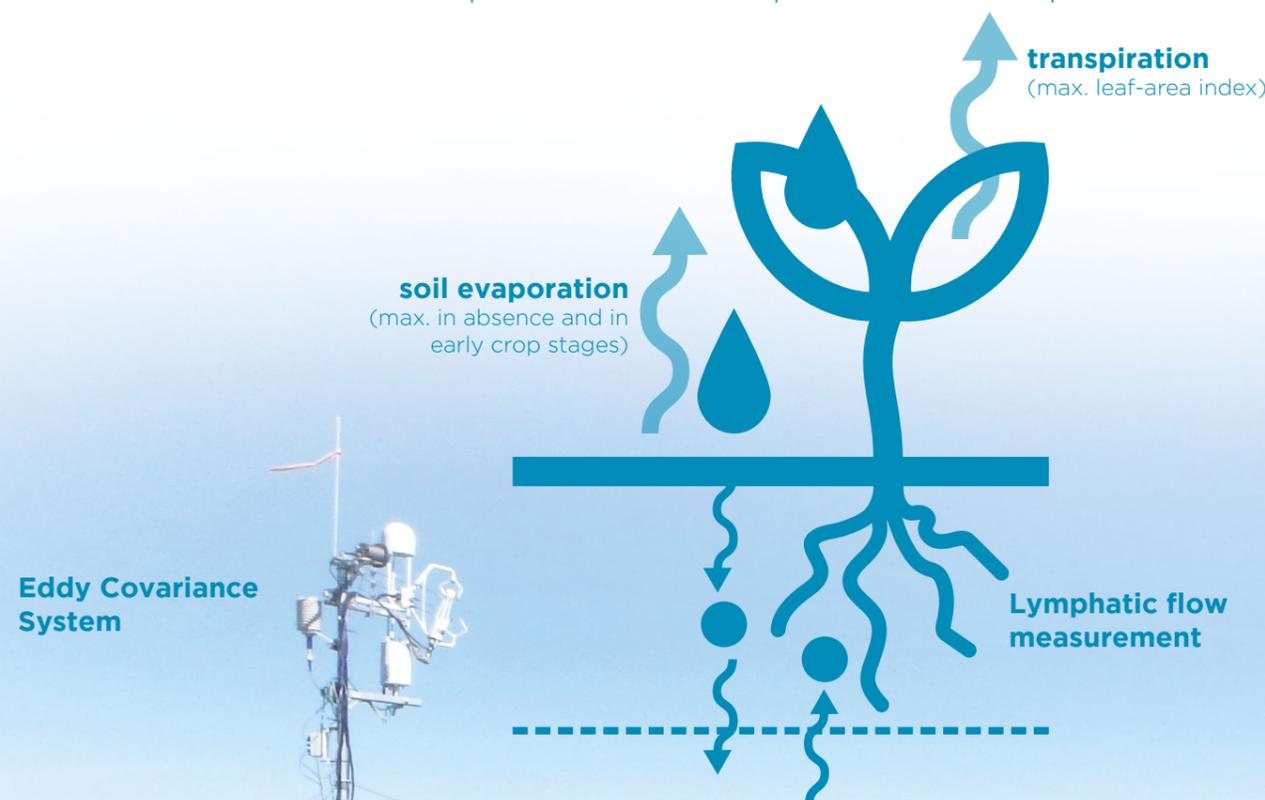
Dipartimento di Ingegneria Civile, Ambientale e Architettura

Scientific Coordinator: MONTALDO, Nicola nmontaldo@unica.it

## Expected impacts

The project objectives respond to common priorities on societal challenges of most of the international organizations dealing with the protection of the planet's natural renewable resources and food security, which are enhanced due to the increase of human pressure and of climatic changes on fresh water. The project economic impact will be significant for agricultural development and its sustainability since it will increase the system efficiency and decrease the overall costs. Stakeholders will be involved and will have a main role in the project. The project will provide to the stakeholders the scientific approach and results for defining the planning and management strategies for both current and future climates.

## Evapotranspiration measurement optimization of crop water consumption



## Water balance



## Thematic area

### Farming Systems



## Section II

**Topic 2.2** - Preventing and controlling emergence of animal and plant pests and diseases



## Budget

634.945,00 €



## Duration

48 months



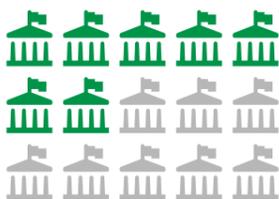
## Coordinating country

France

## Participating countries/ 4



## Partners/ 7



## Project

### 19/ADAPT-HERD

Management strategies to improve herd resilience and efficiency by harnessing the adaptive capacities of small ruminants

## Context

The main effect of climate change on livestock production systems is to induce changes in resource availability. Rising temperatures and lower or unpredictable rainfall patterns decrease primary biomass production and thus forage availability. Improving resilience and efficiency at herd level will contribute to improve resilience and efficiency at the farm level and therefore will be a key element of adaptation of small ruminant systems to climate change. The challenge is to find strategies that are good enough in terms of efficiency, to ensure sufficient income for farmers, and also good enough in terms of resilience, to ensure farm sustainability. In other words, the challenge is not to find an optimal strategy for R&E, but to explore how management strategies impact the relationship between R&E. Small ruminants are recognized for having strong biological mechanisms to deal with constraining and fluctuating environmental conditions, particularly with respect to feeding resources. Such adaptive capacities can be fully integrated within management strategies to improve resilience and efficiency at the herd level.

## Objectives

To develop management simulation tools to implement innovative strategies for resilience and efficiency in small ruminant herds, based on harnessing animal adaptive capacities. These tools will address a wide range of current feed resource constraints in the Mediterranean area (Egypt, France, Spain and Tunisia) and the future perturbations induced by climate change. The locally tailored management solutions will improve the ability of livestock systems to adapt to climate change by: i) managing early-life nutrition to safeguard adult adaptive capacities; ii) managing reproduction to find the best match between feed supply and herd demand; iii) tailoring group feeding strategies depending on animals' adaptive capacities and

## Coordinating institution

### Modélisation Systémique Appliquée aux Ruminants MoSAR



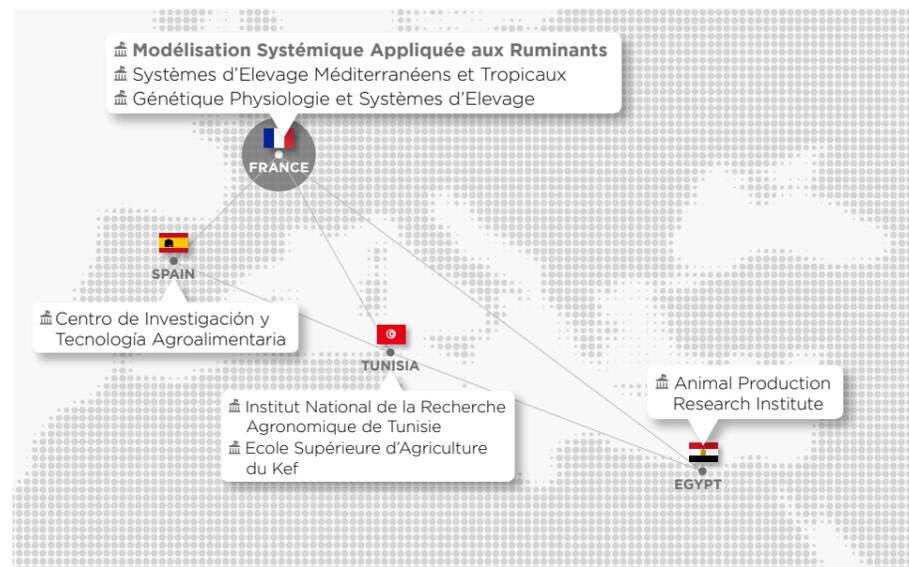
Modélisation Systémique Appliquée aux Ruminants

Scientific Coordinator:  
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iv) managing herd demography with replacement and culling to adjust feed demand.

## Expected impacts

The project will provide new information on animal adaptation and resilience due to the current and future Mediterranean environmental conditions through an improved understanding of the interaction between genotype and early-life environment on adult adaptive capacity. It will also provide technical solutions based on local breeds adaptive capacities, thus contributing to the valorisation of the local biodiversity. By assessing the effects of climate change scenarios on resilience and efficiency for various technical options, the project provides useful results to support decision in rural development pathways. Finally, it will deliver tools to enhance future innovation in the Mediterranean area with protocols to organize data collection and a common modelling architecture, based on a user-friendly toolbox.ment strategies for both current and future climates.



## Thematic area

### Farming Systems



## Section II

**Topic 2.2** - Preventing and controlling emergence of animal and plant pests and diseases



## Budget

687.283,00 €



## Duration

36 months



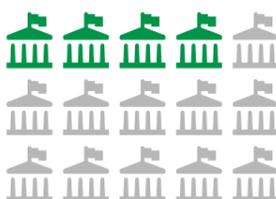
## Coordinating country

Italy

## Participating countries/ 4



## Partners/ 4



## Project

### 20/Blue-Med

A novel integrated and sustainable approach to monitor and control Bluetongue in the Mediterranean Region

## Context

The world's climate appears now to be changing at an unprecedented rate. Although it is a complex phenomenon and its full-scale impacts are hard to predict far in advance, it is well established that it influences the emergence of diseases particularly vector-borne diseases (VBDs). The potential impact of climate change on vector distribution and VBD incidence is of very significant and immediate concern. There is considerable evidence that changes in the phenology and distribution of a wide range of arthropod species have occurred in response to climate change worldwide. No region is immune from the negative impact of climate change. The Mediterranean region is also vulnerable to climatic changes and it is expected that the incidence of VBD in the region will increase in the next coming years. Several outbreaks of different VBDs have been recently documented in the region and it clearly appears that it has been playing a crucial role in emerging and spreading animal diseases particularly those transmitted by vectors such as Bluetongue (BT), Epizootic Haemorrhagic disease (EHD), Lumpy Skin disease etc. These are severe diseases, which have caused and are causing dramatic losses on the livestock industry with strong economic and social consequences. This project mainly deals with BT, which has been one of the most feared VBDs occurring in the Mediterranean region in the last two decades with an impact ranging from 85 million to 1.4 billion/year at national level.

## Objectives

In our intention, BT should represent a model not only for the other Orbiviruses (such as African horse sickness virus or EHDV, which shares the same vector species) but also for other insect transmitted diseases, including those which infect humans. Using a multidisciplinary approach, which includes veterinarians, biologists, entomologists, pathologists, stat-

## Coordinating institution

Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise



Department of Virology

Scientific Coordinator:

SAVINI, Giovanni

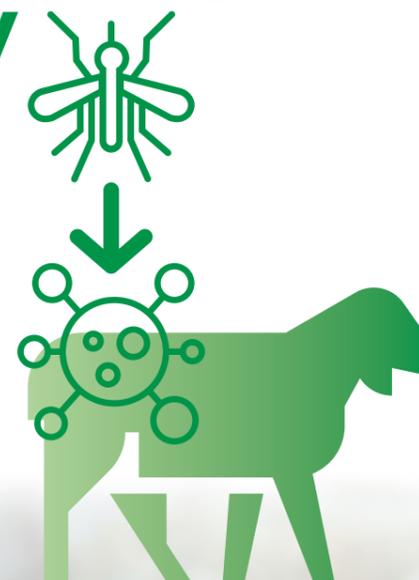
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isticians, epidemiologists and bioinformaticians and through an integrative and sustainable surveillance program where, exploiting web facilities and new technologies, entomological, virological and serological data will be integrated with relevant climatic and environmental variables, this project aims at obtaining scientific knowledge on this viral disease and at understanding what is behind a new strain incursion and spreading.

## Expected impacts

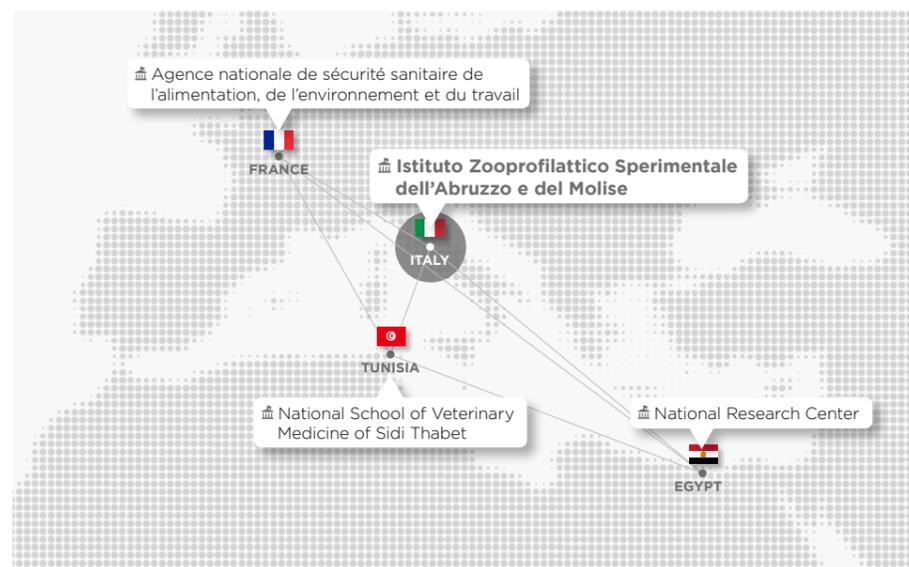
This information will be fundamental to design preventive actions capable of limiting the incursion and spread of these viruses in Northern Africa and Europe. Their application will mitigate the impact of the disease on the region with great benefit to the health and welfare of farm animals, which will ultimately support the family farmers and the economic development of the agricultural sector in the area.

# Bluetongue BTV



## SPECIFIC OBJECTIVES OF THE PROJECT

- ✓ Provide integrated control solutions/pest and disease management updating the molecular epidemiological picture of BTV and potential new viruses (including EHDV and atypical BTV strains) from ruminants and camelids sampled in Tunisia, Egypt, Italy and France;
- ✓ Introduce innovative diagnostic tools, including portable platforms of new generation sequencing (NGS) to be used in the field;
- ✓ Identification of risk factors that produce an inactivated vaccine prototype BTV-3 and develop biosystems that avoid rapid increase in resistance of parasites/pathogens;
- ✓ Establish research and surveillance networks of diseases in close connection with the official ones such as the Euro-Mediterranean network for animal health (Remesa);
- ✓ Carry out dissemination activities to make everyone aware of research progresses and their implications and to help authorities monitoring and controlling disease outbreaks.



## Thematic area

### Farming Systems



## Section II

**Topic 2.1** - Adaptation of agriculture to climate change



## Budget

1.680.950,00 €



## Duration

36 months



## Project

### 21/FREECLIMB

Fruit crops adaptation to climate change in the Mediterranean basin

## Context

The climatic scenario predicted for the Mediterranean areas poses specific challenges for agricultural productions. The vulnerability of agricultural sectors to the modification of agro-climatic conditions depends on both the expected regional climate change and the sectors' ability to adapt. For their perennial status, fruit tree crops are particularly exposed to environmental change. Quality and quantity of fruit productions are strongly affected by genotype x environment interactions.

## Objectives

The FREECLIMB project is built to match topic 2.1 of the PRIMA framework in developing smart and sustainable farming systems in Mediterranean countries, to preserve natural resources (water and land use) by increasing production efficiency. This will be pursued by advancing knowledge on mechanisms of plant environmental adaptation and biotic/abiotic stress resilience. The project targets major fruit tree species with the aim of improving the availability of breeding and germplasm material adapted to limited external resources (input) and future climatic scenarios predicted for the Mediterranean area, through the characterization and exploitation of local biodiversity. The project will focus on key ideotypes elaborated in collaboration with Fruit Farming Actors (FFAs, breeders, nurseries, growers) with the core objective of providing a toolkit (diverse germplasm, tools and methods) to accelerate exploitation, breeding and selection of resilient varieties in key traditional fruit crops of Mediterranean agriculture (stone fruits such as peach, apricot and almond; Citrus spp.; grape and olive).

## Expected impacts

Considering Southern countries climate as representative of changing scenarios predicted for Northern ones, FREECLIMB will strongly benefit from

## Coordinating institution

### Università degli Studi di Milano



UNIVERSITÀ  
DEGLI STUDI  
DI MILANO

Dipartimento di Scienze Agrarie e Ambientali - Produzione, Territorio, Agroenergia

Scientific Coordinator:  
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collaboration between the South and North Mediterranean shores: for each species targeted by the project at least two countries are involved one from the North and one from the South. The balanced composition of the consortium ensures an equal footing approach with particular attention to co- ownership of results, mutual interest and shared benefits.

## 6 FRUIT SPECIES OF THE STUDIED MEDITERRANEAN AREA



## SPECIFIC OBJECTIVES OF THE PROJECT

- ✓ applying protocols (e.g. phenotyping methods) and integrated tools (e.g. genotyping methods, data analysis) to support the characterization, exploitation and selection of varieties adapted to a range of agro- ecological and management conditions
- ✓ dissecting the genetic bases of traits/processes linked to sustainability and plant resilience to biotic and abiotic stresses, with particular focus on disentangling genotype-by-environment-by-management (GxExM) interactions
- ✓ unravelling the molecular, biochemical and physiological basis of plant adaptation to different environmental (soil and climate) and agronomic conditions (water management) and to biotic/abiotic (single or multiple) stresses
- ✓ developing and applying genomics-based breeding methods to improve introgression and selection efficiency
- ✓ devising adaptation strategies to cope with the combined effects of multiple stresses possibly co-occurring under field conditions (e.g. heat waves and drought, pests and diseases)
- ✓ exploiting germplasm resources, by identifying and characterizing spontaneous and domesticated sources of biodiversity
- ✓ transferring project results through training and dissemination activities dedicated especially to breeders (focusing on young scientists), nurserymen, growers and stakeholders, particularly in those countries where fruit production is less developed

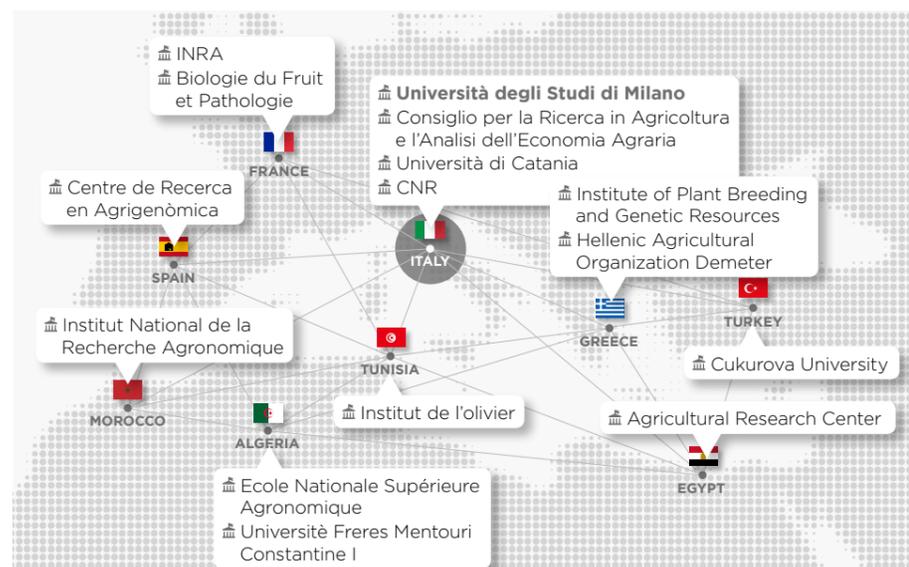
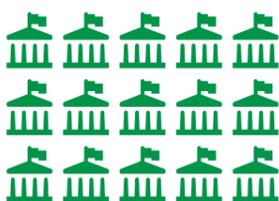
## Coordinating country

Italy

## Participating countries/ 9



## Partners/ 15



## Thematic area

### Farming Systems



## Section II

**Topic 2.2** - Preventing emergence of animal and plant pests and diseases



## Budget

916.545,00 €



## Duration

36 months



## Project

### 22/GeMed

Prevention and control of new and invasive geminiviruses infecting vegetables in the Mediterranean

## Context

Tomatoes and cucurbits are among the major vegetables grown in the Mediterranean, ranking 2nd and 3rd after potatoes. Their intensive production, with year round crops and a limited number of cultivars expose them permanently to the emergence and invasions of pathogens including viruses. Geminiviruses are among the most worrying viruses of these crops due to their economic impact, the frequent introduction of new exotic species into the Mediterranean and the continuous emergence of potentially invasive and resistance breaking strains generated by recombination.

## Objectives

Prevention and control of these viruses is the major objective of GeMed project. The specific objectives, tackled by virologists, entomologists, geneticists, breeders, biologists and computer scientists are to:

1. broaden the knowledge of the ecology of new and potentially invasive geminiviruses with the involvement of partners located at the four cardinal points of the Mediterranean;
2. understand outbreak phenomena of invasive recombinant geminiviruses with field observations and analysis of plant-virus interaction using resistance-breaking viral clones and deep small RNA-ome and transcriptome sequencing and bioinformatics;
3. diversify integrated pest management solutions against insect vectors with plant derived metabolites and against viruses with RNA vaccination of crop plants.

The innovation potential of GeMed is in the exploration of molecular mechanisms underpinning an outbreak phenomenon, the search of new resistance genes, and validation of exogenous RNAi based plant protection approaches.

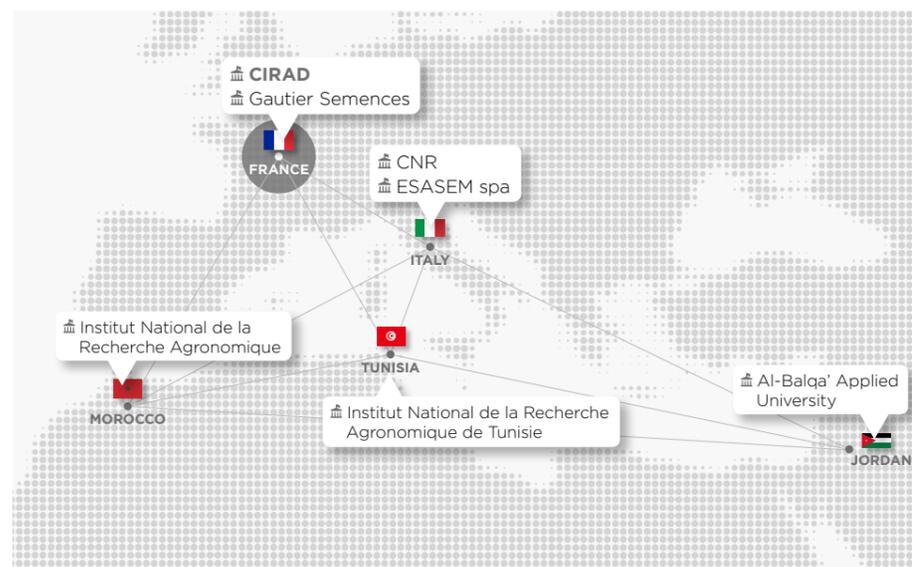
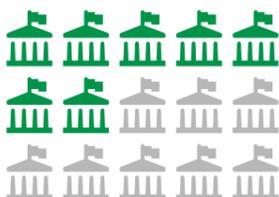
## Coordinating country

France

## Participating countries/ 5



## Partners/ 7



## Coordinating institution

**Centre de Coopération Internationale en Recherche Agronomique pour le Développement - CIRAD**



Scientific Coordinator:  
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## Expected impacts

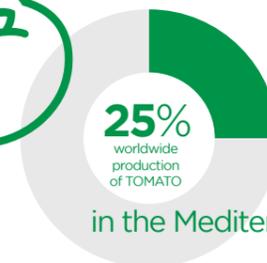
Stakeholder knowledge and the potential of exploitation and dissemination of the result is embedded in the consortium with full participation of two seed companies and the association with various professional organisations interested in GeMed. Larger dissemination will be done via International plant protection organisations (EPPO, ProMED).

# 19 M t

Cucurbitaceae production in the Mediterranean area



## Prevention and control of Geminivirus



## Thematic area

### Farming Systems



## Section II

**Topic 2.1** - Adaptation of agriculture to climate change



## Budget

1.266.367,00 €



## Duration

36 months



## Project

# 23/GENDIBAR

Utilization of local genetic diversity to understand and exploit barley adaptation to harsh environments and for pre-breeding

## Context

In the Mediterranean region, barley is a key cereal crop that contributes to ensure food security of the Southern populations because of its adaptability in low rainfall and less favourable, low input and stress prone environments. Climate change is expected to jeopardize barley yield, yield stability and, therefore, food security across the entire Mediterranean region, a trend already substantiated in some areas during the last years. These challenges, along with the need of a greater barley production for food and feed, make it urgent to target barley genetics and management practices to boost barley yield.

## Objectives

GENDIBAR aims to acquire new knowledge in the genomics and agronomy field on the physiological and molecular mechanisms related to the barley adaptation to abiotic stresses caused by climate changes in the Mediterranean basin, enhancing the biodiversity of local ecotypes through the pre-breeding. Pre-breeding includes a whole series of activities aimed at identifying desirable characters coming from materials that are not suitable for use in varietal development, and at transferring these characters to an intermediate set of materials to create new varieties. GENDIBAR will adopt solutions based on the molecular characterization and sequencing of local barley ecotypes, working on gene expression studies during specific development phases and on new simulation algorithms for the creation of high productivity ideotypes.

## Expected impacts

GENDIBAR will acquire new knowledge to fill the existing research gaps to adapt barley farming in relation to the projected climate change and shifts of the agroecological zones, which in turn will contribute to ensure food

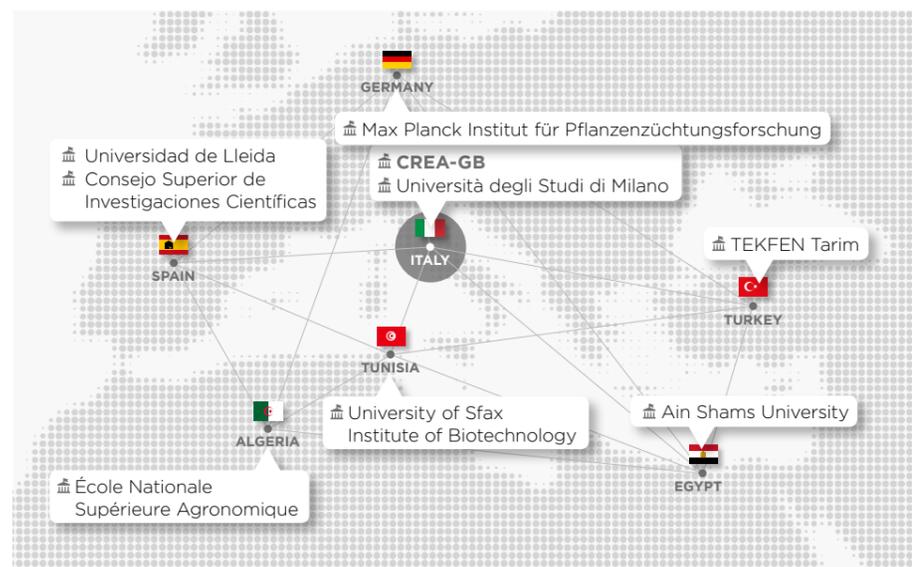
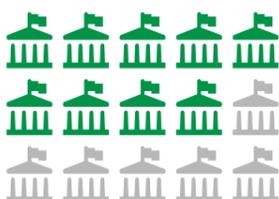
## Coordinating country

Italy

## Participating countries/ 7



## Partners/ 9



## Coordinating institution

**Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria**



Centro di Genomica e Bioinformatica (CREA-GB)  
Scientific Coordinator:  
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agostino.fricano@crea.gov.it

security in the Mediterranean. To valorise barley biodiversity, sequencing data, pre-breeding material and phenotyping results will be shared with scientists and other project stakeholders, using publicly available databases of biological information. One of the legacies of GENDIBAR will be the deployment of the pattern of genetic variants in selected genotypes, which will allow other scientists to sustain current and future barley breeding programmes in different agro-ecological zones of the Mediterranean.

MAJOR CHALLENGES	WORK PACKAGES
<b>DISPLACEMENT OF MEDITERRANEAN AGRO-ECOLOGICAL AREAS</b>	Phenology control of barley ecotypes adapted to Mediterranean environments Tolerance and resilience to abiotic stresses using native traits
<b>LACK OF DROUGHT AND HIGH TEMPERATURES RESISTANT VARIETIES</b>	Molecular markers associated with advantageous alleles Control of biological processes during sensitive phases of barley development
<b>INEFFICIENT EXPLOITATION OF GENETIC DIVERSITY OF LOCAL ECOTYPES</b>	Genetic improvement with the pre-breeding

# pre-breeding

for resilience to biotic and abiotic stresses



# 10 million ha

cultivated with barley in the Mediterranean area



## SPECIFIC OBJECTIVES OF THE PROJECT

- ✓ Assembling a collection of local geo-referenced barley landraces, along with crucial bioclimatic variables of collection sites in Mediterranean agro-ecological zones
- ✓ Identifying genetic signatures of barley adaptation at the whole genome level and of adaptation syndromes at well-known key genes; determining the "true" pleiotropic effects of the genes PpdH1 and HvVrn1; and detecting new alleles for biotic stress resistance
- ✓ Characterizing the morphological, histological and genetic basis of the response to heat waves in the development of the reproductive structures of a selected panel of barley Mediterranean genotypes
- ✓ Improving model-aided design for creating realistic and achievable barley ideotypes based on actual field data for the different Mediterranean agro-ecological zones and future climate conditions along with the implementation of pre-breeding programs to enable the creation of tolerant and resilient barley varieties
- ✓ Transferring of the established genetic materials, knowledge and technologies to the stakeholders and providing hypotheses for new good agricultural practices aimed at minimizing the effects of climate change in current and future Mediterranean environments

## Thematic area

### Farming Systems



## Section II

**Topic 2.1** - Adaptation of agriculture to climate change



## Budget

715.238,00 €



## Duration

36 months



## Project

### 24/IMPRESA

Improving resilience to abiotic stresses in durum wheat: enhancing knowledge by genetic, physiological and “omics” approaches and increasing Mediterranean germplasm biodiversity by crop wild relatives-based introgressions

## Context

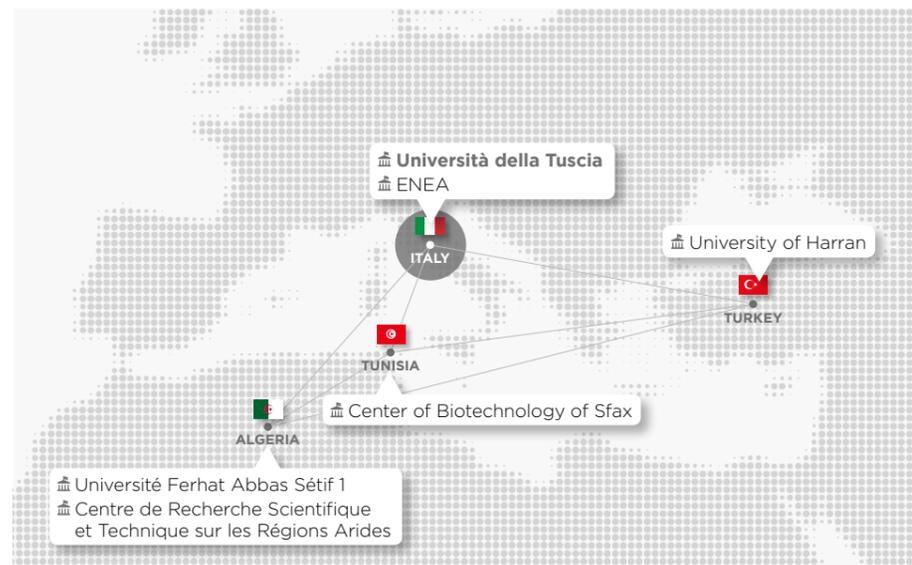
Sustainable production and management of biological resources are key agricultural drivers within a changing world. To ensure adequate food supply whilst safeguarding the environment, crop performance needs to be improved and environmental challenges (e.g. reduced arable land and water resources, abiotic stress conditions like temperature extremes and drought) addressed. Unconventional breeding strategies are required for a challenge-proof production of durum wheat (DW), strategic commodity and staple crop for countries surrounding the Mediterranean basin, and target species of IMPRESA.

## Objectives

As natural diversity of crops, including DW, has been depleted by breeding for high yield under optimal conditions, the overall objective of IMPRESA is to widen DW genetic basis by resorting to wild wheat relatives (WWRs), naturally adapted to stressful environments, hence valuable sources of tolerance genes. Focusing on DW lines possessing variable amounts of WWRs' genomes and genes therein, the operative strategy will be to integrate extensive trials, under natural (across countries) and induced abiotic stress conditions, with study of mechanisms/genes that increase DW performance under stress. The ultimate goal is to improve knowledge of the processes contributing to drought, heat and salinity tolerance, and to set-up solid bases to exploit the new knowledge and the unique genetic materials through the breeding pipeline, transferring the target traits into country-adapted DW varieties.

## Expected impacts

Overall, IMPRESA is expected to enhance knowledge of the way DW and its wild relatives interact with the environment and to improve breeding



## Coordinating institution

### Università della Tuscia



Dipartimento di Scienze Agrarie e Forestali, DAFNE

Scientific Coordinator:  
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effectiveness within Mediterranean countries. Specific expected impacts include:

1. Increased knowledge of genetic, physiological and metabolic mechanisms of plant response to major abiotic stresses affecting the Mediterranean area, focusing on the main cereal crop of the region, durum wheat, and its wild relatives, still largely untapped for the project's target traits;
2. Translation of results from laboratory to field, i.e. application of acquired knowledge to crop improvement strategies, aiming to develop stress-proof and adapted DW cultivars, with higher yield performance and stability. This, in turn, will enhance the market value of local DW germplasm;
3. Wider public engagement, through dissemination among project partners and local stakeholders of awareness of the advantages of the sustainable project's approach (use of WWRs and of non-GMO, “chromosome engineering” strategies) to maximize valorisation of natural and local biodiversity;
4. Implementation of “participatory” approaches, through close interaction with farmers and end-users;
5. Training and qualification of high-potential actors for future management and leadership in the field of sustainable, molecular-assisted and climate-responsive breeding.



## Introgressive hybridization for resilience to abiotic stresses

### Durum wheat (DW)



**Wild Wheat Relatives**  
wild graminaceae related to cultivated wheats

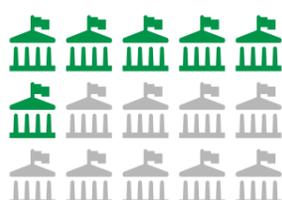
## Coordinating country

### Italy

## Participating countries/ 4



## Partners/ 6



**Thematic area**  
**Farming Systems**



**Section II**

**Topic 2.2** - Preventing and controlling emergence of animal and plant pests and diseases



**Budget**  
812.338,00 €



**Duration**  
36 months



**Coordinating country**  
**Greece**

**Participating countries/ 6**



**Partners/ 9**



**Project**  
**25/INTOMED**

Innovative tools to combat crop pests in the Mediterranean

**Objectives and expected impacts**

INTOMED will identify, develop, validate and promote effective and sustainable Integrated Pest Management (IPM) tools by (a) exploiting beneficial interactions between plants and soil-borne microbes and (b) identifying naturally derived key molecules (peptides, metabolites and RNAs) to enhance the resistance of economically important Mediterranean crops against major agricultural arthropod pests and pathogens, as well as by (c) assessing the social acceptability of the proposed tools by end-users. Soil-borne beneficial microbes have long been recognized for their ability to improve plant growth and nutrition and prime the plant immune system against pathogens and herbivores in plants.

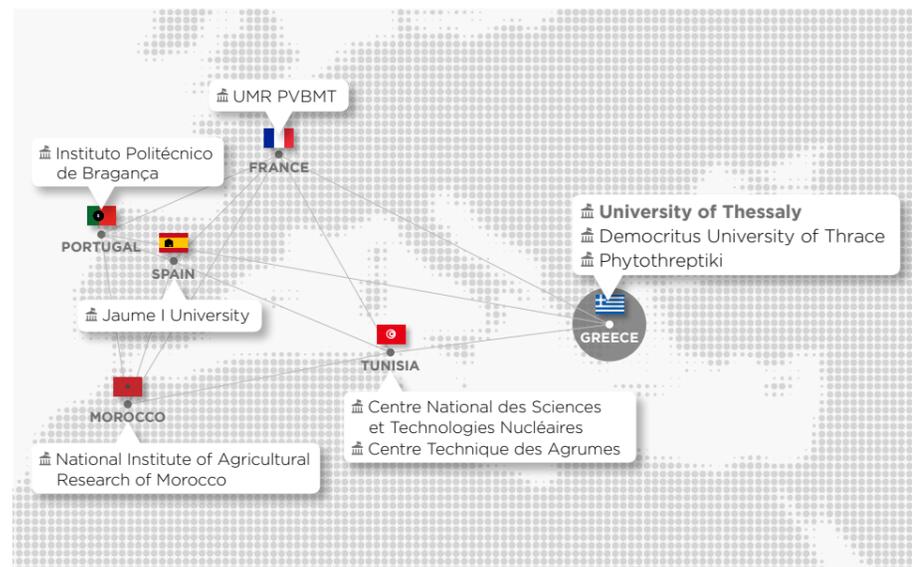
We thus aim to first, assess the potential of selected marketed and laboratory-owned strains of beneficial microbes, including endophytes, for their ability to improve crop resistance to arthropods and pathogens and second, study the molecular mechanisms involved in promising microbe-plant-pest combinations with the aim to also identify plant secondary metabolites and peptides that mediate enhanced resistance and technically support future commercial biocontrol products.

INTOMED also exploits the development of a GMO-free and effective pest control tool i.e. exogenous delivery of RNA molecules having the potential to trigger RNA interference (RNAi) against targeted pathogens/pests in both vegetables and fruit trees.

Pilot demonstration trials, targeting end-users (farmers, SMEs) will assess promising beneficial microbes and plant molecules. In addition, INTOMED will increase public awareness of the nature of the proposed tools and analyse the impact of their acceptance.

Gender will be specifically considered as a key factor in the acceptability of the proposed tools and risk perception.

Our consortium includes 9 academic and industrial partners from Greece, Spain, France, Morocco, Portugal and Tunisia.



**Coordinating institution**  
**University of Thessaly**



**UNIVERSITY OF  
THESSALY**

Department of Biochemistry  
and Biotechnology

Scientific Coordinator:  
PAPADOPOULOU, Kalliopi  
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Responsible and impactful research sits in the core of INTOMED that has been designed to generate knowledge, products, tools and processes (the INTOMED toolbox) to contribute and support the implementation of sustainable development goals in the Mediterranean and beyond.



## Thematic area

### Farming Systems



## Section II

**Topic 2.2** - Preventing and controlling emergence of animal and plant pests and diseases



## Budget

832.988,00 €



## Duration

36 months



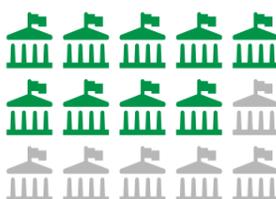
## Coordinating country

### Portugal

## Participating countries/ 6



## Partners/ 9



## Project

### 26/LAGMED

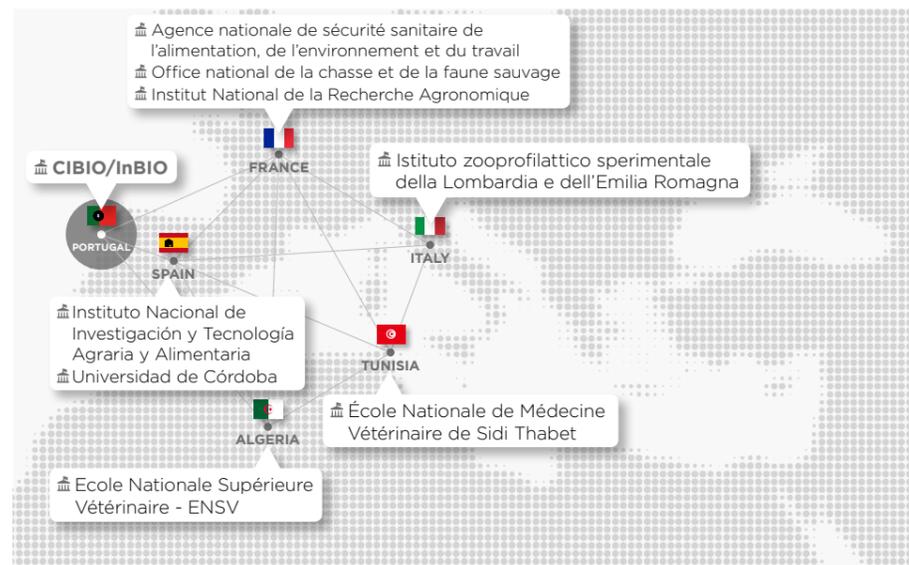
Improvement of preventive actions to emerging LAGoviruses in the MEDiterranean basin: development and optimisation of methodologies for pathogen detection and control

## Context

The traditional epidemiologic triad model holds that infectious diseases result from the interaction between pathogen, host and environment. In the last 30 years, European rabbit populations have been decimated by the rabbit haemorrhagic disease (RHD). RHD is caused by the RHD virus (RHDV), a Lagovirus of the family Caliciviridae, which causes a fulminant hepatitis that leads to death within 48-72h. In rabbitries, the initial impact of RHD slowly abated over time as a consequence of efficient vaccination campaigns and other control measures. However, in 2010, a new genotype named RHDV2 or RHDVb, and more recently GI.2, emerged in France with an unknown origin, but linked to the Euro-Mediterranean region. GI.2 possibly represents a new serotype and was detected both in wild and farm rabbits. Moreover, it has an ability to kill rabbits <11 days old, rabbits vaccinated against RHDV GI.1 (former G1-G6) or naturally immunised, and hares. This new genotype has been reported in Europe, Australia, America and Africa, and showed the relevant impact of this disease, particularly on the fragile equilibrium of the Mediterranean ecosystem. Indeed, RHD is still one of the most (if not the most) devastating diseases of rabbits.

## Objectives

The main objective of this project is to increase interdisciplinary scientific and technical knowledge on RHD and its aetiological agent. Particularly, we will monitor RHD epidemiology in the Mediterranean region and perform a genomic characterisation of circulating strains to develop more accurate, rapid and sensitive diagnostic tools. Considering the dynamics of the different GI.2 strains, we expect to test and determine the most adequate biosecurity measures to contain the disease and prevent future outbreaks both in the field and in rabbit-production systems.



## Coordinating institution

### Rede de Investigação em Biodiversidade e Biologia Evolutiva - CIBIO/InBIO



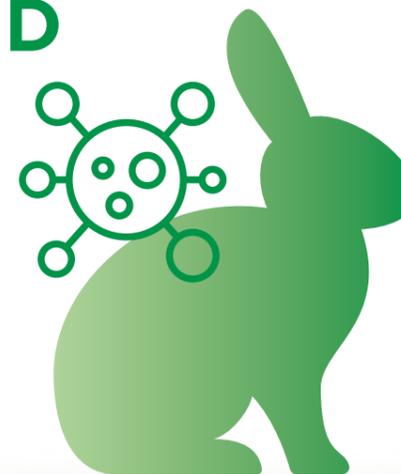
Scientific Coordinator:  
ABRANTES, Joana  
jabrantes@cibio.up.pt

We will study RHDV-host interactions to understand the role of the rabbit immune system for further vaccine design. Finally, knowledge gathered within the proposal will be used to train stakeholders, with emphasis in the African countries, on disease diagnosis and prophylaxis, and technical management.

## Expected impacts

LAGMED is expected to contribute to develop effective preventive actions, capable to reduce the negative socio-economic impact of future GI.2 outbreaks or of newly emergent RHDV genotypes of unknown origin, and to endow stakeholders with the most effective management tools. This is especially relevant for African countries of the Mediterranean basin where rabbits are promoted for poverty reduction programmes.

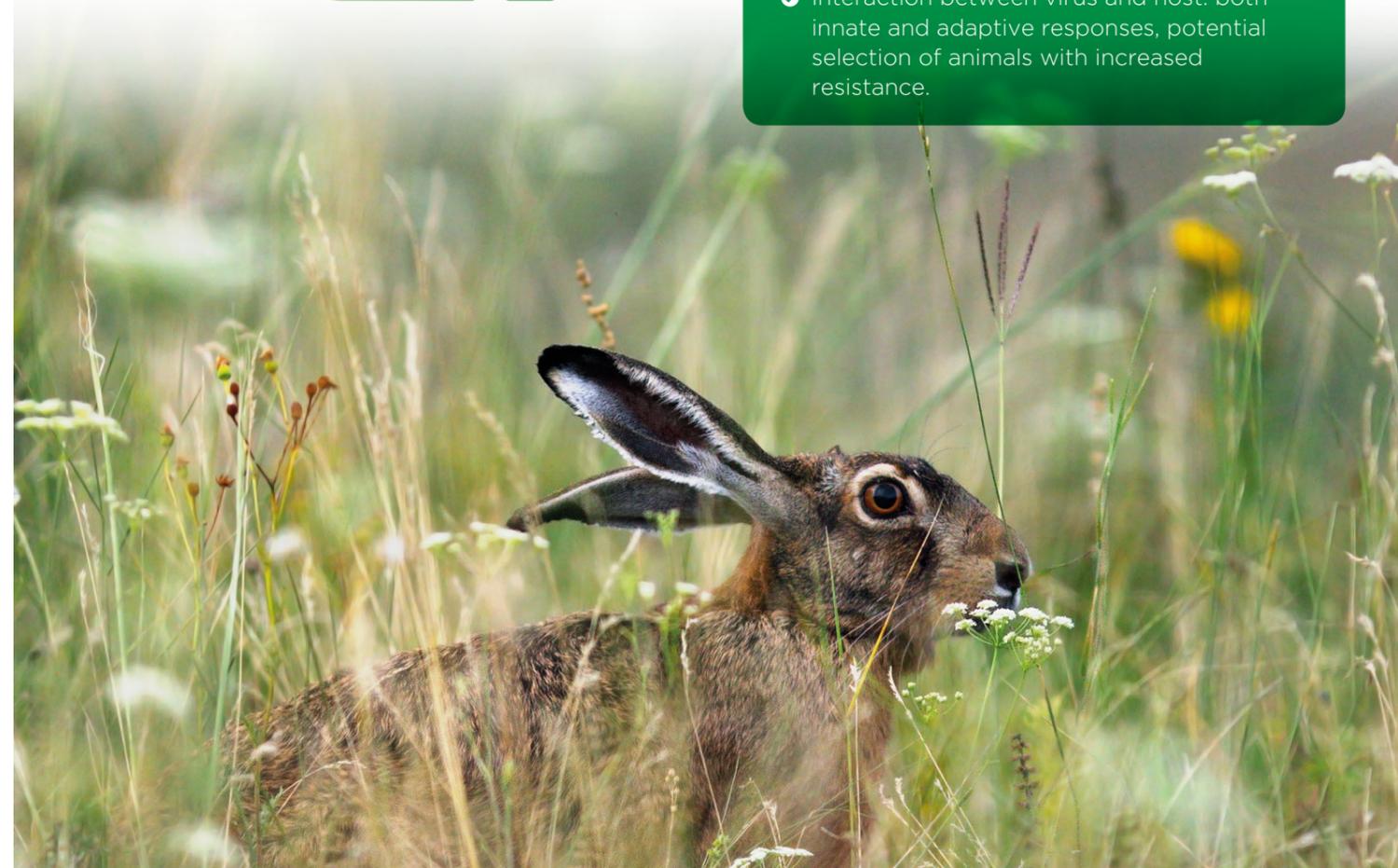
## Rabbit Haemorrhagic Disease RHD



### SPECIFIC OBJECTIVES OF THE PROJECT

Insights into scientific knowledge on various aspects of the genus Lagovirus:

- ✓ Epidemiological: with detailed definition of host range of RHDV2 in leporidae, and mapping of the different species of lagomorphs present in the territories;
- ✓ Virological: evolution of viruses in the territory and classification of subtypes on the basis of antigenic profiles;
- ✓ Interaction between virus and host: both innate and adaptive responses, potential selection of animals with increased resistance.



## Thematic area

### Farming Systems



## Section II

**Topic 2.2** - Preventing and controlling emergence of animal and plant pests and diseases



## Budget

1.264.011,00 €



## Duration

36 months



## Project

### 27/Med-Berry

Developing new strategies to protect strawberry crop in Mediterranean countries

## Context

Strawberry is fundamental crop for Mediterranean countries. Up to 26% of the world strawberries are produced and important strawberry industries and scientific community are active here. Strawberry fruits have unique flavour and precious nutritional properties and their economic value is extremely high. Growing healthy strawberry using sustainable protection solutions that preserve the fruits quality and yield, and respect human health and environment is a challenging task, specially under the temperature increase in Mediterranean basin. In this project complementary expertise of researchers from public and private institutions from Italy, Spain, France, Morocco and Turkey are joined in the effort to develop innovative tools, protocols and strategies suited to revise the pathogen control strategies in view of innovative concepts of protection management. Here, conventional instruments (e.g. traditional breeding programs made with local germplasm) are integrated with New Breeding Techniques (NBT) able to develop new plants and products that counteract the most aggressive pathogens and the new phytosanitary emergences

## Objectives

Med-Berry has 4 objectives:

1. Resistant genes identification and exploitation. Local resistant germplasm will be used to develop resistant varieties against fungal diseases
2. Development of NBT protocols, and RNA interference molecules. Intragenesis protocols will be applied to study the role of key strawberry defense genes to increase fruit resistance. Specific dsRNA molecules will be designed to target pathogen key genes by topical application on plants (SIGS).
3. Socio-economic impact analysis. The economic sustainability of the developed solutions and their social acceptability across the Mediterranean

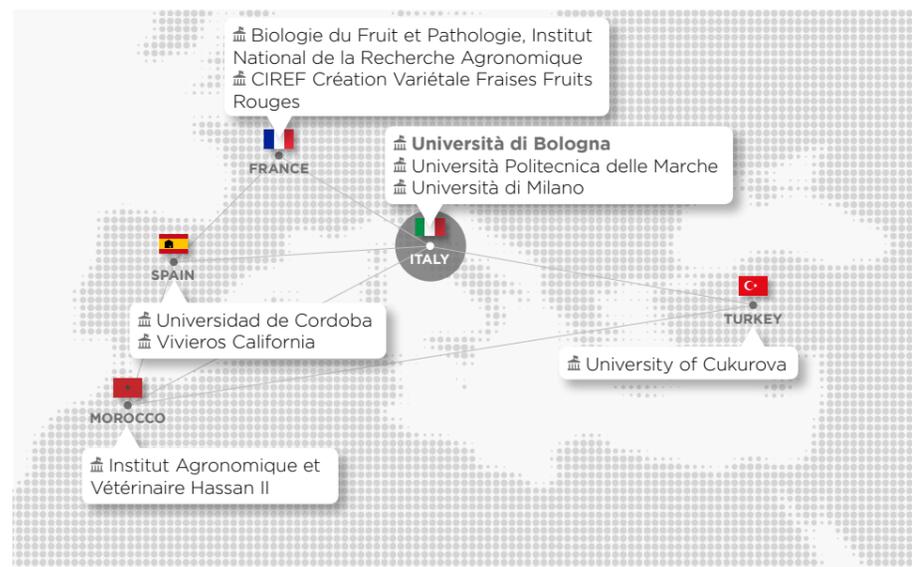
## Coordinating country

Italy

## Participating countries/ 5



## Partners/ 9



## Coordinating institution

Università di Bologna



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

Dipartimento di Scienze e  
Tecnologie Agro-Alimentari

Scientific Coordinator:  
BARALDI, Elena  
elena.baraldi@unibo.it

an countries will be evaluated to obtain realistic measure of the potential application of the new strategies.

4. Dissemination. Large effort will be put to disseminate results in different farming and industrial contexts and to share the newly achieved knowledge through the strawberry research network and the organization of training activities.

## Expected impacts

Med-Berry results will lead to i) a lower risk of increase in infection rate and severity of fungal diseases due to climate change in Mediterranean countries, through development of new strawberry varieties and new agrochemicals; ii) a higher economic, social and environmental sustainability of the disease control in Mediterranean countries; iii) development of new agrochemicals and strawberry industries innovation; iv) healthier and safer fruits to consumers.

# 35.000 ha

cultivated with strawberries  
in the Mediterranean area



26%  
worldwide  
production

  
**292 ha**  
in Spain

  
**376 ha**  
in Turkey

  
**135 ha**  
in Italy

Source: CSO Centro Servizi Ortofrutticoli Italy - dati 2018

## BIOTECH INNOVATION FOR PATHOGENIC AGENTS CONTROL

- ✓ Enhancement of Mediterranean Germplasm and selection of resistance genes;
- ✓ Intragenic regeneration and transformation of new strawberry plants (non-GMO);
- ✓ Development of RNAi protection systems for silencing specific key genes of pathogenic mushroom.

## Reduction in the use of crop protection products



## Thematic area

### Farming Systems



## Section II

**Topic 2.3** - Developing farming systems able to generate income, to create employment and to contribute to a balanced territorial development



## Budget

985.331,00 €



## Duration

36 months



## Project

### 28/SIMTAP

Self-sufficient Integrated Multi-Trophic AquaPonic systems for improving food production sustainability and brackish water use and recycling

## Context

The demand of the EU seafood market is currently supplied for 25% from EU fisheries, 65% from imports and only 10% from EU aquaculture. Aquaculture is one of the pillars of the Common Fisheries Policy (CFP) and the Blue Growth agenda. The increase in fish farming has various environmental impacts due to the production of feed ingredients, the disposal of farm effluents, disease transmission, dispersal of non-native species and destruction of habitats. Integrated Multitrophic Aquaculture (IMTA) is one of the most promising pathways to sustainable aquaculture systems. IMTA integrates complementary species of the trophic chain living in different compartments of the ecosystem. Inorganic and organic wastes from fed aquaculture species (e.g. finfish) are respectively assimilated by autotrophic species (e.g. phytoplankton, micro/macroalgae and higher plants) and heterotrophic species (e.g. oysters, mussels, crustacean, echinoderms and polychaetes) that are co-cultured with the fed aquaculture species.

## Objectives

This project moves from the IMTA approach towards an innovative self-sufficient integrated multi-trophic aquaponic system (SIMTAP) for small scale, labour-intensive and environmentally-friendly marine fish and halophytic plants production adapted to the typical socio-economic and climatic condition of Mediterranean areas. The main goal of SIMTAP is to define, design, set up and test an innovative food production system that drastically reduces, on one side, the required fish feed inputs (e.g., fishmeal, fish oil, soybean, etc.) and the consumption of resources (water, energy), and, on the other side, the production of waste and pollution, decreasing the Life Cycle impact on the environment of this segment of the food industry. Moreover, SIMTAP can be coupled with the re-use of the effluents from greenhouse soilless cropping systems, in a cascade effect acting both as a

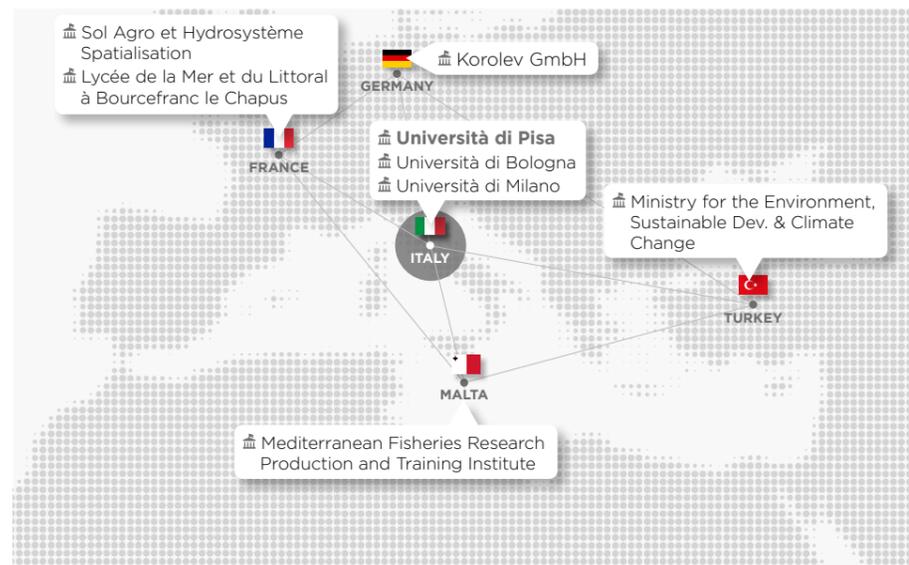
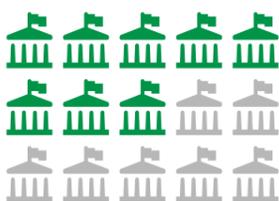
## Coordinating country

Italy

## Participating countries/ 5



## Partners/ 8



## Coordinating institution

Università di Pisa



UNIVERSITÀ DI PISA

Dipartimento di Scienze Agrarie, Alimentari e Agroambientali

Dipartimento di Scienze Veterinarie

Scientific Coordinator:

PARDOSSI, Alberto

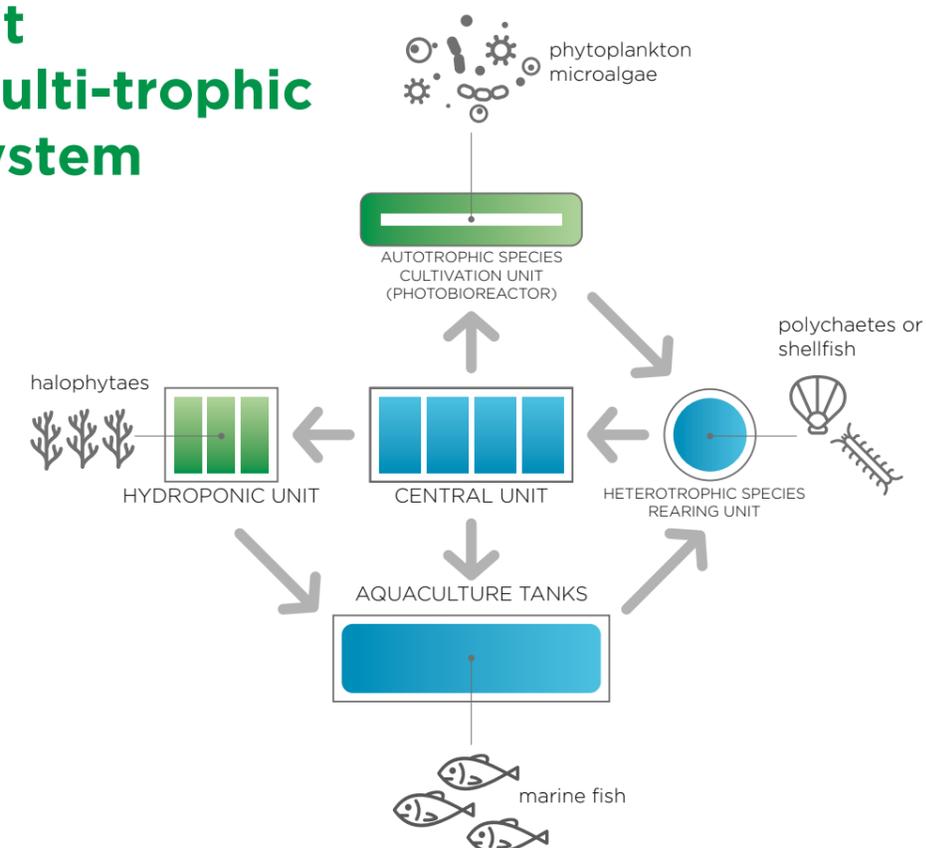
alberto.pardossi@unipi.it

bioremediation of wastewater (run-off) from greenhouse cultivations, and as a recycling of the nutrients still contained in the same wastewater, thus helping the SIMTAP cycle. Besides, the water source can be either brackish or marine. Life Cycle Assessment (LCA), analysis of energy consumption, emergy assessment and Life Cycle Cost (LCC) of SIMTAP will be performed to quantify and compare the potential environmental and economic impacts with the conventional hydroponic and aquaculture systems.

## Expected impacts

Creation of a SIMTAP system aimed at the partial / full replacement of raw materials (i.e. fish meal, fish oil and vegetable proteins) in marine aquaculture; reduction of environmental impact; reduction of the volatility of production costs for a more stable profitability; reduction of dependence on international markets; design of public policies aimed at improving the adoption of innovations; provision of participatory approaches.

## Self-sufficient integrated multi-trophic aquaponic system



**Thematic area**  
**Farming Systems**



**Section II**

**Topic 2.1** - Adaptation of agriculture to climate change



**Budget**

2.016.695,00 €



**Duration**

36 months



**Project**

**29/VEG-ADAPT**

Adapting Mediterranean vegetable crops to climate change-induced multiple stress

**Context**

Climate change is causing serious limitations to horticultural crops in the Mediterranean, due to the increasing frequency of stress conditions, often concurrent, such as drought, heat and salinity. VEG-ADAPT brings together farmers, industry and research in eight Mediterranean countries, with the common goal of increasing the tolerance of three major vegetable crops (tomato, pepper and melon) to stress induced by climate change in this area.

**Objectives**

To increase the tolerance of three important Mediterranean vegetable crops (tomato, pepper and melon) to stress induced by climate change in the Mediterranean region. To this end, the project will follow three lines of research:

1. Characterization and selection of local varieties and new hybrids tolerant to climate change;
2. Research on the physiological processes that contribute to the tolerance of these crops and related genetic markers;
3. Optimization of crop management techniques that reduce sensitivity to climatic stress.

**Expected impacts**

The selection process will provide lines to be used for physiological and genetic studies and to be compared in the field; genetic and metabolic markers will help select genotypes; field experiments will assess the stress performance of selected varieties, soil amendments and smart irrigation techniques. The socio-economic effect of the agronomic tools and techniques developed within VEG-ADAPT will be evaluated. The results will be

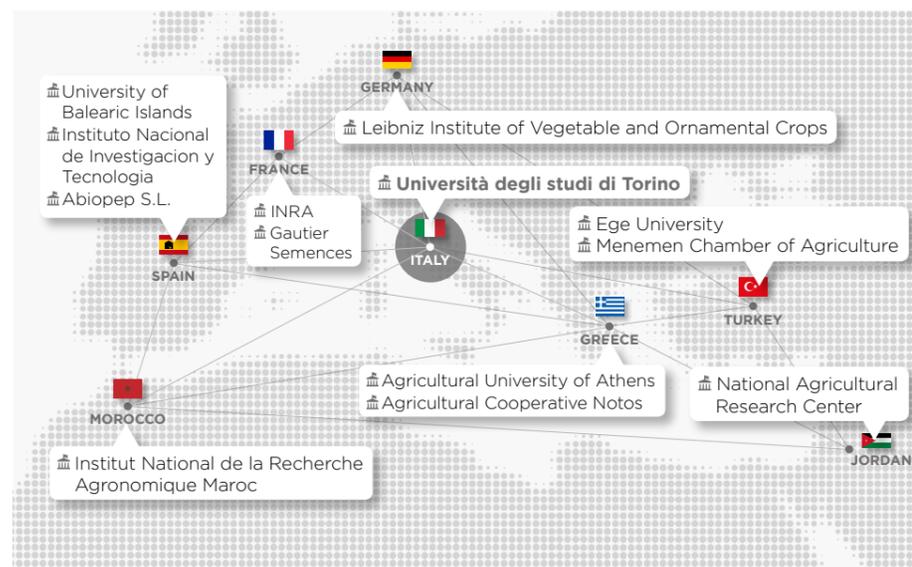
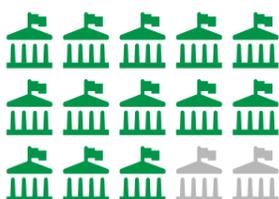
**Coordinating country**

**Italy**

**Participating countries/ 8**



**Partners/ 13**



**Coordinating institution**

**Università degli Studi di Torino**



**UNIVERSITÀ DEGLI STUDI DI TORINO**

Dipartimento di Scienze Agrarie, Forestali e Alimentari

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disseminated and demonstrated to farmers and industry. It will be possible to transfer the results of VEG-ADAPT to other vegetable crops. VEG-ADAPT will impact on Mediterranean farmers by providing ready solutions to the limitations induced by climate change; for the industry, offering varieties and genetic traits to be used in breeding; for researchers, discovering new metabolic and molecular processes; and society, improving the sustainability of vegetable crops.



**Selection of local varieties and new hybrids** tolerant to climate change for 3 horticultural crops in the Mediterranean area



**Thematic area**  
**Farming Systems**



**Section II**

**Topic 2.2** - Preventing and controlling emergence of animal and plant pests and diseases



**Budget**  
 1.322.500,00 €



**Duration**  
 36 months

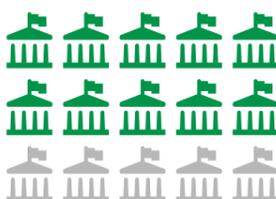


**Coordinating country**  
**Greece**

**Participating countries/ 8**



**Partners/ 10**



**Project**

**30/ZeroParasitic**

Innovative sustainable solutions for broomrapes: prevention and integrated pest management approaches to overcome parasitism in Mediterranean cropping systems

**Objectives and expected impacts**

ZeroParasitic is a three-year project, aiming to deliver innovative sustainable solutions to overcome broomrape plant parasitism in key Mediterranean cropping systems. Genetic and molecular approaches will be used at three critical levels to gain new insights on potential regulatory targets of the infection: the broomrapes per se, the host plants and their interaction (host-parasite). Research will target two of the most important crops in the Mediterranean. i.e. industrial tomato and faba beans. Surveillance tools utilizing remote and satellite images will be employed for monitoring parasitism and for large-scale documentation. Innovation tools will consist of molecular approaches for screening and identification of tolerant/resistant hosts and hormone host-parasite interactions. Deciphering the molecular basis for resistance utilizing pattern recognition receptors (PRRs) and other defense-triggering molecules aiming to support breeding of resistant host plants. Solutions will be integrated in an integrated pest management (IPM) context targeting several innovations such as prevention, biological/non-chemical approaches, and other IPM strategies. Agronomic practices will be scientifically supported by a validated model for prediction of parasitism emergence across various Mediterranean locations and farming systems. Solutions will be socioeconomically evaluated, implemented and disseminated in a participatory way. The dissemination of the Project outputs will be based on a systems-thinking approach and the solutions that will be proposed will be highly accessible via an innovative web platform designed to satisfy requirements of a wide range of endusers.

The main goal of ZeroParasitic is to integrate innovative solutions into a realistic framework through a trans-disciplinary, multi-actor effort targeting broomrapes, which is one of the most critical disease/weed in Mediterranean countries, posing a significant threat to various key cropping systems in the region.

**Coordinating institution**

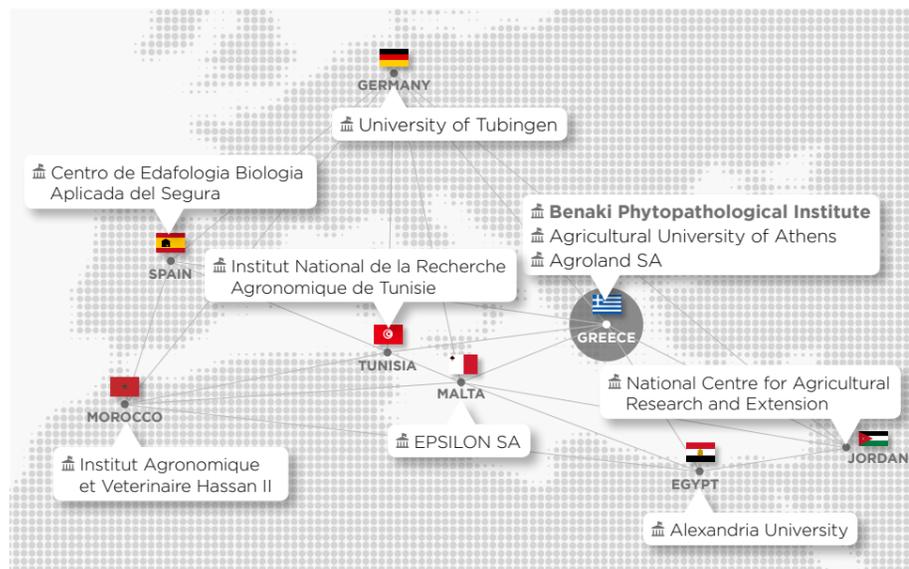
**Benaki Phytopathological Institute - BPI**



**BENAKI PHYTOPATHOLOGICAL INSTITUTE**

Scientific Coordinator:  
 CHACHALIS, Dimosthenis  
 d.chachalis@bpi.gr

- SPECIFIC OBJECTIVES OF THE PROJECT**
- ✓ Identify new genetic variability in different species for broomrape tolerance/resistance
  - ✓ Identify molecular genetic markers in mapping populations and in contrasting genotypes at different phases of parasite-plant interaction
  - ✓ Identify new hormones and metabolites involved in broomrape germination, haustorial development and plant infection during host-plant interaction
  - ✓ Identify the molecular basis of resistance based on pattern recognition receptors (PRRs) to enhance capabilities for targeted breeding of resistance
  - ✓ Provide IPM solutions that are supported by innovative tools such as modelling of emergence of parasitism, validated under different Med cropping systems
  - ✓ Provide surveillance tools for local, regional and national scale monitoring of the parasitism
  - ✓ Disseminate the results among stakeholders, engaging with them in the cocreation of innovative solutions and provide training to farmers to facilitate prevention of broomrape expansion



## Thematic area

### Agro-food Value Chain



## Section II

### Topic 3.2 - Food safety in local food chains



## Budget

1.353.817,00 €



## Duration

36 months



## Project

### 31/ArtiSaneFood

Innovative Bio-interventions and Risk Modelling Approaches for Ensuring Microbial Safety and Quality of Mediterranean Artisanal Fermented Foods

## Context

The Mediterranean region is known for being rich in traditional food products, and they constitute not only a vital part of the cultural heritage, but an important engine of many local economies. Thus, Mediterranean artisanal foods must be further valorised to improve their consumption and distribution; which, on the other hand, requires that local producers ensure the quality and safety of their products.

## Objectives

The objective of this project is to develop efficient bio-intervention strategies, enhanced process criteria, and an easy-to-use food safety decision support IT tool for participating artisanal food producers, aiming to the reduction and control of food-borne pathogens in 15 artisanal fermented foods of meat or dairy origin produced in Portugal, Spain, Italy, France, Greece, Morocco, Tunisia and Algeria. The project will be developed through an integrated risk-based approach sustained by the concepts of (i) extensive tracking surveys in the artisanal food chains, in order to identify origin, routes of contamination, risk factors favouring pathogens' survival, and technological causes for lack of homogeneity in the quality/safety of end-products; (ii) biopreservation, whereby functional starter cultures and natural extracts will be assessed as extra hurdles to ensure safety and extend shelf-life; (iii) fate studies of pathogens, and (iv) risk process modelling, for the delineation of the most effective bio-interventions, optimisation of process variables and norms/standards, and design of quality monitoring tools.

## Expected impacts

A safety decision-support IT tool will be developed to enable artisanal producers to assess the lethality of their traditional and newly-implement-

## Coordinating institution

### Instituto Politécnico de Bragança - IPB



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ubarron@ipb.pt

ed biopreservation-based manufacturing processes against pathogens. Product deterioration will also be delayed, hence reducing the need of chemical preservatives and food waste. Uptake of the novel biopreservation technologies and quality monitoring schemes will bring about more efficient, harmonised and reliable food quality management systems of artisanal foods. Small regional businesses can thus become more competitive, and may reassuringly grow into companies of increased production and enlarged markets and exports opportunities. The producers' ability to prevent food safety incidences that cause economic losses and consumers' loss of trust will be enhanced. New business opportunities for locally-produced plant extracts, and bio-preservation solutions-providing spin-offs can be created.



ANALYTICS TOOL  
FOR FOOD RISK  
MANAGEMENT

## 15 FERMENTED FOODS - CASE STUDIES

- ✓ Alheira sausage and Serrano cheese made with raw goat's milk (Portugal)
- ✓ Morcilla de Burgos blood sausage and Manchego-style cheese made with raw milk (Spain)
- ✓ Squacquerone of Romagna and salame romagnolo (Italy)
- ✓ Camembert de Normandie (France)
- ✓ Numbulo sausage and Katiki Domokou cheese (Greece)
- ✓ Merguez sausage (bovino e pecora) and Jben cheese made with raw goat's milk (Morocco)
- ✓ Klila and Jben cheeses made with raw goat's milk (Algeria)
- ✓ Kaddid, dehydrated salted sheep meat product, and Leben fermented milk (Tunisia)

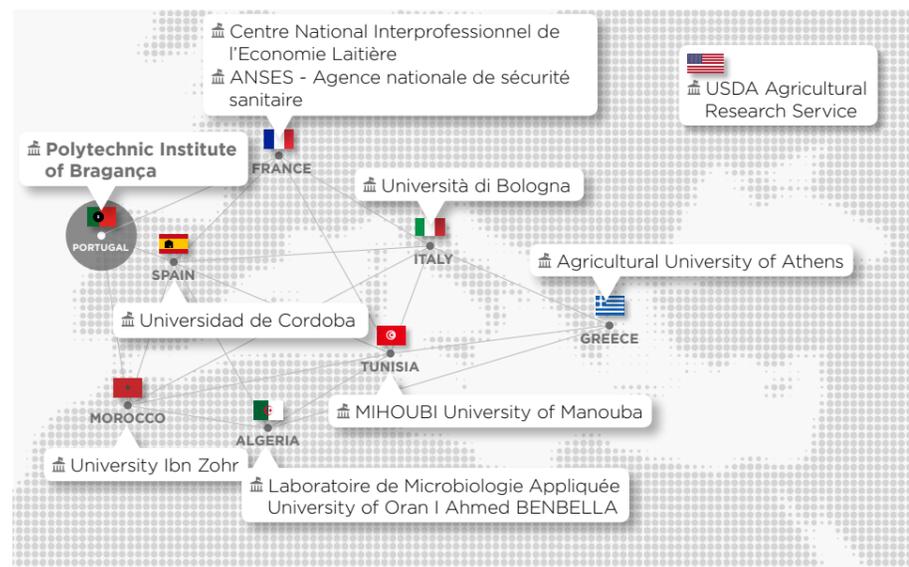
## Coordinating country

Portugal

## Participating countries/ 9



## Partners/ 10



## Thematic area

### Agro-food Value Chain



## Section II

### Topic 3.2 - Food safety in local food chains



## Budget

1.120.009,00 €



## Duration

36 months



## Project

### 32/Boomerang

### Healthier bio-fortified Mediterranean grains

## Context

Some soils in the Mediterranean area are poor on selected minerals, and so are the plants that grow on it. Low Selenium concentrations are found in arid areas with high pH and low clay content, conditions quite prevalent on the Mediterranean area. An important part of the population suffers from dietary deficiency on essential micronutrients as iron (Fe), zinc (Zn) and Selenium (Se). It is reported that -1.6-109 people suffer iron deficiency, with zinc deficiency being equally serious as -1/3 of the population suffer Zn deficiency that is considered the 5th leading risk factor for diseases. Se deficiency is widespread as its concentration on soils tend to be limiting, and the cultivated products and the animals feed with it have the tendency to be deficient.

## Objectives

The main objective is to improve the quality of Mediterranean grains by means of different biofortification to obtain micronutrient dense grains. These biofortified grains will improve the nutrition status of the consumers, while allowing the producers to offer a more valuable product. On one hand, there is the already known concept "from soil to seed" that in our proposal will be focused on the selection of most promising landraces from the local repertoire of variability and to assay the effect of agronomical techniques on the Se, Fe and Zn content of the cereals obtained. Foliar fertilisation can be an approach to increase mineral content more efficient than soil fertilisation, and this is especially relevant for a relatively scarce element as Se. On the other hand, we know the changes produced during seed germination causes changes on malted cereals. Vitamin content can increase, and mineral content can be modified by changing the composition of the stepping water without losing the added minerals to the drain.

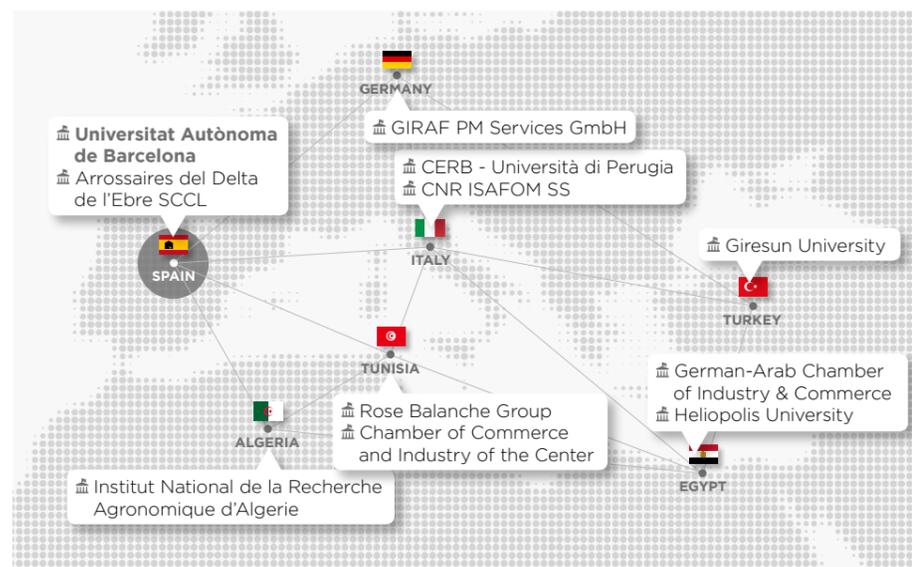
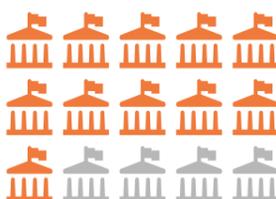
## Coordinating country

Spain

## Participating countries/ 7



## Partners/ 11



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## Coordinating institution

Universitat Autònoma de Barcelona - UAB

# UAB

Universitat Autònoma de Barcelona

Department of Animal and Food Science

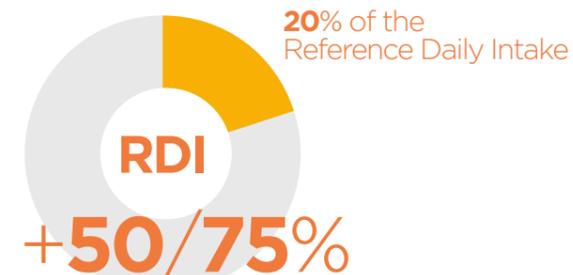
Scientific Coordinator:

SALDO, Jordi

jordi.saldo@uab.cat

## Expected impacts

The expected impact is to increase Fe, Zn and Se content (by 50-75%) on the biofortified grains, to cover at least 20% RDI. of the population of a region with a continuous and increasing demographic pressure. Ensuring a 20% RDI on Zn will reduce by 10% Disability Adjusted Life Years (DALYs). Each DALYs saved are valued at \$1000 each, so it may have an impact of 100,000 on each million people consuming biofortified grains. On germinated grains, the synthesis of enzymes and other proteins would include the metals in a more bioavailable organic form, with the plus of a modification on vitamin profile and some other bioactive substances to consolidate a healthier diet, like GABA in rice. Besides, BOOMERANG contributes to keep providing jobs and supporting local rural and urban economies as food sector is a strategic one in the whole Mediterranean area in terms of employment, livelihoods of rural population, opportunities for job creations and territorial development.



## +50/75% of Iron, Zinc and Selenium

### 2/ Multi-mineral enrichment through malting process



transformation technology

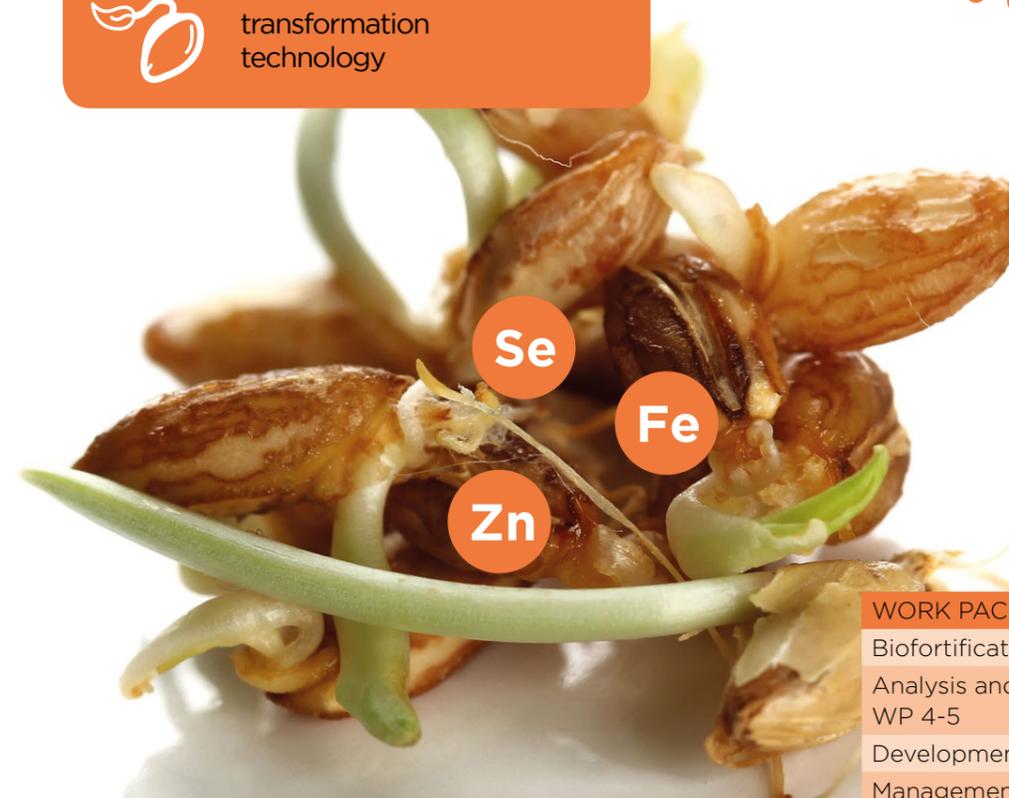
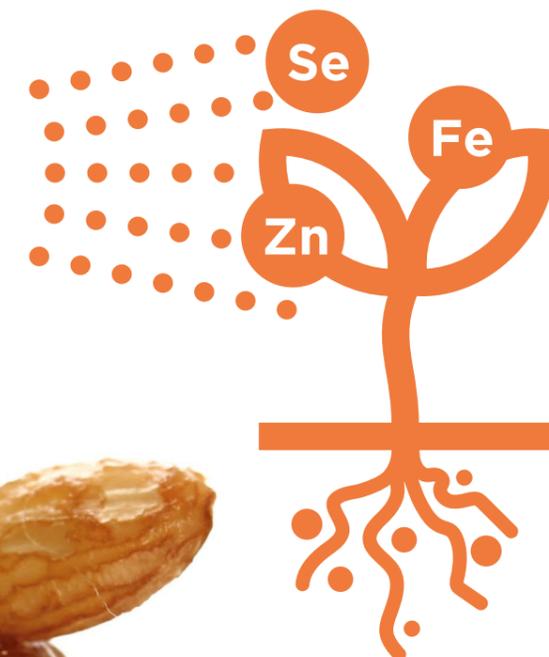
### 1/ Multi-mineral foliar fertilizing system with spraying method



production fertilizer



development spraying method



## WORK PACKAGES

- Biofortification of cereals /WP 1-3
- Analysis and evaluation of the effects/ WP 4-5
- Development of new products /WP 6
- Management/ WP 7
- Dissemination of results/ WP 8

## Thematic area

### Agro-food Value Chain



## Section II

**Topic 3.3** - Implications of dietary shifts and sustainable diets for the Med populations and food industry



## Budget

1.028.480,00 €



## Duration

36 months



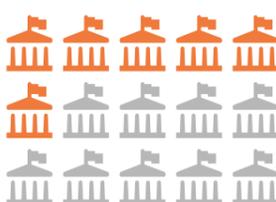
## Coordinating country

Spain

## Participating countries/ 5



## Partners/ 6



## Project

# 33/MED4YOUTH

Mediterranean Enriched Diet for tackling Youth Obesity

## Context

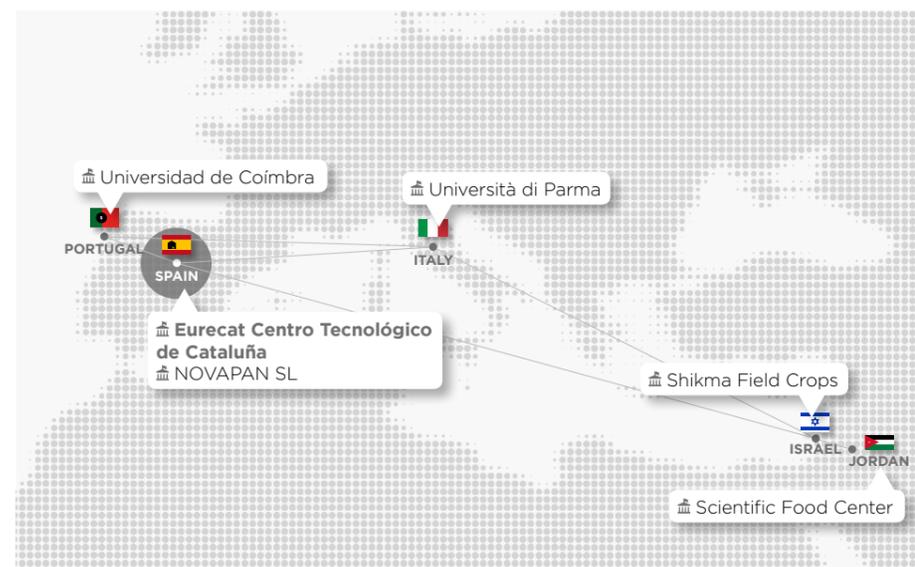
Youth obesity is a strong predictor of adult obesity, which has well-known negative health and economic consequences. Thus, addressing adult obesity needs tackling youth obesity. MED4Youth main objective is to strengthen the link between the Mediterranean Diet (MD) and the health benefits against youth obesity and associated cardiovascular disease (CVD) risk factors, identifying the positive effects exerted by an energy-restricted MD including healthy products from the Mediterranean basis (hummus, mixed nuts and pomegranate) and sourdough bread. Secondary objective is to elucidate whether the health effects of MD are associated with changes in gut microbiota and gut-derived metabolites to shed light on the interplay between MD, gut microbiome, metabolome and youth obesity.

## Objectives

The novelty of MED4Youth project relies on, firstly, a multicentre clinical and MD-based study (4 months) including ICT educational tools specifically targeting 240 obese adolescents (13-16y) from different Mediterranean countries (Spain, Portugal and Italy); and secondly, on the application of omics technologies and a system biology approach, to elucidate whether the MD can shape the gut microbiota and gut-derived metabolites and unravel in the mechanisms by which MD exert its beneficial effects against youth obesity and CVD risk factors.

## Expected Impacts

MED4Youth will contribute to valorise MD products, especially scarcely consumed foods items in European Mediterranean developed countries (sourdough bread, hummus and pomegranate), promoting their consumption in the overall population, especially in adolescents and pave the way for a high, long-term demand of these products, fostering the competitive-



## Coordinating institution

Eurecat, Centre Tecnològic de Catalunya

**eurecat**  
Centre Tecnològic de Catalunya

Biotechnology Area

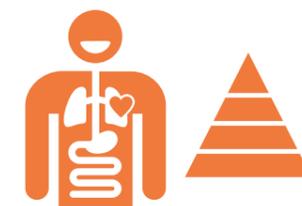
Scientific Coordinator:  
CAIMARI, Antoni  
antoni.caimari@eurecat.org

ness of processing industries and reinforcing local production systems. A multidisciplinary consortium will exchange best practices regarding MD adherence, creating common knowledge to foster long-lasting results and support policies to prevent and ameliorate obesity across the Mediterranean basin.

## Study of the obese adolescent population of Spain, Portugal and Italy on a sample of 240 subjects

### WORK PACKAGES

- Biomakers of colonial origin
- Food consumption biomarkers
- Nutritional and educational applications
- New naturally leavened breads

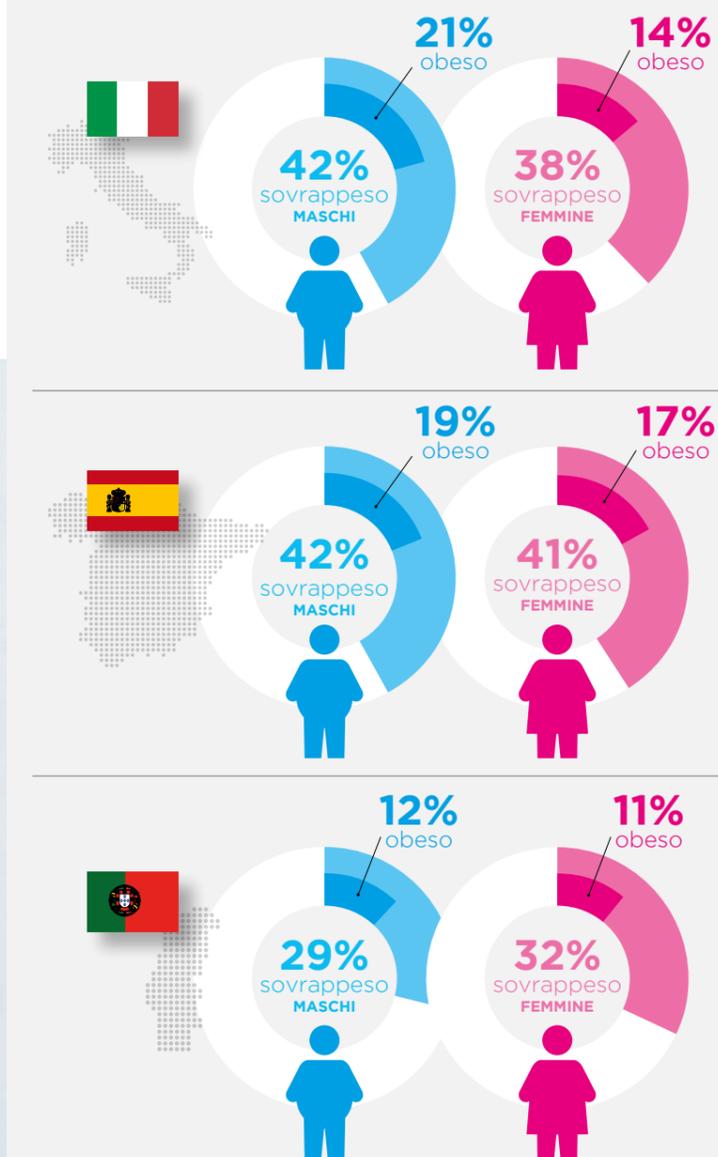


### EXPECTED RESULTS

Improvement in subjective well-being measured through the following indicators:

- ✓ BMI z score and waist circumference;
- ✓ WHO-5 Well-being index;
- ✓ analysis of microbial-derived metabolites (SCFA, organic acids, TMAO, LPS, bile acids) and in microbial genera (Lactobacillus, Bifidobacterium);
- ✓ achievement of a **high adherence to the diet** of the subject group.

## Overweight and obesity prevalence\* (%) COSI 2015-2017



\*Based on the 2007 WHO recommended growth reference for school-age children and adolescents (de Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. Bulletin of the World Health Organization 2007; 85(9): 660-667). Children with a BMI/A Z-score < -5 or > +5 are excluded.

## Thematic area

### Agro-food Value Chain



## Section II

### Topic 3.2 - Food safety in local food chains



## Budget

872.973,00 €



## Duration

36 months



## Project

### 34/MILKQUA

Milk quality all along the dairy chain for a sustainable MILK

## Context

Milk safety and quality are critical issues for human health and welfare of a community. MILKQUA is a cross-multidisciplinary project engaging five EU partners from four countries (France, Italy, Spain, and Portugal) that will team with five Tunisian partners representing research, development, extension and farmers. It aims at enhancing milk and dairy food quality and safety, and decreasing milk-associated health hazards, by reducing the use of conventional antimicrobial products in Tunisian farms to align with the concept of One Health approach.

## Objectives

The main objectives of this project are the following:

1. to set up an extension-based national milk program (QMP) to reduce the incidence of mastitis, and the consequent use of antibiotics in Tunisia;
2. to explore the potential use of essential oils and plant extracts with antibacterial and anti-inflammatory activities on the udder and in diets of young and adult dairy cattle to reinforce immunity at adult age, increase feed efficiency, animal welfare and the burden of mastitis for a better sustainability of milk production system;
3. to improve milk quality, including the shelf life of dairy products.

Essential oils and plant extracts will be tested integrating in vitro and in vivo approaches with up-to-date OMICS analysis, within a system biology perspective. Synergy in communication and dissemination by the several Tunisian stakeholders will permit to reduce and monitor antimicrobial usage in livestock and improve both milk quality, quantity and safety.

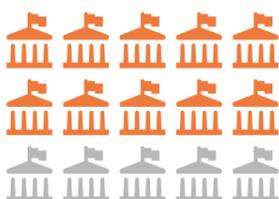
## Coordinating country

France

## Participating countries/ 5



## Partners/ 10



## Coordinating institution

Institut de l'Elevage  
IDELE



Scientific Coordinator:  
ABDENNEBI-NAJAR, Latifa  
latifa.najar@idele.fr

## Expected impacts

MILKQUA ambition is to enhance the role of Tunisian dairy producers as providers of sustainable food supply to consumers. MILKQUA project will enhance milk and dairy food quality and safety, MILKQUA will intend to lay the foundation of an accountable and dynamic system that will stimulate the economy growth and promote prosperous and resilient communities across the country and elsewhere, providing new knowledge about the biological effects of natural compounds that will be extended to other Mediterranean countries.

  
**9.1 ML t**  
cow's milk in TURKEY  
(of which **1.5 ML t** of drinking milk)  
Source: CLAL - data 2017  
[https://www.clal.it/?section=stat\\_Turkey](https://www.clal.it/?section=stat_Turkey)

food safety



reduce and monitor  
antimicrobial usage



environmental  
impact



## WORK PACKAGES

In vitro biological affects of plant extracts (WP5)

OMICS analysis (WP5)

In vivo effects of plant extracts on cows' health and performance (WP4)

QMP program validation (WP2), ICT (WP3)



## Thematic area

### Agro-food Value Chain



## Section II

**Topic 3.1** - Valorising food products from traditional Mediterranean diet



## Budget

1.292.780,00 €



## Duration

36 months



## Coordinating country

Spain

## Participating countries/ 6



## Partners/ 9



## Project

# 35/SAFFROMFOOD

Valorisation of saffron and its floral by-products as sustainable innovative sources for the development of high added-value food products

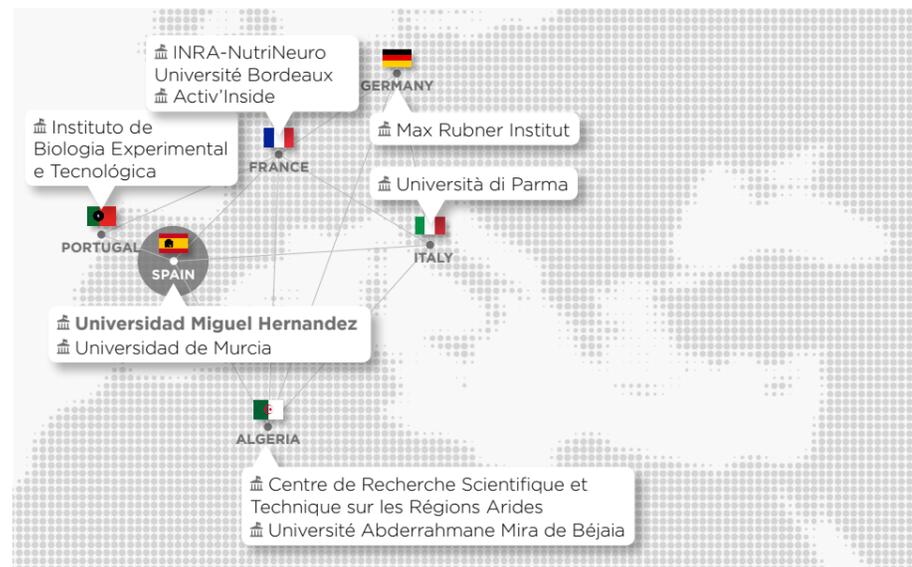
## Context

The bioactive compounds of saffron (*crocus sativus*, L) spice and its floral by-products (mainly crocin, safranal and flavonoids) have potential health benefits particularly regarding cognitive function and mental health. There is a lack of knowledge on their use as a source of bioactive extracts for the development of functional food ingredients. The main objective of the project is to develop new innovative and added-value products from saffron and its floral by-products, improving the saffron quality in the Mediterranean area and turning it into a highly profitable botanical source.

## Objectives

Specific project objectives and the approach to achieve them are:

1. to produce high quality saffron and floral by-products optimizing the cultivation and processing conditions, and their characterization, with contribution of saffron producers and SMEs in Algeria and Spain.
2. to develop and characterize bioactive extracts and ingredients from saffron and its floral by-products improving functionality and stability, using up-to-date and innovative technologies with involvement of the industry.
3. to develop innovative healthier food products from the saffron ingredients through traditional recipes, preserving the nutritional and organoleptic quality.
4. to investigate the antimicrobial and prebiotic potential of the extracts, and their cardiometabolic prospects "in vitro" and "in vivo".
5. to test the effect of the bioactive extracts on mood and cognition in humans.



## Coordinating institution

Universidad Miguel Hernández de Elche - UMH



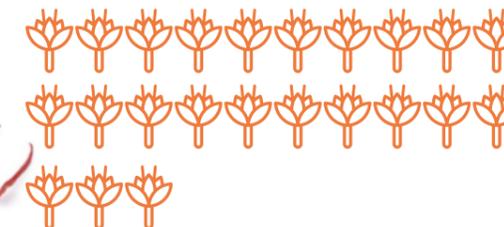
Scientific Coordinator:  
FRUTOS FERNANDEZ, Maria Jose  
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## Expected impacts

The multidisciplinary science-based outputs, technological improvements, and applications of saffron bioactive extracts and ingredients with defined authenticity and functional composition, will lead to new functional foods from the traditional Mediterranean diet, contributing to improve the health of the population. At the same time, saffron production will become more sustainable and profitable taking advantage of a high-value biomass. This will also foster the employment and international market in this industrial sector.



## 230.000 flowers



## 350kg

of wasted petals contain up to 3% of bioactive compounds such as carotenoids, flavonoids and terpenes

## Enhancement of the entire chain of saffron and its by-products

- ✓ Improvement of the sustainability of the saffron production and development of a recovery chain for waste by-products
- ✓ Study of the bioavailability and metabolism of saffron-derived bioactive compounds
- ✓ Development of new functional products such as extracts, ingredients and rich bioactive compounds products from saffron with particular attention to nutritional and organoleptic quality and shelf-life.

## WORK PACKAGES

- Bioactive saffron extracts and processing by-products
- Food supplements based on saffron and on its processing by-products
- Functional foods rich in bioactive and nourishing compounds coming from saffron and its processing by-products



## Thematic area

### Agro-food Value Chain



## Section II

**Topic 3.1** - Valorising food products from traditional Mediterranean diet



## Budget

959.750,00 €



## Duration

36 months



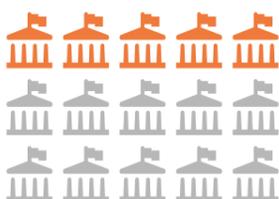
## Coordinating country

Italy

## Participating countries/ 4



## Partners/ 5



## Project

# 36/VEGGIE-MED-CHEESES

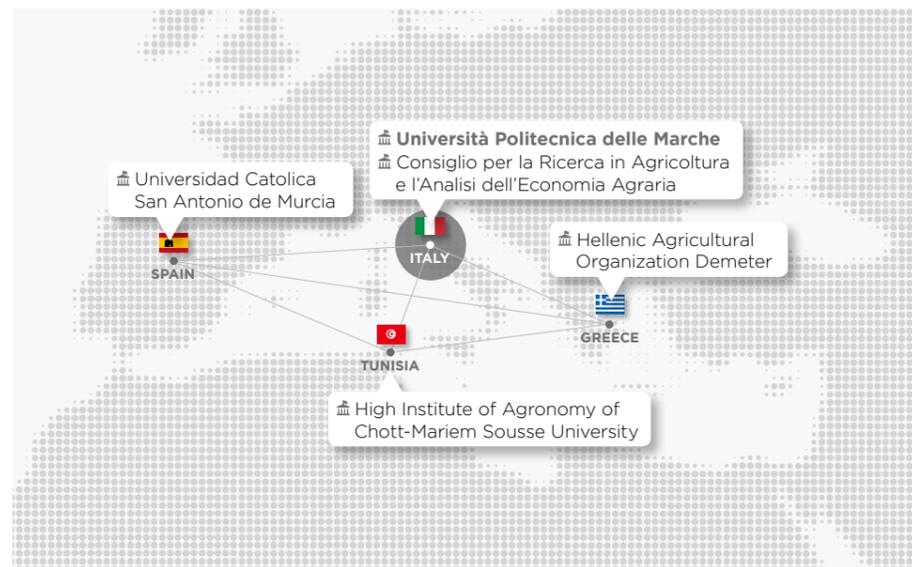
Valorisation of thistle-curdled cheeses in mediterranean marginal areas

## Context

In Western and Southern Mediterranean areas, herbaceous perennial plants, commonly referred to as “thistles”, have been used since ancient times as coagulating agents in the manufacture of traditional cheeses made from raw ewes’ or goats’ milk, either directly on- farm or at small dairies, most often located in marginal areas (high altitude pastures, arid dry lands, islands, etc.). Though these cheeses are greatly appreciated by consumers for their unique, distinctive flavor, their manufacturing is actually an occasional and unpredictable event since the availability of fresh leaves or flowers from spontaneously grown thistles largely depends on seasonal variations (e.g. higher average temperatures), and is limited to narrow time windows.

## Objective

The present project aspires to a full valorization of these local cheeses through a multidisciplinary integrated research work performed in 4 countries of the Mediterranean basin covering the whole natural growth zone of spontaneous thistles. The research work will be focused on the characterization of thistle species and ecotypes spontaneously growing in these countries, as well as on their sustainable cultivation. The aqueous extracts (CEs) from spontaneously grown and cultivated thistles will be fully characterized as well, and further used for cheese-making of two cheeses traditionally manufactured with thistle rennet, namely Caciofiore and Torta del Casar, and two cheeses traditionally produced with animal rennet, namely Queso de Murcia and Feta. All the cheeses will be characterized through physicochemical, chemical, microbiological, textural, colorimetric and sensory analyses; nutritionally valuable, health-beneficial and hazardous substances ascribable to the use of CEs will be also investigated, as well as consumer needs, preferences and acceptance towards thistle-curdled cheeses.



## Coordinating institution

Università Politecnica delle Marche



UNIVERSITÀ  
POLITECNICA  
DELLE MARCHE

Dipartimento di Scienze Agrarie,  
Alimentari ed Ambientali

Scientific Coordinator:  
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## Expected impacts

A fully compliance of the Project to topic 3.1 of the call is envisaged; more specifically it intends to provide a support to the sheep and goat dairy sector in its capacity to deliver both food products and public goods, such as environmental and biodiversity conservation, by increasing efficiency and production of Mediterranean sheep and goat's milk cheeses, mostly located in less favoured areas.

## Studies on the production of cheese with thistle rennet and validation analysis

- ✓ optimized production of two typical Mediterranean cheeses with thistle rennet: **Caciofiore**, Italian ancestor cheese of Pecorino Romano DOP, and **Torta del Casar**, Spanish sheep cheese typical of the Extremadura area
- ✓ new vegetarian alternative productions of two typical Mediterranean cheeses traditionally produced with animal rennet: **Feta**, the famous Greek cheese, made with fresh sheep's and goat's milk, and **Queso de Murcia**, a typical Spanish cheese made with goat's milk
- ✓ new markers to demonstrate the quality and the authenticity of the new cheeses developed

## New thistle crops from species (and/or ecotypes) selected for the production of vegetable rennet thistle

- ✓ species in study: *Cynara humilis*, *Carlina acanthifolia*, *Onopordum tauricum*
- ✓ production of new aqueous thistle extracts completely characterized and naturally rich in bioactive compounds
- ✓ purification and characterization of plant proteases, the enzymes responsible for milk's coagulation activity



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