PRIMA

PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

Funded Projects 2019

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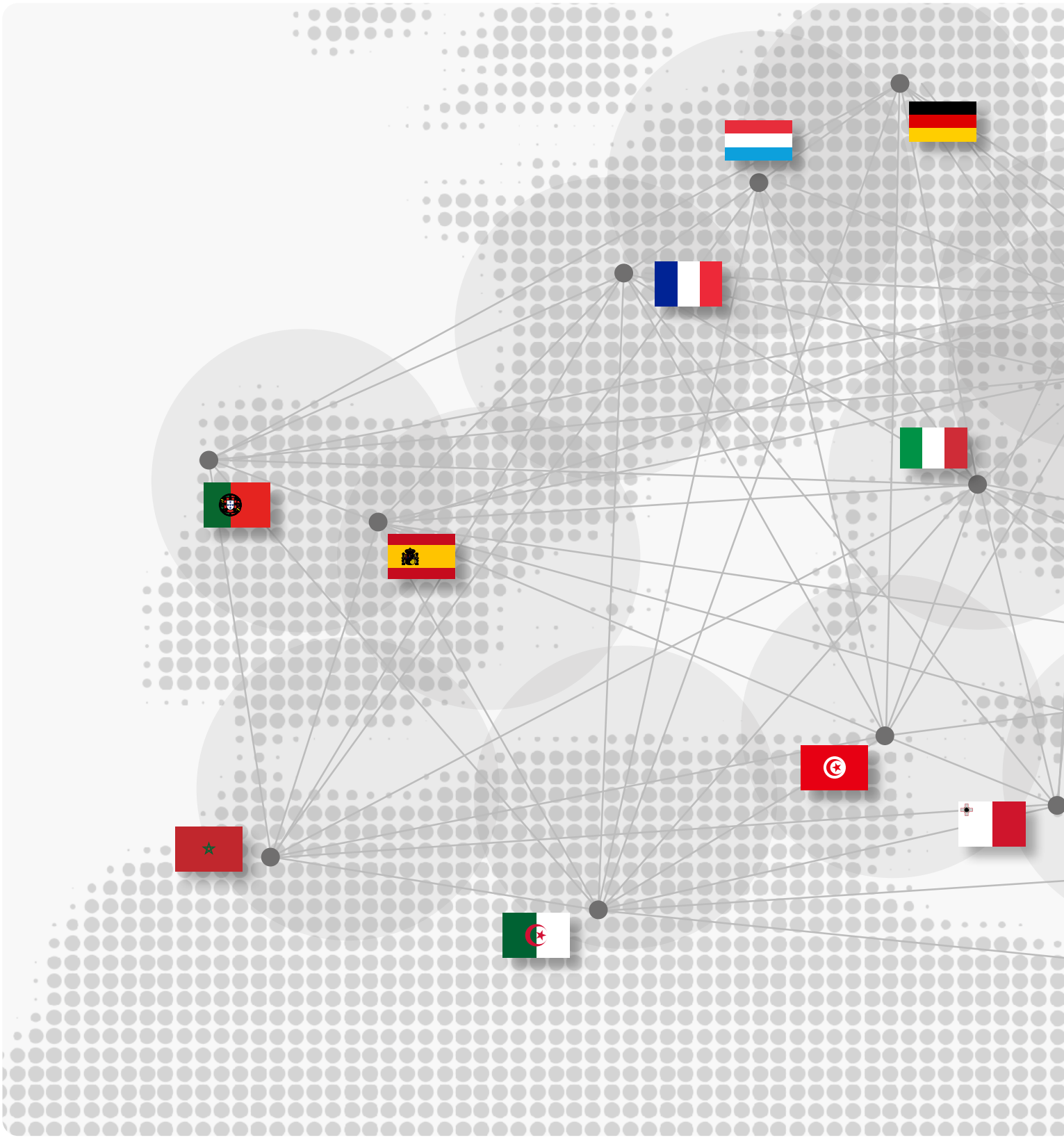


Portugal

FCT Fundação para a Ciência e a Tecnologia

Spain

Ministerio de Ciencia, Innovación y Universidades
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

Morocco

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

Algeria

DG RSDT
البحث العلمي في خدمة المواطن

Tunisia

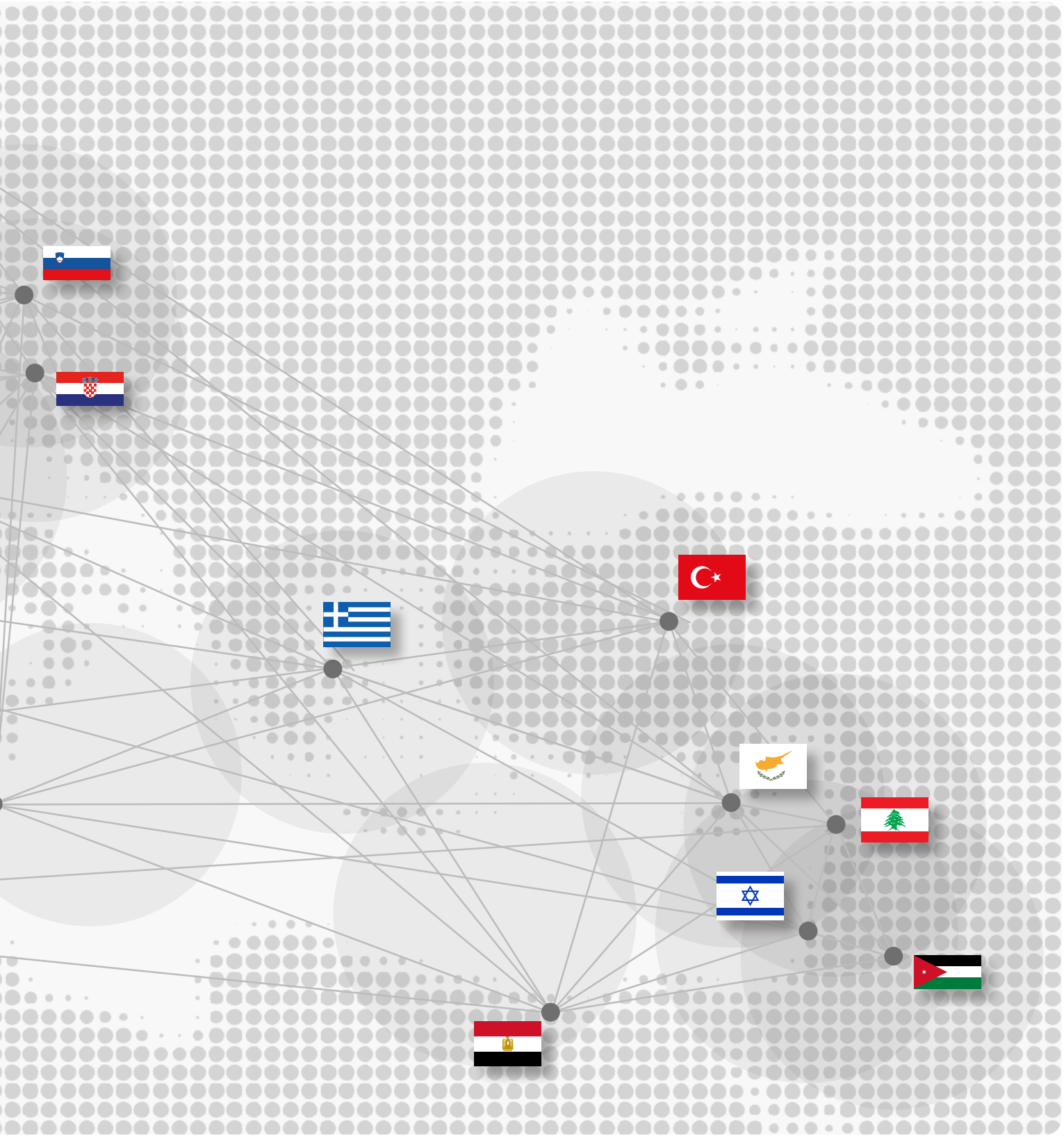
Tunisian Republic
Ministry of Higher Education and Scientific Research
Directorate General of Scientific Research

Italy

Ministero dell'Università e della Ricerca

Malta

Xjenza
The Malta Council for Science & Technology



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

Croatia

REPUBLIC OF CROATIA
Ministry of Science and Education

Egypt

Academy of Scientific Research And Technology
STDF

Israel

רשות החדשנות
Israel Innovation Authority

ISERD
Israel-Europe R&I Directorate

Jordan

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

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The PRIMA programme is an Art. 185 initiative supported and funded under Horizon 2020, the Framework European Union's Programme for Research and Innovation.

PRIMA, *Funded Projects 2019*, May 2020

Index

Angelo Riccaboni Chair PRIMA Foundation

"The results of 2019 confirm that PRIMA is at the forefront in promoting research and innovation in the fields of water management, farming system and food value chains in the MED Area. Given the magnitude of existing MED social and environmental challenges and the vulnerability of the Region to Climate Change, it is crucial to join efforts, resources, ideas and laboratories. Thanks to the European Commission and 19 Countries, PRIMA is building a Mediterranean knowledge platform that after its first two years includes more than 700 research and innovation units working on 83 projects. Such platform will certainly be able to give a valuable contribution also to face the safety and security issues highlighted by the COVID pandemia and to contribute to the Decade of Action in view of Agenda 2030. A special thank should be addressed to the 19 States Representatives and the European Commission for their constant cooperation shown in these years, as well as to the Secretariat of the Foundation for its professionalism and passion. All together we can achieve even greater objectives and results."

Mohamed El-Shinawi Co-Chair PRIMA Foundation

"*At these difficult times that the whole world is facing, we are sure that we can rely on our partnership. We need to align and coordinate our policies and strategies together to tackle the key issues affecting the MED area. We cannot work as isolated islands but we have to build bridges and hear and see each other and synergize together to have a real impact. We in PRIMA realize that in the aftermath of the crisis the world is facing there will be a greater need for more innovative approaches to provide food security which in turn depends on water management and farming system .That is why we will continue to work closely together and with our partners to help in shaping a better future for our nations. We have a lot of opportunities but still many challenges that is why we need to bring our forces together to pave the way for the Mediterranean of the future."*

Foreword

The PRIMA Program, jointly funded by the European Commission and 19 Euro-Mediterranean States entered in 2019 in its second year of activity, confirming the positive results achieved in 2018. Characterized by a strong strategic dimension, the principle of equal footing among participating States and a distinctive geographical focus on the Mediterranean region, the Program has funded **48 projects** for a total funding of around **55 million euro**, constituting it around 20% more than the first year.

From a scientific point of view, in addition to the three main thematic areas (efficient management of water resources, sustainable farming systems and agro-food value chain), a **nexus topic** was also included, thus valorising those proposals and ideas able to establish connections between the water-farming-food areas. It is, in fact, evident that many of the challenges we are facing are better addressed adopting an integrated approach among themes.

Significantly, 2019 registered an increase of budget allocated to **innovation actions** (20%), which confirms the attention that the Program is showing towards the promotion of concrete solutions able to generate positive direct impacts at business, consumer and societal level. The new calls recently opened and the upcoming Annual Work Plan are being prepared in view of boosting further impactful research and innovation projects, open to an increasingly focused approach on some strategic topics.

As a whole, data show a significant participation of the private sector (20% of the total funded projects), an encouraging percentage in terms of gender participation, and a positive share of funds targeting South-East Med Countries (27%). Moreover, 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**.

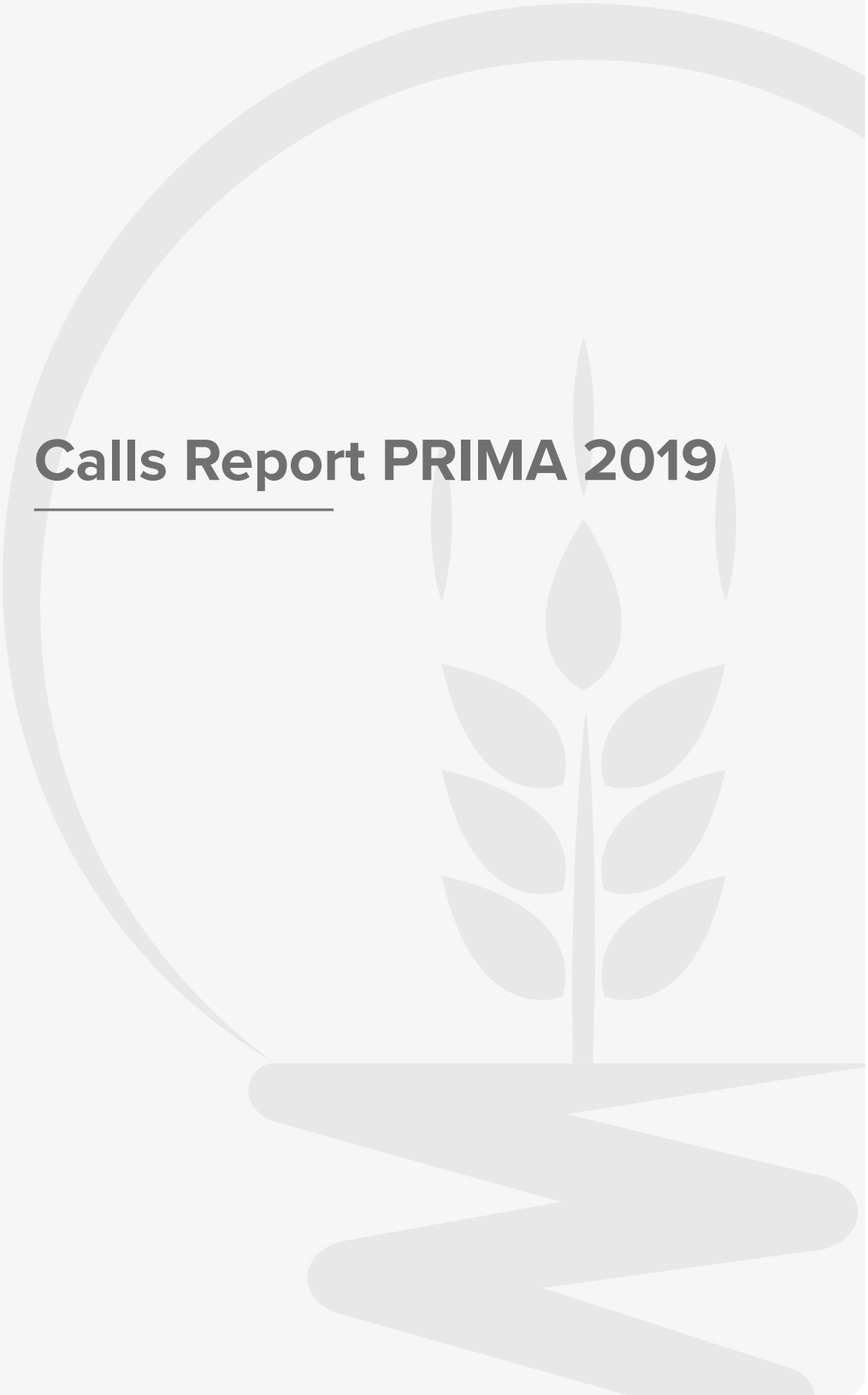
Beside the calls, PRIMA has also strengthened the **institutional partnerships** with relevant international and European institutions and Initiatives, concluding an MoU with FAO and establishing formal interaction with EU Programs such as EIT-Food and JPIs. While striving for further improvements, PRIMA is also advancing in internal managerial professionalism, development of monitoring and dissemination tools, and Country-based administrative alignments.

Forward looking, PRIMA is committed to align its activities to the new frameworks designed at EU and global level, in relation to sustainability, transformative innovation, and adaptation to climate change. The EU Green New Deal and the Agenda 2030 are two key documents in this regard, with an even great relevance for the MED region, which is heavily distressed by climate change related events, as reported by an outstanding publication of the Union for the Mediterranean.

The purpose of the current document is to provide for an accurate overview of the results of PRIMA calls 2019, so to facilitate the communication and dissemination of the outcomes of the PRIMA funding activity. In its first part, the booklet shows data related to the funded projects for each thematic area, the participating Countries and the partners involved. In the second part, the funded projects are illustrated with one-page detailed description. The last two pages offer a biannual 2018-2019 overview.

PRIMA has so far funded more than **80 projects** for a total of more than **100 million euro**, involving around **740 research entities** across the Mediterranean. This proves its contribution in terms of strengthening research and innovation capacities and creating a critical mass of actors. The recent emergency due to the spread of COVID-19 worldwide demonstrates how important research and innovation are, how interconnected our economies and societies are, as well as the fact that many of the most serious challenges we are facing do not know borders. Bearing this in mind, we are even more committed to ensure PRIMA expresses its full potential to the benefit of communities, businesses and citizens and with the ultimate goal of creating sustainable and prosperous Mediterranean societies.

Calls Report PRIMA 2019



Achievement Dashboard 2019 Calls

Section I

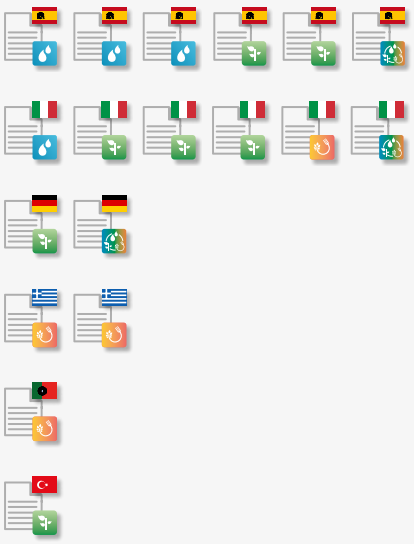
6.2% SUCCESS RATE

278 Proposals submitted

18

AWP 2018/ **9 Projects** were funded

Funded Projects



Projects per nationality of coordinating Entities

15

PRIMA Participating States

of which

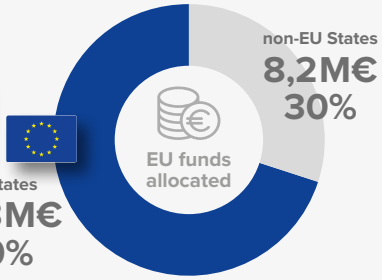
7 EU States

8 non-EU States

27,5 M€

EU funds

AWP 2018/ **18,3M €** were allocated



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

Projects per Thematic area

Actions

AWP 2018/ **3 projects** were funded with **5,9M€**

1 CSA
Coordination and Support Action
1
1,2M€

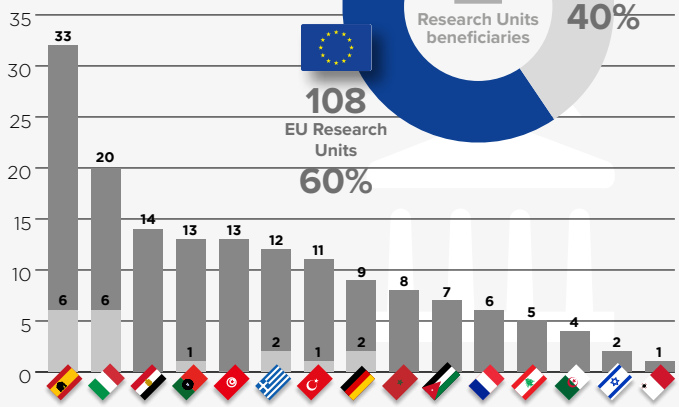
8 IAs
Innovation actions
4 4
12,5M€

9 RIAs
Research and Innovation Actions
4 3 2
13,8M€

169 Research Units

AWP 2018/ **103 Entites** beneficiaries; **31 non-EU Entities** (30%)

158 Entities



33 Entities from private sector (20%of total)
of which **5 Coordinators**

received
4,3M€
15.7%
of EU funds

AWP 2018/ **32 private Entities** of which **1 coordinators** (31% of total)

Calls Report PRIMA 2019

Funded projects Section I

- Water Management
- Farming Systems
- Agro-food Value Chain
- Nexus

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 2019, EU funds amounted to 27,5 million euro.

SECTION I

Funded Projects		Countries	Research Units	Funds
1 **eGROUNDWATER** Citizen science and ICT-based enhanced information systems for groundwater assessment, modelling and sustainable participatory management	RIA	Spain		1.600.000 €
		France		
		Portugal		
		Algeria		
		Morocco		
		5	**9**	
2 **GOTHAM** Governance tool for sustainable water resources allocation in the Mediterranean through stakeholder's collaboration. Towards a paradigm shift in groundwater management by end-users	RIA	Spain		1.599.999 €
		Italy		
		France		
		Jordan		
		Lebanon		
		5	**7**	
3 **InTheMED** Innovative and Sustainable Groundwater Management in the MED	RIA	Spain		1.589.000 €
		Germany		
		Greece		
		France		
		Portugal		
		Tunisia		
		Turkey		
		7	**7**	
4 **RESERVOIR** Sustainable groundwater RESources managEment by integrating earth observation deriVed monitoring and flOw modellng Results	RIA	Italy		1.240.000 €
		Jordan		
		Spain		
		Turkey		
		4	**8**	

5

4CE-MED

Camelina: a Cash Cover Crop Enhancing water and soil conservation in MEDiterranean dry-farming systems

RIA

Spain	
Italy	
Greece	
Algeria	
France	
Morocco	
Tunisia	
7	**11**

1.486.299 €

6

AZMUD

Improvement of Mediterranean greenhouses performance by the use of innovative plastic materials, natural additives and novelty irrigation technologies

IA

Egypt	
Spain	
Jordan	
France	
Turkey	
5	**9**

1.593.025 €

7

CAMA

Research-based participatory approaches for adopting Conservation Agriculture in the Mediterranean Area

RIA

Spain	
Italy	
Portugal	
Tunisia	
Algeria	
France	
Greece	
Morocco	
8	**13**

1.500.000 €

8

ConServeTerra

Overcoming the physical and mental barriers for upscaling Conservation Agriculture in the Mediterranean

RIA

Morocco	
Tunisia	
Germany	
Spain	
Turkey	
5	**16**

1.499.924 €

9

HortiMED

Towards circular horticulture: closing the loop on Mediterranean greenhouses

IA

Spain	
Algeria	
Egypt	
3	**4**

1.556.500 €

SECTION I

10

iGUESS-MED

Innovative greenhouse support system in the mediterranean region: efficient fertigation and pest management through IoT based climate control

IA

Italy	
Spain	
Tunisia	
Turkey	
4	**9**

1.597.700 €

11

SusMedHouse

Efficient, Eco-Friendly, Sustainable Mediterranean Greenhouse Integrated with Artificial Intelligence, Hi-Tech Automation and Control System

IA

Turkey	
Egypt	
Germany	
Portugal	
Spain	
Turkey	
6	**7**

1.549.990 €

12

Med Food TTHubs

Trace & Trust Hubs for MED food

IA

Greece	
Italy	
Egypt	
Jordan	
Portugal	
Spain	
Tunisia	
7	**10**

1.519.000 €

13

MEDIFIT

An interlinked digital platform for Food Integrity and Traceability of relevant MEDIterranean supply chains

IA

Turkey	
Spain	
Greece	
Germany	
Malta	
Tunisia	
6	**12**

1.494.200 €

14

SUREFISH

Fostering Mediterranean fish assuring traceability and authenticity

IA

Spain	
Tunisia	
Italy	
Egypt	
Lebanon	
5	**13**

1.597.025 €

SECTION I

15

TRACE-RICE

Tracing rice and valorizing side streams along Mediterranean blockchain

IA

Portugal	
Egypt	
Spain	
3	**11**

1.599.500 €

16

AWESOME

AWESOME - mAnaging Water, Ecosystems and food across sectors and Scales in the sOuth MEditerranean

RIA

Italy	
Israel	
Egypt	
Germany	
Greece	
5	**7**

1.795.726 €

17

PHEMAC

Participatory Hub for Effective Mapping, Acceleration and Capitalization and of EU-MPC NEXUS best practices

CSA

Egypt	
Italy	
Lebanon	
Tunisia	
Spain	
France	
Jordan	
Morocco	
8	**12**

1.795.726 €

18

SIGMA-Nexus

Sustainable Innovation and Governance in the Mediterranean Area for the WEF Nexus

RIA

Greece	
Germany	
Egypt	
3	**4**

1.100.000 €

Section II

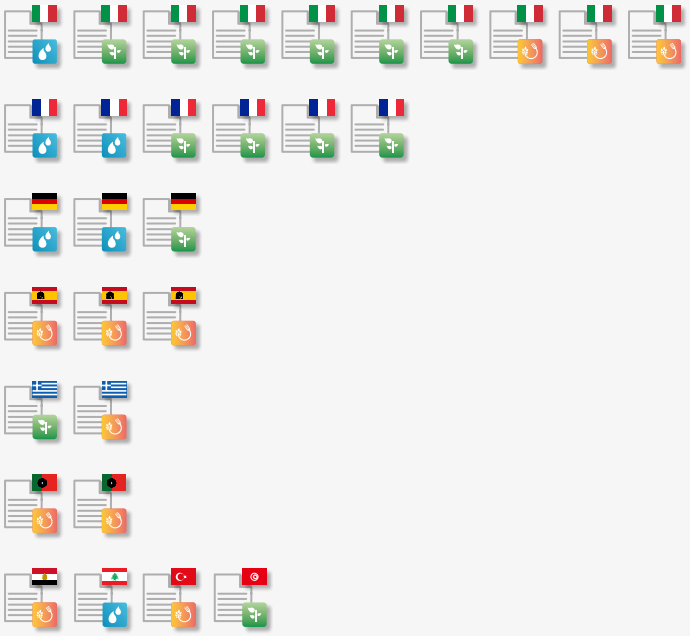
19.5% SUCCESS RATE

154 Proposals submitted

30

Funded Projects

AWP 2018/ **26 Projects** were funded



Projects per nationality of coordinating Entities

17

PRIMA Participating States

of which

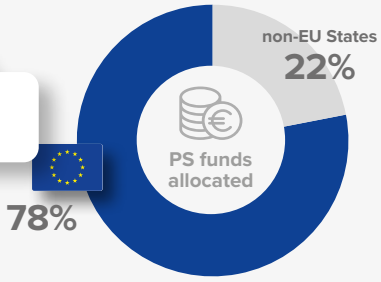
10 EU States

7 non-EU States

27,3 M€

PS funds

AWP 2018/ **27,6M €** were allocated



6 **13** **11**

Projects per Thematic area

Actions

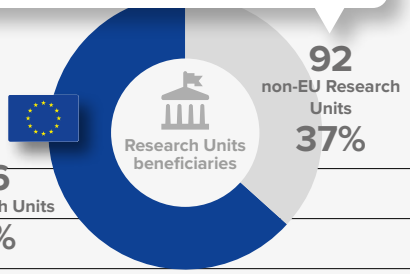
all RIAs

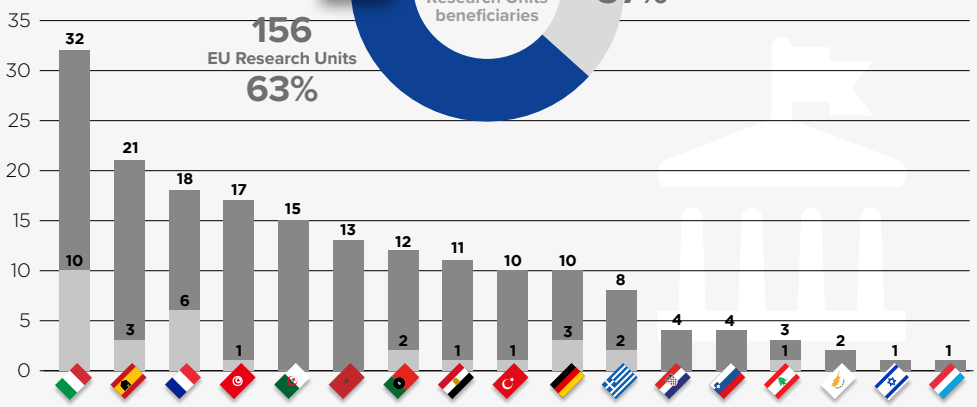
Research and Innovation Actions

248 Research Units

AWP 2018/ **216 Research Units** beneficiaries; **79 non-EU Research Units**

182 Entities





28 Entities from private sector

of which **2 Coordinators**

received **1,6M€** **6%** of the request budget

Calls Report PRIMA 2019

Funded projects Section II

Water Management

Farming Systems

Agro-food Value Chain

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 2019, funds of Participating States amounted to 27,3 million euro.

SECTION II

Funded Projects	Countries	Research Units	Funds
1 **EADANMBRT** Evaluation and development of anaerobic membrane bioreactor (AnMBR) technology to promote unrestricted wastewater reuse and mitigate compromised surface water quality in the Mediterranean region	Lebanon Egypt France Spain **4**	 **4**	415.000 €
2 **HubIS** Open innovation Hub for Irrigation Systems in Mediterranean agriculture	France Greece Morocco Portugal Spain Algeria Tunisia **7**	 **12**	1.170.706 €
3 **IDEWA** Irrigation and Drainage monitoring by remote sensing for Ecosystems and WAter resources management	Spain France Italy Morocco **4**	 **5**	645.240 €
4 **RESIDUE** Risk reduction of chemical residues in soils and crops – impact due to wastewater used for irrigation	Germany Israel Italy Spain **4**	 **5**	1.111.488 €

SECTION II

5

SmaCuMed

Smart irrigation cube for sustainable agriculture in the Mediterranean region

Germany	🏛🏛
Morocco	🏛🏛
Portugal	🏛
Tunisia	🏛
4	**6**

991.800 €

6

SMARTIES

Real time smart irrigation management at multiple stakeholders' levels

Italy	🏛🏛🏛🏛
Tunisia	🏛🏛🏛
Egypt	🏛🏛
Spain	🏛🏛
France	🏛
Luxembourg	🏛
Morocco	🏛
7	**14**

966.089 €

7

AdaMedOr

Adapting Mediterranean Orchards – science-based design of resilient fruit tree portfolios for the Mediterranean region

Tunisia	🏛🏛🏛
Morocco	🏛🏛
Spain	🏛🏛
Germany	🏛
4	**8**

738.000 €

8

Biodiversify

Boost ecosystem services through highly Biodiversity-based Mediterranean Farming sYstems

France	🏛🏛🏛
Algeria	🏛
Germany	🏛
Greece	🏛
Italy	🏛
Spain	🏛
Tunisia	🏛
7	**9**

1.273.600 €

9

BrasExplor

Wide exploration of genetic diversity in Brassica species for sustainable crop production

France	🏛🏛🏛
Algeria	🏛🏛🏛
Italy	🏛🏛
Egypt	🏛
Slovenia	🏛
Spain	🏛
Tunisia	🏛
7	**12**

871.372 €

10 CAMEL-SHIELD

Camel breeding systems: actors in the sustainable economic development of the northern Sahara territories through innovative strategies for natural resource management and marketing

France	
Morocco	
Algeria	
Italy	
4	**6**

871.372 €

11 CerealMed

Enhancing diversity in Mediterranean cereal farming systems

Italy	
Morocco	
Spain	
Egypt	
Greece	
Lebanon	
Turkey	
7	**11**

1.198.570 €

12 DiVicia

Use and management of Vicia species for sustainability and resilience in biodiversity-based farming systems

France	
Algeria	
Morocco	
Italy	
Lebanon	
Portugal	
Spain	
Tunisia	
8	**13**

1.000.000 €

13 EXPLOWHEAT

Camel breeding systems: actors in the Exploring durum wheat genotypes to minimize drought stress impact on grain yield and nutritional quality

Italy	
Algeria	
Spain	
Tunisia	
4	**5**

836.998 €

14 FIGGEN

Valorising the diversity of the fig tree, an ancient fruit crop for sustainable Mediterranean agriculture

Spain	
Italy	
Tunisia	
Turkey	
4	**5**

537.786 €

15 Fish-PhotoCAT

Photocatalytic water remediation for sustainable fish farming

Italy	
Egypt	
Tunisia	
3	**4**

707.573 €

SECTION II

16

HaloFarMs

Development and optimization of halophyte-based farming systems in salt-affected Mediterranean soils

Tunisia	
France	
Egypt	
Italy	
Portugal	
Spain	
6	**8**

847.872 €

17

LEGU-MED

Legumes in biodiversity-based farming systems in Mediterranean basin

Italy	
Algeria	
Croatia	
Germany	
Lebanon	
Spain	
Tunisia	
Turkey	
8	**11**

1.240.190 €

18

SUPERTROUT

Improving SUstainability and PERformance of aquaculture farming system: breeding for lactococcosis resistance in rainbow TROUT

Italy	
Greece	
Spain	
Turkey	
4	**6**

664.000 €

19

VALUEFARM

VALorization of Mediterranean small-scale FARMs by cropping wild UnExploited species

Greece	
Cyprus	
Turkey	
Algeria	
Egypt	
Germany	
Portugal	
Spain	
8	**11**

1.242.435 €

20

BIOFRESHCLOUD

Enhancing Mediterranean Fresh Produce Shelf-life using Sustainable Preservative Technologies and communicating knowledge on dynamic shelf-life using Food Cloud Services and Predictive Modelling

Morocco	
Turkey	
Spain	
Argentina	
Germany	
5	**7**

704.000 €

21

BioProMedFood

Bio-protective cultures and bioactive extracts as sustainable combined strategies to improve the shelf-life of perishable Mediterranean food

Croatia	🏛🏛🏛
Italy	🏛🏛🏛
Slovenia	🏛🏛
Spain	🏛
Turkey	🏛
5	**10**

831.641 €

22

BiOrangePack

Smart and innovative packaging, post-harvest rot management and shipping of organic citrus fruit

Italy	🏛🏛🏛🏛🏛
Tunisia	🏛🏛🏛
France	🏛🏛
Spain	🏛🏛
Algeria	🏛
Turkey	🏛
6	**14**

1.282.397 €

23

FEDKITO

FrEsh FooD sustainable packaging in the circular ecOnomy

Italy	🏛🏛🏛🏛
France	🏛🏛
Greece	🏛
Morocco	🏛
Tunisia	🏛
5	**9**

905.000 €

24

FRUALGAE

Sustainable technologies and methodologies to improve quality and extend product shelf life in the Mediterranean agro-food supply chain

Greece	🏛🏛🏛
Egypt	🏛
Germany	🏛
Italy	🏛
Lebanon	🏛
Portugal	🏛
6	**8**

1.220.000 €

25

GreenPalm

Development of sustainable date palm-based agro systems by preserving their biodiversity

Spain	🏛
Algeria	🏛
Italy	🏛
Portugal	🏛
Tunisia	🏛
5	**5**

703.600 €

SECTION II

26

MEDISMART

Mediterranean Citrus: innovative soft processing solutions for SMART (Sustainable, Mediterranean, Agronomically evolved, nutRitionally enriched, Traditional) products

Turkey	
Egypt	
Italy	
Portugal	
Spain	
5	**6**

1.112.512 €

27

Nano4Fresh

Nanomaterials for an environmentally friendly and sustainable handling of perishable products

Portugal	
Italy	
Portugal	
Spain	
4	**5**

666.332 €

28

PulpIng

Development of Pumpkin Pulp Formulation using a Sustainable Integrated Strategy

Portugal	
Greece	
Algeria	
Egypt	
Germany	
Tunisia	
6	**9**

912.689 €

29

StopMedWaste

Innovative Sustainable technologies TO extend the shelf-life of Perishable MEDiterranean fresh fruit, vegetables and aromatic plants and to reduce WASTE

Italy	
Cyprus	
Spain	
Tunisia	
Turkey	
5	**11**

1.009.017 €

30

WildFood

Eating the wild: improving the value chain of Mediterranean Wild Food Products (WFP)

Spain	
Algeria	
Portugal	
Tunisia	
Italy	
Slovenia	
6	**10**

814.220€

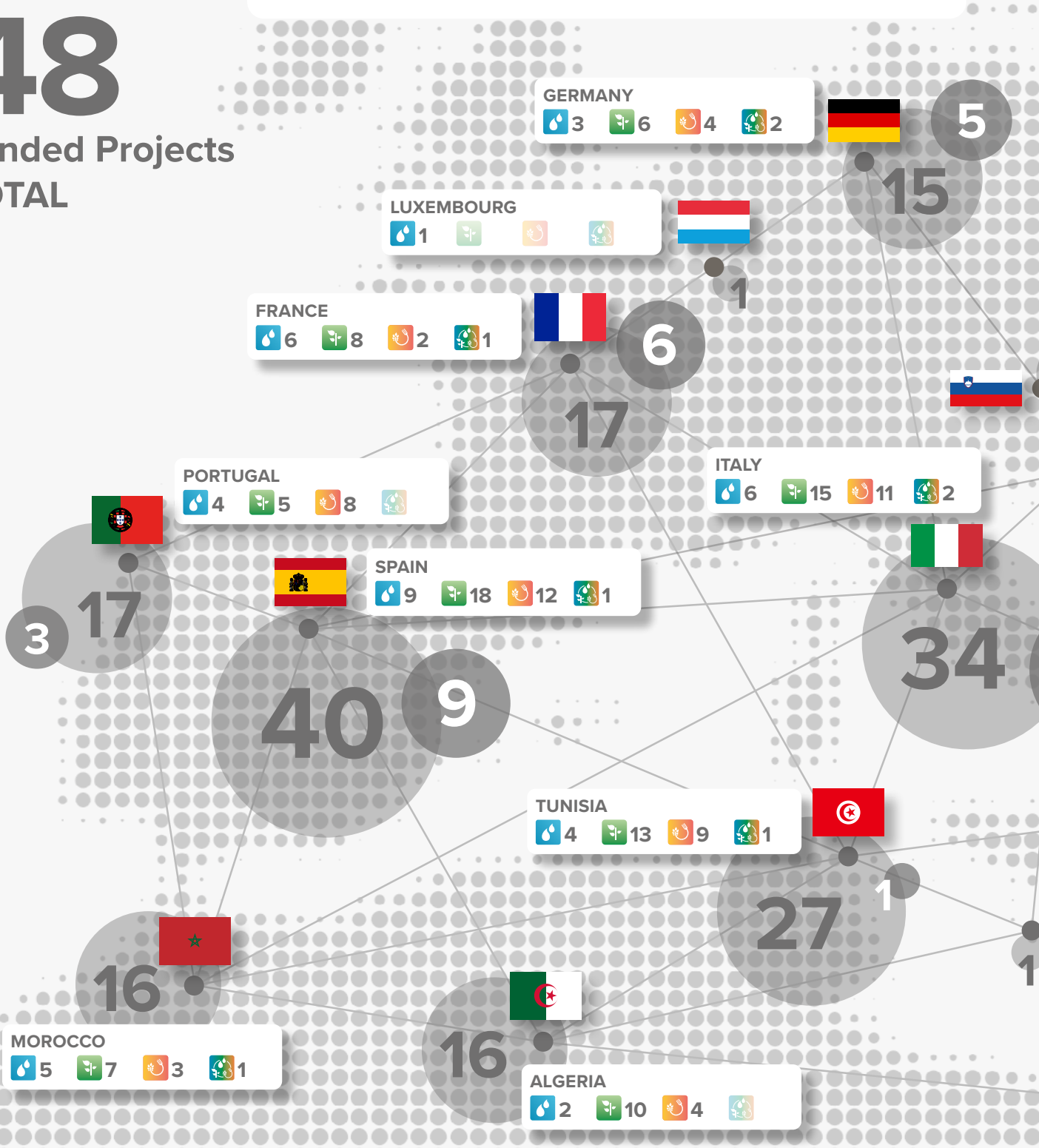
Calls Report PRIMA 2019

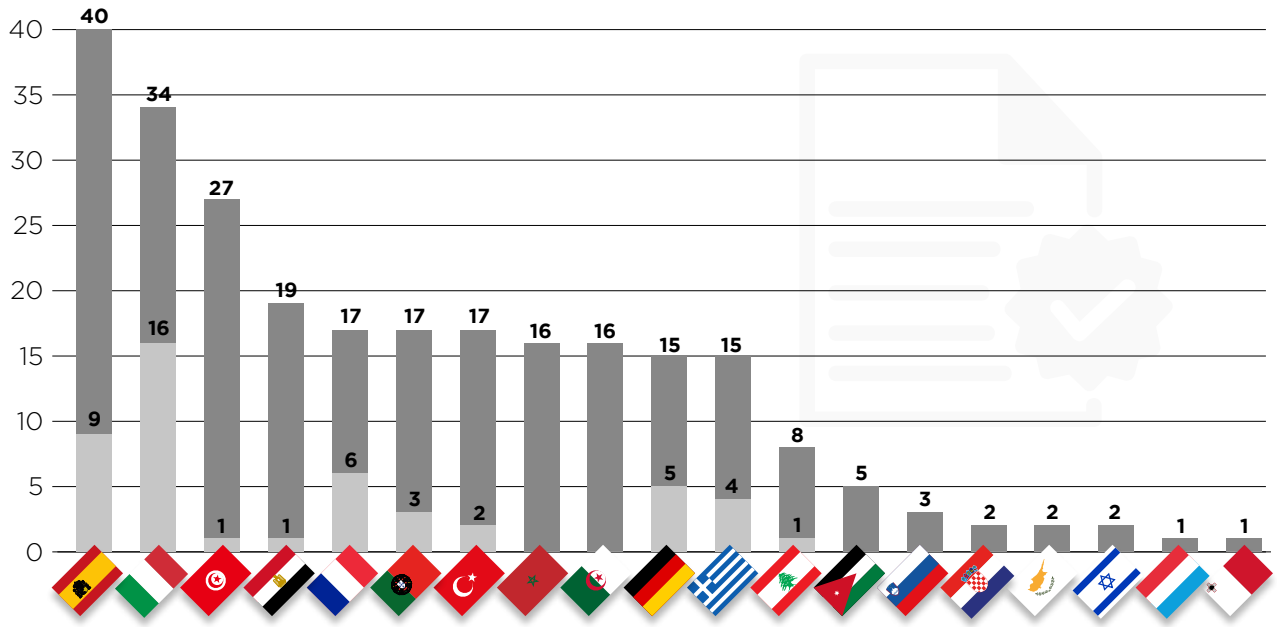
Funded Projects
per Country

Projects

Coordinated Projects

48
Funded Projects TOTAL

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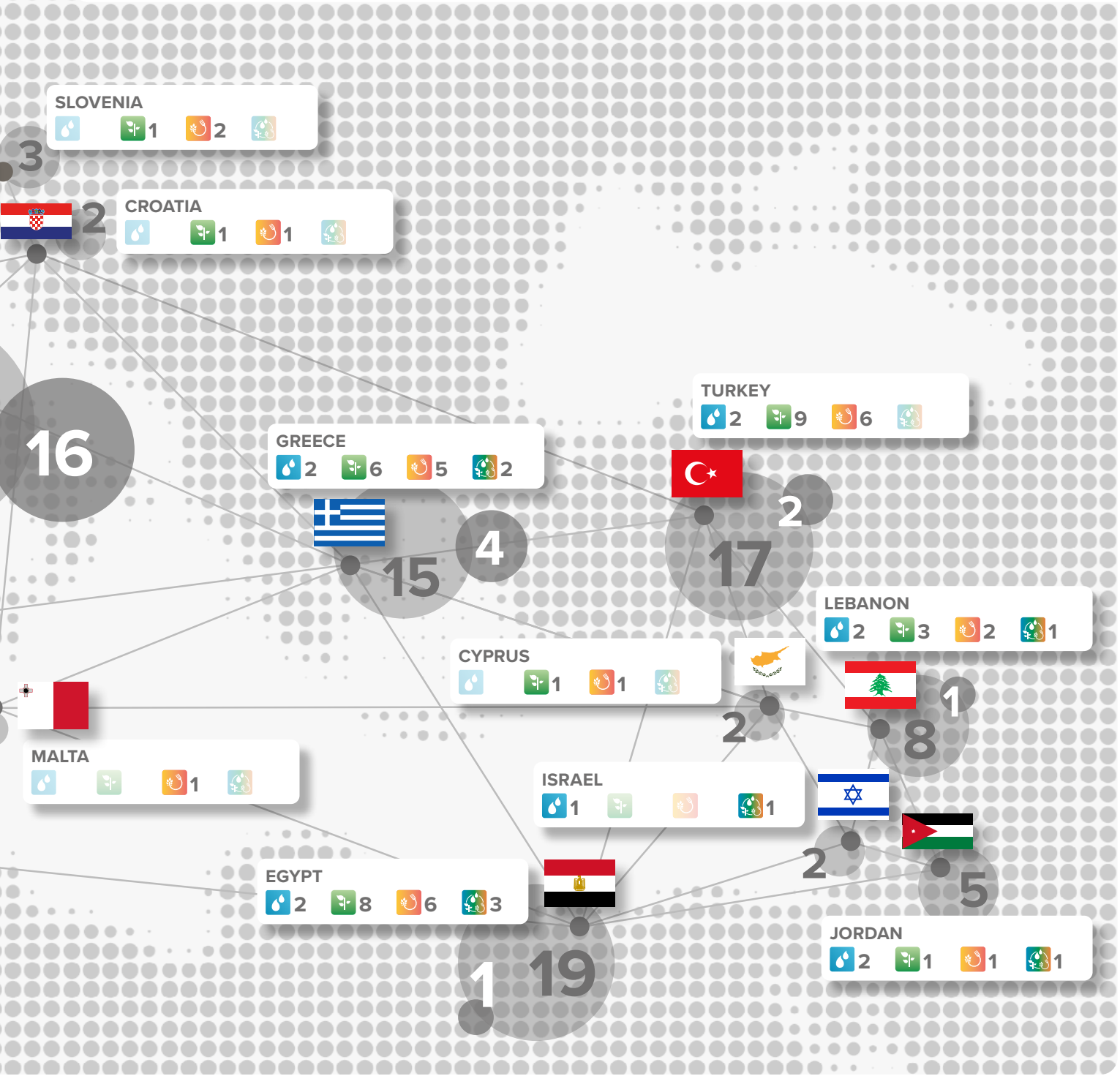
SLOVENIA
1
2
3
CROATIA
1
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2
16
GREECE
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6
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2
15
4
TURKEY
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9
6
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17
CYPRUS
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1
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LEBANON
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1
8
MALTA
1
ISRAEL
1
1
2
EGYPT
2
8
6
3
1
19
JORDAN
2
1
1
1
2
5

ALGERIA

Funds/ 1.482.000 €

	Entities	Projects	Section I	Section II
1	Ecole Nationale Supérieure Agronomique d'Alger - PU		CAMA	BiOrangePack Biodiversify
2	Institut National de la Recherche Agronomique d'Algerie INRAA - PU		4CE-MED	BrasExplor
3	Centre de Recherche Scientifique et Technique en Analyses Physico- Chimiques - PU			PulpIng
4	CIRTA Club semence - ASS			DiVicia
5	Enterprise d'extraction d'huiles essentielles médicinales - SME			WildFood
6	Ferhat Abbas University of Setif - PU			EXPLOWHEAT
7	Institut National de Recherche Forestiere - PU			WildFood
8	ITCMI - PU			BrasExplor
9	National High School of Biotechnology - PU			DiVicia
10	Université Ahmed Draia d'Adrar - PU		eGROUNDWATER	
11	Université des Sciences et de la Technologie Houari Boumediene - PU			BrasExplor
12	Université Kasdi Merbah Ouargla - PU			CAMEL-SHIELD
13	Université Mohamed Khider Biskra - PU		HortiMED	
14	Universite Saad Dahlab Blida - PU			GreenPalm
15	University of Mostaganem - PU			VALUEFARM
16	University of Oran - PU			LEGU-MED
17	University of Tipaza - PU			HubIS
	Research Units/ 20 total		**4**	**16**

17 Entities

20 Research Units
of which **1 SME**

2 **10** **4**

Projects per Thematic area

16 Projects
involve one or more Algerian Entities

CROATIA

Funds/ 220.000 €

	Entities	Projects	Section I	Section II
1	University of Zagreb - PU			LEGU-MED
2	University of Split - PU			BioProMedFood
3	Croatian Veterinary Institute, Regional Veterinary Department - PU			BioProMedFood
4	Centaurus D.O.O. - SME			BioProMedFood
	Research Units/ 4 total			**4**

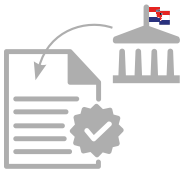
4 Entities

4 Research Units
of which **1 SME**

1

1

Projects per Thematic area



2 Projects
involve one or more Croatian Entities

CYPRUS

Funds/ 340.000 €

	Entities	Projects	Section I	Section II
1	Cyprus University of Technology - PU			VALUEFARM StopMedWaste
2	DP AMARAKOS ORGANICS - SME			VALUEFARM StopMedWaste
	Research Units/ 3 total			**3**

2 Entities

3 Research Units
of which **1 SMEs**

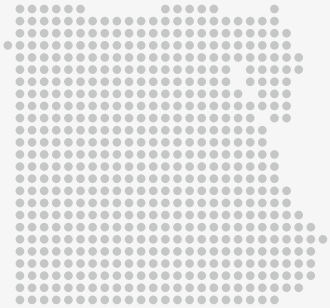
Projects per Thematic area

1 1

2 Projects
involve one or more Cypriot Entities

EGYPT

Funds/ 3.391.000 €



COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	National Research Center, NRC - REC		AZMUD	MEDISMART
2	Alexandria University - PU		TRACE-RICE	FRUALGAE
3	Benha University - PU			PulpIng VALUEFARM
4	Cairo University - PU		SIGMA-Nexus	EADANMBRT
5	Academy of Science Research and Technology - REC		PHEMAC	
6	Agrimatic Farms - SME		AWESOME	
7	Alamal Rice Company - SME		TRACE-RICE	
8	Arab Academy for Science and Technology and Maritime Transport - PU		Med Food TTHubs	
9	Aswan University - PU			SMARTIES
10	Beni-Suef University - PU			CerealMed
11	Central Laboratory for Aquaculture Research - PU		SUREFISH	
12	Desert Research Center - PU			HaloFarMs
13	Egyptian Association for Sustainable Development - ASS			SMARTIES
14	Egyptian Center for Innovation & Technology Development - DP		PHEMAC	
15	Fish Basket - SME		SUREFISH	
16	National Institute of Oceanography and Fisheries - PU		HortiMED	
17	NGB - PU			BrasExplor
18	OTHMAN AHMED OTHMAN COMPMAY - SME		AZMUD	
19	PTROTEUS Ltd - DP		SusMedHouse	
20	Suez Canal University - PU			Fish-PhotoCAT
21	The Egyptian Russian Company for Advanced Agriculture ECOFARM - SME		AZMUD	
	Research Units/ 25 total		**14**	**11**

21 Entities

25 Research Units

of which **4 SMEs**

2 **8** **6** **3**

Projects per Thematic area

19 Projects

involve one or more Egyptian Entities

of which

1 Project

is coordinated by an Egyptian Entity

FRANCE

Funds/ 4.109.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Centre de Coopération International en Recherche Agronomique pour le Développement CIRAD - PU		eGROUNDWATER	CAMEL-SHIELD Biodiversify
2	Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, INRAE - PU			Biodiversify CAMEL-SHIELD HaloFarMs BiOrangePack
3	Centre d'Etudes Spatiales de la Biosphère, CESBIO - PU			IDEWA SMARTIES
4	ARVALIS - Institut du Végétal - ASS		4CE-MED CAMA	
5	Groupe Ecole Supérieure d'Agricultures d'Angers Loire, ESA - DP			DiVicia
6	Institut de Génétique Environnement et Protection des Plantes, IGEPP - PU			BrasExplor
7	Institut National d'Etudes Superieures Agronomiques de Montpellier, SupAgro - PU			HubIS
8	Agdia Emea - SME			BiOrangePack
9	Amélioration Génétique et Adaptation des Plantes méditerranéennes et Tropicales, AGAP - PU			BrasExplor
10	Arts & Métiers Accélération - DP		PHEMAC	
11	Bureau de Recherche Geologique et Minière, BRGM - PU		eGROUNDWATER	
12	Caussade Semences Group - EN			Biodiversify
13	Domaine Experimental du Val d'Ainan - SME			DiVicia
14	Groupe d'Etude et de Contrôle des Variétés Et des Semences, GEVES- PU			BrasExplor
15	Inno TSD - SME		GOTHAM	

16	Institut de Recherche pour le Développement, IRD-Eco&Sols - PU			DiVicia
17	Institut National des Sciences Appliquées de Toulouse INSA - Laboratoire d'Ingénierie des Sytèmes Biologiques et Procédés - PU			EADANMBRT
18	Laboratoire Ecologie Fonctionnelle et Environnement ECOLAB- PU			DiVicia
19	SMARTWALL Energy & Communities LTD. - SME		AZMUD	
20	Centre Technique Industriel de la Plasturgie et des Composites, CT-IPC - ASS			FEDKITO
21	TerraNIS - SME			HubIS
22	Université de Bretagne Occidentale - PU			HaloFarMs
23	Université de la Sorbonne - PU			FEDKITO
	Research Units/ 30 total		**7**	**23**

23 Entities

30 Research Units

of which **5 SMEs**

6 **8** **2** **1**

Projects per Thematic area

17 Projects

involve one or more French Entities

of which

6 Projects

are coordinated by a French Entity

GERMANY

Funds/ 5.616.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	University of Bonn - PU			AdaMedOr FRUALGAE
2	FiBL Research Institute of Organic Agriculture - DP		ConServeTerra	
3	Fraunhofer Institute for Molecular Biology and Applied Ecology, IME - PU			RESIDUE
4	Karlsruhe University of Applied Sciences - PU			SmaCuMed
5	Technical University of Munich - PU		SIGMA-Nexus	
6	ATB Leibniz-Institut für Agrartechnik und Bioökonomie e.V. - PU			PulpIng
7	Benelog GmbH & Co. KG - SME		MEDIFIT	
8	Bergische University of Wuppertal - PU			VALUEFARM
9	DUROPAN GmbH - SME			SmaCuMed
10	Federal Institute for Risk Assessment - PU		MEDIFIT	
11	Fraunhofer Institute for Solar Energy Systems - REC		SusMedHouse	
12	Freie Universität Berlin, WG Geoecology - PU			RESIDUE
13	Helmholtz Centre for Environmental Research - REC		InTheMED	
14	Justus-Liebig-Universität Gießen - PU		ConServeTerra	
15	Leibniz Universität Hannover - PU			LEGU-MED
16	Leibniz-Zentrum für Agrarlandschaftsforschung - PU			Biodiversify
17	RWTH University of Achen - PU		AWESOME	
18	Tsenso GmbH - SME			BIOFRESHCLOUD
19	University of Kassel, Faculty of Organic Agricultural Sciences - PU		ConServeTerra	
	Research Units/ 20 total		9	11

19 Entities

20 Research Units
of which **3 SMEs**

3 **6** **4** **2**

Projects per Thematic area

15 Projects
involve one or more German Entities

of which

5 Projects
are coordinated by a German Entity

GREECE

Funds/ 3.762.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	University of Thessaly - PU			FEDKITO HubIS PulpIng VALUEFARM
2	Agricultural University of Athens - PU			CerealMed FRUALGAE
3	Aristotle University of Thessaloniki - PU		MEDIFIT	Biodiversify
4	Greek Fresh Vegetables IKE - DP			PulpIng VALUEFARM
5	Centre for Research and Technology Hellas - REC		Med Food TTHubs	
6	3D S.A. - SME			HubIS
7	Athens University of Economics and Business - PU		AWESOME	
8	BIOS AGROSYSTEMS S.A. - EN		4CE-MED	
9	Center for Renewable Energy Sources - PU		4CE-MED	
10	ELGO-DEMETER Veterinary Research Institute - REC			SUPERTROUT
11	Green Project SA - SME		Med Food TTHubs	
12	Hellenic Agricultural Organisation, HAO Demeter - REC		CAMA	
13	MEVGAL - EN		MEDIFIT	
14	National Technical University of Athens - PU			FRUALGAE
15	Organismos Anaptiksis Kritis Anonimi Etairia - PU		SIGMA-Nexus	
16	Protypes Ydroponikes Kalliergies Mesologgiou I.K.E. - SME			FRUALGAE
17	Technical University of Crete - PU		InTheMED	
18	University of Crete - PU		SIGMA-Nexus	
19	University of Patras - PU		Med Food TTHubs	
	Research Units/ 25 total		12	13

19 Entities

25 Research Units

of which **3 SMEs**

2 **6** **5** **2**

Projects per Thematic area

15 Projects

involve one or more Greek Entities

of which

4 Projects

are coordinated by a Greek Entity

ISRAEL

Funds/ 375.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Phytor Lab Jerusalem - DP			RESIDUE
2	SEED, Yezreel Valley College - PU		AWESOME	
3	University of Haifa - PU		AWESOME	
	Research Units/ 3 total		**2**	**1**

3 Entities

3 Research Units

1

1

Projects per Thematic area

2 Projects

involve one or more Israeli Entities

ITALY

Funds/ 11.955.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, CREA - PU		CAMA iGUESS-MED 4CE-MED	Biodiversify CerealMed BrasExplor
2	Consiglio Nazionale delle Ricerche, CNR - PU		SusMedHouse	GreenPalm LEGU-MED IDEWA SMARTIES
3	Università di Pisa - PU		iGUESS-MED	FIGGEN FEDKITO HaloFarMs
4	Alma Mater Studiorum - Università di Bologna - PU		4CE-MED	BioProMedFood CerealMed FEDKITO
5	Università degli Studi di Bari Aldo Moro - PU			CAMEL-SHIELD CerealMed StopMedWaste
6	Università degli Studi di Padova - PU		RESERVOIR	WildFood Fish-PhotoCAT
7	Politecnico di Milano - PU		AWESOME	SMARTIES
8	Università degli Studi della Tuscia - PU			EXPLOWHEAT SMARTIES
9	Università Politecnica delle Marche - PU			StopMedWaste DiVicia
10	Engineering - Ingegneria Informatica Spa - EN		GOTHAM Med Food TTHubs	
11	Università degli Studi di Torino - PU			EXPLOWHEAT StopMedWaste
12	ENCO Srl - SME		SUREFISH	
13	Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta - REC			SUPERTROUT
14	Università degli Studi di Catania - PU			BiOrangePack
15	Università degli Studi di Firenze - PU			LEGU-MED
16	Università degli Studi di Milano - PU			Fish-PhotoCAT
17	Università degli Studi di Pavia - PU		RESERVOIR	
18	Agrifutur - SME			LEGU-MED
19	Agromnia Società Cooperativa - ASS		CAMA	
20	Azienda Agricola Canali Cavour S.S. - SME			SUPERTROUT
21	Azienda Furio Salvadori - SME			FEDKITO
22	Bioplanet s.c.a. - SME		iGUESS-MED	

23	Caseificio Sound - SME			FEDKITO
24	Centro Siciliano di Fisica Nucleare e di Struttura della Materia - REC			BiOrangePack
25	CLAI S.C.A - SME			BioProMedFood
26	Consorzio di Bonifica di secondo grado per il Canale Emiliano Romagnolo, CER - PU		RESERVOIR	
27	Consorzio Italbiotec - DP			RESIDUE
28	Decco Italia srl - SME			BiOrangePack
29	EVJA srl - SME		iGUESS-MED	
30	FEEM - Fondazione Eni Enrico Mattei - REC		AWESOME	
31	INNOLABS srl - SME		PHEMAC	
32	Istituto per la Cooperazione Universitaria Onlus - DP		GOTHAM	
33	Laboratory for Molecular Surfaces and Nanotechnology LAMSUN - PU			BiOrangePack
34	Meteo Operations Italia srl - SME			SMARTIES
35	NET7 srl - SME		PHEMAC	
36	Organizzazione dei produttori di Agrumi - OP Cosentino - SME			BiOrangePack
37	Scuola Superiore Sant'Anna Pisa - PU			LEGU-MED
38	Stazione Sperimentale per l'Industria delle Conserve Alimentari - PU			MEDISMART
39	TECNOALIMENTI S.C.p.A. - DP		Med Food TTHubs	
40	Università Cattolica del Sacro Cuore Roma - PU			BioProMedFood
41	Università degli Studi di Camerino - PU			Nano4Fresh
42	Università degli Studi di Modena e Reggio Emilia - PU			FRUALGAE
43	Università degli Studi di Napoli Federico II - PU		SUREFISH	
44	Università degli Studi di Palermo - PU			BrasExplor
45	Università degli Studi di Udine - PU			SUPERTROUT
46	Università di Parma - PU		InTheMED	
	Research Units/ 70 total		**23**	**47**

46 Entities

70 Research Units

of which **13 SMEs**

6 **15** **11** **2**

Projects per Thematic area

34 Projects
involve one or more Italian Entities

of which

16 Projects
are coordinated by an Italian Entity

JORDAN

Funds/ 934.000 €

	Entities	Projects	Section I	Section II
1	Methods for Irrigation and Agriculture MIRRA - ASS		AZMUD	
2	Jordan University Of Science And Technology - PU		Med Food TTHubs	
3	National Agricultural Research Center - REC		GOTHAM	
4	University of Jordan - PU		RESERVOIR	
5	iPark at Royal Scientific Society - PU		PHEMAC	
6	Packaging Industries Company LTD - SME		AZMUD	
7	Royal Society for the Conservation of Nature, Azraq Wetland Reserve - ASS		RESERVOIR	
	Research Units/ 7 total		7	

7 Entities

7 Research Units

of which **1 SME**

2 **1** **1** **1**

Projects per Thematic area

5 Projects

involve one or more Jordanian Entities

LEBANON

Funds/ 537.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Lebanese American University, LAU - DP			EADANMBRT FRUALGAE
2	American University of Beirut - DP		SUREFISH	CerealMed
3	Lebanese Agricultural Research Institute - PU			LEGU-MED DiVicia
4	Berytech Foundation - DP		PHEMAC	
5	Issam Fares Institute for Public Policy and International Affairs - PU		PHEMAC	
6	Lebanese Ministry of Agriculture - PU		GOTHAM	
7	Sophia For Fresh And Frozen Fish Sarl - EN		SUREFISH	
	Research Units/ 10 total		**5**	**5**

7 Entities

10 Research Units

2 **3** **2** **1**

Projects per Thematic area

8 Projects involve one or more Lebanese Entities

of which

1 Project is coordinated by a Lebanese Entity

LUXEMBOURG

Funds/ 150.000 €

1 Project
involves one
Luxembourg Entity

	Entities	Projects	Section I	Section II
1	Luxembourg Institute of Science and Technology - REC			SMARTIES
	Research Units/ 1 total			**1**

1 Entity
1 Research Unit

1
Projects per Thematic area

MALTA

Funds/ 200.000 €

1 Project
involves one
Maltese Entity

	Entities	Projects	Section I	Section II
1	University of Malta - PU		MEDIFIT	
	Research Units/ 1 total			**1**

1 Entity
1 Research Unit

1
Projects per Thematic area

MOROCCO

Funds/ 1.982.000 €

	Entities	Projects	Section I	Section II
1	Institut National de la Recherche Agronomique Morocco - PU		CAMA ConServeTerra	CerealMed DiVicia
2	Institut Agronomique et Vétérinaire Hassan II - PU		ConServeTerra	HubIS CAMEL-SHIELD
3	University of Cadi Ayyad - PU			IDEWA SmaCuMed Nano4Fresh
4	University Mohamed V in Rabat - PU			CAMEL-SHIELD DiVicia
5	Université Moulay Ismaïl de Meknès - PU		eGROUNDWATER	HubIS
6	International Centre for Agricultural Research in the Dry Areas, ICARDA - PU		4CE-MED	
7	Development NGO - DP		ConServeTerra	
8	Université Sidi Mohamed Ben Abdellah - PU		PHEMAC	
9	Moulay Ismail University - PU			SmaCuMed
10	Université Hassan II de Casablanca - PU			FEDKITO
11	University Hassan 1st, FST de Settat - PU			CerealMed
12	Agence Nationale Des Plantes Médicinales Et Aromatiques - PU			BIOFRESHCLOUD
13	Chouaib Doukkali University - PU			SMARTIES
14	Superior School of Technology Khenifra - PU			AdaMedOr
15	Sciences and technologies Faculty - Sidi Mohamed Ben Abdellah University - PU			BIOFRESHCLOUD
16	Ecole Nationale d'Agriculture de Meknes - PU			AdaMedOr
17	El Baraka farmers association - ASS		ConServeTerra	
18	West MA - ASS		ConServeTerra	
	Research Units/ 27 total		**9**	**18**

18 Entities

27 Research Units

5 **7** **3** **1**

Projects per Thematic area

16 Projects

involve one or more Moroccan Entities

PORTUGAL

Funds/ 3.441.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Universidade de Lisboa - PU		eGROUNDWATER	Nano4Fresh HubIS WildFood
2	Instituto Nacional de Investigação Agrária e Veterinária, I.P. - PU		TRACE-RICE CAMA	
3	Instituto Politécnico de Bragança - PU			PulpIng VALUEFARM
4	Centre of Marine Sciences of the Algarve - PU			FRUALGAE HaloFarMs
5	Universidade Nova de Lisboa - PU		TRACE-RICE	DiVicia
6	Aquagri - SME			SmaCuMed
7	Asociación Portuguesa de Movilización Conservación de Suelos - ASS		CAMA	
8	Associação de Viticultores do Concelho de Palmela - ASS		SusMedHouse	
9	Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento - ASS		InTheMED	
10	Building Global Innovators - SME		TRACE-RICE	
11	Casa do Arroz - ASS		TRACE-RICE	
12	Centro Operativo e de Tecnologia de Regadio - ASS			HubIS
13	Collaborative Laboratory Mountains of Research - ASS			PulpIng
14	Cooperativa de Usuarios do Freixo do Meio, CRL - ASS			WildFood
15	Decorgel – Produtos Alimentares S.A. - SME			PulpIng
16	Ernesto Morgado, SA - SME		TRACE-RICE	

17	Frutus - Estação Fruteira do Montejunto, CRL - SME			Nano4Fresh
18	INOV INESC Inovação - ASS		Med Food TTHubs	
19	Instituto de Biologia Experimental e Tecnológica IBET - SME		TRACE-RICE	
20	Mater Dynamics - SME		TRACE-RICE	
21	Universidade Católica Portuguesa - Centro Regional do Porto - PU			MEDISMART
22	Universidade do Algarve - PU		eGROUNDWATER	
23	Universidade do Minho - PU			GreenPalm
	Research Units/ 30 total		**14**	**16**

23 Entities

30 Research Units

of which **7 SMEs**

4 **5** **8**

Projects per Thematic area

17 Projects

involve one or more Portuguese Entities

of which

3 Projects

are coordinated by a Portuguese Entity

SLOVENIA

Funds/ 240.000 €

	Entities	Projects	Section I	Section II
1	Agricultural Institute of Slovenia - PU			BrasExplor
2	Slovenian Forestry Institute - PU			WildFood
3	University of Ljubljana, Biotechnical Faculty, Dept. Food Science and Technology - PU			BioProMedFood
4	University of Maribor, Faculty of Mechanical Engineering - REC			BioProMedFood
	Research Units/ 4 total			**4**

4 Entities

4 Research Units

1 **2**

Projects per Thematic area

3 Projects

involve one or more Slovene Entities

SPAIN

Funds/ 10.496.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Institutos, Centros y Unidades de Consejo Superior de Investigaciones Científicas CSIC - PU		CAMA TRACE-RICE	AdaMedOr CerealMed DiVicia FIGGEN GreenPalm HubIS HaloFarMs RESIDUE VALUEFARM
2	Universidad de Cordoba - PU		GOTHAM MEDIFIT	BIOFRESHCLOUD
3	Universidad de Lleida - PU		CAMA	Biodiversify IDEWA
4	Universitat de València - PU			EADANMBRT BiOrangePack SMARTIES
5	Universitat Politècnica de València - PU		eGROUNDWATER InTheMED	
6	AIMPLAS Instituto Tecnológico del Plástico - REC		AZMUD	BiOrangePack
7	Centro de Investigación y Tecnología Agroalimentaria de Aragón CITA - PU			AdaMedOr SMARTIES
8	Instituto Andaluz de Investigación y Formación Agraria, Pesquera IFAPA - PU			HubIS LEGU-MED
9	Centre de Ciència i Tecnologia Forestal de Catalunya - PU			WildFood
10	CATAQUA, Centro Tecnológico del Agua - REC		GOTHAM	
11	INKOA SISTEMAS S.L. - SME		HortiMED	
12	Universitat Autònoma de Barcelona - PU		PHEMAC	
13	Agrocelys - SME			EXPLOWHEAT
14	AMC Innova - EN			MEDISMART
15	Centro Nacional de Tecnología y Seguridad Alimentaria CNTA - REC		SUREFISH	
16	Universidad de Granada - PU			Nano4Fresh
17	Universidad de Deusto - PU		HortiMED	
18	Water On Line Analysis Europe S.L - SME		SusMedHouse	
19	Fundacion Cajamar - REC		iGUESS-MED	
20	Universitat de Barcelona - PU		ConServeTerra	
21	IDAI NATURE S.L. - SME		AZMUD	
22	Instituto Tecnológico del Embalaje, Transporte y Logística ITENE - ASS		SUREFISH	

23	Instituto Geológico y Minero de España - PU		RESERVOIR	
24	Universidad de Almeria - PU		iGUESS-MED	
25	Universidad de Alicante - PU		RESERVOIR	
26	DOMCA S.A. - SME			BioProMedFood
27	Ingeniería y Control Electrónico S.A. - SME		SUREFISH	
28	VisualNAcert S.L. - SME		eGROUNDWATER	
29	ANFACO - CECOPESCA - ASS		SUREFISH	
30	Institut Valencià d'Investigacions Agràries IVIA, Centro de Tecnología Post-recolección - PU			StopMedWaste
31	Camelina Company Espana - SME		4CE-MED	
32	Universidad Politécnica de Madrid - PU		Med Food TTHubs	
33	Instituto Agronómico Mediterráneo de Zaragoza, IAMZ-CIHEAM- PU		CAMA	
34	Cooperativas Agro-alimentarias de España, SPANISH CO-OPS - SME		4CE-MED	
35	ICATALIST S.L. - SME		eGROUNDWATER	
36	Observatori de l'Ebre - PU			IDEWA
37	Universidade de Santiago de Compostela - PU			CerealMed
38	Iniciativas Innovadoras S.A.L - SME		4CE-MED	
39	Desarrollos Panaderos Levantinos, S.L. - SME		TRACE-RICE	
40	Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria INIA - PU			BrasExplor
41	Consorci de Gallecs - DP		ConServeTerra	
42	GRUPO LA CAÑA, S.L. - EN		iGUESS-MED	
43	TAFIQS in Foods S.L - SME		MEDIFIT	
44	Consejo Regulador de la Denominación de Origen Miel de Granada - PU		MEDIFIT	
45	Centro de Investigaciones Científicas y Tecnológicas de Extremadura - PU			FIGGEN
46	Decco Iberia Post-cosecha S.A.U. - EN			StopMedWaste
47	Promotora del Aliments Catalans - PU			WildFood
48	Universidad Complutense de Madrid Visavet Health Surveillance Centre - PU			SUPERTROUT
	Research Units/ 68 total		**35**	**33**

48 Entities

68 Research Units

of which **13 SMEs**

9 **18** **12** **1**

Projects per Thematic area

40 Projects

involve one or more Spanish Entities

of which

9 Projects

are coordinated by a Spanish Entity

TUNISIA

Funds/ 3.060.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Institut National de la Recherche Agronomique de Tunisie INRAT - PU		4CE-MED CAMA ConServeTerra	BiOrangePack BrasExplor StopMedWaste
2	Centre de Biotechnologie de Borj Cédria, CBBC - PU			PulpIng FEDKITO HaloFarMs LEGU-MED
3	Centre de Recherches et Technologie des Eaux - PU		InTheMED	HaloFarMs SmaCuMed
4	Institut National de la Recherche en Génie Rural, Eaux et Forêts - PU			HubIS SMARTIES WildFood
5	Association pour la promotion de l'agriculture durable - ASS		CAMA ConServeTerra	
6	Ecole Supérieure des Ingénieurs de Medjez El Bab - PU		Med Food TTHubs	SMARTIES
7	Institut de l'Olivier - PU			AdaMedOr Biodiversify
8	Institut National des Sciences et Technologies de la Mer - PU		SUREFISH	Fish-PhotoCAT
9	Université de Tunis El Manar - PU			FIGGEN BiOrangePack
10	Agence Nationale de Contrôle Sanitaire et Environnemental des Produits - PU		MEDIFIT	
11	Agriculture Extension and Training Agency - PU			WildFood
12	Agromillora Méditerranée - SME			AdaMedOr
13	Association Slow Food Tebourba - ASS		SUREFISH	
14	Center of Biotechnology of Sfax - PU			EXPLOWHEAT
15	Centre Technique des Agrumes - PU			BiOrangePack
16	Chamber of the Commerce of the Center - ASS		PHEMAC	
17	EcoPark Borj-Cedria - PU		PHEMAC	
18	Group Didon Marée - SME		SUREFISH	
19	Institut National Agronomique de Tunisie INAT - PU			AdaMedOr
20	Institut Supérieur Agronomique Chott Mériem - PU			SMARTIES
21	National Institut for Field Crops - DP		ConServeTerra	
22	Sanlucar Group - DP			StopMedWaste

23	Regional Research Centre in Horticulture and Organic Agriculture - PU		**iGUESS-MED**	
24	Office of Livestock and Pasture - DP		**ConServeTerra**	
25	University of Gabes, Faculty of Sciences - PU			**GreenPalm**
26	University of Kairouan, Faculty of Sciences and Techniques of Sidi Bouzid - PU			**DiVicia**
	Research Units/ 43 total		**16**	**27**

26 Entities

43 Research Units

of which **3 SMEs**

4 **13** **9** **1**

Projects per Thematic area

27 Projects

involve one or more Tunisian Entities

of which

1 Project

is coordinated by a Tunisian Entity

TURKEY

Funds/ 2.504.000 €

COORDINATED PROJECT

	Entities	Projects	Section I	Section II
1	Çukurova Üniversitesi - PU			BioProMedFood CerealMed FIGGEN
2	Ankara Üniversitesi - PU			BIOFRESHCLOUD BiOrangePack
3	Dokuz Eylül Üniversitesi		RESERVOIR	VALUEFARM
4	Ege Üniversitesi - PU			VALUEFARM StopMedWaste
5	Migros Ticaret A.Ş. - EN		MEDIFIT	BIOFRESHCLOUD
6	AR&TeCS Anadolu AR-GE Technology Engineering and Consulting Co. - SME		SusMedHouse	
7	Akdeniz Üniversitesi - PU		iGUESS-MED	
8	Antalya Tarım Hybrid Seeds - DP		SusMedHouse	
9	Bahri Dagdas International Agricultural Research Institute, Republic of Turkey Ministry of Agriculture and Forestry - REC		ConServeTerra	
10	Baltali Gida Hayvancilik San ve Tic. Ltd Sti. - SME		MEDIFIT	
11	Boğaziçi Üniversitesi - PU		InTheMED	
12	Central Research Institute of Food and Feed Control, Republic of Turkey Ministry of Agriculture and Forestry - PU			MEDISMART
13	Conservation Agriculture Association - ASS		ConServeTerra	
14	ICACHEM Agro İlac San. Tic.Ltd.Sti. - SME			StopMedWaste

15	Karadeniz Teknik Üniversitesi - PU			**SUPERTROUT**
16	SBS Bilimsel Bio Çözümler San. ve Tic. A.Ş. (BEEO Arı Ürünleri) - SME		**MEDIFIT**	
17	Şırnak Üniversitesi - PU			**LEGU-MED**
18	Tabit Akıllı Tarım Teknolojileri A.Ş. - SME		**AZMUD**	
19	Tarım A.Ş. Bursa Hayvancılık Tarım San. ve Tic. A.Ş. - EN			**MEDISMART**
	Research Units/ 25 total		**11**	**14**

19 Entities

25 Research Units
of which **5 SMEs**

2 **9** **6**

Projects per Thematic area

17 Projects
involve one or more Turkish Entities

of which

2 Projects
are coordinated by a Turkish Entity

Projects

Thematic area

Water Management

Section I

Topic - Sustainable groundwater management in water-stressed Mediterranean areas

Type of Action

RIA - Research & Innovation Action

Budget

1.600.000 €

Duration

48 months

Coordinating country

Spain

Participating countries/ 5

Research Units/ 9

of which **2 SMEs**

Project 1/ Section I

eGROUNDWATER

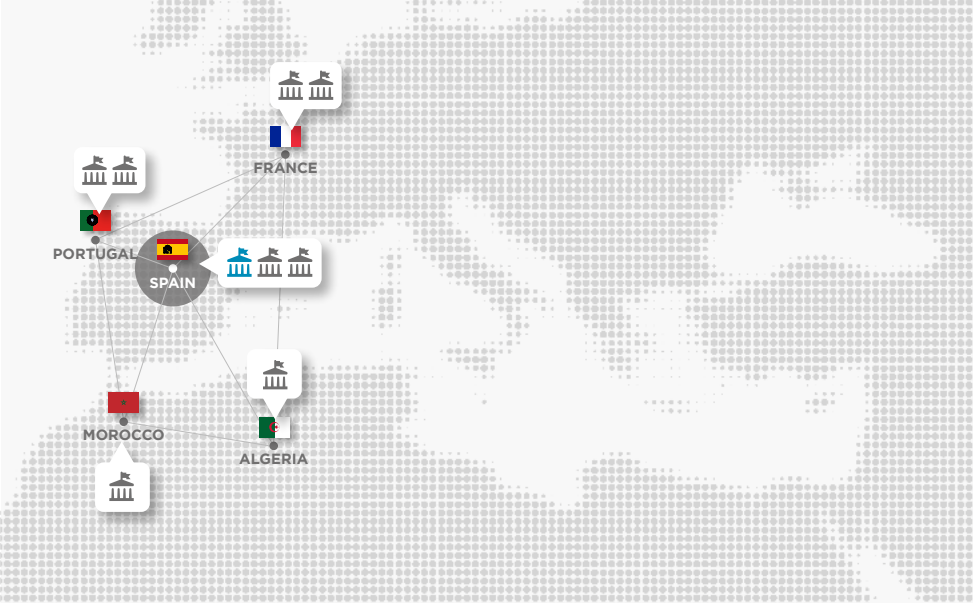
Citizen science and ICT-based enhanced information systems for groundwater assessment, modelling and sustainable participatory management

Context

Groundwater is a strategic resource worldwide, covering almost 40% of the global irrigated area. However, overexploitation of groundwater is a worldwide phenomenon, causing the depletion of groundwater reserves and damaging its quality. Groundwater management is subject to distinct complexities such as uncontrolled overexploitation and pollution. One critical issue for groundwater management is data availability. Data and information systems are key to sustainable groundwater management, providing knowledge on the system status and dynamics and supporting the development of groundwater models and management rules. However, existing data on groundwater levels, consumption, and quality is scarce, preventing a precise modelling, assessment, control, and management of most Mediterranean groundwater bodies.

Objectives

eGROUNDWATER will support sustainable participatory groundwater management in the Mediterranean region through the design, testing, and assessment of innovative enhanced information systems (EIS) integrating citizen science and ICT-based tools. Innovative EIS will improve the understanding of groundwater systems, support modelling and management tools, and contribute to engage stakeholders in the co-development of sustainable groundwater management strategies. Information sources include earth observation (drones, remote sensing), sensors, ICT tools (e.g. mobile apps), and engagement of citizens and stakeholders into information gathering (citizen science). Data will be uploaded to the ICT-based platform, tailored to and validated in four case studies in Algeria, Morocco, Portugal and Spain, with different data availability and features. Enhanced data availability will help to improve control of groundwater abstractions and overexploitation, supporting sustainable groundwater management and farming activities. eGROUNDWATER will examine the socio-economic implications of enhanced information systems including potential benefits, learning and interactions between users, managers and other stakeholders. Easy-to-



Coordinating institution

Universitat Politècnica de València UPV - PU

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Instituto de Ingeniería del Agua y Medio Ambiente

Scientific Coordinator:
PULIDO VELAZQUEZ, Manuel

use and comprehend Serious Games will be based on advanced scientific principles (agent-based model, system dynamics), providing an immersive experience to users (groundwater stakeholders and policy-makers). eGROUNDWATER Technology Readiness Level is currently 3, and it is expected to reach 5 by the end of the project.

Expected impacts

New information provided by the EIS will strengthen the understanding of the groundwater cycle, alleviating data scarcity problems, enhancing the knowledge on groundwater behaviour, improving groundwater modelling and the adoption of resilient, sustainable and participatory groundwater management rules. The use of citizen science will increase the level of involvement of groundwater users in groundwater management, enhance its capacity to understand groundwater processes and build mutual trust.

4 case-studies of eGROUNDWATER

Thematic area

Water Management

Section I

Topic - Sustainable groundwater management in water-stressed Mediterranean areas

Type of Action

RIA - Research & Innovation Action

Budget

1.599.999 €

Duration

36 months

Coordinating country

Spain

Participating countries/ 5

Research Units/ 7

of which **1 SME**

Project 2/ Section I

GOTHAM

Governance tool for sustainable water resources allocation in the Mediterranean through stakeholder's collaboration. Towards a paradigm shift in groundwater management by end-users

Context

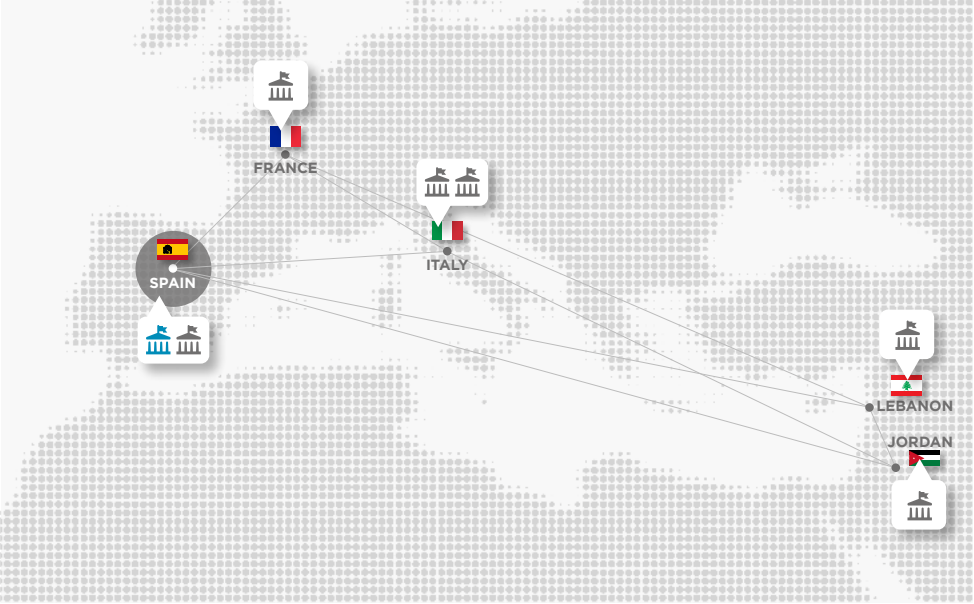
The GOTHAM project targets effective groundwater governance for the improvement of the management and preservation of this essential and strategic resource. This effective groundwater management remains an important and complex challenge in the Mediterranean and elsewhere, but is essential to ensure long-term sustainable use of the resource by means of a bottom-up decision-making approach.
Throughout the decision process of existing groundwater governance models, doubts are raised and knowledge is generated at each decision level. However, nowadays there is no exchange of meaningful information between different agents. There is a need of a tool capable of allowing data exchange between the different stakeholders and water users and the integration of this highly valuable information in groundwater governance decisions.

Objectives

The overarching objective of the GOTHAM project is to develop and validate a user-driven tool that enables effective groundwater governance to ultimately preserve the quantity and quality of this strategic resource in the Mediterranean basin. The GOTHAM Tool (GTool) uses an integrated methodological approach that targets optimal allocation of water resources from an environmental, social and economic perspective, including stakeholder knowledge, priorities and behaviour. A common framework for collaboration and engagement of the different water users (mainly, agricultural communities but also municipal and industrial users) will be provided, as well as other relevant stakeholders such as water producers/operators and regulator(s).

Expected impacts

- A generic methodology for aquifer-scale water balance estimation, reducing the water balance uncertainty;



Coordinating institution

CETAQUA, Centro Tecnológico del Agua - REC

Scientific Coordinator:
ARNALDOS, Marina

- Cost-effectiveness analysis in at least 2 replication sites;
- Several (5) water tariff structures will be evaluated to help in deepening on socio-economic aspects related to groundwater cycle;
- The use of 5 indices of reliability, resilience and vulnerability (RRV) for classifying and evaluating water resource systems performance;
- Based on Data Analytics algorithms, state aquifer variables will be forecasted over the coming 1-3 months from different predictor water balance components, such as rainfall, evapotranspiration and/or groundwater extraction, among others;
- Remote sensing derived products (Land Surface Temperature, Vegetation Indices, Dynamic land-use changes, etc.) and the calculation of multiple drought indices will allow the anticipation of water demand and drought over the coming 1-6 months;
- At least 7 actors will be engaged for each case study, including irrigation communities, public authority/local policy makers, water utilities, agro-food industries, consumer association and scientist organizations;
- A specific module for evaluating the feasibility of MAR schemes as a result of multi-criteria analysis;
- A 10% expected increase in the number of exchanges of water rights (via Blockchain) will contribute to water resilience and security.

WATER CHALLENGES	PROJECT CONTRIBUTIONS	TRL	KEY PARTNERS
Lack of transparency and user's engagement in water management (gap between existing DSS and water users)	Collaborative and participate approach adding value to water users (**User's engagement module**)	3 → 5	INNO, ICU, NARC, MoA
Insufficient implementation of water lessons learned in EU funded projects	**Community Engagement Approach** will be conducted via an interactive workshop environment in three case studies	N/A	INNO, ICU, NARC, MoA
Lack of data interoperability between meteorological and hydro(geo)logical systems (multiple data sources)	Water System Interoperability integrating Data and Analytics (**Data arquitecture**)	4 → 6	ENG
Uncertainty on the impact of multiple water allocation alternatives	What-if analysis and impact simulator(**Optimised water allocation module**)	4 → 6	CETAQUA
Uncertainty on current groundwater Q & C status and potential impacts due to water availability and demand scenarios	Data Analytics algorithms: historical time series and Remote Sensing techniques (**Water balance & availability and demand forecasting modules**)	4 → 6	CETAQUA
Socio-economic assessment must be part of groundwater management	Application of CEA and water tariff structures to GW management scenarios. Water scarcity and economic opportunity cost of water use (**Agro-economic module**)	4 → 6	UCO
Necessity for assessing the feasibility and impacts of multiple MAR and aquifer remediation schemes	Development of a multicriteria algorithm to select the optimum design (**MAR and aquifer remediation module**)	4 → 6	CETAQUA
Flexibilization of the water concession regime and water market for reducing water supply risks	Development of a Blockchain network and its corresponding smart contract (**Agro-economic module**)	3 → 5	CETAQUA, UCO

Fig.9. Innovative project contributions to main water challenges for sustainable groundwater management. Note: (initial TRL / expected TRL). Q = Quantitative; C = Chemical; CEA = Cost-Effectiveness Analysis

Thematic area

Water Management

Section I

Topic - Sustainable groundwater management in water-stressed Mediterranean areas

Type of Action

RIA - Research & Innovation Action

Budget

1.589.000 €

Duration

36 months

Project 3/ Section I

InTheMED

Innovative and Sustainable Groundwater Management in the MED

Context

To provide the most innovative decision support system tools on-line and demonstrate them in five pilot sites. To foster sharing of data, methods and results. On the basis of solid system-process and socio-economic models, and the participatory involvement of all stakeholders.

Objectives

InTheMED is focused on four primary and complementary pillars with the final aim of providing decision-makers, researchers and final users with an interactive, innovative and easy-to-use Fuzzy Web Decision Support System that will improve their ability to respond to environmental, climatic and socio-economic pressures. These four pillars are: i) Strengthen the understanding of groundwater functioning and trends, ii) improvement of groundwater resilience and security in a sustainable social learning process, iii) development of sustainable management and remediation strategies, iv) reinforcement of decision support, communication and dissemination activities using a combination of monitoring and smart modelling. The selection of five representative case studies, with groundwater systems facing a broad range of anthropogenic pressures, will facilitate the replicability and transferability of the InTheMED concept to other MED countries.

Five pilot sites have been selected. The is under pressure by nearby mining activities, the Spanish Requena-Utiel aquifer has shown consistent water declines over the last 10 years after the beginning of vineyard irrigation, a crop that has been dry farmed in the past; the Tunisian Korba aquifer suffers from salinization due to saltwater intrusion plus continuous groundwater depletion owed to agricultural, industrial and tourism activities; the Greek Tympaki aquifer on the island of Crete presents saltwater intrusion up to 2 km inland; and the Turkish Konya aquifer, a large aquifer underlying a closed basin in central Anatolia is suffering from high levels of salinity and nitrate contents and severe water decline due to intensive water use for irrigation.

Coordinating country

Spain

Participating countries/ 7

Research Units/ 7

Coordinating institution

Universitat Politècnica de València - PU

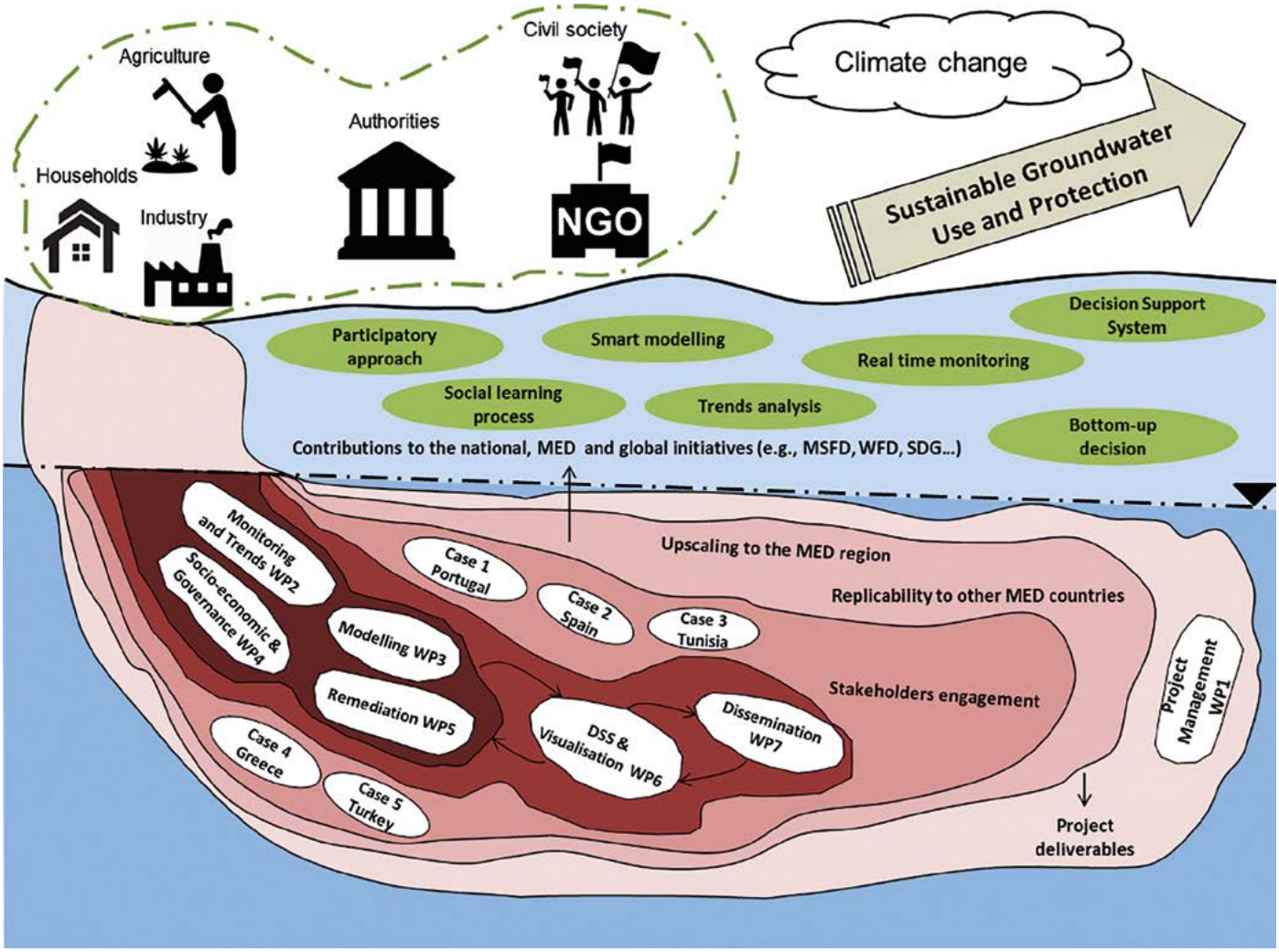
UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Scientific Coordinator:
GOMEZ-HERNANDEZ, J. Jaime

The project is expected to move from the basic principles associated to a TRL 1 up to the application of the Web-Decision Support System in the pilot sites associated to a TRL 4.

Expected impacts

Strengthening the understanding of the groundwater cycle and their temporal variability. Improving the resilience and security for groundwater resources. Development of early-warning systems on aquifer overexploitation and pollution. Cost-effective managed aquifer recharge. New modeling routines for determining the basic components of the water cycle.



Thematic area

Water Management

Section I

Topic - Sustainable groundwater management in water-stressed Mediterranean areas

Type of Action

RIA - Research & Innovation Action

Budget

1.240.000 €

Duration

48 months

Coordinating country

Italy

Participating countries/ 4

Research Units/ 8

Project 4/ Section I

RESERVOIR

Sustainable groundwater RESources managEment by integrating earth observation deriVed monitoring and flOw modellng Results

Context

In Mediterranean areas groundwater resources are taking a more prominent role in providing fresh water supplies in the framework of climatic global changes. Hence, the compound challenges that water planners have to face will require a new generation of more efficient aquifer management plans to address the broad impacts on aquifer storage and aquifer water quality as a result of land subsidence and salinization, respectively. Target zones are farmlands, groundwater-dependent ecosystems, and touristic sites.

Objectives

The aim of RESERVOIR is to provide new products and services for a fruitful and sustainable management of the groundwater to be developed and tested in four water-stressed Mediterranean areas (in Italy, Spain, Turkey and Jordan) and then applicable in other regions. The specific project objectives are the following:
The developed innovative methodology for the hydrogeological characterisation (models) will be tested in selected aquifers located in the Mediterranean areas. Tested aquifers will be selected based on: a) vulnerability to drought, b) occurance and/or frequency of occurance of important dry periods, c) intensive exploitation for agriculture and/or touristic purposes and d) availability of hydrogeological (i.e. piezometric measurements, etc.) and geological data. In some pilot areas, agriculture is traditionally the most important economic activity, but it is being progressively replaced by urban and touristic activities, which also have an important impact on groundwater resources.

Expected impacts

The main expected outcomes of RESERVOIR project are new capabilities (i.e. optimized and advanced numerical models) in an operational groundwater management environment, tested and validated in four pilot sites to develop procedures, wor-

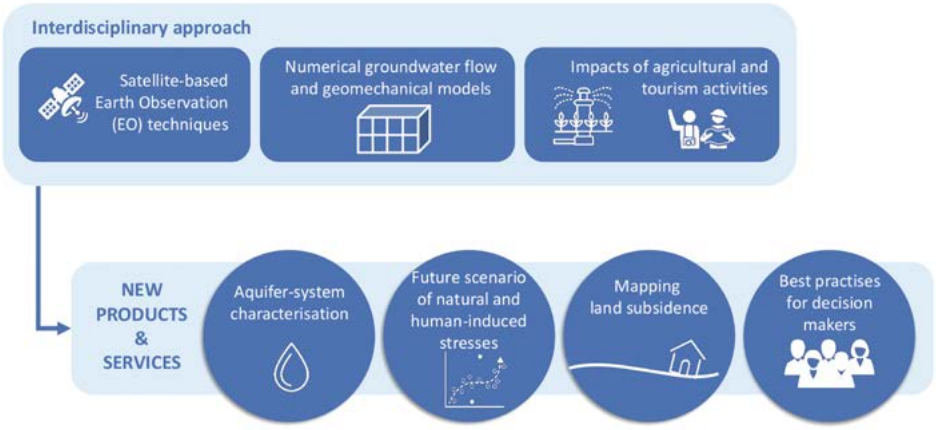
Coordinating institution

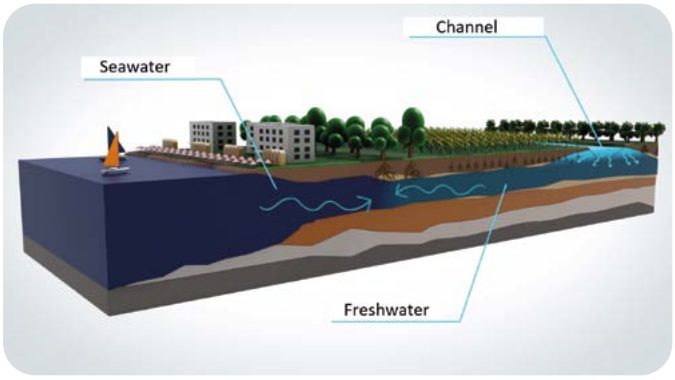
Università degli Studi di Pavia - PU

UNIVERSITÀ DI PAVIA

Scientific Coordinator:
MEISINA, Claudia

kflows, communication strategies, etc. and demonstrate their potentiality and the possibility to be implemented in other areas. Hence, these activities will allow to move from TRL3 to TRL 5 (technology validated in relevant environment).
Namely, the specific expected outcomes are:
1 - Innovative approach for the aquifer characterisation and monitoring using low-cost and non-invasive EO data;
2 - New methodologies and tools for groundwater flow and geomechanical models;
3 - Mapping of land subsidence and related hazards such as seawater intrusion area in coastal aquifers, land loss, flooding and groundwater abstraction effects that can provide different management strategies for policy maker and land reclamation authorities;
4 - Best practises to support the decision makers.





SPECIFIC OBJECTIVES

- Develop an innovative methodology for the hydrogeological characterisation of large-scale aquifer systems using low-cost and non-intrusive data such as satellite-based Earth Observation (EO) techniques.
- Integrate advanced EO techniques into numerical groundwater flow and geomechanical models to improve the knowledge about the current capacity of aquifer to store water and the future response of aquifer systems to natural and human-induced stresses.
- Enhance the knowledge about the impacts of agricultural and tourism activities on the water resources by quantifying the ground deformation during the monitored periods.
- Engage water management authorities and provide models for an optimal management of the aquifer systems.

Thematic area

Farming Systems

Section I

Topic - Conserving water and soil in Mediterranean dry-farming, smallholder agriculture

Type of Action

RIA - Research & Innovation Action

Budget

1.486.299 €

Duration

42 months

Coordinating country

Italy

Participating countries/ 7

Research Units/ 11

of which **3 SMEs**

Project 5/ Section I

4CE-MED

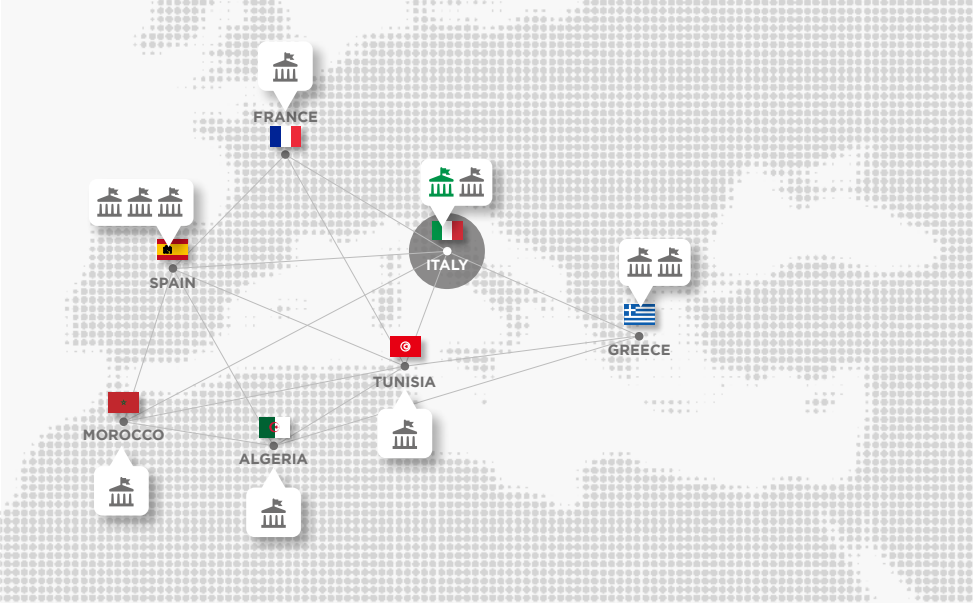
Camelina: a Cash Cover Crop Enhancing water and soil conservation in MEDiterranean dry-farming systems

Context

Mediterranean dry-farming systems mostly rely on cereals generally grown as monocultures or in rotation with very few species. These systems are very intensive in term of agronomic inputs resulting in negative impacts on the environment. Crop diversification can considerably help prevent soil erosion, nitrogen leaching and land pressure and, at the same time, it is expected to increase soil water availability, soil organic matter and biodiversity.
Despite well-known environmental and economic benefits, conservation agriculture (CA) is still not popular in the Mediterranean basin. By contrast, CA would be very suitable for the Mediterranean where agriculture is suffering by market pressure and desertification.
Under those conditions of threat posed by land abandonment and the ageing rural population it is urgent to offer solutions to increase the sustainability of farming systems in the Mediterranean area.
Mediterranean dry-farming systems mostly rely on cereal production, generally sole crop, that are generally highly impacting on the environment.
Conservation agriculture (CA) is still not widespread among Mediterranean farmers despite the evidence of many advantages associated with its use, such as the reduction of soil erosion and nitrogen leaching, and the increase of soil water availability, organic matter and biodiversity.

Objectives

In this context, the 4CE-MED project aims at developing innovative, diversified and resilient cropping systems, through a participatory approach, consistently with the principles of CA.
These cropping systems include Camelina, an emerging oilseed cash cover crop enabling to enhance soil and water conservation. Camelina (Camelina sativa L. Crantz) is particularly interesting due to environmental sustainability and the quality of its oil rich in omega-3. Camelina is currently grown on a commercial level n US ad



Coordinating institution

Alma Mater Studiorum Università di Bologna - PU

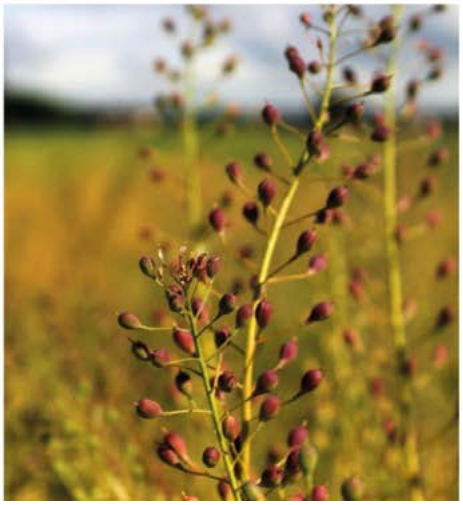
ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Scientific Coordinator:
MONTI, Andrea

Canada where it is commonly grown as a no-till cover crop replacing fallow between two summer crops., whereas in Europe it is still virtually absent. The 4CE-MED project will investigate on the opportunity to develop camelina as a cash cover crop or double crop in the Mediterranean area. Site-specific tailor-made 4CE-MED systems will be co-designed locally through multi-stakeholder platforms across seven PRIMA Countries (Algeria, France, Greece, Italy, Morocco, Spain, and Tunisia).
Camelina seeds have a high content of both protein (~30%) and oil (~40%), which increases its potential market uptake for food, feed (including aquaculture) and bio-based applications, due to a dramatic shortage of vegetable proteins and fats in Europe.
The 4CE-MED project will address all the three principles of CA:
growing Camelina as cash cover crop or double crop will allow increasing organic cover soil while diversifying crop rotations; moreover, Camelina will be grown under no-till/minimum tillage systems to prevent soil disturbance.

Expected impacts

The introduction of camelina into conventional cropping systems would help increasing wintertime soil coverage, preventing N-leaching and soil erosion. Furthermore, it would reduce agronomic inputs, disease incidence and weed pressure, bringing significant benefits to the environment and possible valorization of marginal soils affected by salinization and desertification. 4CE-MED will improve knowledge on technical, spatial and organizational dynamics of Mediterranean production systems to promote adoption of innovations by farmers also by integrating farmers' knowledge in the value chains.



Thematic area

Farming Systems

Section I

Topic - Sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture

Type of Action

IA - Innovation Action

Budget

1.593.025 €

Duration

42 months

Coordinating country

Spain

Participating countries/ 5

Research Units/ 9

of which **6 SMEs**

Project 6/ Section I

AZMUD

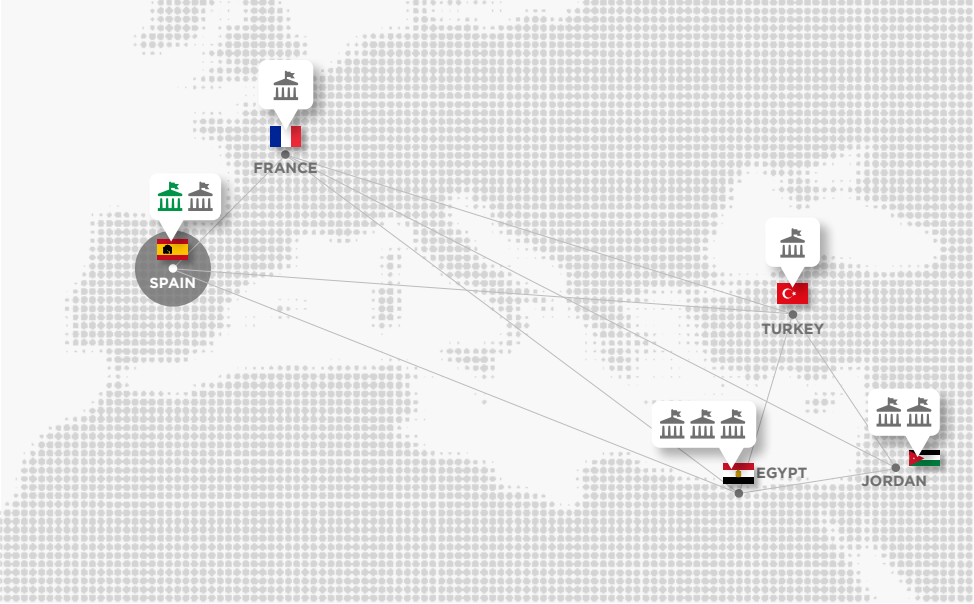
Improvement of Mediterranean greenhouses performance by the use of innovative plastic materials, natural additives and novelty irrigation technologies

Context

Nowadays, greenhouse crop production is growing intensively, providing food safety, protection against pests and diseases for high-value crops... and, in addition, off-setting climate condition, due to the fact this method can monitor the temperature, humidity, light, and other parameters. However, this kind of process requires a great amount of energy, which is directly related to the water consumption of the gre-enhouse. The use of drip irrigation water systems could be a nice solution, although it implies most of the times problems regarding the degradation of it. On the other hand, the amount of pesticides that are used in greenhouses crops has to be moni-tored and under controlled, in order to comply with the law, this way control release (CR) systems, and specifically coating the pesticides are starting to be used, but their implantation in CR is still a problem. AZMUD project has born to give a solution to all these aspects.

Objectives

AZMUD will be focused on reducing the cost and efficiency of heating systems by a local joule heating of plant roots based on electrically conductive plastics integrated in standard soilless systems, at the same time it will be adapted and optimized the ultra-low energy drip irrigation to the soilless greenhouse's conditions to increase the use of wastewater, reduce the water and energy needs. In relation to the irrigation system, it will be identified the potential of magnetically treated water for increasing the efficiency of it, which leads to a better quality and quantity yield of greenhouse crops. Moreover, this last advance will enable to control the number of pathogens/ plant parasites by combining magnetic fields, control release pesticides and opti-mized agronomic parameters. Other solutions settled within AZMUD scope will be developing a new control release system based on tailor-made biodegradable poly-mers, that in melt state can be used to coat and encapsulate natural pesticides from botanical innovative formulations suitable for several crops.



Coordinating institution

AIMPLAS Instituto Tecnológico del Plástico - REC

Scientific Coordinator:
SANZ, Concha

Expected impacts

The project is expected to result in a smart new way to control and reduced the amount of energy needed to manage the activity of greenhouses, as well as in an improvement on plant health; reduction of current environmental problems, reduction of the number of treatments in crops due to prolonged efficiency and prevention of natural pesticides degradation, thanks to the use of encapsulated pesticides in control release systems. Using biodegradable films will reduce the use of pesticides and contribute to organic crops, whereas the reduction of the soilless operation costs will enable an increment of the production. Moreover, AZMUD transparent agriculture films are 3 times more resistant than current ones, compostable mixed with waste plants. If small pieces remain in the soil this will be degraded in a short time (soil biodegradation). In addition, Smart Farming system based on Vodafone Smart Village tech will be adapted to the conditions and singularities of low-tech Mediterranean greenhouses.

Thematic area

Farming Systems

Section I

Topic - Conserving water and soil in Mediterranean dry-farming, smallholder agriculture

Type of Action

RIA - Research & Innovation Action

Budget

1.500.000 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 8

Research Units/ 13

Project 7/ Section I

CAMA

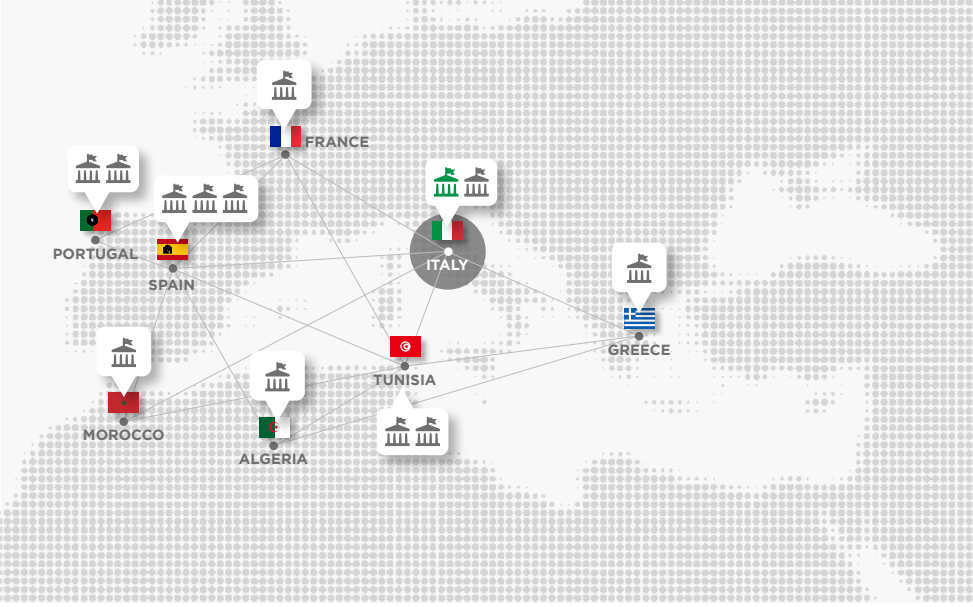
Research-based participatory approaches for adopting Conservation Agriculture in the Mediterranean Area

Context

Among the major challenges in the multidisciplinary fields of research, agricultural entrepreneurship and sustainable development science in the Mediterranean there are some related to encourage the spread of innovative techniques in agronomics to improve soil fertility and at the same time ensure satisfactory harvests, even in the presence of a reduced availability of water due to the growing drought.
According to studies and estimates of the White Paper on Agriculture and Climate Change of the Ministry for Agricultural Policies, 75% of Italian soil is at risk of accelerated erosion due to the steepness and non-conservative management practices.
According to an ISPRA's Report, Italy, due to water erosion of the soil, i.e. the loss of the most superficial layer of the soil due to the action of rainwater, is losing 8.77 tons of soil per hectare every year with levels above the EU average.
Crop management in Mediterranean rainfed cropping systems, is usually finalized to a more efficient water use. Most soils have low soil organic content, due to low water availability, high temperature and tillage intensity.
Conservation agriculture (CA) – no soil layers inversion, plant residues mulching and crop rotations - could reduce the risk of soil quality degradation and improve nutrient and water use efficiencies.

Objectives

The funding will be used to study the main social, economic and agronomic obstacles that prevent the implementation of conservative agriculture by small farmers from different areas of the Mediterranean in order to preserve soil quality and reduce water erosion, thanks to innovative practices of conservative agriculture and testing of new varieties of legumes, to the recovery of traditional association practices and cover crops. The main activities will be evaluation, monitoring, dissemination of knowledge and exchange of know-how on the Italian and other countries of the researchers and farmers of the CAMA project team. The presence in the consortium of farmers' associations, public research institutes and a post-graduate education center will gua-



Coordinating institution

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

Scientific Coordinator:
RINALDI, Michele

rantee a strong multidisciplinary, multicultural interaction and exchange at local and international level between scholars and all final beneficiaries.

Expected impacts

The research activity based on farmers' needs will bring to new crop rotations, breeding of legume crops, technological innovations and will identify new cropping systems in semi-arid environments requiring reduced water and nitrogen fertilisers application amount.
Researches on rainfall water infiltration, soil water depletion, the effect of mulching on the reduction of rainfall impact, water use efficiency assessment in several case-studies of CA will be carried out, also by means of simulation models.
Legume crops will be improved genetically and evaluated in diversity-based systems of CA tailored for specific condition. Cost-efficient genomic selection of drought-tolerant legume crops will be validated and compared to conventional phenotypic selection in conditions of crop monoculture and intercropping.
Some CAMA's activities can be considered in the stage "from idea to application", while others fall into the "from lab to market" stage. The project will cover Technology Readiness Levels from 3 to 7 at its conclusion.
A range of dissemination activities of the research results will be carried out, with specific international training courses.

SPECIFIC OBJECTIVES

- Identifying the major social, economic and agronomic barriers to CA implementation by smallholders of Mediterranean countries;
- Establishing a network of CA experiments and farmers associations adopting CA to apply a participatory research approach;
- Improving legume-based rotations in rainfed CA cropping systems, with genomic and farmer-participatory research aimed to enhance legume crop yield and resilience and research on crop/residues management;
- Quantifying the effects of CA application and developing agronomic innovation, to increase soil fertility, soil physical status, nitrogen and water use efficiencies, and to decrease soil erosion;
- Disseminating the CA concept and techniques in Mediterranean countries, tailoring them to the specific pedo-climatic and socio-economic conditions;
- Increasing technicians', advisors' and farmers' know-how for a better adoption of CA, by the organisation of training courses and their participation in the research activities.

Thematic area

Farming Systems

Section I

Topic - Conserving water and soil in Mediterranean dry-farming, smallholder agriculture

Type of Action

RIA - Research & Innovation Action

Budget

1.499.924 €

Duration

48 months

Coordinating country

Germany

Participating countries/ 5

Research Units/ 16

Project 8/ Section I

ConServeTerra

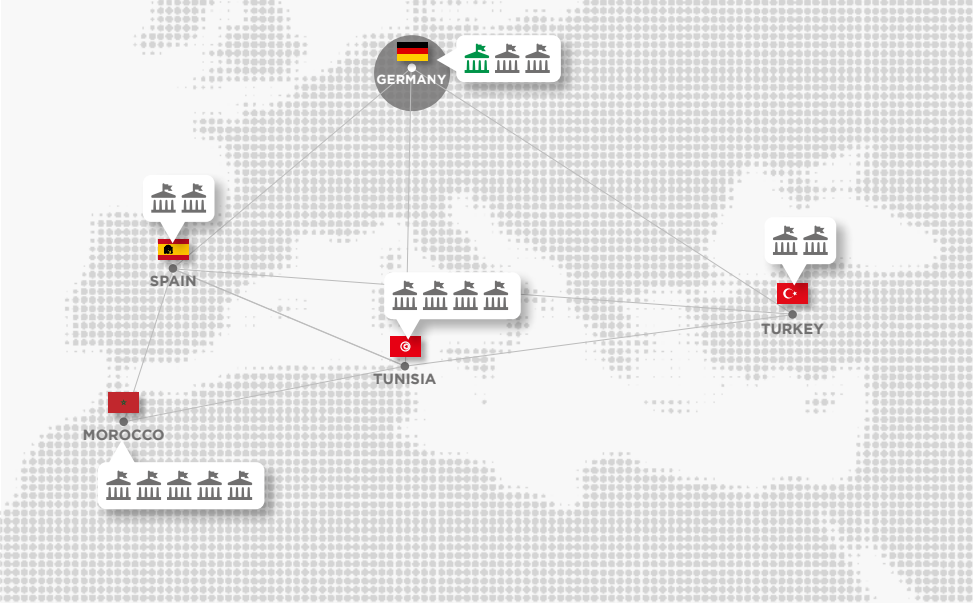
Overcoming the physical and mental barriers for upscaling Conservation Agriculture in the Mediterranean

Context

Despite numerous advantages, and decades of ongoing promotion efforts, CA in the Mediterranean region lacks large scale implementation. Researchers agree on several constraints for the CA adoption in the smallholder context, including, but not limited to: a) limited or no inclusion of legumes as rotational crops; b) lack of sufficient biomass retention on the soil surface in intensive crop/livestock systems; c) lack of access to critical CA inputs (e.g., specialized machinery, fertilizer and herbicides); d) high costs of inputs; e) lack of functional output markets for rotational crops (i.e., forages); and f) weed pressure under CA. Often absent in this list is the human dimension of soil degradation, which is rooted in the socio-economic, political, cultural and mental environment. An additional constraint is the insufficient promotion of context specific, hence a pragmatic approach to CA.

Objectives

The overall objective of ConServeTerra is to facilitate wider acceptance and adoption of CA principles in the Mediterranean region by tackling the mental, cultural and contextual realities surrounding farmers' soil management decisions. This project is designed with the premise that main constraints hampering wider adoption of CA across the Mediterranean region are associated with mental and cultural attitudes, as well as social determinants towards soil and its management. Further complication arises from the direct "technology transfer" approach taken by the CA projects asking smallholder farmers to imitate the large-scale CA management tools. This "technology transfer" approach disregards the local realities such as communal stubble grazing and occasional necessity of tillage in the absence of expensive herbicides. ConServeTerra will directly target commonly agreed adoption constraints of CA systems and develop applicable and adoptable systems. As such, ConServeTerra will adopt a demand-driven, scale appropriate, participatory approach to investigate these systems, moving them from TRL3 (proven feasibility) to TRL6 using successful cases in selected areas.



Coordinating institution

FiBL Research Institute of Organic Agriculture - DP

Scientific Coordinator:
GATTINGER, Andreas

Expected impacts

Pragmatic application of CA principles present a great potential to increase water use efficiency, improve food security and economic well-being of communities in the Mediterranean region.

- Mental models and participatory focus groups will provide improved knowledge of the technical, spatial and organizational dynamics of Mediterranean production systems and enable the innovation facilitators to promote adoption of innovations by farmers.
- Farmer Field Schools will significantly improve farmers' appreciation and knowledge of soil erosion mechanisms under conditions of water scarcity through illustrated examples and demonstration activities.
- On-station experiments and on-farm pilot demonstrations will produce data which will be used to develop management recommendations for soil conservation.
- Redesigned cropping systems, including multi-crop rotations, including pulses and other leguminous plants, will be more resilient to climate uncertainties.
- ConServeTerra will focus on crop and livestock systems based on reduced tillage and legume cultivation, hence will help in the creation and consolidation of viable farms and local economies and communities with more employment opportunities.
- Ecological approach to CA enables reduced and optimised use of water, energy, nutrients and potentially toxic substances (synthetic pesticides, mineral fertilizers, antibiotics).
- ConServeTerra aims to transform recognised methods of soil building and water use efficient management techniques (i.e., crop-livestock integrated CA, reduced/no-till agroecology) into Mediterranean relevant types and demonstrate increased rainfall water availability and water use efficiency for crops, as well as, improved production of Mediterranean crops with efficient water management.
- Since the climate change in the Mediterranean will trigger extremely fluctuating and unevenly distributed precipitation and heat waves, one of the most important climate change adaptation measure is to improve soils' capacity to capture and store rainfall (PRIMA SRIA 1).

SPECIFIC OBJECTIVES

- Determine the mental models and social determinants of farmers' soil management decisions particularly in respect to CA and reduced soil disturbance.
- Improve farmers' appreciation and understanding of soil and its degradation through farmer field schools (FFS) and rainfall simulators.
- Tests whether Farmer Field Schools (FFS) can increase implementation of soil conservation techniques such as CA and enhance farm performance.
- Investigate the feasibility and performance (weed control, crop productivity and soil quality) of strategic tillage and reduced tillage compared to no-till.
- Develop best management strategies for weed management in pulse and forage legume cultivation in low input and conservation/ reduced tillage conditions.
- Develop best management protocols for stubble grazing and livestock management that is in synchrony with CA principles
- Capacity building to strengthen innovation networks for participatory decision-making, science and policy dialogue and dissemination of tested best practices of context specific CA.

Thematic area

Farming Systems

Section I

Topic - Sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture

Type of Action

IA - Innovation Action

Budget

1.556.500 €

Duration

48 months

Coordinating country

Spain

Participating countries/ 3

Research Units/ 4

of which **1 SME**

Project 9/ Section I

HortiMED

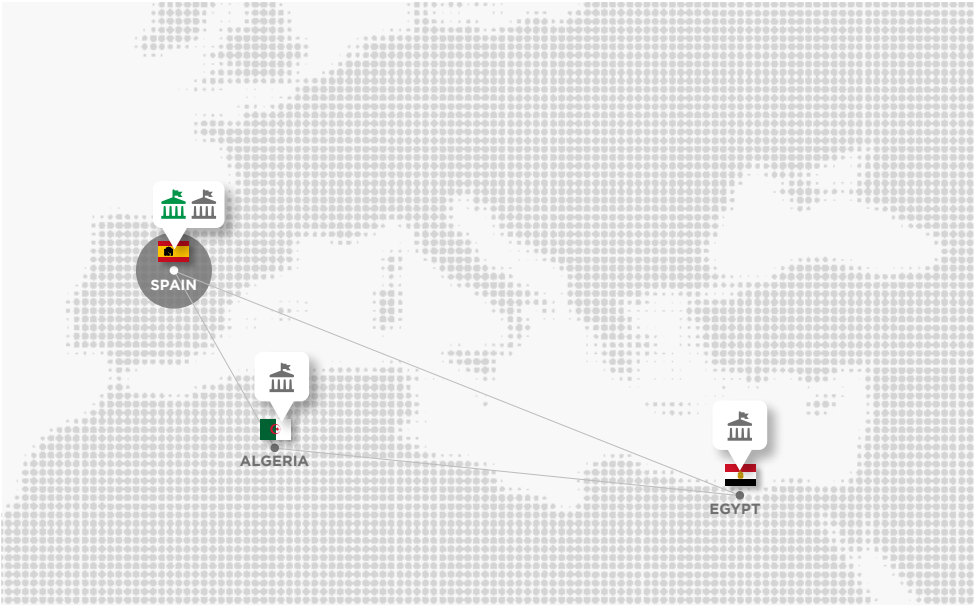
Towards circular horticulture: closing the loop on Mediterranean greenhouses

Context

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

Objectives

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



Coordinating institution

INKOA SISTEMAS S.L. - SME

Scientific Coordinator:
IBAÑEZ, Nora

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

Expected impacts

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

SPECIFIC OBJECTIVES

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

Thematic area

Farming Systems

Section I

Topic - Sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture

Type of Action

IA - Innovation Action

Budget

1.597.700 €

Duration

48 months

Coordinating country

Italy

Participating countries/ 4

Research Units/ 9

of which **2 SMEs**

Project 10/ Section I

iGUESS-MED

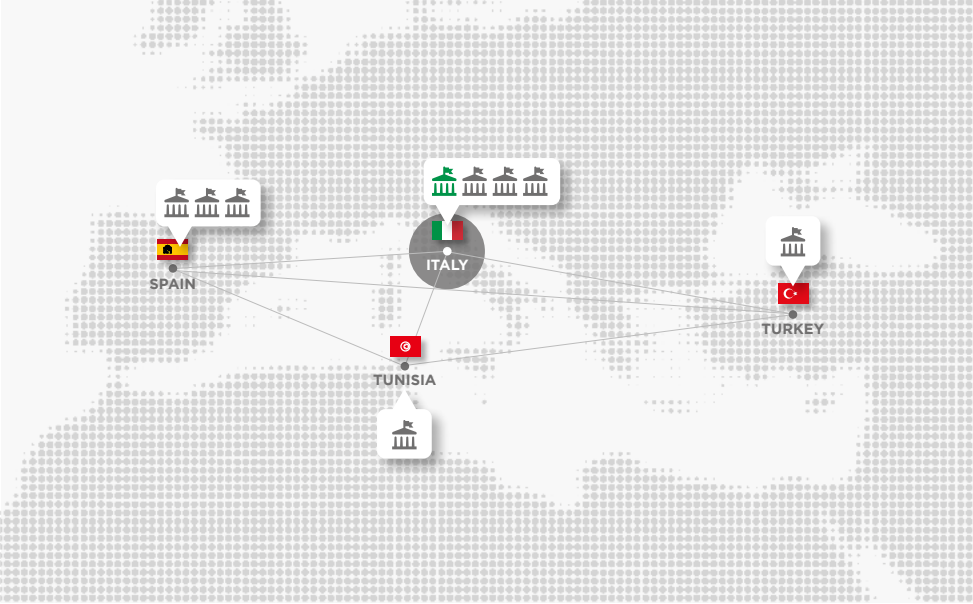
Innovative greenhouse support system in the mediterranean region: efficient fertigation and pest management through IoT based climate control

Context

In the Mediterranean basin, the second largest area of horticultural crops grown under plastic (first is China) is concentrated in an estimated area of 220 kha. Turkey (75kha), Spain (70kha) and Italy (43kha) ranking the first positions in the protected crops world industry, accounting for more than 80% of the total surface in the Mediterranean basin. The next challenges for the sector include climate change, water scarcity in terms of quantity and quality, needs for reduced input of chemicals, and increasing population. High water and nutrient leaching, excess use of pesticides and fungicides, poor (basic) passive climate control are characteristics of the sector. More sustainable and circular production system are therefore mandatory.
Important efforts to update and modernize greenhouse systems have been done in the last decades by Mediterranean countries. Thus, important results have been achieved with estimating tools, like ready-made software available on the market. These solutions cover a range of individual software for optimizing plant water requirements, fertigation strategies or integrated pest management. However, most of these tools remain looseness in the data accuracy or only deal with one of these issues separately, since on their own, most of these solutions are built for addressing a single farm operation and implemented as an isolated solution. The main consequence of this situation on the market is that each single farm must use multiple solutions. iGUESS-MED will pave the way for setting up an innovative DSS by combining and integrating existing tools in a one and unique device to streamline the greenhouse horticulture sector in the whole Mediterranean basin.

Objectives

The Overarching goal of iGUESS-MED is to support a transition toward innovative, sustainable and competitive Mediterranean horticultural greenhouses by developing, validating and transferring an pioneering Decision Support System (DSS) for the MED greenhouses, which is able to: (i) reduce the nutrient leakages into sub-surface and groundwaters by optimizing the fertigation management (both irrigation and ferti-



Coordinating institution

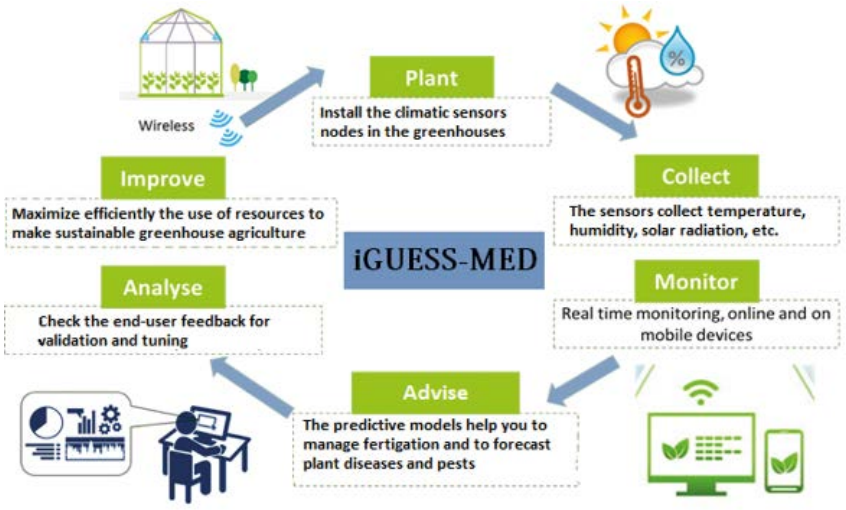
Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, CREA

Scientific Coordinator:
NAVARRO GARCIA, Alejandra Juana

lization) under low quality water conditions (i.e., saline water); (ii) reduce the use of chemicals by a sustainable and integrated pests and diseases control; (iii) increase the productivity by an improved and cost-effective efficiency of climatic control procedures, introducing specific low-cost solutions to apply to pre-existent greenhouse structures (i.e., use of diffusing cover films, improved natural ventilation). The work will be carried out on tomato as reference crop, in soil and soilless culture in low-tech greenhouses typical of the Mediterranean region, by applying participatory and integrated interdisciplinary toolkit of novel and emerging technologies such as sensor technology, IoT, advanced agronomic management, simulation models and self-calibrating mathematical algorithms.

Expected impacts

- Improvement of ventilation in the greenhouse, by a greater number of windows, inserting deflectors, and using low pressure air humidification systems.
- New protocols of IPM (and IDM) improved by forecast models and by biocontrol agents of pests and pathogens.
- Improvement of closed system cultivation with gutter subirrigation using good quality waters and drip irrigation in semi closed system using low-quality waters, maximizing the fertigation efficiency at low costs in low tech MED greenhouses
- New models of ETc using saline waters, including new equations for ETo suitable for greenhouses at different latitudes.
- Design, development, validation and market replication of a smart DSS able to manage efficiently fertigation, prevent diseases and pests, and improve climatic control procedures.



Thematic area

Farming Systems

Section I

Topic - Sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture

Type of Action

IA - Innovation Action

Budget

1.549.990 €

Duration

36 months

Coordinating country

Turkey

Participating countries/ 6

Research Units/ 7

of which **2 SMEs**

Project 11/ Section I

SusMedHouse

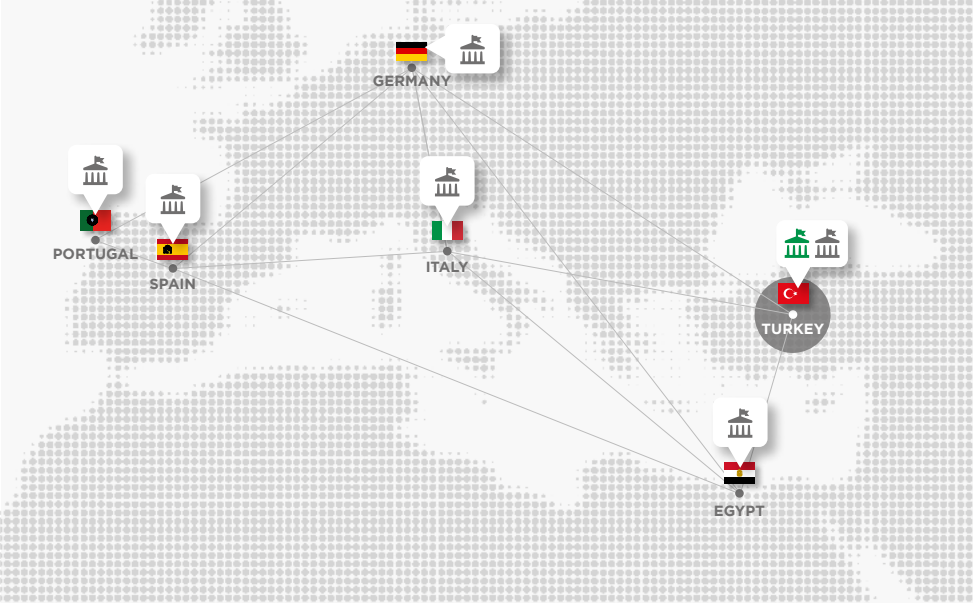
Efficient, Eco-Friendly, Sustainable Mediterranean Greenhouse Integrated with Artificial Intelligence, Hi-Tech Automation and Control System

Context

Mediterranean intensive horticulture systems, especially greenhouse cultivation, can provide high quality products all-year round with an efficient use of external resources and hand-labour. But the current productive capacity and sustainability in terms of quantity and quality can be further improved with adequate use of new biological agro-ecological technologies in a sustainable manner regarding resources, especially energy, soil and water. Challenges resulting from climate change, the scarcity of resources, demographic growth, contamination, desertification, degradation of arable lands make these mentioned improvements necessary. In the Mediterranean basin, technological updates of the greenhouse industry and in general the intensive horticulture sector is strongly needed in order to face increasing competition arising from globalisation of production and marketing considering above challenges.

Objectives

SusMedHouse concept is driven by the aim of boosting greenhouse efficiency and enabling year-round production while preserving energy, soil and water with novel approaches. These approaches will be tailored and optimized for the Mediterranean based on growers' needs and environmental conditions of the region. SusMedHouse will start from TRL 4-5 and end at TRL 7-8, varying relative to the related section and the technology of each Partners.
Artificial intelligence (AI) and image processing (500k+ images) technologies will be adopted to SusMedHouse to increase efficiency by determining optimum conditions database for the plant in Mediterranean climate conditions specifically and by ensuring early detection of pests. Biodegradable peat-free growth media, low emissivity and solar control layers for exterior coating, novel biosensors for water management and quality will also be developed in scope of the project to preserve the resources and get a sustainable environment. In addition, a novel integrated pest and pathogen management technique, Agro PV solution, and a farmer decision support system will be studied for efficiency improvement and sustainability purposes.



Coordinating institution

AR&TeCS Anadolu AR-GE Technology Engineering and Consulting Co. - SME

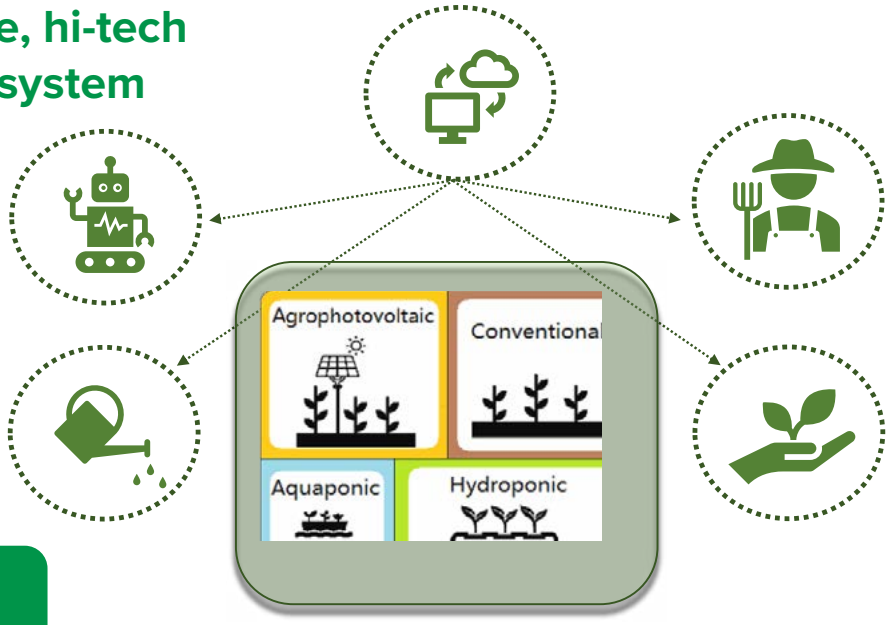
Scientific Coordinator:
KATIRCIOGLU, Temel Yasar

Four cultivation methods, namely, conventional, aquaponic, hydroponic, and agro photovoltaic will be implemented on separate benches of SusMedHouse demonstration greenhouse to examine the effect of cultivation methods on the greenhouse efficiency and preservation of resources applying above mentioned developed methods and technologies and optimal conditions obtained from AI studies.

Expected impacts

SusMedHouse will (1) promote the sustainability and competitiveness of Mediterranean greenhouse and intensive horticulture, (2) increase production amount and period for all-year round, overall efficiency of the Mediterranean greenhouses, (3) present cost-effective and socially accepted new cultivation methods aimed at improving hand-labour conditions, while providing novel tools assisting farmers to improve management, (4) provide a novel environmentally friendly integrated pest and pathogen management practices, (5) minimize the disposal of residues and contaminants to the environment with new bio-degradable growth media to be developed.

Mediterranean Greenhouse integrated with artificial intelligence, hi-tech automation and control system



- AI Driven System
- Sensitive Automation and Control
- Solar / Low-E Coatings
- Biosensors
- Biodegradable Growth Media
- Decision Support System for Grower
- Integrated Pest & Pathogen Management

Thematic area

Agro-food Value Chain

Section I

Topic - Implementation of analytical tools and digital technology to achieve traceability and authenticity control of traditional Mediterranean foods

Type of Action

IA - Innovation Action

Budget

1.519.000 €

Duration

36 months

Coordinating country

Greece

Participating countries/ 7

Research Units/ 10

of which **1 SME**

Project 12/ Section I

Med Food TTHubs

Trace & Trust Hubs for MED food

Context

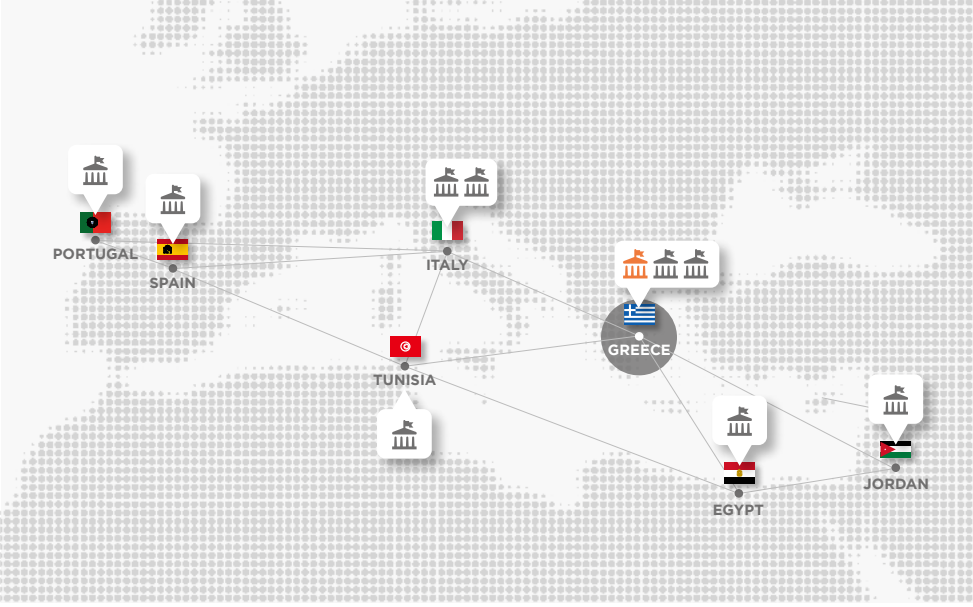
Even though Mediterranean food products are generally recognized for their high nutritional and sensorial value, there is a lack of trust concerning the origin of raw materials (eg. fruits, vegetables, livestock, fish) and the quality of the processes starting from cultivation and breeding until packaging and transport. This lack of trust poses obstacles to the sustainability and competitiveness of small and medium agro-enterprises (SMAEs) into local and global value chains (LVCs and GVCs). The markets around the world are adapting to these novel needs and the food producers must also be adapted in order to be part of a supply chain where chain of custody is a critical factor. The solution that Med Food TTHubs brings is geared to achieve, over a 36-month work plan:

- Safer and more sustainable Mediterranean food products for people around the world,
- Full transparency concerning the traceability and authenticity of these products towards the creation of an end-to-end trust-chain in the food sector

Objectives

The aim of the Med Food TTHubs is i) the establishment and ii) the pilot operation of seven (7) Trace & Trust Hubs, which will form a permanent transnational network playing the role of a one-stop-shop for traceability and authenticity for 'added value' Mediterranean food products in each of the countries involved.

Med Food TTHubs project will support the implementation of full-path tracing practices through the whole distribution channel from seed to shelf. For that purpose, Med Food TTHubs will develop and support the operation of a "Voluntary Scheme of Traceability (VST) of MED foods", which will be a common protocol for the network of these Hubs, acting as a point of reference for the products of the different involved areas. This protocol will include detailed guidelines, audit procedures and KPIs in relation to practices and processes towards traceable, authenticated and of high nutritional quality products.



Coordinating institution

Centre for Research and Technology Hellas, CERTH - PU

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

Scientific Coordinator:
BANIAS, Georgios

Objectives

The protocols that will be developed under Med Food TTHubs and the usage of the e-Platform will actively support the food industry in addressing both the demand for food security and food origin. The medium to long term expected impact of Med Food TTHubs can be summarised as: (i) Increasing companies' interest in food safety and sustainable development. (ii) Promoting the usage of quality and authentication certificates for raw materials as a competitive advantage (iii) Providing full transparency and documentation for the origin of the products and their overall characteristics. (iv) Providing access to information concerning the production processes and the transport. (v) Supporting end-to-end tracking with GS1 standards for more effective re-call management. (vi) Utilization of information on best practices for their integration into the marketing of the company's products and for improving companies' reputation. (vii) Fully documented coverage of even the most stringent requirements of major retailers abroad as well as food safety legislation. Companies will therefore increase their consumer's share and increase their revenues.

The overall approach of Core Modules

CORE MODULE 1:
Whole supply chain from seed-to-shelf

- Identification of food products;
- Capturing process needs for different products;
- Evaluating the info captured vs specified target;
- Interoperability of platform.

CORE MODULE 2:
Common Authentication and Quality Assurance Protocol

- Pre-evaluation;
- Sustainable farming and breeding;
- Full records;
- Biochemical analysis;
- Genetic and genomics analysis;
- Isotope analysis;
- Nutritional profile.

CORE MODULE 3:
Web-based Platform

- Farm App Module;
- IoT Module;
- Quality Module;
- Isotopic Profile Module;
- DNA Markers Module;
- Nutritional Profile Module;
- External Tracing Module;
- Internal Tracing Module;
- B2B App Module;
- Consumer App Module.

Thematic area

Agro-food Value Chain

Section I

Topic - Implementation of analytical tools and digital technology to achieve traceability and authenticity control of traditional Mediterranean foods

Type of Action

IA - Innovation Action

Budget

1.494.200 €

Duration

36 months

Coordinating country

Greece

Participating countries/ 6

Research Units/ 12

of which **4 SMEs**

Project 13/ Section I

MEDIFIT

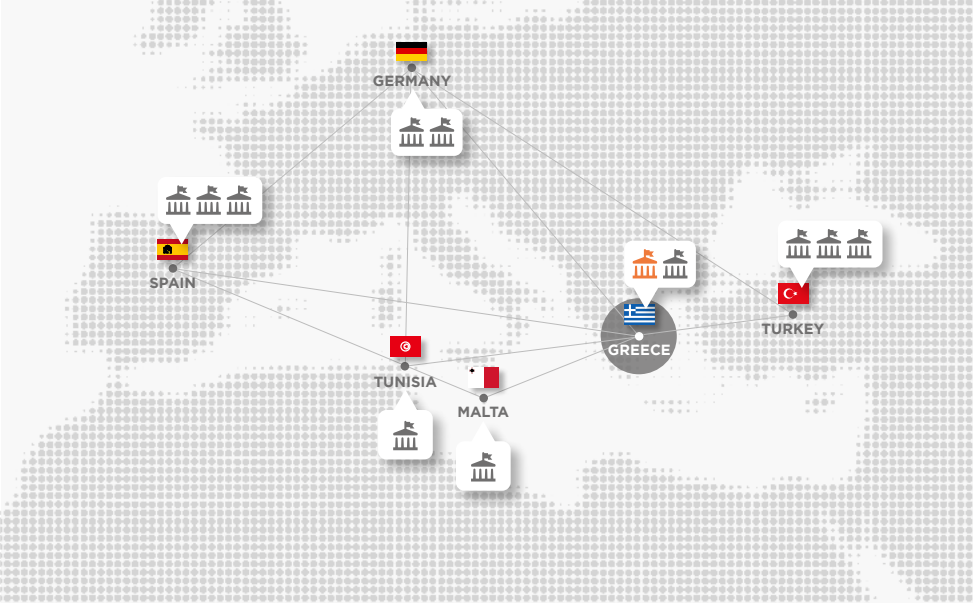
An interlinked digital platform for Food Integrity and Traceability of relevant MEDIterranean supply chains

Context

Food fraud, including the more defined subcategory of economically motivated adulteration, is a public-health food risk that is growing in awareness, concern, and danger. Each food fraud incident has the potential to threaten consumers' well-being but also undermine confidence in the EU food market. The impact may be higher for the Mediterranean traditional food products considering that they are generally recognized for their high nutritional and sensory value. The recent example of the honey fraud between China and US of relabelled filtered honey (free of pollen) to remove traces of its origins is a characteristic example of a traceability flaw.

Objectives

The overall objective of MEDIFIT is to enable traceability and authenticity control of traditional Mediterranean foods using latest analytical and software technologies. The focus will be on high added value Mediterranean products, honey and cheese, which hold nutritional value and are important for biodiversity conservation. MEDIFIT will develop and demonstrate a flexible, modular and standards-based software framework that provides end-users the necessary communication interfaces and web-based software solutions that facilitate the routine use of innovative analytical methods for assessing food traceability and integrity. This includes the creation of cooperative structures for distributed databases, the development of open, reproducible pattern recognition and data analysis methods as well as the link with IT systems containing external product-related information (with respect to e.g. labelling, tracing or other analytical data). Further MEDIFIT will develop Decision Support Systems (DSS) which will be linked to a cloud-based Authenticity and Traceability Data Platform (ATDP) providing access to decentralized food integrity and traceability information repositories. A key aspect of MEDIFIT will be to disseminate this platform to end-users, and organizing training courses for companies and stakeholders which will facilitate better decisions related to food safety, quality, authenticity, as well as traceability.



Coordinating institution

Aristotle University of Thessaloniki, AUTH - PU

ARISTOTLE UNIVERSITY OF THESSALONIKI

Scientific Coordinator:
KOUTSOUMANIS, Kostas

Expected impacts

- Development of efficient methods for assessing food traceability and safety;
- Increased added-value for Mediterranean food products linked to their proven biological and geographic origin, production protocols and processing technologies;
- Improved confidence of consumers and markets in authenticity of Mediterranean food products by implementing dedicated services;
- Foster joint integrative activities with existing database networks and infrastructures in the health & food domain;
- Improved harmonization and data interoperability.

Traceability and authenticity control of traditional Mediterranean foods, honey and cheese.

Thematic area

Agro-food Value Chain

Section I

Topic - Implementation of analytical tools and digital technology to achieve traceability and authenticity control of traditional Mediterranean foods

Type of Action

IA - Innovation Action

Budget

1.597.025 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 5

Research Units/ 13

of which **4 SMEs**

Project 14/ Section I

SUREFISH

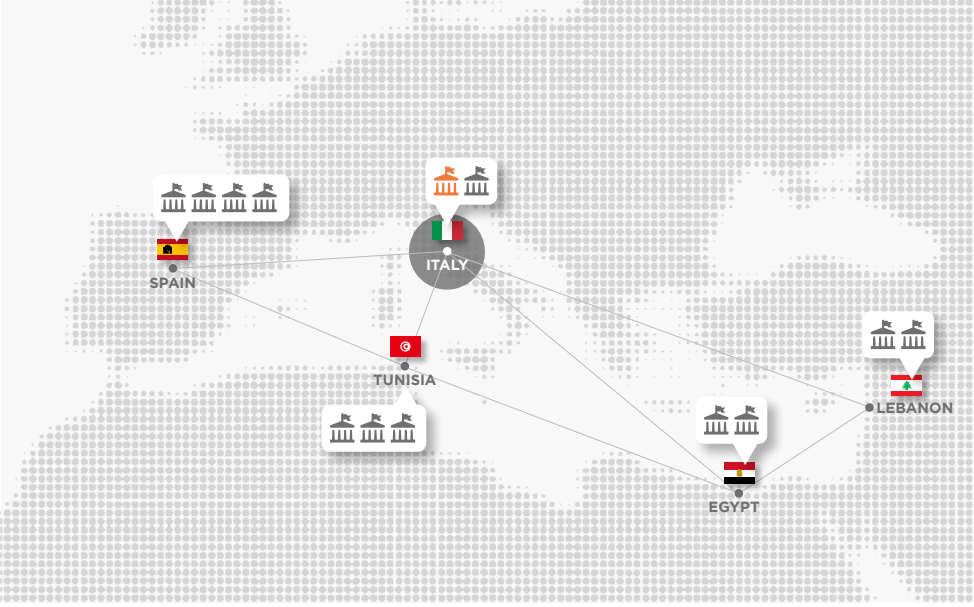
Fostering Mediterranean fish assuring traceability and authenticity

Context

One of the key components of Mediterranean diet is fish, which contributes to a healthy and balanced diet since it is rich in protein, vitamins and minerals. In addition, fishery provides an important income and trade opportunities in many coastal Mediterranean countries. However, fish chain is particularly vulnerable to fraud, primarily to species substitution and mislabelling.
Frauds mainly affect imported/local processed products since they cannot be clearly verified. International legislation stipulates that fish from wild as well as from farmed origin, must provide consumer information concerning the geographical origin, production method and nutritional labeling.
For this purpose, the SUREFISH project proposes an integrated solution to ensure safety, traceability and authenticity all along the Mediterranean fishery supply chain (fishing, on board processing, in land processing, retailers/importer).

Objectives

The main goal of SUREFISH is to valorise traditional Mediterranean fish by fostering the supply-chain innovation and consumer confidence on Mediterranean fish products through deploying innovative solutions to achieve unequivocal traceability and confirming their authenticity, thus preventing frauds.
The SUREFISH project will implement and demonstrate a global solution to assure fish authentication and reduce fraud. The solution is based on RFID, Blockchain, TTI and tamper-proof technologies developed within the supply chain of four fish species. Thus, four pilot use cases are foreseen in i) Tunisia (lighthouse pilot); ii) Egypt; iii) Lebanon; iv) Spain (followers) on different fish species: i) fresh and marinated anchovies; ii) farmed fresh tilapia filets; iii) fresh groupers; iv) Bluefin Tuna.
In addition, SUREFISH will harmonize and validate analytical methods to ensure fish authenticity with the aim to increase consumer confidence of Mediterranean fish.
In particular, consumers will be provided with a mobile APP to provide information on traceability and authenticity, linked to the Blockchain platform.



Coordinating institution

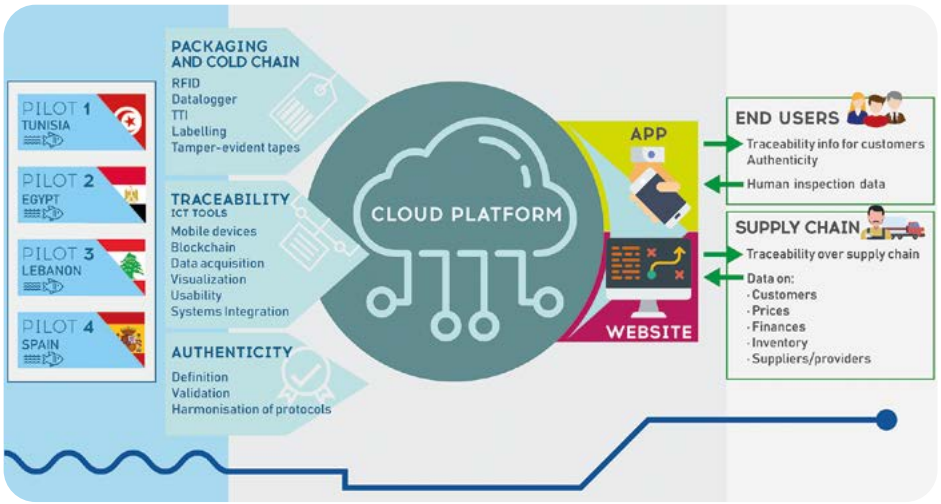
ENCO Srl - SME

Scientific Coordinator:
DE LA FELD, Marco

The SUREFISH project will also get in touch with relevant infrastructures and pre-existing databases in order to optimize their use and assure interoperability.
The activities performed in the project will span from the validation/demonstration in an operational environment (TRL5-6) to system complete and qualified in operational environment (TRL8).

Expected impacts

The SUREFISH project is expected to achieve the development of knowledge and common innovative solutions in the Mediterranean basin by following the intention of PRIMA SRIA. Among its thematic areas, the SRIA calls for sustainable Mediterranean agro-food value chain for regional and local development tackling issues related to inappropriate logistic infrastructure and lack of safety, quality and traceability standards. Perfectly in line with this goal, SUREFISH addresses the need for a digital revolution based on cost-effective and affordable technologies and methods in the fishery sector, generating the necessary enabling knowledge and technologies to innovate the fish value chain from fishing to consumers.



Thematic area

Agro-food Value Chain

Section I

Topic - Implementation of analytical tools and digital technology to achieve traceability and authenticity control of traditional Mediterranean foods

Type of Action

IA - Innovation Action

Budget

1.599.500 €

Duration

48 months

Coordinating country

Portugal

Participating countries/ 3

Research Units/ 11

of which **6 SMEs**

Project 15/ Section I

TRACE-RICE

Tracing rice and valorizing side streams along Mediterranean blockchain

Context

Rice is the primary staple food for about half of the world's population and it provides 20% of the calories consumed worldwide. The relevance of rice in the European diet has been increasing due to its fundamental role in modern and healthy diets. Most of the rice consumed in Europe is grown in the EU Mediterranean countries.
Rice is endowed with a rich genetic diversity that covers a great variety of species and origins, some more valued than others. Rice-based foods are highly prone to adulteration. Rice fraud was reported by EFSA as an emerging food issue. The principal occurrence are fraudulent variety claims that cause significant loss of value for the consumers and jeopardize brand value of honest producers. In addition, fraudulent misrepresentation related to sustainability issues (pesticids residues and mycotoxins) is an increasing risk. TRACE RICE offers an innovative solution to fraud and safety challenges focusing on natural, healthy and tasteful rice-based foods by applying new technologies for product traceability. It will do so with an integrated full chain approach (from farm to fork), for raw rice and ready-to-eat rice, which will enhance the competitiveness of SMEs operating in the rice sector.

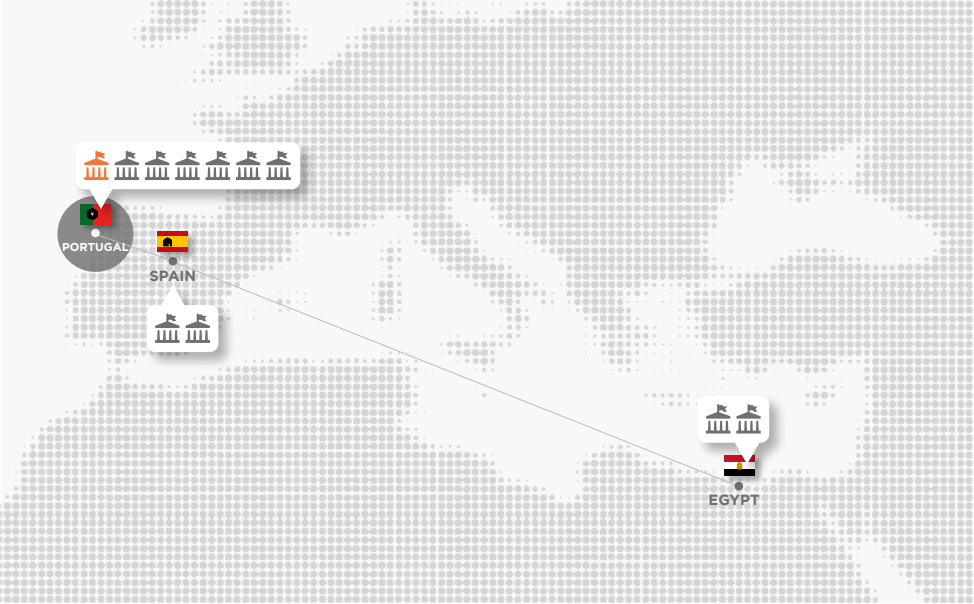
Objectives

TRACE-RICE is focused on providing the Mediterranean rice industry with: highly-efficient and affordable analytical and digital technologies that will facilitate fast traceability and authenticity control of rice varieties; new nutritional and healthy tasty rice-based foods and high added-value products based on an interdisciplinary integrated chain-wide and circular economy approach. This will be achieved in 4 main pilot activities and 3 market replication cases, starting the technological developments at prototype scale (TRL3-5) and will move to validation/production stages (TRL7-8).

Expected impacts

Environmental impacts

- Support contaminant mitigation by promoting the reduction of the use of chemicals.



Coordinating institution

Instituto Nacional de Investigação Agrária e Veterinária, I.P. - PU

Scientific Coordinator:
CARLA, Brites

- Reduce fossil fuels consumption by using blockchain technologies.
- Support the goals of the EU biodiversity strategy by the valorization and genetic characterisation of adapted varieties and integration of datasets in a network database.

Social impacts

- Improve the quality of life of consumers by improving the rice quality control and offering healthier and safer products by upholding quality standards.
- Obtain new high added value products and contribute to food diversity, promoting Mediterranean cultural heritage and boosting the circular economy.
- Increase the confidence and producer-consumer engagement in Mediterranean foods, ensuring traceability and origin of rice varieties and reducing fraud and contamination.

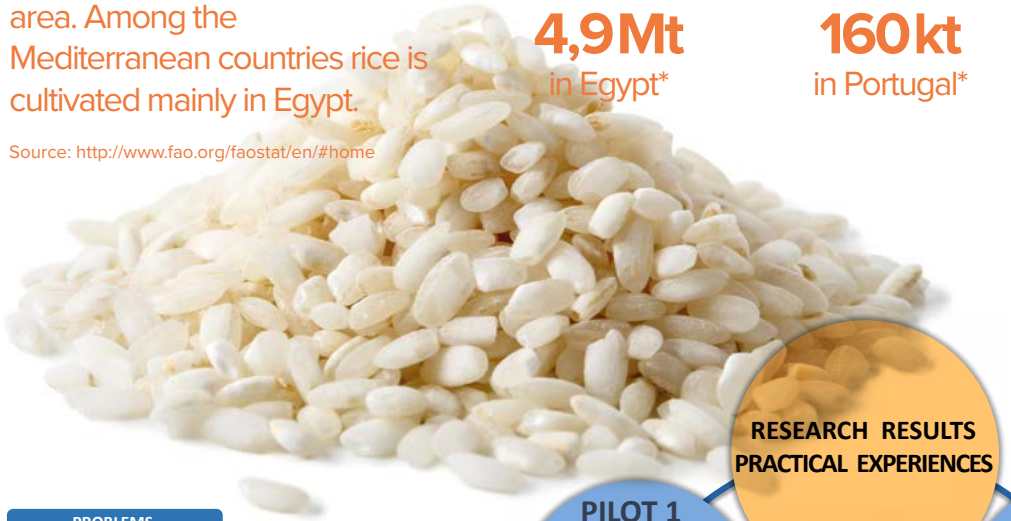
Economic impacts

- Foster importance to the Mediterranean rice commercialization in international markets by the mitigation of rice fraud by the development of rice authenticity tools (DNA-based and predictive models using machine learning strategies).
- Adopt measures to reduce the extreme volatility of prices of rice based foods in the market and facilitate timely access to information thanks to blockchain technologies.
- Introduce new business model for a technologically stagnant sector.
- Improve the competiveness of local producers and SMEs by fostering interaction between scientific and entrepreneurial stakeholders.

8M t

of paddy rice produced in 2018i in the Mediterranean area. Among the Mediterranean countries rice is cultivated mainly in Egypt.

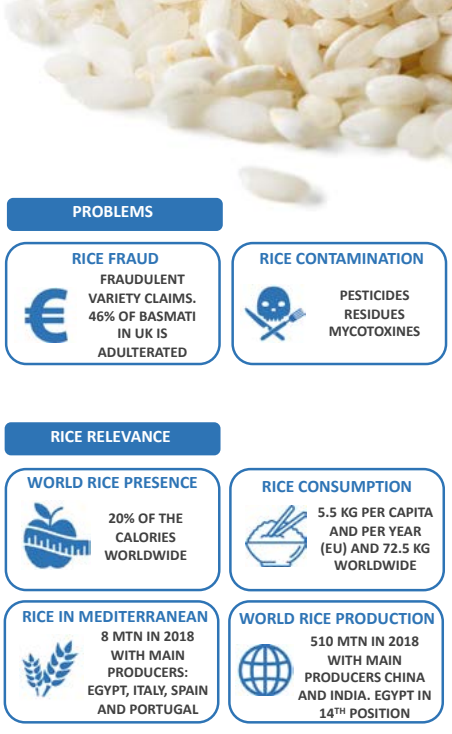
Source: http://www.fao.org/faostat/en/#home

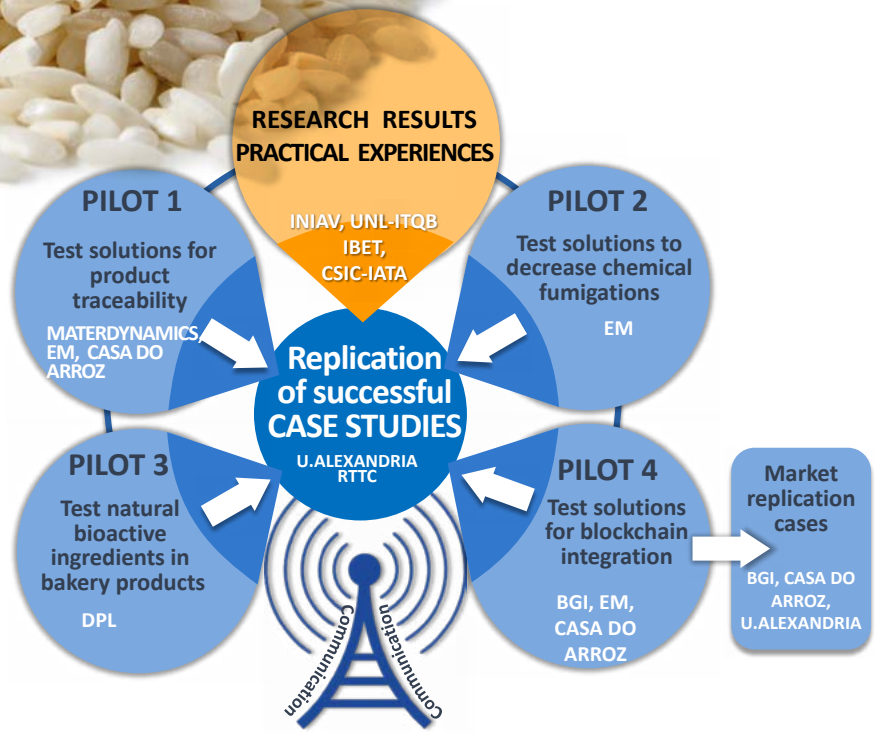


4,9Mt
in Egypt*

160kt
in Portugal*

810kt
in Spain*





Thematic area

Nexus

Section I

Topic - Assessing social, technical and economic benefits of a cross-sectoral governance of the Water-Ecosystems-Food Nexus

Type of Action

RIA - Research & Innovation Action

Budget

1.795.726 €

Duration

42 months

Coordinating country

Italy

Participating countries/ 5

Research Units/ 7

of which **1 SME**

Project 16/ Section I

AWESOME

AWESOME - mAnaging Water, Ecosystems and food across sectors and Scales in the sOuth MEditerranean

Context

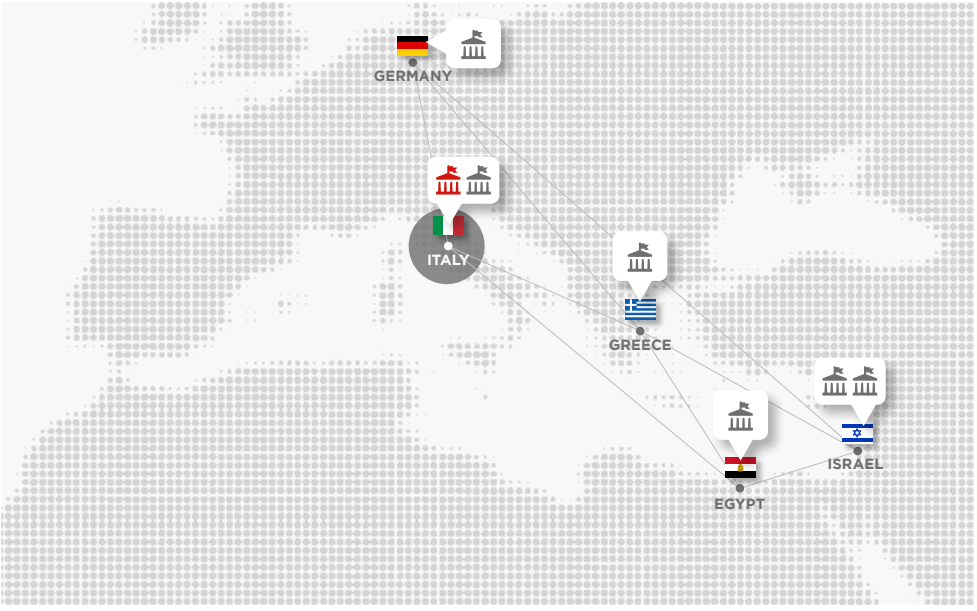
Global trends in population growth and rising economic prosperity are expected to increase the demand for energy, food and water in the Mediterranean region to a point where they may compromise the sustainable use of natural resources. This context calls for the adoption of integrated and participatory approaches that explicitly account for the water-ecosystem-food (WEF) Nexus to explore tradeoffs, synergies, and nested interdependencies across sectors and to generate shared economic, environmental, and societal benefits.

Objectives

The main objective of AWESOME is developing a decision-analytic platform based on a multi-level, integrated WEF model to address the Nexus and explore the interdependencies and feedbacks across a hierarchy of spatial scales, from the macroeconomic development, to regional planning down to the single farm. The platform will allow simulating the impacts of alternative WEF planning portfolios composed of regional policies, river-basin strategic planning solutions, and technological options demonstrated at the local scale, across the different and often competing components of the WEF Nexus. At the local scale AWESOME will develop a demo-site of smart agricultural solutions including solar powered hydroponics, aquaculture, and aquaponics which will provide indications on suitability and sustainability of these new technology to back up existing systems in drying future.

Expected impacts

AWESOME will make substantial progress in systems approaches to support the transition towards a more sustainable and resilient agriculture in southern Mediterranean countries under diverging water availability and demand due to the projected impacts of changing climate and society. The integration of models running at different spatial scales allows a better characterization of different technological solutions to produce



Coordinating institution

Politecnico di Milano - PU

POLITECNICO
MILANO 1863

Scientific Coordinator:
CASTELLETTI, Andrea

water and food, namely soilless agriculture and aquaculture, demonstrated at the micro-scale to inform the systems model supporting strategic planning at the river basin scale, and a more realistic representation of macro-scale processes and regional policies influencing river basin dynamics in terms of land use, water and energy demands, and ecosystem services.

Integration of models running at different spatial scales allows a better characterization of different technological solutions to produce water and food.

Thematic area

Nexus

Section I

Topic - Platform for mapping and capitalisation of best practices from on-going and past experiences related to Farming system, Water management and Food Value chain in the Med area

Type of Action

CSA - Coordination and Support Action

Budget

1.100.000 €

Duration

36 months

Coordinating country

Spain

Participating countries/ 8

Research Units/ 12

of which **2 SMEs**

Project 17/ Section I

PHEMAC

Participatory Hub for Effective Mapping, Acceleration and Capitalization and of EU-MPC NEXUS best practices

Context

Too often, projects' results remain at scientific level and fail to sufficiently establish a connection between public and private sector due to different hindering factors: low interest and lack of incentives by researchers to develop their results into a business-oriented career and the low involvement of the Mediterranean private sector in the research and innovation process. The lack of communication and interaction between industry and academia is the main cause of impactless researches on markets and marketplaces not innovative: academia and industry follow too often opposite roads, making the involvement of the private sector in research and innovation insufficient or not adequate, especially in MCPs.

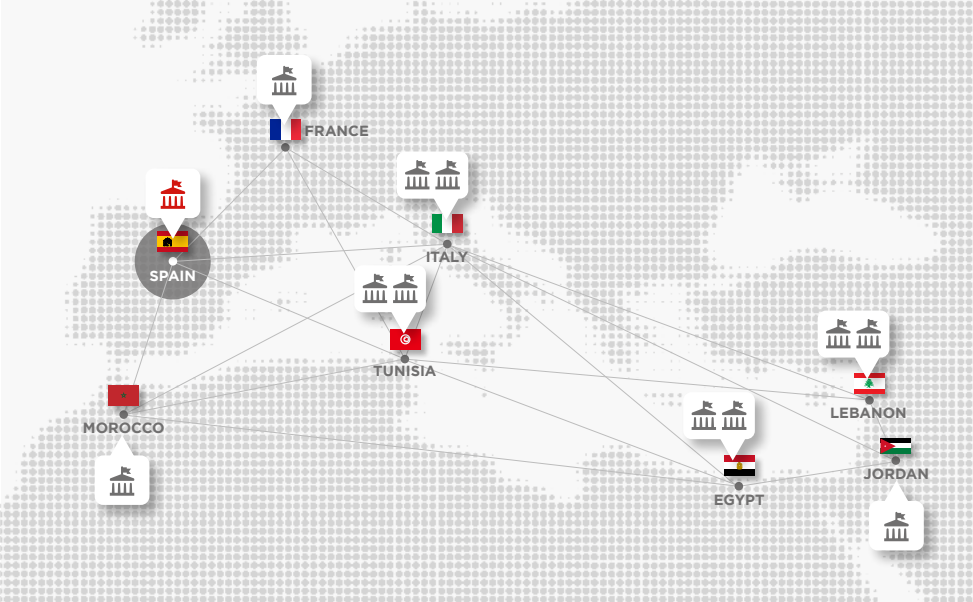
Objectives

To face this challenge, PHEMAC aims to develop and disseminate an interactive platform to profile best practices of previous and ongoing projects and initiatives related to farming system, water and food in MED region. PHEMAC will exploit the legacies of 5TOI_4EWAS(H2020 project) to continue the mapping process and update with new content to identify additional results to be validated and classified in terms of exploitability and market maturity.

Expected impacts

Identification of the results better suited to be considered in innovation actions, gathering information to map, screen, profile and rank project outputs to define suitability for commercialization and understand the barriers to bridge the gap to market. The structured impact analysis of projects/programs will be used to affect policymaking, public opinion, catalyze entrepreneurial development processes, generate tangible economic spillover effects and a measurable social impact.

Identification of innovative solutions towards implementing SDGs, providing at mid-term, innovative solutions to societal challenges, matching innovation demands and



Coordinating institution

Universitat Autònoma de Barcelona - PU

Universitat Autònoma de Barcelona

Scientific Coordinator:
VALIENTE MALMAGRO, Manuel

offer of business/technological solutions. At long-term, it will contribute to a structure change in R&I strategic agenda of territories, embedding outcomes of a systemic approach to transition conveying an environmentally, socially and economically sustainable model, as tested by partners. PHEMAC estimates that a 75% of green and orange labeled projects will offer innovative solutions towards implementing SDGs.

To raise social awareness of the inherent value of research and innovation, through a coordinated awareness strategy able to increase social awareness (+1500 platform users and +15,000 through social media campaigns) to enhance intrinsic value of R&I. Besides, innovation pitches, bootcamps, MED Research Nights, innovation weeks, hackathons are tools that will also have a social awareness raising effect and impact on entrepreneurial attitude of target audience. +1000 companies and business supporting organization will be aware of the innovation potential mapped in the PHEMAC "marketplace" and +50.000 people will be reached.

Promote the uptake of the project results by the private sector to ensure that the more relevant previous outputs can be incorporated into the innovation system, through the online platform to speed up commercialization cycle and enhance replicability of identified best practices while ensuring effective PPPs. The dissemination PLAZA, the RIALTO matchmaking tool, the LINK job bank and the BPiMED on-line mapping tool will be feed by: a) +700 mapped projects; b) ≈350 innovation project results, c) work opportunities for high skilled labors, d) ≈50 case studies as useful guide for the uptake. PHEMAC estimates to collect ≈50 project results mature enough to be exploited.

A concrete strategy plan & policy recommendations to ensure long-term platform sustainability and maintenance, through a Capitalization plan to define a sustainable strategy for iHub, and the methodological approach of the smart cross linkage modules, automated dashboards and enabling users' and funding agencies' ownership of particular sections of iHub which ensures its long-term sustainability and continuous feeding and mutual exchange of data during and beyond project lifetime.

SPECIFIC OBJECTIVES

- To develop an interactive platform to gather best practices focused on PRIMA SRIA priorities, and connect public/private sector addressing NEXUS challenges, focused on best practices and projects related to farming system, water and food, more adapted to commercialisation
- To check potential expected impacts of projects at short-, medium- and long- terms and evaluate potential external factors responsible of chronic scarce involvement of private sector in R&I, while encouraging successful and sustainable PPPs to counter the phenomena of inefficient use of resources, reducing the gap between involved countries to boost economic and social reforms
- To support the exchange of compatible information between involved actors on programmes and policies, giving visibility to natural activities to exchange similar experiences and skills in the region and helping stakeholders to become aware of what already has been developed and implemented, avoiding duplication and using consolidated existing knowledge.

Thematic area

Nexus

Section I

Topic - Assessing social, technical and economic benefits of a cross-sectoral governance of the Water-Ecosystems-Food Nexus

Type of Action

RIA - Research & Innovation Action

Budget

1.544.750 €

Duration

48 months

Project 18/ Section I

SIGMA-Nexus

Sustainable Innovation and Governance in the Mediterranean Area for the WEF Nexus

Context

Climate change and rapid population growth threaten food, water and ecosystem security in the Mediterranean region. The Water-Ecosystems-Food (WEF) Nexus concept builds on the complex interdependencies between water, ecosystems and food security as it presents an integrated approach to resource management. The WEF Nexus enables the Mediterranean region to act on climate change effectively by proposing sustainable pathways that leverage on synergy opportunities towards climate change mitigation and adaptation efforts. Developing potential synergies between the main sectors of the Nexus can enhance efficiency and good governance of natural resources, quantify trade-offs and impacts across sectors, and propose possible policy measures and technical actions to reduce inter-sectoral tensions.

Objectives

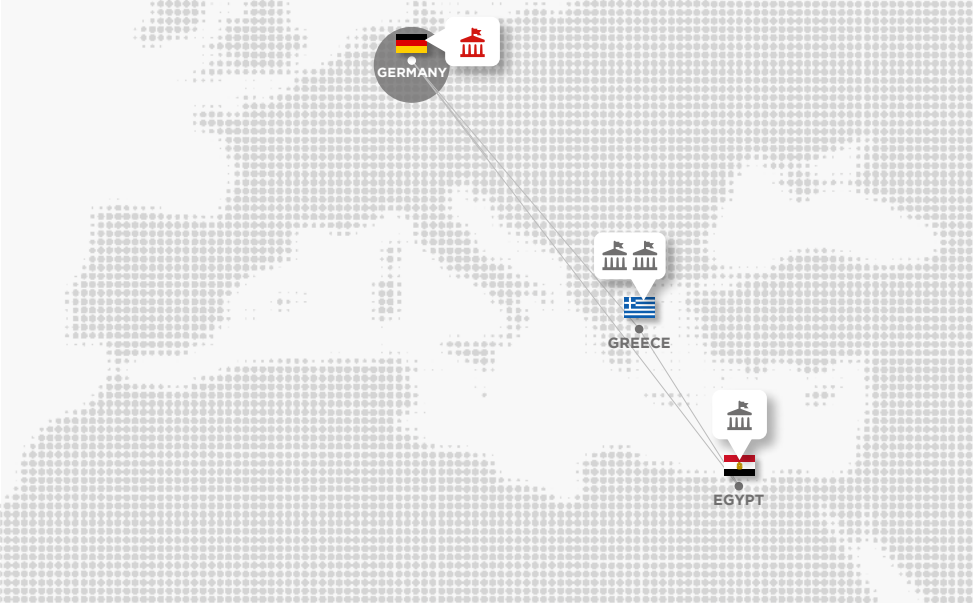
The overarching objective of SIGMA-Nexus is to develop climate resilience in the Mediterranean region by proposing sustainability pathways within the WEF Nexus framework. SIGMA-Nexus will analyse the socio-economic and technical characteristics of several case study sites in Egypt and Greece to develop the WEF Nexus for different hydrological, agricultural and environmental settings in the Mediterranean region. From existing irrigation technologies in the case study sites, now at TRL 3-5, SIGMA-Nexus will adapt and tailor each irrigation technology to each specific geographical and hydrological setting. This will provide a basis for SIGMA-Nexus' targeted interdisciplinary efforts to address synergies and conflicts observed in the three facets of the WEF Nexus, to draw lessons from previous successes or failures, to develop frameworks that advocate the efficient, integrated use and management of land and water, and to break disciplinary silos.

Coordinating country

Germany

Participating countries/ 3

Research Units/ 4



Coordinating institution

Technical University of Munich - PU

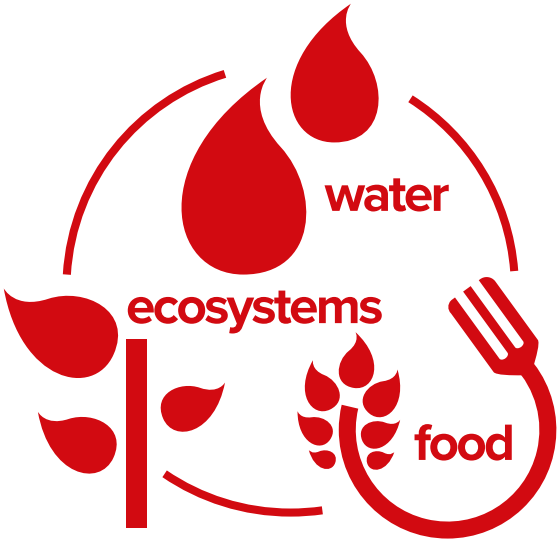
Technical University of Munich

Scientific Coordinator:
VRACHIOLI, Maria

Expected impacts

SIGMA-Nexus aims to accelerate knowledge diffusion and support decision-making that can minimize conflicts and maximize synergies of cross-institutional and sectoral management of water and land resources through participatory multi-stakeholder engagement activities. SIGMA Nexus will design and prioritize Nexus practices that encourage scalability and appraise interventions that balance ecological, socio-economic and natural resource aspects. Finally, SIGMA-Nexus will develop and promote a WEcoF digital innovation portal that will not only promote co-design of Nexus initiatives but also act as a capacity-building tool. The WEcoF innovation portal (TRL 5) will be an online WEF Nexus related innovation platform with the potential for mobile-phone adaptability.

WEcoF digital innovation portal



SPECIFIC OBJECTIVES

- Review and assess existing and previous initiatives in the Mediterranean Region and appraise interventions that balance socio-economic and natural resource factors.
- Identify the key technical and ecological features that promote resilient and productive agro-ecosystems by conducting comparative analysis and modelling simulations.
- Implement training programs and hold workshops that facilitate knowledge-transfer and support decision-making, cross-sectoral governance, scalability and stakeholder participation.
- Develop a WEcoF digital innovation portal that promotes the co-design of Nexus initiatives and acts as a capacity-building tool.

Thematic area

Water Management

Section II

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

Budget

415.000 €

Duration

36 months

Coordinating country

Lebanon

Participating countries/ 4

Research Units/ 4

Project 1/ Section II

EADANMBRT

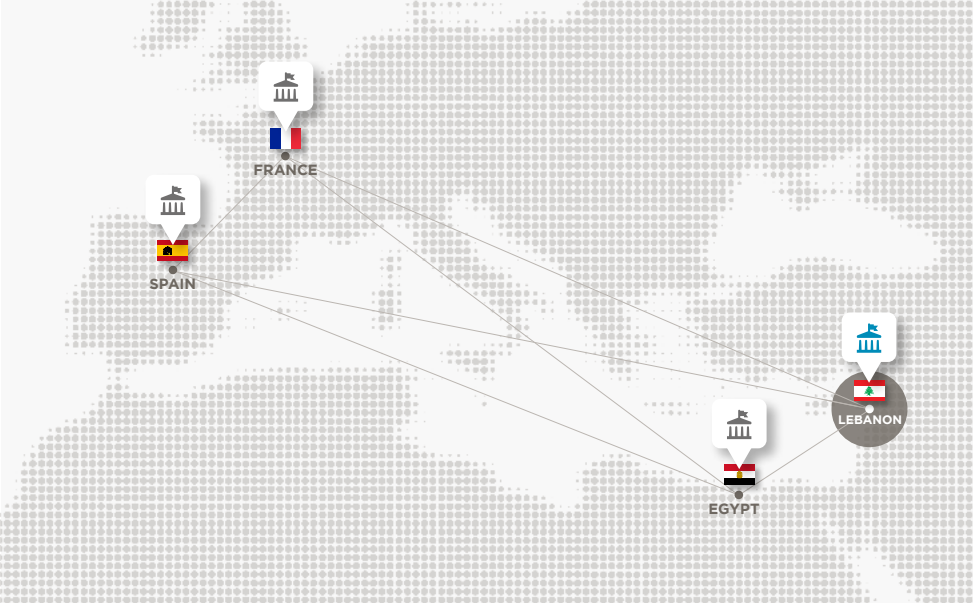
Evaluation and development of anaerobic membrane bioreactor (AnMBR) technology to promote unrestricted wastewater reuse and mitigate compromised surface water quality in the Mediterranean region

Context

Growing water scarcity, catalyzed by the imminent threat of climate change, requires the development of sustainable and innovative technologies to shift the paradigm of water management towards low-impact recycling without incurring major resource or energy footprints. As such, the future of sustainable agriculture is dependent on a near closed loop of treated wastewater reuse. Although the challenges of reuse implementation vary across the Mediterranean region, energy and resource efficiency during treatment are universal requirements due to the potential for greenhouse gas emissions and costs associated with energy input. However, guaranteeing the long-term safety of treated wastewaters for reuse is paramount to ensure public health in the Mediterranean area.

Objectives

The technologies necessary for widespread unrestricted irrigation reuse across the Mediterranean are not at a level ready for municipal or market application. Based on this, the project team will focus on development, advancement, and application of the emerging technology known as the anaerobic membrane bioreactor (AnMBR) for unrestricted wastewater reuse. Integrated testing of AnMBR technology for treatment of wastewaters in multiple participating countries will be performed, with a specific focus on mitigation of contaminants of emerging concern (CECs). In order to broaden the potential reuse application scenarios, low-impact membrane-based tertiary treatment will also be investigated and applied for these systems. Scale-up of AnMBR technology will be addressed using a pilot-scale system, specifically focusing on practical operational strategies to reduce greenhouse gas emissions and enhance energy recovery efficiency. Specific objectives of pilot-scale assessments will include increasing influent waste stream diversification and effluent methane valorization strategies.



Coordinating institution

Lebanese American University, LAU - DP

Scientific Coordinator:
HARB, Moustapha

Operational practicality will be assessed by incorporating life cycle assessment analyses using collected data. Based on the experiments conducted, we will implement a plan for advancing AnMBR technology to a point where technology transfer to local/national stakeholders and responsible governance agencies can occur.

Expected impacts

The project is anticipated to enhance local capacities across the Mediterranean to support employability and economic development in the field of wastewater reuse and resource recovery. Specific impacts will result in an overall improvement of surface water quality in various regions of the Mediterranean by reducing point source discharges while also increasing water and energy availability as part of the direct reuse of treated wastewaters and anaerobic biogas harvesting. These impacts will further serve to reduce reliance on groundwater resources for irrigation practices, decrease the effects of soil salinization, and mitigate the necessity for inorganic fertilizer use. These results will ultimately serve the management of low-quality waters under increasing water scarcity and climate change conditions.

Thematic area

Water Management

Section II

Topic - Bridging the gap between potential and actual irrigation performance in the Mediterranean

Budget

1.170.706 €

Duration

36 months

Coordinating country

France

Participating countries/ 7

Research Units/ 12

Project 2/ Section II

HubIS

Open innovation Hub for Irrigation Systems in Mediterranean agriculture

Context

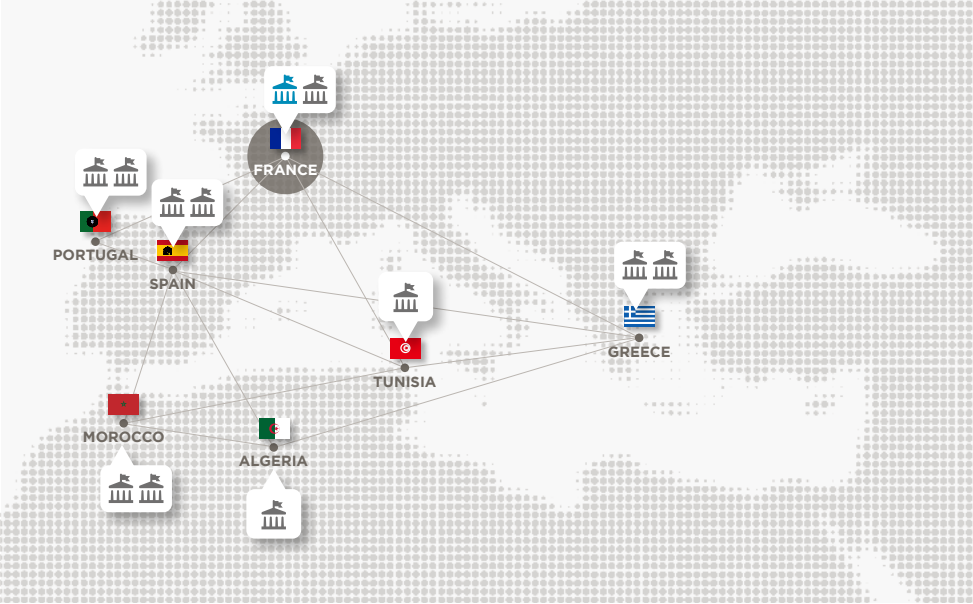
The modernization of irrigation has boosted the Mediterranean agriculture thanks to technology developments and supporting top-down public policies. However, new compelling challenges have arisen: (i) the irrigation performance gap remains much greater than expected; (ii) irrigation intensification and expansion are at the root of pollution of valuable ecosystems and overdraft of non-renewable water resources; (iii) water savings are not as foreseen due to unexpected rebound effects of irrigation efficiency improvements; (iv) modern pressurized systems are costly and environmentally questionable. (v) climate change should accentuate the vulnerability of agroecosystems in areas already coping with water scarcity.

These new challenges require new research paradigms and multiscale approaches:

- Bottom-up actions are now needed to close the remaining irrigation performance gap.
- Management and performance of irrigation schemes is conditioned by planning and management of water resources at a basin scale.
- Water accounting and water quality control must be introduced at all scales (farm, scheme, basin). Last generation of low-cost sensors, communication technology, big data analysis, satellite information and other emerging technologies provide unforeseen opportunities for this purpose.
- There are vibrant opportunities for reducing external energy consumption and nitrogen leaching in irrigation schemes.

Objectives

The main objective is to favour the emergence, evaluate and boost innovations aiming at reducing the performance gap and thus improve the sustainability of irrigation systems in the Mediterranean region.



Coordinating institution

Institut National d'Etudes Superieures Agronomiques de Montpellier - PU

Scientific Coordinator:
BELAUD, Gilles

The innovations comprise new tools and services for farmers and water users associations, designed to increase water, nutrient and energy use efficiency.

Expected impacts

An advanced step in the improvement of farm and basin scale irrigation performance is expected. HubIS will be the start of a stimulating environment for open innovation in the irrigation sector, beyond the duration of the project.
Affordable multi-level and adoptable systems, integrating cost-efficient technologies, for monitoring and prescribing irrigation inputs and tracing return flows will be produced with high level of TRL. A model that will help predict socio-economic and environmental impacts and synergies resulting from irrigation development will be produced too.

SPECIFIC OBJECTIVES

- Strengthen the innovation capacity of the irrigation community, through a multi-actor innovation Hub, and the development of irrigation fablabs on 8 sites in the 7 partner countries;
- Co-create pre-operational and operational methods and services for precision irrigation and agro-ecosystems conservation, based on cost-efficient technologies for farmers and participatory research;
- Assess environmental and socio-economic performances of these innovations;
- Pave the way towards developing a Mediterranean policy framework for sustainable irrigation.

Thematic area

Water Management

Section II

Topic - Bridging the gap between potential and actual irrigation performance in the Mediterranean

Budget

645.240 €

Duration

36 months

Coordinating country

France

Participating countries/ 4

Research Units/ 5

Project 3/ Section II

IDEWA

Irrigation and Drainage monitoring by remote sensing for Ecosystems and WAter resources management

Context

Improving the sustainability and water productivity of irrigated land in the semi-arid areas of the Mediterranean basin is considered as a priority at the European level. A further challenge is the lack of drainage data at integrated spatial scales over irrigated perimeters and the lack of quantitative assessment of the impact of that drainage on the river flow and water quality downstream. Drainage of irrigated agricultural land is necessary to maintain irrigation activities by avoiding salt build up and water logging. But the water drainage also affects the quality of rivers by return flow. There is thus a crucial need to monitor drainage over irrigated areas and our project proposes an approach to fill this gap by using remote sensing data.

Objectives

Retrieving drainage from remote sensing is not an easy task since there is no direct measurement of soil water transfers from space. However, the water budget modeling can be constrained from the remotely sensed crop evapotranspiration (ET), soil moisture (SM) and vegetation water stress (VEG) indices. The main idea is to assimilate remotely sensed ET, SM and VEG data in land surface models at multiple (field, sub-basin and basin) scales. Moreover, the impact of drainage on ecosystems will be measured by remotely sensed water quality indices. The project will be implemented in two Mediterranean representative case and well-monitored study areas in the Ebro (Spain) and Tensift (Morocco) basins. In particular, the drainage retrieval approach will be tested over the Algerri-Balaguer district, where drainage is actually measured at an integrated spatial scale. Since the land consolidation twenty years ago, this irrigated area has been drained by a network of constructed ditches and buried pipelines feeding a general outlet in a 3-meter deep well, which now allows for continuously monitoring the flow rate and electrical conductivity.

Coordinating institution

Centre d'Etudes Spatiales de la Biosphère, CESBIO - PU

Scientific Coordinator:
MERLIN, Olivier

This configuration, resembling a huge passive lysimeter of 3500 ha, thus represents a unique opportunity to develop and test the satellite-based drainage retrieval

Expected impacts

IDEWA will increase knowledge about sustainable irrigation by introducing drainage flow and quality as a necessary component to be considered at the field and basin scales. The overall concept underpinning the project is to determine the right amount of drainage needed to both increase the water use efficiency and ensure the preservation of soils in irrigated areas and of ecosystems downstream. Water management tools will ease coordination at all the affected administrative levels and with all the actors in the basin, avoiding in all cases territorial confrontations. The TRL is expected to increase from 4-5 at the starting point to 6 at the end of the project.

Thematic area

Water Management

Section II

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

Budget

1.111.488 €

Duration

36 months

Coordinating country

Germany

Participating countries/ 4

Research Units/ 5

Project 4/ Section II

RESIDUE

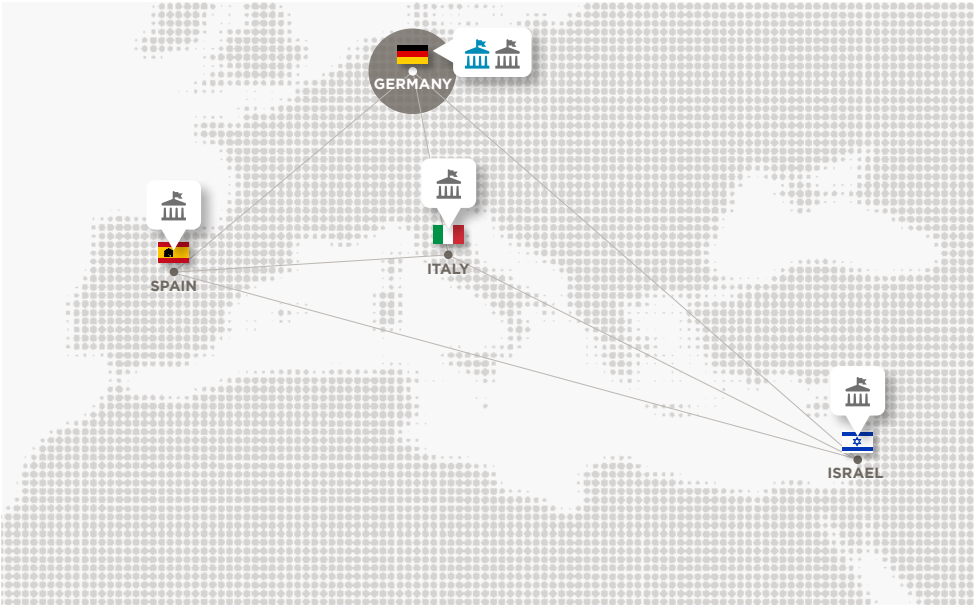
Risk reduction of chemical residues in soils and crops – impact due to wastewater used for irrigation

Context

Reclaimed wastewater use in agriculture has become a solution for feeding a global population under climate change and rising demand for food, which make fresh water and organic matter for agricultural purposes an increasingly scarce resource. Arid and semiarid regions across the globe progressively rely on reclaimed wastewater for crop irrigation. Reclaimed wastewater makes up over 50% of the total irrigation-water used in Israel, 17% in Spain, around 60% of the sewage sludge produced in Italy are used in agriculture. The benefits of reutilizing wastewater and sewage sludges include water conservation and an alternative source of organic matter and nutrients for the agro-environment. However, there are safety concerns regarding the use of reclaimed wastewater and products of wastewater treatment for crop irrigation and fertilization about the contamination of ecosystems and arable land with organic pollutants such as pharmaceuticals and other anthropogenic chemicals. There is an urgent need of developing techniques to minimize risks associated with irrigation with treated wastewater and fertilization with sewage sludge in particular in regions with water scarcity.

Objectives

The main goal of the project is to improve the safety of agricultural products grown in countries, which are obliged to use waste materials for irrigation and fertilization in agriculture. The concept of the project is to develop a technology with significantly reduced risks of transfer of organic contaminants into the agricultural products. The new technology will be based on i) the improvement of soil functions to enhance in situ the removal and detoxification of introduced organic pollutants, (ii) new production procedures for safe soil amendments and iii) a clear discrimination of non-bioavailable organic pollutants introduced into soil that do not constitute a risk for agriculture.



Coordinating institution

Fraunhofer Gesellschaft - PU

Fraunhofer Gesellschaft

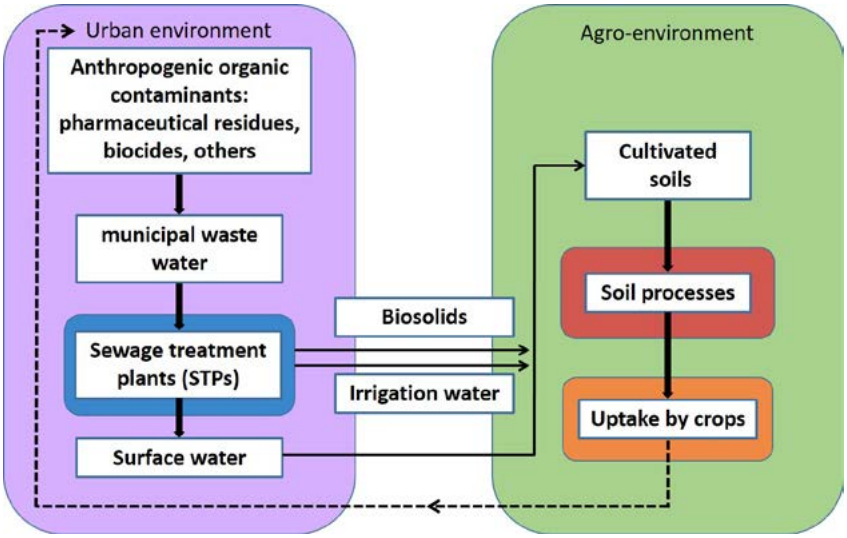
Scientific Coordinator:
HENNECKE, Dieter

Expected impacts

The major innovation of this project is that, for the first time, it will convene experts from PRIMA countries on the environmental fate and metabolism of chemicals, soil functions, bioavailability, and composting and biochar production, to consider how wastewater and sewage sludge can be sensibly incorporated into agricultural practice under water scarcity. The RESIDUE project targets at opening new market opportunities for agriculture in the areas of soil fertilization and irrigation. The use of sewage sludge and wastewaters in this context is widespread but not devoid of associated risks at present. We anticipate that the safe and knowledge-based use of these materials will optimize the performance of agricultural practices under water scarcity, what will be of tremendous interest under the current challenges caused by climate change and the growing world population. This will help to overcome a number of conceptual and technical problems found in the use of sewage sludge and wastewaters that limit the agricultural current applicability of this technology.

The output from this project will be a 'laboratory' of interdisciplinary work that links water scarcity and agriculture. The novel benefits of this RESIDUE project will be the development of a framework for the safe use of wastewater for irrigation. This process will enable (i) a more pragmatic approach to water management under water scarcity, (ii) cost reductions in water treatment through residue revalorization and reconsideration of wastewater depuration targets, and (iii) a more effective and sustainable agriculture.

Scheme on sources and pathways for the occurrence of organic contaminants in the agro-environment and their distribution path.



Thematic area

Water Management

Section II

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

Budget

991.800 €

Duration

36 months

Coordinating country

Germany

Participating countries/ 4

Research Units/ 6

Project 5/ Section II

SmaCuMed

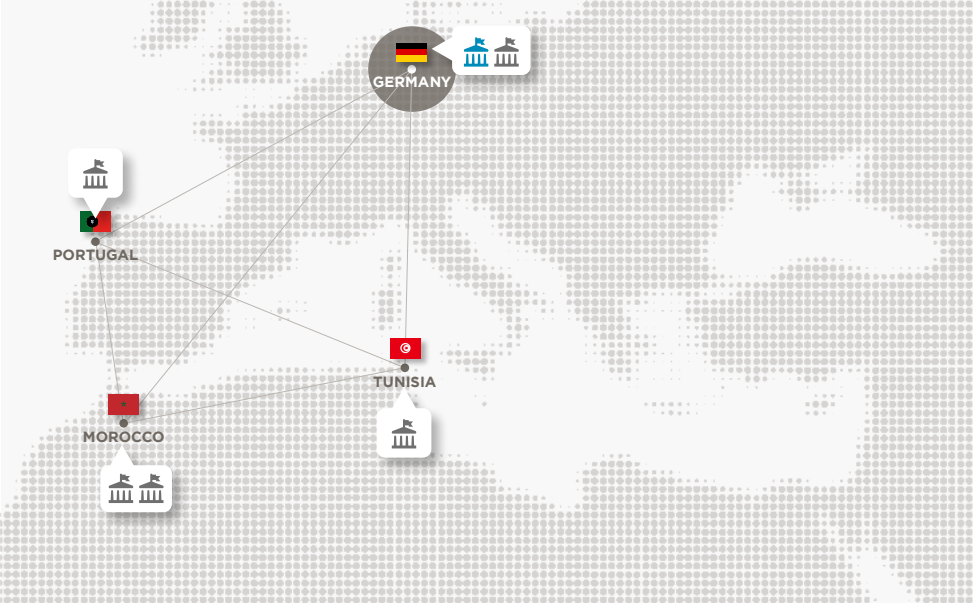
Smart irrigation cube for sustainable agriculture in the Mediterranean region

Context

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

Objectives

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



Coordinating institution

Karlsruhe University of Applied Sciences - PU

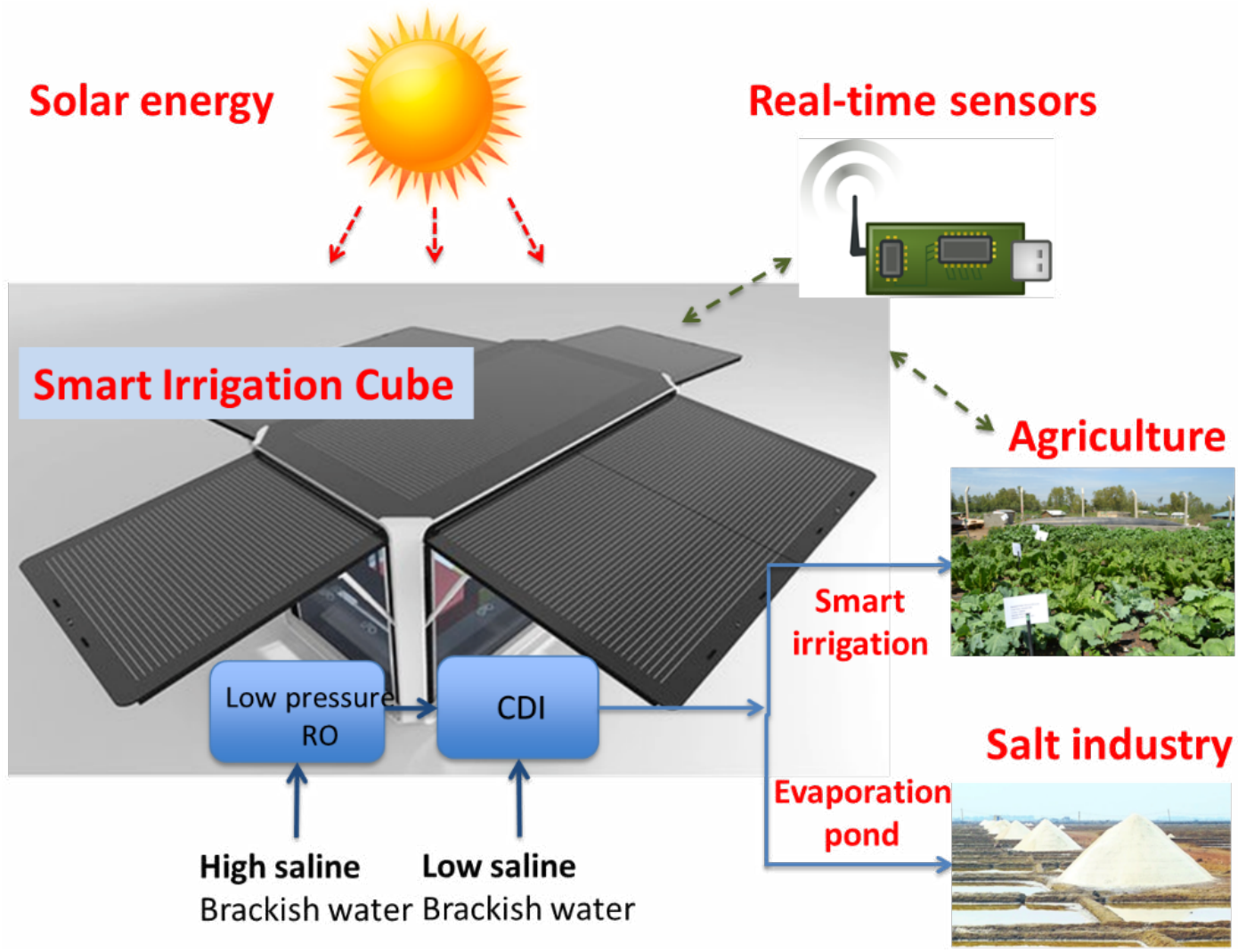
Hochschule Karlsruhe Technik und Wirtschaft
UNIVERSITY OF APPLIED SCIENCES

Scientific Coordinator:
HOINKIS, Jan

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

Expected impacts

The SmaCuMed project will:
- increases agricultural area compared to current area due to tapping and desalination of brackish groundwater;
- reduces the irrigation rate and avoids over-extraction and over-salinization by using real-time water metering as well as IoT based soil moisture and conductivity sensors;
- contributes to reduced CO_2 emission compared to current fossil fuel powered water pumps due to use of solar energy to drive the process;
- contributes to capacity building through training, workshops and exchange of best practices, lessons learned and experiences;
- helps particularly female farmers engaged in growing cash crops to increase production and potentially enhance economic security and to make significant improvements in the social, economic and political conditions;
- support to launch spin-off technology companies run by graduates from University partners.



Thematic area

Water Management

Section II

Topic - Bridging the gap between potential and actual irrigation performance in the Mediterranean

Budget

966.089 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 7

Research Units/ 14

Project 6/ Section II

SMARTIES

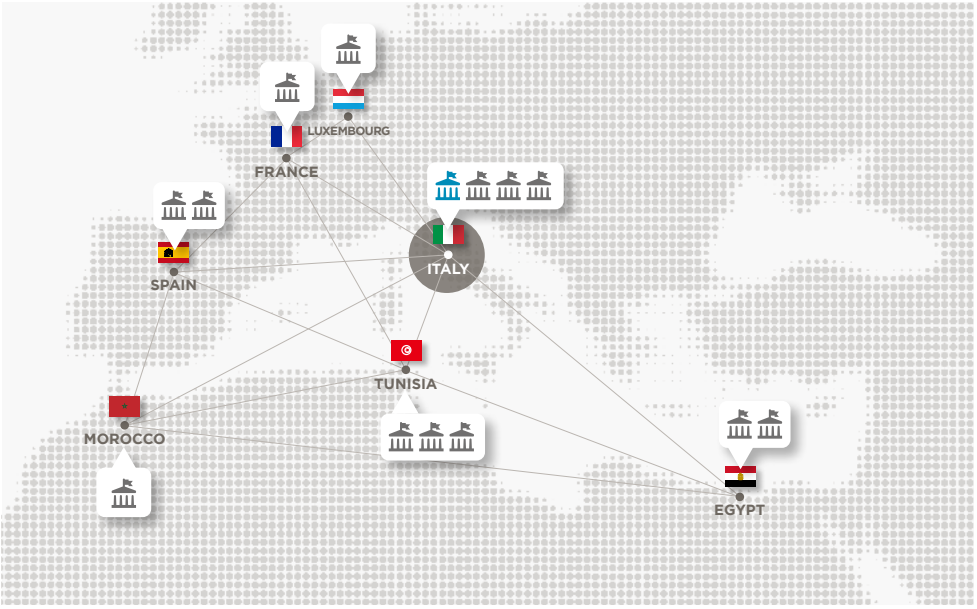
Real time smart irrigation management at multiple stakeholders' levels

Context

EU Water Framework Directive 2000/60/EC and the Common Agricultural Policy (CAP) in Europe together with the present national policies of the Northern Africa countries, and UN SDGs goals, act as international guides and policies to improve water irrigation management towards its sustainable use, economic saving and food security. It is well known in fact that agriculture uses large volumes of water with low irrigation efficiency, accounting in Europe for around 24% of the total water use, with peak of 80% in the Southern Mediterranean part and may reach the same percentage in Mediterranean non-EU countries.

Objectives

The objective of the project is to improve farm and irrigation district water use efficiency and farm profitability developing a real-time operational water and economic management web-gis system for parsimonious and precise irrigation optimizing exact water use and relative water productivity, integrating farm analysis into irrigation district ones. The tool will allow to monitor and forecast the soil moisture behaviour to define the right irrigation volume, optimizing water and economic indicators. The tool supports different levels of stakeholder: i) farmers who control soil moisture avoiding plant water and saline stress, ii) irrigation consortia which allocates water among users; iii) water authorities which manage water withdraw from reservoirs. In addition, the tools present also the possibility to be used as simulator of water allocation supporting decision strategy in real time and for seasonal forecast scenarios. Multi satellite data, ground measurements, daily and seasonal meteorological forecast, soil water budget numerical modelling, crop growth model and economic analysis will support the tool. The proposed tool will be applied in different case studies of the Mediterranean area: Italy, Spain, Egypt Tunisia and Morocco and also in China, characterized by different climatic conditions, fresh and saline water availability, crop types, irrigation practices, polices and water pricing.



Coordinating institution

Politecnico di Milano - PU

POLITECNICO
MILANO 1863

Scientific Coordinator:
MANCINI, Marco

Expected impacts

The parsimonious use of water as achieved by SMARTIES is the key concept that fits with most of the challenging ideas, policies and investments, that characterize international and national actions for improving: environmental quality, conservation and protection of ecosystems natural equilibrium, sustainable food production, water user conflicts mitigation, agricultural society resilience to climate change and anthropic pressure. These actions contribute to improve quality of life promoting as well modern methodologies in an ancient traditional agriculture transforming traditional farmers into technological farmers. The integration of all activities described in this proposal starts from a TRL 4 – technology validated in lab, and we regard that at the end of the project it will be positioned in the segment TRL 7 – system prototype demonstration in operational environment.

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

738.000 €

Duration

36 months

Coordinating country

Germany

Participating countries/ **4**

Research Units/ **8**

Project 7/ Section II

AdaMedOr

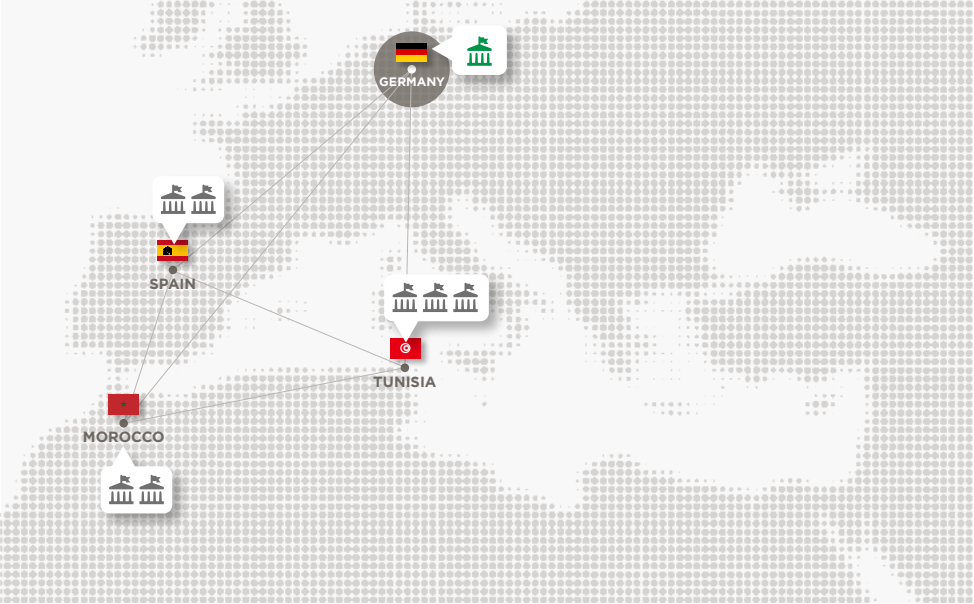
Adapting Mediterranean Orchards – science-based design of resilient fruit tree portfolios for the Mediterranean region

Context

The productivity of many orchards of the Mediterranean region depends on particular climatic conditions during the cool season, which allow trees to break winter dormancy and resume active growth in spring. Temperature increases in recent decades, as well as further warming expected in the future, raise concerns about the long-term viability of tree-based production systems that have shaped the face of Mediterranean landscapes for centuries.
Growers of chill-dependent tree crops, such as almond, pistachio, cherry, peach, apricot and apple, will have to adjust their array of tree cultivars, but they lack credible tools to facilitate such adaptation. Despite decades of dormancy research, there are still no models that perform well in warm climates. Researchers and orchard managers have thus struggled to estimate the thermal needs of available cultivars, and to identify appropriate cultivars for specific agroclimatic settings. A lack of understanding on the current distribution of tree cultivars hampers anticipation of the consequences of global warming, as well as limiting site-specific adaptation planning. The AdaMedOr project addresses these challenges by designing future-proof portfolios of tree cultivars to make orchards in Spain, Tunisia and Morocco resilient to the imminent impacts of global warming.

Objectives

AdaMedOr aims to assess the current agro-biodiversity of temperate fruit trees in the Mediterranean area (Objective 1) by mapping cultivar distributions, identifying promising cultivars and assembling a database on cultivar phenology and performance.
We will anticipate future tree performance with a novel state-of-the-art phenology modeling and climate impact projection framework (Objective 2), which will be used to estimate the thermal needs of Mediterranean tree cultivars, anticipate their future suitable ranges and map present and future chill and heat availability. Controlled experiments will facilitate model refinement.



Coordinating institution

University of Bonn - PU

UNIVERSITÄT BONN

Scientific Coordinator:
LUEDELING, Eike

The emerging information will be used as input for participatory processes to design future-proof tree cultivar portfolios for the target countries (Objective 3). Inputs from tree nurseries, researchers and farmers will be incorporated to ensure that recommendations are in line with end user needs.

Expected impacts

AdaMedOr will produce a novel modeling framework to facilitate science-based adaptation of orchards in the Mediterranean region. The project will also recommend tree crop portfolios for direct deployment in orchards. All procedures involved in this framework will be made available as open-access software tools. Inclusion of various stakeholders through participatory approaches will ensure increased awareness of adaptation challenges and enhanced understanding of promising strategies for ensuring that orchards remain resilient in a warming world.

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

1.273.600 €

Duration

36 months

Coordinating country

France

Participating countries/ 7

Research Units/ 9

Project 8/ Section II

Biodiversify

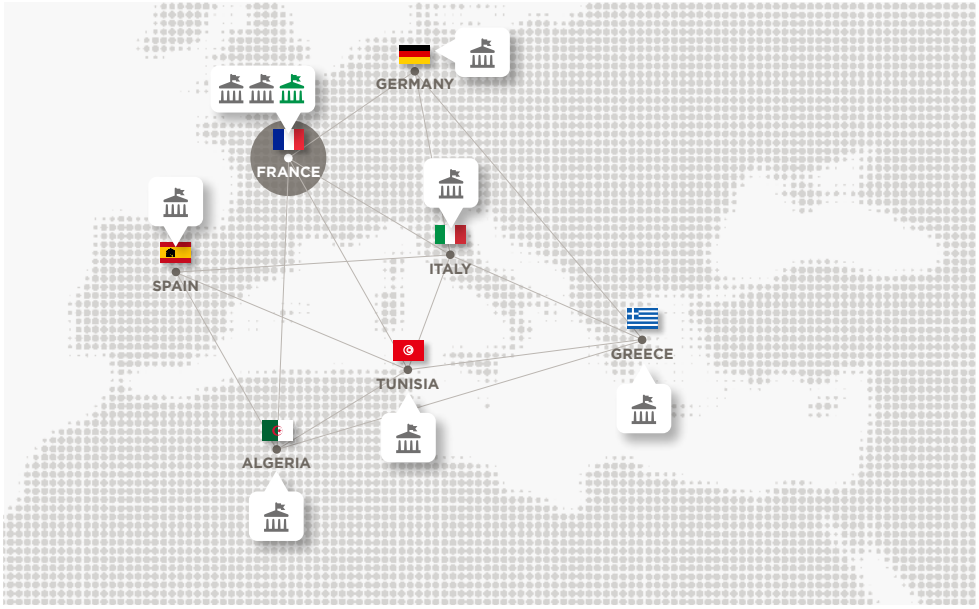
Boost ecosystem services through highly Biodiversity-based Mediterranean Farming sYstems

Context

The Mediterranean basin is characterised by a high dependence on agricultural imports, especially for cereals and legumes. This dependence is likely to grow in the foreseeable future, as a result of global changes. The economic pressure, however, encouraged specialisation, resulting partially in monocultures. This lead to environmental degradations, that threaten the provision of ecosystem services (ES), but the efficiency of inputs and labour remained highly variable. To address the challenges of production in the Mediterranean area, Biodiversify project goes beyond the proof of concept of agroecology proving more resilience for agroecosystems, based on species diversity over time (in rotation and during fallow periods) and space (intercropping and agroforestry). This will enhance resource use efficiency (especially water and nutrients), increase resilience to abiotic stresses such as drought, and control of weeds, pests and diseases without the systematic use of pesticides. Biodiversify will evaluate the effectiveness of high species and cultivars/landraces diversification (HSD) to improve production of grains for human consumption) and forage, both for on-farm self-consumption and market use.

Objectives

Biodiversify will implement a co-design approach, incorporating local experts and scientific knowledge, organised in 8 regional case studies that represent a wide range of systems and pedo-climatic conditions of the Mediterranean basin, such as:
Algeria: Diversified arable rotation and intercropping in the Setif Plain.
France: 1) Agroecological vineyard with multiservice cover crops in the Languedoc area; 2) Agroforestry systems in the Occitanie region.
Greece: 1) Agroecological vineyard with multiservice cover crop in the Central Macedonia region; 2) Intercropping of cereal and legumes in the Thessaloniki region.
Italy: Olive groves with multiservice cover crops and grazed crops in the Umbria region.
Spain: Biodiversified arable rotations in the Ebro valley region.



Coordinating institution

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

cirad
AGRICULTURAL RESEARCH FOR DEVELOPMENT

Scientific Coordinator:
JUSTES, Eric

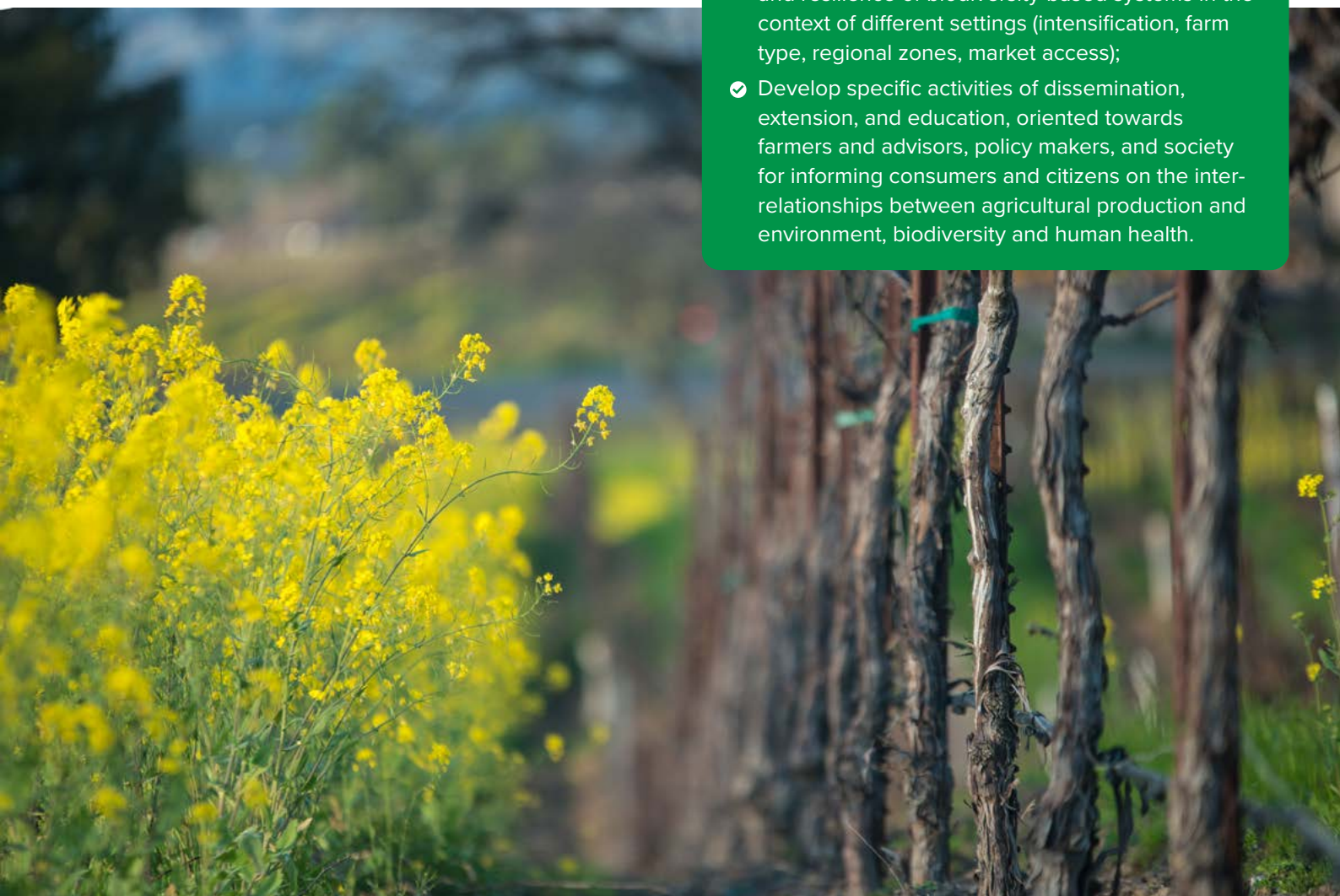
Tunisia: Agroforestry of olive groves with cover crops or grazed crops in the Sfax region.

Expected impacts

Biodiversify will contribute to the Sustainable Development Goals SDG#2 and SDG#11, and will thus: i) promote bio-diversified farming systems in Mediterranean as a modern, efficient, sustainable development; ii) help to increase the use of locally adapted germplasm, including traditional varieties; iii) allow improving soil Organic Carbon and Nitrogen stocks, contributing to climate change mitigation, N fertilizer savings, increase in productivity, strong reduction in pesticide use, decrease of erosion, and then finally have positive impacts on Mediterranean environments, especially the restoration of global soil quality and "health" and reduction of global pollution; vi) boost the adoption of productive and resilient low-input highly biodiversity-based farming systems through experiments, stakeholder- and region-specific adaptations, and model-based assessments of the benefits of a high crop species diversity.
TRL of the project at the beginning, according to the various workpackages, from 3 to 5. Expected at the end from 4 to 6.

SPECIFIC OBJECTIVES

- Understand how traditional highly biodiversified Mediterranean agricultural systems in an efficient "functional biodiversity" for providing sustainable and resilient agroecosystems;
- Engage with farmers and other stakeholders a co-evaluation and co-design process to develop biodiversity-based cropping systems for increasing the benefit of the whole value chains;
- Assess multi-criteria performance, sustainability and resilience of biodiversity-based systems in the context of different settings (intensification, farm type, regional zones, market access);
- Develop specific activities of dissemination, extension, and education, oriented towards farmers and advisors, policy makers, and society for informing consumers and citizens on the inter-relationships between agricultural production and environment, biodiversity and human health.



Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

871.372 €

Duration

36 months

Coordinating country

France

Participating countries/ 7

Research Units/ 12

Project 9/ Section II

BrasExplor

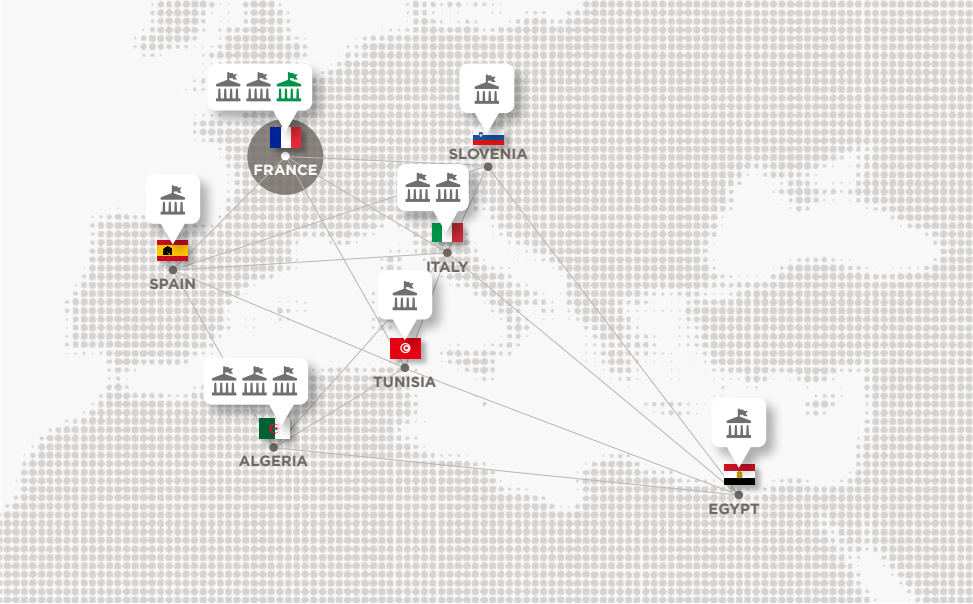
Wide exploration of genetic diversity in Brassica species for sustainable crop production

Context

Mediterranean agriculture has to face great challenges to overcome global warming and improve farming system sustainability while maintaining crop production and quality. In this regard, one fundamental question should be addressed: how can we modulate plant genetic diversity to withstand new climatic regimes? The use of species native of Mediterranean Basin, growing on a wide climatic gradient from the north of Europe to the south of North Africa, is a unique opportunity to identify relevant material and their adaptive traits to face upcoming climate change in the Mediterranean area and so to contribute to biodiversity-based agriculture. We propose in the project to explore the diversity of two native economically important vegetable species of the Brassica genus, B. oleracea (cabbages) and B. rapa (turnips), by taking advantage of two types of populations, wild populations and landraces, locally adapted to their native habitats. This diversity will constitute a starting point to identify plant genetic loci associated to adaptation useful for breeding new varieties and promote landraces.

Objectives

We will collect wild and locally cultivated populations on large climatic gradient from the north of France to south of North Africa. We will adopt a Genome-Environmental-Association (GEA) approach, controlling for plant population structure, to identify the plant genetic loci associated to local habitat variables (i.e. climate variables and soil edaphic and biotic variables). Information on the soil microbiota will also provide important insights on the relationship between variation of the microbiota descriptors (α-and β-diversity) and the plant genetic variability. Results, obtained by the in situ GEA approach will be confirmed under controlled conditions for water and temperature stress as well as under contrasted field conditions for different traits: seed germination, root architecture, flowering phenology, self-incompatibility, microbiota diversity, morphology. Genetic data will be also



Coordinating institution

Institut de Génétique Environnement et Protection des Plantes, IGEPP - PU

IGEPP
Institut de Génétique, Environnement et Protection des Plantes

Scientific Coordinator:
CHEVRE, Anne-Marie

used to infer their population genetic structure and to understand the relationships between wild and cultivated forms for each species. Results will allow development of core-collections for in situ/on-farm management strategies and ex situ conservation as well as for promotion of landraces. Outcomes of this project will also provide first generation of pre-breeding populations.

Expected impacts

The major impact of the project will be the preservation of natural and local genetic resources and the optimization of the use of this diversity through the identification of relevant adaptive genes in the context of global change for Brassica vegetables. The identification of genomic regions involved in responses to different abiotic stress will open the avenue for new breeding strategies through marker-assisted selection. It will offer a unique opportunity to identify novel alleles for genes of agronomical interest in the wild forms or landraces that could thereafter be used to develop prebreeding populations for further new elite variety productions more adapted to climatic changes or agronomical practices. The identification plant loci associated to soil microbiota-Brassica interactions will allow in the future to: i) select for microbial communities protecting Brassica species to environmental fluctuations or extreme conditions, ii) breed new varieties with the ability to select for beneficial bacterial responsible for the uptake of key-nutrients and helping plants to adapt to climate change. Both perspectives will generally allow to develop management strategies in the context of reducing chemical inputs in agriculture. Finally, the detailed assessment of local landraces will allow (i) the preservation of endangered varieties, (ii) the development of niche market appropriate to small-scale farming systems from well-adapted varieties corresponding to local uses.

SPECIFIC OBJECTIVES

- Identify genomic regions involved in the adaptation of brassica oleracea and brassica rapa to environmental variations;
- Determine the genetic bases of these traits underlying local adaptation;
- Develop new agronomic material with relevant traits in the context of climate change for both Brassica species.

Thematic area

Farming Systems

Section II

Topic - Small scale farming systems innovation

Budget

871.372 €

Duration

48 months

Coordinating country

France

Participating countries/ 4

Research Units/ 6

Project 10/ Section II

CAMEL-SHIELD

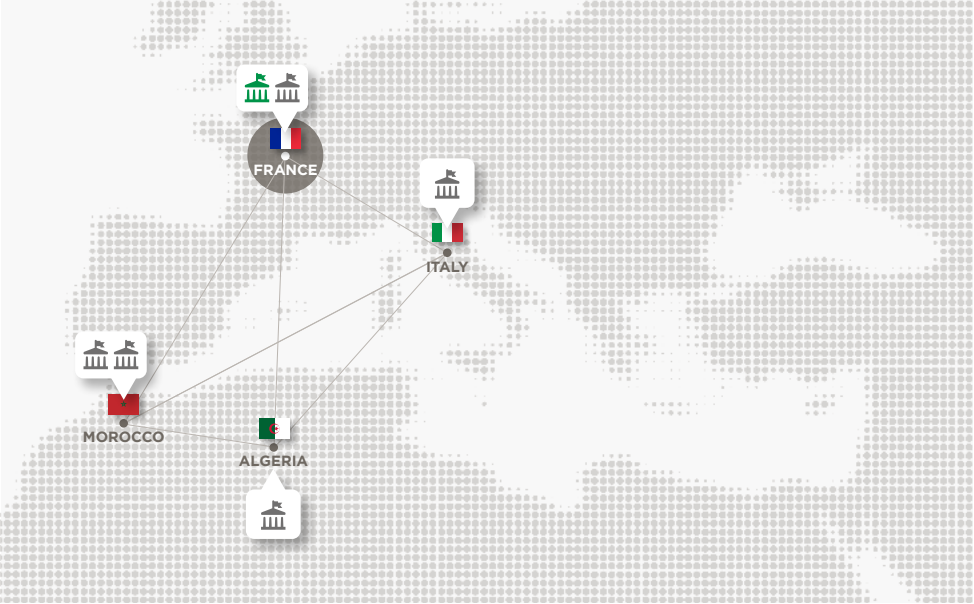
Camel breeding systems: actors in the sustainable economic development of the northern Sahara territories through innovative strategies for natural resource management and marketing

Context

The functions of camel (Camelus dromedarius) breeding have undergone a significant evolution since the last century. It has long been considered the “vessel of the desert” because of its functions as a pack-saddle and for transporting people. They disappeared with motorization. The role of the dromedary was then confined to socio-cultural and hoarding aspects, especially as the environment of this livestock farming has undergone many transformations relating to: the management of livestock farming (e.g. mobility, feeding, etc.), the extension of crops (irrigated and phoeniculture), vegetal erosion of rangelands, population growth, urbanisation, climate change, etc.
All these disturbances in the northern Algerian and Moroccan Sahara (study area) have induced strategies among camel herders. During the 2000s, herders adopted productivity strategies to sell camel milk and fattened young camels. These new approaches are trying to develop but seem to be hampered by organizational constraints and disturbances in the biophysical environment. The practices and strategies of these camel systems are evolving and still seem vulnerable.
The challenge is to combine sociotechnical dynamics and ecosystem processes on resource use, in order to propose social solutions on the part of societies to support human activities and their local resources.

Objectives

The objective of the project is to develop value chain analyses and management tools for techno-economic systems. It aims to implement and design innovative strategies for resilience and efficiency in camel herds, exploiting the adaptability of production systems. These analyses and tools must meet the constraints of access to primary resources (vegetation & water), management of camel populations and animal product flows. They will also address future disturbances that may be caused by climate change in this region.



Coordinating institution

Centre de coopération Internationale en Recherche Agronomique pour le Développement, CIRAD - PU

cirad
AGRICULTURAL RESEARCH FOR DEVELOPMENT

Scientific Coordinator:
HUGUENIN, Johann

Expected impacts

The expected effects of this project are to promote camel breeding in difficult rural areas through their contribution to the rural economy and also their environmental role. Indeed, camel farming systems in the northern Sahara have a key role to play which depends on finding a sustainable balance between resilience and efficiency of the system. The project will go beyond the state of the art by exploring the relationship between resource management, productivity and marketing in camel farming systems, simulating a wide range of herd management situations under different climatic and territorial development scenarios. It will also provide a systemic and holistic approach newly applied to the camel farming system and taking into account its external and internal elements.
TRL (Technology Readiness Level): TRL starting point 2; TRL final 5

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

1.198.570 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 7

Research Units/ 11

Project 11/ Section II

CerealMed

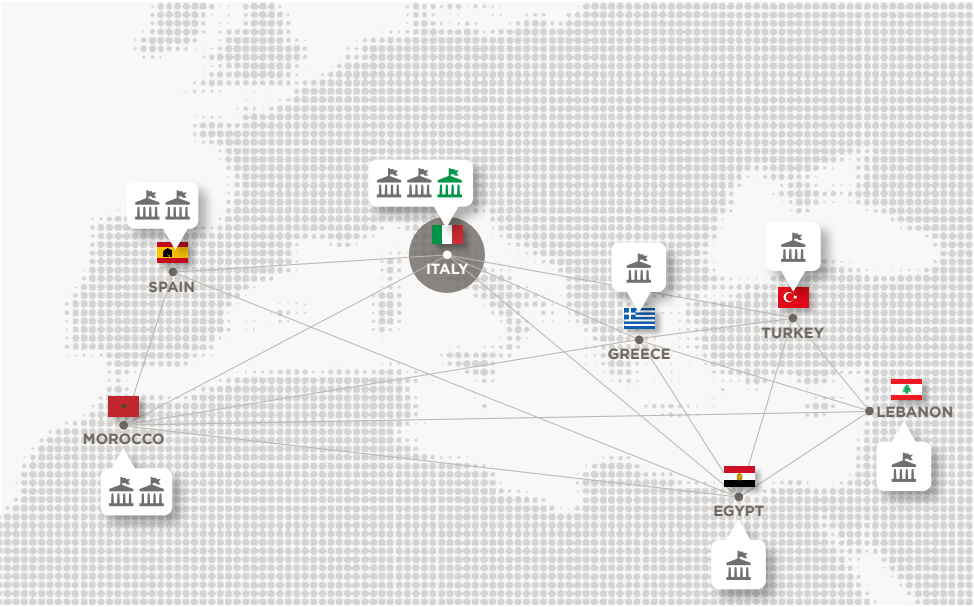
Enhancing diversity in Mediterranean cereal farming systems

Context

Climate change is already having profound consequences on people's lives and life diversity of our planet. The livelihoods of farmers, who have contributed least to climate change, are already suffering most from the global temperature increase and the associated extreme weather events that damage infrastructure, erode natural resources, increase the risk of devastating crop disease epidemics and endanger species, ultimately affecting food security. Moreover, the current intensive agriculture schemes are not only unsuitable for a sustainable agriculture in the forecast of the climate change scenario, but also led to a widespread decline in crop and soil-microbiome biodiversity. On the other hand, the biodiversity based agriculture relies on high diversification of the farming system in terms of crop genetics diversity (both at species and genotype level) and of management practices with beneficial effects on the ecosystem as a whole.

Objectives

CerealMed will pursue and achieve the following specific objectives:
evaluate the available wheat, lentil and chickpea biodiversity, both domesticated relatives and landraces, by testing collections/populations for adaptation to different environmental conditions, disease resistance and quality traits across the Mediterranean region,
create new wheat, lentil and chickpea-related biodiversity through the development of "new germplasm" by inter-generic and interspecific crosses such the example of Tritordeum.
valorise the wheat, lentil and chickpea biodiversity by re-designing and optimizing a sustainable wheat-based cropping system. Biodiversity-based agriculture practices considering the spatial and temporal combinations of wheat and legumes (rotation/consociation) will be tested under conservative agriculture management, together with the use of tailored microorganisms applications, to achieve relevant ecosystem targets:



Coordinating institution

Università degli Studi di Bari Aldo Moro - PU

Scientific Coordinator:
GADALETA, Agata

Agricultural targets: new high nutritional, value-added food products as well as new alternative products from cereal straw or farming side products;
Environmental targets: restoration of soil fertility, enrichment of soil biodiversity, reduction of chemical input (mineral fertilizer, pesticides).
compare the different options of biodiversity-based wheat farming in respect to more traditional/local agricultural systems in term of environmental and technical-economic outcomes/consequences to assess their profitability and their sustainability at regional level.
Implement an integrated bioeconomic model for the assessment of the sustainability at farming level.

Expected impacts

In the longer term, CerealMed will increase the efficiency of business activities of agro farm through the transfer and implementation of innovative systems and proper tools allowing them to increase the performance of their final products.
In addition, the identification of waste and residues of wheat cropping that can be valorised into bio-based alternative end-products, will support the development of new economic activities and new job opportunities in rural and periurban areas.
On the overall, the project will affect changes in the employment structure of the local/regional communities in which outputs of the project are adopted, and relevant new activities developed.

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

1.000.000 €

Duration

36 months

Coordinating country

France

Participating countries/ 8

Research Units/ 13

Project 12/ Section II

DiVicia

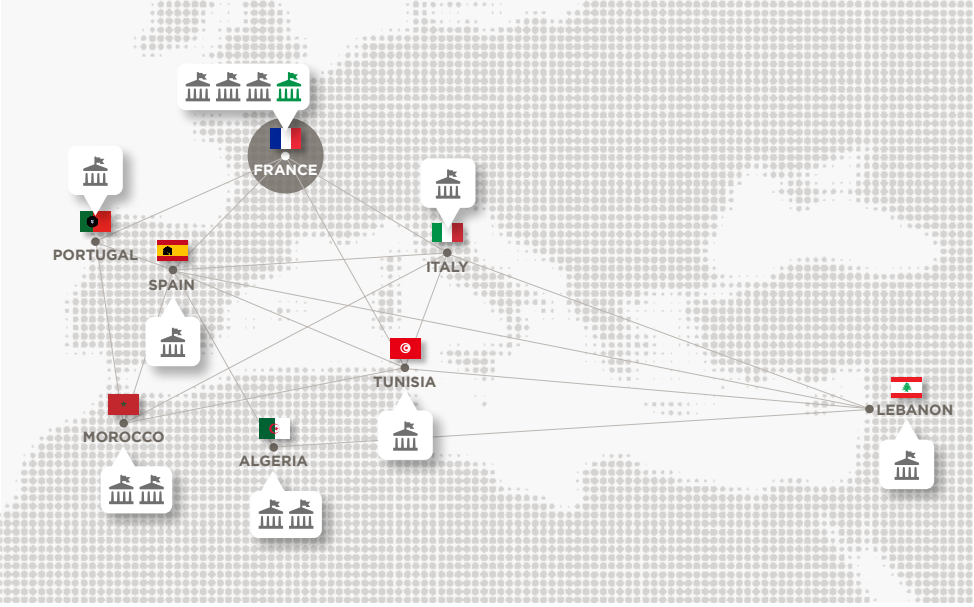
Use and management of Vicia species for sustainability and resilience in biodiversity-based farming systems

Context

Intensive agricultural systems are often characterized by low crop diversity associated with a large use of chemical inputs. They are widely questioned for their negative impacts on soils and environment and their lack of resilience. In contrast, crop diversified systems have the potentialities to improve productivity, resilience capacity and ecological sustainability, especially in the Mediterranean Basin, characterized by arid and semi-arid climates. Rich agricultural traditions and high biodiversity would be fully used for the transition towards sustainable food systems. The loss of traditional crop species and variety diversity contributes to the decline of provisioning, regulating, and cultural ecosystem services, as well as the damage caused to soil quality. DiVicia will work toward the design of sustainable, efficient and resilient biodiversity-based cereal-legume cropping systems adapted to the future challenges and constraints of Mediterranean areas with added values. DiVicia will promote the ecological intensification of production systems through the management of the functional roles of biodiversity.

Objectives

DiVicia will use the contrasting Vicia species faba bean and common vetch as study cases. The project aims to exploit key agro-ecological functions of legumes to restore agro-biodiversity and improve sustainability and resilience of Mediterranean cereal cropping systems. The identification of a wide range of promising landraces and new productive drought-adapted genotypes of Vicia species will help to implement best practices of rotations, intercropping or mix-cropping. DiVicia will mitigate, through a participatory process, the downward spiral of soil fertility decline and food insecurity, with a major impact on improving the livelihoods of the rural populations. The project consortium will make use of its multidisciplinary expertise together with stakeholders, integrating tacit and scientific knowledge to propose innovative agronomic practices, new local and drought-adapted germplasms, and tools to support farmers in such transition.



Coordinating institution

Groupe Ecole Supérieure d'Agricultures d'Angers Loire, ESA - DP

Scientific Coordinator:
FUSTEC, Joëlle

This will help to define strategies to better adapt the systems to the changing context. Sustainability assessments and soil diagnoses will be performed on farm with a participatory approach.

Expected impacts

New designs and germplasms will be tested in field experiments to identify key generic rules on the functioning of biodiversity-based systems. Selection and breeding of productive drought-adapted crops will increase genetic diversity and advance the contribution of Vicia spp. to multiple ecosystem services. Tools will also be built up for prediction of soil quality and fertility, and bioeconomic analysis at farm scale. In conclusion, this program aims to develop biodiversity-based cropping systems able to cope with limited resources and environmental constrains while improving soil quality, enhancing food quality and production stability over time, and increase farmers' income.

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

836.998 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 4

Research Units/ 5

Project 13/ Section II

EXPLOWHEAT

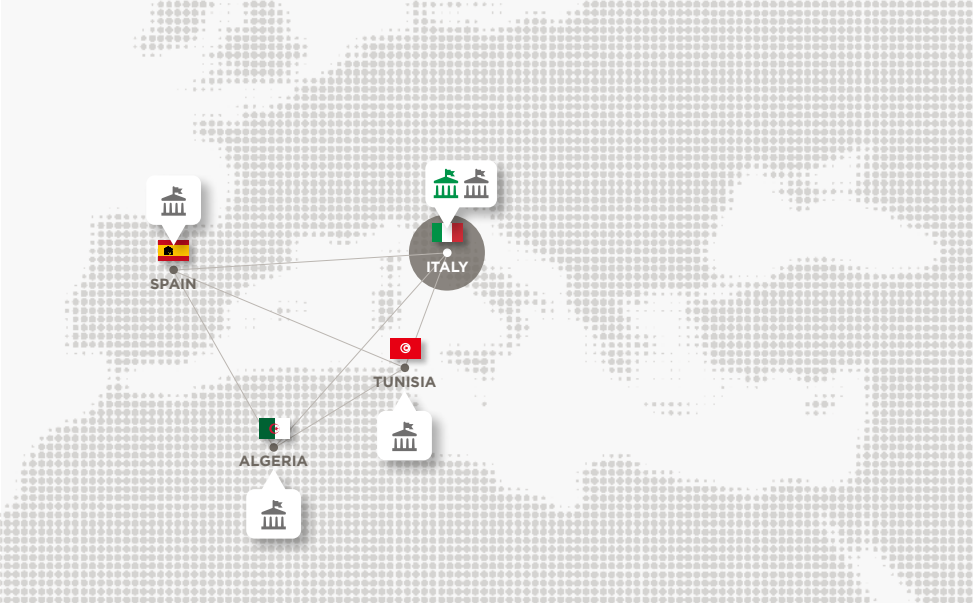
Exploring durum wheat genotypes to minimize drought stress impact on grain yield and nutritional quality

Context

Low-resource environments (e.g., dry or infertile soils) result in limited growth and development, which in turn constrain crop productivity. Drought is viewed as the single most important environmental stress decreasing crop productivity and it will be a major challenge for European agriculture due to climate change projections. Drought may cause nutrient deficiencies even in fertilized fields. The mechanisms that plants have evolved for nutrient uptake, translocation and assimilation may not function optimally under drought conditions. It is generally accepted that fertilization is most effective when plants are not water-stressed, and that irrigation is most effective when nutrients are not limited. Considering that most vegetable and seed crops are cultivated in semiarid areas and in regions suffering from temporary drought, it is important not only to ascertain how water stress affects the nutrient uptake and assimilation capability of these crops but also to identify genes/genotypes to increase crop resilience to face drought and nutrient deficiency under an indisputable climate change.

Objectives

EXPLOWHEAT will focus on durum wheat, a strategic staple food crop in the Mediterranean area and the overall ambition of the project is to exploit Mediterranean biodiversity to identify more resilient genes and/or crop genotypes able to cope with suboptimal water, and with unbalanced nutrient availability deriving from drought, in order to underpin improvement of crop management strategies for future agricultural use. The final goal will be to optimise the crop efficiency and sustainability of water, soil nutrients and fertilizer use, to improve the competitiveness and sustainability of Mediterranean agriculture whilst minimizing environmental impacts. Taken as a whole, this strategy has the objective of exploiting Mediterranean biodiversity for a more sustainable agriculture in terms of water and nutrient use efficiency (WUE and NUE).



Coordinating institution

Università degli Studi della Tuscia - PU

Scientific Coordinator:
ASTOLFI, Stefania

Expected impacts

EXPLOWHEAT impact will be diverse and multifaceted affecting the entire spectrum of stakeholders throughout the food production and utilization chain. Several stakeholders will directly benefit from project's results: the breeding and seed industry (including millers), fertiliser industry, agricultural associations (particularly local farmer associations), environmental agencies, academics and scientists, policy makers, media. Specifically, EXPLOWHEAT benefits will include: a more rational use of natural genetic resources, increased crop productivity and quality, decreased pollution, reduced energy needs and greenhouse gas emissions.
The project stems from background information and experimental evidence at TRL4 and aims to move to applications at TRL6.

Project 14/ Section II

FIGGEN

Valorising the diversity of the fig tree, an ancient fruit crop for sustainable Mediterranean agriculture

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

537.786 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 4

Research Units/ 5

Context

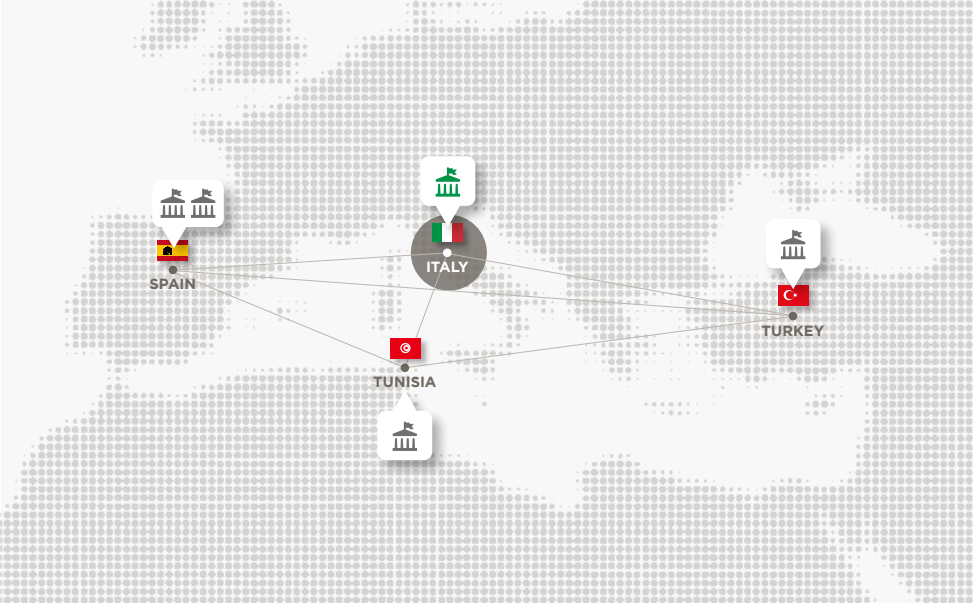
Climate change is dramatically impacting the Mediterranean region and solutions are needed to be found to adapt agricultural farming systems practices to rising temperatures, drought and soil salinity. The adoption of mixed cropping systems as agroforestry can counteract loss of agro-biodiversity and the reduction of soil fertility.
The fig tree (Ficus carica L.) has a great potential for expansion thanks to valuable nutritional and nutraceutical characteristics, combined with the ability to adapt to dry, calcareous and saline environments, making this species extremely interesting for sustainable commercial production in Mediterranean region, also in relation to the climate change.

Objectives

FIGGEN impacts on valorisation and conservation of biodiversity analysing 300 fig genotypes of fig germplasm including neglected or under-utilized cultivars from countries which are the main fig growing countries in the Mediterranean region.
It aims to evaluate performances and genetic variability of fig varieties integrating new knowledge and technologies in assessing biodiversity with knowledge coming from local farmers and stakeholders. This will allow selecting genotypes better adapted to drought/salt condition that can be introduced within traditional agricultural systems to obtain mixing cropping systems as agroforestry.

Expected impacts

The introduction in agricultural systems of new fig cultivars better adapted to drought/salt conditions will help fig sustainable production of the future. This will contribute to implement biodiversity-based agriculture, more resilient to climate uncertainties, and more sustainable, producing beneficial effects in terms of con-



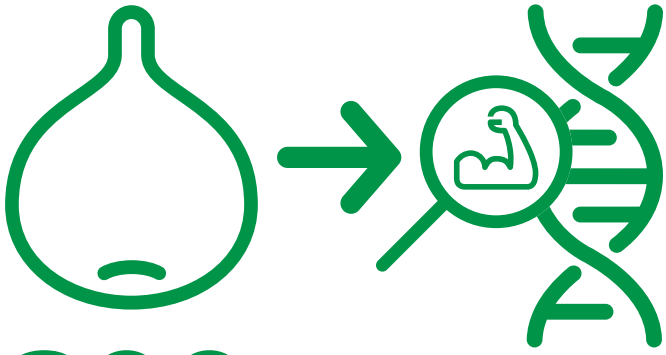
Coordinating institution

Università di Pisa, UNIPI - PU

UNIVERSITÀ DI PISA

Scientific Coordinator:
GIORDANI, Tommaso

servation of natural resources including above and below ground biodiversity, soil and water conservation, poor soil valorisation and, consequently, better ecosystem services.
This will have impact both on well-being and income of farmers, on agro-ecosystem and fig production allowing to invert the decreasing trend of fig production in Mediterranean area recorded in the last years.
Concerning scientific impact, the identification of genes or molecular markers linked to yield and drought/salt condition adaptation developed through (GWAS) will contribute to the genetic improvement of this species developing knowledge on genetics and physiology of plant under abiotic stresses and new varieties better adapted to a changing climate.



300

fig genotypes analyzed

SPECIFIC OBJECTIVES

- Exploring, valorising and evaluating genetic variability of fig genotypes on available Spanish, Tunisian Turkish fig collections using a genotyping by sequencing approach;
- Phenotyping fig genotypes to identify plants with traits wanted by stakeholders and most suitable to be cultivated in drought/salt conditions;
- Identifying genomic loci linked to yield and drought/salt adaptation performing Genome Wide Association Study (GWAS);
- Disseminating project's products and results to stakeholders to maximize project impacts.

Project 15/ Section II

Fish-PhotoCAT

Photocatalytic water remediation for sustainable fish farming

Thematic area

Farming Systems

Section II

Topic - Small scale farming systems innovation

Budget

707.573 €

Duration

36 months

Context

One of the great negative aspects of fish culture practices consists in the untreated wastewater laden containing uneaten feed and fish feces, thus rich in organic compounds containing nitrogen, phosphorous, and organic matter. Many fish culture facilities consist in open rearing systems, where water is taken from a natural basin, used in the tanks and then restituted to the main water body. This implies the use of large amounts of water every day and the discharge of waters rich in organic nutrients and inorganics that may affect the aquatic environment. Also the aquaculture recirculating system (RAS), useful to reduce water sourcing, needs to be equipped with filtering systems to remove suspended particles in water, convert ammonia into nitrogen compounds and sanitize water. In general, proper means of disposal are necessary to ensure the safe discharging of the produced effluents into the aquatic ecosystems, fish production and sustainability.

Objectives

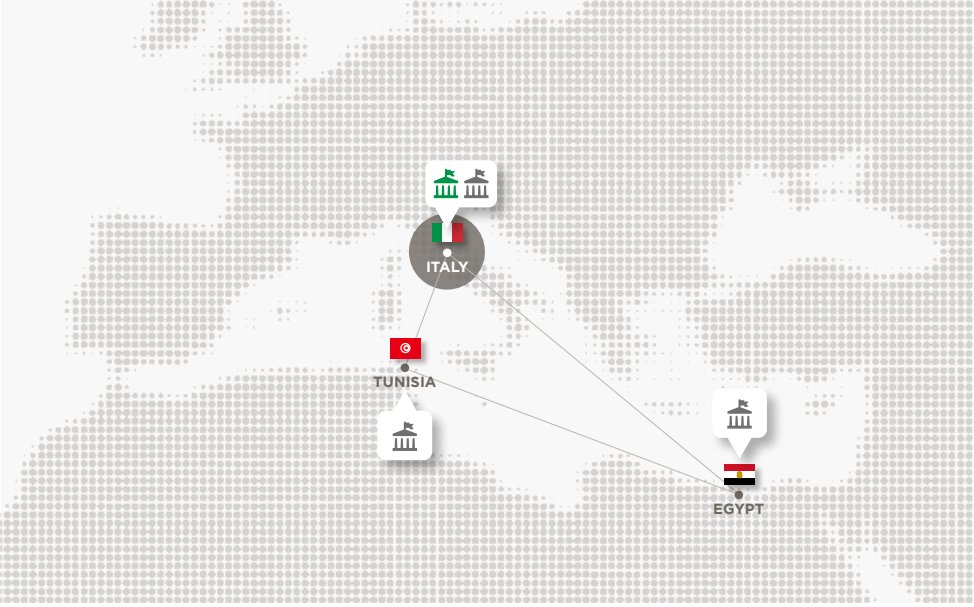
The project aims at investigating the efficiency of a smart purification system to improve water quality, fish production and environmental sustainability in aquaculture systems, through the remediation of nitrogen containing compounds in water and the biocidal action of a TiO_2-based photocatalytic treatment. The photocatalytic reactor will be developed, integrated to aquaculture traditional filters and tested, both in fresh and saltwater, on RAS (recirculating aquaculture systems) farming of two important aquaculture species: the Rainbow trout and the Gilthead seabream. The effect of the treated water on fish health will be assessed by means of: evaluation of the water quality in terms of residual nitrogen-containing compounds and microbial community; morpho-functional analysis in the early life stage to evaluate development, growth, deformities and environmental stress response; morpho-functional analyses at the commercial size to evaluate productivity, fillet quality and safety.

Coordinating country

Italy

Participating countries/ 3

Research Units/ 4



Coordinating institution

Università degli Studi di Milano - PU

UNIVERSITÀ DEGLI STUDI DI MILANO

Scientific Coordinator:
SELLI, Elena

In addition, the purification system will be tested in vitro for its ability to degrade pharmaceutical residues such as antibiotics commonly used in aquaculture and specific pathogens that undermine fish production.

Expected impacts

Besides the proposed innovative technique, this project is directed to:
- educate fish farmers on how to reduce environmental impact;
- inform aquaculture depuration systems producers about this technique to collaborate for innovation licensing;
- involve policy makers to spread information about the results of the project and about the availability of this innovative low cost remediation technique.

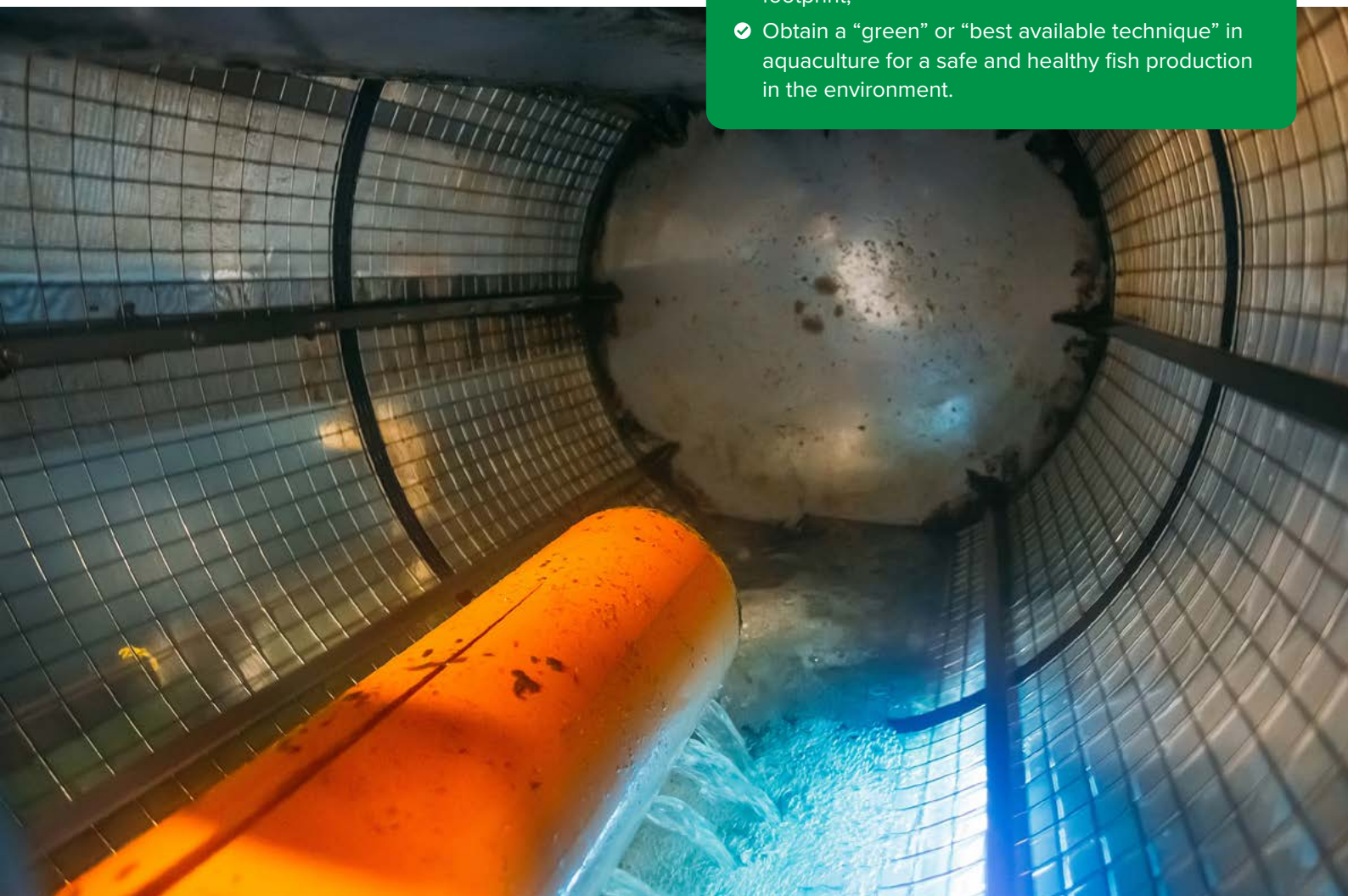
Since the Fish-photoCAT project aims at remediating exhaust water in aquaculture falls, its readiness has different TRL steps, starting from the TRL starting point of Basic principles observed TRL 1, to the final with Technology demonstrated in relevant environment TRL 6 (demo fish farms).

aquaculture recirculating system

TiO_2-based photocatalytic treatment

SPECIFIC OBJECTIVES

- Reduce the water sourcing;
- Mitigate ammonia compounds in fish rearing waters;
- Mitigate environmental pollution, ammonia and greenhouse gasses emission into the atmosphere;
- Reduce bacteria and viruses;
- Improve fish health and vitality, lowering the mortality rate and the following discharging costs in terms of economic losses and environmental impact, avoiding the worsening of its carbon footprint;
- Obtain a “green” or “best available technique” in aquaculture for a safe and healthy fish production in the environment.



Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

847.872 €

Duration

36 months

Coordinating country

Tunisia

Participating countries/ 6

Research Units/ 8

Project 16/ Section II

HaloFarMs

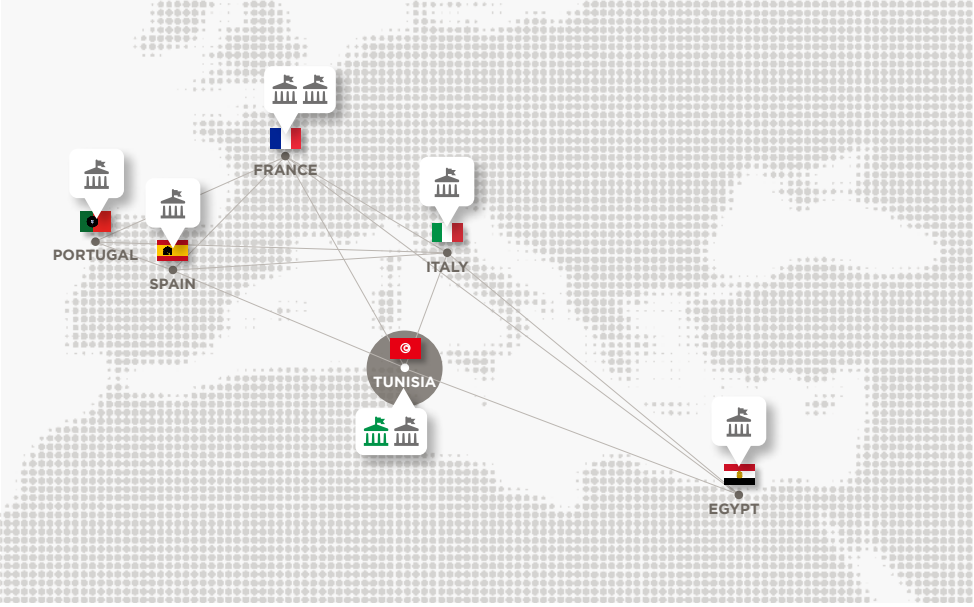
Development and optimization of halophyte-based farming systems in salt-affected Mediterranean soils

Context

The loss of agro-biodiversity, climate changes and food insecurity remain significant challenges in the Mediterranean countries. Approximately 18 million ha, corresponding to 25% of total irrigated land in the Mediterranean area, are salt affected. This situation is aggravated by intensive cropping and the excessive use of expensive inputs. The population in the Mediterranean area is expected to reach 529 million by 2025, which boosts the need to promote a sustainable agriculture with improved yields and productivity, while reducing negative ecological impacts, and use of new areas currently unsuitable for economic cultivation. The sustainability of farming systems in the Mediterranean region, aiming to cope with soil and water salinity, can be effectively achieved by the use of Nature-Based Solutions (NBS), resorting to halophytes. These underutilized plant species, common in the Mediterranean region, are well adapted to survive in natural saline environments. Halophytes can be used for soil desalination, but in addition, they have a high commercial potential on the food, pharmaceutical, veterinarian, and cosmetic markets.

Objectives

The overall objective of HaloFarMs is to develop and optimise sustainable and environmentally friendly new farming practices and producing systems based on the cultivation of halophytes, able to cope with soil and water salinization and to restore biodiversity. HaloFarMs will optimize The produced halophytes will be biochemically characterized for nutritional profile and functional properties; since these high added-value products can be used in the cosmetic, food and veterinary industries.



Coordinating institution

Centre de Biotechnologie de Borj Cédria, CBBC - PU

Scientific Coordinator:
BEN HAMED, Karim

Expected impacts

The halophyte-based farming systems included in HaloFarMs will cover 4 experimental areas in Tunisia, Egypt, Spain and Italy of at least 4000 m^2/ field trial. New market opportunities are opened up as the project's results will promote farmers collaborative networks creating a new business model including diversified local systems by providing farmers with different skills (involved industries: agriculture, food, pharmaceutical, cosmetics, veterinary, agro-tourism). The optimization of protocols for (i) rapid clonal propagation, (ii) conservation of germplasm of halophytic species, (iii) increased productivity, (iv) use of products derived from plants as pasture for small ruminants, and (v) increased food stability through the identification of new profitable halophyte crops will strengthen competitiveness and growth of companies raising the farmers' income.

halophyte based farming systems

for desalination of saline soils

SPECIFIC OBJECTIVES

- Desalination of saline soils by halophytes prior to crop cultivation;
- Intercropping halophytes on salt-affected soils, with important commercial cultivated crops;
- The cultivation of halophytes in salt-affected underutilized soils irrigated with saline water;
- In vitro cultivation of halophytes to provide efficient varieties in salt remediation and of economic value.

Thematic area

Farming Systems

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

1.240.190 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 8

Research Units/ 11

Project 17/ Section II

LEGU-MED

Legumes in biodiversity-based farming systems in Mediterranean basin

Context

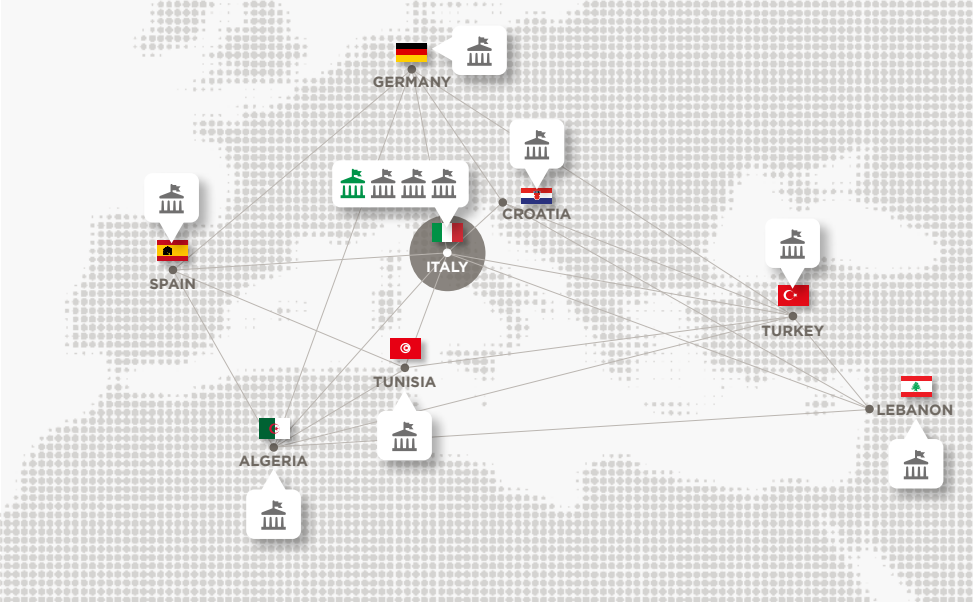
Biodiversity-based agriculture (BBA) is an ecocentric approach that relies on high diversification of biological components in farming systems to maximize fertility, productivity, and resilience to external perturbations. BBA approaches are not exempt of weaknesses. It is urgent to develop and test new models and approaches allowing to exploit and manage BBA in legume-based, Mediterranean traditional farming systems while providing better ecosystem services and better resilience to environmental stresses linked to climate change.

Objectives

LEGU-MED objective is to valorize, restore and manage legume biodiversity in future Mediterranean farming systems with enhanced environmental sustainability. We have assembled a multi-disciplinary consortium composed by 11 partners from 8 countries and consisting of 5 public universities, 5 research centers and 1 company. Our activities are designed to increase ecosystem services, maintain soil fertility, minimize the use of synthetic chemical compounds, and maintain a satisfactory and steady income for growers. LEGU-MED will use a participatory process where a subset of stakeholder's community will be involved in the co-creation of innovative solutions.

Expected impacts

The proposal is structured in 4 work packages (WP) to obtained the following expected impacts: 1) identification of new genes, molecular markers involved in the expression of key traits important to enhance Mediterranean farming system sustainability (WP1), 2) delivery of at least 2-5 new lentil and chickpea genotypes more adapted for biodiversity-based agriculture in 5 different geographic regions of Mediterannean basin (WP1), 3) new tailor-made cropping systems, management innovations based on integration of agrobiodiversity at any level (genetic,



Coordinating institution

Università di Firenze, UNIFI - PU

UNIVERSITÀ DEGLI STUDI FIRENZE

Scientific Coordinator:
MARTINELLI, Federico

species and habitat) with natural capability of coping with biotic and abiotic stresses exacerbated by climate change (WP2), 4) selection of elite rhizobial strains with enhanced BNF with selected germplasm valorising multiple biotic interactions (belowground interactions) (WP3), 5) significantly reducing the use of any chemical inputs through a smart management of agro-biodiversity (particularly pulses) and maintaining high agricultural production (WP3), 6) promote more participatory process between multi-actors in the design, performance, transfer and exploitment of innovations in BBA (WP4).

SPECIFIC OBJECTIVES

- Agronomic, phenotypic and molecular evaluation of wild relatives, land races, neglected genotypes, elite cultivars of lentil and chickpea obtained from different regions of the Mediterranean basin;
- Development of improved traditional farming systems using different strategies: i) diversification, ii) multi-crop rotations, iii) biological regulation of ecosystems, iv) enhanced plant-microbe symbiosis, v) natural resource conservation.

Thematic area

Farming Systems

Section II

Topic - Small scale farming systems innovation

Budget

664.000 €

Duration

36 months

Project 18/ Section II

SUPERTROUT

Improving SUstainability and PERformance of aquaculture farming system: breeding for lactococcosis resistance in rainbow TROUT

Context

Aquaculture represents the winning strategy to face the depletion of fish resources due to the constant growth of world population. Small-scale farming systems are common in the Mediterranean area and trout farming is suitable for this purpose, efficiently exploiting surface and underground water resources. Italy, Turkey, Spain and Greece are at the top of the list of the main producers of rainbow trout (Oncorhynchus mykiss).
The increase in the demand for aquaculture products brings with it the need to make production systems more efficient and sustainable: this entails a management and technological improvement, including the development of vaccines, the reproductive aspect and the genetic selection of characters related both to productive traits and to disease resistance.

Objectives

SUPERTROUT has been designed to face infectious diseases, a major concern in aquaculture farming systems, using novel approaches, and improving at the same time environmental sustainability and profitability of small-scale farming system. In particular, Lactococcus garvieae is reported to be responsible for significant economic losses in aquaculture worldwide: the loss due to this infection is 10-60% of the total rainbow trout production; mortality increasing are reported when water temperature exceeds 15 °C. This is a critical issue for the Countries bordering the Mediterranean Sea where the temperate climate, associated with the global warming, in recent years, favoured the durability and diffusion of lactococcosis outbreaks.
The overall objective of this project is to improve sustainability and profitability of small-scale farming system facing lactococcosis in rainbow trout applying an innovative strategy.

Coordinating country

Italy

Participating countries/ 4

Research Units/ 6

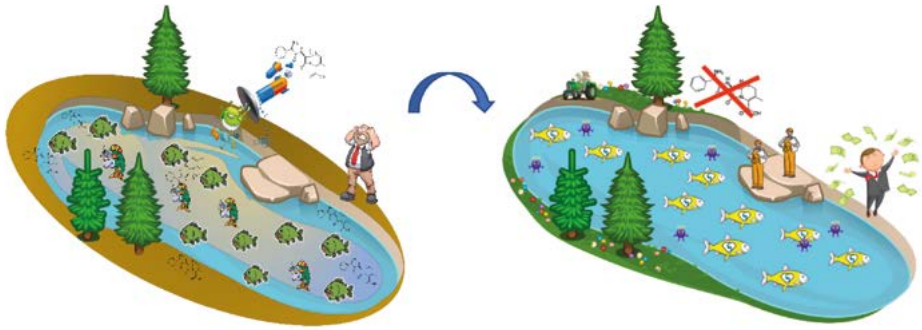
Coordinating institution

Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta - PU

Scientific Coordinator:
ACUTIS, Pier Luigi

Expected impacts

Using this approach costs related to disease control will be reduced, increasing profitability, while sustainability will be enhanced reducing environmental contamination due to antibiotic treatment and reducing antibiotic resistant strains. 20% of reduction of the economic losses due to the infectious disease lactococcosis and 10% of improvement of the reproductive performances are expected. The expected Technology Readiness Level (TRL), define for each scientific WP, are reported in the table below:



Rainbow trout disease

Lactococcus garvieae

SPECIFIC OBJECTIVES

- Exploitation of natural genetic resistance of trout through marker assisted selection;
- Development of recombinant vaccine to be administered by immersion;
- Improvement of reproductive performances exploiting trout genetic features.

Thematic area

Farming Systems

Section II

Topic - Small scale farming systems innovation

Budget

1.242.435 €

Duration

36 months

Coordinating country

Greece

Participating countries/ **8**

Research Units/ **11**

Project 19/ Section II

VALUEFARM

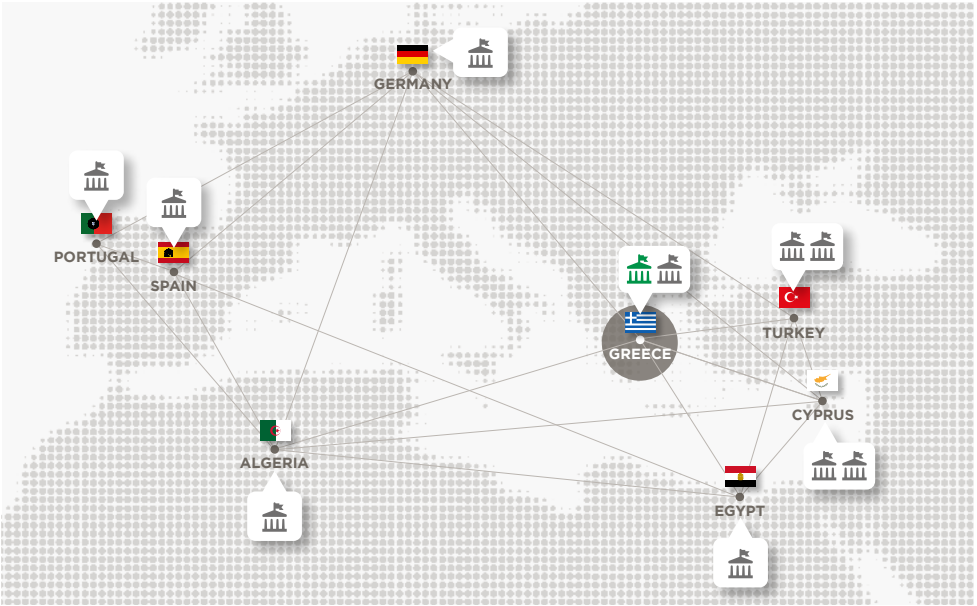
VALorization of Mediterranean small-scale FARMs by cropping wild UnExploited species

Context

Small-scale farms are the backbone of the Mediterranean farming sector, whereas agriculture advances are targeted to large farms; however, the average land farm shrinks and the ongoing climate change makes farming prohibitive, especially for small-scale farms. Mediterranean agriculture is relatively more intensive in terms of per ha labor and output, but undermined by strong land fragmentation, making farms too small to be viable due to high production cost. The result is land abandonment and rural population ageing, since farming sector is unattractive to young farmers. Although efforts have been made to reallocate small farms and increase average farm size, several factors have hampered the progress. Agriculture intensification and mono-crop cultural approach has caused soil degradation and organic matter loss, with high impact on small-scale farms viability. Besides, conventional crops cannot feed the growing population and alternative/complementary food sources such as wild edible plants (WEPs) could be an important addition to human diet. Mediterranean agro-ecosystems host a rich patrimony of WEPs that have always been an important food source, while they are able to grow under arduous conditions and low input regimes.

Objectives

to propagate and cultivate selected WEPs species, to describe and evaluate agronomic performance of WEPs, to evaluate the potential of cultivating WEPs in degraded soils and assess theirsoil improvement properties, to diversify existing farming systems, to evaluate innovative approaches, to analyze chemical composition, nutritional value and bioactive compounds content of WEPs, to increase knowledge and public awareness on the nutritional value and the bioactive compounds content of WEPs, to create physical labs and to implement living lab platforms for technological transfer in each zone of the project.



Coordinating institution

University of Thessaly, - PU

UNIVERSITY OF THESSALY

Scientific Coordinator:
PETROPOULOS, Spyridon

Expected impacts

The exploitation of WEPs in innovative farming systems,
The compilation of best practice guides regarding the cultivation of WEPs,
The improvement of soil quality in small scale farms,
The adaptation of small-scale farming sector to the ongoing climate change with the adoption of alternative/complementary crops,
The documentation of nutritional and chemical composition of WEPs,
The definitive evaluation of the environmental footprint, climatic and soil requirements of WEPs under small-farm scale cultivation,
The demonstration and sharing of the created innovation with on-farm activities and the establishment of physical and living labs.
The whole spectrum of technology readiness level (TRL) is covered, from TRL-1 (Basic principles observed) to TRL-6 (Technology demonstrated in relevant environment).

Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

704.000 €

Duration

36 months

Coordinating country

Spain

Participating countries/ 5

Research Units/ 7

Project 20/ Section II

BIOFRESHCLOUD

Enhancing Mediterranean Fresh Produce Shelf-life using Sustainable Preservative Technologies and communicating knowledge on dynamic shelf-life using Food Cloud Services and Predictive Modelling

Context

The agri-food sector is key in the development of the Mediterranean region providing employment and economic-social benefits to the region. At the same time, it is also the main threat for its sustainability due to the high consumption and use of rural resources. The vegetable sector is the one connected to the largest amount of food losses, as reported by several surveys and scientific studies across Europe. The current challenges in the Mediterranean vegetable chain in relation to the reduction of food losses and optimal shelf-life will be addressed based on a multidisciplinary approach applying Predictive modelling, Food Cloud computing and natural preservatives, obtained from agri-food residues, focusing on the control of temperature, (pathogenic and spoilage) microbial proliferation and sensory deterioration. BIOFRESHCLOUD is aimed to increase Technology Readiness Level (TRL) of the bio-based technologies from 3 to 5, and for the digital technologies and predictive tools from TRL 4 to TRL 6.

Objectives

The proposal aims to develop an integrated, innovative, and eco-friendly approach to assess optimal shelf-life and minimize food losses of strawberries and tomatoes produced in the Mediterranean region, by combining food bio-preservation technologies, food modelling, and Food Cloud tools.

Expected impacts

BIOFRESHCLOUD outcome is expected to foster:
1) The valorisation of agri-food residues from the harvest-to-fork chain of tomato and strawberry by generating new biomaterial and biocompounds for application in active packaging systems. This technology is expected to create new business activities (niches) with a significant economic impact, bringing both environmental and economic benefits to the vegetable SME.
2) Improved food chain sustainability of tomato and strawberry products using

Coordinating institution

Univarsidad de Cordoba - PU

UNIVERSIDAD D CÓRDOBA

Scientific Coordinator:
PEREZ-RODRIGUEZ, Fernando

the concept of dynamic shelf-life developed in BIOFRESHCLOUD. This innovative tool is expected to impact agri-food process providing a new way of managing shelf-life of fruits and vegetable that do not have a Best-by date established by considering remaining shelf-life in the format of the Best-by date or an internal Sell-by date for goods.

3) Moving the Mediterranean food business to more efficient local and transnational logistics to minimize food loss and waste based on the use of Food Cloud technologies.

4) Extending tomato and strawberry shelf-life, by improving sensory and microbial stability, based on eco-friendly and natural preservation technologies.

5) Minimizing the water and carbon footprint of the tomato and strawberry distribution chains.

SPECIFIC OBJECTIVES

- Developing active and eco-friendly packaging systems from agri-food residues;
- Extending shelf-life of tomatoes and strawberry by using bio-protective cultures and bio-active compounds in combination with eco-friendly packaging systems
- Generating and validating mathematical models to predict microbial and sensory dynamics in the products, considering the impact of bio-active packaging systems and bio-protective cultures;
- Developing a cloud computing based systems for food transparency and dynamic shelf-life
- predictions to optimize logistic and retail and reduce food waste;

  Testing the BIOFRESHCLOUD solution in a real environment, involving food stakeholders from farm to fork.

Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

831.641 €

Duration

36 months

Coordinating country

Turkey

Participating countries/ 5

Research Units/ 10

Project 21/ Section II

BioProMedFood

Bio-protective cultures and bioactive extracts as sustainable combined strategies to improve the shelf-life of perishable Mediterranean food

Context

Global projections show that food demand will increase of 35% by 2030. In this perspective, waste reduction in production systems and supply chains through a valorisation of food by-products and/or a prolongation of food shelf life can become a global strategy to guarantee environmental sustainability of agro-food systems. Food safety is a recurrent concern for Mediterranean (Med) fresh and minimally processed products, often obtained in small-scale production. The development of sustainable approaches to assure safety quality and shelf life of fresh products are crucial aspects to pursue production efficiency assuring high food level and diet habits.

Objectives

BioProMedFood aims are to enhance safety and quality of Med perishable products through the exploitation of two innovative and sustainable approaches, evaluated individually and in combination: the use of compounds with antioxidant and antimicrobial potential and the application of bio-protective or functional microbial cultures. Bioactive natural compounds or bio-protective Lactic Acid Bacteria (LAB) strains will be studied to reduce microbiological risks and extend the shelf life in six Med foods (fresh or fermented pork sausages and fish products, aubergine and RTE fruit).

The first approach involves the extraction, purification and use of bioactive compounds from low cost sources, characterized by a great biodiversity potential such as olive, wine and berries by-products or wild-grown brown macro algae, using green technologies. These extracts will be combined both with consolidated strategies (MAP) and novel approaches, with their addition to active food packaging.

The second approach is aimed to valorise the biodiversity and genetic bacterial heritage represented by traditional meat products of Med area, isolating and

Coordinating institution

Çukurova Üniversitesi - PU

Scientific Coordinator:
ÖZOGUL, Fatih

selecting autochthonous LAB strains. These microbial resources will be tested in fresh food as bio-protective cultures or in traditional fermented meat products as starters due to their technological properties and providing an important tool to stabilize Med foods, reducing their safety risks.

Expected impacts

The application of new LAB cultures and natural bioactive compounds will provide new biotechnological tools to meet consumer demand for safe minimally processed products, reducing small-scale traditional production safety concerns and valorizing sustainable sources and by-products. The built-up of a meat fermenting bacteria collection will safeguard the recognisability and differentiation of traditional products, promoting their competitiveness.
The project multidisciplinary and multi-actor approaches will lead to sustainable strategies tested in laboratory environment (TRL3) and validated in relevant environment (TRL5) with the involvement of stakeholders and Med industries.

Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

1.282.397 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 6

Research Units/ 14

Project 22/ Section II

BiOrangePack

Smart and innovative packaging, post-harvest rot management and shipping of organic citrus fruit

Context

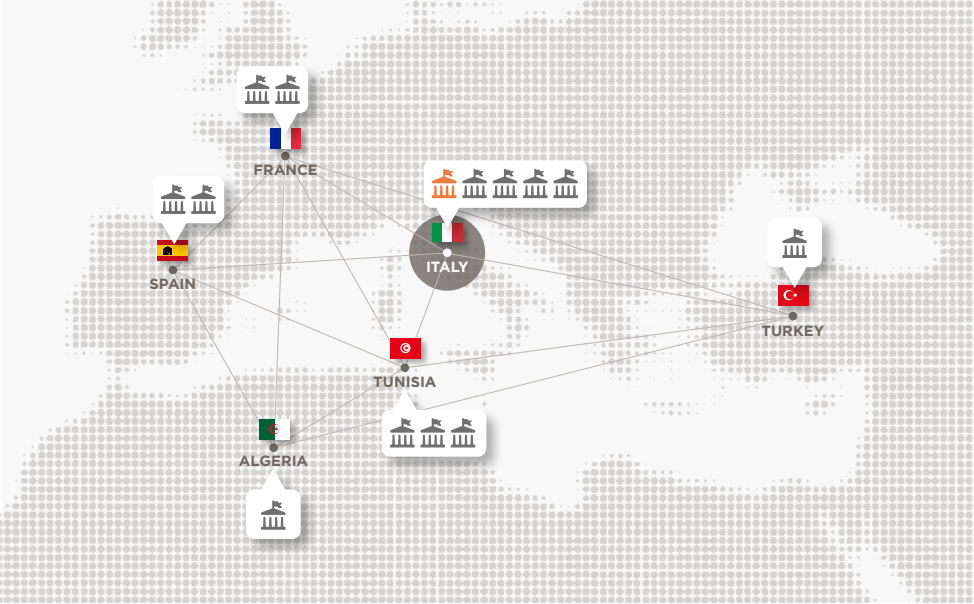
Quality standard, health of the consumers and a long shelf-life are fundamental aspects affecting the competitiveness of citrus fruits produced by Mediterranean countries on both domestic and international markets. Rots caused by fungi and bacteria are the main cause of post-harvest losses (average of 30%) of citrus fruits and may consistently reduce their shelf life. The presence of quarantine fungal pathogens can be a reason for rejecting imported fruits or an obstacle to their export. Some post-harvest fungal pathogens produce toxins that can also be found in juices and are therefore a concern for human health. Prevention of post-harvest rots of citrus fruits is usually carried out with synthetic fungicides; however, increasingly restrictive laws and regulations have reduced or prohibited the use of pesticides and promoted eco-friendly post-harvest fruit conservation techniques aimed at extending fruit shelf-life. The perishability of citrus fruit limits their international trade and long-distance transport and make the management of logistics a critical aspect of citrus trade. Logistics costs amount to about 30% of the total agri-food system. It is estimated that in the EU the average cost of transport of citrus fruits is 0.10-0.15 €/kg. An important issue in the citrus supply chain is the expansion of fresh citrus fruit trade to distant markets like China and the consequent extension of shipping times of up to 45-50 days.

Objectives

The overall objective of the project is to increase the efficiency, sustainability and competitiveness of the organic citrus fruit post-harvest supply chain by addressing the weaknesses and unresolved problems.

Expected impacts

Biocidal substances and innovative diagnostics: (a) non-toxic anti-fungal substances and smart bio-products to reduce losses caused by fruit rots from 30 to 0.5%,



Coordinating institution

Università degli Studi di Catania - PU

Scientific Coordinator:
CACCIOLA, Santa Olga

extend the shelf-life of oranges to 45-50 days, prevent the presence of mycotoxins in organic citrus fruits and juices; (b) practical and low-cost diagnostic kits. Green & Smart packaging: a new type of packaging for shipping (Citrus pack), based on biocides that can be registered for post-harvest treatment of organic fruits. Biocide coating made from citrus pulp is a virtuous example of circular green economy; it could add value to organic citrus fruit in niche markets of EU countries and help the organic citrus fruit market in Europe to expand from the current 15% to 25% and retail prices of organic citrus fruits to increase by 30%. ICT-based logistics: (a) implementation of a multisensory system for the detection of rotten fruit during transport (Citrus e-nose); (b) prototype of a navigation platform (Citrus navigator), which aims to minimise fruit losses due to rots by optimising delivery times and routes (20% increase in shipment efficiency and exclusion of complaints or cuts by GDO).

SPECIFIC OBJECTIVES

- Reduction of losses caused by post-harvest rots during storage and transportation;
- Raising of the quality standards of fresh fruits and juice and excluding fruits not complying with EU and EPPO phytopathological and toxicological standards;
- Extension of the shelf-life of fresh fruit using biodegradable active biocoating and smart packaging;
- Smart technologies (ICT-based technologies and machine learning techniques) to reduce shipping times and optimize the delivery of fruits to the targeted markets;
- Minimizing the waste of the industrial fruit transformation by recycling and exploiting the most of citrus pulp.

Rots caused by fungi and bacteria

Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

905.000 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 5

Research Units/ 9

Project 23/ Section II

FEDKITO

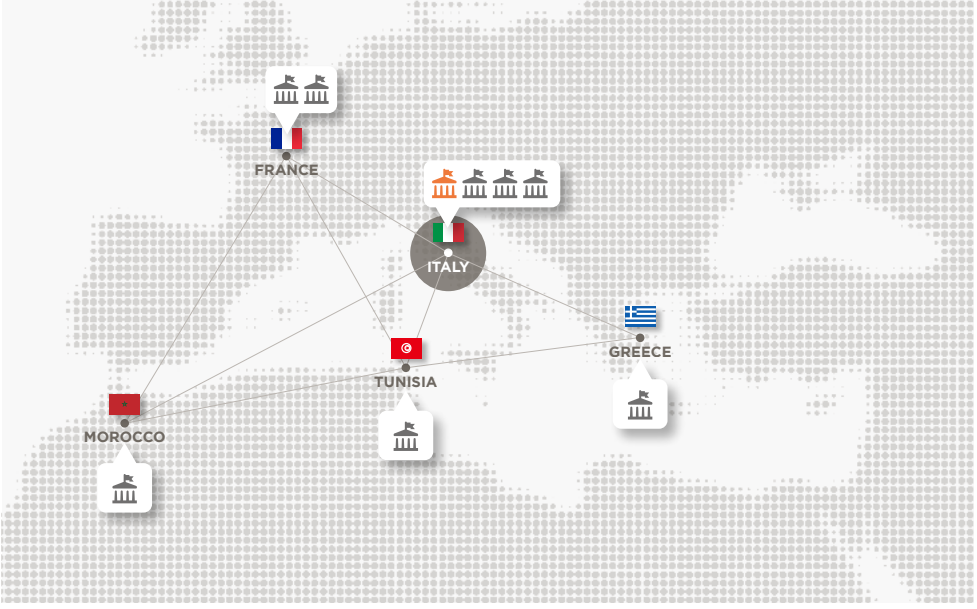
FrEsh FooD sustainable packaging in the clrcular ecOnomy

Context

Fresh Food (FF), such as fruits, vegetables, meat and dairy products, is highly susceptible to spoilage during harvesting, post-farming, and storage. Every year, the 15 to 50% of the worldwide produced FF is lost because of mechanical damages, fungal pathogens contamination, insect pests attack, and oxidation of unsaturated fatty acids. The lack of adequate hygienic conditions and transportation, storage, and logistics technologies affects the quality and the shelf life of FF. All the biological threats not only reduce the market value of food but also expose consumers to the risk of ingestion of toxic metabolites, mycotoxins included.

Objectives

FEDKITO intends to develop innovative strategies for the control of insects and fungi at the post-harvest and storage stages. The insect key species include Ceratitis capitata (Diptera Tephritidae) for fresh fruits, Spodoptera littoralis (Lepidoptera Noctuidae) for vegetables, Calliphora vomitoria and Lucilia sericata (Diptera Calliphoridae) for meat, and Piophila casei (Diptera Piophilidae) for dairy products. The target fungal pathogens are Penicillum spp., causal agents of blue and green moulds, and in particular the mycotoxin-producer P. expansum. The solution proposed by FEDKITO is to create innovative packaging materials using chitosan (CHT), an edible and biodegradable polymer derived from chitin deacetylation, alone or aromatized with essential oils (EOs) extracted from aromatic plants. The smart active packages will be also improved by low-cost electrochemical paper-based nanobiosensors. They will monitor the presence of mycotoxins and chemical residues and constantly check the food quality characteristics during storage and distribution. This innovative technology will establish new protocols for FF processing, storage and trading, to promote food security and waste reduction. Also, to pursue the circular economy criteria, CHT used within FEDKITO will be obtained starting from the chitin-rich pupae and larvae of the black soldier fly, Hermetia illucens (Diptera Stratiomyidae). The fly will be massively reared on



Coordinating institution

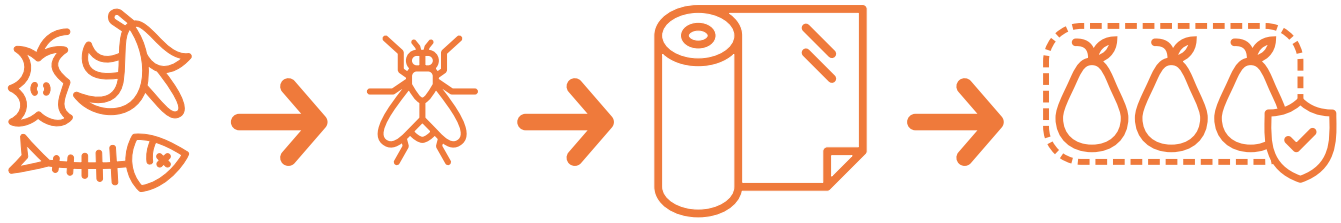
Università di Pisa - PU

Scientific Coordinator:
CONTI, Barbara

FF by-products and waste resulting from the selection of tradable products.

Expected impacts

FEDKITO aims to improve the Green Management of the target species of insects and fungi that attack FF in post-farming, considerably reducing the use of chemicals. The active smart packaging and biosensors developed within the project will improve processing and storing efficacy and efficiency, to give FF a longer shelf life, microbial stability and real-time control of the level of potential contaminants. The information obtained by the biosensors will contribute to the planning and optimization of transportation and storage. The recycling of by-products operated by the fly H. illucens will reduce the amount of FF waste from farms and industries, also adding value to the by-products themselves thanks to the production of CHT. The impact of all the new technical solutions on the nutritional and sensory attributes of FF will be evaluated.
The overall Technology Readiness Level (TRL) of the project is classified as “From idea to application”, 2-6. The initial TRL of CHT production from insects is 2 and the expected is 5; the CHT film production is estimated to grow from 3 to 5, the smart packaging from 4 to 5/6, the aromatized CHT from 4 to 5, and the nanobiosensors from 3/4 to 5/6.



FRESH FOOD WASTE
from farms and industries

CHITOSAN
from larvae
of the black soldier fly

BIODEGRADABLE POLYMER
derived from chitin deacetylation
aromatized with essential oils

INNOVATIVE PACKAGING
for food security

Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

1.220.000 €

Duration

36 months

Coordinating country

Greece

Participating countries/ 6

Research Units/ 8

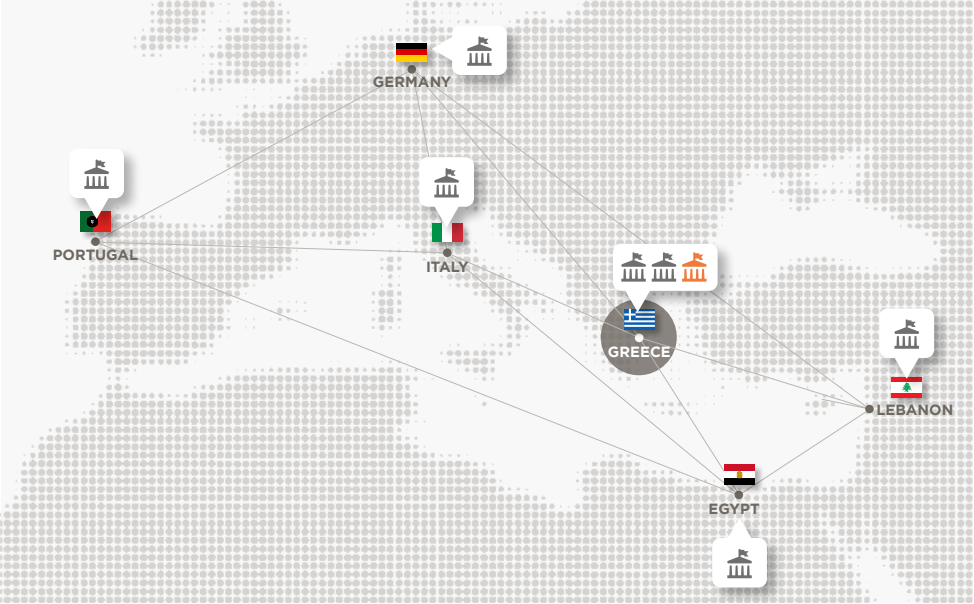
Project 24/ Section II

FRUALGAE

Sustainable technologies and methodologies to improve quality and extend product shelf life in the Mediterranean agro-food supply chain

Context

The FRUALGAE project has a triple helix conformation as there are three core strands that are interlinked, namely: 1) to reduce loss and waste in the agro-food value chain, 2) to improve water management and 3) to build capacity at multiple levels. Context-adapted solutions will be developed to reduce post-farming food loss and waste by extending the shelf life of high-value Mediterranean food products. The project targets technologies, which include, i) to develop a cost-effective and efficient microalgae culture system using greenhouse waste water, ii) to extend the post-harvest quality and shelf life, iii) to develop quality and authenticity monitoring tools, iv) to reduce waste by applying non-plastic, biodegradable packaging solutions based on agricultural by-products, v) to assess the sustainability of the new packaging solution in comparison to commonly used food packaging and vi) to integrate Information and Communication Technologies (ICT) in cold-chain control using low-cost, innovative Time Temperature Integrators (TTI) and to develop a freshness biosensor to test and implement horizontal and vertical tools, with the ultimate goal to deliver overall, improved sustainability of the agro-food value chain. Ready-to-eat fresh-cut tomatoes and leafy vegetables will be the target food products. The technologies developed will also be applicable to other fruit and vegetable products, and this will broaden the scope and impact (medium and long-term) of the project. In addition, the designed packaging technologies may serve as potential protective tools with antimicrobial and/or antioxidant actions applicable perishable products other than fruits and vegetables, such as meat, fish and dairy products.
The project is a nexus between two PRIMA-SRIA priorities, 1) the agro-food value chain (reducing, minimizing and recycling) and 2) management of water by integrating an innovative solution, microalgae production, using one of the most problematic by-products of hydroponic cultures, nutrient and mineral rich effluent water. Hydroponic greenhouse culture is popular for tomatoes and soft fruits and is expanding to other Mediterranean crops. “Proof of concept” for water recycle,



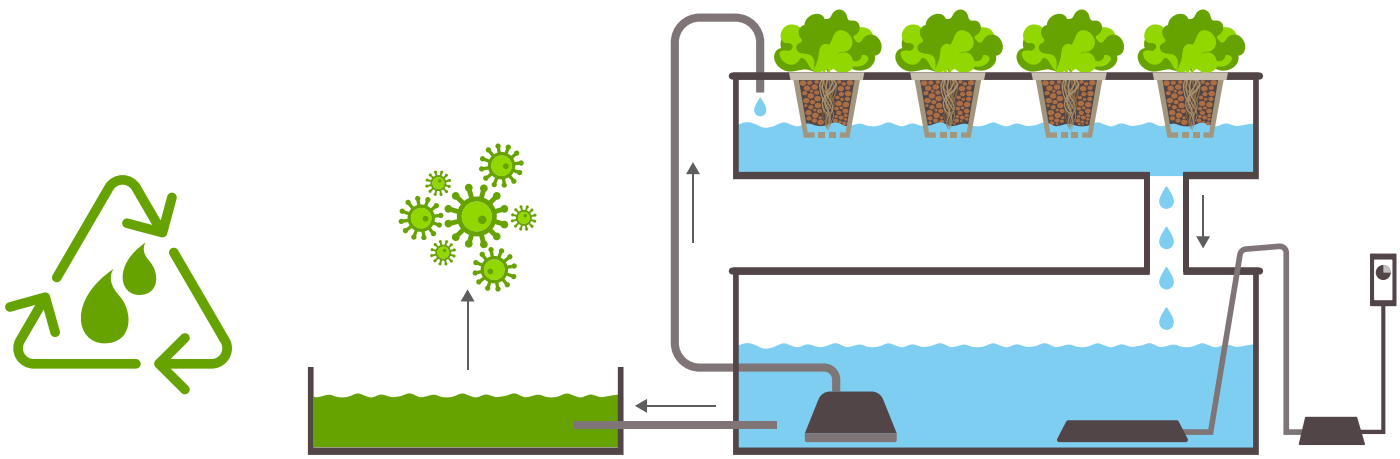
Coordinating institution

Agricultural University of Athens - PU

ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
AGRICULTURAL UNIVERSITY OF ATHENS

Scientific Coordinator:
FLEMETAKIS, Emmanouil

will be established using microalgae and the well-established tomato culture regime. The high value microalgae biomass will be used for the development of new biotechnological products and applications targeted towards the food industry (antioxidants and other bioactive molecules and enzymes). The long-term ambition will be to move the microalgal water recycling concept to demonstration scale in follow-up projects/actions.



Thematic area

Agro-food Value Chain

Section II

Topic - Use and management of biodiversity as a major lever of sustainability in farming systems

Budget

703.600 €

Duration

36 months

Coordinating country

Spain

Participating countries/ 5

Research Units/ 5

Project 25/ Section II

GreenPalm

Development of sustainable date palm-based agro systems by preserving their biodiversity

Context

Date palm has long been one of the most important fruit crops for south Mediterranean countries, where dates are the main income source and staple food for some Mediterranean local populations. Algeria and Tunisia are among the major Mediterranean date producers. However, this fruit crop is currently in danger due to several constraints, such as genetic erosion due to the predominance of the elite cultivar Deglet Noor in modern plantations, anthropogenic spread of disease and pests, and drastic climatic conditions (drought, temperature etc.).

Objectives

The main objective of this proposal is to conserve the biodiversity and improve the sustainability of Mediterranean date-palm agrosystems by genetic, microbiological and technological approaches.
GreenPalm focuses not only on conservation of genetic diversity of date palm cultivars with high added value, but also considers underexploited and neglected cultivars with culinary, cosmetics or medicinal roles.

Expected impacts

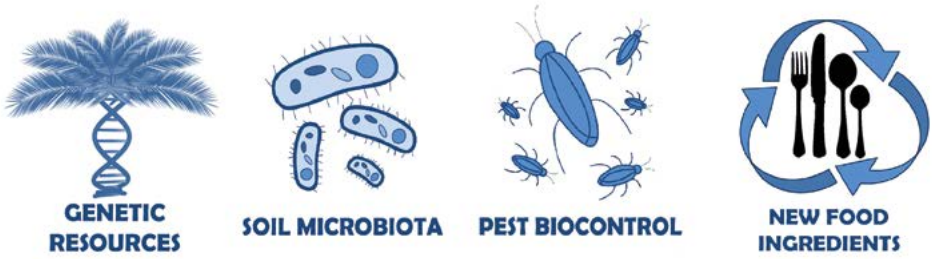
The main beneficiaries of this project must be the agrarian communities growing date palms of Mediterranean countries.
The Database on Genetic Biodiversity of the Palm Agro-ecosystems of the selected oases will be available for local, regional and national administration, and will allow them to plan new date palm plantations adapted to adverse weather conditions and produce higher quality dates.
GreenPalm will provide a comprehensive view of microbial communities driving the biological functioning and diseases for enhancing soil sustainability. It will thus contribute to define new agricultural practices aiming at improving productivity in line with environmental policies as well as providing economic alterna-

Coordinating institution

Consejo Superior de Investigaciones Científicas CSIC - PU

Instituto de la Grasa, ACSIC
Scientific Coordinator:
GUILLEN-BEJARANO, RAFAEL

tives with added value for south Mediterranean countries.
In relation to the circular economy, GreenPalm proposes the valorization of palm byproducts as a source of new food ingredients and phytosanitaries, taking advantage of the tons of waste annually produced from the date palm cultivation. This technology, nowadays at TRL 3, will reach TRL 6 at the end of the project. It will provide tailored information on good agricultural and sustainable practices by means of product specification sheets, new products catalogue and soil management protocols. All this will be transferred to different stakeholders by means of formation activities.



SPECIFIC OBJECTIVES

- To make a screening of P. dactilyfera varieties in southern Mediterranean basin in order to genetically describe the biodiversity of these endangered agro ecosystems.
- To study the palm tree rhizosphere and phyllosphere in order to develop and optimize pest and disease bio-control methods that contribute to agricultural sustainability.
- To obtain high value-added compounds useful as biocontrol agents and food ingredients to improve the socio-economic level of local population.
- Transfer of knowledge generated in the project, by implementation of good farming practices that are easily applicable and economically viable in date palm production areas.

Thematic area

Agro-food Value Chain

Section II

Topic - Enhancing horizontal and vertical integration in Mediterranean agro-food value-chains

Budget

1.112.512 €

Duration

36 months

Coordinating country

Egypt

Participating countries/ 5

Research Units/ 6

Project 26/ Section II

MEDISMART

Mediterranean Citrus: innovative soft processing solutions for SMART (Sustainable, Mediterranean, Agronomically evolved, nutRitionally enriched, Traditional) products

Context

Agricultural residues management is considered to be a vital approach in order to accomplish resource conservation and to maintain the quality of the environment. Concept of green chemistry is extended worldwide, in the last few years environment-friendly techniques have emerged as an alternative to the traditional methods. Citrus is one of the most widely cultivated fruit crops and one of the main agro-food products in the Mediterranean area. Citrus peels, if treated as waste materials, can create environmental problems. This problem could be turned into an advantage, if potentially marketable by-products can be extracted and valorized in several added-value ingredients (e.g. pectin).

Objectives

Citrus pectin is an essentially linear polysaccharide, it is both polydisperse and polymolecular and its composition varies with the source and the conditions applied during isolation. As a natural food additive, it is used extensively in the food industry, valuable functional ingredient for food. The Mediterranean region is particularly susceptible to the detrimental impacts of water scarcity and drought. It has direct impacts on economic sectors that use and depend on water, i.e., agriculture, tourism, industry, energy and transport. One of the most important targets of the project to achieve the sustainability is the use of the hydrogels which prepared from citrus by produts as soil improver to increase the water-holding capacity and/or nutrient retention of sandy soils.

Expected impacts

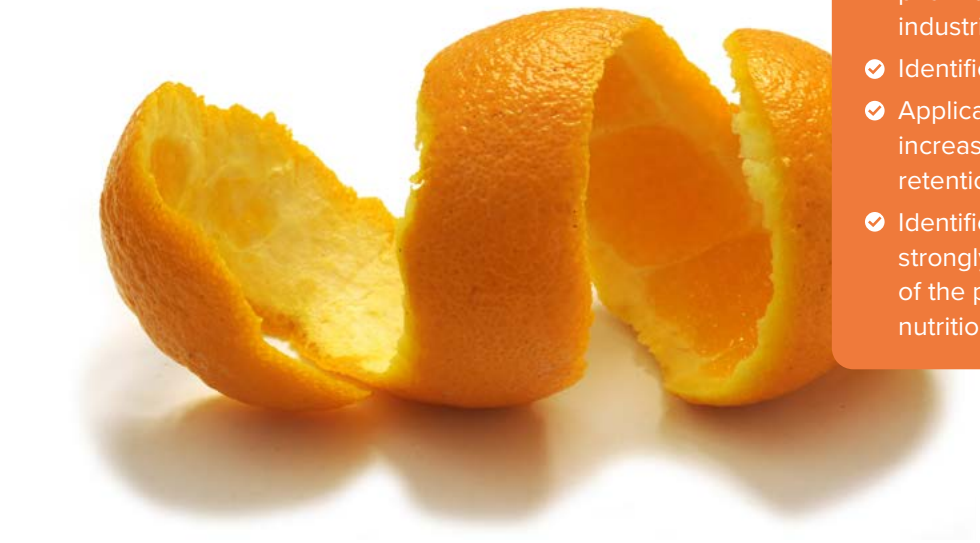
The new products will create a new market, characterized by a different perception of the product and they exert leverage for the whole sector of fresh and processed fruit.
Using pilot scale and semi-industrial plants, the effectiveness of innovative

Coordinating institution

National Research Center, NRC - REC

Scientific Coordinator:
ELHABASHA, Elsayed

industrial processes, able to extend the range of traditional Mediterranean food products.
To create in mediterranean countries affordable and innovative strategies towards waste and byproduct reuse.
Disseminate the concept “citrus wastes may be seen no longer as a polluting agro-industrial residues but as a valuable natural raw material and adding value”.
To promote the use of healthy “clean label” with natural ingredients in agro-food industry.
To promote the use of healthy “clean label” ingredients in agro-food industry.
To transfer project know-how to farms and industry operators, in order to enable operators to apply the proposed processes and technologies at industrial scale.
To produce green pesticides, hydrogel NPK fertilizers and green fertilizers which will reduce the agriculture pollutants and improve the environment.
Establishment MEDISMART Foundation, will safeguard the MEDISMART project’s results beyond the funding period.



SPECIFIC OBJECTIVES

- Use of eco-friendly substances as an alternative to any chemicals in agricultural practices;
- Extraction and purification of some valuable compounds which can be used in agriculture, pharmaceutical, nutraceuticals, food and cosmetic industries;
- Identification of innovative packaging materials;
- Application of a hydrogel as soil improvers to increase the water-holding capacity and/or nutrient retention of sandy soils;
- Identification of innovative process technologies strongly preserving the naturalness and properties of the products raising final quality in terms of nutrition and sensory aspects: HPP, US.

Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

666.332 €

Duration

36 months

Coordinating country

Portugal

Participating countries/ 4

Research Units/ 5

Project 27/ Section II

Nano4Fresh

Nanomaterials for an environmentally friendly and sustainable handling of perishable products

Context

The large part of fresh products in the UE are produced in Mediterranean countries due to their favourable climatology. Thus, the economic, environmental and social impact of agriculture and the derived agri-food sectors have a strong importance in many areas of these countries that depend on the export of agri-food products to different EU countries, North Africa and America. The problem is that many of these products are perishable. Basically, products classified as climacteric (e.g., tomatoes, avocados, pears and apples) present a continuous postharvest ripening, that occurs evolving respiration gases and the production of Volatile Organic Compounds - VOCs like ethylene that works as a natural ripening hormone. This leads to undesirable and progressive ripening and senescence during the storage / transportation steps. The biochemical changes associated to ripening also causes physiological alterations (changes of colour, softening, decay, loss of firmness and crunch, rind breakdown, internal disorders and finally putrefaction) not allowing its commercialization and leading to significant economic loss and waste generation. Therefore, one of the main challenges in the agri-food chain is the optimization of perishable products handling for maximizing their freshness, organoleptic characteristics, quality, and shelf life allowing extension of post-harvest life and transportation to new markets.

Objectives

Nano4fresh aims to extend the shelf-life of perishable products, reducing post-harvest chemical treatments, food losses and wastes.
This will be achieved by developing nanomaterials (carbons, zeolites, MOFs and PCPs) with innovative and versatile characteristics, in terms of adsorption, catalytic photoactivity and antibacterial/fungi performances, to surpass the current state-of-the-art approaches for prevention of the ripening processes of food products.
In practical terms, novel filters and photoreactors will be developed and opti-

Coordinating institution

Universidade de Lisboa - PU

Instituto Superior Técnico, IST
Scientific Coordinator:
RIBEIRO, Filipa

mised for the storage (atmosphere control) during the ripening process. This approach comprises the ethylene removal, both during long storage, transportation and at the retail stores, leading to eradicate the use of chemicals as a post-harvest strategy to prevent the ripening process. The developed technology will be tested, and the performances validated in a laboratory-controlled and real-life environment to supply fruit quality parameters (colour, compactness, sugar content, enzymatic activity) in the presence and absence of developed devices.

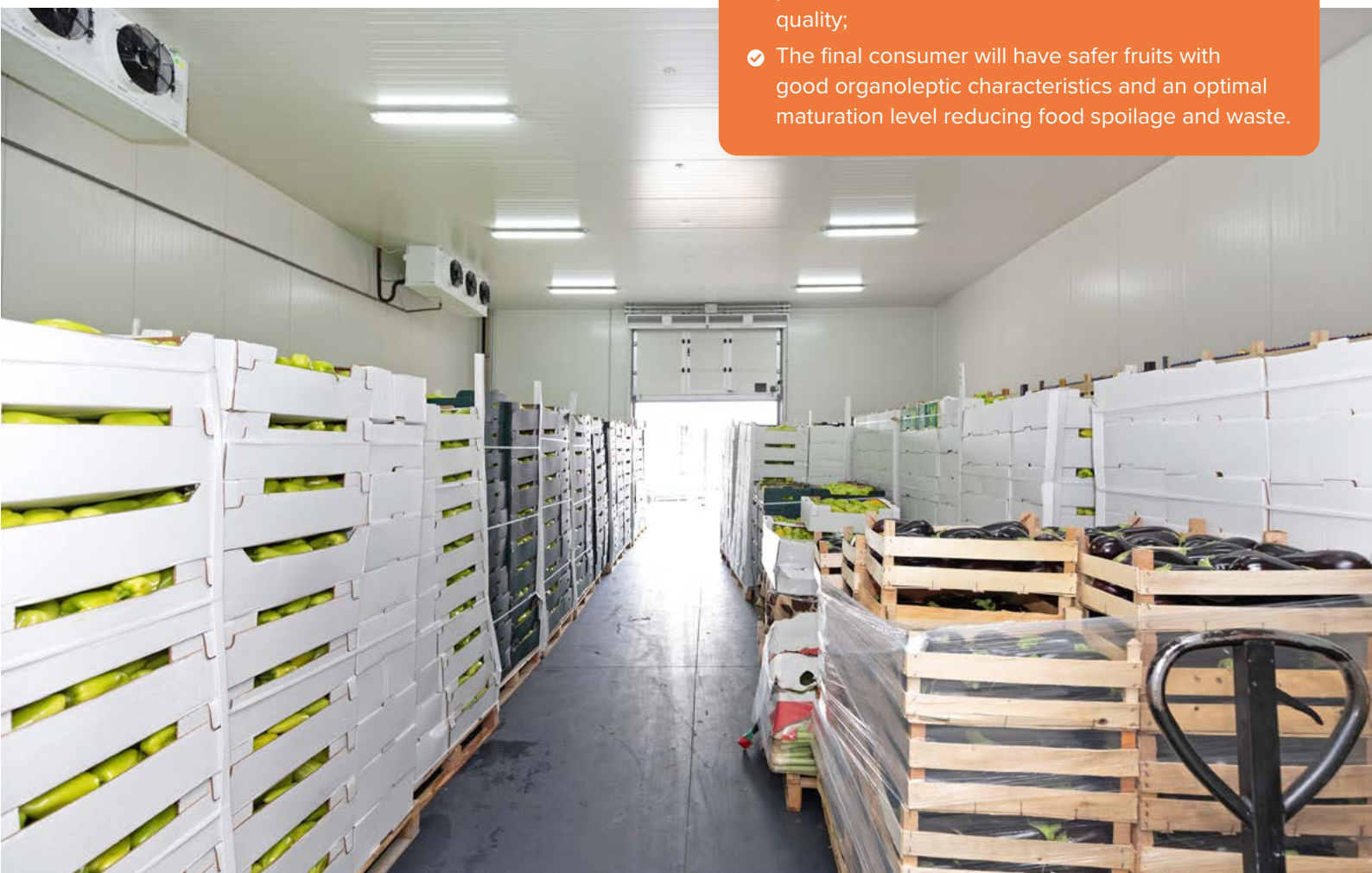
Expected impacts

Nano4Fresh targets to increase the shelf-life of the fruit by removing harmful/toxic substances (e.g., ethylene inhibitors and antibacterial/antifungic) during the transport and storage period. All the actors engaged in the Agri-food value chain will benefit and the society will earn in terms of food safety and reduction of harmful substances both for health and the environment. Moreover, reducing food waste also constitute economic benefits that contribute to the increase of sustainability.

This project presents an innovative and interdisciplinary working plan based on the experience of the Agri-food companies (stakeholder knowledge) regarding the necessity to improve the performances of actual devices and the optimization of the handling processes. The project will start at a TRL 3 and has potential to reach TRL 5-6.

SPECIFIC BENEFITS

- The producer will earn by reducing the quantity of goods returned and local waste during collection, storage and transportation and by a greater appreciation of these products by the final consumers;
- The retailer will have positive economic benefits since the storage periods are lower and therefore products available are fresher and with more quality;
- The final consumer will have safer fruits with good organoleptic characteristics and an optimal maturation level reducing food spoilage and waste.



Thematic area

Agro-food Value Chain

Section II

Topic - Enhancing horizontal and vertical integration in Mediterranean agro-food value-chains

Budget

912.689 €

Duration

36 months

Coordinating country

Portugal

Participating countries/ 6

Research Units/ 9

Project 28/ Section II

PulpIng

Development of Pumpkin Pulp Formulation using a Sustainable Integrated Strategy

Context

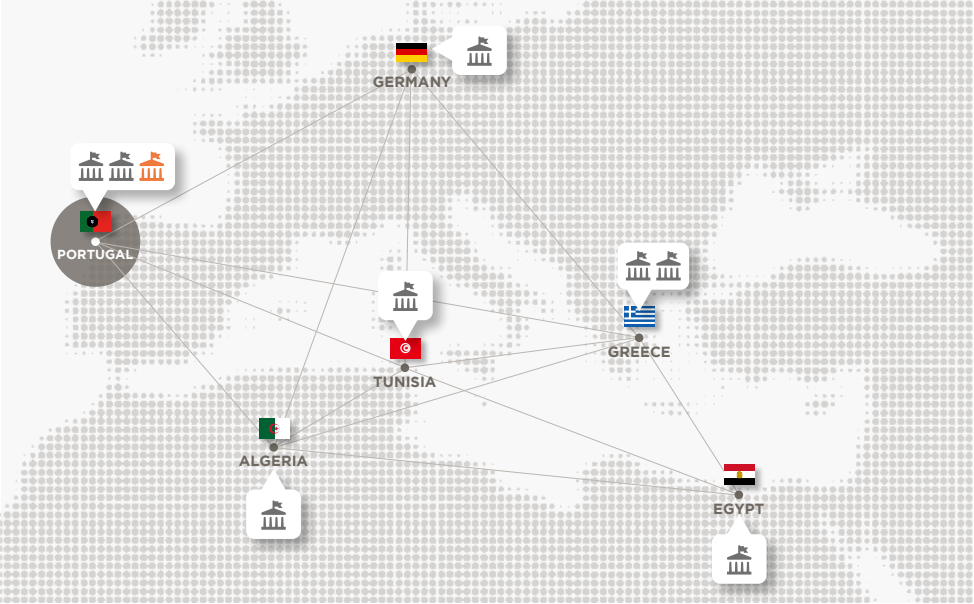
PulpIng intends to stimulate and improve the sustainable valorisation of pumpkin in African and European countries in an integrative and waste-free manner. The agronomic performance of pumpkins will be improved based on sustainable farming tools and the plant as a whole will be used, in a circular economy point of view. The chemical and nutritional profiles of the pumpkin fruit will be analysed, and further transformed into a pulp product targeting African and European markets. Besides, pumpkin by-products (rind and seeds) are to be screened for molecules with preservative potential and tested as food preservatives in the pumpkin pulp.

Objectives

The successful development of the proposed project will be achieved through multidisciplinary research activities divided into the specific objectives.

Expected impacts

The implementation of PulpIng will attend current and future societal needs, especially in the Mediterranean region. Several outcomes and deliverables are expected through its implementation, including:
a) optimized protocols for pumpkin cultivation; b) reports on the chemical composition, antioxidant and antimicrobial properties of pumpkin fruit pulp and by-products; c) optimized protocols for extraction, refinement, and stabilization of preservative compounds from pumpkin by-products; d) reports on the nutritional composition and antioxidant properties of the developed pumpkin fruit pulp formulation; e) Life cycle assessment for different scenarios; f) scientific publications and conference proceedings, press releases, press kits, newsletters, TV and radio communication publicity; g) patents; h) novel, shelf-stable pumpkin fruit pulp preserved with natural ingredients.



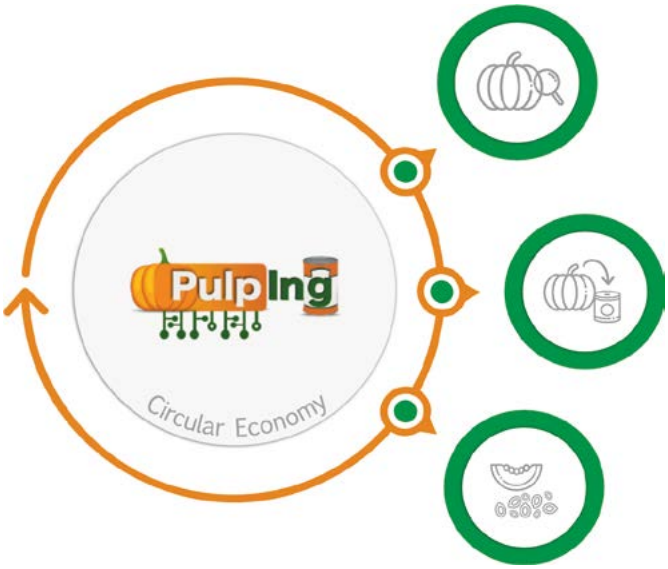
Coordinating institution

Instituto Politécnico de Bragança, IPB - PU

Scientific Coordinator:
BARROS, Lillian

SPECIFIC OBJECTIVES

- Improve cultivation and integrated farming techniques for pumpkin;
- Develop innovative, sustainable and industrially feasible methods to extract high added-value ingredients with effective preserving capacity;
- Identify and isolate natural preservatives from pumpkin by-products;
- Implement sustainable and easy-to-perform techniques to obtain bio-based preservatives;
- Develop a novel pumpkin fruit pulp formulation functionalised with the isolated natural preservatives;
- Develop/optimise non-thermal processing methods based on innovative technologies, which ensure food quality and safety;
- Carry out an optimised approach to enhance the shelf-life of pumpkin fruit pulp formulation;
- Optimise waste/wastewater management and perform a life-cycle assessment.



Thematic area

Agro-food Value Chain

Section II

Topic - Extending shelf-life of perishable Mediterranean food products

Budget

1.009.017 €

Duration

36 months

Coordinating country

Italy

Participating countries/ 5

Research Units/ 11

Project 29/ Section II

StopMedWaste

Innovative Sustainable technologies TO extend the shelf-life of Perishable MEDiterranean fresh fruit, vegetables and aromatic plants and to reduce WASTE

Context

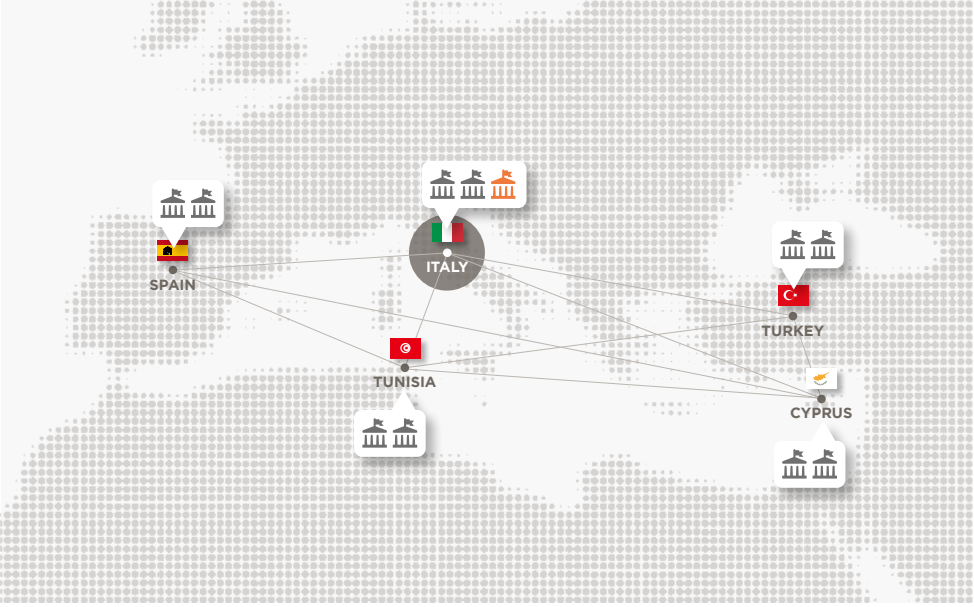
Postharvest losses of fruit, vegetables and aromatic plants have high economic impact in the Mediterranean area, and contribute to food waste. One of the United Nations Priorities, the ZeroHunger Challenge, consists of cutting food waste by half by 2030, as adopted by European Parliament in May 2017. In the EU, every year, food waste amounts to 88 million tonnes, as 173 kg/person, for an emission of 170 million tons of carbon dioxide. This waste occurs from the field to the consumer, and thus innovative sustainable technologies are needed to extend the shelf-life of perishable Mediterranean fresh fruit, vegetables, and aromatic plants.

Objectives

The overall objective of StopMedWaste is to preserve perishable Mediterranean fresh fruit, vegetables and aromatic plants through innovative strategies that are safe for consumers, to reduce waste of agricultural products, and at the same time to minimise or reduce the application of synthetic pesticides. Project StopMedWaste aims to extend the shelf-life of this produce by applying physical means (gaseous ozone, ozonated water, electrolysed water), natural compounds (chitosan, essential oils, antifungal edible coatings [AECs]) and biocontrol agents.

Expected impacts

The StopMedWaste Project results will contribute to PRIMA Operational Objective 7/ REDUCE LOSSES AND WASTES. This will be achieved through the application of innovative and sustainable physical means, natural compounds and biocontrol agents, which will have economic, environmental and social impacts. Smart packaging will be developed for visual demonstration of the quality of fresh fruit, vegetables and aromatic plants for the consumer.
The life-cycle assessment of these technologies will be monitored to define their



Coordinating institution

Università Politecnica delle Marche - PU

UNIVERSITÀ POLITECNICA DELLE MARCHE

Scientific Coordinator:
ROMANAZZI, Gianfranco

sustainability. Moreover, logistic solutions and ICT devices with remote control will monitor environmental conditions during storage and transportation. Training activities for operators will be organised and dissemination will be performed to share gained experiences and best practices among players and stakeholders through the whole supply chain, including consumers. Project StopMedWaste includes a multi-actor approach, with skills from researchers to companies involved in processing, storage and transportation, to move from production to consumer, following the properties of the produce under simulated and commercial retailer conditions. In this context, the sustainability of food chains will be improved using alternative processes to synthetic fungicides to preserve the quality and safety of fresh Mediterranean perishable fruit, vegetables and aromatic plants.

Thematic area

Agro-food Value Chain

Section II

Topic - Enhancing horizontal and vertical integration in Mediterranean agro-food value-chains

Budget

814.220 €

Duration

36 months

Coordinating country

Spain

Participating countries/ 6

Research Units/ 10

Project 30/ Section II

WildFood

Eating the wild: improving the value chain of Mediterranean Wild Food Products (WFP)

Context

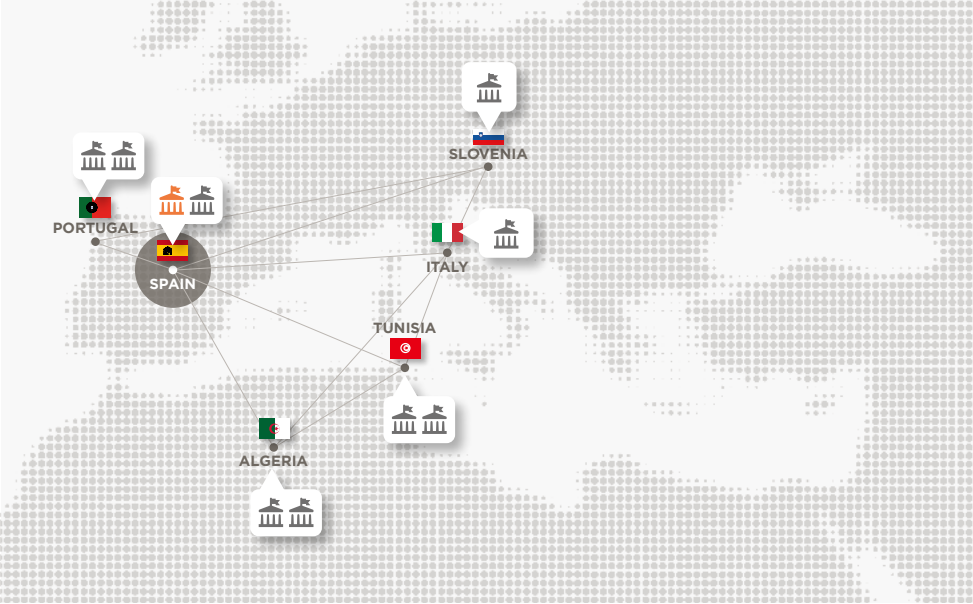
Mediterranean wild and semi-wild food products (WFP) have unique and exclusive properties which are strongly connected to the local economies, rural livelihoods, provision of ecosystem services, biodiversity conservation, traditional knowledge, territorial identity, gastronomy and other cultural values. A significant share of local population at both sides of the Mediterranean harvest and consume WFP, but their full commercial potential is yet to be unlocked. Moreover, WFP sector is mainly formed by small actors, especially the producers, who are disaggregated in rural areas and disconnected among them. Also, the interaction with other sectors is almost inexistent. In most cases their possibilities for innovation are low, thus affecting the quality and safety of the products and leading to unequal final incomes, basically with poor income for the primary stages actors.

Objectives

The overall aim of WildFood is to promote the implementation of joint innovative strategies by involving different actors of the WFP value-chain in the Mediterranean area, focusing on selected products (mushrooms, truffles, pine nuts & Aleppo pine seeds, aromatic plants, acorns and berries) in view of improving their quality and safety controls and sustainability.

Expected impacts

The expected impacts of the WildFood project are to support more sustainable Mediterranean economies and societies by developing and eventually adopting innovative and sustainable solutions for WFP value-chains. This includes seeking the potential socio-economic benefits that include an improved cooperation among actors and increased competitiveness of companies in both shores of the Mediterranean area. WildFood includes pilot projects and demonstration actions aimed at innovative traceability and control systems for quality, safety and sus-



Coordinating institution

Centre de Ciència i Tecnologia Forestal de Catalunya - PU

FOREST SCIENCES CENTRE OF CATALONIA

Scientific Coordinator:
PIQUE, Míriam

tainability in all value-chain stages which situates the project under the Technology Readiness Levels TRL 6: technology demonstrated in relevant environment and TRL 7: system prototype demonstration in operational environment.

SPECIFIC OBJECTIVES

- Analyse and compare the situation of the WFP value-chains and actors in Med PRIMA-communities and identify gaps between current knowledge and its practical implementation;
- Design and demonstrate innovative solutions for tackling the pressing challenges of the WFP value-chains in terms of quality and sustainability by exploring existing business models and control systems in all stages of the chain;
- Facilitate the market access of Med companies and increase the added value of local products by implementing innovative marketing strategies, targeted dissemination and outreach activities;
- Strengthen the integration among the main agro-food value-chains actors promoting partnerships and new models of mutual collaboration, as well as, social inclusion and entrepreneurial business culture;
- Facilitate the adoption of technological and organisational innovations by smallholders and SMEs through capacity building and targeted business support as well as interactive knowledge-exchange.

Achievement Dashboard
PRIMA 2018-19 Calls

83
Funded Projects
of which

35
Projects in PRIMA 2018 Calls

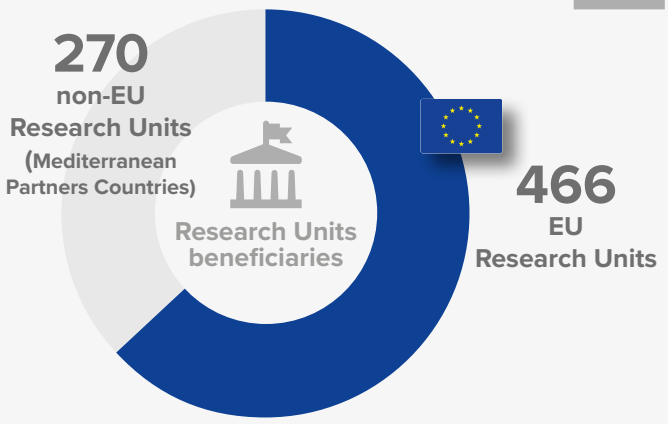
48
Projects in PRIMA 2019 Calls

22 35

23 3

Projects per Thematic area

736 Research Units



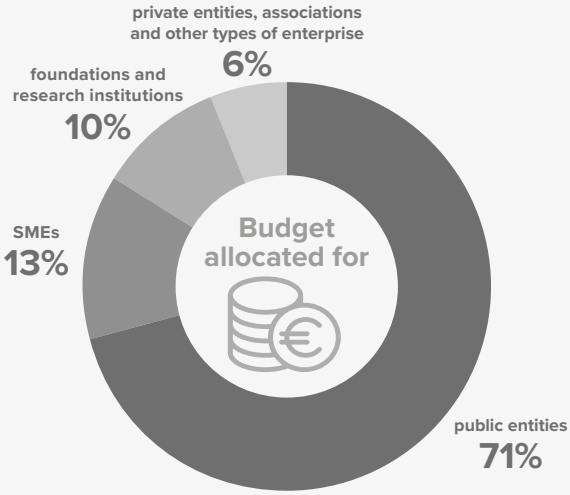
19
PRIMA Participating States
of which

11
EU States

8
non-EU States

+ 2 non Euro-Mediterranean Countries

100,5 M€
Budget



Budget for Actions

Overview 2018-2019

The Projects financed in the framework of PRIMA in the first two-year period 2018-2019 are in line with the **Strategic Research Innovation Agenda** (SRIA) approved in 2017. At the same time, they also contribute towards achieving and aligning to **UN Sustainable Development Goals**, as well as to the implementation of the recent European policies and objectives, as drafted in the **2019 European Green Deal**.

The Projects financed under the Partnership, through specific research and innovation activities, aim to guarantee **the sustainability of the Euro-Mediterranean ecosystems** and obtain, in the long term, **healthier and more inclusive societies** in a complex and challenging scenario. In fact, it is well known that some of the global challenges, including climate change, water scarcity, desertification, food safety, biodiversity loss, land degradation disproportionally affect the Mediterranean area. PRIMA Projects are indeed going in the direction of **providing solutions** to address these challenges.

In particular, both 2018 and 2019 projects focus on three thematic areas. In the **Water Management** area, the proposals have focused mainly on the *reuse of non-conventional water resources*, *innovative irrigation techniques and systems*, as well as the *management and exploitation of groundwater.* As for the **Farming Systems**, projects have developed ideas and solutions on key issues such as *adaptation to climate change*, *resilient agriculture and breeding*, *prevention and control of flora and fauna diseases*, *sustainable and diversified farming systems*. In the **Agro-Food Value Chain** sector, the emerging issues after the first two years of calls are the *valorisation of Mediterranean products* and *promotion of innovation in supply chains*, the issue of food *safety and traceability of production* as well as conservation of perishable foods and fight against *food waste*.

Interestingly, in all these areas, we are registering a **growing role of innovation** and consequently a closer proximity of project ideas and contents to the market and ultimately to **end users**' disposal. Moreover, all the 83 funded projects adopt a **multi-stakeholder approach**, trying to actively involve all interested parties. The impact that the Projects intend to produce on a **social and technological level** is therefore remarkable, ranging from the *adoption of managerial and digital innovation* to *greater profitability for the farmers*, from *more nutritious and healthy food* to *increased water availability and quality*. Significantly, in 2019, a fourth dimension was included, that of the **Nexus**, in response to the need to implement research and innovation projects able to explore and exploit the close interdependence between water, food and ecosystem.

The research *consortia*, which bring together staff, perspectives and expertise from different countries and backgrounds are key to create a **Mediterranean Innovation Community** in the water and agro-food sector, as well as to boost impactful research and innovative solutions. Targeted transformations and concrete innovations remain at the core of PRIMA mission and will result to be of great relevance also in the new European Framework.

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PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

Funded Projects 2019

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